

Industry Collaboration Model-Vocational Education to Strengthen Human Resources, Sustainable Logistics, and Digital Marketing to MSMEs

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Abstract

MSMEs have a strategic contribution to the Indonesian economy, but face significant challenges in human resources (HR), logistics efficiency, and digital marketing utilization. This study develops a collaboration model between industry and vocational education to strengthen MSME competitiveness through the integration of HR training, digital-based logistics systems, and online marketing strategies. The research method uses a qualitative approach through case studies of transportation and trade MSMEs in Central Java, in-depth interviews with business actors, and operational document analysis. The results show that industry-vocational synergy can improve HR skills through joint training, mentoring, internships, and certification programs. In the logistics aspect, a prototype digital supply chain platform and lean logistics training modules were created. Meanwhile, digital marketing is strengthened through a digital marketing academy, MSME business clinics, and collaboration with global platforms. This study produces a collaboration cycle model that includes needs mapping, co-design, pilot project implementation, evaluation and certification, and scale-up. The contribution of this research is to provide an integrative framework for social and technology-based MSME empowerment that can be replicated across various sectors.

Keywords: MSMEs, Vocational Education, Logistics, Digital Marketing, Industrial Collaboration.

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are the backbone of the Indonesian economy. Data from the Ministry of Cooperatives and SMEs shows that MSMEs contribute more than 60% of the national Gross Domestic Product (GDP) and absorb approximately 97% of the workforce. This contribution makes MSMEs a strategic sector, not only in supporting national economic growth but also in creating jobs,

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reducing unemployment, and promoting economic equality across regions.

However, despite their crucial role, MSMEs still face structural constraints. Limited quality human resources (HR), weak logistics systems, and low utilization of digital marketing strategies are key obstacles that reduce their competitiveness. Many MSMEs still rely on traditional practices in business management, from operational management to promotional strategies. As a result, their market access is limited, product distribution is inefficient, and adaptation to digital technology is slow. This situation is further exacerbated by rapidly changing market dynamics, increasing competition from large companies and digital startups, and increasingly complex consumer demands.

In the digital era, the success of MSMEs is no longer solely determined by product quality, but also by supply chain efficiency and data-driven market penetration. Christopher (2022) emphasized that integrated and responsive supply chain management is key to competitive advantage. Meanwhile, Chaffey & Ellis-Chadwick (2019) emphasized that data-driven digital marketing strategies can increase brand visibility, customer loyalty, and sales growth. Therefore, strengthening technology-based logistics and digital marketing systems is an urgent need for MSMEs to survive and grow sustainably.

In the context of strengthening human resources, vocational education plays a strategic role. Unlike academic education, which focuses more on theory development, vocational education emphasizes applied skills that can be directly applied in the workplace. According to UNESCO (2016), vocational education is a crucial bridge between education and the workplace through the concept of "link and match" (McGrath & Yamada, 2023). Through an applied curriculum, practical laboratories, and industry-based training, vocational education can produce skilled workers who meet market needs. This is very relevant for MSMEs that require human resources who are not only technically competent, but also adaptive to technological developments and market demands (Wahjusaputri & Bunyamin, 2022).

On the other hand, industry and MSMEs need support in applied research, technology, and work-ready human resources to improve business sustainability. Collaboration with vocational education allows industry to gain access to skilled human resources, while vocational education provides the opportunity to test the relevance of the curriculum through real-world practice. This approach also opens up opportunities for joint innovation, such as the development of digital platforms for logistics, data-driven market research, and more effective digital marketing strategies (Laundon et al., 2023).

Therefore, a collaborative model between industry and vocational education is needed that not only bridges the competency gap but also creates a sustainable MSME empowerment ecosystem. This collaborative model is expected to strengthen human resource capacity through joint training and certification schemes, increase logistics efficiency with the support of digital technology, and optimize digital marketing so that

MSMEs can penetrate local and global markets. With an integrative approach, this synergy is expected to form the foundation for MSME transformation in the digital era, enabling them to increase their competitiveness, business sustainability, and contribute to national economic development.

LITERATURE REVIEW

Human Resources (HR) and Vocational Education

Human Resources (HR) is a crucial aspect of the sustainability of organizations and small and medium enterprises (SMEs). According to Armstrong, human resource management is a strategic approach to managing people effectively so they can optimally contribute to achieving organizational goals. HR management theory emphasizes recruitment, development, motivation, and retention. In the context of MSMEs, workforce limitations necessitate more adaptive HR management, where the roles of work motivation, organizational culture, and women's empowerment are crucial for improving business performance (Purgal-Popiela, 2025).

Meanwhile, according to Dessler, human resource management is the process of acquiring, training, assessing, and compensating employees, as well as maintaining their relationships with the work environment, health, safety, and equity. This definition emphasizes that people are not merely a factor of production but rather a strategic asset that must be managed to enhance organizational competitiveness (Griep et al., 2025).

Handoko added that HRD is the planning, organizing, directing, and controlling of the recruitment, development, compensation, integration, maintenance, and termination of employees to help achieve individual, organizational, and societal goals. Therefore, HRD is not merely labor administration, but rather a managerial function that impacts the overall effectiveness of the organization (Saxena & Mishra, 2025).

Furthermore, Maslow's motivational theory with its hierarchy of needs and Herzberg's two-factor theory (motivator-hygiene) are relevant for understanding the work motivation of MSMEs. Motivated human resources with a positive work culture will be better able to adapt to market changes, including the implementation of digital innovation (Nicolás-Agustín et al., 2022).

The concept of strengthening human resources within organizations is heavily influenced by Becker's human capital theory. This theory asserts that investments in education, training, and skills development will yield long-term benefits in the form of increased productivity, innovation, and competitiveness (Islam & Amin, 2022). In the context of MSMEs, the quality of human resources is a fundamental factor determining business sustainability, from operational management to marketing strategy. However, the majority of MSMEs in Indonesia still face serious challenges related to managerial skills, digital

literacy, and the ability to adapt to technological change (Hernita et al., 2021).

This is where vocational education plays a crucial role. Vocational education is designed to produce a ready-to-work workforce with technical competencies that meet the needs of the business and industrial world. According to UNESCO, vocational education is a key instrument for linking and matching educational institutions with the labor market (Yoto et al., 2024). It has been found that MSMEs that receive vocational education support through training and mentoring programs are more quickly able to adopt digital technology, improve logistics management, and optimize online marketing strategies. Thus, vocational education is not only a labor provider but also a strategic partner in increasing the adaptive and innovative capacity of MSMEs (Trisninawati & Sartika, 2024).

Logistics and Supply Chain

Logistics and supply chain management (SCM) are two closely related concepts that support the effectiveness and efficiency of the flow of goods, information, and services within an organization and between organizations. According to Ballou, logistics is the process of planning, implementing, and controlling the efficient and effective flow of goods, services, and information from the point of origin to the point of consumption to meet customer needs. This definition emphasizes that logistics is not simply the movement of goods, but rather an integrated system that creates added value for products and services (Richey et al., 2022).

Meanwhile, supply chain management (SCM) has a broader scope. Chopra and Meindl explain that SCM is a set of approaches used to integrate suppliers, manufacturers, warehouses, distributors, and retailers so that goods are produced and distributed in the right quantities, to the right locations, and at the right time, to minimize overall system costs and meet service needs. Thus, SCM encompasses cross-organizational coordination, while logistics focuses more on internal company activities related to managing the flow of goods and information (Negi, 2024).

Logistics is a key factor in the supply chain, determining the efficiency, effectiveness, and competitive advantage of a business. Christopher emphasized that effective logistics can create added value through service accuracy, distribution efficiency, and market flexibility (Tukamuhabwa et al., 2023). In the context of MSMEs, logistics problems often arise due to limited business scale, high distribution costs, and limited access to modern infrastructure. This indicates that most MSMEs in the transportation and trade services sectors still rely on traditional distribution methods, thus facing obstacles in reaching a wider market (Bachofner et al., 2022).

The integration of digital-based logistics systems (digital supply chains) offers a strategic solution to overcome these obstacles. Technologies such as tracking systems, inventory management, and the

use of e-commerce platforms enable MSMEs to reduce distribution costs, increase transparency, and expand market networks (Tubis et al., 2023). Furthermore, the concepts of lean logistics and green logistics are increasingly relevant for MSMEs seeking to improve efficiency while supporting sustainable business practices. With the support of vocational education, MSMEs can acquire technical skills in managing modern supply chains, making logistics not merely an operational function but also a source of sustainable competitive advantage (Babber & Mittal, 2025).

Digital Marketing for MSMEs

Digital marketing is a marketing strategy that utilizes digital technology and the internet to promote products and services to consumers. According to Kotler & Keller, digital marketing is a marketing activity that uses digital media to reach customers more widely, quickly, and interactively. The digital media used include websites, social media, search engines, email, and mobile applications (Rosário & Raimundo, 2021).

In the modern economic context, digital marketing has become a key instrument that enables companies, especially MSMEs, to compete at relatively low costs while achieving a broad market reach. The development of digital technology has changed the marketing paradigm (Sharabati et al., 2024). Kotler & Keller emphasize that digital marketing functions not only as a promotional medium but also as a comprehensive strategy to increase brand visibility, build customer loyalty, and drive sales at a relatively low cost. For MSMEs, digital marketing offers a significant opportunity to compete with large companies, as it can reach a wider range of consumers without geographical limitations (Theodorakopoulos & Theodoropoulou, 2024).

Chaffey & Ellis-Chadwick (2019) added that data-driven digital marketing strategies enable MSMEs to make more informed decisions, adapt promotions to market trends, and accelerate penetration into new consumer segments. They also found that MSMEs that consistently use social media platforms like Instagram, Facebook, and TikTok experienced a 30% increase in orders within three months, while expanding their market reach beyond their primary operational areas. This demonstrates that digital marketing is no longer an option, but rather an urgent necessity for MSMEs to survive and thrive in the digital era.

Digital marketing can be divided into several types, namely:

1. Search Engine Optimization (SEO)

SEO is the process of optimizing content to appear at the top of organic search results on search engines like Google. This strategy aims to increase website visibility and traffic sustainably without direct advertising costs (Nagpal & Petersen, 2021).

2. Search Engine Marketing (SEM)

Unlike SEO, SEM uses paid advertising methods through search engine platforms, such as Google Ads. This approach provides faster results because websites can immediately appear at the top

of search results for specific keywords (Lewandowski & Schultheiß, 2023).

3. Social Media Marketing (SMM)

This strategy utilizes social media platforms such as Instagram, Facebook, TikTok, and LinkedIn to build engagement, increase brand awareness, and drive purchasing decisions. Social media is considered effective because it can create two-way communication with consumers (Sindhuja et al., 2023).

4. Content Marketing

This type of marketing focuses on creating relevant, informative, and useful content to engage an audience and increase customer loyalty. Content can include articles, blogs, videos, podcasts, and infographics (Lou & Xie, 2021).

5. Email Marketing

Email is used as a direct communication medium with consumers through personalized messages, newsletters, and special promotions. This strategy has proven effective in building long-term relationships due to its more personal nature (Thomas et al., 2022).

6. Affiliate Marketing

In this model, companies collaborate with third parties (affiliates) who promote products or services with a commission system based on sales. This strategy can expand the market without large advertising costs (Gu et al., 2025).

7. Influencer Marketing

Collaborations with public figures or influencers are becoming increasingly popular because they can influence audience behavior through their credibility and closeness to their followers. Influencer marketing is effective in building consumer trust (Hugh Wilkie et al., 2022).

8. Mobile Marketing

This type of marketing utilizes mobile devices such as smartphones through SMS, apps, push notifications, and location-based advertising. Mobile marketing is crucial given the increasing number of mobile device users in the digital age (Ahmed, 2021).

Industry-Education Collaboration Model

The concept of collaboration between universities, industry, and government is known as the triple helix. This model emphasizes the importance of synergy between key actors in the innovation ecosystem to boost economic competitiveness, where all three no longer operate separately but interact to create sustainable added value. Universities function as producers of knowledge and innovation derived from academic research, while industry serves as a platform for the practical implementation of this knowledge, and the government provides a regulatory framework and policy support to ensure effective collaboration (Wang et al., 2024). In the context of MSMEs, this model becomes increasingly relevant given resource constraints and the need for rapid

and efficient technology transfer. Universities, particularly vocational education, play a role as providers of adaptive curricula tailored to the needs of the workforce, developers of applied research to solve industrial problems, and producers of skilled workers ready for use in the real sector. Meanwhile, industry is not only a user of labor but also functions as a strategic partner in designing training, meeting the real needs of the workforce, offering internships, and creating job opportunities for vocational graduates. The government, as the third pillar, plays a role in creating a conducive policy climate by providing supporting infrastructure, pro-innovation regulations, and facilitating incentives for cross-sector collaboration (Kebede et al., 2024).

The synergy between industry and vocational education can significantly accelerate the adoption of digitalization by MSMEs. Through various initiatives such as joint training programs, mentoring, industrial internships, and SKKNI-based certification pathways, human resource competency development in MSMEs can be carried out in a more targeted and measurable manner. This collaboration not only produces a workforce ready to face the challenges of the digital era but also fosters adaptive and innovative capabilities among MSMEs. Furthermore, this collaboration encourages innovation in logistics and supply chains, for example, through the development of innovation hubs or joint laboratories that enable the exchange of ideas and experimentation with new technologies (Tereshchenko et al., 2024). In the marketing sector, this triple helix collaboration model opens up opportunities for MSMEs to receive mentoring from vocational universities on branding strategies, digital content creation, and optimization of global trading platforms such as Shopee, Amazon, and Alibaba. Thus, the synergy between the education and industry sectors not only provides academic benefits but also creates tangible economic impact, making this collaboration a practical strategy for strengthening the competitiveness and position of MSMEs in the ever-evolving digital economy ecosystem (Ausat, 2025).

METHOD

This research uses a qualitative approach to gain an in-depth understanding of the phenomenon of industry-vocational education collaboration in the context of strengthening human resources, logistics, and digital marketing for MSMEs. The qualitative approach was chosen because it can explore the meaning, experiences, and perspectives of research subjects contextually, rather than simply measuring phenomena quantitatively. Qualitative research also allows researchers to understand the dynamics of interactions between actors—MSMEs, industry, vocational institutions, business associations, and the government—that play a role in building a collaborative ecosystem. The method used is a case study. Yin states that case studies are suitable for examining contemporary phenomena in real-life contexts, when the boundaries between phenomenon and context are unclear, and when researchers have little control over the events being studied. In this research, the case study is applied to MSMEs in the transportation and

trade sectors in Central Java that are seeking to increase their competitiveness through strengthening human resources, logistics systems, and digital marketing strategies. The location of Central Java was chosen based on the consideration that this region has a relatively high concentration of MSMEs and is one of the pilot areas for strengthening the MSME ecosystem based on vocational education (Sugeng, 2022).

RESULT AND DISCUSSION

Main Components of the Model

This research shows that the collaborative model between industry and vocational education has four key components that are closely interconnected and form a unified ecosystem of sustainable learning and innovation. The first component is vocational education, which acts as a provider of curriculum, teaching staff, and practical laboratory facilities designed to test the relevance of skills to current industry needs. Through this approach, vocational institutions not only carry out formal academic functions but are also responsible for developing dynamic curricula tailored to technological developments and job market demands. Furthermore, vocational education acts as a knowledge hub, integrating applied research findings and industry practices to create innovations that benefit the development of small and medium enterprises. With this capacity, vocational institutions can serve as a bridge between the educational and business worlds, ensuring that graduate competencies truly align with real-world needs and can address the challenges of the digital economy.

The second component encompasses the role of industry and MSMEs as key partners in the implementation of the collaborative model. Industry serves as a provider of real-world needs by providing feedback on the relevance of competencies produced by vocational institutions, setting workforce qualification standards, and providing access for students to gain hands-on experience through internship programs. Furthermore, the involvement of industry practitioners as mentors or guest lecturers adds value to the learning process, enabling students to understand the practical context of the theories they learn. Meanwhile, MSMEs play a crucial role as a locus for the application of vocational learning outcomes and research, allowing students to interact directly with the dynamic small business environment. Through these experiences, they understand the real challenges faced by MSMEs, such as limited resources, the need for technological innovation, and strategies for adapting to digitalization. Thus, collaboration between vocational institutions, industry, and MSMEs not only strengthens the link between education and the workplace but also creates a continuous learning cycle that contributes to increasing the competitiveness of the knowledge-based economy.

The third component of this collaborative model is the role of business associations or business communities, which serve as strategic bridges between MSMEs and vocational education institutions. Business

associations play a crucial role as effective two-way communication channels, enabling the systematic communication of the needs, aspirations, and challenges faced by MSMEs to the educational sector. This allows vocational institutions to adapt their curricula, training programs, and applied research to be more relevant to real-world conditions. Furthermore, business associations play a role in building a networking ecosystem that brings together MSMEs, industry practitioners, and academics within a collaborative framework. Through forums, joint training, and other collaborative initiatives, associations strengthen synergies between actors and open access to resources, partnership opportunities, and innovations. The existence of associations also helps expand the scope of the collaborative model's implementation by ensuring the active participation of various business sectors, including the informal sector, which is often marginalized by formal economic policies. Thus, associations act not only as communication intermediaries but also as catalysts in creating an inclusive and adaptive business environment for digital change.

The fourth component encompasses the role of the government and supporting institutions as regulators and facilitators in strengthening the sustainability of this collaborative model. The government is responsible for creating a conducive ecosystem through the provision of clear regulations, fiscal incentives, and support for competency-based certification programs relevant to industry needs. Furthermore, the government plays a role in providing supporting infrastructure, including logistics facilities, digital technology, and access to financing sources and broader markets. This role is crucial, especially considering that most MSMEs still face limitations in gaining access to professional certification, technological resources, and distribution networks without the assistance of public policy. Supporting institutions such as national training bodies, professional certification bodies, and business incubators help strengthen this ecosystem by ensuring continuity between government policies and the practical needs of the business world. Thus, collaboration involving the active roles of the government and supporting institutions not only creates a strong regulatory framework but also builds a foundation that enables MSMEs to grow sustainably and be highly competitive in the digital economy era.

Collaborative Model Design

The research results show that the collaborative model design encompasses three main aspects: human resource development, logistics systems, and digital marketing strategies.

First, in terms of human resource development, synergy is achieved through a joint training program between vocational institutions and industry. The curriculum is collaboratively designed to encompass both hard skills (logistics, digital marketing, production) and soft skills (problem-solving, teamwork, and communication). Furthermore, a mentoring and internship scheme is in place, where vocational students gain hands-on experience in MSMEs, while industry practitioners are

invited as guest lecturers or mentors. The SKKNI-based certification pathway is a crucial tool to ensure the resulting human resources receive formal competency recognition and are ready for work.

Second, in terms of logistics development, the collaborative model focuses on the development of a digital supply chain platform as a result of co-creation between vocational institutions and MSMEs. This platform includes tracking features, inventory management, and logistics cost transparency. Furthermore, lean logistics training is designed to improve supply chain efficiency by prioritizing environmentally friendly and sustainable principles. Furthermore, a logistics innovation hub is established, which serves as a joint laboratory for research into logistics technologies such as IoT, blockchain for distribution transparency, and environmentally friendly energy.

Third, regarding digital marketing optimization, the research findings highlight the need to establish a Digital Marketing Academy run by vocational institutions, focusing on SEO, social media, data analytics, and cross-border e-commerce. Furthermore, a business clinic is being implemented, where vocational students directly assist MSMEs through a project-based learning approach in branding, digital content creation, and online store management. This model is also supported by collaborations with global platforms such as Shopee, Tokopedia, Amazon, and Alibaba to enable MSMEs to expand their access to international markets.

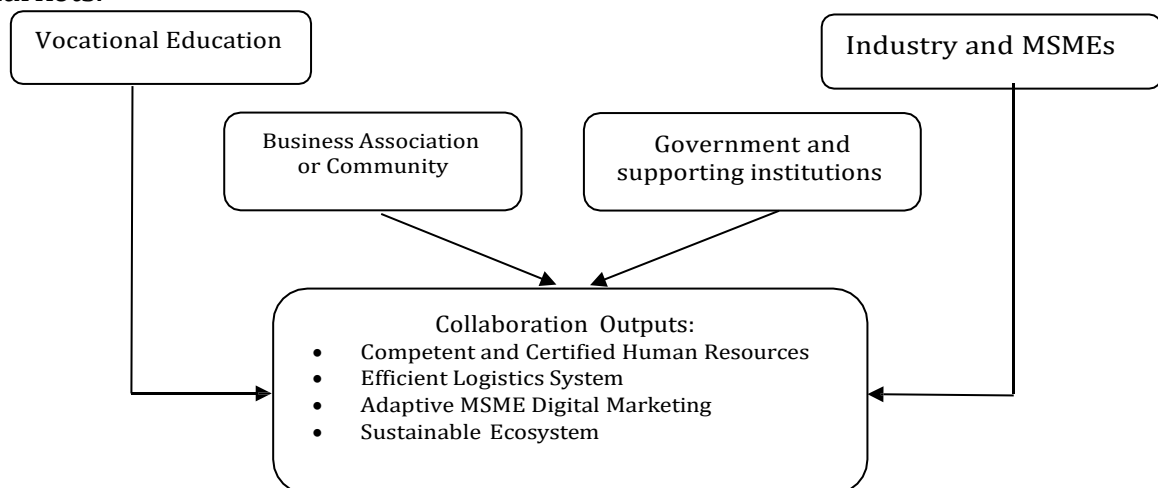


Figure 1. Industry Collaboration Model-Vocational Education for MSMEs

Source: Data Processed by Researchers (2025)

Collaboration Flow

The collaborative model cycle is divided into five main stages. First, the needs mapping stage, where industry and MSMEs convey competency needs to vocational institutions to form the basis for curriculum development. Second, the co-design and co-delivery stage, which involves jointly designing training and internship programs, including the division of roles between the business and educational sectors. Third, the pilot project implementation stage, where vocational

students conduct hands-on practice at MSMEs, the digital logistics system is tested, and digital marketing strategies are implemented.

The fourth stage is evaluation and certification, which is conducted through testing of results by an independent certification body and involves feedback from industry. This ensures the quality of the program and enhances the credibility of the resulting competency certificates. The fifth stage is scale-up, where successfully implemented models are expanded to other sectors and regions. This stage ensures that the collaborative model does not remain a pilot project but develops into a sustainable ecosystem.

Table 1. Cycle of the Industry Collaboration Model – Vocational Education for MSMEs

No	Stage	Input	Proses	Output
1.	Needs Mapping	MSME competency needs data, industry standards, and business association input	Discussion with MSMEs, industry, vocational, and business associations	Competency needs map and adaptive curriculum
2.	Co-Design & Co-Delivery	Vocational curriculum, SKKNI standards, and industrial experience	Joint curriculum development, joint training, mentoring, and internships	Integrated training program, logistics & digital marketing modules
3.	Pilot Project Implementation	Vocational HR, MSME partners, digital supply chain platform	Students' hands-on practice in MSMEs, digital logistics system trials, and implementation of digital marketing strategies	HR pilot projects, efficient logistics systems, and digital marketing strategies
4.	Evaluation & Certification	Training outcomes, industry feedback, certification standards	Competency testing, program evaluation, and result validation	Certified human resources, recommendations for program improvements
5.	Scale Up	Best practices from pilot	Replicating the model to other sectors/regions,	Sustainable collaboration

		projects, government, and association support	strengthening networks	model, strong MSME ecosystem
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Source: Data processed by researchers, 2025

Expected Impact

The implementation of this industry-vocational education collaboration model is expected to have several positive impacts. First, it will produce competent, certified, and work-ready vocational human resources, thereby meeting industry needs while simultaneously supporting MSMEs in increasing their competitiveness. Second, MSMEs will gain an efficient and environmentally friendly logistics system, thereby reducing distribution costs and supporting the sustainable development agenda. Third, MSMEs will become more adaptive in their digital marketing strategies, enabling them to penetrate local and global markets with more targeted strategies. Fourth, a sustainable collaborative ecosystem will be established, where the involvement of vocational education, industry, business associations, and government is synergistic and mutually reinforcing.

These findings corroborate previous research that found that integrating human resources, logistics, and digital marketing through industry-vocational education collaboration can accelerate the transformation of MSMEs in the digital era. In other words, the success of MSMEs is determined not only by the internalization of technology but also by the quality of the collaborative ecosystem that connects the world of education, business, and government within a sustainable, synergistic framework.

CONCLUSION

This research demonstrates that the industry-vocational education collaboration model is an integrative strategy for strengthening the competitiveness of MSMEs. Vocational education provides skilled labor and applied innovation, while industry and MSMEs act as partners in practical implementation, business associations act as liaisons, and the government acts as regulator and facilitator. Through a collaborative cycle encompassing needs mapping, co-design, pilot projects, evaluation and certification, and scale-up, MSMEs can strengthen their human resource capacity, optimize digital-based logistics systems, and enhance their digital marketing strategies. This research contributes by providing a conceptual framework and practical guidance that can be replicated in other sectors and regions, enabling MSMEs to become more competitive in the global market and support sustainable national economic development.

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