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Integration Fuzzy Analytic Network Process (ANP) and SWOT Business Strategy for the Development of Small and Medium Enterprises (SME)

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Abstract. Business competition is one risk factor for Small and Medium Enterprises (SME) to set up good management in handling the risk of loss. This proposed research will look for criteria that influence the occurrence of damages based on data from Cooperative and SME on Batik Madura. Method approach which used Fuzzy Analytic Network Process (FANP) as the weight of interest in decision support systems. Factor analysis of the level losses will influence the performance in the business sector. SWOT analysis combined with FANP method to determine the most appropriate development strategy to be applied industry. From the results of SWOT analysis and FANP, it was found the strategy of the best development to apply business strategy. The raw materials and human resources are available to increase the production capacity of the test results of SWOT analysis SME on Batik Madura. The result measurement of SME are always favourable the position, because the value is well resulted production and the amount is stable revenue which caused SME are in the first quadrant, so the power can exist take advantage of business opportunities. While the trial results of SWOT analysis on SME on Batik Madura in January and March are quadrant of second quadrant because of the number of defective products is quite produced, causing SME are under threat. But although SME suffer threats, SME still have strength on the amount of production and timely delivery.

Key word: Decision Support Systems, SWOT, SME, ANP, FANP

INTRODUCTION

Business competition batik SMEs in Bangkalan is one of the risk factors in management contained in some of the criteria in the assessment of the risk that employee training, education owner, training owners, net income, sales, property (shop), variations of the motif, rising raw material prices, weather conditions, and production. This study identifies the criteria that influence the risk of losses based on the criteria that have been determined by the approach of Fuzzy Analytic Network Process (FANP) as weighting and ranking the decision making. FANP method used to solve the problems of decision making in which there are relationships among criteria interplay in risk assessment (Dargi, A., 2014). This method is used to take the best decision based on the criteria, both qualitative and quantitative (Mehmet Sevkli A, 2012).

The company must choose objectives and strategies that ensure their survival in the competition based on the approaches and techniques can be used in the strategic analysis of the strategic management process (Onut, S, et al. 2009). According to the Electric Company, SWOT analysis matrix, which evaluates the opportunities, threats, strengths and weaknesses of the organization, is one of the most well-known methods. Decision-making on SME performance strategies needed to assess the strategic position of SMEs is based on the analysis of internal and external factors using SWOT analysis (strengths, weaknesses, opportunities, and threats). SWOT analysis is an effective tool in structuring petrified problems, especially analyse the strategic environment, which is commonly
known as the internal environment and the external environment, there are four elements that have always possessed
(Ohman, M. R., Wozny, G. and Repke, J., 2011). Internal of factor comprise a number of strengths and weaknesses
and external factors will be faced with a variety of opportunities and threats (Mehmet Sevki a, Asil Oztekin, 2012).
SWOT analysis has weaknesses in evaluation and measurement, thus requiring additional weights to determine
priorities such as are ANP, AHP, FAHP, FANP (Stanuji D, et.al., 2013). The combination of FANP and SWOT
analysis is used to solve many problems connecting with the fuzzy concept of inter-criteria analysis process.
This method is suitable for decision in some choices and decisions indicators. The theory of fuzzy has been using fuzzy
logic by using parameters such as knowledge, experience and judgment to be transformed into the modelling of real

The weighting factor on FANP and this will ultimately change the priority strategic choice. Thus it is very
important that we use a SWOT analysis that considers possible relationship between the factors in the decision
SWOT (Kheirkhah, A., et. al P., 2014 and Dargi, A., 2014). The algorithm proposed in this study using FANP that
allows us to measure the dependence between the factors of SWOT. Dependence among the factors influencing the
weight SWOT on sub-criteria and weighting criteria and selection strategies can also change the priority of policy
options strategy in accordance with the decision makers (Lee, S. and Walsh, P., 2011).

The proposed this research uses the combination of FANP and SWOT, being a powerful tool of FANP approach
to measure SWOT factors for multi-criteria the decision –makers (S. Jharkharia and R. Shankar, 2007). The concept
of fuzzy ANP used for grouping variables at this stage of assessment criteria and alternatives, and the method of
ANP used the weight of each criterion SWOT factors branches change the priority the weights of strategy options.
The present research in terms of purpose is considered as an applied research. Applied research is a research that its
findings could have scientific use the subjective realm of the research is Fuzzy Analytic Network Process (FANP)
and the local realm is SME. The use of an effective SWOT analysis provides four benefits for managers in create
marketing strategy; 1) simplicity: analysis SWOT does not require special training; 2) collaboration: for The simple,
push their SWOT analysis cooperation and information exchange between manager from different functional areas;
3) flexibility: can raise the quality of strategic planning organization even without the information system marketing;
4) integration: A SWOT analysis associated with a wide variety of sources information.

The Proposed Fuzzy ANP Methodology

Fuzzy ANP method is applied for the improvement of AHP and ANP by combining the fuzzy set theory. Analytical
Network Process (ANP) is a method that is capable of connecting their dependence on one group (inner
dependence) and among different groups (outer dependence). ANP method capable of overcoming the weaknesses
of AHP be the ability to accommodate their inter dependencies and alternative criteria (Saaty, T. L., 1999). In the
ANP Fuzzy, Fuzzy ratio scale used to indicate the relative strength of the factors on which the relevant criteria.
Fuzzy decision so that a matrix can be formed from several alternatives described in the form of fuzzy numbers (Ali
Görener, 2012). AHP and ANP are essentially measured to use pairwise comparisons that represent important matrix
(Chung et al., 2005).

The Analytic Network Process is generally improvement of the Analytic Hierarchy Process to resolve decisions
problems because they need the interaction dependency of higher level elements in a hierarchy on lower elements to
build matrix element (Saaty and Özdemir, 2005). Exactly, the AHP represents a framework with a unidirectional
hierarchical and ANP authorize for complex interrelation between decision levels and attributes (Yüksel and Dağdeviren,
2007).

According to Chang each objects of each - each criteria and sub criteria to be considered and extend the analysis
to obtain a goal executed. This means it is possible to obtain the analysis which can extend the value indicated by
the following notations (Yüksel, İ., and M. Dağdeviren, 2010). $M_{1j}, M_{2j}, M_{3j}, M_{4j}, M_{5j}, ....... M_{nj}$ Set goal
(1,2,3,4,5......m) with $M_{jj}$ (j=1,2,3,4,5....m) is triangular fuzzy (C. Gencer and D. Gürpinar, 2007) after identifying
the initial assumptions, extend analysis can be translated to the stage - the stage following:

1. Develop a pairwise comparison matrix between all the elements / criteria, sub-criteria of the fund each - each
criterion in the dimensions of a hierarchical system based on an assessment with linguistic variables, $n$
performance number of criteria to be evaluated, $C_i$(criteria), $A_j$ as importance of $i$ criteria based $j^{th}$. 

020055-2
2. Change the linguistic variables in the form of fuzzy numbers. Questionnaire data in the form of linguistic variables fuzzy numbers are converted to forms. TFN Chang fuzzy numbers to be seen (the scale of the fundamental interests of Relative ANP) with a different level of importance.

<table>
<thead>
<tr>
<th>Scale Linguistic</th>
<th>Triangular fuzzy scale</th>
<th>Scale TFN</th>
<th>TFN inverse scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equally Important</td>
<td>1</td>
<td>(1,1,1)</td>
<td>(1,1,1)</td>
</tr>
<tr>
<td>Moderate Important</td>
<td>3</td>
<td>(1,3,5)</td>
<td>(1/5,1/3,1)</td>
</tr>
<tr>
<td>Strong Important</td>
<td>5</td>
<td>(3,5,7)</td>
<td>(1/7,1/5,1/3)</td>
</tr>
<tr>
<td>Very strong Important</td>
<td>7</td>
<td>(5,7,9)</td>
<td>(1/9,1/7,1/5)</td>
</tr>
<tr>
<td>Absolute Importance</td>
<td>9</td>
<td>(7,9,11)</td>
<td>(1/11,1/9,1/7)</td>
</tr>
</tbody>
</table>

3. Calculate the weighting and the search criteria listed in steps - steps as follows:

Determining the value of synthetic extend (the) associated with the object to i then represented as follows:

\[
si = \sum_{j=1}^{n} M_{ij}^j \prod \left[ \sum_{j=1}^{n} M_{ij}^j \right]^{-1}
\]  

(1)

To obtain \( \sum_{j=1}^{n} M_{ij}^j \) perform additional fuzzy operation of m with particular matrix

\[
\sum_{j=1}^{n} M_{ij}^j = \left[ \sum_{j=1}^{n} L_j \right] \cdot \left[ \sum_{j=1}^{n} m_j \right] \cdot \left[ \sum_{j=1}^{n} u_j \right]
\]

(2)

Then to get \( \left[ \sum_{j=1}^{n} \sum_{j=1}^{m} M_{ij}^j \right]^{-1} \) surgery fuzzy value \( M_{ij}^j \) (j = 1, 2, 3,...m)

\[
\sum_{j=1}^{n} \sum_{j=1}^{m} M_{ij}^j = \left( \sum_{j=1}^{n} L_j \right) \cdot \left( \sum_{j=1}^{n} m_j \right) \cdot \left( \sum_{j=1}^{n} u_j \right)
\]

(3)

At the end of the first step of the determinant of the inverse vector

\[
\left[ \sum_{j=1}^{n} \sum_{j=1}^{m} M_{ij}^j \right]^{-1} = \left( \sum_{j=1}^{n} u_i \right) \cdot \left( \sum_{j=1}^{n} m_i \right) \cdot \left( \sum_{j=1}^{n} L_i \right)
\]

(4)

Determining the degree of likelihood (degree of possibility) and fuzzy set \( m_2 = (l_2, m_2, u_2) \geq M_1 = (l_1, M_1, U_1) \) defined as

\[
V (m_2 \geq M_1) = \sup_{x \geq l} \{ \min (\mu_m(x), \mu_m(y)) \}
\]

(5)

x and y is the value on the axis of each membership function. Applied to the theory and applications of fuzzy TFN with 3-type of low, medium and upper (l, m, u) and the membership function has been formed with the following equation:

\[
V (m_2 \geq M_1) = \begin{cases} 
1, & \text{if } m_2 \geq M_1 \\
0, & \text{if } l_2 \geq u_1 \\
\frac{1 - u_2}{u_2 - l_2}, & \text{otherwise}
\end{cases}
\]

(6)

\[
V (m_2 \geq M_1) = \begin{cases} 
1, & \text{if } m_2 \geq M_1 \\
0, & \text{if } l_2 \geq u_1 \\
\frac{l_2 - u_2}{u_2 - l_2}, & \text{otherwise}
\end{cases}
\]

(7)
Where \( d \) is the highest ordinate of point \( D \) between \( \mu_{m1} \) and \( \mu_{m2} \). It takes two values \( V (M_1 \geq M_2) \) and \( V (M_2 \geq M_1) \). Where \( d \) is the intersection point of the highest \( \mu_{m1} \) and \( \mu_{m2} \).

**FIGURE 1.** The membership function between \( M_1 \) and \( M_2 \)

Determining the degree of likelihood for convex fuzzy number greater than \( k \) to \( M_i = (i = 1,2,..k) \) can be defined as:

\[
V = (M_1 \geq M, M_2 \ldots \ldots M_k) = \text{min} \quad V (M_{i} \geq M) \quad (8)
\]

It is assumed that \( d = \text{min} \quad V (S_i \geq S_k) \)
so \( k = 1,2,\ldots, n \) \( k \neq i \) then the weight vector equal \( W \)

\[
W = (d(A_i), d(A_j), d(A_j), \ldots ,d(A_n))^T \quad (9)
\]

Where \( A_i (i = 1,2,3,\ldots, n) \) an element \( n \), so develop the weight vector normalization shown in equation (10).

\[
W^* = (d(A_1), d(A_2), \ldots ,d(A_n))^T \quad (10)
\]

Preparation of a hierarchical structure of ANP method is based inner dependence relationship between the sub-criteria and the criteria while outer dependence relationship between the criteria and the sub criteria. So, normalize criteria and multiple the matrixes between the weights of criteria with result value normalization.

**METHODOLOGY RESEARCH**

The developing a hybrid method between SWOT and AHP, ANP to eliminate the weaknesses in the measurement and evaluation steps analysis (Kahraman et al., 2008). ANP approach consists of the three matrices: super matrix, weighted super matrix and limit matrix. The super matrix of relative importance is provided of each cluster which defined. So, the limit matrix need constant values to determine the necessary limit of the weighted super matrix is shown as the limit matrix scores (Sevkli, 2012). The basic steps in many researches proposed SWOT-ANP model to use SWOT sub factors and alternatives which obtained SWOT factors with the matrix manipulation concept of the ANP (Stanujki C., et.al, 2013).

**Application of SWOT fuzzy ANP methodology in SME of Batik**

This research stage use external factors (opportunities and threats) and internal (strengths and weaknesses) will affect the development of SME that will evaluated. Based on the idea of small business owners where each item was ranked and coefficient ratio of importance identified. In the SWOT analysis there are two factors of internal factors (strengths and weaknesses) and external factors (opportunities and threats), which of each has a KPI (Key Performance Indicators). Based on the research of Kurttila et al., with the SWOT factors and sub-factors are included in the hierarchical structures based on the strategic factors. The super matrix of a SWOT hierarchy figure 2, with three levels is as follows:
The actual KPI values in the case of performance measurement batik with the following formula:

1. Production resulted good = \( \frac{\sum \text{result of products} - \sum \text{product defects}}{\sum \text{result of products}} \times 100\% \)

2. A guarantee of defective goods = \( \frac{\sum \text{product defects is replaced}}{\sum \text{product defects}} \times 100\% \)

3. Loyalty labor = \( \frac{\sum \text{all employees} - \sum \text{labor get out}}{\sum \text{all employees}} \times 100\% \)

4. Debt to equity = \( \frac{\sum \text{debt}}{\sum \text{capital}} \times 100\% \)

5. The growth rate of income. = \( \frac{\sum \text{current income} - \sum \text{revenue ago}}{\sum \text{revenue ago}} \times 100\% \)

6. The ratio of on-time delivery = \( \frac{\sum \text{order delivery on time}}{\sum \text{order delivery on time}} \times 100\% \)

7. Lack of workforce training = \( \frac{\sum \text{training}}{\sum \text{training held}} \times 100\% \)

8. Increase in the number of transactions = \( \frac{\sum \text{current transaction} - \sum \text{transaction ago}}{\sum \text{transaction ago}} \times 100\% \)

9. Facilitating the sale or exhibition = \( \frac{\sum \text{items are exhibition}}{\sum \text{exhibition held}} \times 100\% \)

10. Decrease in purchase of raw materials = \( \frac{\sum \text{purchase of raw material now} - \sum \text{purchase of raw material ago}}{\sum \text{purchase of raw material now}} \times 100\% \)

The value of Synthetic consist extend of TFN to obtain the value of L, M, U (Linguistic Scale) as in Table 2.

<table>
<thead>
<tr>
<th>Linguistic variables</th>
<th>L</th>
<th>M</th>
<th>U</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET (Employee Training)</td>
<td>0.04122</td>
<td>0.10284</td>
<td>0.24388</td>
</tr>
<tr>
<td>EO (Education Owners)</td>
<td>0.01498</td>
<td>0.04575</td>
<td>0.12647</td>
</tr>
<tr>
<td>TO (Training for Owners)</td>
<td>0.02087</td>
<td>0.06357</td>
<td>0.16488</td>
</tr>
<tr>
<td>NI (Net Income)</td>
<td>0.09568</td>
<td>0.20216</td>
<td>0.4355</td>
</tr>
<tr>
<td>ST (Sales Transactions)</td>
<td>0.05152</td>
<td>0.14896</td>
<td>0.36582</td>
</tr>
<tr>
<td>O (Ownership)</td>
<td>0.02867</td>
<td>0.07554</td>
<td>0.1904</td>
</tr>
<tr>
<td>VB (Variations Batik)</td>
<td>0.07044</td>
<td>0.15534</td>
<td>0.34256</td>
</tr>
<tr>
<td>IRM (Increase in Raw Materials)</td>
<td>0.01597</td>
<td>0.02756</td>
<td>0.08126</td>
</tr>
<tr>
<td>WC (Weather Conditions)</td>
<td>0.01575</td>
<td>0.02687</td>
<td>0.07543</td>
</tr>
<tr>
<td>PR (Production Result)</td>
<td>0.06749</td>
<td>0.15178</td>
<td>0.34256</td>
</tr>
</tbody>
</table>
The result shown value possible degree was determined the value of the Synthetic Extend accordance equation 8. So, specifies the minimum value of the degree likelihood \( d \) according to Equation 10.

\[
D'_{(ET)} = \min (1, 1, 0.59874, 0.80661, 1, 0.76764, 1, 1, 0.78281) = 0.59874
\]
\[
D'_{(EO)} = \min (0.59892, 0.85561, 0.16448, 0.42069, 0.76652, 0.3383, 1, 1, 0.35743) = 0.16448
\]
\[
D'_{(TO)} = \min (0.75898, 1, 0.33303, 0.57036, 0.91922, 0.50717, 1, 1, 0.52473) = 0.33303
\]
\[
D'_{(NI)} = \min (1, 1, 1, 1, 1, 1, 1, 1, 1) = 1
\]
\[
D'_{(ST)} = \min (1, 1, 0.83547, 1, 0.83547, 1, 0.97886, 1, 1, 0.99064) = 0.33303
\]
\[
D'_{(O)} = \min (0.84531, 1, 1, 0.42794, 0.65417, 0.60052, 1, 1, 0.61717) = 0.42794
\]
\[
D'_{(VB)} = \min (1, 1, 1, 0.84059, 0.84059, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1) = 0.84059
\]
\[
D'_{(IRM)} = \min (0.34721, 0.78466, 0.62645, 0, 0.19677, 0.52292, 0.07807, 1, 0.09979) = 0
\]
\[
D'_{(WC)} = \min (0.31049, 0.76201, 0.59785, 0, 0.16377, 0.48999, 0.03739, 0.98853, 0.05977) = 0
\]
\[
D'_{(PR)} = \min (1, 1, 1, 0.83052, 0.83052, 1, 1, 1, 1) = 0.83052
\]

Weighing vector in accordance with equation is shown on table 3 and 4. The value result contains the calculation of the matrix multiplication algorithm derived from the initial criteria and sub criteria, the matrix normalization criteria and sub criteria. So that the final result obtained weights of criteria and sub criteria in the form of global weight of the weight multiplied by the weight KPI perspective. The following table recapitulation weighting which normalized:

<table>
<thead>
<tr>
<th>TABLE 3. The results of the weighting vector</th>
<th>ET</th>
<th>EO</th>
<th>TO</th>
<th>NI</th>
<th>ST</th>
<th>O</th>
<th>VB</th>
<th>IRM</th>
<th>WC</th>
<th>PR</th>
<th>Sum total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.59874</td>
<td>0.16448</td>
<td>0.33303</td>
<td>1</td>
<td>0.83547</td>
<td>0.42794</td>
<td>0.84059</td>
<td>0</td>
<td>0</td>
<td>0.83052</td>
<td>5.03077</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TABLE 4. Weights matrix normalized</th>
<th>ET</th>
<th>EO</th>
<th>TO</th>
<th>NI</th>
<th>ST</th>
<th>O</th>
<th>VB</th>
<th>IRM</th>
<th>WC</th>
<th>PR</th>
<th>Sum total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.11902</td>
<td>0.03269</td>
<td>0.0662</td>
<td>0.19878</td>
<td>0.16067</td>
<td>0.08506</td>
<td>0.16709</td>
<td>0</td>
<td>0</td>
<td>0.16509</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**RESULT AND DISCUSSION**

SWOT analysis for the calculation of the results in the weighing of the criteria will be multiplied by the weight of the SWOT and the results are shown in Table 5. Based on the inner dependencies are formed with pairwise comparison matrices. The resulting fuzzy eigenvectors are presented with using the computed relative fuzzy importance weight; the inner dependence matrix of the SWOT factors (W2) is formed. Pairwise Matrix Comparison is specified criteria as shown in Table 6.

<table>
<thead>
<tr>
<th>TABLE 5. Results of SWOT analysis</th>
<th>KPI 1</th>
<th>0.558</th>
<th>0.11902</th>
<th>0.270</th>
<th>4</th>
<th>1.078</th>
<th>92</th>
<th>0.99</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPI 2</td>
<td>0.03269</td>
<td>0.150</td>
<td>3</td>
<td>0.449</td>
<td>95</td>
<td>0.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KPI 3</td>
<td>0.0662</td>
<td>0.020</td>
<td>3</td>
<td>0.059</td>
<td>100</td>
<td>0.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KPI 4</td>
<td>0.19878</td>
<td>0.042</td>
<td>3</td>
<td>0.126</td>
<td>25</td>
<td>0.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KPI 5</td>
<td>0.16607</td>
<td>0.078</td>
<td>3</td>
<td>0.233</td>
<td>17.6</td>
<td>0.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KPI 6</td>
<td>0.122</td>
<td>0.08506</td>
<td>0.092</td>
<td>3</td>
<td>0.275</td>
<td>80</td>
<td>0.22</td>
<td></td>
</tr>
<tr>
<td>KPI 7</td>
<td>0.16709</td>
<td>0.031</td>
<td>3</td>
<td>0.092</td>
<td>50</td>
<td>0.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KPI 8</td>
<td>0.263</td>
<td>0</td>
<td>0.197</td>
<td>4</td>
<td>0.789</td>
<td>2</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>KPI 9</td>
<td>0</td>
<td>0</td>
<td>0.066</td>
<td>4</td>
<td>0.263</td>
<td>100</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>KPI 10</td>
<td>0.057</td>
<td>0.16509</td>
<td>0.057</td>
<td>3</td>
<td>0.171</td>
<td>25</td>
<td>0.04</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 6. Results of actual score in January

<table>
<thead>
<tr>
<th>Name</th>
<th>KPI</th>
<th>Information</th>
<th>Actual Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Production resulted good</td>
<td></td>
<td>0.99</td>
</tr>
<tr>
<td>2</td>
<td>A guarantee of defective goods</td>
<td></td>
<td>0.43</td>
</tr>
<tr>
<td>Strength (S)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Loyalty labor</td>
<td></td>
<td>0.066</td>
</tr>
<tr>
<td>4</td>
<td>Debt to equity</td>
<td></td>
<td>0.034</td>
</tr>
<tr>
<td>5</td>
<td>The growth rate of income</td>
<td></td>
<td>0.041</td>
</tr>
<tr>
<td>6</td>
<td>The ratio of on-time delivery</td>
<td></td>
<td>0.216</td>
</tr>
<tr>
<td>Weakness (W)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Lack of workforce training</td>
<td></td>
<td>0.045</td>
</tr>
<tr>
<td>Opportunities (O)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Increase in the number of transactions</td>
<td></td>
<td>0.016</td>
</tr>
<tr>
<td>9</td>
<td>Facilitating the sale or exhibition</td>
<td></td>
<td>0.26</td>
</tr>
<tr>
<td>Threats (T)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Decrease in purchase of raw materials</td>
<td></td>
<td>0.054</td>
</tr>
<tr>
<td></td>
<td>Total of Strength (S) =</td>
<td></td>
<td>1.561</td>
</tr>
<tr>
<td></td>
<td>Total of Weakness (W) =</td>
<td></td>
<td>0.261</td>
</tr>
<tr>
<td></td>
<td>Total of Opportunities (O) =</td>
<td></td>
<td>0.276</td>
</tr>
<tr>
<td></td>
<td>Total of Threats (T) =</td>
<td></td>
<td>0.054</td>
</tr>
</tbody>
</table>

Determine the point quadrant (X,Y):

Value X = (Total score actual strength – total score of weakness)/2
= (1.561 – 0.261) / 2
= 0.65

Value Y = (Total of current score opportunities - number. scores threat)/2
= (0.276 – 0.054) / 2
= 0.111

Then, find the value of X, Y is 0.65 and 0.111 and show graph in Figure 3.

FIGURE 3. Graph quadrant SWOT strategic position

The result SWOT of SME A in January is shown in Figure 5 in the position of the first quadrant obut value are 0.65;0.111. The result shown SME in position the points of strength and opportunities (SO strategies). The most favorable position, so that by the power that it is possible to take advantage of business opportunities that exist. SWOT analysis involves ranking criteria and sub-criteria independently of each other by ignoring the interaction between criteria. SWOT analysis decision support system for performance strategies Small and Medium Enterprises (SMEs) Batik are in quadrant 1.

The results of SWOT analysis on SME Batik A result that SME are always in an advantageous position, because the value of the resulting production well and the amount of revenue has always been stable. So they can take advantage of business opportunities that exist.
TABLE 7. Point X, Y on Madura batik SMEs In Every Month

<table>
<thead>
<tr>
<th>Month</th>
<th>Results Point Values</th>
<th>SME A</th>
<th>Keterangan</th>
<th>Hasil Nilai Titik</th>
<th>SME B</th>
<th>Keterangan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X,Y</td>
<td>(+, +)</td>
<td>Quadrant I</td>
<td>0,5845 ; -</td>
<td>(+, -)</td>
<td>Quadrant II</td>
</tr>
<tr>
<td>January</td>
<td>0,65 ; 0,111</td>
<td></td>
<td></td>
<td>0,0055</td>
<td></td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>0,6345 ; -0,158</td>
<td>(+, -)</td>
<td>Quadrant II</td>
<td>0,587 ; 0,0125</td>
<td>(+, +)</td>
<td>Quadrant I</td>
</tr>
<tr>
<td>March</td>
<td>0,6495 ; -0,230</td>
<td>(+, -)</td>
<td>Quadrant II</td>
<td>0,253 ; -0,0165</td>
<td>(+, -)</td>
<td>Quadrant I</td>
</tr>
<tr>
<td>April</td>
<td>0,658 ; -0,183</td>
<td>(+, -)</td>
<td>Quadrant I</td>
<td>0,574 ; 0,0171</td>
<td>(+, +)</td>
<td>Quadrant I</td>
</tr>
<tr>
<td>May</td>
<td>0,617 ; 0,154</td>
<td>(+, +)</td>
<td>Quadrant I</td>
<td>0,5755 ;</td>
<td>(+, +)</td>
<td>Quadrant I</td>
</tr>
</tbody>
</table>

ANP-SWOT Analysis Model is used to balance the interaction between destinations using SWOT factors, SWOT sub factors and alternative strategies at different levels. The strategic values of final weight use matrix normalization of alternatives to decide value for long term planning the next 10 years. The purpose of the activity of SMEs is improve upraise and maintain and improve competitiveness in the future.

CONCLUSION

While test results SWOT analysis on SMEs Batik, the result that SMEs in January and May are in quadrant 1 because of the number of defective produced continuities and succeed. Although SMEs suffer threats, SMEs still have strength on the amount of production and timely delivery of goods. The results of SWOT analysis is factors internal to SMEs Batik show its strengths and weaknesses. The analysis of SMEs that are in quadrant 1 explained that SMEs are in a position to utilize the strength of the existing opportunities, such as product quality is good, good relations with customers. While quadrant 2 in the position of strategy that should be applied to take advantage of long-term opportunities by way of product, promotion enough and improvement the skill of Human Resources and Management was good.

REFERENCES