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Optimization of Production Capacity and Business Operating System Arrangement for Strengthening the Chicken Nugget Market at Nayami MSE, Blitar City

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A B S T R A C T

This Community Service Program aims to enhance the production capacity and quality of chicken nuggets at Nayami Micro and Small Enterprise (MSE) to meet growing market demand and strengthen long-term competitiveness. Improvement initiatives include: (1) appropriate technology adoption through a meat grinder and semi-mechanical dough mixer (20 kg capacity); (2) implementation of a Business Operating System (BOS) and Standard Operating Procedures (SOPs); and (3) training on operational cost calculation. These objectives were pursued through a participatory approach encompassing needs identification, equipment procurement and installation, SOP development and dissemination, technical and managerial training, production assistance, trial evaluation, and business sustainability strategy formulation.

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INTRODUCTION

Nayami Micro Enterprise is a home-based chicken nugget producer located in Tanjungsari District, Blitar City, managed by Mrs. Binti Asfiah. This business leverages local potential, as Blitar Regency is one of the largest poultry farming centers in East Java with abundant and sustainable raw material availability (Nurlaili & Aulia, 2020). This condition provides a strategic advantage for Nayami MSE in terms of cost efficiency and production continuity.

Meat offers great benefits to humans, as it is a highly nutritious food rich in protein, minerals, vitamins, and fats, as well as other substances that are all needed by the body (Ratulangi & Rimbing, 2021). Nuggets are widely favored by the public because they are considered practical and have a fairly high nutritional value (Hayati et al., 2023). This product is in high demand among families, small food stalls, and household consumers who need practical yet quality food. The selling price of the product is set at IDR 12,000 per pack, while the current price of chicken raw material is approximately IDR 45,000 per kg. Nuggets are a processed product made from ground meat to which binding agents are added and mixed with seasonings, then coated with egg white (batter) and breadcrumbs (breading), followed by pre-frying, then packaged and frozen to maintain quality (Mawati et al., 2017).

Nayami chicken nuggets are produced with a distinctive home-cooked flavor and without the addition of preservatives, giving them a unique appeal among local consumers. Chicken nuggets are one of the meat processing technology products that have good nutritional value and an affordable price compared to processed beef products (Wulandari et al., 2016). Nuggets that are safe for consumption must have the characteristics of being easy to crumble when pressed and having no fishy smell (B. Lestari et al., 2025; Mariana & Raka, 2021). Problems related to the fishy smell in nugget products can be influenced by the lack of freshness of the raw materials used and the absence of a marination process for meat that is not processed immediately after slaughter (Juanda & Aprialdi, 2022).

Product marketing is currently carried out through direct sales using WhatsApp Business and a consignment system at three stores in the Blitar City and Blitar Regency areas. Social media platforms such as Facebook, Instagram, Twitter, and LinkedIn are effective for reaching and interacting with potential customers (E. W. Lestari et al., 2024; Zen & Lestari, 2022). Digital marketing consists of interactive and integrated marketing that facilitates interaction between producers, market intermediaries, and prospective consumers (Asysyifaa et al., 2024; Hidayah et al., 2025).

Based on information from the partner, market demand for chicken nuggets has continued to increase along with the growing number of customers and store partners. Currently, Nayami MSE produces three times a week. In one production day, approximately 5 kg of chicken meat is used, processed over approximately one working day by three employees. From this pattern, approximately 150 packs of chicken nuggets are produced per week, while market demand reaches approximately 500 packs per week.

The chicken nugget production process is still carried out manually using household-scale equipment. The most time-consuming and labor-intensive stages are meat grinding and dough mixing, which results in long production times, low labor productivity, and high employee fatigue levels. In addition, the nugget molding and coating process is still basic, which has the potential to cause inconsistencies in product size and shape.

Beyond the limitations in production capacity, Nayami MSE also faces challenges in business management and product quality. The partner has not yet implemented a business operating system optimally and does not yet have a standardized operational cost calculation. In terms of quality, the smoothness of the dough, nugget size, and level of doneness between batches are still inconsistent, and sanitation and food safety standards have not been well documented (Anshari et al., 2022).

Based on these conditions, the increase in production capacity needs to be accompanied by improvements in management systems and quality control. The need for a meat grinder and a dough mixer is of great importance for improving the efficiency of the production process. In addition, the implementation of Standard Operating Procedures (SOPs) and workforce training are also required to strengthen business management and maintain product quality consistency. With the support of appropriate technology and strengthened production management, Nayami MSE is expected to be able to increase production volume, meet market demand, and enhance the competitiveness of chicken nuggets as a leading product based on the local potential of Blitar. Based on the information above, the partner's problems are: first, the need for appropriate technology to increase chicken nugget production; and second, the need for arrangement and strengthening of business management for business sustainability and development.

IMPLEMENTATION AND METHODS

This activity is a Community Service Program (PkM) with a participatory and collaborative approach, involving the proposing team, partner, and technical personnel in the processes of coordination, discussion, training, and implementation assistance. The details of the implementation method for each problem area are as follows.

Problems in the Area of Business Management

The implementation method and approach for resolving problems in the area of business management. The approach taken involves conducting coordination and discussion among the proposing team, the partner, and the technical team.

Problems in the Area of Production Technology

The approach for resolving problems related to production technology limitations was carried out through:

a. Procurement and Installation of Appropriate Technology
   Procurement and installation of appropriate technology was carried out by: first, evaluating machine production needs in accordance with the partner's capacity and business scale; second, procuring a meat grinder and a semi-mechanical dough mixer; and third, installing and trialing the equipment at the Nayami MSE production site.
b. Technical Production Skills Training
   Technical production skills training was carried out by: training on the operation and maintenance of the meat grinder and dough mixer; training on occupational health and safety (K3) in the use of machines; and direct assistance during the production process to ensure machines are used optimally and sustainably.

RESULTS AND DISCUSSION

Profile of the Community Service Partner

The partner in this community service program is Nayami Micro Enterprise, a home-based chicken nugget producer located in Tanjungsari District, Blitar City, managed by Mrs. Binti Asfiah. The production of chicken nuggets is carried out using traditional or still manual methods. The selling price of the product is set at IDR 12,000 per pack, while the current price of chicken raw material is approximately IDR 45,000 per kg.

Mrs. Binti Asfiah, as the owner of Nayami MSE, has a vision of developing the chicken nugget business into a leading local product of Blitar Regency. The business is managed independently with the involvement of 5 employees from the surrounding community, consisting of 3 people in the production division and 2 people in the marketing division. Although the business has been running well and has regular customers, the production process and management system implemented still have various limitations.

Results of Discussion and Coordination (Focus Group Discussion/FGD)

Based on the results of discussion and coordination, it was found that the problem faced by the Nayami Blitar partner is the inability to fulfill large-quantity customer orders due to the still-manual production process. The manual chicken nugget production process is shown in Figure 1 below.

Figure 1. Nayami Chicken Nugget Production Process

The steps in traditional production are as follows:

a. Raw material preparation, consisting of: main ingredients, including chicken breast with smooth texture and free of fat, and ice cubes to maintain dough temperature and assist with texture; binding and filler ingredients, including seasoning, wheat flour, tapioca flour, and powdered or fresh milk; coating ingredients, including wheat flour and breadcrumbs; and seasonings, including garlic, pepper, mushroom broth, ground pepper, sugar, salt, and broth.
b. Chicken meat grinding using a simple tool, which requires a long time of approximately 90 minutes for 5 kg of chicken meat. The chicken meat grinding process begins with the meat being cut into small pieces so it can easily enter the chopper. Chilling: the meat is typically chilled to a low temperature (around 0 to 4 degrees Celsius) to maintain quality and reduce bacterial growth during grinding. Grinding: the meat is fed into the chopper machine.
c. Mixing of the ground meat dough with seasoning and flour manually, which takes approximately 30 minutes. The mixing stages are carried out by first combining the chicken and seasoning, then adding egg or powdered milk, and gradually incorporating the flour.
d. Chilling of the chicken nuggets before the molding process, which requires approximately 10 minutes. Chilling the dough after grinding aims to improve texture, maintain meat protein quality, and enhance water-binding capacity.
e. Molding of the nugget dough using a simple and manual method, which requires approximately 60 minutes.
f. Steaming the nuggets until cooked, which requires less than 30 minutes per batch. The nugget steaming process begins by heating the steamer until the water boils, arranging the chicken nuggets on a steaming tray or rack, steaming for 30 minutes, and ensuring the center of the nuggets is fully cooked.

g. Coating the nuggets with breadcrumbs manually, which requires approximately 45 minutes. The coating process involves the following stages: the shaped nuggets are thinly coated with wheat flour; the nuggets that have been dipped in batter are then coated with breadcrumbs until evenly covered; followed by a chilling stage.
h. Packaging the nuggets into plastic packaging ready for sale, which requires approximately 30 minutes. The packaging stages are: cool the nuggets before packaging, store in a frozen condition, and attach a complete label.

Nayami MSE produces three times a week. In one production day, approximately 5 kg of chicken meat is used, processed over approximately one working day by three employees. From this pattern, approximately 150 packs of chicken nuggets are produced per week, while market demand reaches approximately 500 packs per week. A comparison of production capacity and market demand can be seen in Table 1.

Table 1. Chicken Nugget Production Capacity and Demand per Week

No	Description	Quantity
1.	Actual Production Capacity	150 packs/week
2.	Market Demand	500 packs/week
3.	Gap (Market Opportunity)	350 packs/week

From this data, it can be seen that the current rate of market demand fulfillment is only approximately 30%. This indicates that market opportunities remain very wide open, yet cannot be optimally utilized due to limitations in production capacity.

Discussion of Procurement and Installation of Appropriate Technology

Based on the results of the discussion, the solution to the partner's problem is through the procurement and installation of appropriate technology. The procurement of meat grinding and nugget mixing machines is expected to help meet the considerably large weekly market demand of 500 packs per week. The procurement of the grinding machine is highly beneficial to the partner as it accelerates business operational activities. The grinding machine plays a role in mincing and smoothing chicken meat and producing a uniform texture, thereby facilitating the process of mixing the ground meat with various other ingredients, such as flour, salt, broth, and others.

The main functions of the grinding machine are: first, to smooth the chicken meat so that the nugget dough has a smooth texture; second, to facilitate mixing with other ingredients because of the smooth and uniform meat texture; third, to help accelerate the production process compared to manual grinding using, for example, a chopper; fourth, to maintain the uniformity of product quality because the meat texture is consistent when using the grinding machine; and fifth, to increasingly improve time efficiency.

The procurement of the meat mixing machine for the meat and supporting ingredients and seasonings will help the partner resolve the problems it faces. The mixing machine plays an important role as it is useful for mixing chicken meat with supporting ingredients and seasonings until evenly blended before molding, which is then followed by cooking. The benefits of the meat mixing machine are: 1) nugget texture will improve, as mixing can help form a dense nugget bond that is not easily crumbled, as well as benefiting meat protein; 2) it facilitates the mixing of chicken meat with other ingredients such as flour, seasoning, salt, ice, and other materials; 3) it can maintain product quality, as mixing with a machine generally uses stable time and speed so the dough remains consistent; 4) it produces a homogeneous dough, as using a mixing machine ensures the dough is evenly blended so the texture remains consistent. The grinding and mixing machine with a meat capacity of 20 kg per hour is described below.

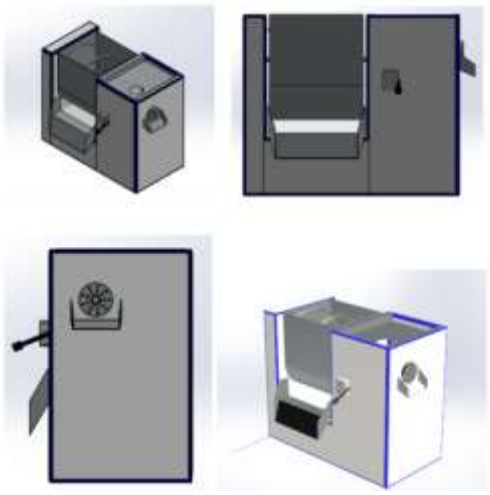

Figure 2. Grinding and Mixing Machine

The grinding and mixing machine can be detailed as follows.

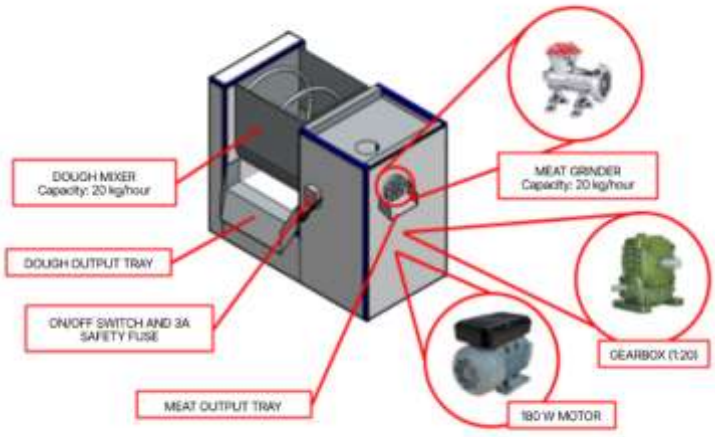

Figure 3. Parts of the Grinding and Mixing Machine

The parts of the grinding and mixing machine are described as follows:

a. Dough Mixer with a Capacity of 20 kg per Hour
   The material used for the dough mixer is food-grade stainless steel. The purpose of using this material is to allow for easy cleaning, resistance to corrosion, and guaranteed food safety standards. The mixing capacity is a maximum of 20 kg per batch, suitable for home-based businesses or small MSMEs. The mixer type is a paddle mixer, which is suitable for mixing meat, seasoning, ice, and flour until evenly blended, smooth, and without damaging the texture.
b. Dough Output Tray
   The dough output tray of the grinding and mixing machine with a capacity of 20 kg per batch accommodates the entire dough with a reserve space of approximately 30% in one mixing batch. The tray uses a container of 30 to 50 liters, with a width of 40 to 90 cm and a length of 50 to 92 cm.
c. On/Off Switch and 3A Safety Fuse
   The 3A safety fuse plays an important role in protecting the electrical circuit and machine motor from excess current. When the current flowing exceeds 3 amperes, the fuse will blow so that the electrical flow stops and the machine components are not damaged or burned. The On/Off switch is used to turn the machine on (On) and turn the machine off (Off). The On/Off switch also plays a role in making it easier for the operator to control the machine.
d. Grinding Output Tray
   The grinding output tray is one part of the grinding and mixing machine that functions as the discharge point for the ground output or dough. The grinding output tray plays a role in: maintaining product cleanliness; reducing material loss during the production process; collecting the grinding output so it does not fall directly onto the floor or work area; and other functions. The material used is food-grade stainless steel, with a thickness of 2 mm and a flat shape. The width used is approximately 75 cm and the length is approximately 45 cm.
e. Meat Grinder with a Capacity of 20 kg per Hour
   The meat grinder is used to accelerate the production process compared to manual methods, to facilitate the mixing of seasoning, flour, and other ingredients, and to produce dough with a good texture. The material used is food-grade stainless steel for easy cleaning, spare parts are available so damaged parts can be easily replaced, it has safety features, and the sharp blade is easily replaced. The blade material is stainless steel that is easily detachable and sharpenable. The sieve size is 4 mm for a smooth nugget texture.

f. Gearbox 1:20
The gearbox 1:20 functions as a speed reducer and torque increaser from the motor to the grinding shaft. The advantages of using a gearbox 1:20 are: it produces evenly and finely ground meat; the motor does not overheat easily; the large torque can grind dense meat; and the blade rotation is stable and slow. The specifications of the gearbox 1:20 include a motor power of up to 7.0 kW, a worm gear reducer type, an input rotation of 1,400 rpm, an output rotation of 70 rpm, and a reduction ratio of 1:20.

g. 180W Motor
The 180W motor is the most important part of the grinding machine, which functions to help mix the dough to make it more homogeneous and to drive the blade to mince the chicken meat. Its advantages are that it is suitable for MSMEs, requires simple maintenance, and is energy-efficient. Power consumption is approximately 0.18 kWh per hour of operation. The motor type is an induction motor or electric dynamo motor, with a working capacity to support grinding of 20 kg per hour. The cooling system uses an internal fan.

Use of the Grinding and Mixing Machine by the Partner

The community service team handed over the grinding and mixing machine to the partner. In the next process, the community service team and the partner conducted a machine trial. The machine trial aims to determine that the machine operates according to specifications and that the grinding results work to their maximum potential. The functions of the trial are to examine machine performance, determine machine efficiency, identify disturbances and problems, and determine the operational capacity of the machine. The machine trial process can be seen in the following figure 4.

Figure 4. Engine testing process

The machine trial began with several stages, namely: Stage 1, preparation before the trial, by checking the electrical installation, cleaning all parts, inspecting the condition of the machine, and preparing measuring tools such as scales, a stopwatch, and other necessary tools. Stage 2: machine trial without meat or nugget ingredients, by turning on the machine to observe machine vibration and noise, the gearbox, the direction of blade movement, and motor temperature.

Stage 3: machine trial with a small portion of meat, by feeding a small amount of meat into the grinder, then running the machine and checking the machine's capability, the smoothness of the process, and observing the homogeneity of the meat. Stage 4: machine trial at normal capacity, by feeding all the meat according to the machine's capacity, running the machine at normal operation, and checking grinding time, electricity consumption, and dough temperature. Stage 5: evaluation, by checking the texture and color of the ground meat, ensuring the smoothness of the grinding results, and examining the homogeneity of the mixture of meat, flour, and other ingredients.

CONCLUSIONS AND RECOMMENDATIONS

The provision of the grinding and mixing machine in this community service activity provides many benefits to the partner. The benefits include a faster production process, time savings, maintained texture of the ground meat, homogeneous dough, and reduced dependence on manual meat grinding methods. The grinding machine also increases productivity so that the community service partner can fulfill consumer demand. The fulfillment of demand can increase the partner's income.

The provision of the grinding and mixing machine also contributes to improving the quality of nugget products. The provision of this appropriate technology machine is expected to provide an opportunity for the partner to expand market share and thereby increase income. Partner assistance will be continued in the future with the aim of product innovation development (flavor variants and packaging), halal certification, and market expansion to the local and regional level. This sustainable approach is expected to strengthen the competitiveness of Nayami MSE as a chicken nugget producer based on the local potential of Blitar Regency, while also providing a greater economic impact on the surrounding community.

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