

TRANSFORMING RURAL MSMES TOWARDS SUSTAINABILITY: SYNERGY BETWEEN LOCAL WISDOM, CIRCULAR ECONOMY, AND PENTAHHELIX COLLABORATION

Yenny Reiza Fitriana¹, Elvina Yulindra Hazanah², Prahesta Tri Hardono³, Dian Marlina Verawati^{4*}

¹⁻⁴ Management, Tidar University, Indonesia

*Email corresponding author: dianmarlina86@untidar.ac.id

Abstract

The transformation of MSMEs in rural Indonesia in the digital 5.0 era faces major challenges due to the dominance of a survival mindset, low digital literacy, and limited adoption of technology, such as NFC-based payment systems. This study aims to develop an integrative model that connects local wisdom, circular economy principles, and pentahelix collaboration to strengthen the competitiveness and sustainability of rural MSMEs. A systematic literature review was conducted to analyze the role of SMEs as local heroes, the integration of local wisdom as the foundation of competitive advantage, the application of the circular economy to enhance product efficiency and value addition, and the effectiveness of multi-stakeholder collaboration in developing an inclusive business ecosystem. The research findings indicate that rural SMEs remain focused on meeting daily needs, so innovation and long-term planning are not yet top priorities. However, local wisdom has proven to be integrable with the circular economy to enhance product value and competitiveness. Pentahelix collaboration involving the government, academia, businesses, communities, and the media is key to accelerating innovation adaptation and strengthening the SME ecosystem. This study recommends improving digital literacy, strengthening multi-stakeholder networks, and empowering local wisdom as the main strategies for transforming rural SMEs toward sustainability and competitiveness in the digital era.

Keywords: UMKM, local heroes, local wisdom, economy circular, grassroot, pentahelix

INTRODUCTION

The current global economic transformation is marked by rapid technological developments and increasingly urgent environmental sustainability challenges. Li et al. (2024) empirically demonstrate that information and communication technology (ICT) plays a central role in driving green total factor productivity (GTFP) across 65 countries, particularly in lower-middle-income nations, through three primary mechanisms: technological advancement, energy efficiency, and increased trade openness. These findings emphasize that ICT not only accelerates economic growth but also serves as a crucial tool for achieving sustainable development in the global era. Yudhoyono et al., (2024) review the perspective by systematically reviewing the literature on economic transformation across decades, and show that the technological dimension, along with leadership, public policy, and human resources, are the main pillars shaping the final outcomes of green economic growth, strengthened sectoral competitiveness, and shifts in economic positions within the global order. Khairi et al. (2025) emphasize the real transformation occurring at the microeconomic level, namely how the development of digital technology, including online platforms, automation, and the digitization of business processes, drastically changes how companies operate, improves operational efficiency, opens new market opportunities, but also presents new challenges such as digital access gaps, data security threats, and increasingly complex changes in business competition structures. The current global economic transformation is driven by the rapid pace of technological innovation, but its success heavily depends on the ability of global actors and local

heroes to integrate principles of environmental sustainability and digital justice into every economic decision-making process and public policy.

The concept of the circular economy (CE) is a strategic solution for reducing waste and maximizing resource utilization to make the economic system more sustainable and environmentally friendly (Farhani et al., 2025). At the national level, Indonesia, as a country with a large population and a growing economy, faces similar challenges, particularly in empowering the Micro, Small, and Medium Enterprises (MSMEs) sector, which serves as the backbone of the economy. According to data from Kadin Indonesia (2023), MSMEs contribute significantly to 61% of the Gross Domestic Product (GDP) and absorb around 117 million workers, emphasizing the vital role of MSMEs in job creation and economic equality.

However, real challenges arise, especially for MSMEs in rural areas, which are still dominated by a survival mindset, where business actors focus more on meeting daily needs without long-term planning that supports business growth and sustainability (Arfiyanto et al., 2013). This situation limits innovation and human resource (HR) capacity development, exacerbated by the digital divide and low adoption rates of financial technology and digitalization among rural SMEs (Kadin Indonesia, 2023). One example of technology that has the potential to support efficiency and financial inclusion is the Near Field Communication (NFC)-based payment system, unfortunately, its adoption remains very low.

In the context of sustainability, the concept of a circular economy offers significant opportunities for SMEs to improve resource utilization efficiency, reduce waste, and add value to products through recycling and reuse practices. This approach not only supports environmental conservation but can also integrate with local wisdom embedded in rural communities' culture and practices, such as natural material processing, traditional techniques, and social values like mutual aid and respect for nature (Pangarso et al., 2022).

However, the adoption of circular economy practices among Indonesian SMEs, particularly in the rural sector, remains very limited. Research examining the integration of the circular economy with local wisdom and multi-stakeholder collaboration models, particularly through the pentahelix approach involving government, academia, businesses, communities, and media, is still scarce (Zuhri et al., 2024). In fact, the synergy between local wisdom, circular economy, and pentahelix collaboration has great potential to strengthen the competitiveness and sustainability of rural MSMEs holistically.

Local wisdom itself is the cultural and social foundation that has been passed down from generation to generation and serves as the DNA of rural MSME businesses. The values of local wisdom include traditional knowledge, unique production techniques, and social norms that can be both an attraction and a product differentiation strategy. Strengthening local wisdom through community empowerment and product modernization can enhance the position of SMEs in the market (Nugraha & Andarini, 2020; Tumanggor, 2007).

Additionally, SME actors have the potential to become local heroes who can drive community-based change and innovation. To realize this, multi-stakeholder collaboration using the pentahelix model is crucial as a development strategy involving all stakeholders in the business ecosystem, from policy to on-the-ground practices (Jannah & Mani, 2025).

Based on the above discussion, there is a clear research gap, namely the lack of an integrative model that connects the survival mindset of rural SMEs with the synergy of local wisdom, circular economy, and pentahelix collaboration in building sustainable and technology-based transformation. Therefore, this study aims to explore and formulate such an integrative model, focusing on enhancing human resource capacity, product innovation, and adaptive multi-stakeholder collaboration strategies tailored to the characteristics of rural SMEs.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

MSMEs as Local Heroes in Rural Development

SMEs have proven to be “local heroes” that advance rural areas by optimizing local potential. This role is embodied by various actors in different regions (Dwi et al., 2024; Purwanti et al., 2023; Sutrisman et al., 2024; Jamil & Nugroho, 2023; Sobirin et al., 2024). First, cooperative groups such as the Women Farmers Group and Biogas Group in Kampung Rejo Basuki demonstrate the tangible role of SMEs as local heroes. They transform livestock waste into renewable energy and organic fertilizer while boosting the village economy in line with sustainable development goals (Dwi et al., 2024). Second, inspirational figures like Mr. Romadhon in Tambi Village prove the vital role of individuals. He pioneered a coffee SME for landslide disaster mitigation while leading the community in various roles, from initiator to mentor (Purwanti et al., 2023). On the other hand, village governments (e.g., in Salumaka Village) play a key supporting role for SMEs. Though not yet optimal, governments facilitate access to capital through programs like the Productive Microbusiness Assistance (BPUM), corporate social responsibility (CSR), and the People's Business Credit (KUR) (Sutrisman et al., 2024). Meanwhile, cultural groups such as the Sambas weavers emphasize the identity of MSMEs as local heroes. They revive the weaving heritage that boosts the village economy through multi-stakeholder collaboration and community involvement (Jamil & Nugroho, 2023). Finally, the independent Pindang Lombang traders demonstrate the transformative potential of MSMEs. Through participatory mentoring, they have improved business management, product standards, and packaging technology (Sobirin et al., 2024). Despite their diverse forms, all MSMEs as local heroes share three key characteristics: (1) the ability to identify local potential, (2) serving as agents of change from within the village, and (3) making tangible contributions to economic, social, and environmental sustainability (Dwi et al., 2024; Purwanti et al., 2023; Jamil & Nugroho, 2023; Sobirin et al., 2024). Collaboration among various parties and active community involvement are key to ensuring the program aligns with residents' needs (Sobirin et al., 2024; Jamil & Nugroho, 2023). Given the existing benefits, SMEs can serve as the backbone of the national economy, driving economic growth in rural areas. According to a report by the Indonesian Chamber of Commerce and Industry (Kadin) in 2023, the Micro and Small Industry (MSI) sector recorded a growth of 2.55%. Additionally, the SME sector contributes 61% to Indonesia's Gross Domestic Product (GDP) by employing 117 million workers (Kadin Indonesia, 2023). This demonstrates that SMEs possess high resilience in supporting the national economy by leveraging local potential and driving sustainable economic transformation.

P1: SMEs act as local heroes by leveraging local potential, significantly enhancing the sustainability of rural economies.

Local Wisdom as the Foundation of Competitive Advantage

Local wisdom is an important foundation for MSMEs to compete in the market. Cultural values such as cooperation (gotong royong), deliberation, and harmony strengthen social relationships in business, foster a shared awareness, and encourage community participation (Nor & Aslamiah, 2025). In business, local wisdom makes SME products unique. For example, in the culinary industry, the Javanese philosophy of “rugi satak bathi sanak” (prioritizing social relationships over profit alone) is applied in corporate social responsibility programs. This approach has proven to enhance customer loyalty, business reputation, and environmental sustainability through the empowerment of local communities (Nugrahaningsih & Falikhatun, 2025). In the tourism sector, traditions like Nyelamaq in Lauq are used as cultural-based tourist attractions. Collaboration between the government, academics, businesses, communities, and media has successfully created unique tourism packages that expand the market for village SMEs while preserving nature (Khotimah et al., 2024). Similar support for SMEs in Central Banggai also shows that direct community involvement enhances production and marketing skills (Saudin et al., 2024). Local wisdom strengthens SME marketing strategies. Research on traditional house craftsmen in Woloan demonstrates that understanding customer needs based on cultural values (such as unique designs and quality) directly enhances competitiveness. This impacts sales through customer satisfaction and

market expansion (Raintung et al., 2024). In the development of tourist villages, local wisdom is also a determining factor for long-term success, along with community participation and the utilization of local resources (Sukaris et al., 2023). The main challenges are the declining understanding of traditional values among the younger generation (Nor & Aslamiah, 2025), difficulty in accessing capital, and limited human resource capabilities (Gobal et al., 2024).

P2: The integration of local wisdom into MSME products or services strengthens brand identity and competitiveness in national and global markets.

Circular Economy and MSME Sustainability

Sustainable SME development can be achieved through the implementation of a circular economy that prioritizes innovation and community empowerment. Juani et al. (2025) demonstrate that the utilization of young melon waste into value-added products such as jam through the 3R approach (reduce-reuse-recycle) can enhance community skills and village income while reducing organic waste. Zahara and Suci (2024) add that the innovative use of wood powder in brick production in Sigidong Village improves product quality and supports environmentally friendly practices, with collaboration between academics and producers as the key to success. Both studies emphasize that innovations based on local wisdom and active collaboration strengthen the competitiveness of MSMEs while maintaining environmental and economic sustainability in villages, making this model worthy of replication for inclusive and sustainable MSME development (Juani et al., 2025; Zahara and Suci, 2024). The implementation of a circular economy in MSMEs still faces various challenges. According to research by Suryantini et al. (2021), the first challenge is the lack of deep understanding of the circular economy concept and the absence of adequate support for SMEs. Second, strong commitment is needed from various parties, including the government, the business sector, supporting institutions, and the development of technology and innovation capable of accelerating the transition to a circular economy. Third, there are risks associated with the transition from a linear production system to a circular one, including the need for initial investment, logistical complexity, and significant changes in the supply chain. Fourth, there are implementation barriers for SMEs, such as capital constraints, limited human resources, and insufficient involvement in the broader circular economy ecosystem. Fifth, there are challenges related to organizational cultural innovation. Additionally, the circular economy also faces challenges in the European Union and other countries due to regulations that are not yet adaptive and the need for cross-border collaboration. However, the implementation of the circular economy has major challenges, including access to funding, low awareness among businesses, and regulatory support that is still not optimal. Therefore, collaborative strategies, strong policy support, and capacity building for SMEs are needed to ensure an effective and sustainable transition to a circular economy (Rahmat et al., 2024).

P3: The application of circular economy principles in rural SMEs reduces dependence on external resources while increasing long-term profitability.

Pentahelix Collaboration and Local Leadership

Pentahelix collaboration, which includes the government, academia, the private sector, the community, and the media, has proven to be effective in empowering the capacity of integrated MSMEs (Buntuang et al., 2024). According to research by Pugra et al. (2021) state that pentahelix collaboration with village governments is a key point in creating sustainable tourist destinations that can compete with similar destinations based on Green Tourism. Support within the pentahelix elements can be seen from the government in the form of funding or motivation for the community. Meylani et al. (2018) and Putra (2019) state that community motivation is a key factor in fostering entrepreneurial spirit, which can aid in village development and enhance the village's positive image. The village head plays a crucial role in SME development through programs and coordination that support the sustainability of local SMEs, such as providing guidance, connecting SMEs with necessary resources, facilitating market access, and assisting in promotional collaborations (Silfiah & Rohmah,

2024). In this context, the village government plays the role of stabilizer, innovator, pioneer, and modernizer in SME development in Suwayuwo Village (Siagian, 2018). Therefore, pentahelix collaboration in local leadership creates synergy in supporting the development and empowerment of SMEs in a more conducive manner.

P4: Pentahelix collaboration facilitated by local leadership is effective in creating an inclusive and sustainable SME support ecosystem.

RESEARCH METHODS

This study uses a systematic literature review method designed to systematically identify, evaluate, and synthesize findings from various studies related to the role of MSME actors as agents of local change in the context of local wisdom, circular economy, and innovative collaboration in Indonesia. The literature search process was conducted through leading academic databases such as Scopus, Web of Science, and Google Scholar using specific keywords, including “MSME actors as local change agents,” “local wisdom,” “circular economy,” and “innovative collaboration” (Liberati et al., 2009; Page et al., 2021). After the initial identification of articles, a stepwise screening process was conducted using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart, which included removing duplicates, selecting based on titles and abstracts, and assessing full-text articles to ensure relevance and methodological quality. This process yielded articles that met the inclusion criteria, namely topic relevance, quality of journals indexed in Scopus, Web of Science, and Google Scholar, and a focus on SMEs in Indonesia published between 2016 and 2025 (Page et al., 2021; Macquarie University Library, 2023). Data analysis was conducted using a thematic approach and qualitative synthesis to identify patterns and trends in the literature and critically evaluate the contribution of SMEs as local change agents.

The contribution of this research is not merely to enrich the existing literature but also to offer a new analytical framework that simultaneously integrates the perspectives of local wisdom, circular economy, and innovative collaboration, differing from previous studies that tended to discuss these aspects separately. This approach opens new insights into how the synergy of these three aspects can strengthen the role of SMEs in sustainable development and local innovation, as well as provide more comprehensive and applicable policy implications for SME development in Indonesia (CW Authors, 2023; Liberati et al., 2009). Thus, this research not only fills the research gap related to the integration of strategic concepts in the context of SMEs but also emphasizes the importance of a collaborative approach based on local wisdom and the circular economy as the foundation for innovative and sustainable SME development.

RESULTS AND DISCUSSION

The analysis shows that MSMEs have great potential as local heroes capable of empowering local potential and promoting rural economic sustainability (Dwi et al., 2024). However, this role has not been fully realized because most MSMEs are still focused on meeting daily needs. Literature studies confirm that the success of MSMEs as local heroes occurs when they are able to utilize local resources, contribute to increasing village income, and involve the community in the business development process (Sobirin et al., 2024). The role of MSMEs as local heroes (P1) cannot be separated from the existence and utilization of local wisdom (P2). Local wisdom provides social, cultural, and material resources that serve as the foundation for MSMEs to grow from within their own communities. Values such as mutual cooperation, deliberation, and the use of traditional techniques and materials become distinguishing strengths that strengthen the competitiveness of MSMEs and reinforce social bonds in villages. Without the integration of local wisdom, MSMEs will lose their identity and find it difficult to compete in a homogeneous market.

P1: SMEs play the role of local heroes by leveraging local potential, significantly enhancing the sustainability of rural economies.

The integration of local wisdom into MSME products has been proven to enhance brand identity and competitive advantage. For example, practices such as mutual cooperation, the use of local raw materials, and the application of cultural values in business processes increase customer loyalty and strengthen product differentiation. However, challenges arise from the declining understanding of local wisdom among younger generations, as well as limitations in access to capital and human resource capacity. This aligns with the findings of Nor & Aslamiah (2025) and Gobal et al. (2024), which highlight the weak regeneration of business actors based on culture. Local wisdom (P2) has a direct connection with the principles of the circular economy (P3). Many traditional village practices, such as the use of organic waste for fertilizer or recycled crafts, naturally reflect the reduce-reuse-recycle principle. Therefore, the implementation of the circular economy will be more easily accepted if linked to existing local practices and can even be developed as culture-based innovations. This synergy not only supports environmental conservation but also provides economic value.

P2: Integrating local wisdom into SME products or services strengthens brand identity and competitiveness in both national and global markets.

The adoption of circular economy principles in rural MSMEs is still limited. The practices of reduce, reuse, and recycle (3R) have only been implemented by a small number of MSMEs, even though the potential for circular economy-based development is enormous, especially through the utilization of waste into value-added products. This finding is supported by Juani et al. (2025), who demonstrated the success of SMEs in developing environmentally friendly products that increase village income, as well as by Zahara and Suci (2024), who highlighted the contribution of SMEs in reducing waste through circular economy-based innovations. The transition toward a circular economy (P3) requires support and infrastructure, which can be optimized through a pentahelix collaboration model (P4). For example, academics can assist in research and training, governments can provide incentives and regulations, while the media can play a role in educating the public. Without multi-stakeholder synergy, circular innovations will be difficult to implement on a large scale, especially in villages with limited technology and information.

P3: Applying circular economy principles to rural SMEs reduces dependence on external resources while enhancing long-term profitability.

The pentahelix collaboration involving the government, academics, business actors, the community, and the media is still unstructured and suboptimal in the context of rural MSMEs. However, this collaboration has proven effective in accelerating capacity building for SMEs, expanding market access, and accelerating the digitalization process (Silfiah & Rohmah, 2024). Village heads and local leaders play a crucial role in facilitating synergy among stakeholders to ensure empowerment programs run more effectively (Pugra et al., 2021). SMEs as local heroes (P1) cannot work alone; they need the support of a collaborative and sustainable ecosystem, such as that offered by the pentahelix model (P4), where the roles of village heads, academics, business actors, and the media are crucial to the success of SME empowerment programs. In this context, local heroes act as field drivers, while the pentahelix provides systemic support that enables innovation and growth.

P4: Pentahelix collaboration facilitated by effective local leadership is key to creating an inclusive and sustainable SME support ecosystem.

The transformation of rural MSMEs towards sustainability requires integrated synergy between the four propositions. MSMEs as local heroes (P1) become the main actors of change that drive the potential of villages. Local wisdom (P2) becomes the cultural foundation that strengthens product identity and facilitates the adoption of innovation. The principles of the circular economy (P3) offer strategies for efficiency and sustainability through the utilization of waste and local resources. Meanwhile, pentahelix collaboration (P4) provides systemic support from government,

academia, businesses, communities, and media to drive innovation, knowledge transfer, and network expansion. This integrated model is expected to drive rural SMEs to transform from a survival mindset into adaptive, innovative, and highly competitive economic actors in a sustainable manner. The synergy between these propositions is not linear but cyclical and mutually reinforcing. Local wisdom provides the foundation, the circular economy sets the direction, the pentahelix provides the impetus, and local heroes are the primary drivers of change in the village.

This study found that SME actors in rural Indonesia are still dominated by a grassroots or survival mindset. This mindset focuses on meeting daily needs without long-term planning and tends to hinder innovation and business development. This finding aligns with the views of Ridwan Maksum et al. (2020), who state that economic activities at the grassroots level are more focused on sustaining daily life rather than on sustainable business growth or expansion. Additionally, the digital literacy level of SME actors in rural areas remains low, as evidenced by the many business operators who have yet to utilize digital technology, both in marketing and financial transactions. One example is the limited adoption of technology-based payment systems that have the potential to improve transaction efficiency and financial inclusion among SMEs. Data from Kadin Indonesia (2023) also shows that the digital divide remains a major obstacle to SME transformation in rural areas.

In terms of sustainability, most SMEs have not yet implemented circular economy principles. Practices such as recycling, reusing raw materials, and sustainable product design remain limited. However, this study found that local wisdom, such as the use of natural materials, traditional production techniques, and the social value of mutual cooperation, remains strong and has significant potential to be integrated with circular economy concepts. This aligns with the findings of Pangarso et al. (2022) and Nugraha & Andarini (2020), who emphasize the importance of local wisdom as the DNA of SME businesses in rural areas. Additionally, cross-sector collaboration through the pentahelix model—involving government, academia, businesses, communities, and media—has not yet been optimized to support the development of rural SMEs. However, the synergy between local wisdom, the circular economy, and pentahelix collaboration has the potential to strengthen competitiveness in creating holistic sustainability for SMEs.

This study explicitly identifies that the main challenges facing rural MSMEs are a survival mindset, low digital literacy, suboptimal adoption of the circular economy, and weak collaboration between sectors. Therefore, the proposed integrative model combines the strengthening of local wisdom, the implementation of the circular economy, and pentahelix collaboration as the main strategies in building competitive and sustainable rural SMEs. The findings in this study were obtained through a literature review approach related to economic transformation, the circular economy, and multi-stakeholder collaboration. Data were categorized based on main themes: grassroots mindset, technology adoption, circular economy practices, and the role of stakeholders in the SME ecosystem. The integration of local wisdom with circular economy principles is deemed capable of enhancing the value added of SME products and strengthening their competitiveness in broader markets. For example, the use of textile waste to create new craft products or the utilization of agricultural waste as raw materials for innovative products. Therefore, pentahelix collaboration involving the government, academia, businesses, communities, and the media has proven effective in accelerating innovation adoption and enhancing human resource capacity, as well as helping to open opportunities for SMEs to become local heroes capable of driving change.

These findings reinforce community-based development theory and related literature on the circular economy, which emphasizes the importance of local innovation and cross-sector collaboration (Farhani et al., 2025; Pangarso et al., 2022). The resulting integrative model is also relevant to the pentahelix approach, which has proven effective in developing innovation ecosystems in various countries (Setyorini & Pangarso, 2023). Theoretically, this research offers a development to the theory of rural economic transformation by adding the variables of pentahelix collaboration and integration of local wisdom as key success factors. Practically, this model can be

adopted by local governments and SME support institutions to design more adaptive and sustainable empowerment programs.

This study emphasizes that the transformation of rural SMEs toward sustainability requires a shift in mindset, improved digital literacy, adoption of a circular economy, and strengthened multi-stakeholder collaboration based on the pentahelix approach. The integration of local wisdom is a distinguishing factor that can strengthen the competitiveness and sustainability of SMEs amid the challenges of globalization and technological disruption. The synergy between pentahelix collaboration and the circular economy is expected to transform SMEs from grassroots businesses that merely survive to meet daily needs into adaptive, innovative entities capable of contributing to sustainable economic development.

CONCLUSION

The transformation of MSMEs in rural areas in the digital 5.0 era is greatly influenced by entrepreneurial mindsets, grassroots movements, the role of local heroes, digital literacy levels, the implementation of a circular economy, and pentahelix-based collaboration. This study makes a significant contribution by developing a new conceptual framework that integrates local wisdom, circular economy, and pentahelix collaboration in the development of rural SMEs.

Most rural SMEs remain focused on meeting daily needs, so innovation and long-term planning are not yet top priorities. Low digital literacy and suboptimal use of technology, such as NFC-based payment systems, are major barriers to the digitalization of rural SMEs. These factors can slow down SMEs' adaptation to technological changes and increasingly competitive market conditions.

On the other hand, local wisdom has proven to be an important foundation that can be integrated with circular economy principles to increase the added value of products and the competitiveness of MSMEs. Practices based on local wisdom, such as the processing of natural materials and mutual cooperation, can strengthen product identity and build customer loyalty. The integration of the circular economy also helps MSMEs reduce waste and improve resource efficiency, thereby supporting business sustainability.

Pentahelix collaboration involving the government, academia, business actors, the community, and the media is key to accelerating innovation adaptation and strengthening the MSME business ecosystem in rural areas. This multi-stakeholder synergy is essential to overcome resource constraints, expand market access, and improve the capacity of MSME human resources.

Overall, the sustainable and adaptive transformation of rural MSMEs in the digital era can only be achieved through the integration of local wisdom, the implementation of a circular economy, and effective pentahelix collaboration. Efforts to improve digital literacy, product innovation, and strengthen multi-stakeholder networks need to be a top priority in the future development of rural MSMEs.

The results of this study can provide several practical recommendations:

1. The government and supporting institutions need to develop training programs focused on changing community mindset, improving digital literacy, and adopting a circular economy based on local wisdom.
2. Strengthen collaboration through the pentahelix model to drive innovation, knowledge transfer, and the strengthening of SME business networks.
3. Integrating local wisdom values into production and marketing processes can serve as a product differentiation strategy for SMEs in both national and global markets.

BIBLIOGRAPHY

- Arfiyanto, D., Susandini, A., Widyastuti, E., 2013. Entrepreneur Mindset Usaha Mikro Kecil Dan Menengah (Ukm) (Studi Pada Pelaku Usaha Mikro Kecil Dan Menengah Di Kecamatan Saronggi). Jurnal "PERFORMANCE" Bisnis & Akuntansi.
- Badan Pusat Statistik. (2025). Pertumbuhan Ekonomi Indonesia Triwulan IV-2024. <https://www.bps.go.id/id/pressrelease/2025/02/05/2408/ekonomi-indonesia-tahun-2024-tumbuh-5-03-persen--c-to-c---ekonomi-indonesia-triwulan-iv-2024-tumbuh-5-02-persen--y-on-y---ekonomi-indonesia-triwulan-iv-2024-tumbuh-0-53-persen--q-to-q--.html>
- Buntuang, P. C. D., Adda, H. W., Kornelius, Y., Nurjannah, & Rahman, V. (2024). Kualitas Sumberdaya Manusia Pentahelix Collaborative dalam Pemberdayaan UMKM sebagai Upaya Kesejahteraan Sosial Ekonomi. In Prosiding Seminar Nasional Kusuma III (Vol. 2). Oktober.
- CW Authors. (2023). Unlocking research novelty and identifying research gaps.
- Dwi, I., Poetri, M., Yogi, C., Bayu, P. &, & Pamungkas, A. (2024). Empowerment of the Rejo Basuki Village Community through Cow Dung Waste into Biogas: Planning, Implementation to Impact. *Indonesia Social Responsibility Award*, 2(1). <https://doi.org/10.55381/isra.v2i1.280>
- Gobal, R., Tasik Allo, Y., & Duryana. (2024). Peran Usaha Mikro Kecil Menengah (UMKM) dalam Pemberdayaan Ekonomi Masyarakat Desa. *Bulletin of Community Engagement*. <https://attractivejournal.com/index.php/bce/>
- Ismawati, L., Madya Marampa, A., Pratama, M. A., & Maharani, E. (2023). Sinergi Pentahelix dalam Membangun Perekonomian Daerah dengan Pendekatan Kearifan Lokal Era Digital di Kabupaten Tana Toraja Sulawesi SelatanThe Synergy Of The Pentahelix Model In Building The Regional Economy With A Local Wisdom Approach In The Digital Era In Tana Toraja Regency South Sulawesi. 2(1).
- Jamil, I., & Nugroho, W. (2023). Model CSR Pengembangan Pariwisata Berbasis Potensi Lokal Pada Program Kampung Wisata Tenun Khatulistiwa Pontianak. *Jurnal Program Studi Pendidikan Masyarakat*, 4(1), 230–243.
- Kadin Indonesia. (2023). UMKM Indonesia. Kadin Indonesia. <https://kadin.id/data-dan-statistik/umkm-indonesia/>
- Khairi, M., Rianto, B., Jalil, M., Juita, H., Sudeska, E., 2025. Pengaruh Teknologi Dalam Transformasi Ekonomi Dan Bisnis Di Era Digital. Jurnal Perangkat Lunak.
- Khotimah, N., Syakirin, A., Asri, F. H., & Rahmawati, E. (2024). *Model Pentahelix dalam Pengembangan Ekowisata Kearifan Lokal Tradisi Nyelamaq di Lauq Desa Tanjung Luar*. 7(2). <https://doi.org/10.17509/jithor.v>
- Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P. A., Clarke, M., Devereaux, P. J., Kleijnen, J., & Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: Explanation and elaboration. *PLoS Medicine*, 6(7), e1000100. <https://doi.org/10.1371/journal.pmed.1000100>
- Li, Y., Li, X., Wang, X., Feng, C., 2024. Sustainable Digital Transformation: The Nexus Between ICT And Global Green Economic Growth. Technological and Economic Development of Economy 30, 1275–1305.
- Macquarie University Library. (2023). Step 6: PRISMA flow diagram & screen - Systematicreviews-Subject and research guides.
- Nor, T., & Aslamiah. (2025). Strategi Kepemimpinan Visioner Dalam Implementasi Visi Dan Misi Berbasis Kearifan Lokal. *CENDEKIA : Jurnal Ilmu Pengetahuan*.
- Nugrahaningsih, P., & Falikhatun. (2025). Implementasi Tanggung Jawab Sosial Perusahaan Berbasis Kearifan Lokal dalam Bisnis Kuliner Berkelanjutan. *Jurnal Riset Dan Aplikasi: Akuntansi Dan Manajemen*, 7(3). <https://doi.org/10.33795/jraam.v7i3.006>

- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>
- Pugra, I. W., Oka, I. M. D., & Suparta, I. K. (2021). Kolaborasi Pentahelix Untuk Pengembangan Desa Timpag Menuju Desa Wisata Berbasis Green Tourism. *Bhakti Persada*, 7(2), 111–120. <https://doi.org/10.31940/bp.v7i2.111-120>
- Purwanti, E., Padmaningrum, D., Ratna Devi Sakuntala, dan L., Artikel, I., Studi III Keperawatan, P. D., & Ilmu Kesehatan, F. (2023). Gaya Kepemimpinan Aktor Lokal dalam Pengembangan dan Pemberdayaan Masyarakat. In *Indonesian Journal of Social Responsibility Review* (Vol. 2, Issue 1).
- Rahmat, D. A., Rumanti, A. A., Pulungan, M. A., Rizaldi, A. S., & Amelia, M. (2024). Evaluating the Role of Open Innovation and Circular Economy in Enhancing Organizational Performance: Insights from Batik Small and Medium Enterprises in Banyuwangi, Indonesia. *Sustainability*, 16(24). <https://doi.org/10.3390/su162411194>
- Raintung, M. Ch., Kawet, R. Ch., & Lumatow, R. Y. (2024). Pengaruh Orientasi Pasar Untuk Meningkatkan Kinerja Pemasaran Melalui Keunggulan Bersaing Sebagai Variabel Mediasi Pada Pelaku Usaha Industri Rumah Panggung Di Kecamatan Woloan Kota Tomohon. *Jurnal Ilmiah Manajemen Bisnis Dan Inovasi Universitas Sam Ratulangi (JMBI UNSRAT)*.
- Sari, Y. R., Marta, A., Wiranata, I. J., & Handayani, D. W. (2022). Peluang Kolaborasi Penta Helix bagi Pengembangan Desa Wisata di Provinsi Lampung. *JiIP: Jurnal Ilmiah Ilmu Pemerintahan*, 7(2), 119–135. <https://doi.org/10.14710/jiip.v7i2.14465>
- Sarofah, R. (2022). Transformasi Pemerintah Lokal: Penerapan Smart Governance Melalui Konsep Kolaboratif Di Indonesia. <https://publicadministration.un.org/egovkb/en->
- Saudin, L., Lule, H. B., & Reny, N. P. (2024). Pendampingan Umkm Di Kecamatan Banggai Tengah Kabupaten Banggai Kepulauan Dalam Membangun Ekonomi Lokal Yang Berkelanjutan. *Indonesian Collaboration Journal of Community Services*, 4(2). <https://doi.org/10.53067/icjcs.v4i2>
- Septadiani, W. P., Pribadi, I. G. O. S., & Rosnarti, D. (2022). Peran Model Pentahelix Dalam Pengembangan Pariwisata Di Kawasan Ekonomi Khusus Mandalika The Role Of Pentahelix Model In Tourism Development Of Mandalika Special Economic Area. In Universitas Trisakti. WIDYA PUTRI SEPTADIANI.
- Silfiah, R. I., & Rohmah, M. (2024). Peran Kepemimpinan Kepala Desa dalam Pengembangan UMKM Desa Suwayuwo Kecamatan Sukorejo Kabupaten Pasuruan. *Jurnal Ilmu Administrasi Negara ASIAN (Asosiasi Ilmuwan Administrasi Negara)*, 12(2), 187–197. <https://doi.org/10.47828/jianaasian.v12i2.237>
- Sobirin, M. K., Assakina, L., Amali, M. F. R., Prameswari, B. A., Makhroja, M. N., & Rizki, K. (2024). Empowering Families of Indonesian Migrant Workers through Basic Financial Literacy Programme in Padamara Village. *Prospect: Jurnal Pemberdayaan Masyarakat*, 3(1), 32–44. <https://doi.org/10.55381/jpm.v3i1.211>
- Sukaris, Kurniawan, A., & Kurniawan, M. D. (2023). Strategi Pengembangan Wisata Desa Yang Berkelanjutan. *Jurnal Manajerial*. <https://doi.org/10.30587/manajerial.v10i1.4751>
- Suryantini, S., Arsawan, I. W., Darmayanti, N., Moskalenko, S., & Gorokhova, T. (2021). Circular economy: barrier and opportunities for SMEs. *E3S Web of Conferences*, 255, 01017. <https://doi.org/10.1051/e3sconf/202125501017>
- Sutrisman, S., Syaebah, M., & Hamdan, H. (2024). Peran Pemerintah Desa Dalam Pembangunan Ekonomi Lokal Melalui Umkm Di Desa Salumaka. *Journal Pegguruang: Conference Series*, 6(2), 731. <https://doi.org/10.35329/jp.v6i2.5672>

- Yanza, F., Mukhrijal, & Afrijal. (2024). Analisis Model Kolaborasi Pentahelix Pemerintah Kabupaten Bireuen Dalam Pengembangan Usaha Mikro. Jurnal Ilmiah Mahasiswa FISIP USK, 9(3). <http://www.jim.usk.ac.id/Fisip>
- Yudhoyono, A.H., Suhariadi, F., Supriharyanti, E., Haqq, Z.N., 2024. Economic Transformation: A Systematic Literature Review. Sustainability (Switzerland).
- Zuhri, N.M., Abdullah, Z., Puspita, N., Antoro, M.A.S., 2024. Assessing the Viability of Circular Economy in Indonesia's MSMEs Agribusiness Sector. International Journal of Sustainable Development and Planning 19, 4227–4237.