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Strategic Management of Enterprises in the Tannery Industry: By an Integrated Deployment of SWOT Analysis and AHP Method

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Abstract: ***Basically, the purpose of this study is to formulate a marketing strategy by combining SWOT analysis with Analytic Hierarchy Process (AHP). SWOT analysis is used to formulate another competitive strategy of the company. After competing optional coherent formulated the next step is deciding the company's strategic priorities by using Analytical Hierarchy process to determine the appropriate decision making. Based on the results of the SWOT analysis and the Internal-External Matrix, obtained alternative strategy is the strategy with the highest weight Weakness - Opportunity (WO), which translates as a strategy that minimizes the weaknesses that exist in the region to exploit the opportunities whose exist. The results of the AHP weighting strategy suggest that the development of technology and production ranks first in the development of the leather industry. The order of the second and third are Quality and Quantity Improvement Raw Materials (raw leather) and Human-Resource Development, while priority to fourth and fifth, respectively Industrial Development Market Development and Support. The results of the SWOT method with AHP incorporation obtained suggested an alternative strategy. This alternative is expected to help the company to achieve its goal, namely the objective is to increase sales volume, customer satisfaction and quality of human resources.***

Keywords: SWOT Analysis, Analytic Hierarchy Process (AHP), Internal-External Matrix

1. Introduction

Leather industry enterprises are continuously influenced by the social, cultural, technological, political and legal changes around them on both strategic and tactical terms. The leather industry must keep up with the changes around it to be able to survive and compete against its rivals. In the competitive environment, leather industry is expected to utilize up-to-date technologies in order to improve its current situation and enhance its export potential. (Gonca Telli Yamamoto, Özgür Şekeroğlu and Eser Eke Bayramoğlu, 2011)

The Indonesian leather industry plays a significant contribution for developing economies. The industry is among the ten largest export earning industries within the so-called non-oil and gas sector. It is a labor-intensive undertaking as the majority of the processing and manufacturing industries consists of medium and small-scale industries. The leather processing industry consists of leather tanning industry and the leather manufacturing industry, producing various finished leather articles such as footwear, bags, suitcases, belts, gloves and apparels.

The problem faced today is the limited process for technology to accelerate the process of production and lack of quality control of the produced commodity items that can affect the performance of the commodity image that has been formed. The development of the leather industry in Indonesia has been struggling to grow rapidly for several reasons, namely lack of knowledge about the market, design and proper business ethics.

Besides the lack of information that could support the production processes and marketing models that can be accessed through the use of information technology such as computers and the internet, as part of the leather industry causes less rapid. The owner of a home industry is in the end only the skin can penetrate the local market and do not experience significant growth. If this problem is not resolved, then the feared leather crafts men will not compete with the leather crafts men from other areas. One of the important sources of competitiveness for SMEs has been to serve as agents of change, as the engines for new idea generation and innovative activity

Strategic management has been widely used by all enterprises to with stand fierce market competition. The strategic management process consists of three stages: strategy formulation, strategy implementation, and strategy evaluation. SWOT analysis of external opportunities and threats as well as the internal strengths and weaknesses of the enterprises is important for strategy formulation and development (Chang, Huang, 2006).The two main components of SWOT are the indicators of the internal situation described by existing Strengths and Weaknesses and the indicators of the external environment described by existing Opportunities and Threats (Markovska, Taseska and Jordanov, 2009). Moreover, SWOT includes no means of analytically determining the importance of the factors or of assessing the decision alternatives with respect to the factors (Kangas et al., 2003). In this paper, a quantitative based SWOT analysis has been proposed to determine priorities among SWOT factors systematically. The proposed method is obtained by performing Analytic Hierarchy Process (AHP)

2. Literature Review

2.1 SWOT Analysis

The internal and external factors most considerable for the company's future are referred to as strategic factors. In SWOT analysis, these factors are grouped into four parts called SWOT groups: strengths, weaknesses, opportunities, and threats. By applying SWOT in strategic decisions, the purpose is to select or constitute and implement a strategy

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resulting in a good fit between the internal and external factors (Kangas et al., 2003). Moreover, the chosen strategy has also to be in line with the current and future purposes of the decision makers (Pesonen et al., 2003). SWOT involves systematic thinking and comprehensive diagnosis of factors relating to a new product, technology, management, or planning. SWOT matrix is a commonly used tool for analyzing external and internal environments concurrently in order to support for a decision situation (Kurtilla et al., 2000; Kangas et al., 2003; Yüksel and Dağdeviren, 2007). Figure 1 shows how SWOT analysis fits into an environment scan (Kahraman et al., 2008).

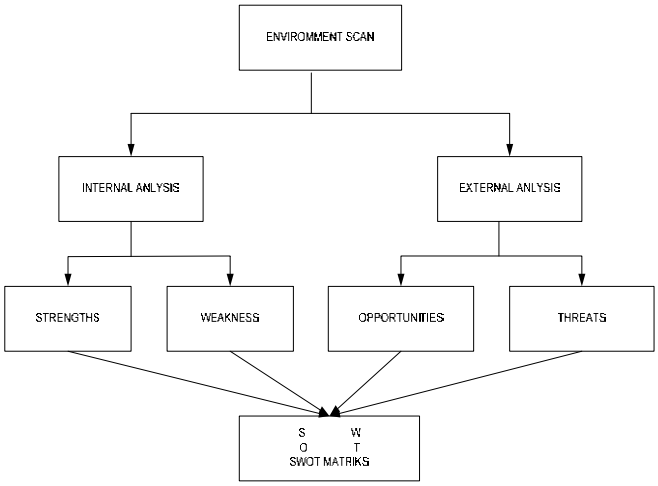


Figure 1: SWOT Analysis Framework (Source: Kahraman et al., 2008)

2.2. Analytic Hierarchy Process

AHP is a multi criteria decision making technique that can help express the general decision operation by decomposing a complicated problem into a multilevel hierarchical structure of objective, criteria and alternatives (Sharma, M. J., Moon, I. and Bae, H, 2008). AHP performs pair wise comparisons to derive relative importance of the variable in each level of the hierarchy and / or appraises the alternatives in the lowest level of the hierarchy in order to make the best decision among alternatives. AHP is a effective decision making method especially when subjectivity exists and it is very suitable to solve problems where the decision criteria can be organized in a hierarchical way into sub-criteria (Tuzmen, S. and Sipahi, S, 2011).

AHP is used to determine relative priorities on absolute scales from both discrete and continuous paired comparisons in multilevel hierarchic structures (Saaty, T. L. and Vargas, L. G, 1996). The prioritization mechanism is accomplished by assigning a number from a comparison scale (see Table 1) developed by Saaty (1980) to represent the relative importance of the criteria. Pairwise comparisons matrices of these factors provide the means for calculation of importance (Sharma, M. J., Moon, I. and Bae, H, 2008).

Table 1: Pairwise Comparison Scale (Source: Saaty, 1996; Yüksel and Dağdeviren, 2007)

Importance	*Explanation*
1	Two criterion contribute equally to the objective
3	Experience and judgment slightly favor one over another
5	Experience and judgment strongly favor one over another
7	Criterion is strongly favored and its dominance is demonstrated in practice
9	Importance of one over another affirmed on the highest possible order
2,4,6,8	Used to represent compromise between the priorities listed above

The AHP method is based on three principles: first, structure of the model; second, comparative judgment of the criteria and/or alternatives; third, synthesis of the priorities. In the literature; AHP, has been widely used in solving many decision making problems (Kurttila et al., 2000; Kangas et al., 2001, Pesonen et al., 2001; Kajanusa et al., 2004; Arslan and Turan, 2009; Kandakoğlu et al., 2009; Dinçer and Görener, 2011; Lee and Walsh, 2011).

In the first step, a decision problem is structured as a hierarchy (Dağdeviren et al., 2009). AHP initially breaks down a complex multicriteria decision making problem into a hierarchy of interrelated decision elements (criteria, decision alternatives). With the AHP, the objectives, decision criteria and alternatives are arranged in a hierarchical structure similar to a family tree (Albayrak and Erensal, 2004).

The second step is the comparison of the criteria and/or the alternatives. Once the problem has been decomposed and the hierarchy is constructed, prioritization procedure starts in order to determine the relative importance of the criteria. In each level, the criteria are compared pairwise according to their levels of influence and based on the specified criteria in the higher level. In AHP, multiple pairwise comparisons are based on a standardized comparison scale of nine levels (Albayrak and Erensal, 2004.

Let C = {Cj | j = 1, 2. . . n} be the set of criteria. The result of the pairwise comparison on n criteria can be summarized in an (n x n) evaluation matrix A in which every element aij (i, j = 1, 2. . . n) is the quotient of weights of the criteria. This pairwise comparison can be shown by a square and reciprocal matrix, (see Eq. (1)).

$$A = \left(a_{ij}\right)_{n\ x\ n} = \begin{bmatrix} a_{11} & a_{12} & \cdot & a_{in} \\ a_{21} & a_{22} & \cdot & a_{2n} \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ a_{n1} & a_{n2} & \cdot & a_{nn} \end{bmatrix} \quad (1)$$

At the last step, each matrix is normalized and be found the relative weights. The relative weights are given by the right eigenvector (w) corresponding to the largest eigenvalue (λ_{max}), as:

$$A_W = \lambda_{\max} . W \quad (2)$$

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If the pairwise comparisons are completely consistent, the matrix A has rank 1 and λmax = n. In this case, weights can be obtained by normalizing any of the rows or columns of A (Albayrak and Erensal, 2004). It should be noted that the quality of the output of the AHP is related to the consistency of the pairwise comparison judgments. The consistency is defined by the relation between the entries of A: aij x ajk = aik (Dağdeviren et al., 2009). The Consistency Index (CI) can be calculated, using the following formula (Saaty, 1980):

$$CI = \frac{\lambda_{\max} - n}{n-1} \quad (3)$$

Using the final consistency ratio (CR) can conclude whether the evaluations are sufficiently consistent. The CR is calculated as the ratio of the CI and the random index (RI), as indicated in Eq. (4). The number 0.1 is the accepted upper limit for CR. If the final consistency ratio exceeds this value, the evaluation procedure has to be repeated to improve consistency (Boraji and Yakchali, 2011)

$$CR = \frac{CI}{RI} \quad (4)$$

Table 2: Random Index (Saaty and Vargas, 1991)

n	1	2	3	4	5	6	7	8	9	10
RI	0,00	0,00	0,58	0,90	1,12	1,24	1,32	1,41	1,45	1,49

2.3. SWOT-AHP

AHP performs pairwise comparisons between evaluation factors in order to prioritize them using the eigenvalue calculation. In typical SWOT analysis, the weightiness of the factors is not quantified to determine the effect of each factor on the proposed strategy alternatives (Yüksel, İ. and Dağdeviren, M. 2007). SWOT analysis does not provide means of systematically determining the relative importance of the criteria or to assess decision alternatives according to these criteria. In order to handle this insufficiency, the SWOT framework is converted into a hierarchic structure and the model is integrated and analyzed using the AHP with its eigenvalue calculation method (Kangas, J., Pesonen, M., Kurttila, M. and Kajanus, M. (2001), Kajanusa, M., Kangas, J. and Kurttila, M.(2003).

The objective in utilizing the AHP within SWOT framework is to systematically qualify SWOT factors and equate their intensities Wickramasinghe, V. and Takano, S. (2010), . The proposed method is applied in three steps Gallego,. Ayala, J. and Juizo, D (2011):

- The first step is to list the considerable internal (strengths and weaknesses) and external (opportunities and threats) factors for the strategic planning, making-up the SWOT analysis.
- The second step applies the pairwise comparisons to capture the weights of each SWOT group.
- Finally the third step uses the AHP to derive the relative priorities of each factor within the SWOT groups. Then, the overall factor weight rank is obtained by multiplying the factors local weights by the specific group weight.

Kurttila et al. [2000] developed a integrated SWOT analysis with AHP to make factors commensurable and to support a more quantitative basis in the strategic planning Gao, C. and Peng, D. (2011). This enhanced method has been broadly applied and studied in miscellaneous areas: from the view of applications, the integrated SWOT and AHP method has been used to determine the outsourcing decisions for sport marketing Lee, S. and Walsh, P. Vanhoof, K. (2011), evaluate the management strategies of a forestland estate Kangas, J, Kurttila, M., Kajanus, M. and Kangas, A. (2003), evaluate the tourism revival strategic marketing plan for Sri Lanka Wickramasinghe, V. and Takano, S. (2010), strategic planning of natural resource management (Pesonen, M., Kurttila, M., Kangas, J., Kajanus, M. and Heinonen, P. 2001), analyze the global competitiveness of manufacturers of machine tools Shinno, H., Yoshioka, H., Marpaung, S., Hachiga and S. (2006), formulate the strategy of the safe carriage of bulk liquid chemicals in tankers (Arslan, O. and Er, I.D 200), determine the business strategy in textile firm (Yüksel, İ. and Dağdeviren, M. 2007), shipping registry selection in maritime transportation industry Kandakoglu, A., Celik, M., and Akgun, I(2009), strategic implementation of integrated water resources management in Mozambique (Gallego,. Ayala, J. and Juizo, D 2011), Application of Combined SWOT and AHP: A Case Study for a Manufacturing FirmGorener, A. (2012).

3. Research Methodology

The framework of this study begins with the vision and mission of the tanning industry in the development is "Making industrial tannery in Indonesia has high competitiveness and sustainable." Its mission is to develop a globally-oriented regional economy by building aggressive advantage by expanding a comparative advantage in the tanning industry to be more efficient, competitive and continues by taking into account aspects of the ecological balance. The goal is to create a strong industrial structure and increase business opportunities, employment opportunities and incomes more evenly.

This was followed by analysis of the internal environment includes factors: Segmentation, Targeting, Positioning (STP), and the marketing mix (marketing mix) services. Marketing mix consists of 8P (Product, Price, Place, Promotion, People, Process, Physical Evidence, and Productivity). Analysis of the external environment included environmental factors at the macro and micro. These factors were identified by using the IFE and EFE matrix to determine strengths and weaknesses and the opportunities and threats of the company that is equipped with weights and rating.

The next stage is the stage of strategy formulation to generate alternative's matrix strategy outlined in the SWOT (Strengths, Weakness, Opportunity, and Threat). The results obtained from a combination of strategy formulation strategy SO (strengths and opportunities), WO strategy (weaknesses and opportunities), the strategy ST (strengths and threats), and strategy's WT (weaknesses and threats). The final step in this research is to find a marketing strategy that is a priority of the various marketing strategies available that can be applied in companies using Analytical Hierarchy Process (AHP). Research framework is shown in Figure 2.

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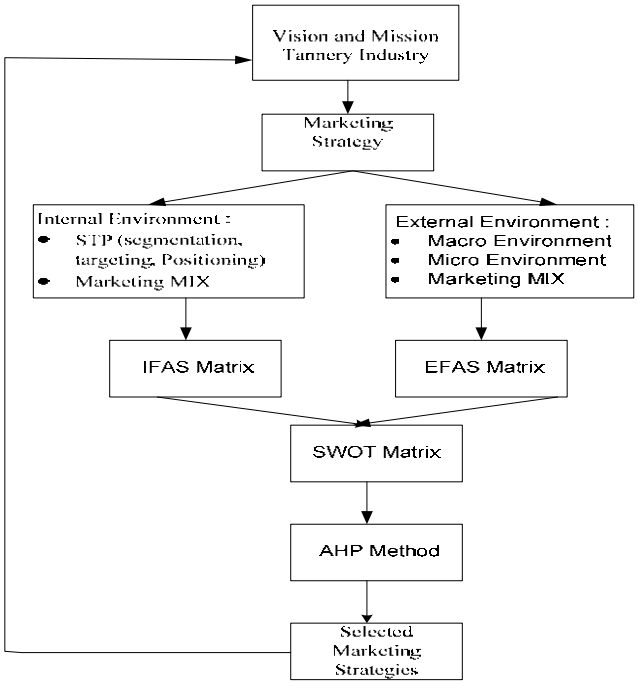


Figure 2: Operational Framework

4. Results and Discussion

4.1. Calculation of Matrix IFAS dan EFAS

Based on the results obtained recapitulation of respondents rating the factors that have been identified and grouped into two parts, namely the International Strategy Matrix Analysis Summary (IFAS) and External Strategy Matrix Analysis Summary (EFAS). Internal strategy matrix (IFAS) and external (EFAS) is used to formulate weighting, rank, and score each item contained in the strength (S), weaknesses (W), opportunities (O) and threats (T). Respondents were eight people consisting of three representatives of craftsmen and 5 of representatives of Government Agencies. Data obtained from the results of the questionnaire calculated the average of each factor and the score by multiplying the average weight of the mean rating to get the highest score of any factors that exist in each of these factors. The result's weighted-EFAS IFAS SWOT Analysis elements with the following:

Table 3: Internal Strategy Factor Analysis Summary (IFAS)

STRENGTH (S)		
NO,	DESCRIPTION	WEIGHT
1.	Small and Medium Enterprises ease in obtaining raw materials.	14,76
2.	These specialty products are of various types.	18,72
3.	Small and Medium Enterprises is always to push the boundaries in terms of models of products or packaging.	27,68
4.	A system that encourages skills training and labor communities to establish new businesses.	17,60
5.	The level of knowledge and expertise that is pretty good labor. An adequate	33,84
6.	number of workers.	28,53
7.	The lack of difficulty in the capital.	40,23
8.	The existence of a common vision among business actors.	25,90
9.	The presence of industry leaders representing actors in the region.	17,76
10.	Cooperation and good enough relationship among industry players	19,24
Total Weight Strength (S) = 244,25		
WEAKNESS (W)		
NO	DESCRIPTION	WEIGHT
1.	The structure and management of the industry that enables capacity building.	36,38
2.	Good management in small industry.	38,29
3.	The use of adequate equipment in the process of products.	35,62
4.	The existence of market centers became the primary location of the region.	23,89
5.	The enthusiasm of entrepreneurs for knowledge development and expansion of the network.	31,89
6.	The same quality standards in products and packaging.	31,89
7.	The existence of leaflets, brochures or other forms of promotion of SME entrepreneurs in the region.	29,89
8.	This is purposely, product quality specifications for each market segment.	27,89
9.	Facilities and adequate infrastructure both land area and buildings.	23,89
Total Weight Weakness (W) = 279,66		

Table 4: External Strategy Factor Analysis Summary (EFAS)

OPPORTUNITIES (O)		
NO	DESCRIPTION	WEIGHT
1.	The support of education and training institutions to improve entrepreneurial capacity.	22,20
2.	Ease bureaucracy to obtain a license from the government.	15,40
3.	Regional security conditions are guaranteed to manage the business.	12,48
4.	Climate conducive to competition or competition and spur improvement of product quality.	19,04
5.	Public interest is high enough to snack chips.	19,68
6.	There is supported for the promotion and marketing of produced in the industrial area.	25,60
Total Weight Opportunities (O) = 114,40		
THREATS (T)		
NO	DESCRIPTION	WEIGHT
1.	Competition with similar business coming from outside the area	12,92
2.	Capitalization efforts are still limited	31,76
3.	The existence of new products	23,35
4.	The promotion of competition	25,36
Total Weight Threats (T) = 93,39		

By weighting the results of a questionnaire on the interaction of a combination of internal-external strategy, the priority strategies can be obtained with a strategy of which have highest value to lowest, as listed in Table 3 below.

Table 5: SWOT Strategy Alternative

PRIORITY	STRATEGY	WEIGHT VALUE
I	*Weakness – Opportunity (WO)*	394,06
II	*Weakness – Threat (WT)*	373,05
III	*Strength – Opportunity (SO)*	358,65
IV	*Strength – Threat (ST)*	337,64

Alternative strategy of interaction sequences IFAS-EFAS results in Table 3 shows lest the generating another strategy with the highest weight is a strategy Weakness - Opportunity (WO), translated as strategies that minimize weaknesses and exploit the opportunities that exist. This situation shows that managers and entrepreneurs in Tannery Industrial Estate have a fairly heavy duty, namely, how to seek the development with conditions that favor the weakest condition but used to seize opportunities.

The strategy Weakness-Opportunity (WO) by IFAS-matrix interactions EFAS SWOT is as follows:

1. Improve the processing of the product in order to have the

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same quality standards;
2. Establishing the location being the center region;
3. Encouraging entrepreneur's motivation for training, seminars and build relationships / network and increase understanding of entrepreneurs in the application of good management in SMEs;
4. Creating leaflets, brochures, or other promotional media in collaboration with the government, including the department of tourism and hospitality to introduce leather products;
5. Creating the specifications of the product quality to increase market reach;
6. Improving infrastructure facilities or businesses in the area, including the land and building / shop

Several strategies have been formulated WO, which are not necessarily all be executed simultaneously, so that should be a priority if the implementation is jointly constrained resource obstacle. Determine prioritization strategy of some policy strategies Weakness-Opportunity (WO) generated through the SWOT analysis performed in this study using Hierarchy Analytic Process (AHP).

4.2. Application AHP

The main idea in utilizing the AHP within the SWOT frame is to systematically appraise the SWOT factors and make them commensurable as regards their weightiness (Kangas et al., 2003). In the following case study, SWOT analysis enhanced the AHP is performed on a SMEs which produces tunning leather in Garut, Indonesia. Saaty's comparison scale using to carry out pairwise comparisons and determined the relative importance between each pair of SWOT factors. After the digitizing SWOT frame via AHP, with the obtained aggregated matrix it was possible to derive the vector weights or priorities for the groups and factors analyzed. AHP structure in order to choose the priority of a complete marketing strategy outlined in Figure 3 below.

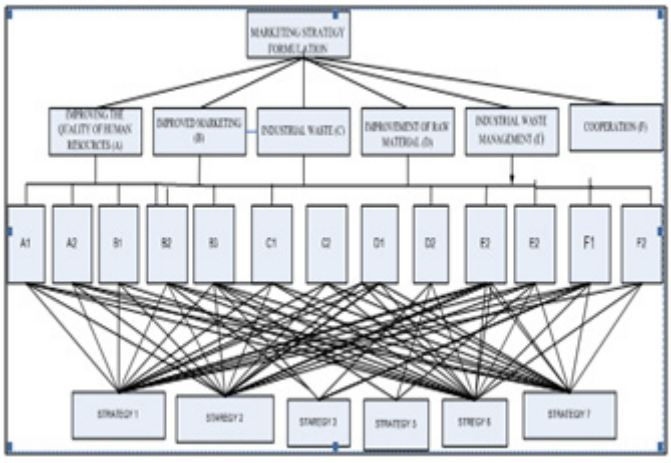


Figure 3: Structure Hierarchy

Description : A1: Education and management training company A2: Education and training of production techniques B1: B2 Product Differentiation: Improving the brand image of B3: Increased promotion C1: Socialization production of clean (clean production) C2; Liquid and solid waste handling;C3: Spatial planning is done to make the center more regularly D1: Improve the development of cattle and sheep D2: Establish a network of procurement of raw materials to the rest of Indonesia E1: Help supported the production machinery E2: Socialization quality leather appropriates national and international standards F1: Sub-contract small medium entrepreneurs E2: Enhanced cooperation in the search for sources of capital.

Based on the results of the calculation of weighting the criteria, sub-criteria, and strategies, then globally, concluded that:

1. Strategies to build location into the center / main central region (S2) occupies the first priority of alternative marketing strategies in the area of Tannery Industry Centers
2. Improve the processing of the product that has the same quality standards (S1)
3. Then motivate employers for training, seminars and build relationships and increase understanding of entrepreneurs in the application of good management in SMEs (S3).
4. The next strategy that makes leaflets, brochures, or other promotional media in collaboration with the government, including the department of tourism and hospitality to introduce chips processed products of the region (S4) is accompanied by improving infrastructure facilities or businesses in the area, including the land and building (S6)
5. Newsletter makes the specification of the product quality to increase market reach (S5).
6. As shown in Table 4, S.2 strategy chosen primarily based on the criteria of product differentiation, enhance brand image, market research, infrastructure and quality leather appropriate socialization of national and international standards.
7. Strategy S1 has the highest weight in the education and training criteria for corporate management, procurement of raw materials to form networks with other regions in Indonesia.
8. Meanwhile, the criteria for liquid and solid Waste Management, education and the education and training of production techniques, quality of human resources, networks and improve promotion be the finest weight on the strategy S3, S4 strategy while having the tallest weight only on regulatory criteria. S5 and S6 strategy is less dominant in the development area Tannery Industry Centers decisive criterion in terms of regional development.

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Table 6: Weights Global Alternative Tannery Industries Development Strategy

NO	CRITERIA	WEIGHT GLOBAL					
		S.1	S.2	S.3	S.4	S.5	S.6
1.	Education and management training company	**0,042**	0,016	0,017	0,008	0,010	0,012
2.	Education and training of production techniques	0,006	0,004	**0,013**	0,006	0,002	0,003
3.	Product differentiation	0,015	**0,053**	0,018	0,018	0,009	0,029
4.	Improving the brand image	0,003	**0,014**	0,008	0.003	0.008	0,003
5.	Increased promotion	0,002	0,009	**0,016**	0,011	0,003	0,002
6.	Socialization net production	**0,012**	0,003	0,005	0,008	0,001	0,002
7.	Liquid and solid waste handling	0,028	0,014	**0,050**	0,020	0,008	0,007
8.	Tax for the rawhide out areas / abroad	0,008	**0,017**	0,003	0,004	0,002	0,014
9.	Increasing development of cattle and sheep	**0,026**	0,014	0,008	0,009	0,004	0,013
10.	Forming raw materials procurement network with other regions	**0,047**	0,014	0,022	0,008	0,018	0,010
11.	Help engine production	0,001	0,005	**0,009**	0,006	0,001	0,002
12.	Socialization quality leather appropriated national and international standards.	0,007	**0,026**	0,003	0,014	0,006	0,015
13.	Subcontracting small medium entrepreneurs	0,005	0,018	0,003	**0,024**	0,006	0,014
14.	Increased cooperation in the search for sources of capital	0,005	0,018	**0,029**	0,007	0,003	0,009
		0,208	0,224	0,204	0,145	0,081	0,137

5. Conclusions

Based on the results of the discussion, it could be concluded that in general internal factors into force SMEs Tannery is in terms of the ease in obtaining raw materials; product specialization, innovative, regeneration, knowledge and skills of labor, a capital good sufficient, the existence of a shared vision among business actors, including cooperation and good enough relationship between industry players. The disadvantage is the lack of support the industry management, capacity building; Inadequate production equipment; Product standardization, absences of market centers are home to regional centers. In terms of external factors into opportunities, SMEs Tannery is the support of educational and training institutions to improve entrepreneurial capacity; Ease bureaucracy; Security; Climate conducive competition or rivalry; Public interest is high enough to leather industry; promotional support. While the factors that a barrier is the lack of support to conduct market research or product innovation; Certification; assistance in the form of appropriate technology for SME entrepreneurs in the region to improve the quality and capacity of its product.

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