Prosiding Brawijaya

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Planning and Strategy for Industrial Development Based on Superior Products in Pangkalpinang City

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ABSTRACT

This study aims to determine the priority superior product of Pangkalpinang City and its development strategy, concerning the preparation of the Regional Industrial Development Plan. In determining the superior product through 2 (two) stages, namely the identification of the leading processing industry subsector, then the superior product is identified based on the superior processing industry subsector. In determining the priority of superior product alternatives, the Analytical Hierarchy Process (AHP) is used. Based on the results of the AHP analysis, it was determined that processed food products made from fish raw materials such as shredded, Surimi, Fish Oil, key citrus drink products and fertilizers as well as fish feed and biodegradable packaging were the flagship products of Pangkalpinang City. Furthermore, the product development strategy is formulated using a SWOT analysis.

Keywords: *Planning, Industrial Development Strategy, Analytical Hierarchy Process, SWOT Analysis.*

1. BACKGROUND

The industrial sector makes a real and important contribution to the Indonesian economy, which is changing the structure of the economy from agricultural to industrial basic. In general, the development of the national manufacturing sector promotes the development of a competitive industry with a strong industrial structure based on natural resources, innovation and technology, and justice. To realize this vision, the government seeks to increase the spread of processing industry development throughout Indonesia. The development of the processing industry is expected to produce characteristics, one of which is the existence of a strong synergy between small, medium, and large industries that carry out their role as a supply chain.

Industrial development is an effort to increase added value and support regional development. In 2020 there are 23 units of companies that are included in the category of Large and Medium Industries. Seven of them are engaged in the food and beverage industry and absorb 473 workers. In addition, those engaged in the basic metal industry with a total workforce of 715 [1]

This study is carried out to identify, analyze and determine the superior products of Pangkalpinang City and their development strategies, concerning the Regional Industrial Development Plan, especially in terms of regional superior industry programs. Three research questions will be answered in this study. First, which sub-sector of the processing industry is the flagship of Pangkalpinang City? Second, from these leading sub-sectors, what are the priority superior products? and Third, what is the priority product development strategy? To answer these, L/Q analysis will be used to answer the first question, then AHP will be used to identify priority superior products and SWOT analysis to develop a priority superior product development strategy. AHP as a multi-criterias decision-making process could breaks down the decision problem into a hierarchical tree or structure consisting of goals, factors, sub-factors, and alternatives [2].

AHP is a c[illegible]ic analysis method ; quantitative and qualitative; for decision making that decomposes the relative factors into a goal, criteria, and levels of alternative [3]. The AHP method is very popular pairwise comparison methods used for decision-making on the Multi-Criteria Decision Making

(MCDM) problem [4]. AHP helps in determining the priority of several criteria by conducting a pairwise comparison analysis of each measure [5]. A major advantage of AHP is its flexibility to make quantitative and qualitative attributes to be more commensurable [6].

According to[7], To solve the matters concerning the decision-making and judgment of the importance of the experts, the AHP analysis has to go through four steps of the process:

1) Establishing the hierarchical model with factors;
2) Conducting pairwise comparison among factors;
3) Calculating the relative weighted value of factors; and
4) Integrating the relative weighted value in evaluating factors. First, establish a matrix with pairwise comparison sub-hierarchy factors using nine scales.

SWOT is a tool to comprehensively analyze the influence of internal and external environmental factors, in various development strategies for its simplicity and intuitiveness [8]. An organization uses SWOT analysis to analyze the strength, weaknesses, opportunities, and threats of the environment to cope with competition with the current business world [9]. To use analysis of SWOT, an organization can select one of four strategic plans as follows [10], :

a. SO: by using opportunities through existing strengths
b. ST: by using strengths to eliminate or reduce the impact of threats.
c. WO: Weaknesses are considered to take advantage of opportunities.
d. WT: existing weaknesses are considered to reduce the impact of threats

Thus, it becomes a prerequisite to analyze and rank the critical SWOT factors according to their importance to devise targeted solutions. SWOT is also a systematic analytical tool for the identification of internal and external factors and the selection of an appropriate matching strategy to optimally coordinate the factors [11] and [12].

The SWOT and AHP are mature, and effective to discuss enterprises' strategies [13]. Mohamed Abdel Basset incorporates AHP into the SWOT model to help analyze the Starbucks Strategic Plan [14]. SWOT / AHP analysis can complement each other's shortcomings by combining quantitative AHP analysis and qualitative SWOT analysis to derive strategies[15]. In step one, the external and internal factors are identified. The number of factors within a SWOT group should not exceed ten. Second, all of the SWOT groups are prioritized by pairing their components. Third, relative comparisons are made, and then the weights are calculated. Finally, a consistency index is estimated to check whether respondents' answers are arbitrary [16]. Subramanian presented a detailed review of the application of SWOT-AHP analysis; socioeconomic decision-making, risk assessments, and development strategy are the important fields of the SWOT-AHP analysis [17].

2. LITERATURE REVIEW

2.1. Industrial Development Concept

According to Law no. 3 of 2014 concerning industries is an economic activities which proceed raw materials, intermediate and or end-goods into products with a higher value, including industrial design, and engineering activities.

The development of leading industries not only determines the priority of resource allocation and policies but is also expected to be able to build a positive image, become a regional symbol, and can indirectly increase regional competitiveness. Several criteria for determining leading industries in Pangkalpinang City are based on the Stratification of determining leading industries referring to resources driven or backward linkages and market-driven or forward linkages. The underdevelopment aspect or source consists of availability, raw materials, capital, auxiliary materials, labor, production facilities, technology, institutional support, and improvement with other types of business. While the forward aspect is related to the market and added value.

2.2. Leading Industry Concept

The determination of the leading industry is based on a combination of two criteria, namely the industry that absorbs the most labor, has the largest share of output, and has close links with other industries. In line with these criteria, if the leading industry is defined as a leading or mainstay industry, Presidential Regulation of the Republic of Indonesia Number 14 of 2015 concerning the Master Plan for National Industrial Development, also limits the mainstay industry, namely the priority industry. The industry

will play a major role as the prime mover economy in the future.

The success of the business is an instrument to know whether the business can maintain its life (going concern). as well as a basis in formulation the companys operational planning in the future and as information for shareholders, stakeholders, and customers concerning the achivement and sucess of the company[18].

Competitive advantage is formed from the uniqueness and tangible differences of goods and services as distinctive products in their respective domains or which are more economical in cost than competitors[19]. According to [19], competitive advantages originate from the abilities of a business to produce or to develop goods an services at superior quality with high efficiency and which customers respond with high satisfaction rates. The competitive advantages also can result from goods and services which exhibit outstanding differences from the typical products in a respective domain or with a lower cost than those of the competitors. [20] stated that the fourth broad determinant on national competitive advantages in an industry is the context in which firms are created, organized and managed as well as the nature of domestic rivalry.

Strategic management is a set of managerial decisions and actions that help determine an organization's long-term performance [21]. On the other hand, strategic management help company to achieve their competitive advantages in the market. The conceptual framework of strategic management has been expanded and refined by business practitioners and researcher to find right formulation [22]

3. METHODOLOGY

Thomas L. Saaty built a supporting model of AHP which describes complex multifactor or multicriteria problems into a hierarchy. According to [5], hierarchy represents the degree of complexity in a multi-level structure where the first level is the goal, followed by the level of factors, criteria, sub-criteria, and so on to the last level of the alternative hierarchy.In general, the hierarchical structure can be seen in the following figure

Figure 1. Generic Hierarchy Structure [23]

If the data that has been obtained is based on the hierarchical structure formed, then a pairwise comparison matrix is arranged. The parameters of each element of the pairwise matrix need to be defined. The elements of a level are compared in pairs while taking into account the specific elements at the level above. A decision matrix (A) will be formulated using this comparison. Each aij element of the decision matrix is formulated based on the comparison between the a_i element row and a_j element column.

$A = [a_{ij}]$ $(i,j = 1,2,3,\ldots$ number of criteria)

aijn>0, aji=1/ aij, aij=1 for all i = j

	a	b	c
c	1	*x*	*Y*
b	*1/x*	1	Z
a	*1/y*	*1/z*	1

The comparison between the two criteria is made based on which criterion is more important by considering the objectives to be achieved, suggesting a scale of 1-9 for quantitative comparison of the available alternatives. It can be seen in Table 1 as follows:

Table 1. Pairwise Comparison Scale

Level Interest	Definition	Information
1	Equally important	Both elements have the same effect
3	Somewhat more important	Experience and judgment strongly favor one element over its partner
5	Quite important	Experiences and decisions indicate a preference for one activity over another
7	Very important	Experiences and decisions show a strong preference for one activity over another
9	Absolute more important	One element is absolutely preferred over its partner, at the highest level of confidence.

Consistency of comparison

Consistency Index (CI) is a way to measure the error of a decision which is formulated as follows:

$$CI == \frac{\lambda - n}{n-1}$$

Where
λ = average consistency for all alternatives
n = number of alternatives

The closer the value to zero, the more consistent the CI. In addition, the ratio of the CI at random is a compared with the random index (RI) known as the consistency ratio (CR).

$$CR = \frac{CI}{RI}$$

The random index (RI) value based on the number of alternatives can be seen in table 2 as follows:

Table 2. Random Index Value(RI)

n	2	3	4	5	6	7	8
RI	0,00	0,58	0,90	1,12	1,24	1,32	1,41

We recommend that the CR value < 10% to indicate that the decision is acceptable (consistent). The matrix approach reflects the dual aspects of priorities, namely dominating and being dominated. Comparisons are made based on the judgment of decision makers by assessing the level of importance of an element compared to other elements [23]

Table 3. Comparative Quantitative Scale In AHP

Level interest	Definition	Information
1	Equally important	Both elements have the same effect
3	Somewhat more important	Experience and judgment e very impartial one element compared to partner
5	Quite important	Experience and decisions show preference for one activity over another.
7	Very important	Experience and decisions show a strong preference for an activity more from the other
9	Absolute more important	One element is absolute preferred over with their partner, at the highest level of confidence.

4. RESULTS AND DISCUSSION

Respondents in this study came from industry players, bureaucrats and communities involved as observers of industrial development, the respondents amounted to 30 people. The majority of respondents in this study were female (87%), had a bachelor's degree education (80%), and all had jobs related to industrial development in Pangkalpinang City.

Data from filling out the questionnaires were analyzed using AHP to capture the aspirations of the community so that it is hoped that these aspirations can be taken into account in development planning. The purposive sampling method was used for 30 respondents representing the Government, Business Actors, and the community.

Before determining the priority superior product, the criteria are weighted first, to determine the perception of experts regarding the most important criteria in determining regional superior products.

Table 4. Criteria Weighting Results

Criterias	Score	Rangking
Availability and continuity of raw materials	0.128	1
Labor Absorption	0.121	2
Economic added value	0.112	3
Government readiness and readiness	0.106	4
Readiness and willingness of business actors	0.094	5
Regional prestige	0.094	6
Social added value	0.093	7
Government policy and institutional support	0.090	8
Community readiness and readiness	0.084	9
Market potential	0.078	10

AHP Results, 2021

The results of the weighting of the criteria as shown in Table 4 have a consistency ratio value of 0.02. This shows that the AHP results have met the CR standard where the maximum CR value is 0.1. Furthermore, the results of the alternative weighting of superior products of Pangkalpinang City will be presented based on the results of the AHP.

Table 5. Featured Product AHP Results

No	Priority Industry	Industry Type	Featured product
1	Mainstay Industry	Food and beverage industry	Fish Processing 1. Shredded 2.Surimi 3. Fish oil 4. Fish meal 5. Fish waste treatment 6. Key citrus drink processing
2	Support Industry	Auxiliary materials industry	Water, ice, biodegradable packaging
3	Upstream Industry	Upstream agro	Fish feed, fertilizer

AHP Results, 2021

The results of the alternative weighting of superior products based on AHP obtained a CR value of 0.01. This shows that the CR is in accordance with the AHP calculation principle. Based on table 5, the priority superior product of Pangkalpinang City based on the perception of the expert group is food/processed fish productsIn the AHP analysis, the criteria are first weighted as shown in table 4. From the results of the weighting, the largest criteria weight in determining regional superior products is the availability and continuity that strengthen .namely the availability of raw materials in the early stages of production will ultimately help target product marketing [24] and most importantly that capital, labor and raw materials are simultaneous and partial effect on the income of industrial entrepreneurs [25].

The second rank is employment. The law of labor market balance explains, if the demand for the amount of production increases, the supply of labor will increase, but the wages received will decrease to reduce production expenditure. In the growth of the industrial sector, investment and wages are trending upwards, affecting employment in the industrial sector [26] [27] [28].

Economic added value is ranked third as a criterion that determines the selection of superior products. In general, value added is the process of changing a product from its original state to be more valuable. In industrial development towards industry 4.0 the importance of the role of technology in creating added value for society and organizations [29].

The fourth rank is the readiness and willingness of the government. The superior products to be produced should be accompanied by the readiness and willingness of the government as a facilitator in providing capital, especially in licensing businesses that stimulate business actors, especially existing SMEs.

The readiness and willingness of business actors as the fifth rank in industrial development shows the willingness of business actors to be committed to carrying out industrial development in the specified period.

The sixth ranking is regional prestige. The uniqueness, distinctiveness, or regional trademark is the most important factor as a determinant of regional superior products, becomes a differentiating factor with other regional products, and becomes a character in facing competition. The uniqueness that is difficult for competitors to imitate will be the strength so that the product can survive in both local and global markets.

Social added value is ranked seventh, in this sense, if it is associated with current economic conditions, several diseases and social problems faced by the community such as unemployment, poverty, limited job opportunities, low incomes, deviated income distribution, health, environment, sluggish production activities. and a series of problems that are impossible to mention. For this reason, industrial development that produces superior products should refer to the basic problems faced by the community.

The eighth rank is support for government policies and institutions. namely policy support related to the development of industrial resources, ease of licensing and institutional availability for small, and medium-sized industries that produce these products.

The readiness and willingness of the community as the ninth rank is that the people who will be the subject and source of labor in industrial development must have adequate knowledge and skills and can participate in developing the creative industry.

In the criteria for determining superior products, it is interesting that market potential is the last rank. According to Tambunan [30] the cause for the difficulty of marketing for IKM products is due to the low competitiveness of their products when

compared to large or imported industrial products. Actually, the cause of low competitiveness is low productivity caused by low product quality, technology, and human resources.

4.1. Industrial Development Strategy In Pangkalpinang City

Based on the results of the SWOT analysis on internal and external factors, industrial development in Pangkalpinang City is carried out by:

a. Strategic strength-opportunity

1. Improving the capacity of human resources and business actors.
2. Strengthening the network of raw material providers.
3. Improve the ability to innovate products.
4. Strengthening institutions for the sake of the sustainability of production and market activities.
5. Encouraging continuity of guidance and facilitation of relevant Regional Apparatus towards industry

b. Weakness-Opportunity (WO) Strategy

1. Strengthen linkages at all levels of the value chain of the industry
2. Prioritizing the quantity and quality of raw materials
3. Implement production processes and technologies that can produce products that are hygienic, safe, and meet the taste required by the market.
4. Develop special HR competencies in the areas of quality management, production, and packaging techniques.
5. Develop and strengthen the role of R&D and universities to improve quality assurance and product safety as well as business management.
6. Encouraging development and facilitation of the relevant Regional Apparatus.

c. Strength-Threat (ST) Strategy

1. Improve production efficiency so that product prices are more competitive;
2. Making designs and variations of even new products to diversify products based on customer requests;

5. CONCLUSION

This study concludes that the priority superior products of Pangkalpinang City are processed food and beverage products made from key oranges, biodegradable packaging products, and processed fish waste into organic feed and fertilizer. The industrial development strategy used for superior products based on the SWOT matrix is the Strength-Opportunity (SO) strategy.

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