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Effect of Technology Introduction on Opak Productivity in Kebumen Village, Tersono District, Batang Regency

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Abstract

Opak production in Kebumen Village faces considerable challenges as it still uses traditional methods, resulting in low productivity and competitiveness in the market. The methods used were counseling, community empowerment, and introducing appropriate technologies such as drying ovens, cassava grinders, and oak dough molders to improve production efficiency. The program included training on Standard Operating Procedures (SOPs) and Occupational Safety and Health (OHS), as well as intensive mentoring for Micro, Small and Medium Enterprises (MSMEs) for 48 days. The implementation resulted in a 30% increase in production efficiency and a 20% decrease in work accidents. Applying this technology accelerates the production process, ensures product quality, and encourages innovation in digital marketing. The success of this program shows that the introduction of appropriate technology significantly contributes to improving the productivity, sustainability, and competitiveness of traditional food MSMEs. This empowerment model can inspire similar traditional food sector development in other areas with similar potential.

Keywords Appropriate Technology; Empowerment; MSMEs; Opak; Productivity

1. INTRODUCTION

Developing Micro, Small, and Medium Enterprises (MSMEs) in Indonesia is one of the essential pillars of the national economy. MSMEs create jobs and drive local and national economic growth (Hamza & Agustien, 2019). Amid increasingly fierce competition and rapid technological development, the introduction of technology is one of the essential keys to increasing the productivity and competitiveness of MSMEs (Aisyah et al., 2022). This is especially relevant for the traditional food industry, such as Opak production, which often still uses conventional methods.

Kebumen Village, Tersono Subdistrict, Batang Regency, is one of the Opak production centers in Central Java, which has great potential to develop this local product to become more competitive. This product has become a cultural identity and a source of livelihood for the local community. However, there are various limitations in the development of this small industry, especially the impact of the COVID-19 pandemic, which has caused a decrease in the turnover of MSMEs in Indonesia (Lorenzo et al., 2022), including Opak turnover in Kebumen Village, which has dropped by more than 50%.

In addition, the lack of knowledge about digital marketing and skills in using social media as a promotional tool is a significant obstacle for MSMEs. This causes Opak sales to still depend on local collectors and traditional markets. This conventional marketing system limits the reach of Opak products. Simple product packaging, without complete information such as composition and production date, also reduces product competitiveness in an increasingly competitive market (Lubis et al., 2021).

The introduction of technology, in the form of modern production machinery and other tools, can solve these challenges (Nur Sadjadah et al., 2024). In the context of Opak production in Kebumen village, the production process depends highly on the weather, especially during the rainy season, which hampers Opak drying. The introduction of technology, in the form of modern production machinery and other tools, can solve these challenges.

This community service aims to analyze the effect of technology introduction on the productivity of Opak MSMEs in Kebumen Village. With new technology, the production process can be carried out more quickly and efficiently, and products can be produced consistently. In addition, this community service also wants to explore how technology can help increase profits and business sustainability of Opak business actors in Kebumen Village.

The community response in Kebumen Village to this service program was quite enthusiastic. The Village Head, BUMDes management, and Opak Artisan Groups welcomed this technological innovation because they hoped to increase the production and quality of Opak in Kebumen Village. Even the artisan groups proposed several technologies to speed up the production process, reducing manual labor.

However, despite this enthusiasm, it cannot be denied that some community members raised some concerns. Some artisans were worried about the cost of maintaining the technology. They worried that keeping the new machines or devices would be too expensive. However, the team has assured the Opak Craft community that these concerns can be overcome with the right approach, such as training for technology management and maintenance and ongoing technical support. Communication between the technology manager, village government, and Opak artisans ensures this innovation can run smoothly and provide long-term benefits.

Through this Community Service, strategic steps can be found to support the development of MSMEs in the traditional food sector to compete in local and global markets. The introduction of technology is expected to increase productivity and open up new opportunities in product innovation, marketing, and business management. This technology is expected to positively impact the welfare of Kebumen Village residents, especially in terms of increasing income.

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2. METHODS

This community service program was carried out in stages every week within 48 days, from 21 October 2024 to 8 December 2024, in Kebumen Village, Tersono District, Batang Regency. Participants or targets in this community service program are Opak craftsmen who are members of the Bina Sutra Group, which Mr chairs Ngakhari. This target selection was made based on direction from the Village Head, who saw this group as the most relevant party as a partner of this service program. The Bina Sutra Group has 13 members who are well organized and have the ability and experience to run an Opak business.

The methods used include counseling, community empowerment, and appropriate technology. Counseling and education in community service are essential methods to increase public awareness and knowledge about various health, social, and economic issues (Badriyah, 2022). In this case, counseling is carried out through socialization to increase community awareness and knowledge about the need for technological innovation in Opak production community empowerment method in community service focuses on the active participation of the community in planning and implementing programs relevant to local needs (Harini et al., 2023). In this case, Opak business actors actively plan and implement appropriate programs according to their needs.

Appropriate technology is an approach that utilizes technology to increase production and provide solutions to local problems (Anuyah et al., 2023). Technology development is introduced to improve Opak's work efficiency in this case. In addition, the manufacture of tools and delivery related to Standard Operating Procedures (SOP) and Occupational Safety and Health (K3) are included in the service method based on the application of appropriate technology and technical education. This method aims to ensure community safety when operating new technology or tools. In this program, the community receives tools designed according to local needs and gets in-depth knowledge on how to use them safely and efficiently through hands-on training and mentoring (Heriansyah et al., 2019). Applying appropriate technology accompanied by SOP and OHS training can increase productivity by 30% and reduce the potential for work accidents by 20%. This method is effective for ensuring the sustainability of community service programs because it not only focuses on physical results (tools) but also builds community capacity in their operation.

The effectiveness of this service program is measured through several indicators, including changes in understanding, skills, and productivity of opal artisan group members. The following methods are used to measure the effectiveness of this program:

a. Measurement of Understanding and Knowledge carried out before and after the implementation of the service programme. This was done through group discussions to determine the understanding of Opak artisans on the benefits of technology, how to operate, and the maintenance process required.
b. Measurement of community empowerment through active community participation. This is seen through community activeness, participation, and enthusiasm for utilizing the technology offered in this service program.

3. FINDINGS AND DISCUSSION

Implementing community service by the Diponegoro University community service team in Kebumen Village 2024 for 48 days provided three functional tools to support Opak production to Opak artisans in Kebumen Village. The three tools are an oven as an Opak dryer, a grinder as a cassava crusher, and a printer for Opak dough. The three tools were given based on the results of considerations related to various problems in Kebumen Village. These problems were identified by directly discussing them with the Opak artisans.

3.1. Initial Design of Functional Tools to Support the Opak Production Process

3.1.1. Oven as Opak Dryer

The oven as a dryer in the Opak-making process has dimensions of 130x90x150 cm and is made from galvanized zinc. On the inside, there are dividers to place the Opak drying rack (tray) so that a rack (right) is also needed to dry the Opak dough. This tool consumes gas from LPG, transferred by a jailed device to generate enough heat to dry the Opak. In the drying process, the amount of gas consumption can be adjusted to match the same operating conditions (heat) as the Opak drying process with the help of sunlight using a regulator device that can regulate the gas discharge.

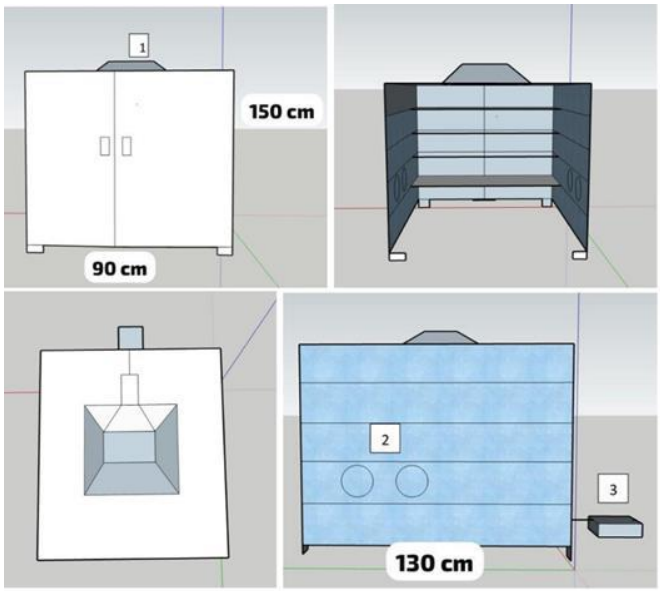

Figure 1. Design of Opak Drying Oven Tool, Description: (1) Gasolec; (2) Circulation Hole; (3) LPG (Liquified Petroleum Gas)

Gasolec is a heating device specifically designed for use in chicken coops, especially during the brooding process. It uses gas as fuel, generally LPG gas, to

generate the heat needed to maintain the temperature. The service team chose to use jailed based on the lack of electric voltage capacity of the Opak artisans's houses. The provision of circulation holes aims to provide an opening for the air in the oven during the heating process to circulate so that heat can surround all parts of the oven.

3.1.2. Grinder as a cassava crusher

This cassava grinder, which resembles a meat grinder, is designed to speed up the process of processing cassava into a finer form. This machine has compact dimensions, around 50x30x40 cm, with the main material made of stainless steel to ensure hygiene and corrosion resistance. On the inside, there is a spiral-shaped cutting knife that functions to grind cassava with high precision. The power source of this machine comes from an electric motor with a power of 850 watts, which provides optimal performance for the grinding process. The machine is equipped with an inlet funnel (hopper) at the top to facilitate the entry of raw materials and an output channel (outlet) at the bottom for milling results. This tool is also made of 100% stainless steel, so it is safe to use repeatedly. The results of Opak dough will also not be blackened due to rust that comes in. This machine also has an on/off button on the side and a motor protection device to prevent overheating during continuous use for safety and ease of operation.

Figure 2. Reference Shredder for Cassava

3.1.3. Opak Dough Molding Tool

Opak dough molders are an important tool supporting the Opak-making process. This tool plays a role as a dough printer, which later makes Opak dough ready for drying. Previously, Opak makers only used Opak molders made of wood.

However, there are obstacles where when using this wooden printer the artisans have to manually separate the dough that will continue to be a product from the discarded

dough. The dedication team plans to make a dough printer that is given a little sharpener made of stainless steel to dispense unused dough. The tool to be made is similar to the previous dough maker, with a size of 23 cm x 62 cm, but the material is made of stainless steel.

Figure 3. Initial Design of Dough Molding Tool

3.2. Tool Design Process and Results

The service team began to execute tool procurement in the third week of service time. Grinder tools are searched for in online stores by paying attention to the specifications of the tools. The service team collaborated with welders in Kebumen Village for oven and printer tools. The manufacturing process begins with surveying and purchasing materials at Budi Jaya Iron Shop, Limpung. The main materials purchased included galvanized cells, iron frames, door frames, hinges, and rivet nails. The materials were immediately taken to the village welder's residence to begin the process. Other materials, such as gasoline, gas hoses, and regulators, were purchased through an online shop.

The process of working on the oven tool takes approximately three weeks, with per week the service team always conducting controlling to monitor the process of working on the tool. The remaining materials used to make the oven were diverted to make a printer. The grinder is also ready to be handed over to the Opak artisans.

Figure 4. Controlling Process of Oven Tool Making

Before being given to Opak artisans, experiments for oven tools need to be carried out to obtain SOPs (Standard Operational Procedures) to ensure the quality of drying results and safety for users. From the trial process, the ideal time for drying Opak dough is 10-15 minutes. Some minor things need to be considered in the operation process, such as setting the regulator to keep the gas discharge small and checking periodically during the drying process because Opak placed in the region's center will dry faster than those on the side.

Figure 5. Oven Tool Trial Process

The service activity was closed with the handover of tools to the BUMDES and Opak artisans. The handover activity was carried out symbolically with the additional delivery of the SOP for using the oven and grinder tools. At the same time, the printer was directly given to the Opak artisans.

Figure 6. Tool Delivery Process

4. CONCLUSION

The community service program conducted in Kebumen Village, Tersono Sub-district, Batang Regency, positively impacted the local community, especially in developing Opak production. Students and the community worked together to identify problems and find appropriate solutions. This program succeeded in encouraging the spirit of the community, especially Opak artisans, to improve Opak production activities by providing functional tools to support the production process. The functional tools provided are an oven as an Opak dryer, a grinder as a cassava crusher, and a dough maker. These tools increase the efficiency of the production process, such as the oven, which can dry Opak dough much faster than usual. Applying appropriate technology accompanied by SOP and OHS training has increased productivity by 30% and reduced the potential for work accidents by 20%. Thus, this program provides practical experience for students and helps the people of Kebumen Village to be more independent and competitive in developing their businesses. Some suggestions that can be considered include conducting regular controlling activities to help Opak artisans maintain tools or deploying the service team again in Kebumen Village in the next period.

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