Research Paper

Sustainable Entrepreneurship and Circularity: Stakeholder Collaboration in Textile SMEs in Indonesia

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Abstract

The textile industry is a significant contributor to environmental degradation, leading to an increasing emphasis on sustainable entrepreneurship and circular supply chains. This qualitative case study examines the experiences of textile-based SMEs in Indonesia who use shredded fabric from larger textile industries to create new fashion products. The urgency of this study lies in understanding the challenges faced by small- and medium-sized enterprises (SMEs) in textile-based circular supply chains, particularly in their collaboration with stakeholders. The in-depth interviews with five SME owners, two consumers, a supplier, a government official, and a CSO activist uncovered several critical challenges, including limited availability and access to shredded-fabric and inconsistent quality and quantity of the raw material, transforming the shredded-fabric into finished fashion products, reaching SMEs' target market and promoting their products effectively, and the management of small leftover fabric pieces from production, referred to as *"tatal."* The study proposes the following strategies to address the challenges: foster trust and transparency with suppliers, reactivate the joint business cooperative, work with government agencies and policymakers to establish customized support and regulatory structures, collaborate with government agencies and academic institutions, expand the market for tatal waste beyond the arts, and partner with the Department of the Environment to manage *tatal* waste. The findings contribute to the academic literature on sustainable entrepreneurship and provide practical insights for SMEs, policymakers, and industry stakeholders to enhance the circularity of textile supply chains.

Keywords: *Challenges, Circular Supply Chain; Stakeholder Collaboration; Sustainable Entrepreneurship; Textile SMEs*

INTRODUCTION

The textile industry is a major contributor to global environmental challenges and responsible for significant resource consumption, pollution, and waste production (Guillot, 2022). However, the industry is undergoing a shift towards more sustainable practices, with a growing emphasis on circular supply chains that minimize waste and maximize resource efficiency (Kazancoglu et al., 2020). Circular supply chains keep materials in use for as long as possible. Circular supply chains in the textile industry involve the reuse, recycling, and remanufacturing of materials to minimize waste and to keep resources in use for as long as possible (Jia et al., 2020). These circular approaches not only reduce environmental impact but also offer economic benefits because they can create new revenue streams and reduce reliance on virgin materials (Sandvik & Stubbs, 2019).

Small and medium-sized enterprises (SMEs) are often at the forefront of sustainable entrepreneurship because they are more agile, innovative, and responsive to changing market demands and environmental regulations (Chowdhury & Shumon, 2020). SMEs in the textile industry, in particular, have shown a growing interest in adopting sustainable practices, such as implementing circular supply chains, to reduce their environmental impact and create new revenue streams (Rizos et al., 2016). The textile industry has been exploring various circular supply chain practices, such as upcycling textile waste into new products, designing for disassembly and recyclability, and implementing take-back programs to collect and reuse garments at the end of their life cycle (Amaral et al., 2018; Coelho et al., 2020; Sandvik & Stubbs, 2019). These efforts

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transition the industry toward a more sustainable and resource-efficient model, addressing the growing concerns about textile waste and environmental degradation.

Although the potential benefits of circular supply chains are well-recognized, SMEs in the textile industry often face significant challenges in implementing and maximizing the circularity of their supply chains (Kazancoglu et al., 2022). These challenges can stem from a variety of factors, including the high cost of recycling technologies, limited resources, lack of technical knowledge, lack of consumer awareness, and difficulties in collaborating with stakeholders (Jia et al., 2020; Kazancoglu et al., 2022; Koszewska, 2018).

Effective stakeholder collaboration is crucial for SMEs in implementing circular supply chains because it allows them to access resources, knowledge, and expertise that they may lack internally (Abreu et al., 2021; Sandvik & Stubbs, 2019; Staicu & Pop, 2018). By collaborating with suppliers, customers, industry associations, and even competitors, SMEs can overcome barriers and develop innovative solutions to enhance the circularity of their operations (Staicu & Pop, 2018).

Previous studies have highlighted the importance of circular supply chains and the role of SMEs in the textile industry, as well as the challenges they face in implementing sustainable practices (Jia et al., 2020; Kazancoglu et al., 2022; Rizos et al., 2016). However, there is a paucity of research that specifically examines the collaboration-related challenges faced by textile-based SMEs in maintaining circular supply chains, particularly in the context of developing economies like Indonesia (Brydges, 2021; Sarasi et al., 2023). This study aims to contribute to the growing body of literature on sustainable entrepreneurship and circular supply chains in the textile industry, particularly in the context of SMEs in developing countries. It seeks to address a research gap by providing empirical insights into the specific challenges faced by these enterprises in collaborating with stakeholders to maximize circularity.

The findings of this study can provide valuable insights for textile-based SMEs seeking to transition to more circular business models. The proposed strategies can serve as a roadmap to help these enterprises overcome the collaboration-related hurdles they face and enhance the circularity of their operations.

LITERATURE REVIEW

Sustainable Enterpreneurship

Sustainable entrepreneurship is a multifaceted concept that goes beyond simply "greening" business practices (Haldar, 2019). It emphasizes the interconnectedness of economic, social, and environmental performance, often referred to as the "triple bottom line" or "people, planet, profit" (Belz & Binder, 2017). It is about creating businesses that are not only profitable but also socially responsible and environmentally sound (Sesini et al., 2020). It adopts a long-term perspective, recognizing that short-term gains at the expense of social or environmental well-being are ultimately unsustainable. It prioritizes intergenerational equity, ensuring that future generations inherit a healthy planet and thriving society (Belz & Binder, 2017; Hossain, 2021).

Sustainable entrepreneurs actively seek innovative solutions to social and environmental challenges, viewing them as opportunities for business growth and positive impact (Shahid et al., 2023). They challenged conventional business models and pioneered new approaches to production, consumption, and resource management (Chapin et al., 2022). It recognizes the importance of engaging with a broad range of stakeholders, including employees, customers, suppliers, communities, and policymakers. Collaboration and transparency are essential for building trust and creating shared value (Bashir et al., 2022).

Circular Supply Chain in Textile Industry

Circular supply chains in the textile industry involve the reuse, recycling, and remanufacturing of materials to minimize waste and to keep resources in use for as long as possible (Jia et al., 2020). These circular approaches not only reduce environmental impact but also offer economic benefits because they can create new revenue streams and reduce reliance on virgin materials (Koszewska, 2018).

The textile industry has been exploring various circular supply chain practices, such as upcycling textile waste into new products, designing for disassembly and recyclability, and implementing take-back programs to collect and reuse garments at the end of their life cycle (Aus et al., 2021; Jia et al., 2020; Koszewska, 2018). These efforts aim to transition the industry toward a more sustainable and resource-efficient model, addressing the growing concerns about textile waste and environmental degradation (Lawrence et al., 2023).

Stakeholder Collaboration in SMEs

Effective stakeholder collaboration is crucial for SMEs in implementing circular supply chains because it allows them to access resources, knowledge, and expertise that they may lack internally (Coscieme et al., 2022; Jia et al., 2020). By collaborating with suppliers, customers, industry associations, and even competitors, SMEs can overcome barriers such as limited financial resources and technical know-how and develop innovative solutions to enhance the circularity of their operations (Moore & Manring, 2009).

The literature on stakeholder collaboration in SME highlights the importance of developing strong, trust-based relationships with various stakeholders (Awan & Sroufe, 2022). This can be facilitated through the use of collaborative frameworks, such as the LCSP (Life Cycle Sustainability Partnership) model, which emphasizes mutual understanding, shared goals, and joint problem-solving among stakeholders (Remund & McKeever, 2018).

Challenges in Implementing Circular Supply Chains

The implementation of circular supply chains in the textile industry faces several general challenges, such as the high cost of recycling technologies, the lack of consumer awareness and demand for circular products, and the linear mindset that is deeply entrenched in the industry (Aus et al., 2021; Kazancoglu et al., 2020). These challenges can be particularly acute for SMEs, which often have limited resources and face greater barriers to adopting innovative practices.

In the textile industry, the circular supply chain model is further complicated by factors such as the complexity of textile materials, the difficulty in collecting and sorting used garments, and the lack of standardization and interoperability across the supply chain (Koszewska, 2018). These industry-specific challenges can make it particularly difficult for SMEs to collaborate effectively with stakeholders and maximize the circularity of their operations (Lawrence et al., 2023).

RESEARCH METHOD

To gain a deeper understanding of the collaboration-related challenges faced by textile-based SMEs in maintaining circular supply chains, a qualitative research approach was adopted for this study (Huang et al., 2021). The case study method was chosen as the most appropriate research design because it allows for an in-depth investigation of the phenomenon within a real-world context (Kazancoglu et al., 2022). Textile-based SMEs in Tingkir, Salatiga, Indonesia were selected as the focus of this case study because of their unique position within the circular supply chain. These enterprises use shredded fabric from larger textile industries to create new fashion products, demonstrating a commitment to sustainable entrepreneurship and circular practices. Additionally, Tingkir is known as a hub for textile-based SMEs in the region, making it an ideal location for

exploring the challenges and strategies employed by these businesses in collaboration with stakeholders to maximize the circular supply chain. The primary data collection method involved in-depth, semi-structured interviews with the owners and managers of selected textile-based SMEs in Tingkir, Salatiga. Ten interviews were conducted in January-February 2024, involving five SME owners, two consumers, a supplier, a government official, and a CSO activist. To complement the interview data, the researchers also conducted a thorough analysis of relevant documents, such as industry reports, government policies, and SMEs' internal records and reports. The data collected from the interviews and document analysis were analyzed using a thematic analysis approach. This method involves identifying recurring patterns and themes in the data, which were then coded and organized to reveal the key challenges faced by textile-based SMEs in collaborating with stakeholders to maintain a circular supply chain.

FINDINGS AND DISCUSSION

Tingkir, Salatiga has earned the nickname "Daerah Sentra Konveksi" (Textile Hub Area) because of the high concentration of residents engaged in textile-related enterprises, especially in Tingkir Lor and Tingkir Tengah Villages, Salatiga. An entrepreneur of Tingkir's textile industry narrated that in the 1990s, the biggest textile factory in Salatiga, PT. Daya Manunggal (Damatex and Timatex) released their remaining fabric for public purchase. These transactions were managed by designated individuals or traders who served as factory agents. Every week, approximately five to seven traders journey to Tingkir to sell unused factory fabric in sacks. The fabric was divided into two categories based on size -1m (less than one meter or <1m) and 1m+ (more than one meter or >1m). This influx of discarded textile materials from larger factories catalyzed the rise of cottage-style SMEs in Tingkir, as local residents recognized the opportunity to upcycle and repurpose waste into new fashion products. These textile-based SMEs have become an integral part of the local economy, with many families relying on income generated from their small-scale textile businesses. These textile SMEs not only provide employment opportunities but also contribute to the sustainability of the circular supply chain by innovatively repurposing textile waste.

The textile sector uses various raw materials such as fabric, yarn, cord, and stretchable materials. The initial phase includes processing the materials to manufacture the final products with added value, which leads to financial gains. In this manufacturing area, there is a primary emphasis on creating drawstring pants; however, this has now broadened to encompass nightgowns, pillow cases, bedspreads, koko shirts (Moslem men's shirts commonly used in Indonesia), coats robes swaddling garments along with aprons by utilizing excess fabrics from factories and clothing production. One entrepreneur who designs drawstring pants in Tingkir stated that there are currently around 10 small- and medium-sized manufacturing enterprises left that focus on producing this type of garment. In contrast, other entrepreneurs in the clothing industry have displayed a greater variety of products. This disparity is explained by the decrease in revenue due to the COVID-19 pandemic.

Circular Supply Chain of Textile SMEs in Tingkir, Salatiga

Generally, clothing entrepreneurs follow a production process that involves several stages such as raw material sourcing, pattern creation, sewing, product marketing, and using fabric scraps. The following provides an overview of multiple clothing manufacturers in Tingkir that adhere to the principles of the circular economy.

Sourcing Raw Materials

Sourcing raw materials is a critical step in the circular supply chain for textile-based SMEs (Kazancoglu et al., 2022). This involves finding and obtaining shredded-fabric from larger textile industries for use as raw material for fashion products. The challenges faced in this stage include

limited availability and access to shredded-fabric and inconsistent quality and quantity of the raw material.

The decrease in production at the Damatex Factory has led to a decline in the availability of patchwork raw materials for textile-based SMEs in Tingkir. This major textile factory in the city underwent significant job reductions, laying off hundreds of employees in 2017. With the reduction in the primary source of raw materials, SMEs have had to seek alternative suppliers. Fortunately, they were able to source patchwork from traders from other regions, including Ungaran and Surakarta, to meet their raw material needs. In addition, one of the SMEs expanded its operations by acquiring patchwork remnants. This entrepreneur successfully expanded his enterprise and obtained a shipment of leftover garment fabric from Ungaran. His shop purchases leftover fabric in bulk from other clothing producers, allowing SMEs to access materials at lower prices and to save on transportation and storage costs. Other textile-based SMEs can also obtain raw materials from these entrepreneurs.

The supplied fabric consists of a mixture of various types packed in sacks, which makes it difficult for buyers to determine the origin and quality of the fabric. The price ranges from IDR 30,000-40,000 per kilogram of cloth, with an average sack weighing around 40 kg. Nearly all SME purchase patchwork measuring less than one meter because it is more affordable. It is estimated that one kilogram can produce 5-6 pieces of drawstring pants using additional raw materials like sewing thread, elastic rope, and drawstring procured at factory prices.

Production Processes

In the production process stage, textile-based SMEs face challenges in transforming shredded textiles into finished fashion products. This process requires a significant degree of skill and knowledge to efficiently transform patchwork into high-value, new fashion items. The entrepreneurs developed specialized techniques for pattern making, cutting, and sewing to maximize the utilization of patchwork materials and minimize fabric wastage.

Fabrics are organized based on their size and pattern of motifs before being cut according to the specified design, which is typically done by skilled entrepreneurs. Once cut, the fabrics are stacked and delivered along with other raw materials (such as thread and rope) to a tailor who then sews them into drawstring pants for sale. Through effective marketing, tailors can currently produce approximately 100 pieces per week, but they have the potential to increase this output to an average of 10 dozen drawstring pants per week. Tailors receive payment of IDR 1,500,- for each stitched piece; they maintain an average weekly output of about 50 pieces. The production cost of sewing, including thread and rope, was IDR 4,000,- per piece.

Distribution and Marketing

In the distribution and marketing stages, textile-based SMEs face challenges in reaching their target markets and effectively promoting their products. The drawstring pants were originally vended in traditional markets, with vendors using motorcycles to reach both marketplaces and residential areas. Customers buy products at wholesale prices through cash transactions. However, this trade declined during the onset of the COVID-19 pandemic, resulting in significantly fewer orders. Consequently, marketing efforts were focused on specific markets, such as the Bringin and Ambarawa Markets in Semarang Regency, along with the Karanggede market in Boyolali Regency of Central Java Province. The average selling price for drawstring shorts was approximately IDR 14,000 per piece. Any remaining merchandize will be sold by placing it in various markets or villages and passing it on its delivery routes.

Several entrepreneurs have succeeded in marketing their products to various regions, including outside Java. For example, an entrepreneur established a textile business in 1997 and focused on producing drawstring trousers using fabrics sourced from collectors at Damatex. After

creating the pattern and manufacturing the trousers, he personally sold 100 pieces at various markets, such as Ampel, Karang Gede in Boyolali Regency, and Ngablak Market in Ambarawa, Semarang Regency. After 6 months of persistence, his dedication bore fruit, as regular traders began placing orders for his products. This success has led to shipments of their products outside Java to regions such as Borneo.

End of Life

Textile-based small and medium enterprises in Salatiga encounter difficulties when dealing with the end-of-life phase of their products, despite their attempts to use all raw materials and reduce waste. The difficulty primarily concerns the management of small leftover fabric pieces from production, which are referred to as *"tatal."*

While larger scraps are repurposed into aprons and potholders by enterpreneurs, *tatal* is sold for IDR 2,000 per kilogram. Some accessory artisans buy these fabric scraps to produce distinct brooches, hairpins, and other items. However, *tatal* buyers do not follow a regular schedule, so these rags often end up used as fuel for wood-burning stoves commonly used in cooking industries, such as tofu production in Tingkir. Using textile waste as an alternative energy source can provide a practical solution. However, this process may also generate carbon emissions due to the combustion of the textile materials.

Stakeholders of Textile SMEs in Tingkir, Salatiga

The circular economy of textile SMEs in Tingkir involves various stakeholders, but not all of them are actively engaged in the development of circular practices. The following provides an overview of the primary stakeholders in textile business in Tingkir.

Larger Textile Companies and Suppliers

Large-scale textile factories are the primary suppliers of raw materials to SMEs in Tingkir. Initially, SMEs in Tingkir obtained raw materials for their drawstring trousers from Damatex and Timatex textile factories, which were the flagship products of the Tingkir textile business. However, with a decrease in production at these factories and their discontinuation of selling patchwork waste, textile businesses started looking into other suppliers outside the city to purchase leftover garment fabric. Additionally, some textile entrepreneurs have diversified into creating different product lines to suit the availability of raw materials.

Alternative suppliers trading shredded fabric from larger textile companies in Ungaran and Surakarta have taken on the role of providing raw materials. As a result, textile business owners have managed to maintain their growth and continue operating. These materials are typically packed in sacks and sorted according to their quality and condition. Payment is generally made upon delivery. The fabric categories are divided into those less than one meter in size and those above that measurement. However, the unpredictable availability and variable quality of these raw materials pose significant challenges for SMEs in maintaining consistent production and satisfying customer demands.

Government

The government agencies guiding the development of textile businesses in Tingkir include the Department of Cooperatives and Small and Medium Enterprises, the Department of Trade and Industry of Salatiga City, and the Department of Environment, which focuses on utilizing waste. However, these services are generally part of their respective programmes and lack dynamic interaction between government agency stakeholders to implement sustainable policies.

The Department of Cooperative and Small and Medium Enterprise offers coaching activities, such as training, not only for textile entrepreneurs but also for other groups like culinary SMEs. Consequently, the training is often general, lacking specific focus on textile SMEs. Specifically, for

the Tingkir textile hub, no specialized guidance is provided, except for marketing assistance when needed to support entrepreneurial development through participation in bazaars, creative competitions, or organizing accounting books using an application-based approach. In addition, according to the SMEs Service criteria of the Department of Cooperative and Small and Medium Enterprise, textile businesses fall under the sewing business category and can receive basic sewing skill training for pattern creation and simple designs. However, many textile SMEs in Tingkir have advanced capabilities beyond this baseline. Additionally, to be eligible, members must register as business actors with a Business Identification Number and be registered with the Smart SMEs platform, which was developed by the Government of Salatiga and a local private university to assist SMEs in the region. Notably, not all entrepreneurs are familiar with this platform.

The Department of Trade and Industry provides guidance specifically for sewing machines within the textile industry. However, there were discussions among group members regarding the uneven allocation of this support, which may have played a role in the disintegration of the Tingkir textile community.

The Department of Environment (KLH) can only facilitate the management of inorganic waste to produce decorative items at this time. Proficiency in crafting accessories from patchwork waste is essential. The KLH is partnering with a fashion company to arrange a carnival where attendees are encouraged to incorporate inorganic waste materials into their attire as part of efforts to minimize overall waste. Furthermore, the event includes exhibitions selling products crafted from recycled materials as well as vendor facilities.

Customers

Textile SMEs in Tingkir primarily cater to individual consumers and traders in traditional markets across Central Java, including those in Karanggede, Bringin, Magelang, and Borobudur. In addition to these market-based sales channels, some consumers visit SME locations directly to purchase goods. However, the consumer base of these textile SMEs remains largely limited to traditional market buyers, who face stiff competition from other producers. Consumers often prioritize lower prices over quality, opting for goods sourced from outside of Tingkir, even if the quality is inferior. Textile products from the Tingkir region are not considered daily necessities for consumers. Although access to trade networks remains predominantly local compared to online business capabilities, the reach and appeal of Tingkir fashion products are limited, primarily catering to traditional market consumers. Additionally, textile SMEs in Tingkir have not fully embraced digital transformation, resulting in a lack of strategic marketing and limited visibility beyond their local communities (Suharyati et al., 2023).

Civil Society Organization (CSO)

Community groups within the Tingkir textile industry came together to create *Kelompok Usaha Bersama* (KUBE - the Joint Business Group), following the designation of Tingkir as a Textile Tourism Village in 2012. Over a period of approximately 5 years, this alliance developed robust connections. Nevertheless, it disbanded in 2018 due to scheduling conflicts and differing priorities. KUBE worked with the Department of Cooperative and Small and Medium Enterprise and the Department of Industries and Trade. SMEs in the KUBE often acted as resource speakers, offering instructional sessions to visitors about design, accessories (including patchwork), and tailoring of wedding dresses and kebaya. Furthermore, they established partnerships with accessory artisans to transform leftover woven patchwork into marketable items such as brooches, pins, clothing embellishments like flowers and hats, and vests made from recycled plastic packaging materials. However, these collaborations face challenges because government agencies primarily focus on conventional programs and lack dynamic interactions to implement comprehensive and sustainable policies.

According to a successful entrepreneur who specializes in designing and creating wedding dresses, kebaya, and accessories, KUBE was founded to advance the textile industry. KUBE operated based on principles that prioritized collaboration over competition, guided by solidarity and emotional connection. Subsequently, they transitioned to a cooperative structure. However, challenges emerged in maintaining cooperative management as discrepancies arose between agreements and practical implementation. The allocation of financial resources and material support (such as sewing machines) for tourism destinations did not align with members' predetermined budget targets as initially intended.

Analysis of Key Challenges

Textile-based SMEs in Tingkir, Salatiga face several critical challenges in collaborating with stakeholders to maximize the circularity of their supply chains. The primary obstacle is the unpredictable availability and variable quality of secondary raw materials. A key barrier is the lack of consistent supply and uniform quality of fabric scraps and other materials procured from larger textile factories. This issue makes it challenging for SMEs to maintain stable production and reliably fulfill customer demands.

As indicated in the literature, the textile industry faces significant challenges in implementing circular supply chains, including problems related to collecting, sorting, and recycling materials (Kazancoglu et al., 2020; Raut et al., 2019). The SMEs in Tingkir are particularly vulnerable to these issues because they rely on secondary materials that are often inconsistent in availability and quality. In addition, the lack of coordination and dynamic interaction between government agencies hinders the development of supportive policies for these sustainable textile enterprises. While training and marketing assistance are provided, tailored guidance and funding, specifically for Tingkir textile SMEs, are lacking to enhance their circular practices. Similarly, the Department of Environment's current focus on using only inorganic waste limits the opportunities for SMEs to incorporate a wider range of recycled textile materials into their production.

Stakeholder Collaboration Dynamics

The analysis of the key challenges faced by textile-based SMEs in Tingkir, Salatiga highlights the critical importance of effective collaboration and dynamic interactions among the various stakeholders involved in the circular supply chain. The unpredictable availability and varying quality of the secondary raw materials procured from larger textile factories underscore the need for robust coordination and information sharing between SMEs and suppliers. The lack of consistent supply and uniform quality of fabric scraps and other recycled materials is a significant hurdle that can only be addressed through close collaboration and transparent communication between stakeholders.

Building trust and fostering open dialog are essential for SMEs to work closely with suppliers and ensure a reliable and consistent flow of secondary raw materials that meet production requirements. Similarly, the disconnect between government agencies and SMEs highlights the importance of enhancing coordination and dynamic interactions to develop tailored policies and support mechanisms that cater to the unique needs of these sustainable textile enterprises.

Moreover, the power dynamics between SMEs, suppliers, and customers can significantly impact the effectiveness of stakeholder collaboration (Kazancoglu et al., 2020; Oelze, 2017). As smaller players in the supply chain, SMEs may have limited negotiating power compared to their larger suppliers and customers, which can hinder their ability to secure favorable terms and influence the quality and availability of the materials they require. Navigating these power imbalances and establishing mutually beneficial partnerships are crucial for SMEs to maximize the circularity of their supply chains (Oelze, 2017).

Potential Strategies for Overcoming Challenges

The insights from the case study suggest that textile-based SMEs in Tingkir, Salatiga can benefit from proactively strengthening their relationships and communication with key stakeholders to overcome the challenges they face in maximizing the circularity of their supply chains. Table 1. below outlines the key challenges, stakeholder dynamics, and potential collaborative strategies across the supply chain.

Table 1. Maximizing the Circular Supply Chain of Textile SMEs in Tingkir

Stages of the Supply Chain	**Key Challenges**	**Stakeholders Dynamics**	**Potential Collaborative Strategies**
Sourcing raw materials	Limited availability and access to shredded-fabric and inconsistent quality and quantity of the raw material	The SMEs have limited negotiating power compared to their larger suppliers	Fostering trust and transparency with their suppliers. In addition, reactivate the *KUBE,* the joint business cooperative, to leverage SMEs' collective bargaining power and establish mutually beneficial terms.
Production	Transforming the shredded-fabric into finished fashion products	There is no specialized guidance provided by the Government	Work with government agencies and policymakers to secure customized support systems and regulatory structures that address the distinct needs of sustainable textile businesses.
Distribution and Marketing	Reaching SMEs' target market and promoting their products effectively	The consumer base of these textile SMEs remains largely limited to traditional market buyers, and they face stiff competition from other producers	Collaborate with government agencies and academic institutions in the region, utilizing existing platforms, to obtain assistance and expand the market
End of life	The management of small leftover fabric pieces from production, referred to as *'tatal.'*	The irregular purchasing patterns of buyers mean that these *tatal* are frequently repurposed as fuel for wood-burning stoves.	Expanding the market for *tatal* buyers is not limited to artists. Additionally, collaborating with the Department of the Environment could help manage the *tatal* waste.

Source: primary data

In the stage of sourcing raw materials, fostering trust and transparency with suppliers, for instance, can help SMEs secure a more reliable and consistent flow of secondary raw materials, ensuring that they can maintain stable production and satisfy customer demands (Oelze, 2017; Raut et al., 2019). This may involve collaborating with suppliers to develop standardized quality control processes, joint forecasting and inventory management systems and shared information platforms to enhance coordination and visibility across the supply chain.

Similarly, during the production stage, SMEs can work closely with government agencies and policymakers to advocate for tailored support mechanisms and regulatory frameworks that cater to the unique needs of sustainable textile enterprises (Jen & Bakari, 2021). This may include collaborating on the development of industry-specific guidelines and certification programs to promote transparency and accountability (Rizos et al., 2016).

In the marketing stage, SMEs can collaborate with government agencies and academic institutions in the region to leverage existing platforms and obtain assistance in expanding their market reach. This may involve partnering with local universities or research centers to conduct market research, identify new sales channels, and develop targeted marketing strategies. SMEs can also seek support from government agencies, such as trade promotion offices or small business development centers, to gain access to export assistance programs, trade fairs, and other initiatives that can help them reach a broader customer base (Fatimah & Nursaidah, 2022).

Finally, in the end-of-life stage, expanding the market for product buyers is not limited to artists. Additionally, collaboration with the Department of the Environment could help to manage textile waste. SMEs can explore partnerships with organizations that specialize in textile recycling and upcycling, such as social enterprises, non-profit initiatives, and community-based programs (Ütebay et al., 2020). These partnerships can create new avenues for SMEs to divert textile waste from landfills and find alternative uses for their products at the end of their lifecycle. Furthermore, engaging with the Department of the Environment can help SMEs navigate regulatory frameworks, access resources for waste management, and potentially provide technical assistance to improve their end-of-life waste handling processes.

CONCLUSIONS

The case study of textile-based SMEs in Tingkir, Salatiga, highlights the critical importance of effective stakeholder collaboration in addressing barriers to implementing circular supply chains in the textile industry. The SMEs in the region have made commendable efforts to incorporate recycled materials into their production processes, but they face significant obstacles in securing a consistent supply of quality secondary raw materials and navigating power imbalances with their larger suppliers and customers. To overcome these challenges, textile-based SMEs in Tingkir and Salatiga can proactively strengthen their relationships and communication with key stakeholders. Fostering trust and transparency with suppliers can help secure a more reliable and consistent flow of secondary raw materials, while collaborating with government agencies and policymakers can facilitate tailored support mechanisms and regulatory frameworks.

To support SMEs in their transition toward more circular textile supply chains, policymakers should develop tailored support mechanisms and regulatory frameworks that cater to the unique needs of sustainable textile enterprises. This may include facilitating the development of industry-specific guidelines and certification programs to promote transparency and accountability.. Policymakers can also play a crucial role in fostering collaborative platforms that bring together SMEs, larger industry players, recycling specialists, and other relevant stakeholders to share knowledge, resources, and best practices.

Furthermore, policymakers can invest in the development of comprehensive waste management infrastructure and recycling technologies that can help address the challenges posed by the varying quality and unpredictable availability of secondary raw materials. By implementing these strategies, policymakers can create an enabling environment that empowers textile-based SMEs to overcome obstacles and unlock the full potential of circular supply chains.

LIMITATION & FURTHER RESEARCH

While this study has provided valuable insights into the challenges and strategies associated with implementing circular supply chains in textile-based SMEs, further research is needed to explore the broader applicability of the findings. Future studies could expand the geographic scope to investigate the experiences of SMEs in other textile-producing regions and examine the unique challenges faced by enterprises of different sizes and operational models. Additionally, cross-sectoral and interdisciplinary collaborations could yield a more comprehensive understanding of the complex and multifaceted issues surrounding circular supply chains in the textile industry, drawing insights from fields such as materials science, logistics, and policy development.

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