

An Analysis of Circular Economy Implementation In Women-Led Msmes and/or Social Enterprises

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Abstract. This study aims to analyze the implementation of the circular economy within micro, small, and medium enterprises (MSMEs), as well as social entrepreneurship ventures led or owned by women. The circular economy is regarded as an alternative to the linear economic model in addressing the climate crisis and broader global sustainability challenges. In the context of Indonesia, MSMEs play a vital role in the national economy, with a significant proportion managed by women, thereby positioning them as key agents of change in advancing sustainable business models. This research adopts a descriptive qualitative approach, utilizing case studies and in-depth interviews with women-led MSMEs and social entrepreneurs engaged in circular business practices. The analysis employs the *9R* framework and the *ReSOLVE* framework to assess the level of circularity implementation. Additionally, it incorporates a gendered leadership behavior framework to identify the leadership styles and enabling factors essential for accelerating the transition toward a circular economy. The findings reveal that, while circular economy initiatives are emerging, entrepreneurs face several barriers, including consumer behavior preferences, limited knowledge, regulatory support gaps, supply chain collaboration issues, and organizational constraints—particularly the lack of skills, expertise, and technological capacity required for holistic implementation. Nonetheless, women's leadership—characterized by collaboration, participation, and value-driven approaches—facilitates the integration of social and environmental dimensions into circular business practices. This study proposes a gender-sensitive and sustainable circular economy business model for MSMEs and social enterprises, advocating for an inclusive, phased, and context-based transition strategy.

Keywords: Circular Economy; Green Economy; Inclusive Business Models; Low-Carbon Development; MSMEs; Social Entrepreneurship; Women's Leadership

INTRODUCTION

The concept of a circular economy is not entirely new, but in recent years it has gained global attention as a potential solution to the worsening effects of climate change. Climate change refers to long-term shifts in temperature and weather patterns, which initially occurred due to natural causes but have been drastically accelerated by human activities since the 1800s, especially through the burning of fossil fuels. These activities emit greenhouse gases (GHG) that trap heat in the Earth's atmosphere, leading to rising global temperatures and severe environmental consequences [\[A1\]](#). According to the United Nations (2022), major contributors to GHG emissions include fossil-fuel-based electricity and heat generation, industrial production, transportation, agriculture, deforestation, and even domestic energy use. The resulting climate disruption has triggered natural disasters such as forest fires, floods, droughts, and biodiversity loss, while also threatening human health and food security.

In *Indonesia*, the impact of climate change is evident through the increasing frequency of weather-related disasters. A 2022 study by the National Development Planning Agency (*Bappenas*) warns that if business-as-usual or linear economic models continue, Indonesia could lose up to IDR 544 trillion in GDP between 2020 and 2024. The current global

overconsumption of resources, combined with a carbon-based linear economy, is leading to unsustainable development. The linear model—extract, use, and discard—has degraded biodiversity, polluted ecosystems, and raised global temperatures. The 2023 Circularity Gap Report estimated that if current linear practices persist, material extraction could reach 170–184 gigatons by 2050, pushing the Earth beyond five of its nine planetary boundaries. Modak (2021) also noted that material use tripled from 26.7 gigatons in 1970 to 84.4 gigatons in 2015, and could double again by 2050. To safeguard the planet, material extraction must be reduced by one-third while maximizing human benefit through more sustainable material use.[\[A2\]](#).

Excessive waste production, GHG emissions, and unsustainable development have intensified the scarcity of resources. Additionally, population growth, urbanization, and global trade have further escalated material consumption. This highlights the urgency of transitioning from a linear economy to a circular one, which can address three planetary crises: climate change, biodiversity loss, and pollution. The circular economy approach offers a systematic framework to reduce material consumption, increase efficiency, extend product lifespans, reuse materials, and regenerate resources. The 2023 Circularity Gap Report recommends circular economy practices as effective solutions to mitigate these global threats and support sustainable growth.

The report also suggests that applying circular economy principles could restore planetary balance and meet global societal needs with only 70% of the materials currently used. This can be achieved through four resource-use strategies: use less, use longer, use again, and use clean. A circular economy thus plays a vital role in achieving a safe and just balance between human life and ecological boundaries. Beyond environmental benefits, the circular economy also fosters new economic opportunities. As stated by Frans Timmermans, Vice President of the European Commission (2023), making economies fully circular could generate new jobs, drive innovation, and simultaneously combat climate and biodiversity crises. *Europe* has initiated its *Green Deal* as a circularity transition policy framework.

While the concept of a circular economy is widely recognized, there is still no global consensus on its definition or measurement. Various organizations, countries, and institutions define it differently. Generally, it emphasizes the "3Rs"—reduce, reuse, recycle—but Modak (2021) highlights that it also requires a shift in mindset, economic systems, and behavior. According to the UN Environment Assembly (2019), a circular economy is one where products are designed from the outset to be reused, remanufactured, and recycled, keeping them in the economic system as long as possible. In contrast, the *Dutch Ministry of Infrastructure and the Environment* (2015) defines the linear economy as one in which natural resources are extracted, processed, used, and discarded as waste.

The *Ellen MacArthur Foundation*, a global leader in promoting the circular economy, defines it as an economic model that focuses on designing out waste and pollution, keeping products and materials in use, and regenerating natural systems. Products should be long-lasting, easy to repair, and upgradeable, made from materials that can be perpetually recycled without quality loss. In addition to product design, the foundation emphasizes developing strategies for returning materials to the economy through collection, reprocessing, and redistribution, as well as restoring natural systems. Thus, circular economy is not merely about recycling but about transforming the entire economic system into one that is regenerative and sustainable.

Indonesia has begun to adopt the circular economy concept in national planning. *Bappenas* has incorporated it into the 2020–2024 National Medium-Term Development Plan (*RPJMN*) as part of its low-carbon development agenda aligned with the Sustainable Development Goals (*SDGs*). According to Minister *Suharso Monoarfa* (2021), the circular economy can drive higher green economic growth compared to a linear economy by promoting efficiency throughout the value chain. *Bappenas* (2021) estimates that by 2030, circular economy strategies could add IDR 593–638 trillion to Indonesia's GDP, reduce waste by 50%, lower GHG emissions by 126 million tons of CO₂e, and save 6.3 billion cubic meters of water. Socially, it could create 4.4 million green jobs between 2021 and 2030.

Among the sectors identified by *Bappenas* (2021) with high potential for circular economy adoption are food and beverage, construction, textiles, retail/wholesale, and electronics. These sectors contribute over 30% to Indonesia's GDP and employ approximately 43 million people. Micro, Small, and Medium Enterprises (*MSMEs*) also hold immense potential. Representing 97% of the workforce and contributing 60% to the national GDP, MSMEs are often led by women, who account for 64% of entrepreneurs in this segment. Empowering women entrepreneurs is therefore vital, not only for gender equity but also as a catalyst for sustainable economic transformation.

Despite the promise of circular economy practices, MSMEs face challenges such as limited legal recognition, insufficient funding, and infrastructure gaps. Modak (2021) argues that the informal sector—dominated by MSMEs—can be the backbone of circular economies in developing countries if supported through inclusive, gender-sensitive business models and better access to capital and training. Cantú (2021) similarly notes that barriers and enablers for MSMEs in emerging markets must be better understood to facilitate their transition to circular practices. Surveys by *Bappenas* and statements from business leaders like *Shinta Kamdani* (*KADIN*) further emphasize the need for structural support, particularly for women-led MSMEs. [\[A3\]](#) [\[A4\]](#).

Previous studies have analyzed the circular economy in relation to global sustainability goals, but few have specifically addressed its application in the context of Indonesia's MSMEs sector, particularly the role of women entrepreneurs. Modak (2021) highlights that informal sectors, especially MSMEs, can be a driving force in circular economies if given adequate support, but face barriers like limited access to finance and infrastructure. Similarly, Cantú (2021) discusses the importance of understanding the barriers and enablers for MSMEs in developing countries to transition toward circular practices. However, these studies do not fully capture the dynamics of MSMEs in Indonesia or the role of women entrepreneurs in advancing circular economy strategies in this context.

The objective of this research is to analyze the potential and challenges of adopting circular economy practices in Indonesia's MSMEs, particularly women-led businesses. The study also aims to provide practical recommendations for policy and support systems to enhance the adoption of circular economy strategies. This research is expected to contribute to the body of knowledge on sustainable economic practices in Indonesia and provide actionable insights for improving MSME competitiveness and supporting green growth in the country.

MATERIALS AND METHODS

The research conducted uses a qualitative descriptive approach, which aims to provide

an in-depth and detailed depiction of a specific phenomenon or condition. Descriptive qualitative research focuses on understanding phenomena in their natural settings and uses non-hypothetical data collection through words, images, or artifacts rather than numerical data (Creswell et al., 2018). In this study, the main phenomenon being examined is the implementation of circular economy practices within micro, small, and medium enterprises (*MSMEs*) and/or social enterprises owned or led by women. The analysis aims to explore how circular economy principles are adopted in a type of entrepreneurship with distinct characteristics—especially where the enterprises are women-owned or women-led.

This study uses case study analysis of several women-led *MSMEs* and/or social enterprises to assess the extent of their circularity initiatives and the leadership practices of women entrepreneurs. The primary data collection methods include in-depth interviews and semi-structured interviews with the business owners and leaders. The researcher also conducted field observations at the business locations to better understand the subjects' behavior and interactions within their natural settings. Furthermore, supporting data were collected from public and personal documents, such as media articles, TV programs, websites, social media, and business brochures.

Interview questions were designed by adapting diagnostic questions commonly used to assess circular economy transitions. These questions were then classified using the *9R* strategy framework. In addition, the *ReSOLVE* framework was employed through semi-structured interviews with open-ended questions to explore both the barriers and enablers in the adoption of circular practices. The study also investigates the leadership behaviors of women entrepreneurs, identifying influencing factors that shape their leadership style and decisions within the enterprise.

The research uses both primary and secondary data. Primary data were obtained through interviews and field observations, while secondary data were derived from published articles, media content, social media platforms, and other publicly available sources. The subject selection for this study was based on criteria such as having clear circular economy initiatives and belonging to one of the government-prioritized sectors under the Low Carbon Development and green industry policy (Bappenas, 2021). These sectors include food and beverage, construction, textiles, retail/wholesale trade, and electrical/electronic appliances.

Respondents or informants were selected based on their direct involvement with the subject and the phenomenon being studied. In case studies, it is essential that informants are willing to share their experiences honestly and openly. Informants' data provide context and a deeper understanding of the background and factors affecting the phenomenon. A diverse set of informants offering various perspectives is crucial for constructing a comprehensive understanding of the subject matter (Yin, 2018).

The main informants in this study were women who both owned and led *MSMEs* or social enterprises. Their selection was guided by the study's aim to explore female leadership behaviors in circular-oriented enterprises. Since the quality of data collection directly influences the credibility of the findings, appropriate data collection techniques were strategically applied to ensure high standards of data integrity. According to Sugiyono (2013), data sources can be categorized into primary (collected firsthand by the researcher) and secondary (collected from existing sources). Primary data collection methods include interviews, observations, focus group discussions (*FGDs*), and questionnaires, while secondary

data are typically collected through documentation, literature reviews, or statistical data.

In qualitative research, interviews are a primary source of data to understand complex social phenomena. Interviews can be structured, unstructured, or semi-structured. This study utilized semi-structured interviews with open-ended questions to allow for flexibility and the emergence of new ideas during conversations. According to Merriam et al. (2016), this type of interview helps researchers respond to dynamic situations and emerging insights from informants. The interview guides were developed based on previous circular economy transition frameworks, such as the 9R strategy, innovation and institutional change models, and the *ReSOLVE* framework. Questions related to female leadership were based on established indicators and influencing factors to further explore the informants' leadership experiences.

The observation method was applied concurrently with the interviews, helping the researcher gain additional insights into the work culture, interpersonal dynamics, and leadership behavior within the business settings. Observations followed *Spradley's* (1980) stages: descriptive observation to understand the general setting, focused observation to narrow the attention to specific interactions, and selective observation for detailed examination of relevant behaviors or patterns. This method enriched the understanding of phenomena not always evident through interviews alone.

Lastly, the documentation method was employed to collect secondary data. Documents—considered the third major source in qualitative research—include public records, personal writings, popular culture materials, visual documentation, and physical artifacts. Documents in this study were sourced from public and personal records, news media, social media content, and any relevant data beyond interviews and observations. To ensure the validity and reliability of data collection, the research applied triangulation techniques, which involve cross-verifying data from multiple sources and methods (*Sugiyono*, 2013). Triangulation ensured the accuracy and credibility of findings by comparing data from different times, settings, and informants, thereby reflecting a more accurate representation of the studied reality.

RESULTS AND DISCUSSION

Application of Circular Economy (ES) in MSMEs and/or Social Entrepreneurship

Several conceptual frameworks of approaches and strategies have been used to identify the implementation of the circular economy, areas of implementation actions, determine the level of circularity as well as analyze the circular economy transition process from the aspects of innovation and institutional social change.

The measurement of Circular Economy (CE) implementation in this study uses the 9R Framework, developed based on previous research by the Netherlands Environmental Assessment Agency (PBL) and Utrecht University (Potting et al., 2017), which was later adopted by Bappenas (2022). This framework ranks circular strategies based on their priority and impact, from high circularity (lower R number) to lower circularity (higher R number). The analysis of the three women-led MSMEs and/or social enterprises—Dawun by Santi, Marun Spa Aromaterapi (MSA), and Sekolah Hijau Lestari (SHL)/Sekolah Rempah Nusantara (SRN)—revealed different levels of CE initiative adoption. Dawun by Santi exhibited the highest level of circularity with six initiatives across four categories: Rethink (R1), Reduce (R2), Reuse (R3), and Repurpose (R7). MSA implemented three initiatives in Reduce and Reuse (R2 and R3), while SHL/SRN applied three initiatives in Reuse, Repurpose, and Recycle

(R3, R7, and R8). Rethink (R1), performed by Dawun by Santi through the entire ecoprint production process, represented the highest form of circularity, focusing on smarter design and more intensive use of products. In contrast, Recycle (R8), as practiced by SHL through waste recycling and redistribution programs, indicated a lower level of circularity.

Further analysis showed that both MSA and Dawun by Santi practiced Reduce and Reuse strategies, such as using renewable materials and reusing packaging and natural dyes in production. Repurpose (R7) was also practiced by Dawun by Santi and SRN by transforming waste materials into new, usable products like fertilizers or value-added crafts. However, none of the three subjects demonstrated a full, company-wide integration of circular business models. Similar to the findings by Brendzel-Skowera (2021), circularity in these enterprises was applied to selected business functions rather than through comprehensive, planned corporate strategies. The transition toward CE was also assessed through the lens of innovation and socio-institutional change. Drawing from Potting's (2017) typology of CE transitions, one of the studied enterprises displayed a Type 2 CE transition, where social and institutional changes (e.g., consumer behavior and regulatory adaptation) play a central role, while technological innovation remains supportive or minimal. None of the enterprises demonstrated a Type 1 (radical technological innovation-led transition) or Type 3 (balanced institutional and technological transition), indicating that in these women-led MSMEs, CE transformation is still at an early or moderate stage, primarily driven by behavioral and managerial change rather than advanced technological integration.

The analysis reveals that Sekolah Hijau Lestari (SHL) and Sekolah Rempah Nusantara (SRN) exemplify a Type 2 Circular Economy (CE) transition, where socio-institutional change takes precedence over technological innovation. One of their primary activities includes shifting farming practices away from chemical-based fertilizers by educating their local farming suppliers on the environmental harms of such inputs. Both SHL and SRN have also developed specialized training curricula to teach farmers how to create and apply their own organic fertilizers. In terms of product design innovation, all three enterprises—MSA, Dawun by Santi, and SRN—demonstrate CE initiatives. MSA focuses on creating natural, plant-based, and sustainable beauty products, Dawun by Santi continues to innovate in eco-print textile production, while SRN repurposes agricultural waste and rejected harvests into new herbal-based products. Regarding revenue model innovation, SHL and SRN have diversified beyond product sales to include services such as training, public speaking, and consulting, alongside donations and CSR partnerships—blending social impact goals with financial sustainability to maintain their operations and community empowerment mission.

From the perspective of socio-institutional change, two key elements—consumer behavior and regulation—were examined. Consistent with Potting (2017) and Geels (2002), it was found that while radical technological innovations often drive sustainability transitions, institutional and behavioral shifts make the process more complex. In this study, all three women-led enterprises acknowledged challenges in consumer perception. MSA reported initial resistance from price-sensitive consumers who overlooked the added value of eco-friendly and health-conscious products. Similarly, Dawun by Santi's handmade, zero-waste handbags were compared unfavorably with mass-produced imports due to a lack of consumer awareness. SRN faced the same issues, reinforcing the findings of Cantú et al. (2021), who identified consumer budget, preferences, and knowledge gaps as potential barriers—or enablers—of CE adoption.

These businesses responded by adjusting their target markets and actively educating customers about the values and processes behind their products. Meanwhile, regulatory challenges also emerged: MSA's difficulty in obtaining BPOM certification due to strict facility requirements, and Dawun by Santi's prolonged IP registration process with limited protection duration, illustrate gaps in policy support. These findings reaffirm Cantú's conclusion that consumer behavior, legal frameworks, and inadequate infrastructure remain critical obstacles to CE implementation in developing economies. Addressing these institutional limitations is crucial for scaling sustainable business transitions among MSMEs.

The ReSOLVE framework was also used in this study in identifying and measuring the application of ES. There are six areas of implementation actions developed by The Ellen MacArthur Foundation (2015) that can be done by the business world to make the transition to ES. Of the six action areas for the application of the principle of circularity or circularity business model, namely Regeneration (*Regenerate*); Share; Optimize; Loop; Virtualization, and Exchange, the areas of Regeneration and Optimization action were carried out by the three research subjects. The three of them in their business activities have made efforts to regenerate or restore, preserve natural capital and improve the quality of the ecosystem through business activities that reduce environmental impact by using as many natural and natural raw materials as possible composition and optimization of the materials used during production by increasing the efficiency of materials, tools and products used in their business production chain. Another area of action for the implementation of circularity, namely *Sharing*, is carried out by Dawun by Santi and SRN by collaborating or collaborating in sharing resources with other parties in order to maximize the use of assets. Collaboration is quite important in overcoming the limitations of small-scale businesses. The results of this study support the conclusion of Cantu's previous research that collaboration can maximize innovation capacity, solve certain problems in the production process in the industry, can take advantage of collaborator partners while addressing individual weaknesses. Another area of circular implementation action is Loop carried out by SHL in its recycling activities with the community by reproducing products from waste utilization into products with different functions. This indicates the variation in the areas of circular implementation actions carried out by the three research subjects.

Women's Leadership Behavior in MSMEs and/or Social Entrepreneurship

Leadership plays a crucial role in the transformation toward Circular Economy (CE) in MSMEs and/or social enterprises, especially regarding female leadership. The relationship between women's leadership and CE implementation initiatives is significant, as female leaders often share values that align with CE principles, such as focusing on long-term goals rather than short-term profits, caring for communities, families, and the environment, and maintaining an environmentally-conscious mindset. These traits, which emphasize waste reduction, reuse, recycling, and local ecosystem values, naturally support CE practices. In the case of the three research subjects, the alignment of their leadership values with CE principles is clear, even though they were not formally familiar with the term "circular economy." These women-led enterprises demonstrate the potential for female entrepreneurs to drive local CE initiatives, even without formal knowledge of the concept.

In line with this, inclusive and collaborative leadership styles are critical to supporting business transitions toward CE. According to Eagly et al. (2003), female leaders typically adopt

participative and transformational leadership styles, which resonate with CE models by fostering strong relationships with communities, employees, and local partners while encouraging innovation based on local needs. This was evident in the three enterprises analyzed in this study, where strong collaboration within the value chain was essential for their business operations. Additionally, the leadership behaviors identified align with sustainability leadership—visionary, ethical, risk-tolerant, and long-term focused—traits emphasized by Visser et al. (2011). These female leaders in the study not only focused on economic growth but also considered the social and environmental impact of their businesses. Their leadership practices support the transition from a linear to a circular business model, with a strong commitment to sustainability, social values, and ecological well-being. This aligns with Rizos et al. (2016), who found that successful CE adoption in MSMEs often stems from visionary leaders who embrace innovation, risk-taking, and sustainability goals rather than just profit.

Solutions to Challenges (Obstacles and Supporting Factors) in the Implementation of Circular Economy in MSMEs and Social Entrepreneurship

Applying circular principles in business activities to MSMEs is not easy. The results of the research on three subjects of MSMEs and/or social entrepreneurship concluded that there are challenges, both obstacles and supporting factors for the successful implementation of circular in their business activities. Based on the external and internal categories for the challenges of implementing ES in MSMEs identified by Cantú in the previous study, several categories were found that are quite significant obstacles for the three MSMEs and/or social entrepreneurship in this thesis research. These external and internal categories that are quite significant obstacles are in line with the categories that are highlighted by most of the Cantú research speakers who identify internal and external obstacles faced by MSMEs in developing countries when implementing ES initiatives, namely User Behavior, Regulation, Supply Chain, *Knowledge*, and Organization.

The role of user or consumer behavior can encourage or hinder ES implementation initiatives. The challenge of user or consumer behavior experienced by the three MSMEs and/or social entrepreneurship of the subject of this study is consumer consideration of the price factor. Price is the biggest driver in purchasing decision-making. For most consumers, they are less willing to buy more expensive products, despite their positive externalities. Circular or *sustainable products* that take into account the negative externalities of their production process, or have a longer lifespan are premium products that are usually more expensive, which may make people reluctant to buy the product. The price of this circular product will also be above the price of its competitors, equivalent products with the same function but without the accompanying circular process so that the price can be cheaper.

The solution then carried out by the three MSMEs in this study was quite successful in creating a market for their products, namely by targeting consumer clusters that have sufficient knowledge capacity about the products produced and natural and environmentally friendly services. The efforts of the three MSMEs of the research subjects in educating and providing information related to their products and the circular principles carried out in the production process are expected to increase consumer insight and understanding. Unfortunately, consumer responses often vary not only depending on the understanding and knowledge of the 'green' product, but also on the social class and educational background of the consumer. Conclusion

to his research, Cantú offers a solution to the importance of considering users/consumers when designing ES business models. Previous studies have also emphasized design as a core principle of ES, including Potting (2017) which places the role of innovation in product design in line with the level of circularity in the production chain. In this sense, it is important to understand well how consumers behave so that they are able to design products with ES principles that answer the problems of consumer needs. Consumer analysis can be done to target market needs and prevalent consumer behaviors. For consumer behavior where consumer perception of the product is low or consumers are skeptical, it is necessary to offer demonstrations of product reliability, offer guarantees and supporting services, and transparency of production processes and quality control mechanisms to increase public trust.

Findings related to regulatory factors in the three MSME subjects of this study show that there is still a lack of promotion, guidelines, disclosure, and training from the government related to ES. Although some circular practices have been applied intuitively, MSME actors have not yet understood the concept and guidelines for the implementation of ES formally. This is closely related to the Knowledge factor as an obstacle to the implementation of ES where understanding of ES principles and holistic approaches is still low. Cantú also notes that companies often don't associate ES initiatives with negative externalities or measure their circularity and sustainability impacts. In fact, these measurements are important to ensure strategic alignment and impact evaluation. It is essential to measure to ensure alignment between ES initiatives and the company's strategy and to track the desired impact. Other regulatory barriers identified include the absence of fiscal incentives such as green taxes, discounts on environmentally friendly production costs, weak implementation of environmental policies, and the absence of clear circular product standards or *ecolabels*. These barriers are also reflected in the case of Dawun by Santi who complained about the lack of transparency in the process of providing incentives for MSMEs, which emphasized the importance of improvements in regulatory aspects to encourage a more structured circular transformation.

Strong regulation plays a crucial role in creating an external environment that supports the implementation of the circular economy through the creation of equal competition. However, Cantú highlighted that developing countries generally still lack comprehensive policy frameworks, especially related to waste management, Expanded Producer Responsibility (EPR), circular product design, and sustainable procurement.

The obstacle found in the *Supply Chain* in this study is the difficulty of finding sustainability-oriented supply chain partners. The relationship formed between the subject and the supply chain partner is generally transactional, limited to the relationship between seller and buyer, without any strategic collaboration. On the other hand, cooperation outside the supply chain, such as with governments, communities, or other partners, tends to be easier to realize. This condition shows the importance of a collaborative approach in dealing with the structural limitations of MSMEs. Research by Rizos *et al* (2016) emphasizes that a sweeping change in the supply chain is often a prerequisite in the implementation of ES, which is difficult to achieve without the support of all business partners. As a solution, encouraging the formation of circular industry clusters where MSMEs can share materials, technology, and distribution networks, developing *digital marketplaces* that connect ES business actors, and facilitating partnerships between MSMEs, large companies, research institutions, and local governments

are key strategies. This is reinforced by Cantú's findings that show that multi-stakeholder collaboration can not only increase innovation capacity, but also solve technical and production challenges, as well as overcome resource constraints through the synergy of partner strengths. In the context of developing countries, collaborative business models are becoming increasingly relevant, as stated by Mishra *et al* (2019), that cooperation between parties is able to answer the challenges of technological limitations, resource scarcity, and logistical barriers. Thus, collaboration involving various stakeholders is a strategic element in strengthening the resilience of MSMEs and encouraging the success of the transition to a circular economy.

The ability of an organization to manage resources as an obstacle, where the lack of skills or expertise and lack of technological capacity required to implement ES in various organizational functions. These challenges can be overcome through training and education programs for employees or members of the work team. This has been done by the research subjects. MSA and SHL as well as SRN have developed training and education programs for their team members to address the shortcomings in work skills according to the organization's vision, values and goals.

Several other categories in the Cantú scheme that were found to be obstacles that need to be highlighted in his research related to MSMEs in developing countries when implementing ES initiatives, such as limited funds and capital and the absence of supporting infrastructure were not recognized as significant obstacles for the three MSME and social entrepreneurship resource persons in this study. This means that these obstacles are not realized or do not affect them in carrying out circular practices in their business activities.

To overcome various obstacles to the implementation of ES in MSMEs, especially in developing countries such as Indonesia, contextual and adaptive approach solutions are very important. In their research, Cantú *et al*, (2021) emphasized that the ES model cannot be adopted directly from developed countries without considering local characteristics, such as consumer behavior, infrastructure availability, and MSME production capacity. The development of an inclusive business model is also a priority. This model not only emphasizes economic and environmental sustainability, but also pays attention to social aspects by involving informal economic factors such as scavengers or local artisans into the supply chain. This form of social inclusion creates a broader impact and strengthens community support for ES transformation. To increase the readiness of MSMEs in implementing the principles of ES, training and technical education are very crucial. Capacity building programs should include an in-depth understanding of ES principles, sustainable product design, and waste management and energy efficiency. Entrepreneurship education that is integrated with technical training will encourage MSMEs to be better prepared to face the overall business transformation process. In addition, the technology used in the implementation of ES must be adapted to local capacity. Simple, modular technologies based on low costs, such as small-scale waste treatment or production from alternative materials, are more realistically applied by MSMEs than expensive complex technologies. This approach emphasizes the importance of adapting technology to the conditions of MSMEs, not the other way around. Finally, as a supporting factor, the leadership role and social motivation of MSME actors also contribute significantly to the success of the implementation of ES. Entrepreneurs who have a strong socio-environmental vision, are brave enough to take risks, and have a long-term commitment to sustainability, will be better able to lead their business transformation holistically.

Circular Economy Business Model in MSMEs/Social Entrepreneurship that is Sustainable and Gender-Sensitive

The transformation of business models towards a circular economy (ES) is a strategic need for entrepreneurs in creating new opportunities amid sustainability challenges. Diverse approaches have been developed to design and implement circular business models, reflecting the complexity of the concept as well as the need for the integration of appropriate design and management tools. However, as concluded by Brendzel-Skowera (2021), the adoption of circular business models is still limited, mainly due to competency gaps and a lack of skilled human resources. These barriers slow down the adoption process, from the initiation stage to implementation, especially in the context of MSMEs that face financial and structural limitations more significantly than large companies. In an effort to overcome these barriers, the Business and Sustainable Development Commission (BSDC) proposes several relevant future business models to address the challenges of ES. This thesis uses two main approaches as an analytical framework, namely the ReSOLVE framework, which includes six action areas based on the principle of circularity, and the 9R framework from Potting, which organizes business activities in a hierarchy of priorities to identify opportunities for the implementation of circular business models. These two frameworks are used to assess the extent to which ES implementation can be systematically integrated into small business practices.

Brendzel-Skowera's research which examines the maturity level of MSME organizations in the implementation of the ES business model found the dominant circular practices, which are simple and tactical, such as the reuse of *raw materials*, the collection and recovery of materials, and the practice of repair/refurbishment). If it is connected to the essence of ReSOLVE, then the most widely practiced circular practices are Regenerate, *Share*, *Optimize* and *Loop*. Meanwhile, *Virtualize* and *Exchange* have not been widely implemented at the low maturity level of MSMEs. These activities demonstrate an initial response to the ES principles, but do not yet reflect the overarching transformation expected in advanced circular business models. MSMEs have not integrated more complex circular business models, such as *product* as a *service* models or circular *design* systems. Nonetheless, simple activities such as recycling and repairs show that early awareness of sustainability is already beginning to grow.

The results of the research on the research subjects of this thesis also show the same thing. The circular practices carried out are dominated by *the practices of Regenerate, Share, Optimize* and *Loop*, and not yet the circular *practices of Virtualize* and *Exchange*. This indicates that the three are still in the early stages in the circular business transformation curve, thus opening up opportunities for improvement areas to achieve higher maturity, the three MSMEs need to include ReSOLVE elements that are not yet applied.

Strategic recommendations for MSMEs to develop to a holistic circular business model stage are to pay attention to the need for a gradual and contextual approach in assisting MSMEs towards ES. Transformation cannot be forced from *top-down*, but must be built from the organization's internal readiness, ranging from managerial awareness, technical skills, to the flexibility of the business structure. This is where the role of training, coaching, and collaboration across actors (academics, government, and industry players) becomes very strategic. When these aspects are facilitated in a sustainable manner, MSMEs not only adopt the principles of ES, but also develop new business models that are oriented towards long-term

sustainability.

The findings of Hoque *et al* (2022) show that women's leadership in MSMEs tends to adopt a collaborative, participatory, and value-based approach, which is in line with ESG principles such as regeneration, collaboration, and environmental responsibility. Greater concern for social and ecological aspects makes women's leadership an important factor in integrating non-technical sustainability dimensions into circular business practices. This role not only strengthens the sustainability orientation, but also drives the transformation of the organization towards a more inclusive and adaptive business model.

In the context of implementing a gender-sensitive circular economy business model, there is a need for women's active involvement in the entire value chain—from green solution design, technology training, to access to green financing. Business models such as *reuse*, *remanufacturing*, and *share economy* are considered closer to women's experiences because of their relevance to local communities and practices. Therefore, support for gender-responsive policies and women-friendly business incubation programs are key strategies in encouraging women's participation in the transition to ES.

Conceptually, the gender-sensitive ES business model is not only limited to *reduce-reuse-recycle* technical practices, but also includes a restructuring of business values that places social justice as a key element. Women MSME leaders play a strategic role in bridging the goals of ecological sustainability and social empowerment. By building a supportive ecosystem that is inclusive and responsive to gender issues, the transition to a circular economy can take place more quickly, equitably, and sustainably.

Relationship between the Implementation of the Circular Economy Business Model and the Achievement of the SDGs

Circular economy (ES) practices can be applied as a tool and become a specific implementation approach to achieve a large number of SDGs targets. Previous research conducted by Valverde *et al* (2021) which identified the level of relationship between SDGs targets grouped in the CSR (social, economic and environmental) pillars and ES, there is a relationship that strengthens each other and makes a direct contribution, namely SDG 6 (Clean Water and Decent Sanitation), SDG 7 (Clean and Affordable Energy), SDG 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production) and SDG 15 (Terrestrial Ecosystems). The structure of the impact of ES implementation for related SDGs targets according to this three-pillar CSR panel can be used as a tool for stakeholders to identify actions related to ES by taking into account the greatest impact on the achievement of the SDGs. The findings on the business activities of the three subjects of MSMEs and/or social entrepreneurship in this study support Valverde's identification where the circular practices carried out have a strong relationship and contribute directly to the SDGs mentioned.



SDG 6 Clean Water and Good Sanitation

In the diagram of the relationship between SDGs targets and the implementation of ES prepared by Valverde, SDG target no. 6, especially sub-targets 6.3 and 6.4 are found in the business activities of the research subjects. Sub-target 6.3 is to improve water quality by reducing pollution, eliminating disposal, and minimizing the release of hazardous materials and chemicals, halving the

proportion of untreated wastewater, and significantly increasing recycling, as well as safe reuse of recyclable items globally. Recycling activities and minimizing (eliminating) the use of hazardous chemicals and materials were carried out by the study subjects. MSA and dawun by Santi are trying to reduce the composition of chemical raw materials in their production, while SHL and SRN have waste recycling activities, using raw materials from organic farming products without chemical fertilizers. Sub-target 6.4 is to significantly improve water use efficiency in all sectors, and ensure sustainable use and supply of fresh water to address water scarcity, and significantly reduce the number of people suffering from water scarcity. Water efficiency activities are carried out by Dawun by Santi by optimizing wood boiling water for dyes which are at the same time used for steaming *ecoprint* fabrics. Wastewater reuse is also carried out by Dawun by Santi and SRN by reprocessing the waste they produce for natural fertilizers.



SDG 7 Clean and Affordable Energy

Until now, efforts to combat climate change have focused on the transition to renewable energy, which is complemented by energy efficiency. As stated by the Ellen MacArthur Foundation (EMF) (2021), this effort is only able to overcome 55% of emissions while the remaining 45% comes from the production process of cars, clothing, food and other products used daily. For this reason, the application of ES in the production process of *daily use products* carried out by MSMEs will be able to contribute to completing the picture of emission reduction by changing the way we make and use products. The production process and several business activities in the supply chain of the three MSMEs and/or social entrepreneurship of the subject of this thesis research have been identified to carry out circular principles that are able to increase the use of renewable materials, reduce the use of materials that damage the environment, convert the remains of raw materials into new products, use of agricultural products that fail and do not sell well in the market to be used as products, Processing waste and organic waste into fertilizer that is reused on plants or plantations. The circular efforts carried out by the three research subjects more or less contribute to energy efficiency, the use of renewable energy and changes in the lifestyle of consumers who pay more attention to the impact of a product on the environment.



SDG 8 Decent Work and Economic Growth

SDG 8 supports inclusive and sustainable economic growth, full and productive workforce uptake, and decent work for all. According to Van Kruchten *et al* (2020), the current economy is wasteful. Most of the resources at the end of their lifespan end up in landfills and are lost forever. In a circular economy, these resources remain circulating through the practice of *redesign, reuse, repair, refurbishment, remanufacturing* and *recycling*. These activities take precedence over *recovery* and disposal. In the case of the three research subjects, circular practices carried out based on the R framework were indeed more in the practices of *rethink* (R1), *reduce* (R2), *reuse* (R3), *repurpose* (R7), and *recycle* (R8) which indicates a higher level of circularity than *recover* (R9). In this effort, one of the important aspects is to create jobs. Van Kruchten said that compared to primary production and large-scale waste disposal practices in a linear economy,

ES can create more potential jobs that are local and more meaningful or have added value.



SDG 12 Responsible Consumption and Production

SDG 12 ensures sustainable production and consumption patterns. Due to environmental degradation that is quite decreasing as a result of rapid economic and social growth and progress that makes the system that is the basis for development and survival of living things dangerous, changes in consumption and production patterns are very necessary. In the business and business world, it is important to find new solutions that allow sustainable consumption and production patterns. A better understanding of the environmental and social impacts of products and services is needed.

A green square with white text and a tree and birds AI-generated content may be incorrect.loop) has already been implemented by them. The use of the R framework principle in their business activities also proves that they have practiced circular initiatives that are very important in contributing to sustainable management.

SDG 15 Life on Land

SDG 15 protects, restores and encourages the sustainable use of terrestrial ecosystems, sustainably manages forests, combats desertification, and halts and reverses land degradation and halts biodiversity loss. In his publication, Van Kruchten mentioned that the circular economy in SDG 15 is related to regenerative practices, such as circular agriculture, organic agriculture, organic waste management (fertilizers, soil restoration), regenerative agroforestry, multispecies plantations and industrial symbioses in forestry. In the context of the research subject, the business activities carried out that directly contribute to the SDG 15 target are the use of agricultural products that are encouraged to carry out organic farming on raw materials, spices, plants and agricultural products from SRN. Because it is often in contact with farmers, good practices from agriculture are encouraged by Prapti as a female leader at SRN so that agricultural products and land can provide good results, increasing farmers' income. Organic waste management practices are also carried out by Dawun by Santi, SRN and SHL which manage waste into organic fertilizer used for crops or agricultural land in the area where the community is located.

CONCLUSIONS

In conclusion, the study highlights the varying levels of Circular Economy (CE) implementation across three female-led MSMEs—*Dawun by Santi*, *Marun Spa Aromaterapi (MSA)*, and *Sekolah Hijau Lestari (SHL)/Sekolah Rempah Nusantara (SRN)*—through the lens of the 9R framework and the *ReSOLVE* framework. While *Dawun by Santi* led in terms of circularity, the three enterprises demonstrated a mix of innovations such as product design and circular revenue models. Their leadership styles, rooted in the *Path-Goal Theory*, were instrumental in driving their CE initiatives, with an emphasis on empathy, collaboration, and long-term environmental vision. Despite these efforts, challenges such as consumer behavior, regulatory gaps, and supply chain constraints persist, limiting the full potential of CE practices. The research contributes to the understanding of how female leadership influences CE adoption in MSMEs and emphasizes the need for supportive policies, capacity building, and inclusive strategies. Future research should focus on refining CE transition strategies, examining sector-specific challenges, and investigating the impact of supportive policies on MSME sustainability and gender equality. This study offers valuable insights for policymakers, businesses, and researchers aiming to foster sustainable practices and empower women-led enterprises.

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