

# Dynamic Analysis of Strategic Issues in Lubricating Oil Manufacturing Industry Based on Supporting Activities

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## Abstract

Value chain expresses two major activities -primary and supporting activities- in manufacturing organizations. The organization strategy should cover different strategic issues, considering factors affecting them and based on strategy issues analysis should lead to more strategic synergy between primary and supporting activities. This research includes dynamic analysis of strategic issues in lubricating oil manufacturing industry to identify main affecting factors required to revise the company's strategy. Because of the versatility in strategic issues, the value chain was used as a tool to categorize the analysis. Basic causes as well as main intermediate variables were identified and their statuses were specified in Porter value chain. Finally, the number and weight of each main cause of organization strategic issues were analyzed using AHP statistical method which enables the organization to focus on issues of greater importance. The results of this research can be used as a useful and efficient tool for choosing the most proper strategy for increasing the organization efficiency.

**Keywords:** Dynamic analysis, strategic issue, AHP statistical method, value chain

## 1- Introduction

In decades of the 50<sup>th</sup> century Forrester, introduced dynamic systems for analyzing complicated systems. This method was first applied in occupation systems modeling, but it was immediately used in different areas including policy, economic behavior, medicine and engineering [1].

Economic-social systems stand in the group of complicated systems. Complicated systems are those which are made up of so many variances and are crimpy. The main reason that the applied policies are not affective is because of the change in the condition of a system after making a decision or adapting a policy. In a common approach, the relation between the variances is unilateral, which is linear and non systematic. If the adopted policy, change the situation in a way that the previous decision is not desirable and idealistic, the decision made doesn't reach the goal and results in undesirable effects (side effects). The phenomena's non linearity (the change of relation between system's behavior and the affective factor in a period of time) is explainable with dynamic analysis [2].

According to Porter definition the primary or value making activities are those activities which make surplus value for organization directly and supporting or fundamental activities are those activities which support the process of the business in primary activities. So, nine groups of activities are introduced in this model and different organization's processes and activities are inserted in these groups. Figure 1 demonstrates the Porter value chain and its related activities. The key point here is to recognize strategic issues and to identify the strategic and key factors in these nine groups, because the organization strategy should cover the diverse strategic issues which are introduced in primary and supporting activities and take into consideration the affective factors of these issues. Such strategy (based on the analysis of strategic issues) enables the organization to make strategic coordination and parallelism among all of the primary and supporting activities [3].

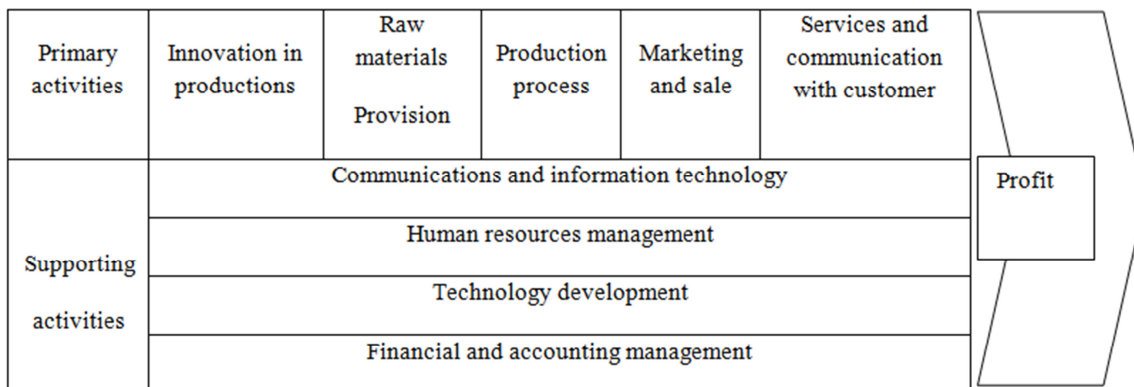


Figure 1- Porter value chain

For analyzing each one of the issues, first the issue is described. In other words, this question is answered firstly: why this issue is strategic? Then, those strategic realities which are pointed by the sages are taken into consideration and finally dynamic analysis of the issue is done based on the existing realities. In dynamic analysis, there are some intermediate variables and fundamental factors as well as the main variable (strategic issue). Fundamental factors affect the main variable directly or they will connect to the main variable through affecting the intermediate variables. Besides, there may be relations between intermediate variables. All of these relations have been investigated and the results are present in the diagram of dynamic analysis of the strategic issue.

After dynamic analysis of the issue, the fundamental factors are analyzed in the organization activities area and the main purpose is to answer the following questions in the conclusion part: “Which one of the studied organization activities area are more important according to the dynamic analysis and investigations about the cause and effect relation of the variables?” and “Which one of the organization main activities area is more important?”

## 2- Theoretical framework and literature survey

### 2-1- Theoretical framework

Dynamic systems mechanisms were planned and investigated in 1940s and 1950s decades. This field aroused from industry and the issues attached to it. Their first performances were related to some management issues like, instability in production and occupation, the decrease in the growth or incompatibility in organizations activities and market ratio decrease. Dynamic system has been used in broad area of issues, among which are programming strategy and integrated designing (Forrester and Linz, 1980), economic behaviors (Sterman, 1983), social management (Hammer and Clayer 1991), non linear compound dynamism (Moskida, 1991), dynamic decision making (Sterman J.D 1989), software engineering (Abdolhamid, 1984), and provision chain management (Tavil, 1990, Barlas and Eksogan, 1997, Ekreman, 1999).

The purpose of investigating outside, inside and beneficiaries is to recognize, discover and formulate the strategic issues, because the root of a successful strategic planning is recognizing strategic issues. Usually, in real world, strategic issues are not behaved appropriately.

Strategic issues are defined as it follows: strategic issues are those discussions which influence the organization extremely at present or in the future. If an appropriate strategy is adopted in facing with a strategic issue, it is expected that the organization has obtained a strategic profit or got rid of a strategic problem. Strategic issues usually affect commitments, predictions, values and services criterion [4]. Strategic issues are divided into two groups; one of them is called strategic choices which connect to the ideas and alternative methods of organization in the future. But the second group is strategic issues which are related to existing challenges, problems and obstacles and they are vague or ambiguous. In spite of the strategic choices they are about the issues which exist at present or are predictable in incoming future in the existing situation. In fact they are the promoters of managers’ strategic thinking direction and not a bulk of raw and irrelevant data. [5].

Hierarchical process which was indicated by Thomas Saati in 1996 was a process based on the concept of super matrix for solving the problems which are dependent. In analyzing AHP hierarchy process there are four conditions which all of this method’s calculations and rules are firm up, they are: reciprocal condition, homogeneity, dependency and expectations[6].

### 2-2- Literature Survey

Bisbeh and Malagwa (2012) worked on the strategic performance assessment systems for instructing strategy and answering the question that whether these systems perform in dynamic environments? They investigated strategic performance assessment system on organizational performance by making a strategic instruction and a

series of strategic issues which resulted in compilation process of the considered strategy[7].

Sarijavi and koosla (2012), with applying two by two comparison methods assessed the competitive strategies priorities in provision chain. The advantage of precise unity and an access to a common strategy in provision chain is recognized broadly, however among other competitive advantages, it is difficult to access to this issue, because strategic stability assessment tools of provision chain are limited[8].

The purpose of this article is to explain and indicate that how two by two comparison method can be used to find the importance and the role of each one in the members of supply chain regarding the importance of different competitive priorities including cost against flexibility.

Wang&Tseng (2009), studied strategic decisions in organizational growth with the help of modeling and investigating provision chain simulation. Simulating model studies the issue from the aspect of finding the organization aims and expectations of organizational growing and how the relation between variables is. This modeling gives the managers a full concept of organization with the help of dynamic system method.

Lehr& Milling (2009) researches, stand in the group of those studies which are done in the area of investigating the effective strategies using dynamic system method for optimum usage and value added reference for products which are at the end of their lifetime cycle. In this study, some simulations are done for investigating suggested model structure and finally the existing economic potentials are introduced for appropriate use of productions in spite of existing complications and connections in the system.

Otto (2008) studied dynamic system model for assessing incoming strategies for entrance to complex markets by marketing managers which are not often able to use them because of the existing complications in other decision making systems, and in order to make cooperation between them and help the system outputs for precise investigation of entering strategies to the new markets.

Cheng et al. (2008) investigated the dynamic system modeling approach for strategic management of the provision chain of TFT-LCD in uncertain and continuous disrupting services condition and studied different policies of capacity investment under these condition and appropriate time for their administration and their utility and effectiveness on the entire system.

Penlope (2005) devoted his time on studying dynamic system model for investigating relevant problems to source limitation and provision chain management and different strategies tests according to empirical evidences. The mentioned model is a complete model made up of market factors, provision chain internal segments, the costs and chain transportation, and the flow of the orders, materials and cashing.

Georgiadis et al. (2005) studied dynamic system modeling structure for food provision chain structure, then introduced a comprehensive methodology with investigating different capacity policies for food provision chain and transitory events which results from the parameters effect and market limitations. This model is developed for better comprehension of Greek south and north restaurants and national distribution network.

Zhang& Dilts (2004) in a dynamic analysis studied the categorized management structures of provision chain of networking organization structures and control on different effects control of demands and structures on cost, performance and dynamic relations between them. Besides, the effects of information technology developments were studied on the respond pace and chain performance with sensitive analysis on the results of the model.

Ge et al. (2004) dynamic system modeling of provision chain was applied for studying the problems like sudden demand increase and bullwhip effect chain in a supermarket chain in England.

Schröter& Spengler (2003) suggested a dynamic system model for strategic management and investigating the effects of different policies in provision chain with closed rings. Different policies are studied for the goods transfer time, delivering the equipments and rearranging time.

### **3- The hypothesis development and conceptual model**

In this research, first, the organization's strategic issues, which are done through open interviews, are determined. Then the strategic issues which are taken into consideration as main variables are dynamically analyzed for finding the major factors. Figure 2 demonstrates the overall schematic of dynamic analysis for the strategic issues using intermediates variables to access the fundamental factors. Finally a two by two comparison is done among the main factors and they are scored by Expert Choice 11 data analysis software. Then strategic issues are prioritized regarding the weight of the major factor in each issue.

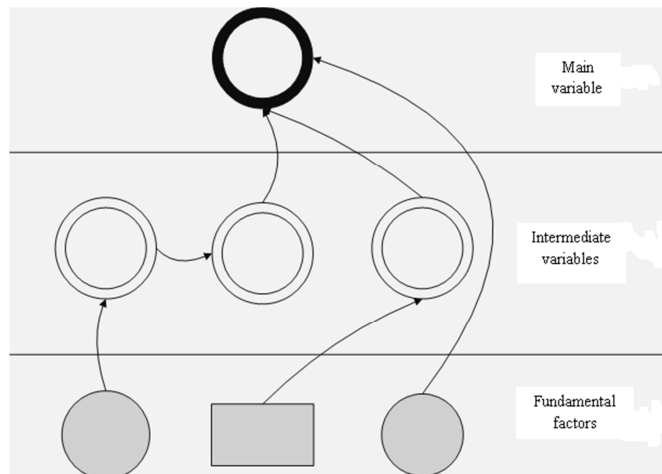


Figure 2- Dynamic analysis of the strategic issues to access the fundamental factors

#### 4- Methodology

Choosing strategy needs foresighted decisions with a complete and continuous viewpoint. According to this viewpoint, one of the management tools is dynamic system science. This science has the ability of simulation. With the help of simulation, the ambiguous results of decision making are appeared. The main purpose of this simulation is to accelerate and facilitate the system's behavior comprehension in present and future situations. So first, main variables are recognized and their relations are established in scientific chains framework [9]. But the main point here is to emphasize on the primary activities in identifying organization strategy. In other words, the organization strategy consists of organization emphasis on one (or at most two) of its primary activities.

However, the importance of supporting activities should not be ignored, since as it was indicated, organizational strategy should cover different strategic issues which are identified in primary and supporting activities.

In the studied organization which is a great lubricating oil manufacturing company in Iran, through holding strategic committee meetings of the company senior managers and mental storm meetings, after a true recognition of realities and strategic variables, strategic issues headings were identified as follows:

- 1- Marketing and selling
- 2- Cashing and profitability
- 3- Additives supply
- 4- Products export quantity
- 5- Degree of knowledge and experience
- 6- Production/sale software program
- 7- New product development
- 8- Domestic market proportion

But each one of these headings is affected by different factors and variables so that the basics of one heading are sometimes identified in another heading. So for having an access to major and fundamental factors, each one of the above strategic issues should be analyzed dynamically and in detail. Besides, strategic issue foundations are sometimes related to the organization external factors outside the organization activities area.

Focusing on strategic issues in one field of Porter chain value shows the strategic importance of that field for organization. However, the focus of the issues alone is not enough for assessment of the strategic importance of fields, and it is here that dynamic analysis, through identifying the main factors of each issue, shows that in which fields the focus of the main factors is more.

Because of the issues diversity, in this research, those issues which affect on the field of supporting activities in the studied company would be analyzed dynamically.

#### 4-1- Cashing and profitability

##### 4-1-1- Explaining the problem

The company faces with cash deficiency. The profitability decreases in recent years and its debts increases so the company's profit margin encounters a marked decrease. The main reason for this is the production cost significant growth, resulted from the increase in the amount of buying raw material and the increase in direct wage cost, so the stockholders of the competitive companies benefit from higher output.

##### 4-1-2- Strategic facts

- 1- The organization performance is weaker than the competitors in inventory control, because the stock is

- replaced in every 160 days, but in competitive companies they are replaced every 80 days.
- 2- The period of demands recovery is approximately twice the competitive and it has grown worse in late years (the period of demands recovery is every 108 days and the competitive every 65 days).
  - 3- A large amount of the current cashing and short time investments are spent for purchasing raw material stock.
  - 4- The participation of organization departments in budgeting and financial issues is low and it makes some problems including, disagreement between the sale and financial policies.

#### **4-1-3- Dynamic analysis**

Dynamic analysis of cashing and profitability level is shown in Figure 3. Among the main factors in dynamic analysis of profitability, as it can be observed, three factors of raw material provision, marketing and sale, and exports are remarkable strategic issues themselves. The details and reasons of these factors are investigated separately.

#### **Figure 3- Dynamic analysis of cashing and profitability level**

Every company's profitability results from the difference between costs and incomes, but the organization costs are unbalanced due to inappropriate management of the flow of assets, thus make the organization to use facilities. Therefore the company debt increases and the repayment of the facilities interest has a negative effect on the organization profitability. However, for appropriate cashing management, the assets management of the company should be organized, and a harmony between the costs and incomes should be established. Compatibility between the costs and incomes needs the participation of company departments in budgeting and integrated software programming, in order to harmonize the costs with the incomes in long time, mid time and short time programs. Integrated software programming helps the assets management in optimizing the degree of raw material assets, in production process.

#### **4-2- Degree of knowledge and experience**

##### **4-2-1- Explaining the problem**

The company needs employing skilled labor forces with high abilities for increasing the flexibility, but employing skilled and experienced labor forces is not easily done in the organization. On the other side, the company loses some of its key labor forces for some reasons. The organization skill and experience is not in a favorable level, because 80 percent of the company are beginners and inexperienced, so an appropriate labor force training program is necessary for them.

##### **4-2-2- Strategic facts**

- 1- Several key personnel have leaved the company which their discharge has been generally done by the company itself.
- 2- Precise investigations are not done about manpower satisfaction, and organization key personnel discharge. Besides, there is not accurate information about the condition of manpower indices including job satisfaction or loyalty.
- 3- Knowledge transfer and replacement nurturing are not made, on other hand, manpower training and nurturing is not taken into consideration in organization appropriately.
- 4- The required skills and experiences for lubricating oil industry are extremely especial so the number of qualified manpower would be very low.

- 5- The organization is frequently faced with management changes. The quick management changes and organization's not so fair conditions, leads to avoiding skilled employment from competitive companies to be employed.
- 6- Labor force problems result from disability in personnel employment and contract conditions which make motivation problems.

#### 4-2-3- Dynamic analysis

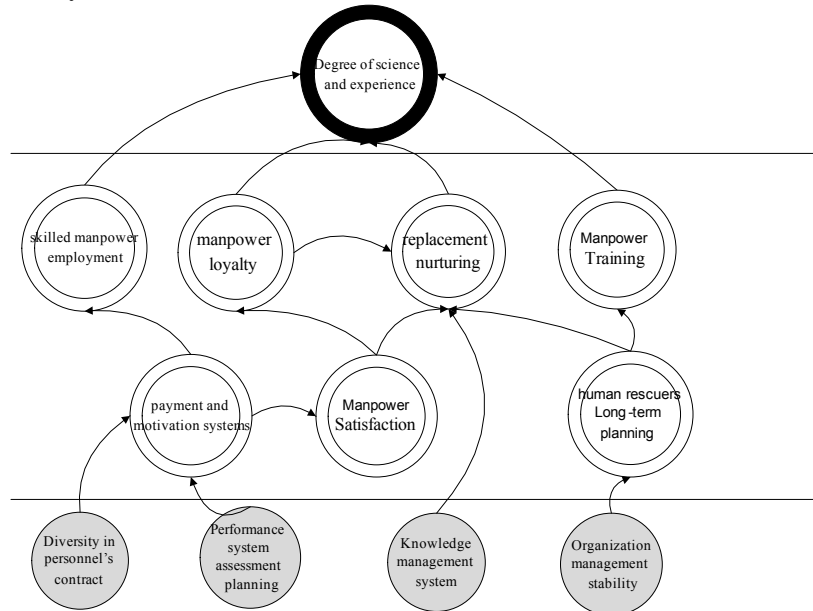


Figure 4- Dynamic analysis of the knowledge and experience degree

Figure 4 demonstrates dynamic analysis of the knowledge and experience degree. Organizational knowledge is a complicated issue, but the relevant strategic facts which are derived from the sages, believe that organization knowledge and experience level are related to four factors: training, replacement nurturing, loyalty and skilled manpower employment. Training needs long term programming in organization manpower management, which in turn needs management stability. In other words, without management stability and thus without such programming, if there are some trainings in the organization, it doesn't bear enough effectiveness, because training should also be programmed as one of the segments of manpower management in major and long term programming.

Replacement nurturing needs other strategic factors in addition to manpower long term programming, including knowledge management system, personnel's satisfaction and their loyalty to the organization. However, personnel's satisfaction depends on payment and motivation systems in organization. In order to achieve such systems, a performance assessment system should be established in organization which can be relied on its results for personnel's encouragement. In addition to this performance assessment system, the conditions should be provided for making changes in personnel's contract in organization, so that, they can observe their performance in the organization through services payment system and organization payments.

There are four major factors in the field of knowledge and organization experience level which are present in the Figure 4: organization management stability, knowledge management system (for recording the personnel's experiences and the possibility of its transfer to others), performance assessment system designing and establishment, and making changes in personnel's contract.

#### 4-3- Production/ sale software program

##### 4-3-1- Explaining the problem

The capacity and ability of the company production is specified so the determining factor in production capacity is programming which is affected by different factors including procurement, sale, and programming issues. Since there is not an appropriate programming in marketing and sale planning, production, and procurement, so, the monthly production planning faces with problems. However, the organization performance in comparison with competitive is weaker in stock control ,because the stock is replaced every 160 days in average in comparison with almost every 80 days for competitive companies. So, the role of production programming and its compatibility with sale is very significant.

##### 4-3-2- Strategic facts

- 1- The production technology does not have the flexibility required for producing different products in a short time to cover the market needs. Also, production facilities are too old and should be replaced with



- new ones.
- 2- There is no production integrated software (e.g. ERP), so the programming process would not be highly efficient.
  - 3- There is not enough attention to packaging in company, but if the material and packaging facilities are supplied, the production rate and flexibility will increase hence production program would be achieved according to sale needs. In other words, it should be said that the major problem is that suppliers do not perform their obligation properly.
  - 4- So far, the focus has been on production and sale of Base oil, and the beneficial potential of other productions to produce a great amount of added value have been ignored. If the necessary raw materials are provided, the company can produce all of the competitors' productions.
  - 5- In blending unit, there is a low possibility for replacing the systems in case of disrupts and this fact may stop the production.
  - 6- Orders for industrial oils in the sale department are trifle and according to the customer's needs. Such trifle production should be avoided with running researches on the market and correct sale expectation.

#### 4-3-3- Dynamic analysis

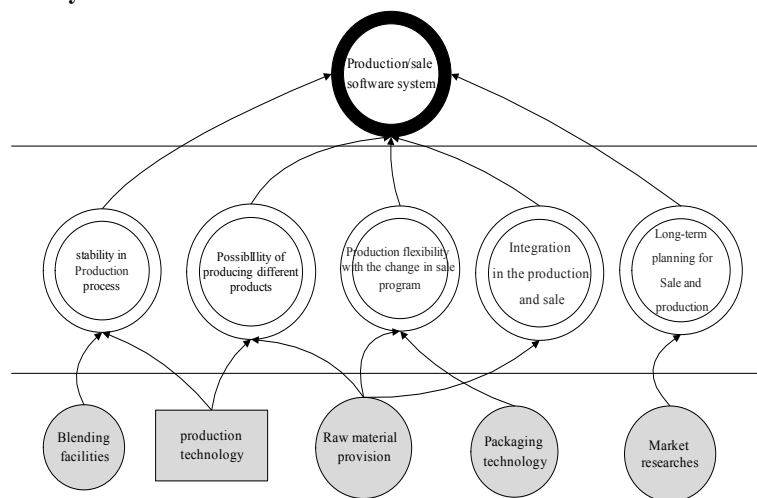


Figure 5- Dynamic analysis of production/sale software program

Dynamic analysis of production/sale software program is shown in Figure 5. One of the major factors related to this issue, i.e. production technology is an outside factor. Meanwhile, raw material supply is a major factor as well.

It is resulted from strategic realities that five factors affect directly on production/sale software system issue: long term programming for production and sale, integrated production/sale programming, production flexibility with making changes in sale program, the possibility of producing different products, and production process stability. However, each one of these factors are connected with several major factors, and they are not improved and solved without paying attention to major factors. All of the relations are presented in Figure 5, but as an example here, production flexibility is focused on, with the changes I sale program. This factor needs three major reasons: integrated programming software, the technology of product packaging, and raw material procurement. In other words, if different parts of the organization are planned through a integrated system, any change in the sale program leads to related changes in the program of procurement and production departments fitting to sale demand.

#### 5- Data analysis

After identifying the main factors in each supporting activities areas of strategic issues, it was determined to score each one of the main factors regarding its importance in lubricating oil production industry, by applying hierarchical AHP method. For processing this issue, a two by two comparative questioner for the main factors of strategic issues was provided, and distributed among 16 senior managers of the company. Then, the questioner outcome was situated in the matrix form and the normalized matrix was analyzed by Expert Choice 11 software.

Table 1 demonstrates the main factors scores exploited from the software calculations.

Activity's area		Strategic issues	Main factors	Main factors weight
Supporting activities	Information technology and communications	Production/sale software system	Market researches	1.04
			Packaging technology	0.33
			Raw material provision	1.80
			Production technology	1.51
			Blending unit facilities	1.19
			Integrated software	1.16
	Human resources management	Degree of science and experience	Organization management stability	0.11
			Knowledge management system	0.48
			Performance assessment system planning	0.57
			Diversity in personnel's contract	0.56
	Technology development	—	—	—
	Financial management and accounting	Cashing and profitability	Participation of departments in budgeting	0.54
			Integrated software	1.16
			Utility and material provision	1.80
			The cost of the wages and other costs	1.19
Marketing and sale			1.45	
Export			1.34	

Table 1 - Main factors scores exploited from the software calculations

## 6- Discussion and conclusion

As it was noted before, regarding the diversity of organization activities in this research, only the issues in supporting activities area of Porter value chain were investigated.

After summing up the scores related to the main factors of the strategic issues of the studied company priorities determined as it follows:

- 1- Cashing and profitability of the organization with 1.24 score
- 2- Production and sale software system with 1.17 score
- 3- Degree of science and experience with 0.43 score

The level of organization cashing and profitability issue stands at the high priority so it is advised to the company to put this strategic issue at the highest level of its affairs and establish and carry out an appropriate strategy corresponding to it. The next priority is the integrated software system which was in the technology area of Porter value chain, so it is advised to the company to establish a strategy for this issue regarding to domestic and foreign restrictions. Finally the organization degree of science and experience which are included in power man management activities of Porter value chain situates in a lower importance level.

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