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Social Capital And Climate Change Analysis Through Circular Economy Strategy On Goroho Banana MSME Resilience

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ABSTRACT

Research aims: This study aims to analyze the influence of Social Capital and Climate Change on Business Resilience with the Circular Economy Strategy as a mediator.Design/Methodology/Approach: This study employs a mixed-methods approach, with a dominant quantitative component and supporting qualitative components, to explore the causal relationships among the variables under investigation. It also seeks to test five research hypotheses that are expected to address the research objectives. The sample in this study consisted of 145 SMEs engaged in the processing of Goroho bananas. The samples were distributed across two regencies: Minahasa and North Minahasa. The sample was determined using a purposive sampling method. The criteria for sample selection were SMEs that have been operational for at least three consecutive years.Research findings: The key findings reveal that the Circular Economy Strategy is not merely an operational response, but rather a transformational mechanism that mediates 41-45% of the total impact of Climate Change and Social Capital on Business Resilience, with a statistically significant result ($t > 5.2$, $p < 0.001$) and a medium-to-large effect size ($f^2 > 0.23$). More importantly, effect size analysis demonstrates that Climate Change and Social Capital have a very substantial practical impact on the adoption of the Circular Economy Strategy ($f^2 > 1.0$), indicating that businesses or enterprises facing high climate pressures or possessing strong social networks will dramatically enhance the implementation of circular practices. Qualitative findings reveal the actual dynamics behind statistical figures, showing that the resilience of banana goroho MSMEs is built through

real-world experience and collective adaptation. In-depth analysis of the life experiences of banana goroho processing MSME actors reveals that business resilience is genuinely rooted in the foundation of communal values that are deeply ingrained in the lives of the Minahasan community. Social Capital is concretely manifested in mutual aid practices, belief systems passed down through generations, and kinship networks that form a natural safety net when facing external shocks, such as climate anomalies. Empirical evidence shows that, amid crop failures due to unpredictable weather, resource-sharing and knowledge-transfer mechanisms among community members occur without economic calculation—a practice reflecting the local wisdom of "torang samua basudara" (we are all brothers) as a social glue supporting the sustainability of collective endeavors.Theoretical Contribution/Originality: The theoretical contribution of this study lies in the empirical evidence that business resilience in the era of sustainability is not built through a single pathway, but rather through dual pathways—direct and indirect—which require business actors or organizations to transform external challenges into internal capabilities through innovation in circular business models, particularly in the local culinary SME sector.Practitioners/Policy Implications: Based on the research findings, to support business resilience and the implementation of the circular economy in SMEs, policies should include capacity-building for SMEs through training and improved access to resources, as well as incentives for those adopting environmentally friendly practices, such as using recycled materials and reducing waste. Additionally, it is crucial to foster stronger partnerships between the public and private sectors to support the transition of SMEs to a circular economy, along with establishing clear regulations to encourage the adoption of sustainability principles. These measures will enhance the competitiveness of SMEs, help them survive market challenges, and contribute to more sustainable development goals.Research Limitations/Implications: This study focuses on SMEs involved in the processing of Goroho bananas in Minahasa and North Minahasa districts. The study is limited to data from a specific sector; thus, generalization to other industries or geographic contexts should be done with caution.

INTRODUCTION

Pisang Goroho (Musa acuminata) is a superior indigenous commodity of North Sulawesi, possessing unique biological characteristics and profound local wisdom. Traditionally, the Minahasa people have recognized goroho bananas as a "functional food" that is not only highly nutritious but also holds philosophical value in local culture as a symbol of fertility and prosperity. As a regional commodity, goroho bananas have unique characteristics and high nutritional value, making them widely used to produce a range of processed products, including chips, flour, and traditional cakes. Banana-based MSMEs have become a driver of local community economic growth and have the potential to become a sustainable industry (Mangkay

et al., 2025). Additionally, the content in goroho bananas is believed to reduce cholesterol and treat high blood pressure and diabetes (Sangkilen et al., n.d.). However, in its development, the banana processing MSMEs in Goroho face complex challenges.Analyzing macro-environmental factors, such as economic, political, social, cultural, legal, technological, and environmental aspects, as well as the overall impact of ecological interactions on MSME resilience, is necessary for food processing MSMEs to effectively monitor the environment, assess potential threats, and respond to disruptive challenges in a way that maintains their competitive advantage (Gorjian Khanzad & Gooyabadi, 2021). There are 10 elements of business resilience for food processing MSMEs, according to Dewi et al. (2024), including social Capital, business model, diversification of processed products, and digital transformation.

On the one hand, climate change, including extreme weather events and changing rainfall patterns, has affected the productivity and quality of goroho bananas, the primary raw material. Meanwhile, limited access to formal financial capital forces MSMEs to rely on social Capital based on local wisdom, such as the "mapalus" (mutual aid) system and traditional Minahasa kinship networks. The paradox arises when organic waste from goroho banana processing (peel, stem, leaves), which accounts for 60% of the total raw material, is not optimally utilized, despite its potential as an alternative resource through a circular economy approach. This condition presents significant opportunities to integrate local wisdom with modern circular-economy principles to enhance MSME resilience. This research also supports the achievement of the 1st SDG goal of eradicating poverty, the 2nd goal of eradicating hunger, the 8th goal of economic growth, and the 12th goal of sustainable consumption and production (Sustainable Development Goals, 2023). This research was also conducted to support the 3rd asta cita, which is to encourage entrepreneurship, and the 6th asta cita, which is to build from the village and from the bottom for economic equality and poverty eradication (Presidential Regulation of the Republic of Indonesia No. 12/2025, n.d.).The literature on integrating local wisdom into the circular economy in commodity-based MSMEs remains limited, especially in the context of climate change adaptation. Research on goroho bananas as a regional flagship commodity using a circular-economy approach remains scarce, despite their significant economic potential. This study aims to analyze the influence of Social Capital and Climate Change on Business Resilience, with the Circular Economy Strategy serving as a mediator.

LITERATURE REVIEW

The Role of Social Capital in the Circular Economy Strategy

The theory about the importance of social Capital in supporting the circular economy strategy is becoming increasingly relevant, especially in the context of sustainable business development. Social Capital, which includes social relationships, trust, and norms present in interactions between members of society, plays a vital role in creating a solid foundation for the implementation of circular economy practices. Research shows that strong collaboration among business actors—driven by high social Capital—can accelerate the transition to a circular economy and enhance organizational capacity to address challenges, including crises arising from climate change (Ortega Alvarez et al., 2025) (Liu & Hu, 2022). Social Capital helps overcome barriers to implementing a circular economy strategy by facilitating communication and cooperation among various parties, both locally and internationally. Close social relationships foster the exchange of knowledge and the adoption of best practices in eco-friendly innovation, which is a crucial foundation for a circular economy across various sectors, including hospitality and waste management (Liu & Hu, 2021). Organizations focused on social capital development tend to be more agile and flexible in the innovation process, leading to efficient resource utilization and waste reduction (Sharma et al., 2023); (Ratum, 2024). Additionally, social Capital serves as a bridge in implementing the circular economy strategy, which is expected to address the challenges arising from climate change. As awareness of the importance of environmental

sustainability increases, businesses that effectively leverage social Capital can proactively implement circular economy practices and be more responsive to market changes and consumer needs (Yandri et al., 2024); Atieh Ali et al., 2024). Initiatives that involve the community in the design and implementation of a circular economy open new opportunities to develop innovative solutions focused on sustainability, such as more efficient raw material management and reduced environmental impact (Rista Ayu Ningtias & Sebayang, 2024).
H1: There is a significant relationship between social Capital and circular economy strategies.

Impact of Climate Change on Circular Economy Strategies

Climate change significantly impacts the implementation of circular economy strategies, which aim to keep products, materials, and resources in the economy for as long as possible. Some studies indicate that circular economy practices can help reduce greenhouse gas emissions and address issues arising from climate change. For example, strategies such as product reuse and recycling can reduce waste and conserve natural resources, thereby supporting global sustainability goals, including Sustainable Development Goals (SDGs) 12 (Responsible Consumption and Production) and 13 (Climate Action) (De Jesus et al., 2024). In the context of climate change, implementing a circular economy also involves eco-friendly innovation and strategies that support natural sustainability. The use of modern technology in waste management and material reuse is becoming increasingly crucial. This kind of innovation is not only essential for addressing the industry's environmental challenges but can also support economic growth. In sectors like textiles, the challenges and opportunities of adopting circular models are key factors influencing the success of circular economy practices, particularly in developing countries (Saha et al., 2021; Farrukh & Sajjad, 2024). The implementation of this strategy can also increase the sector's contribution to national income, as seen in Pakistan's innovative business models focused on waste management (Iqbal et al., 2023). Further research indicates that resilience to climate change and adaptation can be strengthened by implementing a circular economy that reduces ecological footprints and supports economic diversification. This concept is relevant not only at the national level but also at the international level, where policies need to encourage and facilitate the transition to a circular economy. For example, research in the European Union shows that green initiatives embedded in environmental policies are crucial for achieving sustainability goals, including within the context of the European Green Deal (Stefanis et al., 2024). However, the economic impact of environmental crises and climate change shows how uncertainty can hinder the necessary investment in a circular economy (Feiferytė-Skirienė & Stasiškienė, 2023). It demands that the government formulate more proactive policies to support recycling initiatives and efficient waste management as part of its economic recovery strategy after the crisis. All of this underscores the importance of synergy between technological innovation, supportive policies, and public awareness to realize an effective circular economy in the face of climate change. Thus, circular economy strategies can be a real solution to address the challenges of climate change by promoting resource efficiency and reducing carbon emissions while still supporting sustainable economic growth. The successful implementation of a circular economy relies heavily on cooperation between the public and private sectors, as well as on a willingness to change current consumption and production patterns (Chen et al., 2025).
H2: Climate change significantly impacts circular economy strategies.

The Influence of Circular Economy Strategies on Business Resilience

Circular economy strategies have a significant impact on business resilience, particularly amid environmental changes and evolving supply chain dynamics. By prioritizing waste reduction and more efficient resource utilization, the circular economy model helps companies become more flexible and resilient in the face of market challenges and unexpected crises. Research shows that implementing a circular economy in the supply chain can strengthen resilience by improving relationships and collaboration between various parties involved in the

distribution network (Alonso-Muñoz et al., 2021). A critical element in strengthening business resilience is more effective resource utilization. The use of closed-loop strategies in the supply chain has been proven to increase efficiency and reduce dependence on scarce raw materials, creating a competitive advantage as resources become limited (Kalaitzi et al., 2019). Some studies show that adopting circular economy principles not only helps reduce environmental impact but also improves financial performance through cost savings, a factor crucial to long-term business sustainability (Siratan et al., 2025).

Additionally, the ability to adapt to rapid change through innovation is becoming a key element in business resilience strategies. The utilization of digital technologies such as blockchain and the Internet of Things (IoT) in supply chain management helps companies improve transparency and responsiveness to market demand (Chari et al., 2022). Research also shows that integrating technology into the circular economy enables companies to respond to disruptions more effectively and reduce risks associated with market uncertainty (Ning et al., 2023).Furthermore, several international studies indicate that sustainable practices combined with a circular economy can strengthen supply chain resilience, particularly in developing countries. In this context, the cradle-to-cradle concept is relevant, as it emphasizes recycling and creates value through innovation focused on social and economic sustainability (Abbas et al., 2022). By incorporating sustainability principles, companies can build a strong foundation for resilience amid economic fluctuations and increasingly fierce competition. Overall, implementing a circular economy strategy can enhance business resilience by optimizing resource use, leveraging innovative technologies, and integrating sustainable practices into operations. To achieve this, government policy support and sectoral collaboration are essential. Therefore, business resilience not only depends on internal changes within the company but must be viewed as a system involving various parties in the economy.

H3: Circular economy strategies have a significant impact on business resilience.

The Influence of Social Capital on Business Resilience

Social Capital plays an essential role in strengthening business resilience, particularly among MSMEs. This social Capital encompasses aspects such as trust networks, collaboration, and social norms that can help business owners navigate challenges in the ever-changing business world. Some studies show that solidarity and trust within social networks can significantly enhance business resilience by providing access to information and resources crucial for surviving difficult situations (Safriadi & Al Isra, 2025). For example, in the Duano tribe fishing community, despite their limited social Capital, their potential to create business opportunities can help them expand their businesses and increase their income (Tambunan et al., 2023). Substantial social Capital, in the form of cooperation and participation among fishermen, greatly supports the development of their businesses and strengthens their resilience in the face of economic uncertainty. It is proven that relationships between individuals within a community can be an essential asset for maintaining business continuity. The strengthening of social Capital is also evident in Village-Owned Enterprises (BUMDes), which show a positive impact on the village economy. Extension activities focused on improving understanding of the local economy and the importance of collaboration have been proven to help increase the profitability of BUMDes (Purbadharmaja et al., 2024). By strengthening managers' capacity to understand and leverage social Capital, BUMDes can operate more effectively and make a significant contribution to village economic development.

Additionally, social Capital has proven crucial in maintaining business resilience during crises, as seen during the COVID-19 pandemic. Research shows that companies that successfully survived the pandemic had more substantial social Capital, such as strong relationships with suppliers and solid cooperation with fellow business owners (Mislihah & Da Silva, 2022). Substantial social Capital, both within the company through mutual respect among team members and outside the company through supplier loyalty, is key to gaining a competitive

advantage and strengthening business resilience. At a broader level, the utilization of social Capital also plays a crucial role in building business resilience, as seen in the strategies of street vendors in tourist areas. A study in Pekanbaru showed that strong social networks and high levels of trust among street vendors significantly contributed to their economic improvement (Haris et al., 2024). This social Capital facilitates information sharing, provides access to resources, and fosters customer loyalty, all of which are crucial for sustaining their businesses even in intense competition. Overall, social Capital not only helps entrepreneurs face challenges but also enhances their ability to adapt, innovate, and collaborate with others to develop their businesses. Given the significant influence of social Capital on business resilience, stakeholders and policymakers must foster an environment that supports the development of positive, collaborative social networks among business owners.
H4: Social Capital not only directly influences business resilience but also does so through its impact on circular economy strategies.

The Impact of Climate Change on Business Resilience

Climate change has a significant impact on business resilience, which is crucial for the sustainability and growth of businesses across various sectors. For example, smallholder farmers in the agricultural industry, who are highly dependent on the climate, often face higher risks due to weather uncertainty. Research shows that climate change can increase production yield instability, negatively impacting farmers' bargaining power and their ability to survive difficult economic situations (Irham et al., 2021). Therefore, farmers must adopt sustainable and adaptive farming practices to strengthen their resilience. In the broader micro, small, and medium enterprise (MSME) sector, climate change also presents significant challenges. According to studies, MSMEs that implement sustainability strategies and innovate in their operations can increase their resilience amidst market fluctuations and environmental impacts. It includes the use of environmentally friendly technologies and efficient resource management, which not only reduce environmental impact but also provide a competitive advantage (Ali et al., 2024; Artanto et al., 2022). By adapting to market changes and adopting a circular business model, MSMEs can strengthen their competitiveness and resilience. Additionally, it is essential to foster collaboration between the business world and other stakeholders to improve business resilience. Collaboration between government, academia, and the private sector can create policies and incentives that support climate change adaptation and business sustainability. For example, investing in sustainable infrastructure and technological innovation can help businesses adapt to climate change and boost local economic resilience (Mirza Rzayev, 2025). Research also shows that communities with substantial social Capital tend to be more resilient to the impacts of climate change. Social Capital, which involves community networks and cooperation, can strengthen the drive to adapt and share resources (Zou, 2023). It shows that building strong relationships between business owners and the local community can be an effective strategy for increasing business resilience in the face of challenges posed by climate change.Furthermore, training and skills development among business actors, especially in green innovation, are crucial steps to boost business resilience. Programs that support the development of green skills and entrepreneurship can open up new opportunities in sectors focused on sustainability and adapting to the impacts of climate change. In Indonesia, training for MSMEs to adopt environmentally friendly practices has been proven to increase business resilience and help them adjust to new economic conditions influenced by environmental factors (Lalit Jain, 2025; Sarirati et al., 2024). Overall, the impact of climate change on business resilience is very complex and multidimensional. Businesses that can adapt to change, implement innovation, and build collaborations with stakeholders have an excellent opportunity to survive and thrive amidst existing challenges. The sustainability and resilience of a business depend not only on its internal strategies but also on its relationships and interactions with its surrounding community and environment.

H5: Climate change affects business resilience, not only directly but also through circular economy strategies.

METHODS

This study employs a mixed-methods approach, with a dominant quantitative component and a supporting qualitative component, to explore the causal relationships among the variables under investigation. It also seeks to test five research hypotheses that are expected to address the research objectives.

Sample and Data Collection

The sample in this study consisted of 145 micro, small, and medium enterprises (MSMEs) that process goroho bananas. The samples were distributed across two districts: Minahasa and North Minahasa. The sample was determined using the purposive method. As for the criteria for determining the sample, it is MSMEs that have been operating continuously for at least 3 years. Data was collected through questionnaires, observations, and direct interviews with respondents. Researchers also prepared a questionnaire that was distributed online through Google Forms, but they encountered difficulties in its use. Most MSME actors involved in processing goroho bananas are middle-aged and have limited digital literacy.

Construct Measurement

This research employed a quantitative design comprising four constructs to investigate five hypotheses. The four constructs are social Capital, climate change, circular economy strategies, and business resilience. Each variable consists of 3 dimensions, each measured on a 5-point Likert scale ranging from strongly disagree to agree strongly. All research constructs were developed based on the literature and have undergone validity and reliability testing. The four variables used in the study were adapted from previous research. The social capital and business resilience variables each use three indicators adapted from Nguyen et al. (Nguyen Thi & Vu Dinh, 2025). The circular economy strategy indicator, used as a mediating variable, is adapted from Chakraborty et al. (2025), while the climate change variable is adapted from Okutan & Otay (2025) and Zeleke et al. (2025).

Validity and Reliability

After conducting an in-depth analysis and making adjustments to the instrument used in this study, all existing indicators are now proven to be valid and reliable. Through convergent validity testing, the AVEs for the constructs ranged from 0.6 to 0.7. Similarly, the cross-loadings test for discriminant validity was deemed valid. Reliability testing using Cronbach's Alpha yielded a score of 0.9, indicating strong Reliability and appropriate validity. With these adapted instruments, we are confident that measurements of social Capital, climate change, circular economy, and business resilience variables can be made with greater accuracy and Reliability.

Goodness of Fit

The model fit evaluation indicates that the model has a good fit. An SRMR of 0.049 is well below the recommended threshold (< 0.08; Hu & Bentler, 1999), indicating an excellent model fit. A substantial GoF value of 0.7 was obtained. Additionally, a d_G value of 3.505 also indicates low discrepancy between the model and the data. Although the NFI (0.771) is below the conventional cutoff of 0.90, this is acceptable in the context of PLS-SEM, which is more focused on prediction than model fit (Hair et al., 2019). Given that SRMR is the primary indicator of model fit in PLS-SEM, this model is suitable for further analysis. Table 1 below shows the coefficient of determination values.

Table 1. Coefficient Determinant

	R-square	R-square adjusted
Business Resilience (Y)	0.787	0.782
Circular Economy Strategy (M)	0.666	0.661

Source: Data Primer

The information in Table 1 shows that the R-squared and adjusted R-squared values obtained indicate how well the model explains the variation in the variables studied. For Business Resilience (Y), approximately 78.7% of the variation can be explained by the model, with a slightly lower adjusted R-squared (78.2%), indicating that despite some additional factors, the model is still quite effective in describing the variability. Meanwhile, for the Circular Economy Strategy (M), the model explained 66.6% of the variation, and after adjusting for the number of independent variables, 66.1% remained explainable. Overall, both values indicate that the model used performs well in explaining changes in both variables, with slightly more explanation provided for Business Resilience.

Hypothesis Testing Results

The research hypothesis testing was conducted using PLS analysis with SmartPLS software version 4.0. Table 2 summarizes the hypothesis-testing results for direct effects.

Table 2. Hypothesis Test Results for Direct Effects

	Hypotesis	Original sample	T statistics	P values	Description
Social Capital (X1) -> Circular Economy Strategy (M)	H1	0.579	13.526	0.000	Positive, Significant
Climate Change (X2) -> Circular Economy Strategy (M)	H2	0.578	14.602	0.000	Positive, Significant
Circular Economy Strategy (M) -> Bisnis Resilience (Y)	H3	0.447	5.942	0.000	Positive, Significant
Social Capital (X1) -> Bisnis Resilience (Y)	H4	0.313	5.419	0.000	Positive, Significant
Climate Change (X2) -> Bisnis Resilience (Y)	H5	0.372	6.202	0.000	Positive, Significant

Source: Data Primer

Specific Indirect Model

The final step is to test the indirect effect, which can be determined based on the results of the specific indirect effect. If the p-value is less than 0.05, the result is considered statistically significant. It means that the mediating variable plays a role in mediating the exogenous variable's indirect influence on the endogenous variable. Conversely, if the p-value is greater than 0.05, the result is considered insignificant, indicating that the mediating variable does not influence the relationship between the exogenous and endogenous variables. Table 3 summarizes the results of hypothesis testing for indirect effects. The proposed hypothesis appears acceptable.

Table 3. Hypothesis Testing Results for Indirect Effects

	Original sample	T statistics	P values	Description
Social Capital (X1) -> Circular Economy Strategy (M) -> Bisnis Resilience (Y)	0.259	5.201	0.000	Positive, Significant
Climate Change (X2) -> Circular Economy Strategy (M) -> Bisnis Resilience (Y)	0.258	5.37	0.000	Positive, Significant

Source: Data Primer

Effect Size (f^2)

Effect size (f^2) measures the magnitude of the substantive contribution of a predictor variable to the endogenous (dependent) variable in a structural model. Unlike statistical significance (p-value), effect size indicates the practical impact of the effect.

Table 4. Effect Size (f^2)

Rute	f^2	Effect Categor
Circular Economy Strategy → Business Resilience	0.313	Medium-Large
Climate Change → Business Resilience	0.324	Medium-Large
Social Capital → Business Resilience	0.230	Medium
Climate Change → Circular Economy Strategy	1.000	Very Large
Social Capital → Circular Economy Strategy	1.004	Very Large

Source: Data Primer

RESULTS AND DISCUSSION

The Role of Social Capital in the Circular Economy Strategy

This research reveals that social Capital has a significant positive influence on the implementation of the circular economy strategy. This result aligns with other studies showing that social values formed within a community, such as trust, social networks, and shared norms and values, can strengthen the implementation of sustainable initiatives in the business sector (Kussudyarsana et al., 2023). This social Capital serves as a connector, facilitating communication and knowledge sharing and promoting collaboration among stakeholders involved in the circular economy. It is also consistent with the argument that social Capital plays a vital role in supporting the adoption of environmentally friendly practices, especially in small and medium-sized enterprises that rely on community support. Additionally, research shows that sectors with substantial social Capital tend to be more successful in implementing sustainable strategies, as stronger relationships among members facilitate innovation and the adoption of environmentally friendly technologies, including digital technologies (Akarsu, 2024). (Khan et al., 2022) highlights the application of digital platforms to create social capital collaboration that can develop a circular economy culture from consumers to supply chain managers (Viscardi & Colicchia, 2025). It indicates that building social Capital is crucial to enhancing MSME competitiveness (Kim & Shim, 2018). It aligns with the idea that collaboration within social networks enables the accumulation of collective knowledge that can drive innovation in circular economy practices (Mele et al., 2025).

Impact of Climate Change on Circular Economy Strategies.

The results of this study also show that climate change has a positive impact on the implementation of circular economy strategies. The higher the awareness of the effects of climate change, the greater the push to adopt circular economy practices (Vihma & Moora, 2020). It shows that external factors, such as environmental threats, can drive changes in the way businesses operate. The uncertainty presented by climate change is driving efforts to adapt, and one such adaptation method is implementing circular economy principles, such as waste reduction and resource reuse. Previous studies also support the view that climate change is not only an environmental challenge but also a driver of transformation in how businesses operate (Rahim Munir & Rafika Fausiah, 2025; Kaya, 2025). Many companies are now transitioning to a circular model to reduce their carbon footprint (Leal Filho et al., 2024) and increase resilience to climate impacts. However, implementing this circular economy still faces challenges due to limited public literacy and knowledge (Farrukh & Sajjad, 2024).

The Influence of Circular Economy Strategies on Business Resilience

Circular economy strategies have been proven to enhance business resilience significantly. The implementation of a circular economy is expected to increase business resilience to emerging challenges, both internal (such as resource efficiency) and external (such as economic crises or climate change) (Fahad & Hossain, 2025). Businesses that adopt circular principles are better prepared to manage risks and maximize resource utilization, ultimately strengthening their long-term resilience (Kopytko & Tkachuk, 2025). Previous research has also shown that the circular economy plays a vital role in increasing business resilience by reducing dependence on limited natural resources and improving operational efficiency, enabling businesses to survive longer even in the face of market shocks or external changes (Lin & Chang, 2024).

Indirect Influence: Social Capital and Climate Change through Circular Economy Strategies. The results of this study also indicate that social capital and climate change influence business resilience not only directly but also through the influence of circular economy strategies. In this case, the circular economy strategy acts as a mediating link between these two variables and business resilience (Ooi & Memon, 2025). Social Capital facilitates the adoption of circular strategies, while climate change provides an additional impetus for their implementation (Yang et al., 2024). Social Capital not only strengthens the adaptive capacity of individuals and groups to external changes and pressures but also creates an environment that supports collaboration and innovation in circular economy practices (Bamasood et al., 2025). Other studies also show that, in an increasingly vulnerable economic context to climate change, implementing a circular economy is a way to strengthen business resilience (Park, 2023). Therefore, businesses need to build substantial social Capital to accelerate the adoption of sustainable strategies, thereby increasing their resilience to crises.

CONCLUSION

This study empirically confirms a new paradigm in building business resilience through the strategic integration of climate change pressures, social Capital, and circular economy practices. Key findings reveal that the Circular Economy Strategy is not merely an operational response, but a transformational mechanism mediating 41-45% of the total influence of Climate Change and Social Capital on Business Resilience, with highly significant statistical strength ($t > 5.2$, $p < 0.001$) and a medium-to-large effect size ($f^2 > 0.23$). More importantly, effect size analysis indicates that Climate Change and Social Capital have a substantial practical impact on the adoption of the Circular Economy Strategy ($f^2 > 1.0$), suggesting that businesses under high climate pressure or with strong social networks will dramatically increase their implementation of circular practices. The theoretical contribution of this research lies in the empirical proof that

business resilience in the sustainability era is not built through a single path, but rather through a dual path—direct and indirect—which requires MSME business actors, particularly those involved in processing goroho bananas, to transform external challenges into internal capabilities through innovation in circular business models. The practical implication is clear: move away from a reactive approach and adopt a proactive strategy by making the circular economy a core, not a peripheral, initiative to achieve sustainable, competitive, long-term resilience in an increasingly turbulent business landscape.

Qualitative findings reveal the actual dynamics behind statistical figures, showing that the resilience of banana goroho MSMEs is built through real-world experience and collective adaptation. In-depth analysis of the life experiences of banana goroho processing MSME actors reveals that business resilience is genuinely rooted in the foundation of communal values that are deeply ingrained in the lives of the Minahasan community. Social Capital is concretely manifested in mutual aid practices, belief systems passed down through generations, and kinship networks that form a natural safety net when facing external shocks, such as climate anomalies. Empirical evidence shows that, amid crop failures due to unpredictable weather, resource-sharing and knowledge-transfer mechanisms among community members occur without economic calculation—a practice reflecting the local wisdom of "torang samua basudara" (we are all brothers) as a social glue supporting the sustainability of collective endeavors.

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