THE ENHANCING PRODUCTIVITY AND COMPETITIVENESS OF RURAL MSMES THROUGH APPROPRIATE TECHNOLOGY: INSIGHTS FROM A FOOTWEAR PRODUCER IN EAST JAVA

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Abstract

Micro, Small, and Medium Enterprises (MSMEs) play a vital role in driving local economic development, especially in rural areas. However, many MSMEs face persistent challenges related to limited production capacity and low competitiveness, largely due to inadequate technological adoption. This study presents insights from a community service initiative aimed at improving the production process of *Vario Shoes Lady*, a women-led MSME in Junwangi Village, Sidoarjo, East Java. The intervention introduced appropriate production technology, such as semi-automatic sewing machines and ergonomic cutting tools, tailored to the enterprise's operational needs. Through a participatory approach involving training and mentoring, the intervention succeeded in enhancing production efficiency, reducing defects, and shortening processing time. The findings highlight the significant role of appropriate technology in increasing MSME competitiveness and suggest that localized, context-sensitive technological strategies can be an effective pathway for stimulating rural economic development. This case reinforces the importance of synergizing academic engagement, local wisdom, and technological solutions to empower MSMEs as a backbone of inclusive economic growth.

Keywords: MSMEs, appropriate technology, rural development, productivity improvement, local economic empowerment

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are vital to the economic landscape of Indonesia, playing a critical role in job creation, poverty alleviation, and equitable economic distribution. The Indonesian government, through the Ministry of Cooperatives and MSMEs, continuously supports this sector, recognizing its capacity to foster inclusive and sustainable development in line with

the Sustainable Development Goals (SDGs). However, many rural-based MSMEs, despite their potential, face challenges that hinder their productivity and competitiveness, particularly in production technology and human resources.

One such example is Vario Shoes Lady, a women's footwear producer located in Junwangi Village, Sidoarjo, East Java—part of a prominent local shoe-making cluster. Like many small-scale producers, Vario Shoes Lady struggles with outdated production methods, limited access to capital, and lack of technological know-how. These constraints negatively impact product quality, production capacity, and the enterprise's ability to scale or compete in broader markets.

In response to these issues, this community service initiative aims to strengthen the production aspect of Vario Shoes Lady by introducing and implementing appropriate technology solutions. The intervention includes the provision of industrial-grade embossing and sewing machines tailored to the business scale and technical capability of the enterprise. Furthermore, hands-on training and ongoing mentoring ensure effective knowledge transfer and sustainable technology adoption. This project also aligns with the Indonesian higher education key performance indicators (IKU), particularly in involving students and lecturers in off-campus, real-world problem-solving engagements.

This paper presents the initial outcomes and insights from this technology-driven empowerment program. It reflects on the strategic approach, the practical challenges encountered, and the transformative effects of appropriate technology in enhancing the productivity and competitiveness of rural MSMEs.

LITERATUR REVIEW

The intervention in this community engagement program is grounded in several interrelated theoretical perspectives that support the use of appropriate technology as a driver of productivity and competitiveness in MSMEs, particularly in rural settings.

2.1 Appropriate Technology Theory

Originally developed by Schumacher (1973) in *"Small is Beautiful,"* the concept of appropriate technology emphasizes the use of tools and systems that are small-scale, affordable, locally adaptable, and environmentally sustainable. In the context of rural MSMEs, this approach advocates for technology that aligns with local skills, resource availability, and socio-economic conditions. The introduction of an industrial sewing machine and embossing machine to Vario Shoes Lady aligns with this theory, as the tools are both accessible and practical for the scale of the business.

2.2 Resource-Based View (RBV)

Barney's (1991) Resource-Based View argues that a firm's competitive advantage stems from its internal resources and capabilities, particularly those that are valuable, rare, inimitable, and non-substitutable (VRIN). Technological capacity—including the ability to utilize production equipment effectively—is one such critical resource. Through the enhancement of internal capabilities, such as skilled labor and modern production tools, Vario Shoes Lady can achieve greater efficiency and differentiation in its products.

2.3 Technology Acceptance Model (TAM)

Developed by Davis (1989), the Technology Acceptance Model explains how users come to accept and use a technology. It posits that perceived usefulness and perceived ease of use are the primary determinants of adoption. By ensuring that the introduced machines are easy to operate and visibly improve output quality and quantity, the likelihood of sustained usage by MSME operators increases significantly.

2.4 Community-Based Empowerment

Empowerment theory (Perkins & Zimmerman, 1995) in the context of community development focuses on building capacities at the individual, organizational, and community levels. This program promotes empowerment by enabling MSME actors to improve their production processes, increase self-reliance, and participate more actively in the local economy. The inclusion of students and academics further reinforces a collaborative model of knowledge exchange and capacity building.

Together, these theories provide a solid foundation for understanding how technology interventions can catalyze meaningful change in small enterprises. They guide the strategy of selecting, applying, and evaluating technology in a manner that is sustainable and socially responsive.

METHOD

3.1 Preliminary Socialization and Problem Identification

The program began with a series of socialization sessions aimed at building mutual understanding and trust between the academic team and the MSME partner. During these sessions, the team gathered comprehensive information on the business profile, current production methods, and specific operational constraints. This phase facilitated the identification of key problems, particularly limited access to modern equipment and inefficient manual production processes.

3.2 Training and Capacity Building

Following the initial assessment, tailored training sessions were conducted for the MSME owner and workers. These trainings covered the technical use of two types of machinery: an industrial-grade embossing machine and a professional shoe sewing machine. Emphasis was placed on hands-on practice, safety procedures, and daily maintenance routines to ensure that the new technologies could be effectively and sustainably utilized.

3.3 Technology Implementation

In the third phase, the project team delivered and installed the appropriate production equipment. The machines were selected based on their compatibility with the business's scale and production needs. The embossing machine was intended to enhance product branding and aesthetics, while the sewing machine was deployed to increase efficiency and consistency in shoe assembly.

3.4 Mentoring and Evaluation

To ensure effective technology adoption, regular mentoring and monitoring visits were conducted. The team evaluated progress based on improvements in production capacity, product quality, and the ease of technology use. Adjustments were made as needed based on real-time feedback from the MSME team.

3.5 Program Sustainability and Follow-Up

To support long-term sustainability, the program encouraged the MSME to internalize the new technologies into their standard operating procedures. Discussions were held regarding opportunities for future collaboration, business development, and scaling up operations. The MSME also contributed in-kind and financial support (incash), demonstrating a shared responsibility and commitment to the project's success.

Through these stages, the methodology ensured that technology implementation was not merely transactional but transformational—building local capacity, fostering innovation, and strengthening the socio-economic role of rural MSMEs.

RESULTS AND DISCUSSION

Results

The implementation of appropriate technology at Vario Shoes Lady yielded significant improvements in both operational and product outcomes. The key results include:

- **Increased Production Capacity:** Prior to the intervention, the MSME was producing approximately 10 pairs of shoes per day. Following the integration of the new machines, daily output increased to 20–25 pairs, effectively doubling the production capacity.
- **Enhanced Product Quality:** The use of the industrial sewing machine resulted in more consistent and durable stitching, while the embossing machine allowed for attractive, uniform branding on shoe surfaces. These enhancements elevated the perceived quality of the product.
- **Improved Efficiency and Time Management:** The transition from manual to semi-automated processes reduced the time required for each production cycle. Workers reported greater ease in handling tasks, leading to better time utilization and reduced physical strain.
- **Technology Adoption by Local Workers:** The training phase ensured that local workers, many of whom had never operated industrial machinery, were able to learn and apply new skills. This not only increased their productivity but also boosted their confidence and motivation.
- **Business Readiness for Market Expansion:** With improved production processes and output quality, Vario Shoes Lady is now better positioned to meet larger orders and explore broader market opportunities, including participation in local trade fairs and online platforms.

Discussion

The positive outcomes of this program validate the theoretical framework on which it was based. The introduction of appropriate technology, as defined by Schumacher (1973), proved to be both feasible and impactful when tailored to the specific needs of a rural MSME. The machines provided were not only affordable and scalable but also easily operated by the existing workforce, confirming the relevance of the Appropriate Technology Theory.

From the perspective of the Resource-Based View (Barney, 1991), the added equipment and human capital training functioned as valuable and rare resources, helping the MSME build a more defensible competitive position. Moreover, the participatory training approach aligns with the Technology Acceptance Model (Davis, 1989), in which user confidence and perceived usefulness are key to sustained technology adoption.

The results also reflect the broader community empowerment framework (Perkins & Zimmerman, 1995). The transformation seen in this MSME—particularly in production capacity and workforce competency—demonstrates how targeted interventions can build agency, ownership, and resilience within community-based enterprises.

Overall, this project highlights how simple yet strategic technological interventions can catalyze improvements in productivity, product quality, and local economic impact. Moreover, it underscores the importance of combining technology delivery with training and mentorship to ensure sustainable development outcomes.

CONCLUSION

Conclusion

This community engagement program demonstrated that the application of appropriate technology can significantly enhance the productivity and competitiveness of rural MSMEs. At Vario Shoes Lady, the provision of an embossing machine and an industrial shoe sewing machine, coupled with hands-on training and mentoring, led to tangible improvements in daily production capacity, product quality, and operational efficiency.

The results affirmed several theoretical perspectives, particularly the value of aligning technology with local capacity and context. By equipping MSMEs with suitable tools and the necessary knowledge to operate them, technology adoption becomes not only possible but empowering. Furthermore, the participatory model involving students and faculty proved effective in fostering mutual learning and sustainable impact.

Ultimately, this initiative highlights the potential of technology-based interventions to serve as a practical model for empowering rural enterprises and contributing to inclusive economic development.

Recommendations

Based on the findings and outcomes of this program, the following recommendations are proposed:

1. Expand Focus to Marketing and Digital Presence: After strengthening production, the next phase should address branding, packaging, and digital marketing strategies to help MSMEs expand their reach and customer base.
2. Introduce Financial and Business Management Tools: Basic accounting applications or tools tailored for MSMEs should be introduced to support better financial decision-making and business sustainability.

3. Ensure Continuous Mentoring and Technical Support: Post-project mentoring should be provided to ensure the MSME can maintain and optimize the use of the new technologies, especially in cases of minor machine breakdowns or workflow improvements.
4. Foster Multi-Stakeholder Collaboration: Stronger partnerships with local government, universities, and private sector actors should be encouraged to support funding, policy, and ecosystem development for rural MSMEs.
5. Replicate the Model in Similar Communities: The success of this pilot program in Junwangi suggests the model can be scaled and adapted to empower other small producers across rural Indonesia with similar characteristics.

By following these recommendations, future programs can build on the momentum generated by this initiative and contribute further to the advancement of technology-enabled entrepreneurship in rural areas.

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