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The Application of SWOT-AHP Combination in Small-Medium Enterprises (SMEs): A Literature Review 2010-2020

This study discusses two cases of combined use of SWOT-AHP in SMEs from outside Indonesia. The journals studied were journals published in the last 10 years, namely from 2010-2020. This study explains the combined use of SWOT-AHP abroad and domestically (Indonesia) and further discusses the benefits and challenges in the combined implementation of the SWOT-AHP method in SMEs. This research can be a reference in subsequent studies that apply the combined SWOT-AHP based on the potential and challenges of using the combined SWOT-AHP.

Keywords: *Analytical Hierarchy Process (AHP), Strength Weakness Opportunity Threat (SWOT), SWOT-AHP, Small-Medium Enterprises (SMEs)*

1. INTRODUCTION

In the process of its journey, the organization faces problems both from within and from outside the organization. The existing problems require organizations to find solutions to maintain the sustainability of the organization. In line with this condition, the organization is also required to continue to grow. The whole process of the organization both in maintaining the sustainability of the organization and striving for its development, the organization needs to devise an appropriate strategy. Many factors need to be considered in designing an organization's strategy. The organization needs to understand its ability to respond to existing challenges and then develop an appropriate strategy.

Strategy development can be done using a SWOT analysis. SWOT analysis can effectively assist companies in developing organizational strategies. Strategic management is the organization's efforts in achieving the organization's vision, mission, and objectives. In developing a strategy with SWOT, an external and internal organizational environment analysis is carried out. The internal environment is identified by Strengths and Weaknesses, while the external environment is identified by Opportunities and Threats. Components of Strengths and Weaknesses can be raised by looking at the Opportunities and Threats of the organization both now and in the future. The application of SWOT analysis has many benefits, but on the other hand, there are also shortcomings of this analysis. One drawback of applying SWOT analysis is its ability to analyze qualitatively. A single SWOT analysis cannot see the urgency of the strategy generated [1].

Analytical hierarchy process (AHP) is a method that can be used in a complex decision-making approach with a hierarchical structure analysis approach. The application of AHP begins with determining the objectives to be achieved to further compile the factors that influence decision making. The hierarchy is arranged in the form of levels starting from the objectives followed by criteria, sub-criteria, and alternatives that exist at the final level. This method is a quantitative method by giving a comparison weight for each criterion that is paired in determining the value of existing criteria. The assignment of weights to each criterion can be carried out by related parties who understand to give weights on a scale between 1 and 9 that sequentially describe the importance level [2].

Combined SWOT and AHP analyzes have been widely used in previous studies. The use of SWOT analysis allows organizations to find a competitive advantage and analyze the environmental conditions of the organization. On the other hand, the AHP method has been widely used to determine the decisions taken by organizations. The combined application of the two methods can make the SWOT analysis quantified and more objective. The combination of SWOT and AHP has been widely applied to find solutions to various organizational problems in various fields and organizational levels including small-medium enterprises. This research was conducted to answer several research questions, including:

- RQ1: What has been achieved by the combined use of SWOT-AHP in SMEs?
- RQ2: What are the challenges faced in implementing the combined SWOT-AHP in SMEs?
- RQ3: What is the potential of the combined SWOT-AHP in its implementation in the future?

2. SWOT-AHP COMBINATION

In generating corporate strategies, the SWOT analysis does not consider the importance of implementing the most important alternative strategies to be implemented. This is one of the shortcomings of the SWOT analysis that is behind its ability to generate many alternative strategies, the SWOT analysis does not provide priority information from the alternative strategy formed [1]. Combining AHP and SWOT analysis methods addresses the disadvantages of using individual SWOTs. The AHP method in pairwise comparison gives a value for the factors arranged in the SWOT analysis to make the analysis results more measurable [3].

Following are the stages in carrying out the analysis with SWOT-AHP [3]:

- Conduct a SWOT analysis by identifying internal and external factors of the organization and at the same time developing alternative strategies using the SWOT matrix.
- Provides a comparison of importance levels for factors in each SWOT group (Figure 1) with Pairwise Comparison
- Determine the priority of the SWOT factor that can be done in several ways one of them calculates the priority of the factor with the highest weight of each group by calculating the relative weight of the factor to the weight of the SWOT group
- Alternative evaluation of the weighting of the SWOT factor
- Alternative priorities are obtained from alternative evaluation results

The stages of SWOT-AHP implementation tend to be flexible and the outline of the SWOT-AHP analysis implementation scheme can be seen in Figure 2 which was adapted from the Gurel and Tat strategy management process scheme [1].

Figure 1 Hierarchy in SWOT-AHP analysis [3]

Figure 2 SWOT-AHP analysis process

The implementation of the SWOT-AHP combination has been widely used in the industry. Most of the case studies apply the combined SWOT-AHP for corporate strategy formulation. The scope of application of this combined method in industry is quite broad. The combined SWOT-AHP method can help companies in developing strategies for energy management. Energy is very influential in the company's processes, which are strongly influenced by market changes. SWOT-AHP is applied in developing strategies for solving these energy problems so that a strategy that can keep companies competitive can be obtained [4]. Corporate relocation decisions for improving environmental quality can also be made by applying a combined SWOT-AHP analysis. The uniqueness of the combined SWOT-AHP lies in the simple procedure.

The combined ability of SWOT-AHP is conducting environmental analysis and also decision making

makes the combined analysis method can be used in other compatible cases [5]. Forest management can also be done by applying a combined SWOT-AHP analysis [6,7]. The application of SWOT-AHP analysis in forest management captures the possibility of different perceptions from related stakeholders that influence the findings [6]. One case study discussed the use of the SWOT-AHP combined analysis in decision making for the development of road infrastructure networks [8]. Some of these studies prove the combined ability of SWOT-AHP analysis is flexible in its use and has a broad scope.

3. IMPLEMENTATION OF SWOT-AHP IN SMEs

3.1 Case Study 1 - Strategy Selection in Milk Sector Turkey [9]

From 2012 to 2014, dairy products and processed products in Turkey experienced the largest growth, namely 15.8% and 17.2%, respectively. The SWOT-AHP combination is implemented to increase customer satisfaction at milk SMEs in Turkey. Long-term goals are set to survive in the market and increase the reach of the company. The combined application of SWOT-AHP, in this case, was carried out in 2 main stages. Beginning with the preparation of SWOT, the strength group is composed of 6 factors, the weakness group is composed of 3 factors, the opportunity group consists of 4 factors, and threats 4 can be seen in Table 1.

Based on the SWOT that has been prepared, then the strategy criteria are determined. The hierarchy is arranged in 4 levels, the objectives are at the top level, the next level is the criteria, the sub-criteria at the third level, and alternative strategies at the lowest level can be seen in Figure 4.

Table 1 SWOT of milk sector [9]

Strength	
S1	Breed diversity
S2	Knowledge of resources
S3	Areas suitable for raising
S4	Product quality and strong brand image
S5	Commitment to high-quality products and strong supply chain networks
S6	The focus of research and development is following finance
Weakness	
W1	Low producer education and knowledge and inadequate statistical data
W2	Limitations of increased yields and the use of technology
W3	The middle and upper market targets are following the purchasing power of UHT milk prices
Opportunity	
O1	The business target for processed milk growth is by increasing the level to 20% per year
O2	Export opportunities in the textile sector
O3	Increased interest in organic products and profits in rural development
O4	Increase the level of processed milk production
Threat	
Q1	Climate change
Q2	Weak competition and inflation have caused purchasing power to decline
Q3	Reduction in area and number of goats
Q4	The intensity of immigration to the city and the low level of government support

Figure 4. Hierarchy of SME milk sector

The priority determination of strategy criteria is done by AHP analysis. At the beginning of the analysis, the scale of importance is determined by the expert on the existing strategy criteria. The determination of the scale of importance is done by Pairwise Comparison. The value obtained from determining the scale in pairwise comparison is used as a basis in AHP calculations. Priority strategy criteria obtained sequentially are A3) Increase brand awareness with a weight of 0.3, A1) Increase milk usage with a weight of 0.25, A2) Increase health awareness with a weight of 0.23, A5) Message sharing with a weight of 0.18, and A4) Positioning Strategy with a weight of 0.15. In the sub-criteria, the strategy that has the greatest weight is brand awareness through advertising with a weight of 0.415.

3.2 Case Study 2 - Strategy Development in Sinjai Chips, Bukittinggi [10]

Sinjai Chips is an SME that produces famous cassava chips in Bukittinggi. Sinjai chips experienced a decline in production in the last five years (2009-2014). This decline in production is expected to result from increased market competition. There are many internal causes of this problem. Strategies need to be developed to respond to problems that arise. The environment both internally and externally was analyzed to help formulate strategies. Strategy development is carried out by implementing a combined SWOT-AHP.

Table 2. Internal factor evaluation [10]

Internal Factors		Weight	Rating	Value Score
Strengths				
S1	Land ownership and Sinjai chip factory	0.15	4	0.60
S2	Ownership of production equipment	0.10	3	0.30
S3	Have a business permit	0.08	3	0.24
S4	Business people have a minimum education of SHS	0.10	4	0.40
S5	High motivation	0.15	4	0.60
Sub-Total		0.58		2.14
Weakness				
W1	Small capital	0.05	1	0.05
W2	The current amount of capital is relatively small	0.06	1	0.06
W3	Many business chips use secret ingredients	0.04	2	0.08
W4	Many products do not have brands and packaging	0.05	2	0.10
W5	The business is carried out by the family	0.04	1	0.04
W6	Low work	0.05	1	0.05
W7	Only a small proportion form partnerships	0.05	1	0.05
W8	Not yet formed a cooperative	0.04	2	0.08
W9	Individual business execution	0.04	2	0.08
Sub-Total		0.42		0.57
Total		1.00		2.71

Sentosa, *et al.* [10] implemented SWOT-AHP in 2 stages, namely 1) Collecting data through a questionnaire with a sample of 60 respondents and 8 policyholders, 2) Processing data analysis funds with a combined SWOT-AHP. The hierarchy is arranged in 4 levels. The highest level is the goal, the second level is a group of strengths, weaknesses, opportunities, and threats. At the third level, there are factors included in each SWOT group, and the last level is the strategy to be chosen according to the priority scale obtained from the AHP analysis can be seen in Figure 5. The sample in this study were 60 respondents and 8 decision-makers.

The combined implementation of SWOT-AHP, in this case, begins with identifying internal and external factors of the company. Internal factors consisting of Strengths and Weaknesses arranged in an internal factor evaluation table can be seen in Table 2. External factors consisting of opportunities and threats are identified in the external factors evaluation table which can be seen in Table 3.

Based on the results of the IFE and EFE calculations then a Cartesian diagram was formed to show the position of the Sinjai Chips SME. The Sinjai Chips SME position is in quadrant 1 which means the company needs to make a strategy for Growth and formulate a strategy based on Strength-Opportunity. Some strategies that are compiled then look for strategies that are priorities. Priority strategies are sought by applying AHP. The calculation of strategic priorities is arranged relative to the importance scale of the SWOT group and the factors determined by the Expert. The priority levels of strategies obtained sequentially are: A1) Promotion and development of institutions with a weight of 27.3559, A2) Determination brands with importance weights

27.3553, A3) Competition with low-cost and product development with weight weights of 26.9195.

Table 3 External factor evaluation [10]

Internal Factors		Weight	Rating	Value Score
Opportunity				
O1	Increase capital with bank loans	0.1	4	0.4
O2	Variations in product taste	0.075	4	0.3
O3	Institutional cooperation related to training	0.09	4	0.36
O4	Collaboration with other institutions for capital development and sales	0.09	4	0.36
O5	Form a cooperative	0.06	3	0.18
O6	Form a group effort to increase competitiveness	0.065	3	0.195
O7	Production with modern technology	0.05	4	0.2
O8	Improve service quality	0.06	3	0.18
O9	Increase the availability of raw materials by developing agribusiness	0.08	3	0.24
Sub-Total		0.67		2.355
Threat				
Q1	The emergence of a new industry of Sinjai chips outside of Bukittinggi	0.08	2	0.16
Q2	The emergence of the Sinjai chips substitution product industry	0.06	2	0.12
Q3	High bargaining power of consumers	0.07	2	0.14
Q4	High bargaining power of suppliers	0.05	1	0.05
Q5	Competition between producers	0.07	2	0.14
Sub-Total		0.33		0.66
Total		1		3.015

Figure 5 Hierarchy of SME chips sinjai

3.3 Case Study Analysis

The case studies discussed have several similarities and also differences in their application. Both of these case studies are taken from research applying the combined SWOT-AHP in SMEs in the food or beverage industry sector which is a superior product in each region. The combined application of SWOT-AHP in the two SMEs aims to determine priority strategies that need to be carried out to expand market reach. In conducting a SWOT analysis, the types of factors considered in these two cases tend to be the same. Some factors to be considered include land availability, the ability and knowledge of business people, the use of technology, competition in the market, products, product selling prices, relevant stakeholders, and so on. Some typical factors of problems in SMEs lie in the availability of raw materials and price sensitivity to the market. At SME the price is getting direct influence from consumers where this affects the company's business.

The stages that were passed in the application of the combined SWOT-AHP were relatively the same in both cases. Even so, in the case study at SME Sinjai Chips, the SWOT analysis stage carried out the calculation of the value of IFE and EFE then the generation of alternative strategies was carried out based on these results. A comparison of the stages of the two case studies can be seen in Figure 6. The priority strategies generated in these two cases tend to be the same. The strategy resulting from the calculation of priorities in the case of Turkey's SME milk sector is to increase brand awareness carried out through advertising with a weight of 0.3 and for the case of Sinjai chips is the promotion and development of institutions with a weight of 0.2736. In this market expansion issue, the chosen strategy is to increase brand promotion related.

Figure 6 The stages of SWOT-AHP application a) SME milk sector b) SME ships Sinjai

4. DISCUSSIONS

4.1 Worldwide SMEs

The application of combined SWOT-AHP has been widely carried out by SMEs throughout the world. The combined use of SWOT-AHP in SMEs has been proven to help companies in determining the best strategy in building sustainable business performance. The inability of SMEs to determine strategic priorities is one of the obstacles to SMEs in creating sustainable performance. Case studies on Aluminum Companies in India adopted the SWOT-AHP combined method to determine strategies in meeting customer demands. The company took the initiative to reduce costs and improve quality with the help of experts. Business success factors to alternative strategies are raised by these experts. The difficulty of the company in determining alternative strategies that will be taken encourages companies to apply the SWOT-AHP analysis. SWOT-AHP analysis can assist companies in determining priority strategies with an objective and subjective analysis approach [11]. The SWOT-AHP combination is also applied to Turkey in developing SMEs in the dairy industry with the main goal of creating customer satisfaction. The use of AHP as a combination in this analysis is believed to provide solutions to complex decision-making problems such as determining priority factors in determining SME level strategies that have many considerations (Erdil and Erbiyik [9]). The development of SMEs with the application of SWOT-AHP will then be carried out on the production of Mushrooms in the Philippines to find business development strategies that are in line with the company's objectives. In this case study, the SWOT analysis is carried out first to identify the company's competitive advantage. Besides, based on the company's vision and mission, several alternative strategies were formed with a SWOT analysis. The existing alternative strategies are then selected by AHP [12].

The combined implementation of SWOT-AHP has flexible stages. Even so, the outline of the analysis of SWOT-AHP in SMEs is the same. The initial stage carried out in the application of SWOT-AHP in existing cases starts from conducting an environmental analysis by applying SWOT analysis. In the SWOT analysis, an alternative strategy is formed by the company. The next step entered in the AHP analysis is starting from the preparation of the hierarchy by setting goals, factors, and sub-factors if deemed necessary. A comparison of the level of importance of the factors arranged is done by providing a scale of importance carried out by several experts or related ones to be further carried out the calculation of priority weights to determine the priority ranking of alternative strategies [11,12].

The results obtained with the analysis are considered reasonable, it can be seen from the comparison of results with predicted factors. The SWOT-AHP analysis has been shown to produce selected factors that are in line with previous expectations (Erdil and Erbiyik [9]). The use of SWOT-AHP can help SMEs in conducting objective and subjective analysis in making corporate strategy decisions. The combined implementation of this method can help SMEs in their sustainability and improve business performance [11]. The combined SWOT-AHP analysis method can help SMEs in making business strategy decisions.

4.2 Indonesia SMEs

Indonesia has many SMEs engaged in various fields. Some case studies from previous research apply the combined SWOT-AHP in Indonesian SMEs. The combined application of the SWOT-AHP analysis method has been carried out in the batik industry in developing marketing strategies. The development of strategies

using SWOT-AHP analysis produces updated strategies according to the development of environmental conditions. Considering so far the strategy used in the batik industry is still traditional [13]. Case studies using the SWOT-AHP combination were also carried out at SMEs producing wheat flour in Jember. The main problem in the production of food raw materials is the fluctuating price of raw materials, but the selling price is demanded to remain affordable. Efforts to resolve the problem through the preparation of the company's supply chain strategy. The results of the SWOT-AHP analysis provide solutions for companies in the form of alternative strategies and priorities [14]. Strategy development in SMEs in a certain area with SWOT-AHP analysis provides output in the form of alternative strategies that can be done. The results of the resulting strategy can increase company income and allow an increase in employment in the area [10]. Strategy development in SMEs in a certain area with SWOT-AHP analysis provides output in the form of alternative strategies that can be done. The results of the resulting strategy can increase company income and allow an increase in employment in the area [10]. Strategy development in SMEs in a certain area with SWOT-AHP analysis provides output in the form of alternative strategies that can be done. The results of the resulting strategy can increase company income and allow an increase in employment in the area [10].

4.3 Advantages of SWOT-AHP Combination

Case studies that have been done previously agree that analysis with the combined SWOT-AHP can help SMEs in the complex decision-making process of the company. This approach can provide alternative priority information that needs to be followed up by the company. The combined SWOT-AHP analysis provides an objective and subjective analysis approach [11] with the appropriate results [9]. This analysis also considers the overall environmental factors both internally and externally by identifying the company's competitive advantages to then make decisions. This analysis allows the company to find out alternative company development strategies that fit the company's business goals [12].

SWOT analysis as initialization in the implementation of the analysis with the combined SWOT-AHP looks at the factors that affect internally and externally in the current conditions. This provides more benefits for companies in carrying out the analysis with a combination of methods. The current condition of the environment identified in the SWOT analysis makes alternative strategies that are arranged to follow the changing times. Indonesia has many SMEs that produce cultural products that have existed for a long time [13]. The development of the era brought changes in trends in products in the market. The development of a development strategy through analysis with the combined SWOT-AHP becomes very useful for the company to be able to follow the latest developments.

4.4 Disadvantages of SWOT-AHP Combination

In applying the combined SWOT-AHP analysis, it found deficiencies that could affect the results of the study. Components collected in the input analysis have the possibility of uncertainty [3]. Differences in opinion on the implementation process allow the uncertainty of the results of this analysis. The expert group that played a role in this analysis could get different points of view that influenced the results [6]. Although this problem is not found in the implementation of the combined SWOT-AHP in SMEs, it does not rule out the possibility of this challenge in the implementation of combined methods in SMEs. This proves that the selection of decisions by related parties in carrying out the SWOT-AHP joint analysis requires careful consideration. Analysis with the combined SWOT-AHP requires the participation of experts who master the fields analyzed in depth. The involvement of several experts who became important in carrying out this analysis.

5. CONCLUSION

Many previous studies have used the combined SWOT-AHP as a tool in problem solving. Broadly speaking, the combined SWOT-AHP can complement each other's deficiencies in the use of both methods. Analysis with the combined SWOT-AHP is flexible and can be applied in various types of cases, the scope of study, objectives, and different applications. This research takes several case study literature applying SWOT-AHP. The results of this study have answered the research questions that have been determined, namely:

- Some things that have been achieved by applying the combined SWOT-AHP in SMEs, such as analysis with the combined SWOT-AHP can help companies with a subjective and objective approach to finding the company's competitive advantage [11,12]. The use of this analysis is very useful for SMEs in the development of strategies and decision making that provide priority information from the strategies formed. The resulting strategy also follows the changing times because of the external factors the company is considering. That way this analysis can help companies achieve their business goals. Business continuity and company performance can also be improved by applying this analysis

in developing strategies to meet customer demands.

- The challenge faced in implementing the combined SWOT-AHP in SMEs is data uncertainty. The determination of experts in determining factors and the level of importance during the process of carrying out this analysis is very important. This affects the results of the research conducted by Kangas, *et al* [3]. The different points of view of the experts who play a role in the analysis can greatly affect the results of the study by Etongo, *et al* [6] for this reason it is necessary to ensure the similarity of viewpoints and supporting data during the analysis.
- The potential of the combined SWOT-AHP in its application in the future is considered based on the strengths and weaknesses found in the application of this analysis. Seeing the advantages and disadvantages of the combined SWOT-AHP, further research can be carried out on the application of this joint in helping SMEs to analyze and strategize amidst market changes due to the current pandemic conditions. Remember that the combined SWOT-AHP in previous studies has succeeded in providing a solution in the selection of priority strategies for SMEs. Responding to the shortcomings of the combined methods can be enhanced with the help of analysis with the use of big data for both internal and external conditions of the company. Selection of customer behavior patterns and customer voices so that the strategies generated are more in line with market conditions. The customer's voice can be filtered manually by a questionnaire or through data mining on the internet. That way the point of view of external factors can have a wider range. Also, the calculation of the cost of each alternative strategy can also be taken into consideration for the company. Strategy formulation with the combined SWOT-AHP that has been carried out to generate strategies in the midst of the company's difficult times in the future can be done at the beginning of the formation of SMEs of routinely to support company milestones.

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