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A SWOT ANALYSIS TOOL FOR INDONESIAN SMALL AND MEDIUM ENTERPRISE

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ABSTRACT

Small and medium enterprises (SMEs) play important role in the growth and stabilization of Indonesian economy. SMEs face many challenges that affect their growth and existence. However, they rarely adopt strategic management planning such as SWOT analysis that considers the external environment for opportunities and threats and internal conditions for strengths and weaknesses. SME operators are somewhat aware of the factors but many have limited understanding of how to employ the analysis. In this work, we develop "Sparta", a SWOT analysis tool that is easy to operate by novice users. The tool has many features. A user needs only to input profile data and answer a set of questionnaire. From the answers, Sparta calculates strength and competitive posture, maps many aspects of SMEs condition into S, W, O and T categories and provides general strategies. Sparta helps doing the 8 steps of a normal SWOT analysis session so that they can be executed in approximately 15 minutes, compared to hours when doing them manually.

Keywords: small and medium enterprise, SME, strategic management process, SWOT analysis.

1. INTRODUCTION

Small and medium enterprises (SMEs) provide development sinews to the hook and corner of the economy (Kalpande, Gupta, & Dandekar, 2015). SMEs play important role to accelerate economic growth as SMEs are productive and dynamic contributors to the national economy. Data from National Statistic Bureau state that in 2012 there are more than 56 million SMEs in Indonesia with more than 107 million people employed (Biro PusatStatistik, 2014). The number reckons up to approximately 89% of the whole workforce and it grows by 5.83% in the year. The importance are verified further by the level of SME growth, which stands at about 2.41%. Furthermore, the contribution of SMEs to the increase of gross domestic product has been increasingly high though the growth has been fluctuative from year to year. Similar phenomenon is evidentfor the contribution of SMEs in the value of export.

SMEs are labour intensive but the capital intensity is much less than that of the large scale industry. On the other hand, the labour absorbing capacity of large scale industries is limited and has been declining due to the fact that it is becoming more capital intensive and replacing labour work force with mechanical automation. Economic crisis during late 1990s saw the closing down of large scale industry that put many into unemployment. However, many SMEs survived the crisis (Regnier, 2005). On this background, SMEs surely represent a vital backbone of the national economy and their importance cannot be accentuated. This is true not only for the case of Indonesia, but also for other countries including the UK, the USA, Korea, Japan, India, and Australia (Kalpande, Gupta, & Dandekar, 2015).

Despite the strong contribution, SMEs remain susceptible to changes in the economic atmosphere. There are strong evidences that many SMEs have a short, volatile life, and many do not achieve a long-lasting existence, even fewer achieve substantial growth (Wiesner and Millett, 2012).

To remain in competitive business, SME managers should not rely on intuitive approach in finding strategies to overcome problems or to expand market. Competitive advantages can be achieved if SMEs choose the right business strategy by first conducting the strategic management process (Kraus, Kauranen, & Henning Reschke, 2011; Wang, Walker, & Redmond, 2007; Stonehouse & Pemberton, 2002). Implementation of strategic management increases competitiveness, reduce costs, improve decision-making, facilitate implementation of employee motivation system, shorten delivery times, and higher quality of customer satisfaction (Holátová & Monika, 2013).

SWOT analysis is a strategic management tool to identify the extent to which the current strategy of an organization capable of dealing with the change taking place in the business environment(Rangkuti, 2014; Rangkuti, 2015). SWOT is the combination of four major terms as Strength, Opportunity, Weakness and Threats. Strength refers to inherent abilities to compete and grow strong. Weaknesses are the inherent deficiencies that deter one's growth and survival. Strength and weakness are mainly internal. Opportunities are the good chances and openings available for growth. Threats are extremely wielded challenges, which might suppress strength, exacerbate weakness and stifle with opportunities being exploited. Opportunities and threats are environmental and external.

Employing SWOT analysis, however, requires sound understanding of the concept, which may not be possessed by most SME owners and managers. Hence, there is a gap between the need to conduct SWOT analysis and the capacity of the SMEs. This writing describes a software tool called "Sparta" as an effort to help ordinary SME individuals to do SWOT analysis. By answering several survey questions, Sparta guides SMEs to discover

their strengths, weaknesses, opportunities and threats. Initial study shows that Sparta helps SMEs to learn their business posture and obtain general suggestion on their business strategy.

2. METHOD

This work was completed through two main activities, i.e. application modelling and software development. Application modelling consists of several sub-activities including literature review, interview, and design of SWOT analysis steps, and construction of application questionnaires. Software development consists of software design, coding, and testing.

2.1 Application modelling

During application modelling, we interview 16 local SMEs with various business types, such as cullinary, fashion, and automotive. A list of questions have been prepared and the SMEs are asked to answer the questions prior to a deep interview. The questions are carefully prepared to include various factors, both internal and external ones. In the first phase of interview, several questions are found to be irrelevant to SMEs conditions. Therefore, in the next phase, the finding are used to modify the list of questions and refine the answers.

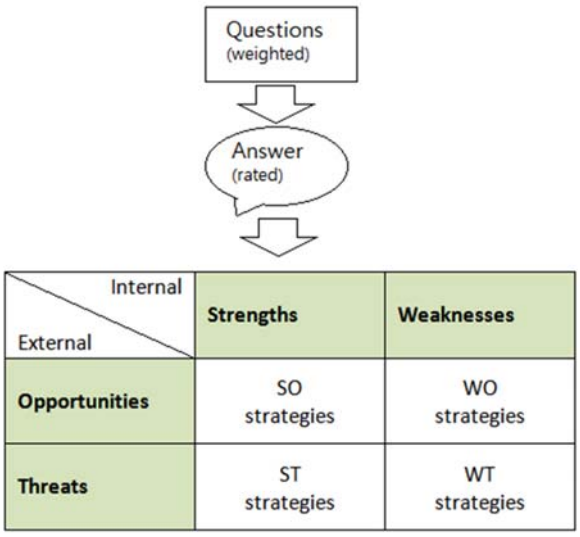

Figure-1. SWOT mapping based on answers of questions.

Based on the result of interviews, we predict the weight of each question and the rate of each of four possible answers for the questions. The value of rate is refined based on the result of SWOT mapping, whether the answer will lead to a positive or negative mapping. An answer with positive sentiment will lead to a mapping to either Strengths or Opportunities, while an answer with negative sentiment will lead to a mapping to Weaknesses or Threats.

Answers to every questions are used to calculate the score of the statement that underlies the question, and map the statement to one of SWOT categories (shaded area of Figure-1), either as Strengths, Weaknesses, Opportunities, or Threats. The answers is also used to calculate the position of an SME with regard to SWOT posture plane (see Figure-2).

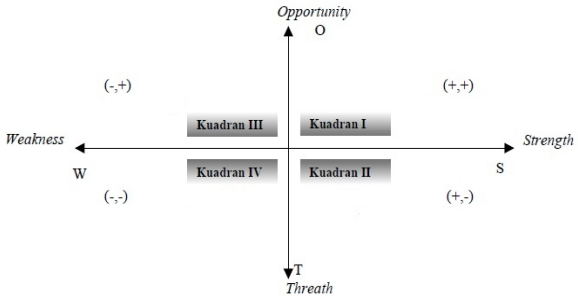

Figure-2. SWOT posture plane with four quadrants.

2.2 Software development

The software is designed to interact with users in four big steps. Firstly, users fill in a biodata form, during which they select the type of SME. Secondly, users answer 21 pre-weighted questions. Thirdly, the software calculate the answer score and map statements into SWOT categories. Fourthly, it displays SME posture and display strategy suggestions (see Figure-3).

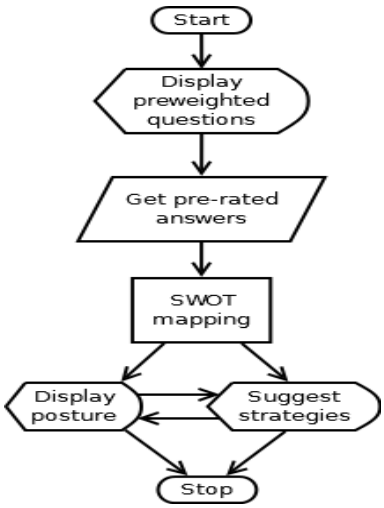

Figure-3. User software interaction.

The software is built using Python programming language. The graphical user interface is designed and implemented using Tkinter module. Normally, the script has to be run under Python platform but for Windows users, the software has been converted into a single executable application using Py2exe.

We conduct black box testing to examine the correctness of the application flow. Later we visit a number of SMEs and ask them to try the software and give feedbacks. Comments from the SMEs are used as software validation.

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Figure-4. Home screen of software Sparta.

3. RESULTS

The work produces software called "Sparta" which is a desktop application. It can be run in various platforms of operating system including GNU Linux, Apple OS X, and Microsoft Windows. The software is written in Python so it is ready to run in sytems with Linux, where Python is among default installed softwares. Windows version of Sparta is available to download at the website and it is in executable format so the deployment should be effortless.

When the software is run, it firstly shows a home screen with a form to input brief personal data and the type of SMEs (Figure-4). A user is opted to choose one of six types: fashion, agribusiness, cullinary, automotive, education, and technology. These are the most common types of local SMEs found in Central Java, Indonesia.

A click on the OKE button at the bottom left of the home screen leads a user to a series of questionnaire screens, each with a multiple choice answer question. After several cycles of trial and refinement, we select a total of 21 questions that are most relevant to the conditions of SMEs. Relevance is decided qualitatively during deep interviews.

The topic of each question is shown in Table-1. It also shows the weight of each question. The weight resembles the level of importance of each question with regard to the factors that affects the life and growth of an SME. The weights are dissimilar for different type of SME. Among the 21 questions, eleven is about internal factors and ten is on external ones. The questions try to probe the fact of an SME on a topic of interrest.

Answers to a question is designed to divulge the position of an SME whether it is in a high profile or at risk. For the sake of SWOT mapping, it is sufficient to learn whether the answer falls into positive or negative side. Our implementation, however, includes the level of positiveness or negativeness, i.e. the rate.

Table-1. Weight of various factors in the SWOT analysis for a typical type of SME.

No.	Descriptors	Weight
	Internal factors	
1	Location	0.1
2	Year established	0.05
3	Brand	0.1
4	Percentage of rejected product	0.05
5	Site facillity	0.15
6	Employee's education	0.075
7	Number of employees	0.075
8	Net revenue	0.15
9	Sponsorship	0.1
10	Marketing strategies	0.075
11	Employee training program	0.075
	External factors	
12	Oil price	0.1
13	Tax	0.08
14	Waste treatment	0.08
15	Public opinion/sentiment	0.12
16	Product sertification	0.15
17	Number of customers	0.07
18	Marketing events	0.1
19	Competitors	0.15
20	Number of suppliers	0.07
21	Number of branches	0.08

After the last question is answered, the application will show the table of SWOT mapping, which puts SWOT statements on the Strengths, Weaknesses,

Oppotunities, or Threats categories. Figure-5 shows an example of SWOT mapping result. The user are also opted to display the posture of his SME. The posture tells whether an SME is in positive or negative side of strength posture and competitive posture. Those with both positive strength posture and positive competitive posture have high profile, while those with either negative strength posture and negative competitive posture are at risk.

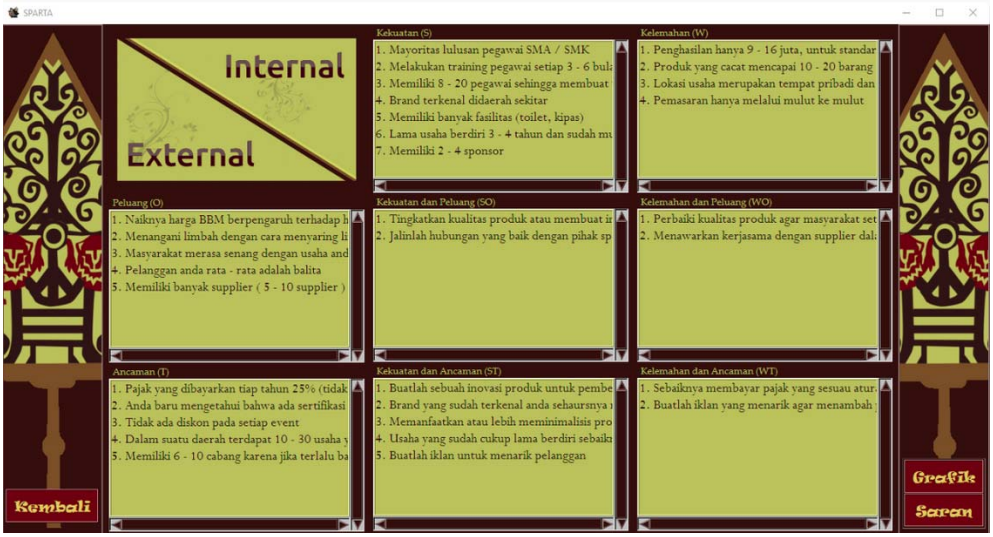

Figure-5. Typical result of SWOT mapping by the application.

4. DISCUSSIONS

Typical SWOT analysis for an institution may proceed in eight steps (Rangkuti, 2014). Those steps combine quantitative and qualitative approaches, as follows:

a) Identify the internal dan external conditions that affect the existence or growth of the institution. This step results typically in (SWOT) statements.
b) Analyze of the statements and put them into one of four categories: Strengths, Weaknesses, Opportunities and Threats.
c) Decide the weight of each condition or variable. The weight represents the relative percentage of a condition among other conditions. The weight is a number between 0 and 1 and all weights add up to 1.
d) Decide the rate of each condition. The rate represents the factual level of the institution with regard to the condition under consideration.
e) Calculate the score of each condition for the institution. The score is a multiplication of the weight and rate.
f) Calculate the strength posture and competitive posture. The strength posture is accumulation of the scores for internal conditions, while competitive posture is accumulation of the scores for external conditions.
g) Draw a point in SWOT posture plane. The abscissa is the strength posture and the ordinate is the competitive posture.
h) Decide strategies or solutions for the institution. Depending on the available resources that it has, the institution may take all the strategies into actions or select a limited number of strategies depending on the weight and priorities.

An institution, however, may reduce the steps to only three, i.e. step number 1, number 2 and number 8. The consequence is that it has to disregard the weight of conditions and it fails to get posture information.

Sparta takes into account all the 8 steps of the above SWOT activities but automates the calculation processes. As such, the user are left with three steps only. Firstly, the user fills in a short personal biodata and chooses the type of SME. Secondly, the user answers 21 multiple choice questions. Thirdly, the user decides strategies and solutions. The third step is mostly manual, but Sparta is able to produce SWOT strategies that can be regarded as a general suggestion. In the example of Figure-5, SWOT mapping results in SWOT statement to be put to the two uppermost boxes and the two leftmost ones, while SWOT strategies are given in the four other boxes (see Figure-1 as comparison description).

Manual SWOT analysis has to be conducted by a team or led by an experienced person. It requires that the executor has a good understanding of SWOT analysis or strategic management process at least in general. Such an understanding is not commonly possessed by SME operators. The advantage of using Sparta is more obvious then. Sparta users do not have to comprehend SWOT analysis. All they have to do is to answer several questions with factual answers about their circumstances.

Manual analysis needs a careful assessment of the situation faced by an SME. Inexperienced person may easily fail to notice important issues. Sparta helps users in the assessment because it already includes the most common situations in its questionnaires. For more

experienced users, should they need to include more factors, they may do so after the session with Sparta.

A SWOT analysis session with Sparta takes approximately 15 minutes to accomplish. Several questions in Sparta may not be directly answerable but it only needs simple search by SME owners to find the answers. On the other hand, a manual SWOT analysis session may take lengthy time to carry out, especially in the period where knowledge gathering and discussion (Houben, Lenie, & Vanhoof, 1999). Hence the use of Sparta provides time efficiency.

Sparta is not the sole SWOT analysis tool ever developed. WikiWealth has a Free SWOT Analysis Generator, a web based tool to create SWOT analysis (WikiWealth). The website says that the simple generator has many options, but it allows a user to create additional unique content in the custom space provided. The advantage of this tool is that it provides more than 4000 examples, or templates, from many industries, products, and investments. The templates may help a user to identify factors that are appropriate with his/her institution. The tool helps to add, edit, delete and weight the factors. The tool does not, however, help with the analytical process, nor it helps in generating strategies. Hence, users with little comprehension to SWOT analysis may find difficulties to utilize the tool. A study is needed to discover which templates fit for SMEs.

MindTools provides a worksheet in pdf format to help a user identify SWOT statements (MindTools). It teaches how to explore conditions and map them to SWOT categories. The tool, however, provides only a small number of general questions, which may not suffice for most users, in particular for SME operators.

The use of SWOT analysis tools by SMEs is scarce. However, SMEs are aware of many factors in specific functional areas that affect their effort to achieve business goals (Wiid, Cant, & Holtzhausen, 2015). Consequently, the chance of SMEs to use the tools is high, provided that they are aware that such factors can be identified in a SWOT analysis. The job to be done now is to campaign for the use of the SWOT analysis of SMEs.

5. CONCLUSION AND FUTURE WORK

The results and discussions suggest that Sparta can help SME operators to do SWOT analysis. Sparta can be run easily by novice users who do not have knowledge of SWOT analysis. Sparta automate many of the eight steps during SWOT analysis so that a user has only three steps left to do. As a consequence, a user needs to spend approximately 15 minutes to accomplish the analysis, compared to hours of time spent in a manual SWOT analysis session. Sparta is able to map SME conditions into S, W, O, and T categories, display strength and competitive postures, and provide general strategies.

Sparta is, at the moment, more suitable for novice users who has little understanding of SWOT analysis. More advanced users can use it as a starting tool and may go further without it. Further works are needed to modify the software so that advanced users are opted to input additional conditions/statements, modify the mapping, and input more strategies. Such facilites are somewhat easy to put, but there is one issue to fix. The mapping of the statement into S, W, O, and T categories requires the implementation of short text classification and sentiment analysis. Studies on the last issue have been extensive for English but still immature for Bahasa Indonesia (Thamrin & Sabardila, 2014)(Thamrin & Sabardila, 2016) (Pamungkas & Putri, 2016).

Our research has identified 21 main factors (see again Table-1) that are most relevant to the strategic planning of SMEs in Central Java, Indonesia. Another study in another area of the country has collected 26 main factors that affect the development of SMEs (Machmud & Sidharta, 2014). Both studies agree in some points, such as facility and waste treatment, but both disagree in more. Therefore, further study is needed to reaffirm the factors that most influence the life and growth of SMEs.

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