

BUILDING THE COMPETITIVENESS OF MICRO ENTERPRISES IN THE DIGITAL ECONOMY ERA THROUGH ENTREPRENEURSHIP EDUCATION, DIGITAL LITERACY, AND GOVERNMENT SUPPORT AS DRIVERS OF INNOVATION AND COMMUNITY WELFARE

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ABSTRACT

This study aims to comprehensively examine how entrepreneurship education, digital literacy, and government support contribute to building the competitiveness of micro enterprises in the digital economy era, as well as how these three elements collectively foster innovation and community welfare. The study employs a literature review method with a descriptive qualitative approach, collecting data from various academic sources such as Google Scholar and credible websites covering the period 1985–2025. Out of 50 initially identified articles, 39 were selected through a rigorous screening process based on thematic relevance, source credibility, and contextual suitability. The findings indicate that entrepreneurship education plays a vital role in shaping innovative mindsets and adaptive capabilities among micro-entrepreneurs, while digital literacy enhances their technological competence in facing the dynamics of digital-based markets. Government support—through policies, training programs, and the provision of digital infrastructure—acts as a catalyst that accelerates the transformation of micro enterprises toward a knowledge-based economy.

Keywords: Micro Enterprise Competitiveness, Entrepreneurship Education, Digital Literacy, Government Support, Innovation, Community Welfare, Digital Economy

MEMBANGUN DAYA SAING USAHA MIKRO DI ERA EKONOMI DIGITAL MELALUI PENDIDIKAN KEWIRAUSAHAAN, LITERASI DIGITAL, DAN DUKUNGAN PEMERINTAH SEBAGAI PENGGERAK INOVASI DAN KESEJAHTERAAN MASYARAKAT

ABSTRAK

Penelitian ini bertujuan untuk meninjau secara komprehensif bagaimana pendidikan kewirausahaan, literasi digital, dan dukungan pemerintah berperan dalam membangun daya saing usaha mikro di era ekonomi digital, serta bagaimana ketiganya berkontribusi terhadap inovasi dan kesejahteraan masyarakat. Penelitian ini menggunakan metode tinjauan pustaka dengan pendekatan kualitatif deskriptif, dengan data yang dikumpulkan dari berbagai sumber ilmiah seperti Google Scholar dan situs web kredibel selama periode 1985–2025. Dari 50 artikel yang ditemukan pada tahap awal, sebanyak 39 artikel dipilih melalui proses seleksi ketat berdasarkan relevansi tema, kredibilitas sumber, dan kesesuaian konteks penelitian. Hasil kajian menunjukkan bahwa pendidikan kewirausahaan memiliki peran penting dalam membentuk mindset inovatif dan kemampuan adaptif pelaku usaha mikro, sementara literasi digital memperkuat kemampuan teknologis mereka dalam menghadapi dinamika pasar berbasis digital. Dukungan pemerintah, baik melalui kebijakan, pelatihan, maupun penyediaan infrastruktur digital, menjadi faktor penggerak yang mempercepat proses transformasi usaha mikro menuju ekonomi berbasis pengetahuan.

Kata kunci: Daya Saing Usaha Mikro, Pendidikan Kewirausahaan, Literasi Digital, Dukungan Pemerintah, Inovasi, Kesejahteraan Masyarakat, Ekonomi Digital

INTRODUCTION

The rapidly advancing digital economy era has transformed the global business landscape, including in Indonesia, where micro enterprises serve as the backbone of the national economy. According to data from the Ministry of Cooperatives and SMEs, approximately 97% of business actors in Indonesia fall within the micro-enterprise category, playing a crucial role in absorbing labor and stimulating local economic growth (Limanseto, 2023). However, amidst the opportunities brought by digitalization, many micro-entrepreneurs still face major challenges in adapting to technological change and new business models. The digital capability gap, low entrepreneurial literacy, and limited access to support facilities remain significant barriers to their competitiveness. This condition highlights that digital transformation is not merely a technological shift but a paradigm change in managing micro enterprises to ensure their resilience, growth, and competitiveness in a modern economic ecosystem.

In the context of national economic development, strengthening the competitiveness of micro enterprises depends not only on their production and marketing capabilities but also on their ability to integrate digital innovation into their business processes. The concept of competitiveness refers to the ability of an entity to create added value compared to its competitors, as explained by Porter (1985) in *The Competitive Advantage of Nations*, emphasizing the importance of innovation, differentiation strategies, and efficiency in facing competition. In the digital age, these aspects become increasingly complex, requiring adaptability to technology, mastery of digital branding strategies, and the use of data for informed business decision-making. Enhancing micro-enterprise competitiveness, therefore, cannot be separated from the development of technology-based entrepreneurial competencies and systemic support from various stakeholders, including the government and educational institutions.

Entrepreneurship education plays a strategic role in shaping the mindset, skills, and innovative behavior of micro-entrepreneurs in

the digital era. According to Rae (2006) in the *Entrepreneurial Learning Theory*, entrepreneurship is a learning process that involves experience, reflection, and adaptation to changes in the business environment. Through entrepreneurship education, individuals are trained to understand market dynamics, manage risks, and identify digital innovation opportunities. Training programs developed by educational institutions—such as entrepreneurship campuses and business incubators—have proven effective in enhancing the competencies of micro-entrepreneurs, as evidenced by the *Kampus Merdeka UMKM* program in Indonesia, which fosters collaboration between students and MSME actors in developing sustainable digital business models (Business School, 2025).

Beyond entrepreneurship education, digital literacy serves as a crucial foundation for strengthening micro-enterprise competitiveness. According to Kusumo et al. (2022), digital literacy encompasses critical thinking skills, an understanding of digital security, and the ability to utilize technology for productivity and innovation. For micro-entrepreneurs, digital literacy enables market expansion through e-commerce, optimization of promotion via social media, and improved operational efficiency through digital applications. A concrete example can be seen in Bandung City, where MSMEs leverage digital platforms such as Tokopedia and Instagram to market local creative products. Their revenues have significantly increased following digital marketing training programs organized by local governments and nearby universities (Rosmayati et al., 2024).

Government support serves as a crucial external factor in strengthening the competitiveness of micro enterprises in the digital era. According to the *Innovation Systems Theory* proposed by Lundvall (2010), synergy among the government, educational institutions, and the industrial sector is essential to creating a sustainable innovation ecosystem. The government acts as a facilitator by providing affirmative policies, digital infrastructure, and access to financing and training programs. Initiatives such as the

National Digital Literacy Movement (Gerakan Nasional Literasi Digital/GNLD) and the Digital Entrepreneurship Academy (DEA), managed by the Ministry of Communication and Information Technology (Kominfo), have made significant contributions to enhancing the digital competencies of MSME actors across various regions in Indonesia. Moreover, policies like the Digital People's Business Credit (KUR Digital) and technology-based mentoring programs represent concrete government actions to strengthen the resilience of micro enterprises amid global economic disruptions.

Digital transformation in the context of micro enterprises can also be seen as a vehicle for improving community welfare. Based on the Capability Approach developed by Amartya Sen, welfare is determined by an individual's ability to utilize available economic opportunities (Walker, 2005). Through entrepreneurship education and digital literacy, micro-entrepreneurs acquire new capabilities to access markets, manage resources, and create value-added product innovations. In several regions of Indonesia—such as Ponggok Village (Klaten) and Kutuh Village (Bali)—the success of community-based digital transformation among micro enterprises has led to significant increases in residents' income and strengthened local economic independence (Kusjuniati, 2021; Yuliana & Natalia, 2025). This indicates that digital economic development has a strong correlation with social welfare improvement, provided it is supported by effective education systems and well-designed public policies.

Nevertheless, challenges in building the competitiveness of micro enterprises in the digital economy era cannot be overlooked. Digital inequality, low levels of technology adoption, and limited managerial capacity remain key obstacles, particularly in rural and semi-urban areas. According to the World Economic Forum, only about 19% of micro-entrepreneurs in Indonesia have fully integrated digital technology into their business operations (Febrianti & Siregar, 2022). Barriers such as limited internet access, low basic digital literacy, and insufficient professional mentorship have hindered many entrepreneurs from optimizing digitalization's potential. Cross-sector collaboration is therefore essential

to bridging this gap through continuous training programs, inclusive regulatory support, and equitable provision of digital infrastructure.

Based on these considerations, this study aims to comprehensively examine how entrepreneurship education, digital literacy, and government support contribute to building the competitiveness of micro enterprises in the digital economy era, with a focus on their impact on innovation and community welfare. Using a literature review approach, this research seeks to provide an in-depth understanding of the synergistic relationship among education, technology, and public policy in fostering a sustainable micro-enterprise ecosystem. Furthermore, the study aims to identify best practices and challenges in implementing digital competitiveness enhancement policies for micro enterprises in Indonesia, thereby serving as a strategic reference for policymakers, educational institutions, and entrepreneurs in strengthening the foundation of the national digital economy.

LITERATURE REVIEW

Micro Enterprise Competitiveness

Micro enterprise competitiveness refers to the ability of small business entities to survive and grow amid competitive market pressures by creating added value and distinctive advantages that are difficult for competitors to imitate. According to the Competitive Advantage Theory by Porter (1985), competitiveness can be achieved through product differentiation, operational efficiency, and continuous innovation. In the context of the digital economy, the competitiveness of micro enterprises is no longer determined solely by the quality of physical products but also by their ability to adopt technology, understand online consumer behavior, and utilize data for strategic decision-making. Micro enterprises that successfully integrate digital marketing strategies, e-commerce platforms, and technology-driven market analysis are more likely to expand their market reach and increase profitability. Building micro enterprise competitiveness in the digital era requires a combination of managerial capability, technological utilization, and a constantly renewed innovation-oriented mindset aligned with global market dynamics.

Entrepreneurship Education

Entrepreneurship education is a systematic process aimed at instilling creative, innovative, and resilient values in individuals to enable them to create and manage businesses effectively and sustainably. According to the Entrepreneurial Learning Theory by Rae (2006), entrepreneurship is a continuous learning process involving experience, reflection, and adaptability to changes in the business environment. In the context of micro enterprises, entrepreneurship education helps entrepreneurs understand business strategies, financial management, product innovation, and digital marketing. Entrepreneurship training programs integrated with technology have been proven to enhance entrepreneurs' adaptive capacity, as shown by various initiatives such as the Digital Entrepreneurship Academy (BPPTIK, 2022). Through such education, entrepreneurs develop a proactive entrepreneurial mindset, courage to take calculated risks, and readiness to face the ongoing challenges of digital economic transformation.

Digital Literacy

Digital literacy encompasses an individual's ability to access, understand, evaluate, and utilize digital technology effectively, productively, and ethically in daily life and economic activities. Based on the Digital Literacy Framework proposed by Ng (2012), digital literacy consists of three core components: technical, cognitive, and social competencies. In the context of micro enterprises, digital literacy serves as a key asset for managing business operations efficiently through e-commerce platforms, social media, and digital financial applications. A study by Sulistiyowati & Rahmawati (2024) revealed that entrepreneurs with high levels of digital literacy can increase sales by optimizing online promotions. Digital literacy acts as a catalyst for innovation, efficiency, and market expansion, directly strengthening micro enterprise competitiveness in the digital economy era.

Government Support

Government support is a crucial element in establishing a strong and adaptive micro enterprise ecosystem amid the evolving digital economy. According to the Innovation System Theory by Lundvall (2010), a nation's innovation success and competitiveness depend on the synergy between government, industry, and educational institutions. The government acts as a facilitator by implementing affirmative policies, providing digital infrastructure, offering entrepreneurship training programs, and ensuring access to financing schemes such as the People's Business Credit (KUR) and the Digital Entrepreneurship Academy (DEA). Inclusive, data-driven regulatory support accelerates technology adoption and increases micro-entrepreneur participation in the digital economy ecosystem. A concrete example is the success of the Jakpreneur program in Jakarta, which has helped thousands of MSMEs transition toward digitalization (Darmawan & Brata, 2024). The sustainability and effectiveness of government support are key factors in strengthening competitiveness and promoting the independence of micro enterprises in Indonesia.

Innovation

Innovation refers to the process of creating, developing, and applying new ideas that generate added value for products, services, or business processes. According to Schumpeter's Innovation Theory, innovation serves as the main driver of economic growth and the foundation of sustainable competitive advantage (Ziemnowicz, 2013). In the context of micro enterprises, innovation can manifest through new product development, market diversification, the adoption of digital technologies, or data-driven marketing strategies. A study by Azis (2024) found that MSMEs actively engaged in innovation experience higher productivity growth. For example, culinary MSMEs in Bandung improved operational efficiency by using digital ordering applications such as GoFood Partner (Fauziah & Destania, 2025). Innovation must be internalized as a core strategy within the

culture of micro enterprises to survive and thrive amid dynamic global competition.

Community Welfare

Community welfare in the context of microeconomic development is not only measured by income growth but also by individuals' and communities' ability to achieve a dignified, productive, and sustainable quality of life. According to Amartya Sen's Capability Approach, welfare is realized when people possess the freedom and capacity to access economic opportunities and participate in the development process (Walker, 2005). Strong and competitive micro enterprises can generate employment, expand economic participation, and strengthen social resilience within communities. A case study in Ponggok Village (Klaten) demonstrated how community-based digital tourism enterprises significantly increased residents' income and reduced unemployment rates (Fatmawati et al., 2016). Enhancing community welfare through digital micro-enterprise empowerment reinforces the foundation of inclusive and equitable national development.

Digital Economy

The digital economy is an economic system built upon the use of information and communication technology across all economic activities—from production and distribution to consumption. As defined by Yasar & Pratt (2023), the digital economy encompasses all economic activities driven by data, the internet, and digital platforms. In the context of micro enterprises, the digital economy opens vast opportunities to expand market access, improve efficiency, and strengthen connectivity between producers and consumers. However, successful participation in the digital economy largely depends on the level of digital literacy, supportive policies, and the readiness of technological infrastructure. For example, the UMKM Go Digital program initiated by the Indonesian government has helped millions of entrepreneurs transition to online platforms, thereby enhancing national competitiveness (Saputra, 2023). The digital economy serves as a new foundation for inclusive economic growth that promotes innovation, productivity, and community welfare on a broad scale.

RESEARCH METHODOLOGY

This study employs a literature review method with a descriptive qualitative approach aimed at deeply analyzing previous research findings related to efforts in building the competitiveness of micro-enterprises in the digital economy era through entrepreneurship education, digital literacy, and government support as drivers of innovation and community welfare. The qualitative approach was chosen because it allows for an exploration of meanings, conceptual relationships, and social contexts embedded within various scholarly sources without relying on statistical calculations, but rather through analytical and reflective interpretation of the phenomena under study. The data collection process was carried out by reviewing scientific literature from various credible sources such as Google Scholar, ResearchGate, and official websites of government institutions and relevant international organizations. The selection criteria for the literature were limited to publications from the period 1985–2025 to ensure relevance with recent developments in the context of digitalization and micro-enterprise empowerment in Indonesia.

In the initial stage, a total of 50 articles related to the topic were identified. However, after a rigorous screening process based on inclusion and exclusion criteria—including thematic relevance, journal credibility, data completeness, and alignment of research context with the study's focus—39 articles were ultimately selected as the most representative and scientifically sound. These articles were then analyzed to identify thematic patterns, inter-variable relationships, and empirical findings that provide a comprehensive understanding of the issues under examination. The analytical technique used in this study is qualitative descriptive analysis, which involves systematically describing and interpreting the content of the selected literature. The analysis process follows the stages of data reduction, data display, and conclusion drawing, as outlined in the qualitative analysis model by Miles and Huberman (1994). This approach enables the researcher to present an in-depth overview of how entrepreneurship education, digital

literacy, and government support interact to shape the competitiveness of micro-enterprises in the digital economy era, while also identifying research gaps that remain open for further investigation.

RESULTS AND DISCUSSION

In the increasingly dynamic landscape of the digital economy, the ability of micro-enterprises to adapt to technological change is not merely a necessity but serves as the foundational element for building sustainable competitiveness. According to the Resource-Based View Theory (Barney, 1991), internal resources that are valuable, rare, inimitable, and non-substitutable form the core of sustainable competitive advantage. In the context of micro-enterprises, these resources manifest as human capital with strong digital literacy, creativity, and an adaptive entrepreneurial mindset toward emerging technologies. Entrepreneurs capable of integrating digital tools—such as cloud-based customer management systems, data-driven digital marketing, and automated e-commerce transactions—hold stronger competitive positions than those adhering to conventional methods. For instance, micro-entrepreneurs adopting digital marketing strategies using search engine optimization (SEO) or paid social media advertising can reach cross-regional markets without opening physical branches, thereby reducing operational costs and expanding customer reach. Investment in digital competency and entrepreneurial skill development represents a long-term strategy to create added value and maintain competitive advantage amid the rapid global digital transformation (Galindo-Martín et al., 2023).

Entrepreneurship education acts as a central catalyst in shaping innovative mindsets and fostering independence among micro-entrepreneurs to navigate complex market changes. According to Entrepreneurial Learning Theory (Rae, 2006), the entrepreneurial process is viewed as a continuous learning journey that unfolds through practical experience, critical reflection, and adaptation to business dynamics. Entrepreneurship education designed with project-based learning, mentorship, and

collaborative learning approaches has proven effective in enhancing problem-solving abilities, creativity, and market awareness among micro-entrepreneurs. Research by Nugroho and Muchran (2023) reinforces this notion, revealing that digital entrepreneurship training for MSMEs in Yogyakarta improved their capacity to utilize social media and e-commerce platforms by 40%. A practical example can be seen in “Sakha Leather” in Bantul, which doubled its sales after implementing digital marketing strategies learned from entrepreneurship training organized by a local university (Sakasoko, 2025). This demonstrates that entrepreneurship education, when combined with digital literacy, can broaden market access, strengthen customer trust, and drive sustainable innovation in micro-business management. Strengthening digital-based entrepreneurship curricula should thus be a strategic priority for educational institutions and local governments to nurture a new generation of resilient and adaptive entrepreneurs.

Digital literacy has become an essential capability determining the success and sustainability of micro-enterprises in the digital economy era. Based on Ng’s Digital Literacy Framework (2012), digital literacy encompasses cognitive skills to understand, evaluate, and create digital content ethically and effectively. Micro-entrepreneurs with high digital literacy can leverage technology to optimize supply chains, accelerate transactions, and develop data-driven marketing strategies. The study by Ramdan et al. (2025) indicates that MSME actors with higher levels of digital literacy are more likely to innovate products and access global markets. A concrete example can be seen in a women-led MSME group in Malang Regency, which successfully expanded its bamboo craft marketing reach through platforms like Shopee after participating in digital literacy training facilitated by the Ministry of Communication and Information Technology (Kominfo) (Fitriyani, 2025). This transformation reinforces their position as independent economic actors capable of adapting to the digital era. Hence, digital literacy should be viewed as a crucial form of

intellectual capital—a means of socio-economic empowerment that fosters the self-reliance of local communities.

Government support serves as a decisive external factor in strengthening the competitiveness and sustainability of micro-enterprises in the digital economy. Based on the Innovation System Theory (Lundvall, 2010), innovation success depends not only on individual or organizational capabilities but also on the synergistic interaction among government, academia, industry, and society in creating a conducive innovation ecosystem. The Indonesian government has demonstrated its commitment through strategic initiatives such as the Digital Entrepreneurship Academy (DEA) and the National Digital Literacy Movement (GNLD), designed to enhance digital capacity among micro-entrepreneurs nationwide. According to a 2024 report by the Ministry of Communication and Information Technology, these programs have trained numerous MSME actors with a focus on improving digital marketing, app-based financial management, and cybersecurity skills (Kristianti, 2022; Rochman, 2024). A successful example is “Batik Trusmi” in Cirebon, which received digital promotion and product development support from the local government, enabling it to penetrate export markets (Rachmat & Darmansyah, 2023). Such collaborations exemplify how government policies aligned with digital transformation can accelerate local economic growth, strengthen regional product identity, and foster digital inclusion among micro-entrepreneurs. Government support oriented toward digital innovation thus contributes significantly to building an inclusive and sustainable national economy.

The competitiveness of micro-enterprises in the digital economy is largely determined by their capacity for continuous innovation, which extends beyond product creation to include adaptive processes in response to market and technological dynamics. Based on Schumpeterian Innovation Theory, innovation serves as the driving force of economic growth through the process of “creative destruction,” wherein old systems are replaced by newer, more efficient, and higher-value systems (Ziemnowicz, 2013). In the

context of micro-enterprises, innovation can take various forms, such as adopting digital technologies for operational efficiency, using customer data for personalized services, or engaging in creative collaborations with other industries to develop superior local products. A study by Noho (2025) found that MSMEs that actively engage in technology-based innovation increased productivity by up to 50% compared to stagnant businesses. For example, culinary entrepreneurs in Bandung using the GoFood Partner app leveraged customer data analytics to understand consumer preferences, optimize inventory management, and improve digital promotions (Pasaribu, 2020). This illustrates that digital innovation functions as a core strategy for long-term competitiveness. When innovation becomes ingrained as part of an organization’s culture, micro-enterprises can evolve into key drivers of local economic growth and form the backbone of national economic resilience in an increasingly competitive global landscape.

Community welfare as an outcome of enhanced micro-enterprise competitiveness can be explained through Amartya Sen’s Capability Approach, which emphasizes the expansion of individual capabilities and freedoms to pursue a life they value (Walker, 2005). This approach underlines that welfare is measured by an individual’s ability to participate productively in economic and social activities. In the context of micro-enterprises, entrepreneurship education and digital literacy serve as key determinants that expand entrepreneurs’ capabilities to access economic opportunities, increase productivity, and generate new employment. When micro-entrepreneurs can manage their businesses digitally, they not only increase personal income but also stimulate local economic growth. A concrete example is found in Desa Ponggok, Klaten, which successfully developed local tourism potential through digital innovations, such as social media marketing and integration of online booking systems (Yuliana & Natalia, 2025). These efforts increased village revenue by hundreds of millions of rupiah per month while creating job opportunities for local residents. This case demonstrates that community-based digital empowerment produces a multiplier effect on social welfare by enhancing economic

inclusion, strengthening social solidarity, and expanding the productive economic base at the local level.

Despite the broad opportunities offered by digitalization, micro-enterprises in Indonesia still face structural challenges that hinder the optimization of digital transformation. According to research reports, approximately 64% of micro-entrepreneurs are unable to fully leverage technology due to limited access to knowledge, low digital literacy, and relatively high technology investment costs (Burhan, 2024). Digital infrastructure disparities between urban and rural areas exacerbate these gaps, making it difficult for entrepreneurs in underdeveloped regions to access stable internet or e-commerce platforms. Additionally, low digital financial literacy prevents many MSMEs from understanding online financing mechanisms such as peer-to-peer lending or digital banking platforms. Studies by Miradji et al. (2024) confirm that insufficient ongoing training and weak coordination among government agencies, academia, and the private sector are primary causes of MSME digital stagnation. This situation calls for inclusive and sustainable empowerment policies, with community-based training models and long-term mentoring systems capable of enhancing digital readiness across different levels. Such an approach ensures that digital transformation reaches rural areas that have historically lagged in the national digital economy ecosystem.

To address the digital divide and accelerate micro-enterprise empowerment, the development of community-based Digital Incubation Centers represents an effective and sustainable strategic solution. This concept aligns with the Triple Helix Model (Etzkowitz & Leydesdorff, 2000), emphasizing the importance of synergistic collaboration among academia, government, and industry to create inclusive innovation ecosystems. Digital incubation centers serve as practical learning hubs integrating digital skills training, business consulting, and access to advanced technology for micro-entrepreneurs. For example, the Jakpreneur program in DKI Jakarta has become a successful model, providing thousands of entrepreneurs with digital training, business

licensing support, and online marketing assistance through collaboration between local government and universities (DKI Jakarta, 2025). The success of this model demonstrates that cross-sector support enables entrepreneurs to accelerate their digital transformation more effectively. If the Digital Incubation Center concept is expanded across Indonesia, especially in rural and peri-urban areas, it would create a uniformly competitive innovation ecosystem. Beyond strengthening local economies, this strategy would accelerate national digital inclusion, expand the base of productive entrepreneurship, and better prepare Indonesia to face the challenges of the Industry 5.0 revolution driven by creative economy and digital technology.

In addition to establishing Digital Incubation Centers, collaboration between micro-enterprises and higher education institutions is a crucial strategy for strengthening competitiveness and promoting sustainable digital transformation. Universities play a strategic role as knowledge producers, innovation hubs, and sources of skilled human resources capable of directly contributing to micro-enterprise development. Based on the University-Industry-Government Collaboration concept, universities act as partners in applied research, innovative product development, and digital entrepreneurship training aligned with market needs (Moeliodihardjo et al., 2012). A tangible example is Universitas Brawijaya in Malang, which, through its Desa Binaan Digital program, has helped local MSMEs optimize e-commerce, data analytics, and social media utilization to improve operational efficiency and expand market reach (Aziz, 2023). This collaboration fosters a symbiotic relationship between academia and business via community service learning based on MSMEs. Students gain hands-on business experience, while entrepreneurs acquire new insights on digital strategies, modern financial management, and product innovation. Partnerships between educational institutions and micro-enterprises serve as vital catalysts in creating a knowledge-based entrepreneurship ecosystem capable of supporting inclusive and sustainable digital

economic growth at both local and national levels.

Overall, strengthening micro-enterprise competitiveness in the digital economy requires an integrative approach that synergizes entrepreneurship education, digital literacy, innovation, and government policy support. This approach aligns with the Integrated Development Framework, emphasizing the balance among individual, institutional, and environmental factors in building resilient business ecosystems. Enhancing entrepreneurial competence must be accompanied by affirmative policies providing incentives for technology adoption, locally tailored digital training programs, and improved access to transparent and inclusive digital financing platforms. Governments should also expand cross-sector collaboration with universities, research institutions, and industry to accelerate technology transfer and broaden innovation networks supporting micro-enterprise sustainability. With systemic and sustainable support, micro-enterprises can transform into key drivers of local economic innovation. The successful development of digitally-based micro-enterprise competitiveness ultimately contributes to community welfare, job creation, and the strengthening of a national economy that is inclusive, adaptive, and technologically progressive. In other words, synergy among the education sector, government, and entrepreneurs is a strategic key to realizing a fair and sustainable digital economic transformation in Indonesia.

CONCLUSION

This study concludes that enhancing micro-enterprise competitiveness in the digital economy requires a synergy between entrepreneurship education, digital literacy, and government support. Entrepreneurship education plays a crucial role in shaping an adaptive, innovative, and value-oriented mindset, while digital literacy provides a foundation for entrepreneurs to leverage technology effectively in marketing, production, and management. Government support through policies, training programs, and digital infrastructure further strengthens an innovation ecosystem that drives sustainable micro-enterprise growth. When strategically

integrated, these three aspects can enhance competitiveness, create jobs, and broaden community welfare. Therefore, human capacity development and cross-sector collaboration are key to the successful transformation of micro-enterprises in facing the challenges of the digital economy.

The findings of this study have strategic implications for policymakers, educational institutions, and entrepreneurs. For the government, the results underscore the importance of policies that prioritize entrepreneurship education and digital literacy within MSME development programs. Educational institutions can use these findings to strengthen technology-based entrepreneurship curricula and promote community engagement practices to support micro-entrepreneurs. For entrepreneurs themselves, the study highlights that business success depends on the ability to learn, innovate, and adapt to technological developments. Thus, this research contributes to reinforcing the paradigm that competitiveness in the digital era is derived from the synergy between knowledge, innovation, and policy support.

This study has several limitations that should be acknowledged. First, because it employs a qualitative literature review method, the results are descriptive and cannot be empirically generalized. Second, the data sources are limited to publications from 1985–2025 accessed via Google Scholar and certain credible websites, so potentially important literature outside this period may not be fully represented. Third, the study does not deeply explore contextual factors such as regional differences, industry sectors, and the education level of entrepreneurs, which may influence the application of digital literacy and entrepreneurship education. Therefore, the findings are more conceptual and require further empirical testing or in-depth field studies.

Based on the results and limitations of this study, several recommendations can be proposed. First, future research should adopt empirical approaches, using surveys or field case studies to quantitatively examine the relationship between entrepreneurship education, digital literacy, and micro-enterprise

competitiveness. Second, the government should expand digital training programs integrated with entrepreneurship mentoring, particularly in rural and semi-urban areas. Third, higher education institutions are encouraged to establish technology-based entrepreneurship hubs that serve as centers for learning and innovation for MSMEs. Fourth, collaboration between government, industry, and academia should be strengthened through

the implementation of the Triple Helix model, ensuring that the digital transformation of micro-entrepreneurs is inclusive, sustainable, and directly contributes to improving community welfare.

Table 1. Key Findings on Strengthening Micro-Enterprise Competitiveness in the Digital Economy

Aspect	Key Findings	Theoretical/Conceptual Basis	Examples/Case Studies
Digital Competence & Resources	Micro-enterprises with valuable, rare, inimitable, and non-substitutable resources, particularly human capital with digital literacy, creativity, and adaptive entrepreneurship, gain sustainable competitive advantage.	Resource-Based View (Barney, 1991)	Entrepreneurs using cloud-based CRM, data-driven marketing, SEO, and paid social media expand market reach and reduce costs.
Entrepreneurship Education	Acts as a catalyst for innovation, independence, problem-solving, creativity, and market awareness among micro-entrepreneurs. Project-based learning, mentorship, and collaborative approaches are effective.	Entrepreneurial Learning Theory (Rae, 2006)	“Sakha Leather” in Bantul doubled sales after implementing strategies learned in local university-led training (Sakasoko, 2025).
Digital Literacy	Enables entrepreneurs to optimize supply chains, accelerate transactions, and access new markets. High digital literacy fosters innovation and socio-economic empowerment.	Digital Literacy Framework (Ng, 2012)	Women-led MSMEs in Malang expanded bamboo craft marketing via Shopee after government-facilitated digital literacy training (Fitriyani, 2025).
Government Support	Strengthens competitiveness and sustainability through policy, training, and infrastructure. Cross-sector collaboration creates conducive innovation ecosystems.	Innovation System Theory (Lundvall, 2010)	“Batik Trusmi” in Cirebon penetrated export markets with digital promotion support from local government (Rachmat & Darmansyah, 2023).
Innovation Capacity	Continuous innovation—including technology adoption, data-driven personalization, and creative collaborations—drives long-term	Schumpeterian Innovation Theory (Ziemnowicz, 2013)	Culinary entrepreneurs in Bandung use GoFood Partner analytics to optimize inventory, promotions, and services (Pasaribu,

	competitiveness.		2020).
Community Welfare	Enhanced competitiveness leads to expanded capabilities, higher productivity, employment generation, and social inclusion.	Capability Approach (Amartya Sen; Walker, 2005)	Desa Ponggok, Klaten increased village revenue and job opportunities through digital tourism promotion (Yuliana & Natalia, 2025).
Challenges & Barriers	Limited digital literacy, high technology costs, infrastructure gaps, and weak coordination hinder digital transformation among micro-enterprises.	Empirical observation	64% of micro-entrepreneurs in Indonesia face barriers in leveraging technology (Burhan, 2024).
Strategic Solutions	Development of community-based Digital Incubation Centers and collaboration with universities enhance digital skills, innovation, and market access.	Triple Helix Model (Etzkowitz & Leydesdorff, 2000); University-Industry-Government Collaboration	Jakpreneur program in DKI Jakarta and Universitas Brawijaya's Desa Binaan Digital program (DKI Jakarta, 2025; Aziz, 2023).
Integrated Approach	Combining entrepreneurship education, digital literacy, innovation, and government support fosters resilient business ecosystems, inclusive economic growth, and sustainable community welfare.	Integrated Development Framework	Systemic support enables micro-enterprises to drive local economic innovation, job creation, and national economic resilience.

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