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APPLICATION OF SWOT AND ANP METHODS IN ORDER TO SELECT THE AGROINDUSTRIAL DEVELOPMENT STRATEGY BASED ON TAPAI IN BONDOWOSO

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ABSTRACT

Tapai is one of the products that become the flagship and image of Bondowoso district. So, the existence of cassava is very supportive to the continuity agroindustry based on Tapai. The main purpose of this research is determining methods that can be used to select the agro-industrial development strategies. One of the decision-making methods that can be used for the selection of agro-industrial development strategies is the Analytic Network Process (ANP) method. In the formulation of strategies is also used SWOT analysis. Based on the research, a priority strategy is obtained, namely the WO strategy, namely strengthening capital for the Tapai agroindustry business and increasing promotion by conducting training.

Keywords: ANP, Tapai, SWOT analysis

INTRODUCTION

One of the potential food crops that can encourage the economic development in Bondowoso Regency is cassava. Where cassava in third ranks of main agricultural product which has the largest harvest area and production volume in Bondowoso Regency (BPS, 2018). Based on this, the cassava commodity is a potential for Bondowoso Regency. This potential sector encourages farmers and community in Bondowoso Regency to process cassava in order to create an added value to increase their income. According to the results of research, processed cassava products that have the potential to be a regional superior product are Tapai and it's processed products (Hermanuadi, 2018). There are so many products based on Tapai in Bondowoso Regency, so the availability of Tapai is very meaningful for several agroindustries that produce them.

The strategy formulation of an organization and industry always follows the dynamics internal and external strategic environment that is adjusted with the mission of the organization/industry. The presence of competitors, the dynamics of social, political, and subsequent technological developments can be analyzed by SWOT matrix. SWOT analysis is a process that involves four areas into two dimensions. It has four components: 'Strengths', 'Weaknesses', 'Opportunities', 'Threats'. Strengths and weaknesses are internal factors and attributes of the organization, opportunities and threats are external factors and attributes of the environment. SWOT analysis is typically drawn out in a four-quadrant box that allows for a summary that is organized according to the four section titles. The following table is a SWOT analysis, with its four elements in a 2x2 matrix (Gurel, 2017).

One of the decision-making methods that can be used for the selection of agro-industrial development strategies is the Analytic Network Process (ANP) method. ANP is used to measure the complexity of a mega project based on supporting factors so that it becomes a reference in managing mega projects (Zhao *et al.,* 2014). ANP is able to determine the order of priority between projects that have proven to be economically profitable based on the level of project risk and the delay in execution time (Beltran *et al.,* 2014). In

previous research, the ANP method was used in decision support in determining the strategy for developing robusta coffee in Jember, where ANP could help stakeholders in making decisions by ranking alternatives (Kasutjianingati, 2020).

The purpose of the research is to obtain the weight of the criteria and sub-criteria for the development strategy of the Tapai agro-industry in Bondowoso Regency using the Analytic Network Process (ANP) method. The results of the research are expected to maintain the existence and availability of Tapai so that several Tapai-based processed agroindustries can fulfill the consumer demand in the market. So that by carrying out this analysis, steps or strategies that need can be taken to support the development of a agroindustry based on Tapai in Bondowoso Regency can be obtained or formulated.

MATERIALS AND METHODS

This research is a holistic qualitative research in which all factors are taken into account as a whole, depending on each other for the benefit of all. Therefore, much more theory is needed because it must be adapted to the phenomena developing in the field (David, 2013). The framework for developing agroindustry based on Tapai in Bondowoso Regency (Figure 1) was obtained through a survey and direct inquiries from the agroindustry, in this case, UMKM that process products based on Tapai, so the actual conditions being faced are known. Supported by the opinion of experts that are compared between theory and reality, so that strategic issues can be obtained. These alternative strategies are the result of weighting the SWOT analysis which is then prioritized using the ANP method.

In this research, the method used is a case study. The case study method is the right strategy if the researcher has little opportunity to control the events to be investigated and the focus of the research lies on contemporary phenomena in the context of real life (Hermanuadi *et al.*, 2020).

Methods

Research Techniques and Data Collection

The research technique used is survey method. The data used are primary data and secondary data. Primary data is obtained directly from respondents through observation and interviews guided by questionnaires. Secondary data were obtained from related institutions, such as the Central Bureau of Statistics, the Department of Agriculture, journals, books, and internet media in accordance with this research.

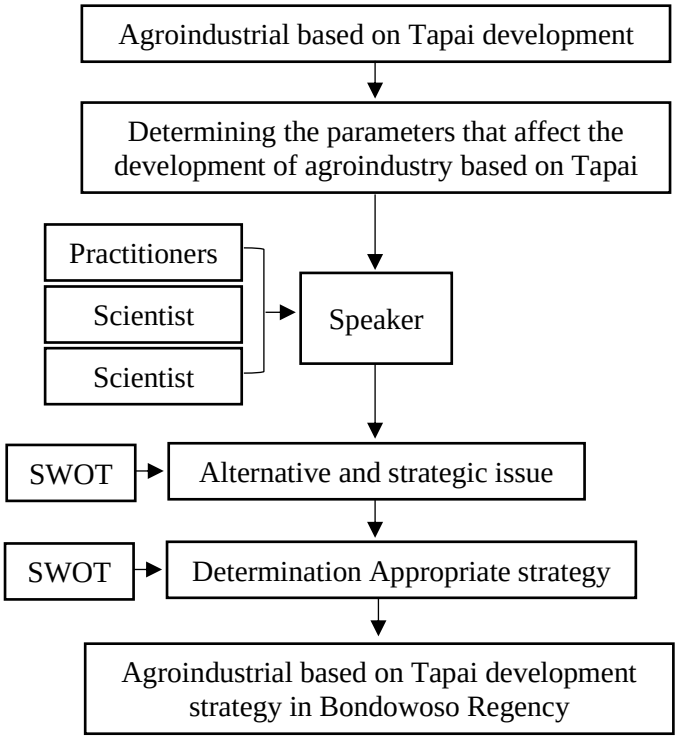


Figure 1. Agroindustrial based on Tapai development research framework in Bondowoso Regency

Respondent Determination Techniques

The number of industries based on Tapai in Bondowoso Regency is 506 and a sample size of 5 industry players is determined purposively with the provisions that the industry players sampled (respondents) are UMKM owners based on Tapai and have been running for at least 5 years. Apart from samples from industry players, informants who were determined purposively were also taken, namely 2 academics and 1 head of the Industry and Trade Office of Bondowoso Regency.

Analysis Technique

The analysis technique in this study was carried out in 2 stages, namely by using descriptive qualitative analysis (SWOT) to complement the results of the qualitative analysis which were then quantified using the ANP method. By using this approach it is

expected to obtain a holistic analysis result. SWOT analysis (Strength, Weakness, Opportunity, Threat) is an analysis tool used to identify various factors that influence strategy formulation (Suwarsono, 2002). The qualitative approach to SWOT analysis can produce strategic alternatives that can be taken by the company by looking at the relationship between SWOT factors (Marimin, 2004). These alternative strategies have different ways to improve the performance of an organization (Sammut, 2015).

Analytic Network Process or ANP is a mathematical theory that allows a decision maker to deal with interconnected factors (dependence) and systematic feedback (feedback). These connections are oriented only to elements in lower levels. A network has clusters of elements, with the elements in one cluster being connected to elements in another cluster (outer dependence) or the same cluster (inner dependence). A hierarchy is a special case of a network with connections going only in one direction.

The priorities derived from pairwise comparison matrices are entered as parts of the columns of a super matrix. The super matrix represents the influence priority of an element on the left of the matrix on an element at the top of the matrix with respect to a particular control criterion. A super matrix along with an example of one of its general entry matrices is shown in Figure 2.

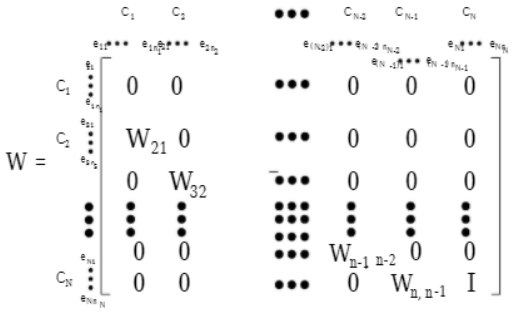


Figure 2. A super matrix of Hierarchy

ANP is a method of decision making based on the many criteria (parameters) developed by Thomas L. Saaty. This method is a new approach to qualitative methods which is a continuation of the previous methods, namely the Analytic Hierarchy Process (AHP) (Saaty, 2008). According to Aziz (2003), ANP is used to solve problems that depend on alternatives and existing criteria.

An ANP network can have criteria and alternatives in it, which are now called nodes. Besides using a hierarchical network, decision making can also be done by creating a feedback network. This network more accurately describes the conditions of a very complex research problem as stated earlier. The ANP method is able to improve the weaknesses of AHP in the form of the ability to accommodate the linkages between criteria or alternatives (Saaty, 2006).

RESULTS AND DISCUSSION

IFE (Internal Factor Evaluation) Matrix

Based on the interviews and validation that has been carried out, there are 13 indicators that are internal indicators (strengths and weaknesses) of the agroindustry Tapai in Bondowoso Regency. Assigning weights to each factor based on the consideration of "very important" (0.1) up to "very unimportant" (0.0), which factors are likely to have an impact.

Further ratings are calculated for each factor by providing a scale ranging from 4 (outstanding) to 1 (poor) based on the influence of these factors on the development of Agro-industrial Based on Tapai Based on the calculations in Table 1, it can be seen that the total internal matrix of strength is 1.49 and the total internal matrix of weakness is 1.52 so that the total score of the overall internal matrix is 3.01.

Table 1. Internal Factors Matrix of Agro-industrial Based on Tapai in Bondowoso Regency

NO	DOMINANT INTERNAL FACTORS STRENGTHS	Amount	Rating	Weight	Weight x Rating
1	Taste and Product Quality	5	1	0,04	0,05
2	The supporting facilities of the operation	6	2	0,05	0,07
3	Experience in Industry	13	3	0,10	0,32
4	Product practicality (easy to carry)	13	3	0,10	0,32
5	The labeling of packaging	11	3	0,08	0,23
6	There is already a job description	16	4	0,12	0,48

7	Customer loyalty	4	1	0,03	0,03
NO	WEAKNESSES	Total	Rating	Weight	Weight x Rating
1	Limited source of funds	11	2,75	0,08	0,23
2	Lack of promotion	12	3,00	0,09	0,27
3	Products are not optimal	15	3,75	0,11	0,42
4	The technology used is still simple	5	1,25	0,04	0,05
5	The level of education of workers is still low	16	4,00	0,12	0,48
6	Products are easily damaged	6	1,50	0,05	0,07
TOTAL		133		1,00	3,01

EFE (External Factor Evaluation) Matrix

Based on the interviews and validation conducted, 11 indicators were obtained which are external indicators (opportunities and threats) of the agroindustry Tapai in Bondowoso Regency. Based on the calculations in Table 2, it can be seen that the total external opportunity matrix is 1.80 and the total external threat matrix is 1.11 so that the total external matrix score is 2.92.

Table 2. External Factors Matrix of Agro-industrial Based on Tapai in Bondowoso Regency

NO	DOMINANT EXTERNAL FACTORS OPPORTUNITIES	Total	Rating	Weight	Weight x Rating
1	Technological developments are advancing	13	3	0,12	0,38
2	The image of eating is typical of the area	7	2	0,06	0,11
3	Open market domestic and overseas	14	4	0,13	0,44
4	Higher population growth	16	4	0,14	0,57
5	Training and coaching from local governments	11	3	0,10	0,27
6	The absence of a fixed supplier of raw materials	4	1	0,04	0,04
NO	THREAT	Total	Rating	Weight	Weight x Rating
1	Fluctuating production costs	4	1,00	0,04	0,04
2	Raw materials are hard to come by	7	1,75	0,06	0,11
3	Raw materials are seasonal	11	2,75	0,10	0,27
4	Bondowoso area is less strategic	12	3,00	0,11	0,32
5	The absence of substitution products	13	3,25	0,12	0,38
TOTAL		112		1,00	2,92

IE Matrix for Positioning

The value obtained from the IFE and EFE matrices will be entered into the Internal-External matrix to map the position of the Tapai agroindustry in Bondowoso Regency. This Internal-External Matrix positions the production in a nine-cell view. This IE matrix is based on two key dimensions, namely the total IFE weight score on the X axis and the EFE weight score on the Y axis. Based on the IFE and EFE Matrix, it can be seen that the position on the X axis at point 3.01 and the position on the Y axis at point 2.92.

The SWOT matrix is a tool used to help determine strategies by considering strengths, weaknesses, opportunities and threats. The SWOT matrix consists of the SO (Strengths Opportunities) strategy, the WO (Weakness Opportunities) strategy, the ST (Strengths Threats) strategy and the WT (Weakness Threats) strategy. Based on the analysis through the IE matrix, it can be found that the Tapai agroindustry in Bondowoso Regency is in quadrant IV. Where companies that are in the 4th quadrant include companies described as Keep and Maintain (Rangkuti, 2006), this quadrant is very suitable for implementing the following strategies:

- SO strategy
  1. Maintaining the quality of the Tapai produced with the latest technology and expanding the marketing network (S1, S4, S5, S6, S7, O1, O2, O3, O5).
  2. Maintain and improve the performance of the existing supply chain by creating

an institutional system in the form of a cooperative (S2, S3, O4, O6).

• WO strategy

1. Strengthen capital for the Tapai agro-industry business and increase promotion by conducting training (W1, W2, W3, W4, W5, W6, O1, O2, O3, O4, O5, O6).

• ST strategy

1. Developing clean Tapai production, improving quality through good post-harvest, and making regulations for business partners (S1, S2, S2, S3, S4, S5, S6, S7, T1, T2, T3, T4, T5).

• WT strategy

1. Creating good cooperation with investors (W1, W2, W3, W4, W5, W6, T1, T2, T3, T4, T5, T6)

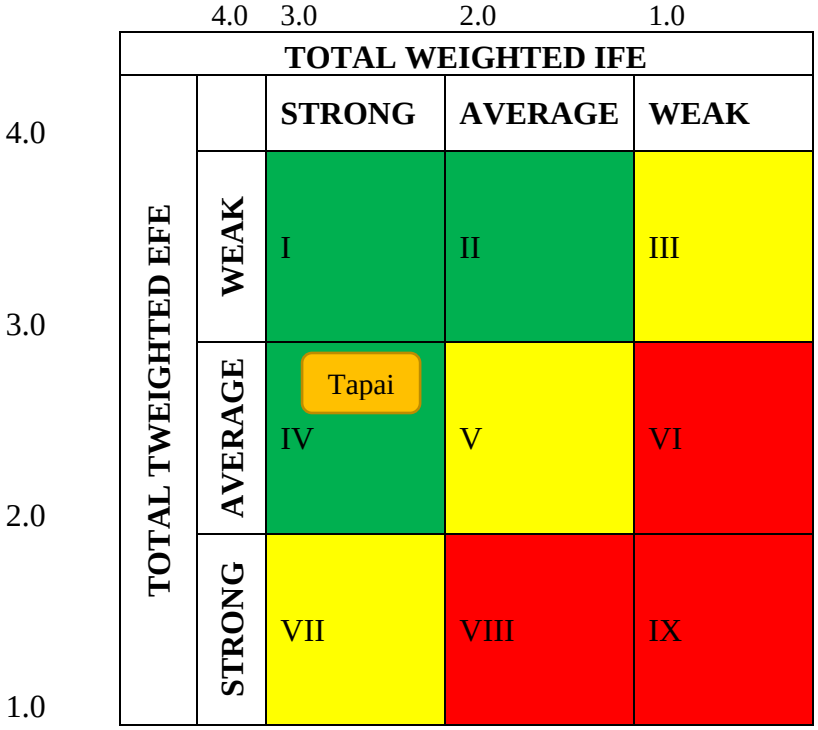


Figure 3. Matrix of IE Agroindustri Based on Tapai in Bondowoso Regency

Analytical Network Process (ANP)

In determining strategic priorities using the Analytical Network Process (ANP) approach, modeling is first carried out using Super Decisions software. From ANP modeling, a pairwise comparison matrix was carried out. In the pairwise comparison matrix, there is a relationship between the elements in one cluster (inner dependence) and the relationship between elements between different clusters (outer dependence) (Sugiyono, 2012). Figure 4 shows the ANP model using Super Decisions.

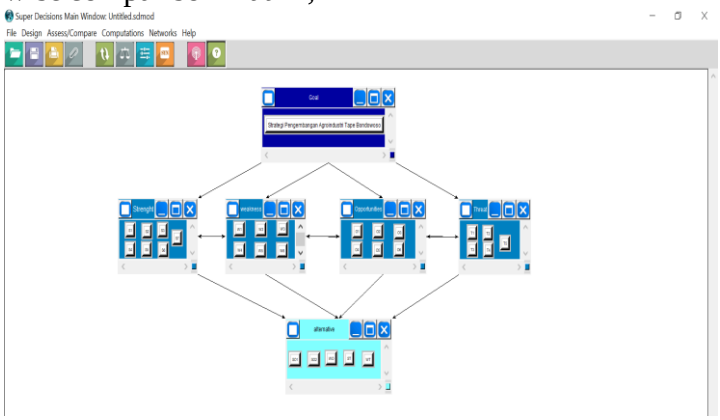


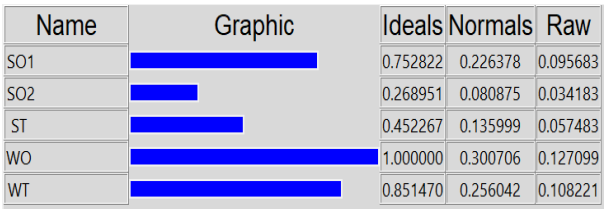
Figure 4. ANP model of agroindustry Tapai development strategy using Super Decisions

Tapai Agroindustry Strategy Priority in Bondowoso Regency

After ANP modeling, pairwise comparisons, prioritization of production

development strategies is obtained with the help of Super Decision Software. From the results of calculations using Super Decisions, the priority for the development of the Tapai agroindustry development strategy in Bondowoso Regency is obtained. Figure 5 shows the ranking of each available alternative. Based on the above, it can be seen that the alternative strategy with the highest value is the WO strategy, namely:

Strengthen capital for the Tapai agroindustry business and increase promotion by conducting training. Strengthening capital can be done by providing guidance, institutional empowerment development and farm management by establishing cooperatives or Tapai associations. The institutional role is very much needed in the development of the Tapai Agroindustry, it aims to make a good welfare allocation at the farmer level. With the background of farming conditions such as low land ownership scale, traditional farming systems and various product quality, the development of the Tapai agroindustry requires an institution such as the Cassava Farmers Association. This must be supported by adequate human resources.



Name	Graphic	Ideals	Normals	Raw
SO1		0.752822	0.226378	0.095683
SO2		0.268951	0.080875	0.034183
ST		0.452267	0.135999	0.057483
WO		1.000000	0.300706	0.127099
WT		0.851470	0.256042	0.108221

Figure 5. Results of priority analysis of the Tapai agroindustry development strategy using Super Decisions

CONCLUSION

Based on the research that has been carried out by researchers in determining the strategy for the development of the Tapai agroindustry in Bondowoso Regency, it can be concluded that there are 5 alternative strategies obtained in the Tapai agroindustry development strategy in Bondowoso Regency. The priority strategy is carried out using the (ANP) approach. Based on calculations using Super Decisions, a priority strategy is obtained, namely the WO strategy, namely strengthening capital for the Tapai agroindustry business and increasing promotion by conducting training.

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