COMBINING SWOT AND AHP TECHNIQUES FOR STRATEGIC PLANNING

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Summary: *A well-known technique in strategic planning is to gather and organize information regarding the strengths, weaknesses, opportunities and threats facing the immediate and near future of an organization. This technique is usually called SWOT. Based on this information the organization must develop alternative plans and select the most convenient to its interests. It is assumed that previously to this process, for the appropriate evaluations of the plans, the organizations should have reviewed (and restate if needed) its mission, vision and values. The objectives of these plans should be to take most advantage of the strengths and opportunities, as well as to reinforce most the weaknesses and develop the best defense to the threats. As we can expect neither of the plans could be considered as dominant in the sense that it would be the best one with respect to all of the objectives. Consequently, we will be faced to the classical problem of relative preference between them. In this work, we propose to solve the problem by combining this technique with AHP in order to compare the alternatives. A case study is presented.*

1. Introduction

We will assume that an organization, in order to design strategies for its growth and development, must be aware of the factors related to their failure or success. For a complete strategic planning process, this stage of design should be complemented with the analysis of the proposed strategies and the selection of the one considered as the most convenient to the organization.

For the first part –design of strategies– of this process it is usual to rely on a technique similar to the one we will describe in the next section (SWOT), complemented with a clear statement of the mission and values of the organization as a frame of reference. Though this seems an obvious way for the utilization of the SWOT technique, most of the organizations use its results in neither one of the mentioned stages of the second part of the whole process –analysis of alternatives and selection of the most convenient one–. They use it only to obtain a description of the actual situation of the organization and its environment (Aranda, 2004). Furthermore, when they use it for strategies design they do not follow with an appropriate analysis of the alternatives and with the subsequent decision making process, which we consider should be a natural second part of the whole process of strategic planning.

In this work, we propose that to fill this gap in the process we should use a formal analysis and selection of the proposed alternatives by means of AHP techniques. In the case study included in this work, we describe the general procedure for doing it.

2. The SWOT technique

SWOT is a widely used technique whose purpose is to provide information about the internal and external variables that should be taken into account in the formulation of planning strategies for an organization. The variables of interest are grouped in four categories, usually identified with the letters S, W, O and T. We follow with the characterization of these groups.

S: Variables associated with factors in which the organization shows certain strength; variables we should take advantage of in the growth and development of the organization.
W: As opposed to the previous group, this group contains variables associated with factors in which the organization shows certain weakness; variables that, unless be corrected or improved, could impede or make difficult the growth and development of the organization.
O: Variables associated with aspects that can be seen as opportunities that the organization could take advantage of for its growth and development.
T: Variables that could represent a threat to the growth and development of the organization; variables whose effects look advisable to prevent or neutralize.

It is be clear that this information would allow us to take advantage of the strengths and opportunities, and to undertake actions for a better handling of the threats, as well as for lessening the effects of the weakness factors. All these should be considered as objectives for any strategic plan.
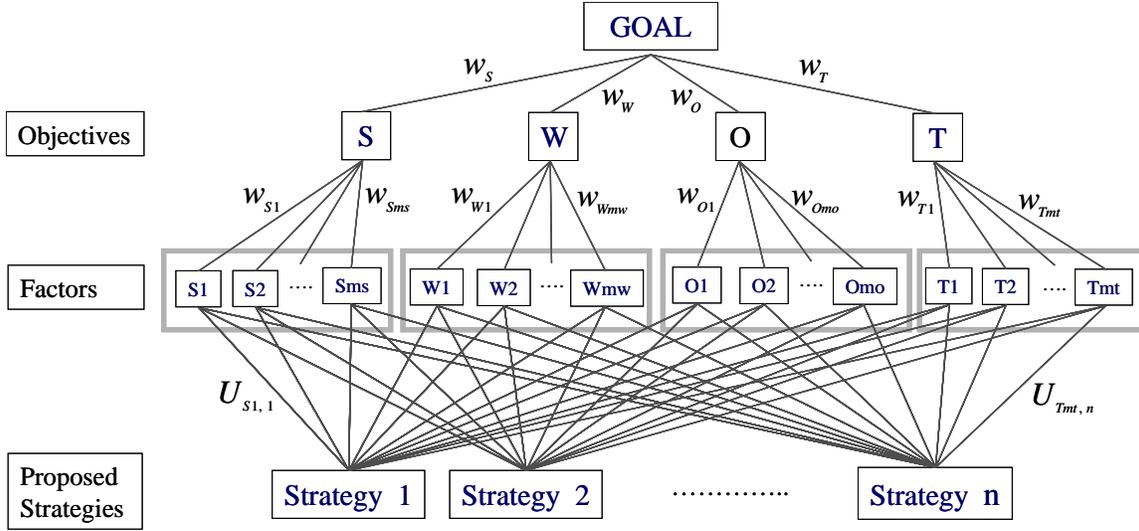
We do not intend here to describe the shortcomings of SWOT, some of which have been pointed out by some authors (Hill and Westbrook, 1997). We will restrict ourselves to describe the way to complement this technique with AHP procedures in order to make it more meaningful for the strategic planning process.

3. SWOT/AHP integration

Our proposal is to structure a hierarchy for the strategic planning process based on a SWOT study, and to use a quantitative technique to estimate a global value for each one of the proposed strategies. We also propose to use AHP/Expert Choice to perform these evaluations. In a previous work J. Kangas, M. Pesonen, M. Kurttila and M. Kajanus (2001) propose the integration of both techniques, and illustrate it with a real case. Here we are proposing a similar combination, though using a different procedure for the final evaluation of the strategies. Kangas et al. obtain relative values for the strategies with respect to the factors using pair comparisons, whereas we are proposing to use direct evaluations of degrees of efficiency of the strategies to fulfill the requirements of the factors (as will be seen next). This difference could turn out to be important if, for example, some strategy fails in these fulfillments, in which case the pair comparison would give a misleading answer by not identifying this weakness of the strategy. In other words, when we try to compare strategies with respect to factors the important thing is not the relative value of a factor within the strategy, but how well a strategy achieves the objective implied by the factor, independently of how well it behaves for other factors.

The Hierarchy
The hierarchy for our problem has been structured in four levels, as we describe next. The first level, as usual, is the goal to be achieved by the decision; the next level is constituted by the four groups of factors as defined by the SWOT technique: Strengths (S), Weaknesses (W), Opportunities (O) and Threats (T); the third level is constituted by the factors included in each one of the four groups of the previous level; and finally, the fourth level is constituted by the strategies that should be evaluated and compared. A graphical representation of the hierarchy is presented in the following figure:

GOAL

w_S w_W w_O w_T

Objectives

S   W   O   T

w_{S1} w_{Sms} w_{W1} w_{Wmw} w_{O1} w_{Omo} w_{T1} w_{Tmt}

Factors

S1 S2 .... Sms   W1 W2 .... Wmw   O1 O2 .... Omo   T1 T2 .... Tmt

$U_{S1,1}$ $U_{Tmt,n}$

Proposed Strategies

Strategy 1   Strategy 2   ....   Strategy n

We can see in the figure the lines that represent the relationships between levels, as well as some symbols for the relative weights of these relationships and for the degree of efficiency of each strategy in the achievement of each one of the factors included in the previous level of the hierarchy. We next describe the meaning of these symbols.

(w_S, w_W, w_O, w_T): relative importance of each group of factors (S, W, O and T) for the achievement of the organization growth and development

(w_{S1}, w_{S2}, …, w_{Sms}): relative importance of the Strengths factors (S1, S2, ..., Sms) within their group (S)

(w_{W1}, w_{W2}, … , w_{Wmw}), (w_{O1}, w_{O2}, … , w_{Omo}) and (w_{T1}, w_{T2}, … , w_{Tmt}) : same as above, for the Weaknesses, Opportunities and Threats factors within their own group (W, O and T)

For any Strategy j (j = 1, 2, ..., n) we have

$U_{Si,j}$: Efficiency of Strategy j in taking advantage of the strength factor Si (i = 1, 2, ..., ms)

$U_{Wi,j}$: Efficiency of Strategy j in lessening the effects of the weakness factor Wi (i = 1, 2, ..., mw)

$U_{Oi,j}$: Efficiency of Strategy j in taking advantage of the opportunity factor Oi (i = 1, 2, ..., mo)

$U_{Ti,j}$: Efficiency of Strategy j in facing the threat factor Ti (i = 1, 2, ..., mt)

If we define V_j as the global (relative) value of the Strategy j (j = 1, 2, ..., n), we can write:

$$V_j = w_S \sum_{i=1}^{i=ms} w_{Si} U_{Si,j} + w_W \sum_{i=1}^{i=mw} w_{Wi} U_{Wi,j} + w_O \sum_{i=1}^{i=mo} w_{Oi} U_{Oi,j} + w_T \sum_{i=1}^{i=mt} w_{Ti} U_{Ti,j}$$

In addition, finally, it is natural to consider that the selected strategy should be the one with the highest V_j value.

4. An example of application: The Case of VWL Medical Services

The combination of SWOT and AHP techniques for strategic planning as has been described in this paper, was applied in the real case that we present next.

4.1 The case

VWL Medical Services is a firm operating since year 2000 for the supplying of several health services as ambulatory surgery, specialized medical consulting, laboratory services and medical programs for firms. In order to help the patients with their financial arrangements they maintain relations with the health insurance companies, and have developed a personalized micro-credits service for the patients. Their main interest with regard to the future on the company is to increase their portfolio of clients, which include not only the patients themselves but also the doctors that could address their own patients to the use of the VWL services.

In the years before the study we are reporting, the company had been growing steadily but without following a pre-established strategic plan for it. They considered that it was time to develop such a plan, and with this purpose, they decided to follow a SWOT study. As result from this study, they came up with six possible strategic plans to consider, and started the process of selecting among them. As usual in these situations, none of these plans was considered the best for all the actors involved in the decision. Consequently, we advised them to structure the problem in a hierarchy and try to perform a quantitative evaluation of de six strategic plans using TeamEC (Expert Choice for group decision-making) with the group of individuals responsible for making the decision. The results of this process, including the SWOT study, are presented next.

4.2 Strategies for growth and development

The subjects in charge of identifying the factors in the SWOT study, designing the strategies and selecting the most convenient one, were a group of seven executives and top management personnel of the organization. After several sessions of discussion, they ended up with nine strengths, nine weaknesses, eight opportunities and eight threats to consider in the strategic planning process. All these factors are summarized in the Appendix. Based on these 34 factors they designed the following six strategies to be compared:

Strategy 1: *Broadening the Firm*
This broadening would include the increase of the physical space, the inclusion of new services (e.g. Pharmacy, Para clinics services like Ophthalmology, etc.), as well as the expansion of some of the actual services.

Strategy 2: *Strategic alliances*
To develop associations with the intermediaries of health funds (e.g. insurance companies)

Strategy 3: *Pensions Fund*
To create a pensions fund for the doctors attending in VWL.

Strategy 4: *Micro-Credits*
To develop a system of prepaid programs of medical services that do not have to be attended immediately (services that are not considered as emergencies and could be planned for a later time), or for medical services that are not included in the insurance policy of the patient (e.g. aesthetic surgery).

Strategy 5: *International expansion*
By the time of the study, VWL had patients from countries other than Venezuela, but they did not represent an important part of the business. This strategy calls for an increase in that number. It required the increasing of marketing efforts outside the country, and the structuring of packages that include air transportation tickets, housing and medical services.

Strategy 6: *Marketing*

Though the scope of a marketing strategy sounds too wide, in the industrial sector of ambulatory medical services (as the ones offered by VWL) it is usual that the firms do not invest important amounts of money in marketing and publicity. This strategy calls for giving special attention to these activities, and for providing them with an important share of the operational budget.

All these six strategies should be evaluated and compared in order to select the best one for the organization, with the main objective of its growth and development for the three years following the date of the study (2004). In addition, the results could provide a guide for how to split the efforts and resources for attending the rest of the strategies.

The responsible for the decision-making were the same seven actors in charge of the SWOT study and of the strategies design. As usual in these processes, there was no agreement with regard to the best strategy, and the use of a quantitative technique as TeamEc (Expert Choice for Groups) was recommended.

4.3 Results of the evaluation process

Next, we present the results (combined for the seven decisors) of the paired comparisons for the groups of factors and for the factors within each group, as well as the results for the evaluation of the efficiency of each strategy in the achievement of each factor. This later evaluation was obtained by direct questioning to the decisors about their estimation of these efficiencies (in a scale from 0 to 5 with 5 as the highest) for any combination strategy-factor. We finally present the results for the global value of each strategy.

Relative importance of groups of factors:

Group of Factors	Relative importance (w_S, w_W, w_O, w_T)
STRENGTHS	0.213
WEAKNESSES	0.218
OPPORTUNITIES	0.244
THREATS	0.325

Relative importance of factors within their groups:

STRENGTHS	S1 Credibility	S2 Cash	S3 Quality of Service	S4 Values	S5 Capacity to respond	S6 Management	S7 Cost Structure	S8 Work Teams	S9 Commercial Location
w_{Si}	0.060	0.066	0.135	0.213	0.109	0.172	0.063	0.103	0.079

WEAKNESSES	W1 Strategic Alliances	W2 Accounts to Collect	W3 Concentration	W4 Marketing	W5 Iddle Capacity	W6 Financial Capacity	W7 Lack of Alliances	W8 Stock and Equipments	W9 Corporative Governance
w_{Wi}	0.102	0.108	0.031	0.220	0.127	0.078	0.131	0.178	0.026

OPPORTUNITIES	O1 International Projection	O2 Low Income Services	O3 Health Fund	O4 Diversification	O5 Telemedicine	O6 Extend Base of Costumers	O7 Medicine School	O8 Non-traditional Services
w_{Oi}	0.140	0.050	0.152	0.100	0.066	0.296	0.073	0.122

THREATS	T1 Sensibility	T2 Rent in Foreign Currency	T3 Physical Space	T4 Economic Environment	T5 Basic Services	T6 Competition	T7 Legal Framework	T8 Dependance
w_{Ti}	0.086	0.065	0.105	0.088	0.044	0.145	0.038	0.428

Efficiency of strategies in each factor:

The following tables shows, for Decisor # 1, the efficiency of each strategy in each of the factors considered in the analysis. (The results for the other six decisors are omitted; they can be obtained from the authors).

$U_{Si,j}$	EFFICIENCY OF STRATEGIES IN STRENGTHS - Decisor 1								
Strategy	Strength 1	Strength 2	Strength 3	Strength 4	Strength 5	Strength 6	Strength 7	Strength 8	Strength 9
Broadening of the Firm	5	5	3	3	3	5	5	5	5
Strategic alliances	5	5	5	5	3	5	5	5	3
Pensions Fund	5	3	5	3	3	5	3	3	3
Micro-Credits	5	5	5	3	3	5	3	5	5
International Expansion	5	5	5	3	5	5	5	5	5
Marketing	5	5	5	5	5	5	5	5	5

$U_{Wi,j}$	EFFICIENCY OF STRATEGIES IN WEAKNESSES - Decisor 1								
Strategy	Weakness 1	Weakness 2	Weakness 3	Weakness 4	Weakness 5	Weakness 6	Weakness 7	Weakness 8	Weakness 9
Broadening of the Firm	5	2	5	5	5	5	5	5	3
Strategic alliances	5	2	5	5	5	5	5	5	3
Pensions Fund	3	3	3	5	5	3	3	3	3
Micro-Credits	5	2	5	5	5	5	3	5	3
International Expansion	5	3	5	5	5	5	5	5	3
Marketing	5	3	5	5	5	5	5	5	3

$U_{Oi,j}$	EFFICIENCY OF STRATEGIES IN OPPORTUNITIES - Decisor 1							
Strategy	Opportunity 1	Opportunity 2	Opportunity 3	Opportunity 4	Opportunity 5	Opportunity 6	Opportunity 7	Opportunity 8
Broadening of the Firm	5	5	5	5	5	5	5	5
Strategic alliances	5	5	3	3	5	5	3	3
Pensions Fund	3	3	3	5	3	5	3	5
Micro-Credits	3	5	5	3	3	5	3	5
International Expansion	5	3	5	3	5	5	3	5
Marketing	5	3	5	5	3	5	5	3

$U_{Ti,j}$	EFFICIENCY OF STRATEGIES IN THREATS - Decisor 1							
Strategy	Threat 1	Threat 2	Threat 3	Threat 4	Threat 5	Threat 6	Threat 7	Threat 8
Broadening of the Firm	3	3	3	5	5	5	3	5
Strategic alliances	3	3	3	3	5	5	3	5
Pensions Fund	3	3	3	3	3	3	3	3
Micro-Credits	3	3	3	3	3	5	3	5
International Expansion	5	5	3	5	5	5	3	5
Marketing	3	3	3	3	3	5	3	3

Global evaluation of strategies

To obtain the global evaluation of the strategies we apply the general formula established in Section 3:

$$V_j = w_S \sum_{i=1}^{i=ms} w_{Si} U_{Si,j} + w_W \sum_{i=1}^{i=mw} w_{Wi} U_{Wi,j} + w_O \sum_{i=1}^{i=mo} w_{Oi} U_{Oi,j} + w_T \sum_{i=1}^{i=mt} w_{Ti} U_{Ti,j}$$

$$= 0.213 \sum_{i=1}^{i=9} w_{Si} U_{Si,j} + 0.218 \sum_{i=1}^{i=9} w_{Wi} U_{Wi,j} + 0.244 \sum_{i=1}^{i=8} w_{Oi} U_{Oi,j} + 0.325 \sum_{i=1}^{i=8} w_{Ti} U_{Ti,j}$$

(Note: The values to be used for the efficiencies $U_{Si,j}$, $U_{Wi,j}$, $U_{Oi,j}$ and $U_{Ti,j}$ are the ones estimated by each decisor).

The results for global evaluation made by each decisor for the strategies are shown in the following table:

GLOBAL EVALUATION OF STRATEGIES							
Strategy	Decisor 1	Decisor 2	Decisor 3	Decisor 4	Decisor 5	Decisor 6	Decisor 7
Broadening of the Firm	18.117	12.938	9.317	10.268	18.051	15.354	16.636
Strategic alliances	17.585	12.899	14.787	11.093	17.192	17.012	18.612
Pensions Fund	14.461	14.921	12.966	10.879	14.361	12.893	15.891
Micro-Credits	16.977	16.288	16.364	10.883	16.637	14.909	16.737
International Expansion	18.569	15.660	16.732	11.418	17.981	17.119	16.314
Marketing	17.543	16.498	16.383	11.764	17.351	18.012	16.816

As final value for each strategy, we took the arithmetic mean of the values given by the seven decisors. These means are shown in the following table, in decreasing order:

Marketing	16.34
International Expansion	16.26
Strategic alliances	15.60
Micro-Credits	15.54
Broadening of the Firm	14.38
Pensions Fund	13.77

Based on the analysis of these results, the group in charge of the study made some recommendations to VWL. We present next these recommendations, as well as the final decision of VWL.

Analysis of results and final decision of VWL

As can be seen, the first two strategies (Marketing and International Expansion) resulted with almost the same global value. For this reason, the group in charge of the study recommended VWL to consider that both strategies should have the same attention in the plans of the organization. Furthermore, between the first and the fourth strategy (Micro-Credits) there is less than one standard deviation in global value, which made the group recommend VWL to consider that third and forth strategies should receive some attention, though less than the first two. Finally, since between the first and the fifth strategy there is almost two standard deviations, they recommended VWL that the last two (Broadening the Firm and Pensions Fund) should receive much less attention than the others should. As final decision, VWL accepted these recommendations of the group, which was eventually reflected in the structuring of the operational budget of the organization.

It is worth to point out that the ideal strategy –with full efficiency in attending all the 34 factors– would have a global value of 20. Therefore, the analysis showed that the degree of satisfaction of each one of the two selected strategies (16.34 and 16.26) is about 80% of this maximum.

4. Conclusion

The SWOT technique has proved to be of great help in the understanding of the environment for organizations and, consequently, in the strategic planning of their growth and development. However, experience has shown that often its usefulness has been sub valued by limiting it to the stage of strategies design. Its value could be increased substantially by complementing it with techniques for the evaluation of these strategies, and for the selection of the most convenient one for the organization. In this work, we have sustained that this could be achieved by combining SWOT with AHP techniques following the procedure described in Section 3. This proposal has been proved useful in the real case that we have presented in Section 4.

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