


Palm sugar business development model through mold-making

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ABSTRACT

This research aims to develop a palm sugar business model through the engineering of palm sugar molds. The study was conducted using qualitative research methods, based on social phenomena and issues occurring in the development of the palm sugar business. The result of this research is a design for a modern palm sugar molding unit based on a stainless-steel machine, which will serve as a role model for palm sugar business actors to ensure that the production process is carried out more safely and hygienically (efficiently), as well as more quickly (effectively). The practical implication of this research is that the development of a stainless steel-based palm sugar molding unit can significantly enhance cleanliness and safety standards in the palm sugar production process. By adopting this modern design, palm sugar business operators can produce sugar more efficiently and effectively, reducing production time and improving the quality of the final product. Additionally, with a more standardized and hygienic process, businesses can meet higher health standards, open new market opportunities, and increase consumer trust. The implementation of this molding machine can also encourage overall improvements in production practices and enable larger-scale production without compromising quality.

Contribution/Originality: The originality of this research lies in the development of a palm sugar molding unit based on a stainless-steel machine, designed to enhance efficiency and cleanliness in the production process. This innovative approach offers practical solutions for palm sugar businesses to meet higher health standards and improve overall product quality.

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1. INTRODUCTION

The palm tree (*Arenga pinnata* Merr) is one of the plants that maintains the balance of ecological and rural ecosystems. The use of palm oil plants starts from the roots, stems, leaves, flowers, stalks, and fruit. The sap can be extracted from palm flower stalks, which have high economic value. Fresh sap is the main raw material for palm sugar processing. Several factors need to be considered when processing palm sugar, including the color of the brown sugar, the taste of the brown sugar, and its water absorption capacity. On the market, palm sugar is available in various forms characterized by nutritional content, micronutrients, antioxidants, glycemic index, fiber, and health benefits. To increase added value and commercialize sap products, better cooling, heating, fermentation, and storage techniques are

used to produce products in different packaging that can be developed by small and medium enterprises (SMEs) and home industries (Heryani, 2016; Prihantini, Purbaningsih, et al., 2022; Purbaningsih, Helviani, Karim, & Sejati, 2022).

The continuing development of science and technology means that there is a need to increase the added value of a product by creating and engineering the production process. Process engineering is the result of research that aims to create standard production process work procedures and product forms that can provide added value. Palm sugar product development strategies must be implemented to gain market share and loyal consumers. The palm sugar business development model is the application of a business development model through a technical production technology model, in this case, palm sugar molds, which can be utilized by palm sugar farming industry players.

Polinggona Village, Polinggona District, Kolaka Regency, is one of the traditional palm sugar-producing centers in Southeast Sulawesi Province. The object of this research activity is the Home Industry Guren Enah in Polinggona Village, Polinggona District, Kolaka Regency. This industry is a palm sugar household industry whose production runs continuously and is the main work carried out to earn income. One of the obstacles or problems experienced by this home industry is that the brown sugar mold used in the palm sugar processing process is still traditional, namely, using coconut shells. This is an unhygienic and ineffective production process (Prihantini, Rizqy, Nursalam, Purbaningsih, & Onuigbo, 2022).

The palm sugar home industry has the power to carry out business development. The business development strategy is implemented to support aggressive economic growth. Optimizing the expertise and skills of processors to innovate palm sugar products, along with maximizing government support in introducing palm sugar products and product development through local or national events and exhibitions (Agus, Saleh, & Harjito, 2020).

The business development model used so far is still simple, maintaining the same market segmentation without making any efforts to acquire new customers. The right choice of strategy for the palm sugar business is a change in direction or strategy that requires the company to increase its value proposition and take advantage of market opportunities by expanding its market network (Rizaldy & Mahbub, 2019). Processing sap water into palm sugar provides an increase in added value from the relatively high output value produced. Every expense incurred will be able to produce or obtain revenue equal to the relative profit value or the ratio between total revenue and total costs. This means that the palm sugar agro-industry being carried out is feasible to be developed (Purbaningsih et al., 2023).

The novelty of this research is to carry out a palm sugar business development model by creating a design engineering and palm sugar molding unit, which is used as a role model for the palm sugar household industry so that the palm sugar production process is carried out more safely and hygienically (efficiently), as well as more quickly (effectively). Previous research that has been presented only examines the improvement of palm sugar quality, optimization of product introduction, general and simple business development strategies based on several factors and added value, as well as the feasibility of palm sugar processing businesses.

This research aims to carry out a palm sugar business development model through engineering palm sugar molds, which will have an impact on increasing production and income of palm sugar household industry players. Additionally, the palm sugar can be developed into a Village Featured Product (PUD) in Kolaka Regency, Southeast Sulawesi Province.

2. METHODS

The research object was determined using purposive sampling, namely the Home Industry Guren Enah in Polinggona Village, Polinggona District, Kolaka Regency, Southeast Sulawesi Province, based on the consideration that this object has special characteristics that align with the research objectives to address and answer problems or obstacles in the palm sugar production process, which is still traditional and unhygienic. This research was conducted using a qualitative research method with a case study model, employing data collection techniques such as observation and interviews. This research focuses on the interpretation process and events (focusing on interactive processes and events) as they relate to reality in the field. The results of the interviews are analyzed by completing and adjusting them based on the results of observations that have been carried out specifically on the research object, which are then verified or conclusions drawn from the research results (Murdiyanto, 2020).

The stages of research carried out start from introducing and identifying needs, initial observations of phenomena and problems that occur based on the research objectives, pilot surveys in the home industry Enah, and pilot surveys to other palm sugar industries (Temon Palm Sugar and Banjar Palm Sugar), discussion activities/meetings with team leaders and research members in the context of data validation and verification processes, or drawing conclusions related to research on palm sugar business development models through mold engineering.

3. RESULTS AND DISCUSSION

One of the palm sugar business development models is through engineering palm sugar molds. The palm sugar mold was initially designed in the form of a picture and then made using stainless steel to address the problems that occurred in the Guren Enah Home Industry, so the mold was used as a role model for carrying out the palm sugar production process. The mold is formed in two shapes, namely round and square. The palm sugar mold technique consists of one molding table measuring 2000 mm long, 872 mm wide, and 800 mm high. Palm sugar molds come in two shapes and four sizes, namely Round Mold with a diameter of 30 mm, Round Mold with a diameter of 52 mm, Square Mold with a diameter of 52 mm, and Square Mold with a diameter of 30 mm. The design of the palm sugar mold can be seen in Figure 1, Figure 2, and Figure 3.

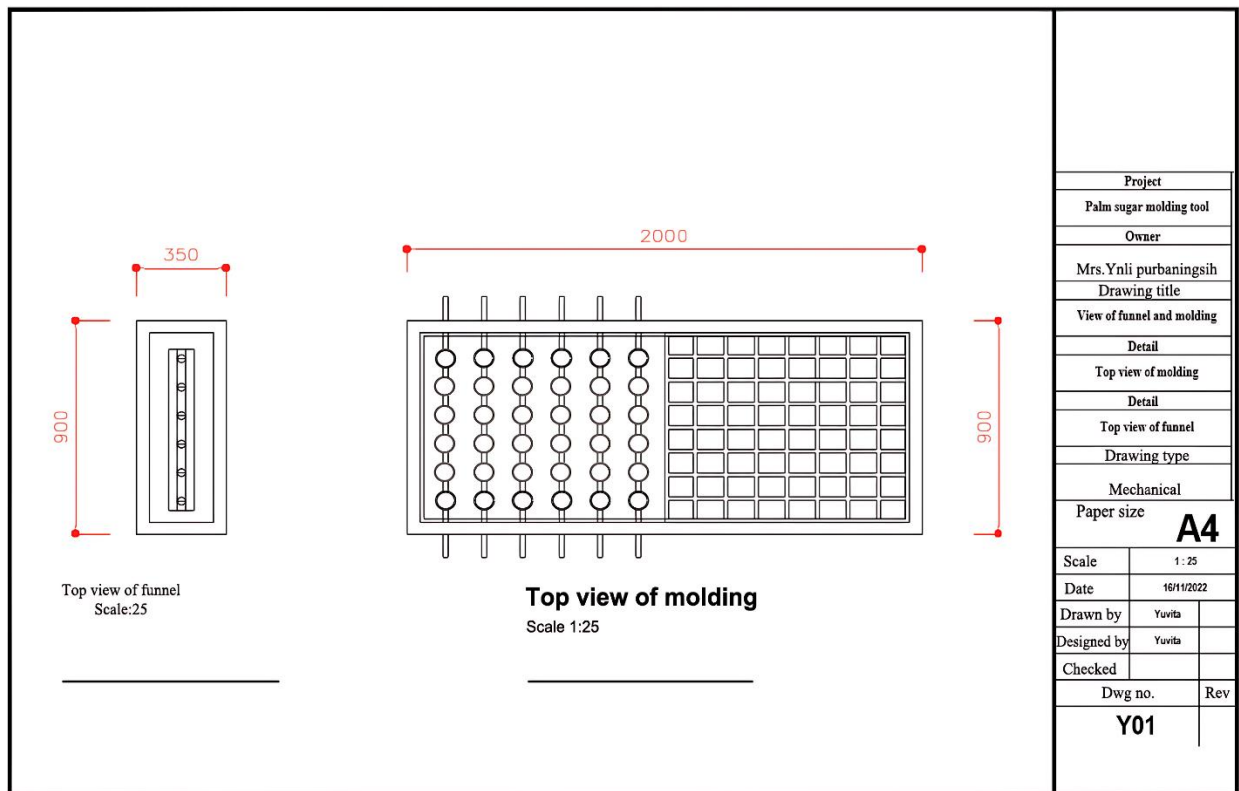


Figure 1. Palm sugar mold design from above.

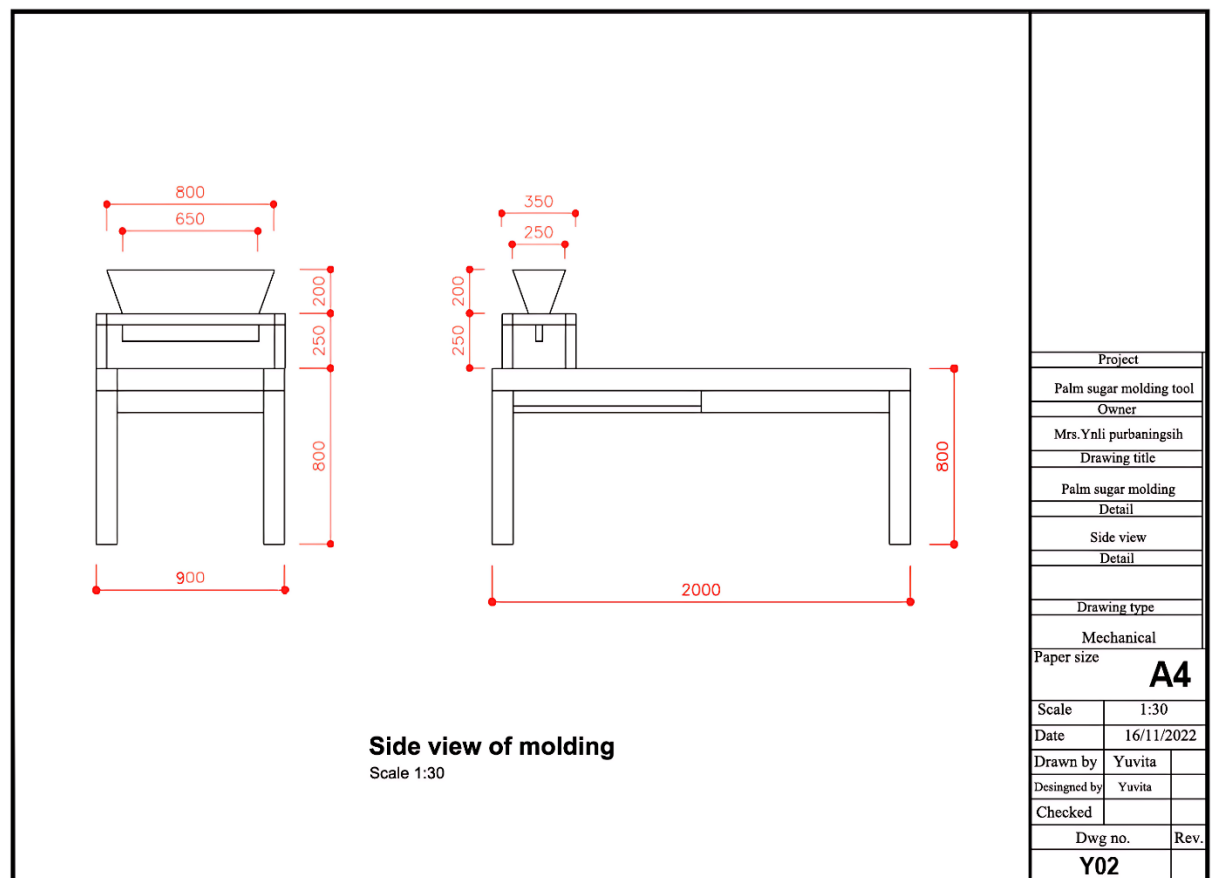


Figure 2. Palm sugar mold design from side view.

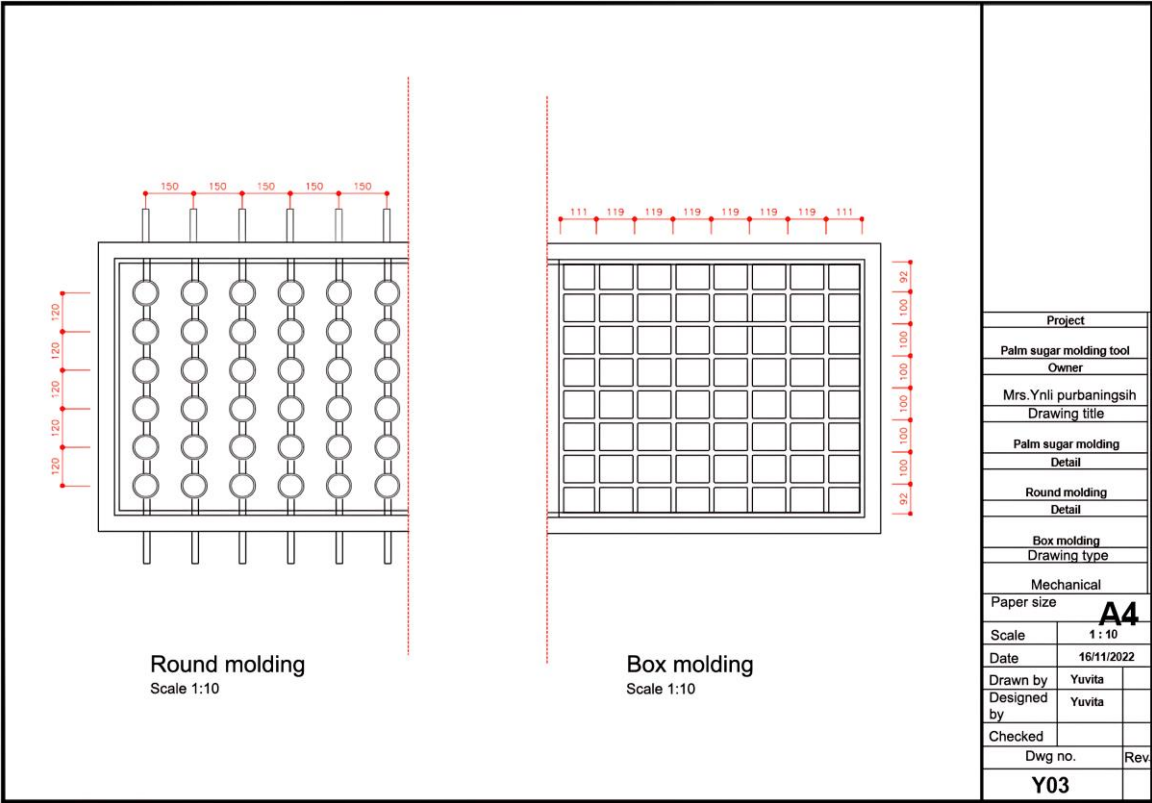


Figure 3. Palm sugar mold design in round and square shapes.

The palm sugar mould that has been made is then tested, so the result is that the mould has an effect on the palm sugar production process, especially the production process that occurs is cleaner, more hygienic, and safer than before which used traditional moulds from coconut shells, as well as the moulding process. done more quickly. This has an impact on increasing the amount of palm sugar production in one production process. Images of the moulds that have been made can be seen in Figure 4 and Figure 5.



Figure 4. Box and round shape mold.



Figure 5. Palm sugar molding table.

Before determining the desired mold engineering model, researchers also conducted a pilot survey of several palm sugar industries whose production and sales volumes occur continuously and in quite large quantities, and which have exported palm sugar. These industries are the Temon Palm Sugar Home Industry, which is located in Temon Village, Pacitan District, Pacitan Regency, East Java Province, and the Banjar Home Industry, which is located in Banjar Village, Banyuwangi Regency, East Java Province. This was done to conduct interviews and obtain technical data on the palm sugar industry regarding comparisons in terms of production for the palm sugar molding process.

From the results of the pilot survey that has been carried out, the two industries still carry out the process of molding palm sugar traditionally and simply, not using machine-based molds or modern molding equipment, which are engineering results from research or community service activities in the form of innovation and technology. Samples of palm sugar molds and products from the pilot survey results can be seen in Figure 6 and Figure 7.



Figure 6. Temon pacitan palm sugar molds and products.



Figure 7. Banjar Banyuwangi palm sugar molds and products.

The sugar palm is the most important plant in humid tropical areas. This plant not only produces sugar but also offers many products and benefits to its users and is one of the most diverse and versatile tree species in cultivation (Mogea, Seibert, & Smits, 1991). Gluttony has interesting benefits and nutritional content (Victor & Orsat, 2018).

Palm sugar is used as a sweetener in traditional alternatives in Southeast Asia and South Asia. One of these is Indonesia, the world's largest producer of palm sugar. This sugar is often used as a sweetener in drinks and foods. This not only gives the product a sweet taste but also develops color, aroma, and taste (Saputro, Van de Walle, & Dewettinck, 2019). Palm sugar has better nutritional value than processed cane sugar (Srikaeo, Sangkhiaw, & Likittrakulwong, 2019). Palm sugar is a product that is highly valued by locals and foreigners for its virtues and has become a culinary tourism destination (Elfriede, Fransisca, Dewi, & Widiastuti, 2023).

The palm sugar processing company is a palm-based agribusiness whose main raw material is juice, and the main product is palm sugar. Palm sugar has the potential to replace domestic sugar and help reduce dependence on imported sugar. Brown sugar juice made from sugar materials has great economic potential (Simbolon, Supriana, & Lindawati, 2021).

Agribusiness encompasses any business related to agriculture, forming a complex system of interactions that includes the production, distribution, and consumption of food, clothing, and shelter. It also involves all economic activities within the food and fiber system. This system aims to deliver food to consumers and includes utilities, agricultural production, post-harvest activities, and value-added processes such as raw material processing, food manufacturing, and food distribution (Imbiri, Rameezdeen, Chileshe, & Statsenko, 2021).

Palm sugar is the most important alternative to cane sugar. A modern palm sugar processing system needs to be developed so that the product can become a Leading Village Product (PUD), which can create and improve the economic conditions for palm sugar processing in rural communities. Business development is carried out with support and collaboration between the government, scientists, and researchers through technological innovation to achieve product-market objectives. This is in line with a study by Isnaini (2011), which states that due to the important role of the palm sugar business as a source of livelihood, the strategy to be implemented is fundamentally very important for the development of the palm sugar business. For this reason, regional governments should implement this strategy comprehensively for all parties involved, paying attention to the synergistic allocation of resources, including financial, technological, and human resource capabilities. The business development model for palm sugar is briefly shown in Figure 8.

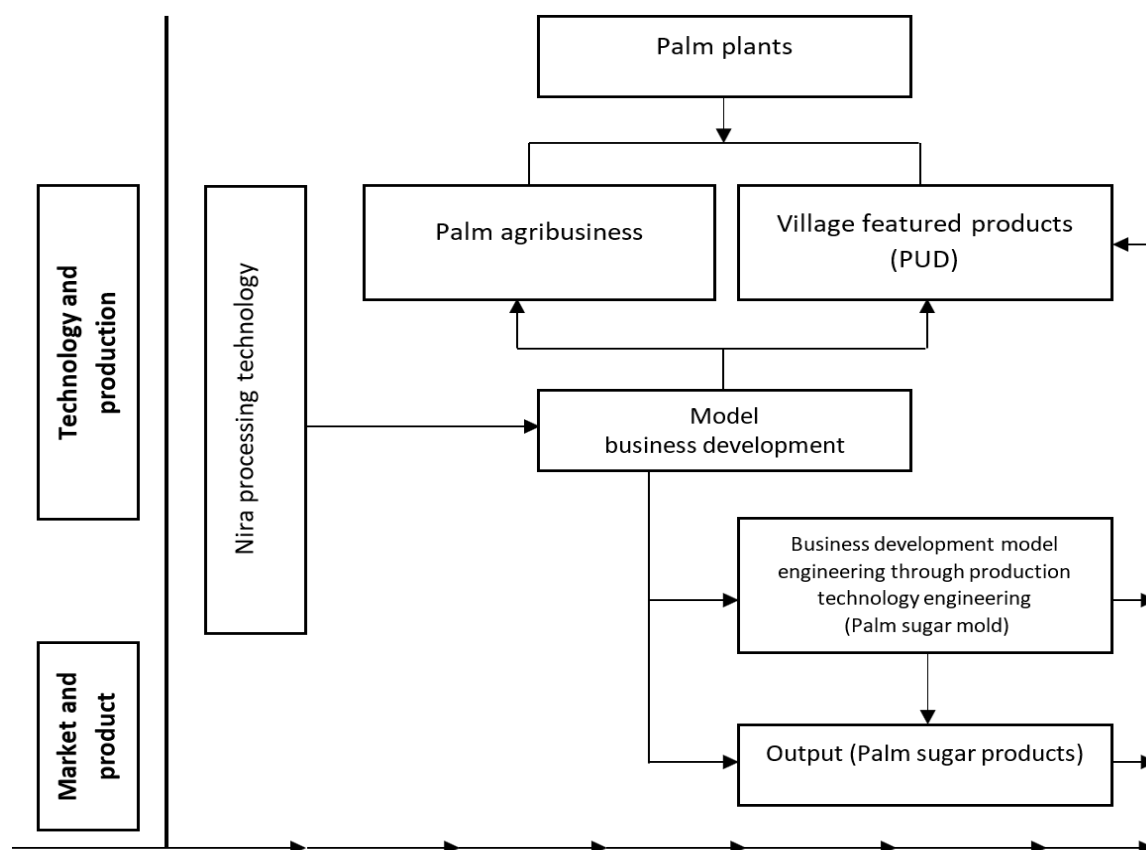


Figure 8. Palm sugar business development model.

The palm sugar business is promising because many people are interested in the product. However, the majority of these companies continue to operate traditionally due to a lack of knowledge and skills, as well as a lack of government interest in improving this business sector. Maintaining good customer relationships is the key to success. However, it is important to offer a unique value proposition that matches actual consumer needs. The weakness of palm sugar products is that the size produced is too large, making the product less attractive, and the equipment used is still very simple. The palm sugar business currently has a simple business model. The company continues to maintain the

same market segment for a long period without making any efforts to acquire new customers. Therefore, the business model strategy implemented so far needs to be changed. Choosing the right strategy is the pivot this company needs to take advantage of market opportunities by increasing its value proposition and expanding its market network (Rizaldy & Mahbub, 2019).

The palm sugar agricultural business is an effort to diversify palm sugar, expand its economic use, and encourage rural communities to actively participate in small-scale or cottage industries. The palm sugar sector is also a way to earn or increase family income, even if the processing (process and equipment) remains very simple. The revenue of the domestic palm sugar industry will lead to a more balanced income distribution within the domestic palm sugar industry, contributing to the total income of the domestic palm sugar industry. Palm sugar and the revenues of the domestic palm sugar industry will be more balanced. Domestic palm sugar industries play an important role in the well-being of palm sugar-producing households in Kolaka District (Rianse et al., 2018).

Palm sugar offers market opportunities that can be tapped. The actionable palm sugar business development strategy supports aggressive growth. The advice is to maintain the characteristics and taste of the product and improve the quality of the product through innovations in product packaging and diversify product types to provide high added value (Syahid & Syahwiah, 2021).

The low competitiveness of MSMEs in the palm sugar sector in entering the modern market and exporting is one of the causes of low product quality. The low quality of the product is due to the low technology used in the production of palm sugar. The results of technical innovations have a positive impact on competitive advantages and marketing performance. Competitive advantage mediates the relationship between technical innovation and marketing performance.

MSMEs in the palm sugar sector need to implement technical innovations across various stages, including the collection, processing, and packaging of palm sugar. Traditionally, bamboo molds, bowl-shaped molds, and concave-shaped wooden molds were used in production. However, these molds result in palm sugar sizes that do not meet market demand or standards. The proposed technical innovation is to design aluminum molds with standard dimensions tailored to the needs of modern and export markets. Additionally, aluminum molds are easier to clean and more hygienic. The limited ability of palm sugar producers to penetrate international and modern markets is attributed to the poor quality of palm sugar, which stems from inadequate production processes, particularly at the production stage. To enhance the quality of palm sugar, it is essential to provide training and support to palm sugar producers. This will enable them to consistently produce high-quality palm sugar that meets international and modern market standards. Such efforts should be regular and sustainable, involving collaboration with local governments, universities, associations, or groups of palm sugar producers, and non-governmental organizations (NGOs) (Suliyanto, Novandari, & Suwaryo, 2019).

Many scholars view agribusiness not as a descriptor but rather as an approach to the increasingly close relationship between business and agriculture, emphasizing in particular the relationships involving both businesses that provide farmers with the inputs they need to farm and businesses that process and distribute agricultural products. Strategies for increasing the income and diverse work patterns of farmers deserve more attention (Coclanis, 2022). Integrated management strategies to address the increasing pressure on agricultural production, ecosystem conservation, and rural livelihoods need to be implemented (Salvini, Dentoni, Ligtenberg, Herold, & Bregt, 2018).

The agribusiness sector represents a very important economic sector and has the highest employment rate. This sector is very complex due to the characteristics of the organizations that are part of it and the need to base their competitive advantage on innovation, which is often obtained by sharing knowledge (Awan, Nauman, & Sroufe, 2021; Vesperi, Melina, Ventura, Coppolino, & Reina, 2021).

To date, and throughout the world, most business activities in the agribusiness sector focus on increasing productive efficiency without sacrificing the environmental impact of these activities, despite the close relationship between agribusiness and natural resources. This paper argues that knowledge and innovation management (KIM) can play a key role in cultivating and managing creativity in the agribusiness sector (Ureña-Espallat, Briones-Peñalver, Bernal-Conesa, & Córdoba-Pachón, 2023).

Agribusiness also makes a major contribution to the sustainability of food supplies, conservation of biodiversity, and protection of economically viable agriculture, not least for small farmers in developing countries. The demand for sustainable agricultural products will ensure the profitable growth of agribusiness in the future, which plays an important role in enabling farmers to significantly increase production output and thereby secure the world's supply of food and agricultural products (Giovannucci, 2001; Pragnell & Berendes, 2005).

4. CONCLUSION

The palm sugar mold technique was created and used as a role model by the palm sugar home industry for business development. This mold affects the production process, namely that production is carried out more safely and hygienically (efficiently), as well as faster (effectively), which has an impact on increasing the amount of production in the palm sugar industry. The recommendation that can be given is to further implement a palm sugar business development model through product packaging engineering and implementing digital marketing strategies to increase the income of the rural palm sugar household industry.

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Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

Competing Interests: The authors declare that they have no competing interests.

Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

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