

ANALYSIS OF REGIONAL SUPERIOR PRODUCT STUDY OF PENUKAL ABAB LEMATANG ILIR DISTRICT, SOUTH SUMATERA

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ABSTRACT

This study aims to identify and evaluate the superior regional products of Penukal Abab Lematang Ilir (PALI) Regency, South Sumatera, using the Analytical Hierarchy Process (AHP) and the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). The primary problem addressed is the need for a structured approach to prioritize regional products based on key criteria. The study evaluates five products: Sagarurung, Jengkol Chips, Aluminum Crafts, Bumi Ayu Temple, and Batik PALI, across criteria including economic contribution, price, market potential, socio-cultural value, and product uniqueness. The AHP method was used to determine the weight of each criterion, revealing that economic contribution was the most significant (0.262), followed by price (0.236). The TOPSIS method then ranked Sagarurung as the highest-performing product with a preference value of 0.823, indicating its strong economic impact and market potential. Batik PALI followed with a preference value of 0.551, excelling in uniqueness and socio-cultural value. The results suggest that while Sagarurung and Batik PALI are the leading products, others like Aluminum Crafts, Jengkol Chips, and Bumi Ayu Temple require targeted improvements to enhance their competitiveness. The study concludes by recommending focused strategies to optimize the development of these products, leveraging their strengths and addressing identified weaknesses.

Keywords: *AHP, MSMEs, PALI Regency, superior products, TOPSIS*

BACKGROUND

A region's welfare level increases with its economy (Jufriyanto, 2019). This indicates that the economic growth of a region is crucial. Economic growth is an increase in the output of goods and services in a country or region over a certain period. It is usually measured using the GDP growth rate, which is the total value of a country's products and services in a given year. Thus, inclusive economic growth can help reduce income inequality. In many countries, sound financial sector development and better access to capital markets have been shown to increase the income of low-income groups proportionally, thereby reducing economic inequality (Beck et al., 2023).

Micro, Small, and Medium Enterprises (MSME) play an important role in achieving various Sustainable Development Goals (SDGs). They contribute significantly to poverty reduction (SDG 1), inclusive economic growth (SDG 8), and inequality reduction (SDG 10). Studies show that MSMEs play an important role in economic growth, as they contribute to technology development and labor skill upgrading, which in turn increases a country's economic competitiveness (Endris & Kassegn, 2022). MSMEs are a major source of job creation, especially in rural areas and those with high unemployment rates. By providing jobs to many people, MSMEs help reduce the unemployment rate and improve economic welfare. MSMEs are key pillars of the Indonesian economy. Based on data from the Ministry of Cooperatives and SMEs, there are currently 64.2 million MSMEs that contribute 61.07% to GDP, equivalent to 8,573.89 trillion rupiah. MSMEs also contribute to absorbing 97% of the total workforce and collecting up to 60.4% of the total investment (Coordinating Ministry for Economic Affairs, 2021).

Products or commodities that are the superiority or specialization of a particular region or location are called regionally superior products. According to the Regulation of the Minister of Home Affairs of the Republic of Indonesia Number 9 of 2014, Regional Superior Products, hereinafter abbreviated as PUD and in Indonesian called *Produk Unggulan Daerah*, are products, both in the form of goods and services produced by cooperatives, small- and medium-scale businesses that have the potential to be developed by utilizing all the resources owned by the region, both natural resources, human resources, and local culture, and bringing income to the community and government, which are expected to become economic forces for the region and local communities as potential products that have competitiveness, marketability, and thrust towards and are able to enter the global market. Regional products are often identified based on their unique local potential, both in terms of natural resources, culture, local community skills, and technological innovations applied (Waehning & Filieri, 2022).

One of the leading regional products that need to be studied is the Penukal Abab Lematang Ilir Regency or PALI Regency. In recent years, the Gross Regional Domestic Product (GRDP) of the PALI Regency has improved. Most of the region's GRDP comes from final household consumption by expenditure. In 2023, household consumption expenditure contributed 68.09 percent to the GRDP (BPS, 2024). After a prolonged period of crisis, including the pandemic, households were motivated by economic recovery to improve and restore their consumption habits. The abundant supply of various products and services in the domestic market, including imported products and services, has also led to an increase in consumer spending, particularly household consumption. The selection of PALI Regency as a study subject is relevant because this region reflects the dynamics of successful economic recovery, with household consumption serving as the driving force. The increase in GRDP driven by the recovery in consumption indicates the presence of local economic strength that deserves further investigation.

Examining economic potential that can be further developed into superior products that can compete at regional and national levels is something that the PALI government should do. Therefore, it is necessary to select the best priorities among superior regional products. The Regional Research and Development Agency (Balitbangda) of the Penukal Abab Lematang Ilir (PALI) district in 2024 states that it has identified several PALI regional superior products, namely Sagururung, Jengkol chips, aluminum handicrafts, the Bumi ayu temple tourism cluster, and the PALI batik. The selection of superior regional products (PUD) in PALI Regency was determined through a comprehensive process involving various stakeholders, including business actors, academics, and local government

representatives, during a Focus Group Discussion (FGD) organized by the PALI Regency Government. The FGD served as a platform for gathering and analyzing insights from those with deep knowledge of the local economy. Products such as Sagururung, jengkol chips, aluminum handicrafts, the Bumi Ayu temple tourism cluster, and PALI batik were identified as superior products based on several agreed-upon criteria. These criteria include their potential contribution to the Gross Regional Domestic Product (GRDP), their uniqueness and competitiveness in regional and national markets, their potential for further development, and the availability of local resources to support their production. The outcomes of this FGD provided a foundation for the local government to prioritize the development of these products. Based on the description above, this research will focus on further examining the regional superior products of PALI Regency using the Analytical Hierarchy Process (AHP) method combined with the Technique for Others Reference by Similarity to Ideal Solution (TOPSIS) method.

The use of a combination of Analytical Hierarchy Process (AHP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) methods is not new in research, and has proven effective in various studies involving multicriteria decision making. The AHP method is used to determine the weight of each criterion based on a predetermined hierarchy, while TOPSIS is used to rank alternatives based on their proximity to the ideal solution. Numerous studies have successfully leveraged the AHP method as a powerful decision-making tool to tackle complex problems. For instance, Pujiarti et al. (2020) utilized AHP to meticulously prioritize risk components and devise targeted risk-control strategies at every stage of the red chili seed production process. Similarly, Windarti et al. (2022) applied AHP to pinpoint the most crucial and impactful digital marketing strategies, significantly boosting dragon fruit sales in Jawai District. On the other hand, Salahuddin et al. (2023) employed the TOPSIS method to expertly rank the best study programs based on a comprehensive set of criteria defined by prospective students. Combining these two methods has been applied in various research contexts. Saragi et al. (2023) combined the Fuzzy AHP and TOPSIS approaches to strategically determine the priority of palm caul fuel suppliers for a major pulp company in North Sumatra, demonstrating the versatility and precision of these methodologies in various contexts. In the context of regional superior products, Mahmudi and Tahwin (2016) conducted research related to regional superior products in the Rembang Regency using the AHP-TOPSIS method.

Although several superior products have been identified, in-depth studies using multi-criteria analysis approaches such as AHP and TOPSIS have not been conducted. Existing research is still descriptive and does not provide structured and objective results that can assist in strategic decision-making. This research is needed because inclusive economic growth can help reduce income inequality and improve regional welfare (Beck et al., 2023; Jufriyanto, 2019). This research can increase the contribution of MSMEs to local and national economies by identifying and developing regionally superior products. In addition, the prioritization of superior products based on the AHP and TOPSIS methods will provide a strong basis for the PALI government to formulate economic development policies and strategies based on local potential to maximize its resources and support sustainable development.

RESEARCH METHODS

This research was conducted in the Penukal Abab Lematang Ilir (PALI) district, South Sumatera, between June and July 2024. A purposive sampling technique was used to identify the respondents in this study. The purposive sampling is a sample selection method in which a researcher intentionally selects certain individuals or groups based on specific characteristics or criteria relevant to the research objectives. This technique does not involve random selection but relies on the researcher's judgment and expertise to select a sample that provides the most relevant and in-depth information related to the research problem. Fifteen respondents were selected based on their competence and participation in MSME development initiatives, which included relevant local governments, academic institutions, and business owners. Information was collected using self-administered questionnaires. The data analysis method used the Analytical Hierarchy Process (AHP) and Technique for Order Preference by Similarity to the Ideal Solution (TOPSIS) approach. Data processing using the AHP method was carried out with the help of Expert Choice software, while data processing for the TOPSIS method was performed using Microsoft Excel.

The AHP is a tool, methodology, or approach used to prioritize existing alternatives and select the best based on criteria obtained from numerical values when making decisions about complex, unstructured, and multi-attribute situations. The purpose of a hierarchical organization is to gain an in-depth understanding by breaking down a complex reality into its component elements in a hierarchical manner. Priorities are set based on the opinions of experts or relevant parties that are capable of making decisions. The core idea of logical consistency is that the AHP synthesizes quantitative and qualitative information to provide concise judgments and preferences. Pairwise comparisons through expert judgment were used in the AHP measurement approach to determine priority values among the available alternatives. When creating a pairwise comparison matrix, a scale of to 1-9 was used to compare each element with other items, indicating the relative importance of each element (Fasyah et al., 2016). This analysis technique was used to establish the relative importance of superior product quality. The results indicated the value of each criterion. Data processing in the AHP method will be conducted based on the research steps carried out by Mahmudi and Tahwin (2016): 1) arranging the hierarchy of the problem at hand, 2) assessment of criteria and alternatives, 3) form synthesis, and 4) measure consistency.

The TOPSIS approach compares each alternative with the best and worst choices among alternative problems to produce solutions from various existing alternatives (Talan et al., 2020). The TOPSIS approach uses distance to perform comparisons. This strategy is often used to solve practical decision-making problems. This is because of the simplicity of the concept, computational efficiency, and TOPSIS' consideration of the distance to positive and negative ideal solutions by calculating the relative closeness to the previous ideal solution. The TOPSIS procedure that will be carried out follows the steps of the research (Borman et al., 2020) : 1) The priority level of each criterion must be established before the TOPSIS approach can begin. The original weight attributes are separated into two categories: costs and benefits; 2) normatively creating a decision matrix; 3) creating a weighted normalized decision matrix; 4) determining the positive ideal solution and negative ideal solution; 5) determining the distance between the value of each alternative and the ideal solution matrix, both positive and negative; and 6) determining the preference value for each alternative.

RESULT AND DISCUSSION

Overview of PALI Regency

Astronomically, the Penukal Abab Lematang Ilir Regency is located at 103 °36–104 °15'30" East and 3 °00–3 °25' LS. Located in South Sumatra Province, this regency is an agricultural area of 1,840.00 km² divided into five sub-districts with 65 definitive villages and six urban villages. Regionally, the Penukal Abab Lematang Ilir Regency is crossed by a primary local road network that connects the regency capital with the sub-district capital and local activity centers. The Penukal Abab Lematang Ilir Regency is a lowland area with an altitude of less than 100 m above sea level and a dominant slope above 40%, covering an area of 136,437 hectares. The region's main agricultural and plantation potential is rice, rubber, and palm oil.

Analysis of Superior Products through the AHP-TOPSIS Method

AHP Method

The Regional Research and Development Agency (Balitbangda) of the Penukal Abab Lematang Ilir (PALI) district has identified several flagship products in the PALI region, namely Sagururung, Jengkol chips, aluminum crafts, the Bumi ayu temple tourism cluster, and the PALI batik. Figure 1 shows the criteria and alternatives organized in a hierarchical structure. This figure illustrates the relationship between the criteria and supplier alternatives being evaluated.

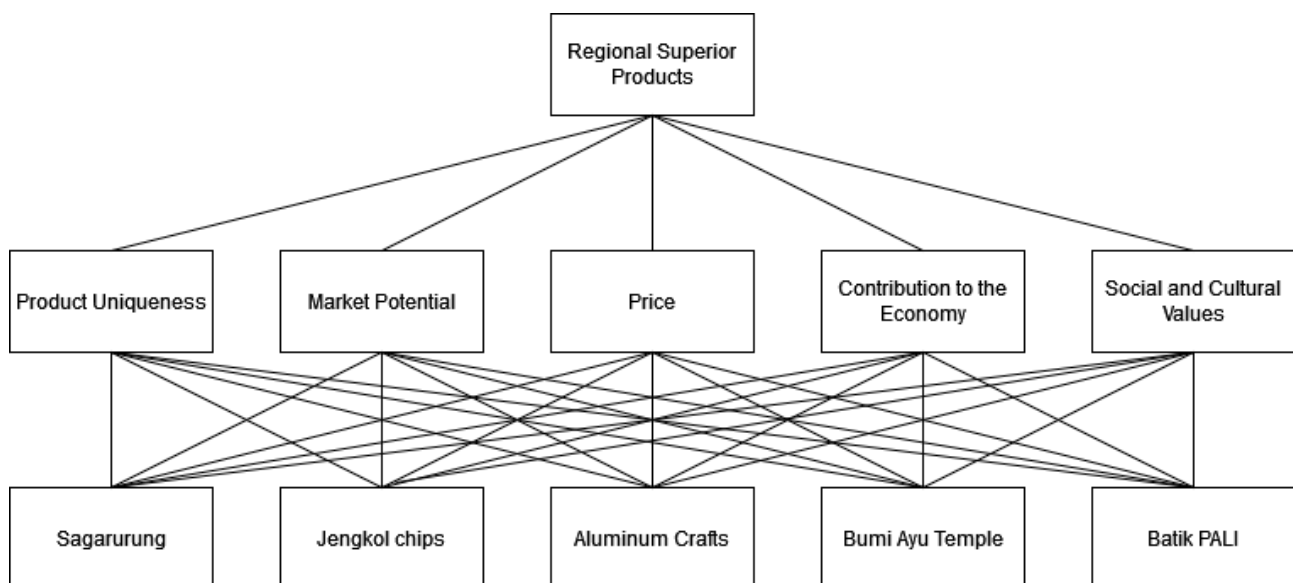


Figure 1. Hierarchical structure for determining Regional Superior Products (PUD) of PALI Regency

Sources: Primary Data (2024)

After obtaining the weight value of each criterion, pairwise matrix data were inputted. This comparison matrix shows how each expert compares the criteria in pairs to determine their relative importance. Fifteen experts provided their assessments, and each matrix reflected the expert's individual perception of each criterion's importance in the evaluation of the Regional Product of Excellence (PUD). The results of the criteria weighting displayed in Table 1 show that contribution

to the economy has the highest weight of 0.262, making it the most important criterion for determining a regional superior product. This emphasizes that the main factor considered is the economic impact generated by the product, such as job creation and increased regional income. Price also had a high weight of 0.236, placing it as the second priority. A competitive price is essential to ensure that various consumer segments can reach the product and remain profitable. Market potential, with a weight of 0.200, is the third priority, indicating that the product's ability to be accepted and demanded by consumers is also an important factor in the evaluation. Social and cultural values, with a weight of 0.165, indicate the importance of the product in preserving and promoting local cultural heritage, although not as strong as the economic contribution or price. Finally, product uniqueness has the lowest weight at 0.137, which is essential in differentiating the product from competitors. These overall weights reflect a balance between economic and cultural values, with greater emphasis on the direct economic contribution of regional flagship products.

Table 1. Criteria Weighting Results

Criteria	Weight
Product uniqueness	0.137
Market potential	0.200
Price	0.236
Contribution to the economy	0.262
Social and cultural values	0.165

Sources: Primary Data (2024)

The results of weighting alternatives across the criteria displayed in Table 2 show that Sagarurung has the highest weight in contribution to the economy (0.365), signifying that this product has a significant economic impact on the region through job creation and income generation. In addition, Sagarurung excels in market potential (0.240) and has a competitive price (0.231), making it one of the superior products. Batik PALI stands out regarding product uniqueness (0.279) and social and cultural value (0.335), reflecting its cultural representation, history, and usage. Although Batik PALI also has good market potential (0.195) and competitive price (0.202), its economic contribution is lower than that of Sagarurung.

Jengkol Chips has the highest weight in the price criterion (0.268), indicating that it offers good value to consumers at a competitive price. In addition, Jengkol Chips also has good market potential (0.212), although it is less unique (0.127) and has a lower social and cultural value (0.092). Aluminum Handicrafts have good market potential (0.227) and economic contribution (0.199), but their social and cultural value (0.173) and uniqueness (0.161) are moderate. The Bumi Ayu Temple has significant social and cultural value (0.206) and uniqueness (0.209), but its market potential (0.126), price (0.112), and economic contribution (0.132) are lower. This interpretation suggests that each superior product has strengths and weaknesses based on the evaluated criteria, which helps in more comprehensive decision-making. Sagarurung and Batik PALI stand out in several critical criteria, whereas Jengkol Chips, Aluminum Craft, and Bumi Ayu Temple each have advantages in specific criteria.

Table 2. Alternative Weighting Results between Criteria

Criteria	Regional Superior Products				
	Sagarurung	Jengkol Chips	Aluminum Crafts	Bumi Ayu Temple	Batik PALI
Product uniqueness	0.224	0.127	0.161	0.209	0.279
Market potential	0.240	0.212	0.227	0.126	0.195
Price	0.231	0.268	0.187	0.112	0.202
Contribution to the economy	0.365	0.148	0.199	0.132	0.156
Social and cultural values	0.194	0.092	0.173	0.206	0.335

Sources: Primary Data (2024)

The results of the total weighting of regional superior products displayed in Table 3 show that Sagarurung ranks highest, with a weight of 0.261, making it the main superior product of the Penukal Abab Lematang Ilir Regency. Sagarurung's superiority is mainly due to its significant economic contribution, large market potential, and competitive prices. Second, Batik PALI obtained a weight of 0.221, supported by high scores for product uniqueness and prominent social and cultural values. Aluminum Crafts ranked third with a weight of 0.192, indicating that although the social and cultural value and uniqueness of the product are at a moderate level, the market potential is good and the economic contribution is significant.

Jengkol Chips are in the fourth position, with a weight of 0.177. Although it has a very competitive price and good market potential, the lower social and cultural value and uniqueness of the product reduce its total weight. The Bumi Ayu Temple is ranked last, with a weight of 0.149. Although it has significant social and cultural value and uniqueness, its lower market potential, price, and economic contribution cause it to obtain the lowest total weight. In conclusion, Sagarurung and Batik PALI stand out as the main flagship products with strengths in various important criteria, while Aluminum Crafts, Jengkol Chips, and Bumi Ayu Temple have their own strengths but need improvement in some aspects.

Table 3. Results of Total Weighting of Regional Superior Products

Regional Superior Products	Weight
Sagarurung	0.261
Jengkol Chips	0.177
Aluminum Crafts	0.192
Bumi Ayu Temple	0.149
Batik PALI	0.221

Sources: Primary Data (2024)

TOPSIS Method

The TOPSIS method utilizes the previously obtained AHP calculation data to rank alternatives. In this method, the AHP weighting results are used as inputs for several stages. In the first stage, the decision matrix is normalized. This process begins by transposing the previously obtained decision matrix as listed in Table 2. After transposing, the normalized decision matrix results are listed in Table 4, which are then used in the next steps of the TOPSIS method. The normalization of the matrix is essential to ensure that all criteria are on the same scale, thus allowing a fair comparison between alternatives.

Table 4. Decision Matrix Normalization (Weighting is taken from AHP results)

Regional Superior Products	Criteria				
	Product uniqueness	Market potential	Price	Economic contribution	Socio- cultural value
Sagarurung	0.224	0.24	0.231	0.365	0.194
Jengkol Chips	0.127	0.212	0.268	0.148	0.092
Aluminum Crafts	0.161	0.227	0.187	0.199	0.173
Bumi Ayu Temple	0.209	0.126	0.112	0.132	0.206
Batik PALI	0.279	0.195	0.202	0.156	0.335

Sources: Primary Data (2024)

The next step was to determine the weighted multiplication result. To obtain this result, each product weight value in Table 3 is multiplied by the corresponding criterion in Table 4. This multiplication process follows the equation described in the Methods section, and the results are presented in Table 5. This process aims to obtain a value that describes the extent to which each product meets the predefined criteria, considering the weight of each criterion. The results of this weighted multiplication provided a clearer view of the relative ranking of each product based on the weighted criteria, allowing for more accurate decision-making.

Table 5. Weight Multiplication Result

Alternative/ Criteria	Product uniqueness	Market potential	Price	Economic contribution	Socio-cultural value
Sagarurung	0.058	0.063	0.060	0.095	0.051
Jengkol Chips	0.022	0.038	0.047	0.026	0.016
Kerajinan aluminium	0.031	0.044	0.036	0.038	0.033
Bumi Ayu Temple	0.031	0.019	0.017	0.020	0.031
Batik PALI	0.062	0.043	0.045	0.034	0.074

Sources: Primary Data (2024)

The next step is to build a positive ideal solution (A*) and a negative ideal solution (A'). In the TOPSIS method, building a positive ideal solution (A*) and a negative ideal solution (A') is important in determining the distance between each alternative and the ideal condition. The results of the positive and negative ideal solutions are presented in Table 6.

Table 6. Positive and Negative Ideal Solutions

Ideal Solution		Value			
Max (A*)	0.062	0.063	0.060	0.095	0.074
Min (A')	0.022	0.019	0.017	0.020	0.016

Sources: Primary Data (2024)

The next step was to calculate the distance between the values of each alternative to the positive and negative ideal solutions. Determines the distance between the value of each alternative and the ideal solution matrix, both positive and negative. The following formula is used to find the separation between alternative and the positive ideal solution:

$$D_i^+ = \sqrt{\sum_{j=1}^n [y_{ij} - y_1^-]^2}$$

The distance between alternative and the negative ideal solution is formulated as follows:

$$D_i^+ = \sqrt{\sum_{j=1}^n [y_1^+ - y_{ij}]^2}$$

The results of this calculation are presented in Table 7.

Table 7. Distance between Weighted Values to Positive and Negative Ideal Solutions

Positive Ideal Solution	Value	Negative Ideal Solution	Value
D ¹⁺	0.024	D ¹⁻	0.109
D ²⁺	0.102	D ²⁻	0.036
D ³⁺	0.082	D ³⁻	0.041
D ⁴⁺	0.111	D ⁴⁻	0.017
D ⁵⁺	0.065	D ⁵⁻	0.080

Sources: Primary Data (2024)

After obtaining the distance value of each alternative to the positive and negative ideal solutions, the last step is determining the preference value (Vi) for each alternative or the superior product of the Pali Regency (Table 8).

Table 8. Preference Value

Alternative	Preference Value	Ranking
VI (Sagarurung)	0.823	1
V2 (Jengkol Chips)	0.263	4
V3 (Aluminum crafts)	0.332	3
V4 (Bumi Ayu Temple)	0.132	5
V5 (Batik PALI)	0.551	2

Sources: Primary Data (2024)

The results of the preference value table show that Sagarurung ranks highest with a preference value of 0.823, making it the best alternative among the five regionally superior products based on the criteria that have been evaluated. A high preference value indicates that Sagarurung performs best in fulfilling the evaluation criteria. Batik PALI occupies the second position with a preference value of 0.551, showing a strong performance, and is considered one of the main superior products of Pali Regency. This value reflects Batik PALI's ability to fulfill most evaluation criteria. Aluminum Crafts ranked third with a preference value of 0.332, indicating that although this product has some advantages, there is still room for improvement compared to Sagarurung and Batik PALI.

Jengkol Chips is ranked fourth, with a preference value of 0.263, indicating that this product has some weaknesses or shortcomings in fulfilling the evaluation criteria compared to other products. Despite its potential, Jengkol Chips needs further improvement to become a more competitive flagship product. The Bumi Ayu Temple occupies the last position with a preference value of 0.132, indicating that this product performs poorly in fulfilling the set evaluation criteria. From the results of this preference value table, it can be concluded that Sagarurung is the main superior product of the Pali district, followed by Batik PALI in second place, with Aluminum Crafts in third, and Jengkol Chips and Bumi Ayu Temple in fourth and fifth positions, respectively.

CONCLUSION AND SUGGESTION

This study demonstrates that the superior regional products of Penukal Abab Lematang Ilir (PALI) have strengths and weaknesses based on criteria evaluated using the Analytical Hierarchy Process (AHP) and the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). From the weighting of the criteria. Economic contribution has the highest weight (0.262), followed by price (0.236), market potential (0.200), social and cultural value (0.165), and product uniqueness (0.137). Sagarurung ranked highest as the primary superior product with a preference value of 0.823, followed by Batik PALI with a preference value of 0.551; aluminum crafts, Jengkol Chips, and Bumi Ayu Temple ranked third, fourth, and fifth, respectively. Sagarurung excels in economic contribution, market potential, and competitive pricing, whereas Batik PALI stands out regarding product uniqueness and social and cultural value.

To optimize the development of PALI's superior regional products, recommendations are based on key criteria evaluated in the study. Sagarurung, which excels in economic contribution and market potential, should focus on increasing production scale, improving efficiency, and expanding market reach through aggressive marketing and strategic pricing. Batik PALI, known for its uniqueness and cultural value, should enhance design innovation and leverage its cultural heritage to boost market appeal. Aluminum crafts need quality improvement and design innovation to strengthen

economic contribution and product uniqueness. Jengkol Chips should diversify flavors and maintain competitive pricing, while Bumi Ayu Temple should develop better tourism facilities and effective marketing strategies to enhance its socio-cultural impact and attract more visitors.

Training and capacity building for MSME actors should also be a focus of local governments. Training programs that enhance managerial, technical, and marketing skills will help MSMEs optimize production, manage their businesses more efficiently, and expand their marketing networks. Lastly, strengthening collaboration between the government, academia, and private sector is essential to support the development of superior products. This collaboration can include joint research, business incubation programs, and access to financing for the MSMEs. With these steps, it is hoped that superior regional products can significantly contribute to the economy and welfare of the PALI community.

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