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Increasing Quality and Competitiveness of Witpari Culinary MSMEs Through Modern Production and Digital Marketing

Sri Murwanti[1], Siti Zulaekah[2], Afif Faishal[3], Imam Riefly Aditomo[4], Fauzan Muhammad Ihsan[5], Heilin Alber Siva Haryoko[6]
[1,4,5,6]Management Study Program, Universitas Muhammadiyah Surakarta
[2]Nutrition Science Study Program, Universitas Muhammadiyah Surakarta
[3]Mechanical Engineering Study Program, Universitas Muhammadiyah Surakarta
Email: ira197@ums.ac.id

ABSTRACT

Rural culinary MSMEs frequently face structural constraints in production efficiency, packaging standardization, and technological literacy, limiting their competitiveness in tourism-based markets. This community service program aimed to strengthen production capacity and hygienic packaging practices within the Witpari Culinary MSME Community in Kemuning Village, Karanganyar. The intervention provided two spinner oil-draining machines and five heat sealer units, supported by participatory technical training and mentoring approaches aligned with Participatory Action Research (PAR) principles. A participatory action research framework was applied through needs assessment, intervention design, hands-on implementation, and evaluation using pre-test and post-test instruments. Baseline results revealed low mechanized production literacy (mean score 42.5/100). After intervention, the mean score increased to 81.3/100, with 85% of participants demonstrating independent operational competency. The program resulted in reduced oil residue, improved packaging durability, increased product professionalism, and enhanced technological self-efficacy among participants. Findings confirm that small-scale appropriate technology combined with structured mentoring significantly enhances operational literacy, standardization, and competitiveness of rural MSMEs.

Keywords: community service, MSME upgrading, appropriate technology, production efficiency, packaging standardization

1. Introduction

Kemuning Village, Ngargoyoso District, Karanganyar Regency is a leading natural tourism destination that also has culinary potential driven by MSMEs. A total of 25 active culinary MSMEs in this village are united under the *Witpari MSME Community*, producing local processed products that support tourism and the community's economy. However, limitations in production technology, quality standards, and market access remain the main obstacles to improving competitiveness.

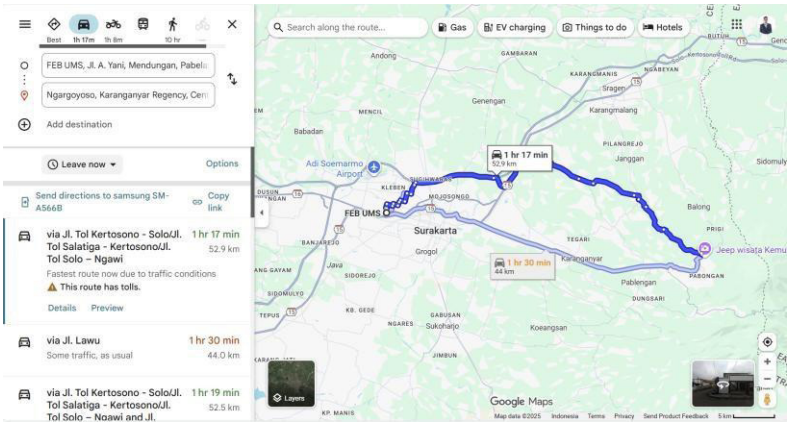

Figure 1. Location of Kemuning Village, Ngargoyoso, Karanganyar

Although the total turnover reaches approximately IDR 200 million per month, with the majority of raw materials (85%) sourced from local farmers, MSMEs in Kemuning face several interconnected challenges. First, in terms of production, around 70% of business actors still rely on simple equipment, limiting production capacity to only 50–200 packages per day. Second, regarding quality, only 18 out of 25 MSMEs hold PIRT certification and 12 have halal certification, with no standardized hygiene practices or uniform food safety SOPs in place. Third, in management, about 80% of MSMEs have not adopted digital financial recording systems. Fourth, in marketing, although 15 MSMEs already use social media and marketplaces, all still depend on offline sales. These four challenges are directly linked to the main urgency in Kemuning Village: increasing production capacity through appropriate technology, standardizing quality and hygiene, digitalizing marketing, and strengthening eco-friendly innovation.

Figure 2. Initial meeting with the Witpari Community

Additional challenges faced include limited capital (approximately 65% rely on personal funds), low food-safety literacy, and a lack of market-analysis skills. The implementation of appropriate technology in MSMEs is not only aimed at increasing production capacity but also at improving product quality and operational efficiency in a sustainable manner (Kristiawan et al., 2025; Wijayanti et al., 2021). These conditions risk leaving Kemuning's culinary MSMEs behind amid competition. Academics and MSME actors will jointly identify problems, design methods, test hygienic production technologies, develop innovations based on local ingredients, and strengthen digital marketing. The objectives of this activity are to increase production efficiency, improve product quality and safety, expand market access, and build a sustainable and competitive culinary MSME ecosystem in Kemuning.

Figure 3. Product samples from the Witpari Community

The development plan for this initiative is focused on three interrelated strategic pillars. First, modern production and quality enhancement, where the use of appropriate technology such as slicing machines, oil spinner dehydrators, food processors, and vacuum sealers has been widely proven to improve efficiency, product quality consistency, and shelf life (Putra et al., 2020; Sari et al., 2022; Dewi et al., 2025; Murwanti et al., 2023). This approach simultaneously accelerates production, reduces product damage, and ensures compliance with food safety standards (PIRT, BPOM, halal). Second, research-based product innovation through collaboration with universities and food technology laboratories, aimed at creating innovative products from local raw materials for example, low-sugar/low-fat foods or variants with higher nutritional value. This will strengthen competitiveness while enriching the variety of flagship products. Third, digital management and marketing implementation by adopting POS applications, inventory management systems, and digital marketing strategies across social media and marketplaces to expand market reach from local to national and even international levels. Digital marketing adoption plays a crucial role in expanding market reach and improving competitiveness of MSMEs, particularly in tourism-based rural areas (Cornellia, 2023; Suprihatin et al., 2024). These three pillars are integrated into this community service program to build a sustainable and competitive culinary MSME ecosystem in Kemuning.

2. Method

Initial stage

The preparation phase begins with initial coordination through meetings with representatives of the Witpari MSME Community to agree on objectives, priority needs, and the work plan, and to develop a schedule involving village officials, MSME groups, and accompanying students. Next is participant selection, designating at least 20 priority MSMEs based on active involvement, readiness to innovate, and willingness to participate in the full program. The final step in this phase is an initial mapping (baseline study) consisting of a survey of production capacity, product quality, and business management conditions; the survey results will serve as the basis for evaluating achievements after the program concludes.

Solution implementation phase

The solution implementation phase in production and quality begins with the introduction of appropriate technologies by procuring and demonstrating slicers, spinners, food processors, and vacuum sealers, accompanied by operational and basic maintenance training so that MSMEs can operate and maintain the equipment independently. Field trials are conducted at partner production sites to adapt the technologies to the characteristics of local raw materials, and SOPs for equipment use and borrowing mechanisms are developed through the Witpari Community. In addition, training on quality standardization and food safety is carried out, including GMP workshops based on local product case studies, drafting hygiene SOPs for three flagship community products (for example chips, dodol, and syrup), and simulations of SOP implementation at production sites to ensure compliance and consistent quality.

Partner participation stage

The role of MSME partners includes providing production locations, actively participating in training, implementing introduced technologies, and supporting program sustainability by forming management teams responsible for operations and shared equipment maintenance. The role of academics involves developing evidence-based training materials, providing technical guidance during training and trials, and conducting evaluations to assess intervention effectiveness and recommend improvements. The role of students is to assist MSMEs in daily practice, document processes and learning outcomes, and monitor progress to support reporting and program follow-up.

Evaluation of Program Implementation

Program implementation evaluation is conducted through several interconnected stages. First, the process evaluation is carried out for each training and mentoring activity using participant satisfaction questionnaires to measure implementation quality and participant response. Second, the outcome evaluation compares baseline and endline data, covering indicators such as increased production capacity, SOP adoption, and changes in management practices. Third, the impact evaluation is conducted three months after program completion to assess the sustainability of technology adoption, the effectiveness of digital marketing, and changes in MSME income. To ensure sustainability, the Witpari Community will form an internal team responsible for overseeing the use of appropriate technologies and SOP implementation, as well as facilitating equipment maintenance, continued training, and market access coordination.

Role of the Implementation Team

Name	Institution	Position	Job Description
Sri Murwanti, S.E., M.M.	Management, UMS	Chair	Develop activity plans and targets; coordinate the team and Witpari MSME partners; oversee modern production, product innovation, and digital marketing; conduct monitoring and evaluation
Siti Zulaekah, S.Gz., M.Si.	Nutrition Science, UMS	Member	Provide guidance on product formulation for balanced nutrition; perform nutrient content testing; recommend development of healthy products (low sugar/low fat, high fiber/protein); assist in preparing nutrition information labels.

Name	Institution	Position	Job Description
Afif Faishal, S.T., M.T.	Mechanical Engineering, UMS	Member	Advise on selection and use of modern production machines; design machine workflow for efficiency and safety; perform maintenance and troubleshooting; recommend machine modifications suited to MSME capacity.
Imam Riefly Aditomo, S.M., M.B.A.	Management, UMS	Member	Provide business management assistance (planning, control, evaluation); support marketing strategy and business networking; and manage intellectual property rights and other outputs.
Fauzan Muhammad Ihsan and Heilin Alber Siva Haryoko	Management, UMS	Student Members	Assist implementation of digital marketing on social media and marketplaces; create promotional content (photos, videos, descriptions); manage digital POS and online stock systems; analyze sales data and consumer behavior for marketing recommendations; and help manage the other outputs.

Potential Recognition of Semester Credit Units (SKS) for Students

Students who actively participate in the program will receive recognition of academic credits (SKS) through the Merdeka Belajar Kampus Merdeka (MBKM) activities. This involvement can be credited with 6–12 SKS for participation in MSME business development related to courses such as Introduction to Management, Life Skills, and Feasibility Study. In addition, the field experience will be acknowledged as practical work experience contributing to the university's Key Performance Indicators (IKU), particularly IKU 2 and IKU 3, thereby strengthening students' academic and professional portfolios.

3. Results and Discussion

Based on the situational analysis, the priority issues faced by the Witpari Community MSMEs lie in two main aspects: production and quality. In terms of production, limited capacity and technology remain the primary obstacles. Around 70% of business actors still rely on simple equipment, restricting their production capacity to only about 50–200 packages per day. This condition hampers the potential for scaling up their businesses. Meanwhile, in terms of quality, product standards and food safety are not yet evenly applied. Out of 25 MSMEs, only 18 have obtained PIRT certification, and 12 hold halal certification. Moreover, hygiene standards and Standard Operating Procedures (SOPs) for food safety have not been consistently implemented across all members. The application of Good Manufacturing Practices (GMP) is essential in ensuring food safety, standardization, and consistency of product quality in small-scale food industries (Anshari et al., 2022; Herdhiansyah et al., 2021; Handayani et al., 2024). This inconsistency poses risks of reducing consumer trust and limiting MSMEs' access to modern markets. To assess the effectiveness of the intervention, the program outcomes were translated into measurable outputs and performance indicators. This approach ensures that the impact of the community service program can be evaluated quantitatively, particularly in terms of production efficiency, product quality, technology adoption, and digital marketing performance.

Table 2. Actual Outputs and Performance Outcomes of the Program.

No	Intervention Area	Actual Outputs Achieved	Performance Indicators	Observed Results
1	Production Technology	Increased production efficiency	Reduction in oil residue and processing time	Improved efficiency
2	Production Technology	Adoption of spinner and heat sealer technology	Percentage of participants able to operate equipment independently	85% participants
3	Product Quality	Improved packaging quality and durability	Product resistance to leakage and contamination	Demonstrated qualitative improvement
4	Product Quality	Standardized hygienic production practices	Consistency in hygiene and packaging process	More consistent
5	Technical Capacity	Increased technological literacy	Pre-test and post-test score improvement	42.5 → 81.3
6	Business Professionalism	Improved product appearance and market readiness	Visual quality and packaging presentation	More professional
7	Technology Adoption	Increased confidence in using modern equipment	Level of independent operation and usage frequency	High adoption
8	Community Impact	Strengthened operational capability of MSMEs	Ability to sustain improved production practices	Sustained improvement

The results indicate that the intervention successfully generated measurable improvements across multiple aspects of MSME performance. The most significant impact was observed in production efficiency, where MSMEs demonstrated measurable improvement after adopting appropriate technology. Furthermore, 85% of participants were able to operate the introduced equipment independently, demonstrating effective knowledge transfer and technological adoption.

Figure 4. Discussion with the Witpari community

This reinforces the effectiveness of the participatory training and mentoring approach implemented in the program. Based on an in-depth analysis of the partner conditions, namely the Witpari MSME Community in Kemuning Village, the solutions were implemented systematically from upstream (production) to downstream (marketing), following an integrated MSME development approach (Mulyaningsih et al., 2022; Siswati et al., 2020). These interventions also strengthened business management foundations. To address production and quality issues, the proposed solutions include the introduction and training on appropriate technology (ATG), such as slicers, spinners, food processors, and vacuum sealers, which have been widely applied to improve efficiency and product quality in MSMEs (Putra et al., 2020; Wardono et al., 2022; Witjaksono et al., 2023). These technologies directly address low production capacity and dependence on simple equipment. In addition, training and mentoring on quality standardization

are conducted through Good Manufacturing Practices (GMP), which are essential to ensure food safety and product consistency (Anshari et al., 2022; Rachma et al., 2022). This includes hygiene procedures, development of production SOPs, and proper packaging techniques, as well as assistance in obtaining PIRT and Halal certificates to expand market access. Meanwhile, for management and marketing problems, the solutions provided consist of training and implementation of simple digital financial recording systems using bookkeeping applications (e.g., Excel templates) to address the manual recording habits still practiced by 80% of the MSMEs, as well as workshops on digital marketing strategies and creative content covering social media management, which have been proven to enhance MSME competitiveness and consumer engagement (Cornellia, 2023; Suprihatin et al., 2024), product photography, short video creation, and online store management on marketplaces such as Tokopedia and Shopee.

Figure 5. Handover of the production equipment to the Witpari community

The implementation of these solutions resulted in observable improvements, particularly in production efficiency, product quality, and technological literacy, as reflected in the increased post-test scores and participants' ability to operate the equipment independently. The research results of the proposing team further strengthen this intervention design, such as the study by Murwanti et al. (2023) on digital marketing training successfully applied to Boyolali milk soap MSMEs and adopted for creative content training and marketplace activation for Witpari; the study by Subroto & Faishal (2021) on engineering principles and the utilization of organic waste relevant to developing efficient and environmentally friendly culinary production equipment; and the study by Isa et al. (2024) on MSME vulnerability analysis which serves as the basis for strengthening business resilience through digital financial recording and business development strategies. Thus, the solutions, targeted outputs, and achievement indicators systematically designed in this manner align with the findings of an increase in technological literacy scores from 42.5 to 81.3 and the success of 85% of participants in operating equipment independently, as previously described. These findings are consistent with previous studies that highlight the importance of integrating appropriate technology, capacity building, and digitalization in strengthening MSME competitiveness (Ramdhani et al., 2025; Safitri et al., 2025).

4. Conclusion

This community service program successfully addressed the production and quality constraints faced by the Witpari Culinary MSME Community in Kemuning Village, Karanganyar. The intervention, which combined the provision of appropriate technology (spinner oil-draining machines and heat sealers) with participatory training and structured mentoring, produced measurable improvements. The participants' mean technological literacy score increased significantly from 42.5 (pre-test) to 81.3 (post-test), and 85% of MSME actors demonstrated independent operational competency. Tangible outcomes included reduced oil residue in fried products, improved packaging durability and hygiene, and enhanced product professionalism. These findings confirm that small-scale appropriate technology, when integrated with hands-on training and continuous mentoring, effectively increases

production efficiency, standardizes product quality, and strengthens the competitiveness of rural culinary MSMEs. To ensure sustainability, it is recommended that the Witpari Community establish an internal maintenance team for shared equipment and receive ongoing assistance in digital marketing and financial management.

5. Allowance

The proposing team extends its deepest gratitude to the Council for Higher Education, Research, and Development of PP Muhammadiyah for funding through the RisetMu Grant Batch IX 2025, Number: 0259.412/I.3/D/2025, which has enabled the implementation of this community service program. Appreciation is also conveyed to the Witpari MSME Community and all its members, especially Mrs. Yenni Maula as the Community Chairperson, for their willingness to collaborate, active participation, and full support throughout the planning and execution stages of the program. We also express our sincere thanks to the Kemuning Village Government, Ngargoyoso Subdistrict, Karanganyar Regency, for granting permission and providing facilitation for the activities. Furthermore, we acknowledge Universitas Muhammadiyah Surakarta through the Institute for Research and Community Service (LPPM) for administrative and technical support. May this program bring sustainable benefits in enhancing the quality, competitiveness, and welfare of culinary MSMEs in Kemuning Village.

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