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## Application of AHP method in external strategic analysis of the selected organization

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### Abstract

Strategic management belongs indisputably to the activities enabling long-term development of the organization. Managers must decide on future actions. The first step of the process is strategic analysis, which helps to identify and to describe organizational internal and external environment. SWOT analysis is the most frequently applied method which enables synthesis of partial results of external and internal analyses. The paper is focused on external part of SWOT analysis. The aim is to propose evaluation of the partial results of external strategic analyses, which are basis for creation of external part of SWOT matrix. Analytic hierarchy process is used for the evaluation and this method is applied on data of the selected organization

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## 1. Introduction

Strategic analysis is the first step of strategic management (Grasseová, et al., 2010). It consists of two parts, external and internal analysis. The main aim of strategic analysis is not only to describe a company's environment, but also to evaluate which factors are the most important for our strategic decision-making and how big their influence is. It is important to synthesize partial results to get the framework of the environment condition. A frequently used method for this is SWOT analysis (Grasseová, et al., 2010, Afonina, 2011).

The synthesis of the results of partial analyses is not easy and in the application of the proposed method there are some mistakes, which will be described in the paper. This paper focuses on the analysis of the external environment. Methods, which are applied for external strategic analysis, will be chosen and the evaluation of their results will be suggested in order to create a data base for the external part of SWOT analysis.

The aim of the paper is to propose a methodology, which will serve to synthesize the results of partial external analysis methods, in order to identify opportunities for and threats to the company. First, the theoretical background of SWOT analysis and external environment analysis will be described and then, the weaknesses of SWOT analysis will be pointed out. In the second part of the paper, use of the analytical hierarchy process is suggested to help create the SWOT matrix.

## 2. SWOT analysis

SWOT analysis is a conceptual framework for systematic analysis, focusing on the characteristics of key factors influencing the strategic position of a company (Sedláčková, 2000, p. 78). The name of for the analysis is derived from four English words – Strengths, Weaknesses, Opportunities and Threats. SWOT analysis is divided into the analysis of a) the internal environment and b) the external environment.

SWOT analysis is known as one of the most frequently used tools of strategic management. It is also a tool that integrates the results of the external analysis, in which are formulated opportunities and threats, and the results of the internal analysis that describes the strengths and weaknesses. In order to allow a company long-term growth, managers must choose factors that enable business growth and avoid those that would cause eventual failure. SWOT analysis is often considered as a first step towards the strategy formulation, see e.g. (Ferrel, Hartline, 2014, Hill, Jones, 2012).

The information basis for the external and internal parts of SWOT analysis are the results of selected methods. Mallya (2007) emphasizes that it is important to abide by the principles in the processing of SWOT analysis. These principles include that the conclusions of this analysis should be relevant, that it is necessary to focus on the important facts and phenomena, and that in order to identify facts on a strategic level, it is crucial to be objective and to evaluate the various factors according to their importance.

SWOT analysis is as method of strategic analysis which is very popular within companies. This was proven by several research studies aimed at using strategic tools conducted both in the Czech Republic (Mutinová, Baňáková, 2013, Baurová, Janečko, Papalová, 2013, Afonina, 2011) and abroad (Tassabehji, Isherwood, 2014). Summarizing the results of the surveys that were focused on identifying the usage of the tools and methods of strategic analysis in both Czech and foreign companies, it can be stated that the SWOT analysis takes the first, resp. third place in the order.

### 2.1. Critical aspects of current application of SWOT analysis

Even though SWOT analysis is very popular and widely used, there are some critical aspects (Hill, Westbrook, 1997, Valentin, 2005). As for each method, it depends on the quality of the input data. Relevant conclusions from SWOT analysis cannot be without that. To ensure an adequate data base can be time consuming and costly. It is also difficult to assess the extent to which it is worth investing time and resources in a data base due to the benefits that flow from these findings.

Hill and Westbrook (1997) in their critical article define these fundamental errors. Application of SWOT analysis in practice often happens only based on writing an itemized list. Methodology during the process is missing. This means that it is not clearly defined how to proceed in SWOT matrix compilation. Valentine (2005) pointed out this absence of the methodology. While it is given that opportunities and threats describe external environment and strengths and weaknesses describe internal environment, often only selected analyzes of internal and external environments are actually made. The SWOT matrix does not reflect their results. Factors of partial analyses are not evaluated respectively, the evaluation of their impact on businesses is missing.

As Hill and Westbrook (1997) mentioned, the factors are described very vaguely. Another potential pitfall is that some points of SWOT analysis are not based on any analysis and generally describe the entire enterprise -all products and markets. The problems come not from the method itself but from its application. Therefore, focus should be given to improving its implementation rather than on its rejection. Many authors referred to this method as a preferred method (Grasseová et al., 2010) and "simple" (Sedláčková, 2000), which can lead to negligence in implementation on the one hand and to excessive expectations from the results on the other.

Despite this critic, SWOT analysis will be used as a tool for synthesis of external and internal analysis but there will be suggested methodology to avoid mentioned problems. In this article we focus on the external part of SWOT analysis.

## *2.2. External analysis as a part of SWOT analysis*

The following text focuses on external analysis as a part of the SWOT analysis - it contents and methods that can be the base for identifying opportunities and threats for the selected organization.

Strategic analysis of the external environment deals with identification and investigation of factors which effect an organization from outside and influence its actions and strategic position on the market. This action has both positive character (because it brings new opportunities to the organization) and negative character when these factors may significantly jeopardize the organization's activities. We can say that external analysis is the general term for opportunities and threats identification, which has impact on the company. As Keřkovský and Vykypěl (2006, p. 40) say, external analysis should be focused on revealing trends that may affect the organization in the future.

Environment can be divided into two layers, into macroenvironment, which means distant environment, and microenvironment, by which is meant the industry environment of the organization (Mallya, 2007). For external factors identification PESTE analysis, Porter Five Forces analysis, Stakeholders analysis, Product Life Cycle analysis, 3C analysis and other analysis are used.

## **3. Proposal of the model for external analysis evaluation**

As revealed from results of research (Afonina, 2011, Baurová, Janečko, Papalová, 2013, Tassabehji, Isherwood, 2014), PESTLE analysis (and its modification PEST, PESTE) is applied to assess political, economic, social, technological, legislative and environmental surrounding and Porter Five Forces analysis is applied to analyze customers, competitors, the threat of new entrants, suppliers and substitutes. Results of these analyses serve as a base for SWOT analysis compilation respective of opportunities and threats identification.

Proposed model uses the results of a partial external analysis, where the inputs to the model are PESTLE analysis and Porter Five Forces analysis. Figure 1 shows the model graphically. To evaluate the internal part of SWOT analysis other suitable analysis will be suggested, but it is not the aim of this paper.

This proposed model only sums up findings of all analyses. Therefore, it is necessary to propose a methodology for assessing the importance of individual factors. Under every factor of each analysis we can find concrete characteristics, which will be described below and will be evaluated for chosen company.

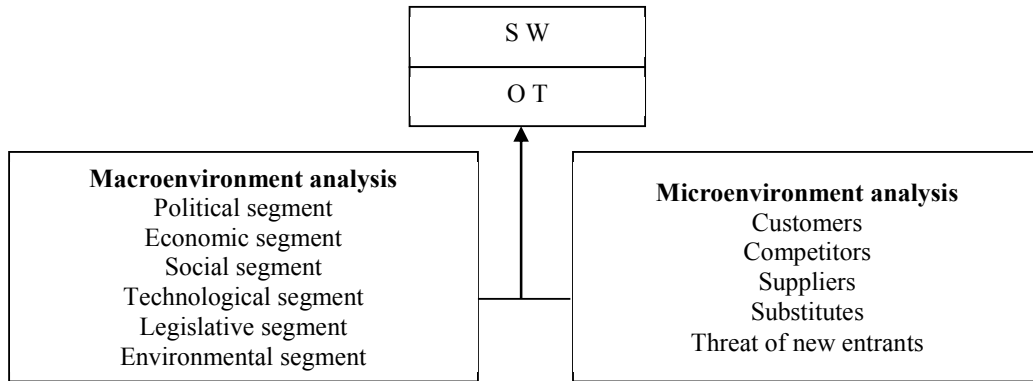


Fig. 1. Proposal of the model to SWOT analysis creation (own elaboration)

### 3.1. Using analytic hierarchy process (AHP) for synthesis of the results

Whereas it is a decision problem and it appears to be a suitable method for AHP. As Grant claims (2013, p. 11), each factor cannot always be regarded only as an opportunity or as a threat. Easily one can become the other. It is therefore necessary to consider each factor - to what extent this is an opportunity or a threat. Therefore, it is advisable to use the method of AHP, which allows an assessment of the resulting alternative (opportunities and threats) with respect to all sub-criteria (factors SWOT matrix).

AHP (Analytic Hierarchy Process) is a method of multi-criteria decision making, developed by Thomas L. Saaty and is designed to solve complex decisions (Saaty, 1994). Decision-making about strategic questions is not easy for managers but using AHP, managers can ascertain some of mistakes that can occur during the decision-making process. For application in strategic management see (Mutinová, Baňářová, 2013, Kresta, Franek, 2013).

By means of AHP, we can determine both the significance of that factor and choose whether the factor is more an opportunity or a threat. The result will be SWOT matrix elements that emerge from this assessment. Since by the method of AHP the elements in each group are compared with each other, any substantial factor is not overlooked as well as any insignificant factor should not get into this group. It is up to the company as to how it sets the criteria and factors and how many factors it will want to have in the resulting matrix. This number is necessary to consider carefully in order to avoid an "overload" by information and consequently problems in SWOT matrix evaluation.

Processing will be carried out under AHP methodology. For the mathematical expression of the AHP process, see (Mutinová, Baňářová, 2013, Kresta, Franek, 2013). Processing procedure for the synthesis of the results of such analysis can be divided into the following steps:

- In the beginning, it is necessary to correctly determine the hierarchy. This is outlined in Figure 2. First, methods for PEST and Five forces analysis will be pairwise compared. Then follows a comparison of the partial factors within each method and finally the individual specific characteristics are compared. Each factor will be compared with each factor and it will be determined by how many times is one factor more important than another factor. Factors are placed in reciprocal matrix and therein are compared to each other. Dominance of individual criteria can be expressed by a number in the range of values 1 to 9. To express the size preferences, Saaty recommended a point scale (Table 1).

Table 1. Point scale (Saaty, 1994)

Point scale	Description
1	criteria are equally significant
3	the 1 <sup>st</sup> criteria is slightly more important than the 2 <sup>nd</sup>
5	the 1 <sup>st</sup> criteria is strongly more important than the 2 <sup>nd</sup>
7	the 1 <sup>st</sup> criteria is very much greater than the 2 <sup>nd</sup>
9	the 1 <sup>st</sup> criteria is absolutely more important than the 2 <sup>nd</sup>

- It is necessary that each matrix is consistent, which indicates that the matrix is properly assembled. In our case, it was the consistency of all matrix observed.
- We always proceed from local values of determined scales to global values (which always take into account the results of the parent criteria).
- At the end, there is a comparison of possible alternatives with respect to each sub-criterion. It means that it will be assessed whether the resulting factor is an opportunity or a threat to the company.

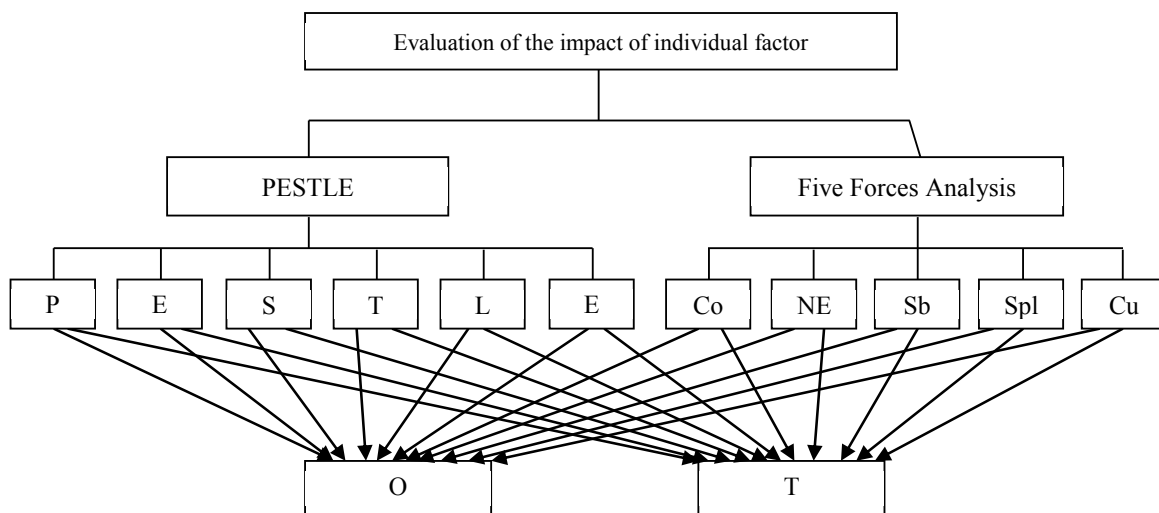


Fig. 2. Graphical outline of the hierarchy (own elaboration)

### 3.2. Elaboration of model for the selected organization

For the compilation of the model, the results of several surveys were used (Bartusková, 2015, Baurová, Janečko, Papalová, 2013, Afonina, 2011, Tassabehji, Isherwood, 2014), which focus on the use of methods of strategic analysis. These surveys indicate that for the analysis of the external environment is mainly used PESTLE analysis and Porter five forces analysis. It was found that for some companies the application of these analyzes do not pay attention to all elements that belong to them but focus only on those that match their business focus. In this paper, the proposal is made for an unnamed real company and its data were used. This company works with PEST analysis (legislative and environmental factors are not independently assessed) and Porter five forces analysis.

If we use the AHP method, criteria are individual methods and sub-criteria are their partial factors and individual characteristics. PEST analysis and Five forces analysis were conducted by the company itself. The results of the analysis, we can see in Table 2 and Table 3.

Table 2. PEST analysis

Political factors	Economic factors	Social factors	Technological factors
VAT rate	GDP decrease	Demographic structure	Low-energy houses
State deductions	Decrease in construction work	Average salary	New lightweight materials
Foreign trade	Inflation rate		New sophisticated products
	Unemployment rate		

Source: own elaboration based on company's documents

Table 3. Five forces analysis

Competitors	New entrants	Customers	Suppliers	Substitutes
Higher quality compared to competitors from Turkey and China	New plants in Asia	Only the European market, lack of knowledge of other markets	The existence of a stable source, sharp price change is not expected	Sheet boilers
High market share of competitors	Unused capacities of competition	Tailored contracts		
		Good sales promotion		
		The higher price of some products		

Source: own elaboration based on company's documents

First, the pairwise comparison of individual methods was conducted and their weights were determined. Then the individual sub-criteria in each category were compared. This comparison was conducted for PEST analysis as well as for Five forces analysis. Results are in Table 4.

Table 4. Local and global weights of criteria and sub-criteria

	Local weight	Global weight
PEST analysis	0.33	
Porter's Five forces analysis	0.67	
Political	0.15	0.05
Economical	0.26	0.09
Social	0.08	0.03
Technological	0.51	0.17
Competitors	0.27	0.18
New entrants	0.06	0.04
Customers	0.50	0.33
Suppliers	0.15	0.10
Substitutes	0.03	0.02

Source: own elaboration

Subsequently, the comparison of next level of sub-criteria within each parent factor was conducted and local and global weights of individual sub-criteria were determined. For calculating global weights, it is needed to multiply sub-criterion weight by weight of superior criterion.

In the last step, it is necessary to evaluate if the concrete factor is more an opportunity or more a threat for the company. It must be decided in every factor how many times it is more an opportunity than a threat. The result is the weight of each alternative. Then we multiply these weights by global weights, which were obtained in the previous step. By this we get final result, which helps us to create SWOT matrix, respectively its part defining opportunities and threats. All the results are sum in Table 5.

Table 5: Summary results for the definition of opportunities and threats

Factor	Local weight	Global weight	Weight of alternative		Global weight of alternative	
			O	T	O	T
VAT rate	0.28	0,01	0.17	0.83	0.00	0.01
State deductions	0.07	0,00	0.20	0.80	0.00	0.00
Foreign trade	0.65	0,03	0.83	0.17	0.03	0.01
GDP decrease	0.11	0,01	0.13	0.88	0.00	0.01
Decrease in construction work	0.61	0,05	0.10	0.90	0.01	0.05
Inflation rate	0.05	0,00	0.17	0.83	0.00	0.00
Unemployment rate	0.22	0,02	0.13	0.88	0.00	0.02
Demographic structure	0.67	0,02	0.17	0.83	0.00	0.01
Average salary	0.33	0,01	0.83	0.17	0.01	0.00
Low-energy houses	0.61	0,10	0.83	0.17	0.09	0.02
New lightweight materials	0.27	0,05	0.88	0.13	0.04	0.01
New sophisticated products	0.12	0,02	0.83	0.17	0.02	0.00
Higher quality compared to competitors from Turkey and China	0.33	0,06	0.88	0.13	0.05	0.01
High market share of competitors	0.67	0,12	0.13	0.88	0.01	0.10
New plants in Asia	0.75	0,03	0.17	0.83	0.00	0.02
Unused capacities of competition	0.25	0,01	0.25	0.75	0.00	0.01
Only the European market, lack of knowledge of other markets	0.29	0,10	0.17	0.83	0.02	0.08
Tailored contracts	0.10	0,03	0.90	0.10	0.03	0.00
Good sales promotion	0.55	0,18	0.83	0.17	0.15	0.03
The higher price of some products	0.05	0,02	0.17	0.83	0.00	0.01
The existence of a stable source, sharp price change is not expected	1.00	0,10	0.88	0.13	0.09	0.01
Sheet boilers	1.00	0,02	0.17	0.83	0.00	0.02

Source: own elaboration

From the Table 5, it is obvious that chosen factors are strongly influenced by their global weights. We can see that when the global weight is strong, then factors can fall under the categories of both opportunity and threat. In this case, it is necessary to consider if the factor belongs only to one group or if it is good to take it into account in the second group. This decision falls on the top managers of a company. In our case, it happened in two cases – good sales promotion and low-energy houses. In the both cases, managers evaluated it was more of an opportunity than a threat. We can see the external part of the SWOT matrix in Table 6.

Table 6: External part of SWOT matrix

Opportunities	Threats
Higher quality compared to competitors from Turkey and Tailored contracts	High market share of competitors
Good sales promotion	New plants in Asia
The existence of a stable source, sharp price change is not expected	Only the European market, lack of knowledge
Foreign trade	Sheet boilers
Low-energy houses	Decrease in construction work
New lightweight materials	

Source: own elaboration

As was mentioned, this matrix is compiled based on real data. It is not enough only to point out these factors. In the company, every factor is described in detail but to protect the anonymity of the company and to protect against competition, all the factors are generalized.

#### 4. Conclusion

The aim of this paper is to propose external analysis evaluation in order to identify opportunities and threats for the company. SWOT analysis was described, its benefits as well as critical aspects. Attention was paid mainly on the external part of SWOT analysis. Based on our own research as well as literature, defined methods of strategic analysis that serve as the basis for preparing the external part of the SWOT matrix, were defined in order to identify opportunities and threats for the company. Subsequently, a methodology that uses AHP methods was designed and applied on the concrete data of the company. At the end, the external part of SWOT matrix was conducted.

It is important to consider the practical implementation of this methodology in the company and its limitations. Presented methodology can help managers to create a matrix. The advantage of this is that factors that should influence the outcome are not missed. The disadvantage can be for a first pass, this may be a more complicated processing procedure. This disadvantage, however, is certainly not overwhelming. First, an external environment assessment and an adjustment to the strategy does not happen very often - the company will carry out this decision not more often than once a year or every two years. If the results of a partial analyses are prepared, it is not a problem to evaluate it in Excel or SW Trend (or others). Thus the prepared methodology is simple and allows company also to take into account the decisions of more members. The results will then be used as a guide for managers in preparing the SWOT matrix. We could proceed in the same way if we want to decide on an internal evaluation of the SWOT matrix.

If we compare our results with the results obtained by the organization that provided the data and itself compiled a SWOT matrix, we found that at some points the company has come to the same conclusion without using the proposed methodology (for example: the factors in the range of opportunities such as tailored contracts and use of new materials, and the factors in the range of threats such as new plants in Asia and the high market share of competitors). In the case that the organization will define factors other than those evaluated by this methodology, it is necessary to determine whether all members who make decisions understand the factors equally and whether there is not a misunderstanding in the assessment.

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