

Improving the production and managerial performance of tempeh chip MSMEs

Ferry Setiawan^{1*}, Dhimas Wicaksono², Ikbal Rizki³, Raden Fatchul Hillal⁴,
Djoko Widagdo⁵, Dimas Aditya Mahendra⁶

¹College of Technology Aerospace, Yogyakarta, Indonesia, email: ferry.setiawan@sttkd.ac.id

²College of Technology Aerospace, Yogyakarta, Indonesia, email: dhimas.wicaksono@sttkd.ac.id

³College of Technology Aerospace, Yogyakarta, Indonesia, email: ikbal.rizki@sttkd.ac.id

⁴College of Technology Aerospace, Yogyakarta, Indonesia, email: raden.fatchul@sttkd.ac.id

⁵College of Technology Aerospace, Yogyakarta, Indonesia, email: djoko.widagdo@sttkd.ac.id

⁶College of Technology Aerospace, Yogyakarta, Indonesia, email: dimasadyamahendra2@gmail.com

*Corresponding author

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Dhimas Wicaksono, Ikbal Rizki,
Raden Fatchul Hillal, Djoko Widagdo,
Dimas Aditya Mahendra

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ABSTRACT

The Community Service Program of STTKD Lecturers is funded by the Directorate of Research and Community Service of the Ministry of Education and Culture due to the problems faced by Micro, Small, and Medium Enterprises (MSMEs) of tempeh chips brand "Tempe Krees", including; low production capacity, inability to meet market demand, poorly organized managerial processes, and unattractive product branding that hinder online market penetration. The solution provided by the Community Service Team in the technological field is to increase the productivity of tempeh chips by using appropriate technological equipment, such as a soybean skin separator machine, tempeh slicing machine, and oil separator machine. In the managerial field, management and marketing training is conducted to reach a wider market share and improve packaging design to increase product branding in order to penetrate the online market. The result of this program is that the managerial competence of the partners has improved, as can be seen from the results of the posttest which has a better value than the pretest results. With the application of appropriate technology equipment, the production of tempeh chips increased from 50-55 pieces @ 250 grams per day to 100-110 pieces @ 250 grams per day. Production costs have decreased from Rp11,025 to Rp9,932, so the profits of MSME partners have increased from before. The next step after this community service is to encourage partners to penetrate the modern market so that partner businesses can develop well and trigger economic growth in the community around the location of MSMEs.

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) in Indonesia are experiencing rapid growth from year to year, and their role is important in supporting the growth economy as a whole in Indonesia. Data from the Indonesian Ministry of Cooperatives and SMEs in 2017 shows that MSMEs dominate the market in Indonesia with a proportion of around 99.99%, which is

equivalent to 62.9 million business units, while the large business sector only covers around 0.01% market Indonesia or around 5.4 thousand units business (Tarmidi et al., 2021). With this significant development of MSMEs, Tempe Chips are one of the foods that many people like and the process of making them is not too difficult. The large public interest in tempeh chips products is one of them opportunities promising business (Yusendra & Widarti, 2015). Tempeh is usually produced from soybean seeds and can be produced by both home and small industries. The manufacturing method tempeh from material standard soya bean in Indonesia, Good in scale industry nor in a way traditional, basically similar (Wisnujati, 2016). However, in the process of producing and marketing tempe chips, local residents still carry it out through individual micro business units (UKM), without any collaboration within business groups. This situation results in difficulties in coordinating product development and quality improvement production, and effort to expand the market (Mahmudi & Suryandani, 2018).

Rogoitian Hamlet, which is located in Bantul Regency, Yogyakarta, is one of the areas that has the potential to develop tempeh chips MSMEs, one of which is a chips product tempeh brand "Tempeh Krees." Partner MSMEs chips tempeh brand "Tempeh Kress" This is a small, household-scale business that was started with its own capital with several workers involving the community around the MSME production location. In terms of price, the actual price product the Still can compete with other, with profile business on table 1.

Table 1. MSME profile

Data	Partner
Name Business	Chips Tempeh Kress
Founder / Owner Business	Herna Asril
Type of business	Business Production Chips Tempeh
Number Permission Try	NIB: 0220007813213
Permission Production MSMEs	P-IRT 2113402010111- 37
Address	Rongoitan Village RT.62 Pendowoharjo Sewon Bantul
Amount Worker	5 people
Capacity Production	±55 units/ day (Packing 250 grams)
Price Product Offline	Rp.12. 000, – per 250 grams
Price Product Online	Rp.13. 000,- per 250 grams

In operating business production food light chips tempeh brand "Tempeh Krees", owner business that is Mother nana already recruiting some worker to help the process of making tempeh chips, in this case, there are 5 workers from around the tempeh chips production location, the owner wants to add employees but it turns out it is inefficient and not significant in increasing production capacity because the manufacturing process is still done manually with human power. The manual production process relies heavily on the physical endurance and skills of workers. In conditions like this, ergonomics is rarely paid attention to, so health complaints often occur from workers (Anton, 2018), when carrying out business processes production tempeh chips snacks brand "Tempeh Krees" business actors have participated in several training and counseling sessions both carried out by government agencies and

universities, including training in making NIB (Business Identification Number) through the OSS (Online Single Submission) Institute from the District government. Bantul, Food safety education & training (PKP) from BPOM Yogyakarta City, IPR Education and Advocacy from Department of Industry and Commerce Yogyakarta City, Digital marketing training from STTKD Yogyakarta. To achieve the optimal development potential of the MSME "Tempe Kress", efforts need to be made to improve production and managerial performance in the operations of the MSME business. This is due to several weaknesses in the "Tempe Krees" brand MSMEs, including:

The problem in the production sector is that production capacity is not optimal so it cannot meet market demand. However, when partners increase the number of employees to meet market demand, the result is that the profit margin decreases, even reaching a loss. This decrease can be caused by the use of manual production methods which take a lot of time in making tempe chips. However, this approach is often less effective because it takes a long time, so people often cannot implement it carefully (Barly, 2018).

In figure 1, Process solution seed soya bean manually the result unsatisfactory because apart from not being clean due to the fact that there is still skin remaining. The manual splitting of soybeans process results are less satisfactory because apart from being less clean due to the remaining skin. The time (Gultom & Tamara, 2021) required for the partner is 60 minutes for 1 kg,



Figure 1. Manual separator skin soya bean

In Figure 2, the oil draining process, which takes 12 hours from stage frying until stage packing in 1 kg tempeh chips, integrated in the production process. The frying process is an important step in cooking and drying products using heat, which generally involves the use of oil. High oil content in food can reduce its shelf life. To avoid rapid deterioration, the oil content should be reduced or even eliminated, thereby extending the shelf life of the product. In addition, high levels of oil can cause unpleasant aromas and have a negative impact on production quality (Sujito et al., 2021).



Figure 2. Manual oil drainer

While for the process of slicing tempeh The time required is 30 minutes for 1 kg. This method takes a long time and sometimes the thickness of the tempeh slices is not uniform (Tasliman, 2023).



Figure 3. Manual slicer tempeh

In the managerial field, MSME problems include management and operational management which are still not well organized, low knowledge of producers in understanding efforts to reduce the cost of production, marketing processes which are still carried out door to door *and* by word of mouth among customers, MSME players. still have limited understanding of the benefits of *branding*. In a marketing context, *branding* has an important role in forming a positive image in consumers' minds. Therefore, a deep understanding of *branding* needs to be instilled in MSME players, because product *branding* is a key factor to ensure product MSMEs will remain remembered by the public or consumers for a long time (Saifulloh, 2021).

In Figure 4, the old packaging used by the partner is evident. This packaging may no longer align with current market trends and consumer expectations. It is crucial to update the packaging design to make it more appealing and in line with the desired brand image. An attractive packaging design can provide additional allure to consumers, help enhance the product's image, and strengthen branding in the market.



Figure 4. Old packaging

In Figure 5, it can be observed that the partner is still using the old logo design. The longstanding logo design may need to be reconsidered for an update to align with current developments and follow relevant design trends. An attractive and modern logo can provide a strong identity to the brand, enhance consumer appeal, and support marketing efforts to expand market share. Therefore, it is important to consider updating the logo design as part of the brand strengthening and company image strategy.



Figure 5. Old logo

With this background, this community service was initiated as a response to the potential and challenges faced by tempe chip MSMEs in Rogoitian Hamlet, with the hope of being able to make a real contribution in improving the quality of life of the community and regional economic development.

METHOD

In the implementation method of Service Learning and Community Development, the STTKD lecturer community also involves MBKM students and KKN students. Certainly, partner participation is crucial to ensure that the established programs can run smoothly. This method engages partners in various aspects, such as preparing the necessary space, facilities, and infrastructure, as well as human resources and other resources to carry out the service learning and community development programs. Partners also play a role in program planning by providing input and suggestions in line with needs

and desires. Additionally, partners assist in program implementation, both actively and passively. They can provide information, collect data, and contribute to various activities held in the service program.

In the context of Community Development, partners also have a key role in advancing the surrounding community. They not only participate in program activities but also contribute to the development and improvement of the local community's life. Partners actively engage in the planning, implementation, and evaluation processes of projects designed to support economic growth and community well-being. This comprehensive method creates a mutually supportive relationship between academics, students, and partners in a collective effort for service-based learning and community development.

RESULT AND DISCUSSION

In Figure 6, we provide a detailed explanation of active engagement strategies on social media platforms, such as creating captivating posts on Instagram, Facebook, and TikTok, with a strong emphasis on creativity and visual appeal. Additionally, we demonstrate the use of relevant hashtags to enhance product discoverability, along with innovative online marketing techniques designed to capture and sustain the interest of millennial buyers. It is anticipated that this training will offer a comprehensive view and practical solutions for tempe chips MSMEs in crafting effective marketing strategies that align with current millennial consumption trends.



Figure 6. Training about interesting buyer millennial

In Figure 7, a comprehensive understanding is provided regarding all costs associated with the production process, including raw materials, labor wages, overhead costs (such as electricity, water, and equipment), and production costs. Through this understanding, culinary entrepreneurs can better assess and comprehend the complexity of cost factors influencing the final product. Furthermore, to achieve a profitable selling price, culinary entrepreneurs are expected to carefully consider production costs along with the desired profit margin.

With the ability to manage and understand production costs, coupled with strong financial management skills, MSMEs can devise more effective operational strategies. This ensures not only the sustainability of the business

by ensuring adequate profits but also provides opportunities for the business to thrive and grow sustainably. Thus, MSMEs can remain competitive and responsive to market dynamics and changing consumer needs.



Figure 7. Training about managerial price principal production

In Figure 8, we provide an explanation of the product development strategy, which serves as a cornerstone in advancing the tempeh chips product. Our primary focus is on understanding the latest market trends, evaluating customer feedback, and designing innovations that not only meet consumer needs but also provide a competitive edge in an increasingly dynamic market. We conduct a thorough analysis of the previous product, identifying areas for improvement and designing significant enhancements to boost the product's competitiveness. Additionally, the discussion in Figure 8 also encompasses concrete steps related to the improvement of the main logo and packaging stickers, aimed at enhancing the product's visual appeal and reinforcing the brand image of Tempeh Krees. All these steps are directed towards ensuring that our product development strategy not only meets customer expectations but also brings sustainability and sustainable growth to our product.



Figure 8. Training strategy development product

In Figure 9, we provide training on the utilization of social media in a more comprehensive marketing strategy. This training goes beyond the basics and details practical steps in creating effective marketing campaigns. Participants are guided to understand various features and tools available on social media

platforms, such as the use of paid advertisements, statistical analysis, and engaging content strategies. Additionally, they are equipped with knowledge on how to effectively manage crises or handle negative responses on social media.

With this enhanced understanding, "Tempe Kress" entrepreneurs can optimize their presence in the digital world, improve interactions with customers, and steer more targeted marketing strategies. By encompassing these aspects, the training in Figure 9 helps establish a strong foundation for the implementation of successful social media marketing strategies to support the growth and development of their businesses.



Figure 9. Training media social marketing

In Figure 10, we provide training on motivation in business development aimed at strengthening the spirit and commitment of business practitioners. This training not only covers business strategies and development techniques but also focuses on motivating individuals or teams to overcome challenges and achieve their business goals. In this session, participants will be guided to reflect on their business vision and mission, identify intrinsic and extrinsic motivating factors, and formulate motivation strategies that can be applied in their day-to-day activities.

This motivation training supports the creation of a positive and enthusiastic work environment, where each team member feels compelled to contribute their best. By understanding individual and team motivations, business practitioners can create a company culture that inspires, encourages innovation, and enhances overall performance. This Figure 10 serves as a visual representation of our commitment to providing holistic training, not only focusing on the technical aspects of business but also considering the crucial motivational aspects in sustainable business development.



Figure 10. Training motivation business development

In Figure 11, it illustrates the design of the soybean skin separator device developed by the Community Engagement Team. This design serves a specific function in enhancing the efficiency of the tempeh chip production process. The device is crafted with careful consideration of the partner's need to expedite and streamline the soybean skin separation process, aiming to significantly boost production capacity. The detailed design and key features of the soybean skin separator device will be elucidated to provide a comprehensive understanding of the applied technology in the endeavor to elevate the operational performance of our business partner.

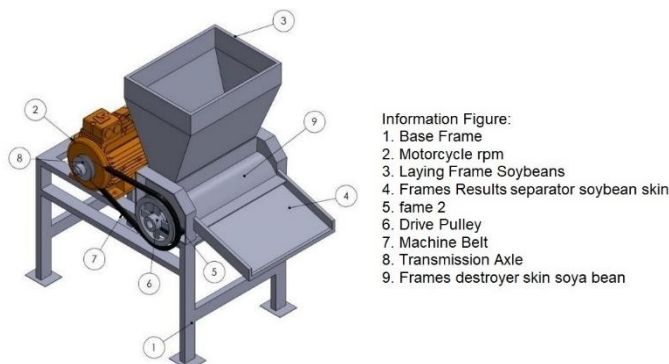


Figure 11. Design tool separator soybean husk

In Figure 12, it captures a significant moment in the project, which is the official handover of the soybean skin separator device to our business partner. This handover process involves not only formalities but also includes a session of instructions and practical training on the usage, maintenance, and handling of the device. The purpose of this activity is to ensure that our business partner not only receives the physical equipment but also gains a comprehensive understanding of its functionality and benefits. The device handover marks a crucial step in supporting the implementation of technological solutions to enhance production efficiency and competitiveness for our business partner in the market.



Figure 12. Submission tool separator soybean husk

In Figure 13, we observe the innovative design of the tempeh slicer device developed by the Community Engagement Team. This design plays a specific role in optimizing the tempeh chip production process by providing ease and precision in slicing tempeh.

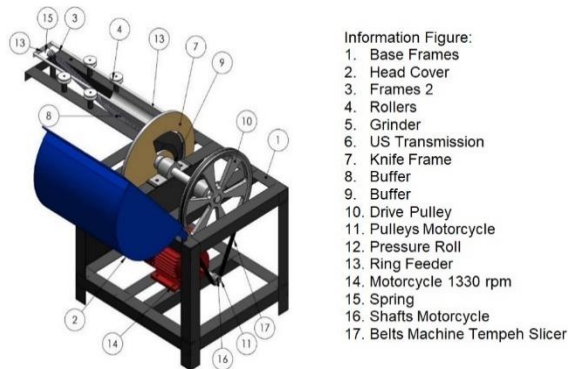


Figure 13. Design tool slicer tempeh

In Figure 14, it illustrates the formal handover moment of the tempeh slicer device to our business partner. This handover process involves verification steps, the delivery of user guidelines, and direct training sessions. The objective is to ensure that our business partner not only receives the physical device but also gains a comprehensive understanding of its operation and benefits. Through this handover, it is anticipated that our business partner can utilize the tempeh slicer device optimally to enhance production efficiency and the overall quality of their tempeh chips.



Figure 14. Submission tool slicer tempeh

In Figure 15, we can observe the innovative design of the oil draining device developed by the Community Engagement Team. This tool plays a crucial role in the tempeh chip production process by efficiently removing excess oil from the final product. The implementation of this device not only enhances the overall quality of the tempeh chips but also contributes to optimizing the production process, ensuring a more appealing and healthier end product for consumers.

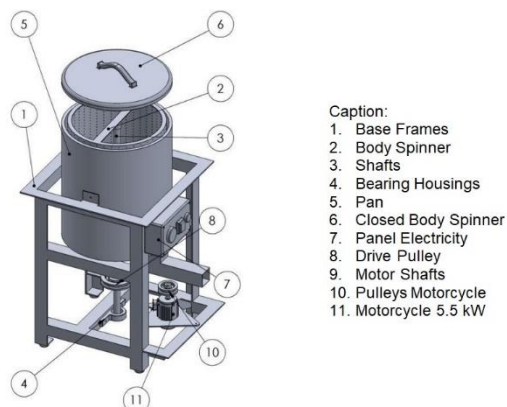


Figure 15. Design tool centrifugal oil drainer

In Figure 16, we can witness the formal handover moment of the oil draining device to our business partner. This process involves verification steps, the delivery of user guidelines, and direct training sessions regarding the operation of the device. The handover aims to ensure that our business partner not only receives the physical equipment but also comprehensively understands how to operate the tool effectively. With this handover, it is anticipated that our business partner can seamlessly integrate the oil draining device into their production process, enhancing efficiency and the overall quality of the final tempeh chips.



Figure 16. Submission tool centrifugal oil drainer

Tempe Kress MSMEs have demonstrated strong competence in various aspects of their business operations. First, they have successfully managed business bookkeeping well. This means that they have neatly organized their financial records, which include income, expenses and profits. With well-organized bookkeeping, these MSMEs can make more informed decisions and measure their financial performance appropriately. Furthermore, they have solid knowledge in managing business operations. This knowledge helps them manage every operational aspect with efficiency, including their tempeh production process.

MSMEs appear to be able to identify ways to increase productivity, reduce waste and maintain the quality of their products. So, they can ensure that business operations run well and provide the best results. This MSME has implemented an effective marketing strategy. With logo and packaging stickers Which new And more dance in hope *branding* product can walk with Good and finally Tempeh products Krees can be known more widely.

In Figure 17, the implementation of the new logo on our business partner is evident. This change not only provides a fresh and appealing new identity but is also anticipated to enhance the brand image and product allure for our partner. With the updated logo design, it is hoped that our business partner can capture a broader market's attention and achieve greater success in marketing their products.



Figure 17. New design logo

In Figure 18, the implementation of the new packaging sticker design on our business partner is evident. This change not only provides a more modern and attractive appearance but also aims to enhance the product's appeal and convey a more professional impression on the packaging. With this updated packaging sticker design, it is anticipated that our business partner can attract consumer attention more effectively and elevate the image of their product in the market.



Figure 18. New sticker packaging

In Figure 19, MSMEs have also understand the importance of promoting products with Good to candidate customers. With strategy good marketing, incl marketing *online*, they can reach *audiences* which are wider and more appropriate targets. This increases brand awareness and expands their market share. Enhancement knowledge in the field manage it the only one can in Look on results pretest and posttest training in field managerial.

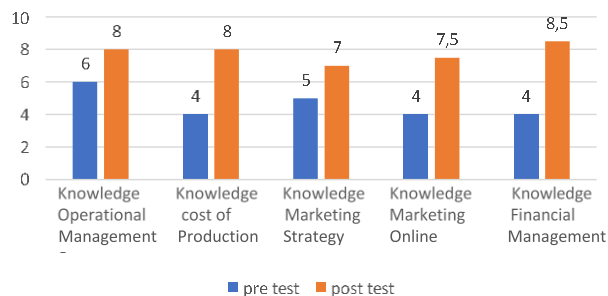


Figure 19. Graphics results test understanding managerial which has done

In figure 20, manual production processes in MSMEs pose significant challenges, especially related to the time which required for completing each stage. On stage separating soybean skins, for example, takes around 60 minutes for 1 kg of soybeans. This manual process is consuming time which long and needs perseverance which tall in doing separating the skin from soybeans. Then, at the tempeh slicing stage, 1 kg of tempeh takes around 30 minutes. This is also a time consuming process and requires precision in slicing the tempeh.

Challenge mainly related with draining oil, in which time which required to complete the oil draining process, it takes a very long time, namely around 720 minutes, starting from the time the frying product is removed until the stage when it is ready for packing. This very long time can limit production capacity, slow down the production process, and potentially hinder business growth.

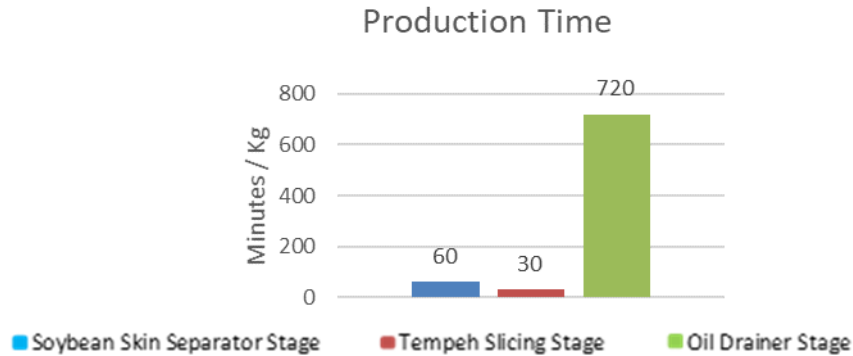


Figure 20. Chart time process production by manual

With appropriate technology, time challenges in the production process can be overcome. The soybean hull separating machine can reduce the processing time of 1 kg of soybeans to only 1.3 minutes, overcoming the problem of time efficiency in hull separation. Tempeh slicing can also be completed in just 1 minute for 1 kg of tempeh, which is much more efficient compared to 30 minutes. Thereby also, draining oil can be resolved in a short time, only 1 minute For 1 kg. Use technology appropriate to use bring solutions effective For overcoming problem time, increase efficiency, productivity, And production capacity, as well as help growth MSMEs in market Which competitive. Chart Production Process Time Using Appropriate Technology can be seen in Figure 21.

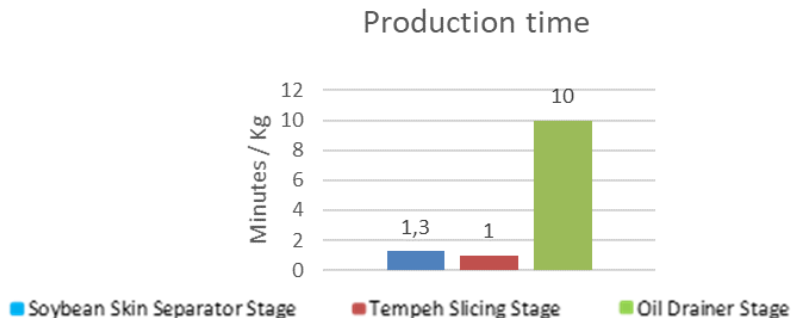


Figure 21. Chart time process production using appropriate technology

Influence product *branding* in online marketing the increase in market demand to more than 100 units is very significant. This happens because *branding* is able to create a strong and positive impression in the minds of consumers. With *branding* which effective, products can more easily be recognized, trusted, and remembered by potential consumers. As a result, market demand increases because consumers tend to be more selective about products with strong identity brands. Besides that, the use of auxiliary machines in the production process by partners also plays an important role in significantly

increasing production capabilities. These machines can increase production efficiency, quality and quantity, which in turn is able to meet greater market demand. Thus, the combination of product *branding* in strategy online marketing and improvement ability production through technology is a key factor in reaching significant sales growth.

Initially, the partner's production process involved 5 employees with a production capacity of approximately 55 pcs per day. However, with the implementation of production machines, the production capacity can increase to more than 100 pcs per day. This, in addition to improving production efficiency, also has the potential to significantly reduce the Cost of Goods Production. With this increased product capacity and efficiency, the company can offer products at more competitive prices in the market, enhancing competitiveness and gaining a larger market share. This can be seen in Figure 22.

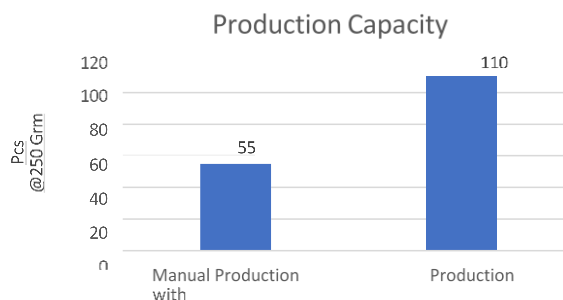


Figure 22. Chart enhancement production partner on MSMEs

In case partner MSMEs Tempeh Kress, initially they experience HPP as big as Rp. 11,025 while still using manual production processes. COGS includes various costs related to production, such as raw materials, labor, and overhead costs. However, after they switched to a production process with appropriate technology, they succeeded in reducing COGS to Rp. 9,932. This is an important achievement, Because decline of HPP shows that they have succeeded in optimizing their production costs. With lower COGS, they can increase the profitability of their business, or perhaps reduce the price of their products to be more competitive in the market. Reducing COGS may also indicate that appropriate technology has helped them reduce waste and increase efficiency in the production process. This is a positive step in managing the business better. This can be seen in Figure 23.

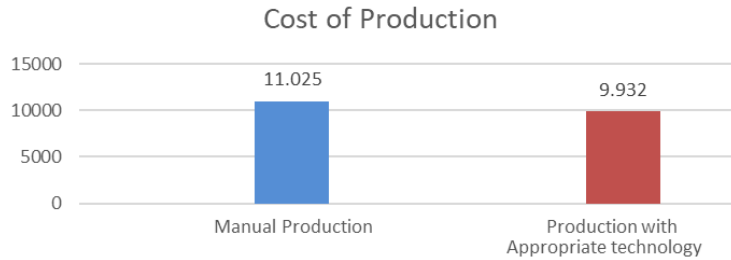


Figure 23. Chart decline cost of production on MSMEs

In Figure 24, profit partner MSMEs Tempeh Kress experience growth Which outside normal after they switch from process production manual to use of technology appropriate. At first, with a manual production process, they managed to get a profit of IDR 2,824,250. However, when they adopted appropriate technology in their production process, profits jumped sharply to reach IDR 7,179,900. This change reflects the positive impact of efficiency brought by technology.

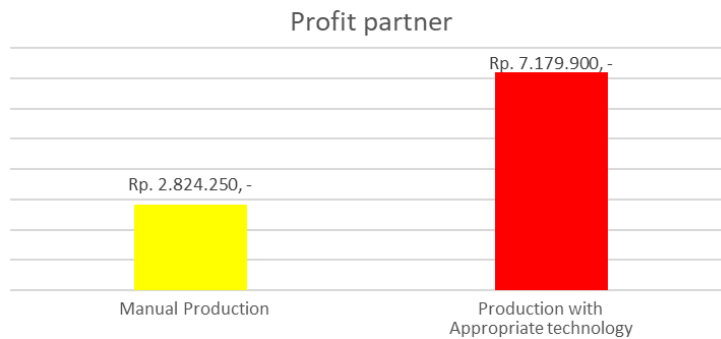


Figure 24. Chart enhancement profit partner on MSMEs

With supporting technology, they can increase productivity, reduce production costs, and possibly also improve the quality of their products. The result was a significant increase in the profitability of their business. Partner "Tempe Krees" has planned comprehensive development to develop their business. First, they will enter the wider online market by opening an online shop (e-commerce) and utilizing leading e-commerce platforms, so that they can reach customers in various regions, including outside the area where their business is located. Furthermore, they will collaborate with well-known marketplaces such as Tokopedia, Shopee, and Lazada to expand market share and utilize existing infrastructure.

Additionally, they will develop an aggressive digital marketing strategy through social media, paid advertising, and online campaigns to increase awareness and attract potential customers. Their efforts will also be focused on improving product quality and developing new products in line with growing market demand.

Furthermore, Partner "Tempeh Krees" will intertwine partnership strategic with parties who can assist in distribution, marketing and operational improvements. Through this development plan, they aim to expand market share, reach a wider range of customers, and increase the profitability of their business. They will too monitoring And evaluation continuously to results every step in this development plan to ensure its success.

CONCLUSION

The close collaboration between mechanical engineering and economics/management experts in the community service program demonstrates a positive and significant impact on tempeh chips MSMEs. The increase in production by 110 units, a decrease in COGS by Rp. 9,932, and a rise in partner profits to Rp. 7,179,900 serve as clear evidence of the noteworthy achievements, with a 15% increase in production and a 20% increase in profits.

These accomplishments substantiate that this collaboration has brought about beneficial and sustainable changes for the MSME community. To enhance this positive impact, recommended follow-up actions include advanced training for MSME participants, focusing on improving production efficiency and quality, as well as developing managerial and marketing skills.

In pursuit of sustainability, implementing a continuous monitoring system to measure and evaluate MSME performance is crucial. Additionally, diversifying products is expected to create new opportunities for business growth and expansion, while building a broader network with stakeholders such as suppliers and distributors will support more effective distribution and marketing.

As a multi-faceted initiative, coordination with local government authorities is emphasized to align with policies and programs encouraging MSME growth at the community level. Through these actions, the aim is not only to enhance the well-being of individual MSME participants but also to generate a more significant positive impact on the local economy. These steps are anticipated to create a more sustainable environment and support sustainable growth for tempeh chips MSMEs in this community.

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