

# A Study on 3C & PEST-SWOT-Timing Positioning-AHP Methodology for Strategic Task Extraction and Prioritization

<sup>1</sup>Bong-cheol Lee and <sup>2</sup>Do-sung Na

<sup>1</sup>Dept. of Smart Convergence Consulting,

Hansung University, 116, samseongyo 16gil, Seongbuk-gu,  
Seoul Metropolitan Government, Korea. [cnsint@naver.com](mailto:cnsint@naver.com)

<sup>2</sup>Dept. of Knowledge Service and Consulting,

Hansung University, 116, samseongyo 16gil, Seongbuk-gu,  
Seoul Metropolitan Government, Korea. [dosna@naver.com](mailto:dosna@naver.com)

## Abstract

In this study, we propose a methodology to select strategic tasks based on logical, quantitative and objective criteria as well as personal intuition in order to extract and prioritize client strategic tasks. As a method of conducting research, we studied precedent researches and literature survey that used 3C, PEST, SWOT, AHP, etc., and based on this, we modeled the strategy task extraction framework that linked strategy analysis tool and statistical analysis technique. The questionnaire survey was conducted on 150 students that are part of the business strategy education program of the Korea Productivity Center. The biggest difference of the 3C & PEST-SWOT-Timing-AHP (abbreviated CPSTA) framework is that SWOT analysis and AHP analysis, which is a process of 'strategy development' that divides many strategic tasks extracted from the SWOT analysis into the immediate tasks, medium-term task, and long-term task. In other words, this study suggests a two-step methodology for the extracted strategic tasks: 1) to prioritize tasks based on timing, and 2) to prioritize priorities among the first selected tasks. In the first step where the priority is given on timing of each of the strategic initiatives, there are 6 criteria for evaluating the specificity of strategy and 4 criteria for evaluating the feasibility of strategy. In addition, we have studied how to make consistency by using Microsoft Excel program so that management consultants can use it easily and usefully in AHP analysis. It is necessary to conduct empirical studies and professional insights on the usefulness of the proposed framework and to test the validity and reliability of the indicators that measure the specificity and feasibility of the strategy.

**Key Words:** 3C&PEST, PEST analysis, SWOT analysis, AHP analysis, SWOT-AHP, PEST-SWOT-AHP, problem solving skills.

## 1. Introduction

As a result of studying the past researches on the quality of consulting service, the ability, knowledge and attitude of the management consultant, the consultant's ability to solve problems was recognized as a very important factor for the consultant's competence. In addition, respondents in the preliminary questionnaire conducted before and during the course of the training for the students who participated in the training course of the in-house consultant in the management strategy section of the Korea Productivity Center in 2016 were well aware of the 3C & PEST analysis and the SWOT analysis, but they had little knowledge of how to link these techniques into a single process and to prioritize strategic tasks and extract key strategies. PEST-SWOT-Timing-AHP (abbreviated as CPSTA), which is a methodology that can be easily used when both internal and external management consultants extract strategic tasks and prioritize strategic tasks based on the above problems, is the framework proposed in this study. For this purpose, the concepts such as 3C, PEST, SWOT, and AHP used in this frame are summarized through literature analysis.

On the contrary to past studies where the AHP analysis is done immediately after the SWOT analysis, this study includes the "strategic development system" which differentiates short, medium, and long term tasks between the SWOT and AHP analyses. In other words, if the existing research is to prioritize all strategic tasks extracted by SWOT analysis by applying AHP technique, then this study should be considered as the priority order of strategic tasks and thereby 1) identifying tasks that must be completed immediately, and 2) presenting a two-step methodology that assigns relative priorities to challenges. An empirical analysis of the usefulness of this framework was conducted by a brief questionnaire after carrying out an exercise to extract the strategic tasks of the training program participants in the management strategy field of Korea Productivity Center. On the other hand, no expert group opinion survey was conducted.

## 2. Materials and Methods

### Theoretical Background

#### *3C Analysis*

3C stands for Customer, Competitor, Company (Corporate) as the three elements of strategy, and is the starting point for strategic planning and business planning<sup>1</sup>. 3C analysis is to analyze the current status of the industry or make a basic analysis to formulate management strategy. 3C analysis seems to be somewhat simplistic, but it is a very useful way to frame the initial analysis and a framework for organizing a lot of information needed for problem solving<sup>2,3</sup>. To analyze customer trends, the customer markets must be defined and customers must be segmented. In addition, we must identify the key purchasing factors for each customer group and analyze the customer's purchasing

decision-making system<sup>2</sup>. The reason for analyzing a competitor is to figure out how much of its position it is, and to anticipate its current strategy and its future actions and responses, and then take its strategy to prepare for competitors<sup>2</sup>. Competitor analysis includes business performance analysis, business system analysis, and organizational component analysis. In particular, PPM (Product Portfolio Management) is used for competitive advantage comparison. Our analysis is more important than customer analysis and competitor analysis. Analyzing its trends is an assessment of its competitiveness status by analyzing its own resources and internal capabilities, which is similar to the analysis of competitors

### *PEST Analysis*

PEST is a macro-environmental element (Wikipedia) that is used to identify the environment among strategic management components. It is a word made by synthesizing acronyms of Political, Economic, Social, and Technological analysis. PEST analysis is a methodology of macroeconomic analysis using these factors as a methodology to objectify the situation of the field of interest<sup>4</sup>. The Political element is an analysis of the degree of national interference in environmental laws, labor laws, trade sanctions, taxes and tariffs, political stability, etc., and may also include the type of goods or services that are being sanctioned or promoted at the national level. It also considers the impact of the central government on health, education, and infrastructure at the national level (Wikipedia). Companies are paying particular attention to factors that have a direct impact on corporate management activities, such as governance ideals, laws and ordinances, strengthening or mitigating regulations, open policies, FTAs, and social norms<sup>1</sup>. Economic factors include GDP growth rates, exchange rates, interest rates, and the price index, and these factors have a major impact on economic decision making (Wikipedia). Companies will also consider oil prices and raw material prices. Social factors include occupational attitudes, population growth rates, age distribution, health awareness, safety-related factors, and cultural elements (Wikipedia). A company's management style and products may be affected by social factors. In addition, the gradual increase of the elderly population requires the government and enterprises to change the policy and management of the elderly population. Technological factors include R&D activities, automation, technology incentives and technological innovations as factors affecting entry barriers, minimum utility production, outsourcing, technology investment and quality, cost and innovation (Wikipedia). The six major technological revolutions refer to Bio, Culture, Environment, Information, Nano, and Space<sup>1</sup>. Some scholars add the Environmental element to the PEST, naming it PESTEL or PESTLE, and sometimes adding the Legal element and calling it SLEPT. However, STEEP is used as a concept similar to PEST. It is a method to classify major issues into Social, Technical, Economic, Ecological, and Political factors for macroeconomic analysis<sup>5</sup>. As the society becomes complicated and the strategic

management system is introduced in modern management strategy, PEST analysis is becoming a basic framework of environmental analysis in companies.  
*SWOT Analysis*

The SWOT analysis is a methodology developed by Albert S Humphrey (1926-2005), a management consultant and a Ph.D. in MIT in the US, who proposed various management theories such as Team Action Management (TAM). Based on the results of 3C and P.E.S.T analysis, Strength, Weakness, Opportunity, Threat, and then combine them to form a strategic task. Strength and weakness among the four factors can be found through the analysis of the company itself, Opportunity and Threat can be found in the customer, competitor, and PEST, which is the outside environment excluding the company itself. There are four types of strategic tasks that companies can identify by identifying their strengths and weaknesses, opportunities and threats from outside the company. They can be divided into four types: SO (strength-opportunity) - using strength to capture market, WO (weakness - opportunity) - strategy to overcome weakness to capture opportunities, ST (Strength - Threat) - strategy to avoid threats from outside by utilizing strengths, WT (weakness - Threat) – minimizing weakness to avoid market's threat. Some limitations of the SWOT analysis technique are as follows. First, it is difficult to clearly define the definition or category of a specific factor. Second, it is a simple environmental analysis technique that makes it difficult to measure the weight or priority of the derived factors. Third, subjectivity may be strongly involved in the generation and decision of factors<sup>6</sup>.  
*AHP Analysis*

The Analytic Hierarchy Process (AHP), a method of decision-making developed by Thomas L. Saaty in the early 1970s, aims to capture the knowledge, experience and intuition of the evaluator through the 'Pairwise Comparison'<sup>7</sup>. In other words, AHP is a multi-standard decision making method that is highly useful in various situations where decision making is required such as daily decision making of individuals or organizations, multiple group decision making, rational convergence of expert's experience and knowledge. Sang Jung Park et al. (2011) and KIM JONG BEOM (2016) proposed a 4-step framework for the AHP analysis method. Soon-Suk Chung (2007) proposed a 5-step framework. The following five steps are summarized as follows<sup>7,8,9</sup>. First, to establish a decision-making hierarchical model, the decision problem is classified into a hierarchy of mutually related decision-making.

In general, the decision-making problem of an enterprise with attributes that make decisions by various factors is often interrelated and complex. To solve this problem, the related decision-making criteria are classified and classified into three or more vertical hierarchical structures such as Goal, Criteria, Alternative from the top to the bottom. Second, we select one-to-one decision-making elements for each layer, and perform pairwise comparison between

elements to identify priority or superiority among the elements. At this time, the scale is generally based on an isometric series such as 1,3,5,7,9. Third, we calculate the eigenvector using the matrix equation to estimate the relative weight between elements. Fourth, the final weight is calculated by dividing the relative weight of decision factors in order to obtain a comprehensive ranking of the alternatives to be evaluated. Fifth, AHP analysis technique may lose coherence in similar items in repetitive survey. Therefore, consistency ratio of consistency index divided by random index is calculated, and consistency is determined and analysis is finished<sup>10</sup>. AHP analysis often uses professional and expensive commercial programs, but this study has implemented and implemented a method to utilize Microsoft Excel program so that consultants can easily use it.

### **Precedent Studies**

We looked for past studies using the 3C&PEST-SWOT-AHP framework, but most research papers used SWOT-AHP that excluded 3C, so the only study focusing on PEST-SWOT-AHP Framework was one done by Hansoo Chang et al (2012)<sup>5</sup>.

#### *Precedent Studies of SWOT-PEST Analysis*

KIM JONG BEOM presented Establishing Cooperative Governance of Disaster Safety Education through the analysis of SWOT-AHP Analysis (2016)<sup>8</sup>. Jung, Im Jae (2015) used Maritime Variables in the Period of Power Competition In Northeast Asia<sup>11</sup>, and Kim, Bo Seok (2015) studied the development strategy of Seoul Digital Industrial Complex using SWOT / AHP analysis method<sup>6</sup>. In addition, Chung Youn kyaei (2014) studied the development strategy of Korean Hidden Champion Firm based on the SWOT / AHP technique based on the competitiveness index<sup>12</sup>.

#### *Precedent Studies of PEST-SWOT-AHP Methodology*

Hansoo Chang et al. (2012) conducted research on Establishment of National Science and Technology Strategy applying PEST-SWOT-AHP methodology focusing on nuclear fusion research<sup>5</sup>.

## **3. Results and Discussion**

### **3C&PEST-SWOT-Timing-AHP(CPSATA) Framework Summary**

The 3C&PEST-SWOT-Timing-AP(CPSTA) framework as proposed in this study is as shown in Figure 1.

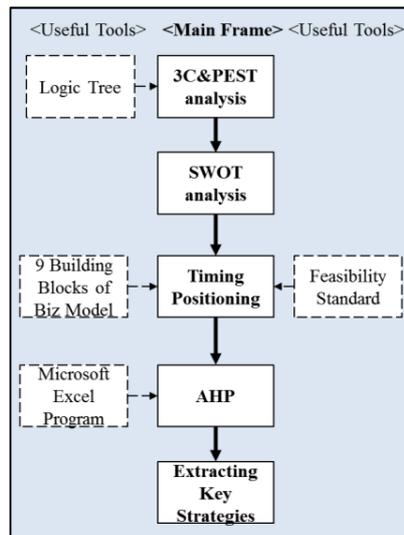


Figure 1: 3C&PEST-SWOT-Timing-AHP(CPSTA) Framework

**3C&PEST Analysis Methodology**

3C & PEST analysis is analyzed by using Logic Tree which uses the MECE (Mutually Exclusive, but Collectively Exhaustive) concept as shown in Figure 2, and its analysis is carried out by its competitors in terms of achievement, organizational component, and business function <sup>1</sup>. As an achievement analysis method, ROI System, which is a time series management analysis tool, is mainly used, and Economic Value Added (EVA) Tree is also available. Mckinsey's 7S Framework is often used to analyze organizational phenomena. 7S includes Shared Value, Hard S such as Strategy, Structure, System, and Soft S such as Staff, Skill, Style. Business System Analysis is a MECE-minded listing of important business functions until a product or service is delivered to customers.

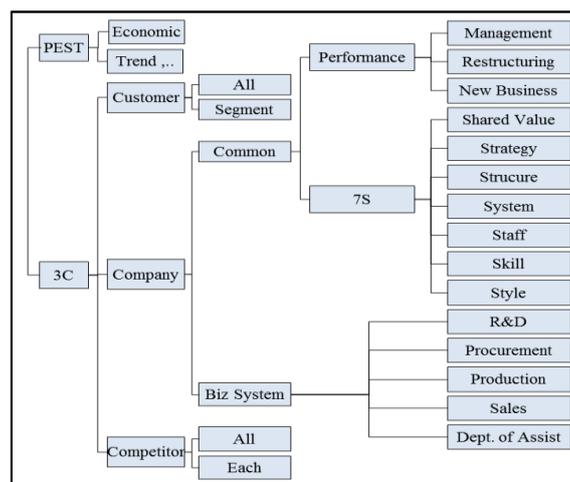


Figure 2: Logic Tree for 3C&PEST

### SWOT Analysis Methodology

The SWOT analysis result is presented as Matrix as shown in Figure 3, and the procedure for creating the Matrix is as follows.

		Internal Factors	Strength(S)	Weakness (W)
		External Factors	• • •	• • •
Opportunity (O)	• • •		[Strategy 1]	[Strategy 2]
			SO	WO
Threat (T)	• • •		[Strategy 3]	[Strategy 4]
			ST	WT

Figure 3: SWOT Matrix

1) During the 3C & PEST analysis, we conduct our own analysis to extract our strength and weakness factors, and list opportunistic and threat factors from environmental factors other than our own. 2) Among the Opportunity and Threat items, items with small Impact on the organization are excluded by brainstorming. 3) Describe the SO strategies that can utilize the strengths of the Opportunity items and list them in the SO column of the Matrix. 4) Write the Strength and Opportunity items used to derive the SO strategy in columns S and O of the Matrix. 5) Next, the WO strategy that can be improved by improving the weakness of the Opportunity item is drawn up and described in the WO column of the Matrix. 6) Write the Weakness and Opportunity items used to derive the WO strategy in the W and O boxes of the Matrix. 7) Once the SO strategy and the WO strategy have been derived, extract the ST strategy and the WT strategy that can prevent the threat element from the Strength and Weakness items of the Threat elements in the same manner and write them in the ST column and the WT column of the Matrix respectively. 8) Describe the Weakness and Threat items used to derive the ST strategy and the WT strategy in columns W and T of the matrix

#### Timing Positioning of the Strategic Task

As shown in Figure 4, this study distinguishes the strategic tasks as the concrete tasks and the feasibility of the strategies as shown in Figure 4, and divides the strategic tasks into immediate tasks, mid-term tasks, and long-term tasks. In other words, the process of selecting the core strategy that should be promoted in the first place before the AHP analysis is applied in advance is defined as the Timing Positioning of the strategic task.

Specification Of Strategy	High	<b>Mid-term problem</b>	<b>Urgent problem</b>	
		SO1 WO2 ST3	SO2 ST1 ST2	
		<b>Long-term problem</b>	<b>Mid-term problem</b>	
	Low	WT1 SO3 ST2	SO4 WO1 WO3 ST4	
	Low	<b>Feasibility</b>		High

Figure 4: Timing Positioning

As a measure of the specificity of the strategy, Alexander Osterwalder et al. (2011) proposed 6 items such as the Business Segmentation, Value Proposition, Channel, Customer Relationship, Key Resources, Key Activities and the Likert’s 10 points scale is used for the measurement<sup>13</sup>. The feasibility of the strategy was selected by Cheol Soo Lee et al. (2009) as four items such as economic feasibility, political feasibility, technical feasibility, and socio-ethical feasibility as indicators of feasibility of the policy<sup>14</sup>. The results of this study are as follows. Timing positioning methods for strategic tasks include 1) Urgent Problem if the specificity and feasibility of the strategy is 5 or more, 2) Mid-term task if any of the specificity and feasibility of the strategy is below 5, 3) If the specificity and feasibility of the strategy are less than 5 points, they are placed as long-term tasks.

**Implementation of AHP Using Excel Program**

As shown in Figure 5, the eigenvector is calculated by using a pairwise comparison matrix for each strategy task. The Excel function used at this time is 'MMULT'.

	A	B	C	D	F	G
2		Strategy 1	Strategy 2	Strategy 3		
3	Strategy 1	1.0000	0.2000	0.3333		
4	Strategy 2	5.0000	1.0000	3.0000		
5	Strategy 3	3.0000	0.3333	1.0000		
7						
8		Strategy 1	Strategy 2	Strategy 3	Σ	Eigen Vector
9	Strategy 1	3.0000	0.5111	1.2667	4.7778	0.1030
10	Strategy 2	19.0000	3.0000	7.6667	29.6667	0.6397
11	Strategy 3	7.6667	1.2667	3.0000	11.9333	0.2573
13					46.3778	1.0000

Figure 5: Calculating Eigen Vector

Next, as shown in Figure 6, in order to verify the consistency of the response, the consistency ratio obtained by dividing the consistency index (CI) by RI (Random Index, by Thomas L. Saaty) is calculated and it is confirmed whether this ratio is less than 0.1.

	A	B	C	D	E	F	G
1	pair wise comparison matrix				Eigen Vector (A)	matrix * Eigen Vector : (B)	B/A
2		Strategy 1	Strategy 2	Strategy 3			
3	Strategy 1	1.0000	0.2000	0.3333	0.1030	0.3167	3.0748
4	Strategy 2	5.0000	1.0000	3.0000	0.6397	1.9266	3.0117
5	Strategy 3	3.0000	0.3333	1.0000	0.2573	0.7795	3.0297
7	$\lambda_{max} =$						3.0387
8	$CI(\text{Consistency Index}) = (\lambda_{max} - n) / (n-1) =$						0.0194
9	$CR(\text{Consistency Ratio}) = CI/RI(\text{Random Index}) =$						0.0372
10	Consistency						accepted

Figure 6: Calculating Consistency Ratio

As such, the 3C & PEST analysis can be used to assign the importance of each task among the strategic tasks extracted, so that the efficiency of strategy implementation can be enhanced by focusing on the most important strategic tasks

**Discussion**

As a survey of the usefulness of this framework, 150 students who participated in the strategy management Education Department of Korea Productivity Center in 2016 were asked to pre-study questionnaires. All respondents answered that they did not know the SWOT-AHP framework and 3C & PEST -SWOT-Timing-AHP methodology after the training, 134 respondents (89.3%) responded positively that they could be very useful in business performance.

**4. Conclusion**

This study focuses on the fact that most of the internal intuition and qualitative criterion are used in the cases where the internal and external management consultants extract strategic priorities and prioritize strategic tasks. Therefore, when selecting core strategic tasks, logical, quantitative and objective criteria, we proposed a decision framework that can be judged based on logical, quantitative and objective criteria when selecting core strategic tasks. The 3C & PEST-SWOT-Timing-AHP framework proposed in this study is to prioritize priorities for the importance of strategic tasks, It is possible to judge the consistency of the response easily and simply with the Excel program of Microsoft company and the addition of the process of selecting middle-term and long-term tasks.

On the other hand, the framework presented in this study gained a very

encouraging response in terms of acceptability of the task, but the criterion of the respondent was very narrow, and the fact that there is no empirical study of the unintentional decision making process frame and expert judgment can also be limiting. In the future, we hope that the versatility of the proposed methodology will be verified through future empirical analysis, and if the errors in the proposed methodology are solved and complemented through the repeated research and feedback process, the consultant will be able to contribute a lot to decision making ability.

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