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## Measuring Performance Using SWOT Analysis and Balanced Scorecard

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### Abstract

This paper presents a method to measure the performance of a company by combining Strengths-Weakness-Opportunities-Threats Analysis (SWOT analysis) and the Balanced Scorecard (BSC) through the Analytical Network Process (ANP). BSC is a strategic measurement system that has become a strategic management system. A BSC includes strategic objectives and performance indicators that are aligned with the mission and strategy of the organization. The literature in modeling a BSC using Multicriteria Decision Making Methods (MCDM) is vast. Methods such as ANP have been used for different purposes. On the other hand, Strengths-Weaknesses-Opportunities and Threats Analysis (SWOT) analysis is a methodology for analyzing a company from an internal and external perspective in order to generate strategies for the firm. It has also been modeled quantitatively in order to produce strategies. This paper presents a method that combines quantitatively BSC and SWOT analysis to assess a company. The proposed method was implemented in a company that belongs to the food industry. After the application, managers were asked about the method and the implementation process. They found that the method was useful, but time consuming.

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## 1. Introduction

There is not an agreed definition about what performance measurement is [1], [2]. Neely et al. [2] define it as “the process of quantifying the efficiency and effectiveness of action”. There are a number of frameworks for measuring the performance of an organization. Among them, the BSC is used in this work. In the proposed method, what it is evaluated is the achievement of the strategic objectives of the BSC, by using the scale proposed by Cheng et al. [3] that ranges from 0 to 1.

Kaplan and Norton [4] developed the BSC as a performance measurement system. It challenges the usual use of financial indicators to measure the performance of a company from a strategic point of view, by considering indicators in other perspectives. The BSC has evolved from a performance measurement system (PMS) to a strategic management system and has become very popular among practitioners [2], [5], [6], [7]. It considers four perspectives, Finances, Clients, Internal Processes and Growth & Learning, defining strategic objectives for each of them, which are aligned with the mission and strategy of the company. The strategic objectives are also linked through causal relationships to create a “strategy map”, which is a way of representing the strategy of a company [8], [9], [10].

On the other hand, The Strengths-Weaknesses-Opportunities and Threats Analysis (SWOT) analysis is a tool for analyzing a company from an internal and external perspective, in order to generate strategies for the firm. It was popularized by Andrews [11], based on the ideas of Drucker [12], Selznick [13] and Chandler [14]. The SWOT matrix, derived from the SWOT analysis, presents a mechanism to facilitate the link between the strengths and weaknesses (internal factors) and the threats and opportunities of the market (external factors). The SWOT analysis allows managers to develop four types of strategies: SO (Strengths – Opportunities), ST (Strengths – Threats), WO (Weaknesses – Opportunities) and WT (Weaknesses – Threats). In this way, it provides a framework for identifying and formulating strategies.

Both BSC and SWOT analysis have been quantified using multicriteria decision-making methods (MCDM), such as the Analytic Hierarchy Process (ANP) and its extension, the Analytic Network Process (ANP), both developed by Saaty [15], [16], [17].

BSC has been modelled using MCDM for various purposes. Some examples are shown. Sohn et al. [18] investigated the relationship between the corporate strategy, the environmental forces and the performance measurements of the BSC. Ravi et al. [19] proposed a decision model based on AHP and ANP to select decision alternatives within a BSC framework. Leung et al. [10] used AHP/ANP to support the BSC implementation process. Lee et al. [20] modelled a BSC using Fuzzy-AHP to evaluate a department of information technologies. Yüksel and Dağdevire [21] proposed a model to estimate the performance of a company using a BSC modelled with Fuzzy ANP. Poveda et al. [22] proposed a method for selecting performance indicators using ANP and BSC. Boj et al. [23] developed a methodology to identify and manage the intangible assets of a firm, using a BSC as a framework and ANP to quantify it. Quezada and López-Ospina [24] identified the causal relationships of the strategy map of a BSC using AHP and Linear Programming. Patil and Kant [25] evaluated the impact of the adoption of knowledge management on a supply chain performance using BSC and Fuzzy ANP. Modak et al. [26] developed a framework based on BSC and Fuzzy AHP to define performance indicators to evaluate outsourcing decisions.

As stated above, the SWOT analysis is a powerful tool for carried out an external and internal analysis from a strategic point of view, as well as for defining strategies. However, it does not provide a method to assign a rank or a priority to the factors/strategies identified. To overcome this limitation, authors, such as Kurtilla et al. [27], Shrestha et al. [28], Kahraman et al. [29], Eslamipour and Sepehriar [30], Mehmood et al. [31], Zare et al. [32] and Polat [33] used AHP to assign priorities to the various elements of the SWOT analysis. Some authors, such as Chang et al. [34], Yüksel and Dagdeviren [21], Azimi et al. [35], Sevkli et al. [36], Shahabi et al. [37], Arsić et al. [38] have used ANP to have to assign priorities to the factors or strategies associated to the SWOT analysis.

The analysis of the existing literature shows that both the BSC and SWOT analysis have been modelled and quantified using MCDMs. However, it was not found any work in which BSC and SWOT analysis were combined quantitatively. In fact, there are a number of papers in which both tools are combined conceptually. Two examples are the papers authored by Quezada et al. [39], who created a SWOT matrix from the strategic objectives of a BSC, and Lee and Lo [40] who produced a framework for formulating a strategy for vocational education.

The objective of this paper is to design a method for measuring the performance of a firm using ANP under a framework of BSC and SWOT analysis. In this way, two powerful management tools are combined to take advantage of the characteristics of both of them. The contribution of the paper is that the strategic objectives are explicitly connected to the internal and external analysis provided by the SWOT analysis.

## 2. THE PROPOSED METHOD

### 2.1. Overview

The central element of the proposed method is an ANP model that includes SWOT factors and sub-factors, strategies, BSC perspectives and strategic objectives. It means that the company has to undertake a strategy formulation process, in which a SWOT matrix is carried out and strategies and strategic objectives are defined. ANP is used to estimate the priority of the strategic objectives, which are combined with an assessment of the level of their achievement in order to get a measurement of the company's performance.

### 2.2. The ANP model

The ANP model has 6 levels. It is depicted in Figure 1. It should be noted that it is not hierarchical, because there is an inner dependence in the SWOT level and in the Perspective level. The application of the techniques provided by ANP leads to a priority assigned to each strategic objective.

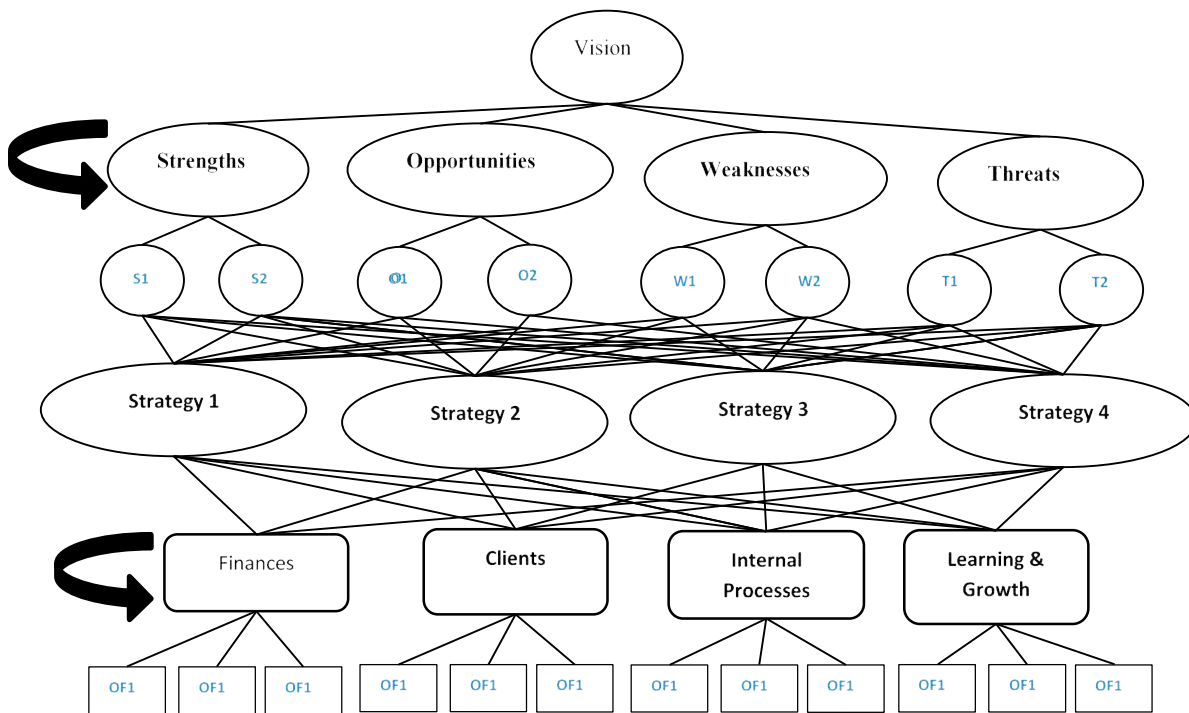


Fig. 1. ANP Model for Performance Evaluation

### 2.3. Performance Assessment

The performance assessment is done by assigning a degree of achievement of the strategic objectives. The scale proposed by Cheng et al. [3] is used, which ranges from 0 (very low achievement) to 1 (very high achievement). The value assigned to a strategic objective depends to the current value of performance indicator in relation to the target defined. On the other hand, one of the key results from the ANP model is the priority of each one of the strategic objectives. The performance index is calculated as follows:

Let

$w_i$  = priority of strategic objectives  $i$  (obtained from the ANP model)

$x_i$  = assessment value of strategic objective  $i$

Then, Performance Index =  $\sum_i w_i x_i$  (1)

This index may also be calculated for each BSC perspective.

### 2.4. The steps of the model

**Step 1:** SWOT analysis. The Strengths, Weaknesses, Opportunities and Threats are identified. The strategic alternatives to be evaluated are obtained from the SWOT matrix.

**Step 2:** Identification of Strategic Objectives. The strategic objectives are identified. They are then grouped into the BSC perspectives.

**Step 3:** Building the ANP model. The SWOT factors (Strengths, Weaknesses, Opportunities and Treats), SWOT sub-factors, strategic alternatives and strategic objectives are included in the ANP model.

**Step 4:** ANP calculations. The pairwise comparisons between the various elements of the ANP model are carried out. The usual method of building the supermatrix and then calculating the supermatrix can be used. However, the method proposed by Tseng y Huang et al. [41] is utilized. This method takes into consideration that the ANP model is a hierarchy with interdependence of the nodes in some of the levels

**Step 5:** Performance assessment. The equation (1) is used to evaluate the performance of the company.

## 3. Application in a company

### 3.1. Description of the Firm

The company is dedicated to the distribution of food products in the local market. It has three sales stores and a distribution center. Its sales have increased dramatically in the past 3 years. It has led the company to consider the strategy of opening more sales stores. The increase of the sales level has made this firm to become an excellent case for applying the proposed method. The complete process was implemented with the participation of the managing director, the marketing manager, the finances manager and the operations manager.

In order to implement the process, it was necessary to carried out a strategy formulation process, which is not shown in this paper. One of this work authors acted as a facilitator.

### 3.2. The SWOT analysis

The managers of the company identified the following Strengths, Weaknesses, Opportunities and Threats. From the analysis of the factors, the SWOT matrix shown in Table 1 was defined.

Table 1: SWOT matrix of the company

	Strengths	Weaknesses
	Good relations with suppliers and customers. Good delivery standards. Adequate location of stores and distribution centre. Variety and prices of products. Good Financial situation.	Marketing area not developed. Inefficient layout of stores. Lack of an integrated information system. Poor financial management system
<b>Opportunities</b>	Broaden the objective market. Increase the number of stores in strategic locations	Improve coordination between the stores and distribution centre. Improve financial management
Tendency to consume health products. Increase of the market. Increase of the e-commerce. New information systems for SMEs		
<b>Threats</b>	Implement marketing plan focus to healthy products.	Implement plan for improving firm's image in the objective market. Improve layout of stores
Restriction for some company products that are not considered "healthy". Expansion of main competitor.		

### 3.3. The Balanced Scorecard and ANP results

The development of a BSC considered a set of steps, which were undertaken with the participation of the managers of the company. The strategic objectives were defined from the mission, vision, company values and the SWOT analysis. The managers (managing director, the marketing manager, the finances manager and the operations manager) were asked to fill-in the comparison matrices of the ANP model. The entries of the matrices were decided by consensus, because of the richness of the discussion produced.

According to the process developed, the ANP model includes the 4 SWOT factors, 15 sub-factors, 6 alternative strategies and 15 strategic objectives. The priorities of the strategic objectives obtained, after performing all the pairwise comparisons, are presented in Table 2. The local priority corresponds to the priority of a strategic objective within its perspective, whereas the global priority is the local priority weighed by the priority of the corresponding perspective. The performance of the strategic objectives was estimated according to the scale proposed by Chang et al. (1999). The resulting performance index of the company is 50.7%, which is the result of calculating the average of the values of the column "Evaluation", weighed by the values of the column "Global Priority" of Table 2.

Table 2: Priority of Strategic Objectives of the Company

Perspective	Strategic Objective	Local Priority	Global Priority	Evaluation	Score
Finances	Increase the value of the company	0.17	0,040	0.50	0.020
	Increase sales	0.54	0,130	0.75	0.098
	Reduce operational costs	0.29	0,070	0.50	0.035
Clients	Increase clients' loyalty	0.19	0,045	0.25	0.011
	Increase small clients' satisfaction	0.06	0,015	0.75	0.011
	Increase large clients' satisfaction	0.13	0,030	0.50	0.015
	Increase number of clients	0.25	0,060	0.25	0.015
	Improve company's image	0.38	0,090	0.25	0.023
Internal Processes	Increase quality of the service	0.24	0,058	0.75	0.044
	Strengthen payment service	0.06	0,015	0.25	0.004
	Improve stock management	0.48	0,116	0.25	0.029
	Improve delivery	0.06	0,015	0.75	0.011
	Improve trucks control	0.15	0,036	0.75	0.027
Learning & Growth	Improve culture and labour satisfaction	0.32	0,090	0.25	0.023
	Improve workers competences	0.68	0,190	0.75	0.143
	Performance Index				0,507

### 3.4. Discussion

The SWOT analysis showed that the most important factors were the threat “Restriction for some company products that are not considered healthy” and the opportunity “Tendency to consume health products”. It may be seen as contradictory, but it produces a clear strategy of re-defining the product variety to be offered. This was consistent with the fact that the most important strategy was to carry out a marketing plan to focus on healthy products. The second most important strategy is to create stores in strategic locations, which means producing a geographical expansion of the company.

Regarding the Finances Perspective, the most important objective is to “Increase sales” and it is also doing well. However, this performance has to be looked carefully, because this result depends on the performance of other objectives and also on the target defined. In relation to the performance assessment belongs to the Clients Perspective, the poorest strategic objectives are “Increase clients' loyalty”, “Increase number of clients” and “Improve company's image”. This is consistent with the results of the workshops, where managers express their concern in the clients' loyalty and how to attract new clients. Among them, the most important is “Improve company's image”. The strategy “Implement plan for improving firm's image in the objective market” goes in this direction.

There are two objectives that are very important (“Improve stock management” and “Improve workers competences”). However, the performance of the first one is low; hence some actions should be taken. Particularly, the strategy “Improve coordination between the stores and distribution center” includes the issue of improving the stock management. Another important strategic objective that deserves attention is “improve culture and labor satisfaction”, because its performance level is low. It should be noted that this issue is not included in any of the strategies. It might be because it was not concern of the managers when the SWOT analysis was undertaken. In spite of that, a strategic initiative should be considered to increase the performance indicator.

The managers of the company should put attention first in those strategic objectives that are important and have a poor performance. Then they may continue with those objectives that are less important and with low performance.

## 4. CONCLUSION

The proposed method includes an internal and external analysis of a company from a strategic perspective, by using the SWOT analysis tool. It leads to strategic alternatives to face those internal and external factors. On the other hand, the strategic objectives of a BSC are derived from the previous study and the degree in which they have

been achieved. In this way, the ANP model obtained allows the connection between the strategic objectives and the internal-external analysis.

The method was implemented in a SME that sales food products for the domestic market. After the application, managers were asked the method and its application. Regarding the implementation process, the managers declared that they understood the method. However, they found that the process for filling in the comparison matrices was time consuming. Some of the characteristics they wanted to highlight about the method are (a) It looks at the company from a holistic perspective, (b) It integrates internal and external factors in assessing the company, (c) It leads to a discussion about strategic issues and (d) It is a communication tool.

In relation to the utility of the proposed method, managers found that the results were very useful. The priorities obtained could be used to focus the efforts and resources on those strategic elements that are more important. On the other hand, the way in which the assessment of the strategic objectives was calculated offers and integrated view of the whole company.

The contribution of the paper is the combined use of SWOT analysis and BSC in the formulation of strategies, under a quantitative approach. It allows senior managers to focus on those issues that are strategically more important. The contribution is both theoretical and practical. It is theoretical, because it developed a method that integrates the SWOT analysis with a BSC in a quantitative approach, something not found in the existing literature. It is practical, because the proposed method is a tool for measuring the performance of a firm and for supporting the decision-making process in strategic issues.

It is necessary to point out that the main interest of the application is to test the method instead of measuring the performance of a given company. It is also important to mention that the results are only valid for this company. What can be replicated in other cases is the application of the method. It is suggested, as further research, to apply it in other companies in order to validate the method in other situations and to improve it.

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