STUDY ON THE EFFECTIVENESS OF STRATEGIC PLANNING ON THE FLEXIBILITY OF OPERATIONAL PLANNING CASE STUDY: REFINERY, PHASE 9 AND 10, SOUTH PARS

Sayed Habib Maktabi and *Mehdi Shamsipour
Department of Management, Islamic Azad University, Qeshm International Branch
*Author for Correspondence

ABSTRACT
The significant changes in public sector makes the top decision-makers of the government thought inevitably about the strategic approach on what public companies should do, and how to use the strategic planning. Although both the strategic and comprehensive plans are a set of concepts, procedures, and tools, but there are different approaches for strategic planning which will be provided by purposes and the desired situations. In this study, we attempt to assess the effectiveness of the strategic planning on the flexibility of Operational planning. Since the information about the managers are collected through a questionnaire, this study is measurement; it will also be applicable in providing the services and meeting the operational managers because the expected results could be useful and in line with the manager's performance and staff and legislations which lead to increase the organizational productivity. The questionnaire technique is used for assessing the evaluation indices of the effectiveness of strategic planning on the operational planning in the main processes. Delphi technique is used for assessing the differences between various components and their status in the main processes and various companies. Data will be collected in fuzzy form in order to determine the weight of indices and components, and after collecting data the fuzzy-neural technique is used for achieving the main goal. In this study, MATLAB software is used. The results show that teamwork is the most important factor in operational planning. Through reinforcing the teamwork in different parts of the organization, it can be assured that the quality of work will be double. Because the fault will be less in the team-work and the individuals try to corporate and work together in order to represent their works flawless.

Keywords: Strategic Planning, Flexibility, Operational Planning, Fuzzy-Neural Techniques

INTRODUCTION
Because of massive transformation and developments and mutual cohesions and dependences, the boundaries between the public, private and non-profit parts are changing and no organization or company is full responsible for a particular matter. Increased environmental uncertainty requires that government agencies and non-profit organizations (and societies) try to think strategically, unlike the past. But you have to realize the strategic planning is not considered the goal by itself, it is merely a set of concepts to help the leaders in making major decisions and handling the critical practices. What important is the strategic thought and action but not the clear process for strategic planning. Due to these thoughts, the strength and weakness points should be realized by the strategic planning in order to meet properly the development of the world and use the opportunities and overcome and minimize the existing threats.

The various definitions about strategic planning can be founded in different scientific references. According to these definitions, it could be said that the strategic planning is the systematic method which support the strategic management process. The strategic planning includes all applications which result in defining the goals and determine the suitable strategies in order to achieve the goals for total organization (HamidiZade, 2005). The strategic planning is the framework for applying the strategic thoughts and guiding the mission in order to achieve the specified goals and results. In other word, it is the organized attempts for making basic decisions and applying the critical actions which form the entity of organizational actions in the legal framework (Brison, 1999).
Bilo et al., believe that strategic planning is the framework for applying the strategic thoughts and guiding the mission.

Officials and authorities in the down categories of the organization should conduct the mission planning through the determined strategies and total goals of the organization and perform the unimportant goals in their unit (MoeniDehkordi and Salman, 1999). In total, management authors and thinkers represented the special definitions about these planning which could be detailed that "the strategic planning is a process for equipping the organizational resources and uniting the attempts in order to achieve the long-term goals, according to the internal and external limitations and constrains (Iran and Sasan, 1996). The compilation of the strategic planning in one organization is considered as the main prerequisites of the success in that organization. Because performing any action without target in specific in organizational dimension, could deviate the organization from the development and lead to failure. In strategic planning, the macro goals and its application constrains should be realized; and the specified strategies should be codified to simplify the goal achievement (Hmidizade, 2005).

But the Operational program is the heroic action which can help in actualizing the imaginations and dreams. The operational program is a method which entrust you to realize your organization outlooks. It also explains the method which your group uses in order to apply the strategies. An operational program includes a set of operational steps in order to achieve the predetermined goals.

Each operational step should include the following information:
- What actions should be performed?
- Who will be the responsible for performing the determined action?
- When each action should be performed and how long they may take time?
- What resources may need for applying the actions?
- Who they obtained information should be delivered to? (Mobini and Salman, 2012).

In large and small organizations, the strategic planning has been formed and applied in different ways. In the small organizations, the method of planning is more informal and often followed by the manager's viewpoint. He determines the future goals and strategies and notifies to his staffs orally and figurative.

At great organizations, the strategic planning is followed by special discipline and not performed individually. So, it requires the certain position in the organization. In the process of the strategic planning, the group of specialists and experts should cooperate with the excellent managers and policy-makers in organization. In the centralized organizations, the planning group is placed on the top levels and the top managers perform the planning. In the non-centralized organizations, the minor skilled groups in accompanying with the basic and central managers perform the planning actions. They also use the top manager's viewpoint of the organization for applying the first step. The best situation for the strategic planning in the organization is the combination and consolidation in different categories of the organization and the participation of the officials of the various levels in planning action. Therefore, collecting data, obtaining the possible goals and strategies, making the necessary prediction and technical affairs will have been more easily happened, and due to the official of various level in the planning action.

The action motivation and application of the selected strategies will be increased and organizational organization will be stronger (Dorri et al., 2012).

Separation of the strategic and operational planning is not possible. Because what in the strategic planning is considered as the determined goals, in the operational planning did applicable. So, these two planning are cohesive and not separated.

Using the strategic planning has been proposed as the necessity in the organization and the manager can determine his orientations of the future through these planning and equip the organization for next changes and developments (Alvani, 2007).

Bilo et al., believe that the operational and strategic planning are supplemented and a framework for applying strategic thoughts and guiding the operation should be needed for the strategic planning. They proposed that operational planning focuses on the productivity and efficiency. Strategic planning focuses on effectiveness. They believe that effectiveness means the main goals could be determined and
obtained. They also believe that in efficiency, the determined goals could be obtained with maximum productivity. Each organization needs the productivity (effectiveness and efficiency) in order to achieve the perfection (Rain and Mizberg, 2008).

Generally, the strategic planning tries to promote the capability and power of the strategic management in the organization so that the excellent managers get involved in planning process and play their role properly. However, getting involved in this process is not sufficient, the excellent managers should coordinate, unit and participate actively in developing the process of planning, compilation and application of the codified strategies. The unity, coordination and actively participation of the excellent managers are considered as great factors in applying the organization strategies (Mobini and Salman, 2010).

In short, Strategic planning tries to answer three main questions of the organization:
Where is the organization?
Where it wish to go
How it will go

Answering these questions, the strategic planning represents a framework for organizational activities and staffs. Finally, it help the organization in achieving the total development, favorite organizing and having better knowledge from current and future environment and customers and knowing their capabilities and limitations (Rezaeian, 2007).

Operational planning is the final part of the management in each organization and its goals are as following:
1. Achieving the short term practical outcome: The short term results include the financial results, the sale operation of new product evolution, new customers and markets and human force development. But it is not limited to these affairs. These goals should be more detailed and dedicated in strategic planning.
2. Using the component of current year (calendar) in strategic planning of the organization
3. Operational planning is the first factor which can make the strategic planning action. So, it should be coordinated and merged with the strategic planning.
4. It assures that all parts of the organization are progressed.
5. Getting Involved and committed of the main individuals for achieving the organization goals.

Background
Several studies have been conducted about the topics of this investigation. For example, in few foreign articles written by as Mohamedi and Sntavy (2013), entitled "neural-fuzzy method for solving the operational planning problems through strategic planning, the information entropy method is used to determine the weight of the applied criterion, due to the lack of decision-maker preferences. The neural-fuzzy method is used to classify the main factors in the operational planning regarding the inconsistency of criterion. In another article by Oven and Vinem (2007) entitled "the decision-making framework for the strategic management used in gas and oil industry", a framework is represented for strategic management according to the decision-makers judgment of the operational managers, the related strategies and decision-making process. Also, in another article entitled "using the evaluation of the operational management for assessing the strategic planning and determining the increased costs rate risk in the international construct projects", Dicman and Birgonel (2007) have represented a method for evaluating the performance of the operational planning through strategic planning in the construct-fuzzy projects.

In internal investigations, Nakisa (2012) studied on the operational management in the gas and oil projects aimed to identify the process of operational management and its application in the gas and oil industry. Seyed (2011) in his article entitled "representing the evaluation model of the effectiveness of operational planning on strategic activities of the organization for development projects", represented a methodology of evaluating the operational planning in order to determine the amount of project strategies and estimate the deviation of strategic planning of the project. This methodology uses the effectiveness graph for constructing the model and evaluating the fuzzy programs in order to estimate the increased control of each activities and the qualitative deviation of project phases. Dr. Ali and Majid (2010) in their
Research Article

article entitled "introduction of strategic and operational planning", tried to propose the importance of the strategic planning in the effectiveness of the modern organizations. By defining the strategic planning properties, they expressed the differentiation between this planning and operational one. Then the various styles of strategic planning have been expressed and organizational strategies determined. Finally, the process of strategic planning has been proposed in a system form and its required techniques discussed.

Expressing the Problem

Out of all duties, the planning management is the most critical which can link the present to the future. The basic goal of the planning is to reduce the accepted risk of the possible events and to make coordinated decisions for achieving the organizational success. The strategic planning is a systematic method which can support and confirm the strategic management. It includes the affairs which result in defining the goals and determining appropriate strategies for total organization. It tries to promote the power and capability of the strategic management of the organization so that the top managers get involved in planning process and play their role properly. For representing the optimized and efficient information, the present study seeks to create a model determining the effectiveness of strategic planning on the flexibility of the operational planning.

There are various techniques used for forecasting and making priority of the factors affected the planning. In this study, the neural-fuzzy network technique and the artificial intelligence algorithm have been used to show that these networks will be able to learn the complicated non-linear series and adapt with various statistical distributive functions.

The strategic planning is codified purposeful in many organizations. The managers in various levels commit themselves to apply these programs more effectively. In many cases, the managers play major role in codifying these programs. Due to the environments and local and foreign resources, the managers codify the strategic planning.

The refinery of South Pars phase 9&10 is not excluded. According to the common gaseous resources, it should follow the more productivity and transcend in production and use the modern technologies for the continuous production. Certainly, it will not happen unless by the long-term planning regarding all dimensions especially the application of the operational programs and its observation while applying.

The researcher had some concerns about the study topic: what factors causes the mutual effects on both operational and strategic planning? What factors can play determinant role in applying the operational planning and what factors can affect the strategic planning? How the application of the operational planning can lead to define and re-codify the strategic planning due to the level of these programs activity?

The main goal of this study is to examine the effectiveness of the strategic planning on the flexibility of the operational planning in phase 9&10 South Pars refinery according to the neural-fuzzy model using MATLAB software.

The main questions which the research seeks to answer are as follows:

What are the most important factors influencing the strategic planning? What are the appropriate indices to assess the operational planning by the strategic planning perspective? Could we separate and prioritize the indices from others in term of the importance and the unacceptable status? Would we create the neural-fuzzy model which can be able to determine the effectiveness of strategic planning on the flexibility of the operational planning in phase 9&10 South Pars refinery and to generalize to other industries?

MATERIALS AND METHODS

The Research Method

The statistical population was 120 managers in unites of repairs, refinement and commercial. 90 individuals were selected as the samples. Accordingly, they refer to the related unites for the research questionnaire and the required information were collected by research questionnaire. Therefore, we try to apply the appropriate and accepted indices and components using the international resource model. Then these indices will be used for the experts of phase 9&10 refinery of South Pars, using Delphi model.
Other indices will be proposed natively through interview and questionnaire, in term of state condition. The least qualifications for the experts are as follows: at least 5 year experience about one part of triple parts of the phase 9&10 refinery of South Pars, at least license document (B.A), communicate with academic centers and study about the concept of the strategic, operational management and human relationship. Data will be collected in fuzzy form in order to determine the weight of the indices and components. After collecting, the neural-fuzzy technique is used to achieve the main target. All steps of the research are applied by MATLAB software.

**RESULTS AND DISCUSSION**

**Research Findings**

The action of the neural network is that whenever an input pattern is represented, it creates an output pattern. The neural networks are learned by the training patterns to classify the various patterns. Also, they have the generalization properties; it means that they can answer correctly to those patterns which not represented certainly. So, two properties of the neural networks which is the same as human brain, is the learning and generalizing.

**Developing the Neural-Fuzzy Network**

In this section, a neural-fuzzy network is developed for identifying the factors affected the strategic planning of the organization. First, the fuzzy logic is described in the form of fuzzy set as follows:

\[ \tilde{A} = \{ \text{Factors Influencing the strategic planning of the organization} \} \]

In other word, the factors influencing the strategic planning of the organization is regarded as the fuzzy set, and the register of each factor is followed by the fuzzy logic.

ANFIS toolbox in MATLAB software has been used to develop the neural-fuzzy network (adaptive neural- Fuzzy inference system). In the first step, input and output data required for the network should be ready. For this purpose, different states of manager's answers to the questions of the questionnaire have been converted to fuzzy numbers. These states are "very low", "low ", "medium ", "high "and" very high" which considered as 1, 2, 3, 4 and 5 in the questionnaires. To convert this number to the fuzzy set, the triangular membership function is used. For example, the state of "very small" corresponding to "1" is converted to fuzzy number (0, 1, 2). The other states are converted to fuzzy according to table 1.

<table>
<thead>
<tr>
<th>Corresponding fuzzy number</th>
<th>Corresponding finalize number</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0,1,2)</td>
<td>1</td>
<td>&quot;very low&quot;</td>
</tr>
<tr>
<td>(1,2,3)</td>
<td>2</td>
<td>low</td>
</tr>
<tr>
<td>(2,3,4)</td>
<td>3</td>
<td>medium</td>
</tr>
<tr>
<td>(3,4,5)</td>
<td>4</td>
<td>high</td>
</tr>
<tr>
<td>(4,5,6)</td>
<td>5</td>
<td>very high</td>
</tr>
</tbody>
</table>

The membership function of the input states has been shown in figure 1. According to the figure, the degree of membership of a given number is equal to 1 for each case. For example, in the case of the "medium", the membership of its given number "3" is considered to be 1. This means that if a variable is 3, certainly belongs to "moderate". Accordingly, the input –output patterns of the network is constructed in fuzzy form.
First, in the part of Load Data, we represent the input – output patterns to the network. In this part, three sets of input – output patterns named "training, evaluating and tests" are introduced to the toolbox ANFIS. The percentage of the training, evaluating and testing set in total input - Output patterns has been 85, 10 and 5. In other words, 85% of the input-output patterns is randomly selected and represented as the training set to the network, so that in each iteration of the learning algorithm, the network weights and biases are adjusted accordingly.

Figure 1: The membership function of input state

Figure 2: Test of input output patterns of the network
Also, 10% of the input-output patterns were randomly selected and represented as the assessment set to the network at each iteration. It should be noted that the assessment set is merely used to control the training process on order to prevent the more network training. Finally, 5% of the input-output patterns (the remaining input-output patterns) is represented to the network for measuring network performance for new data.

Then, the structure of membership functions of neural-Fuzzy networks should be formed. With regard that 5 was considered the membership functions for structured data, the number of membership functions in the network input structure was equal to 5, and its type is selected in triangular from. In the output membership function, indicating the degree of influence of various factors on the organization's strategic planning, its type is selected fixed.

Then, the main structure of the network is examined. After determining the network structure, we should train network by the training data, until the network can set its weights and biases in term of this data with minimum error. Hybrid algorithm is used to learn network. The error tolerance is equal to zero, which means that if the error difference between in assessment data in two continuous durations related to the training algorithm is equal to zero, the training algorithm will be terminated. The maximum number of the repeated duration of training algorithm is equal to 150, then, the network is continued on order to develop the target (Figure 2).

After constructing the network and testing the errors percentage, the network is stored to achieve the final result.

One sample of the analysis is as follows:

Factor: Teamwork Quality
In the questionnaire related to the exploitation managers, this factor is proposed in 21th question. In the questionnaire relating to the commercial and financial managers, it is proposed in 22th one and in the questionnaire relating to the maintenance managers, it is proposed 22th. The information relating to the answers of these three categories provides 90 data for this factor.

![Figure 3: Network output for testing patterns](image)

First, 90 factors are arranged randomly. (The random numbers are 1 to 90 and data arranged accordingly). Then, one-unit delay is made for creating the output input variables for the software in data. For example, fourth data is regarded as output for third data. This delay creates 89 output-input patterns for the software. The percentage of the training, evaluating and testing patterns is equal to 85, 10 and 5. So, 76
first input-output patterns are selected as the training patterns, 9 patterns as evaluating patterns and 4 final patterns as testing patterns. These data in MATLAB software are defined as trn, tst and chk for training and evaluating and testing patterns, respectively.

As you can see at figure 3, the network output for testing patterns is equal to 3.21 relatively, indicating the effect of 55.25% in this factor.

After developing a neural-fuzzy network, which has appropriate error rate, 10 factors of the most important factors affecting organization strategic planning have been obtained as table 2.

Table 2: 10 major factors of operational planning in term of the effect percentage on strategic planning of refinery

<table>
<thead>
<tr>
<th>Effect percentage</th>
<th>Factor</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>55/25</td>
<td>Quality of teamwork</td>
<td>1</td>
</tr>
<tr>
<td>54/75</td>
<td>Senior management support of operational programs managers engage in strategic planning of the Refinery</td>
<td>2</td>
</tr>
<tr>
<td>53/50</td>
<td>Effectiveness of relationships between different areas of management</td>
<td>3</td>
</tr>
<tr>
<td>51/30</td>
<td>Skill level of operating executives at refinery</td>
<td>4</td>
</tr>
<tr>
<td>50/75</td>
<td>Resolving the conflicts related to the strategic planning among the managers</td>
<td>5</td>
</tr>
<tr>
<td>45/75</td>
<td>Skill level of staff of different areas</td>
<td>6</td>
</tr>
<tr>
<td>43/25</td>
<td>Mutual reporting between the senior managers</td>
<td>7</td>
</tr>
<tr>
<td>30/75</td>
<td>Guidance committee for operational activities in the refinery</td>
<td>8</td>
</tr>
<tr>
<td>30/00</td>
<td>Using the efficient method for managing the human force</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>

Regarding that the most important and effective factor is the teamwork's quality; it is recommended that the training curriculum, training the teamwork and enhancing the teamwork temperament is prioritized at the refinery. Moreover, another important factor is the manager's support of operational planning. It is recommended to set the regular meetings by senior managers for seeking the process of short term programs and to apply its result.

Suggestions for Future

According to research findings and the obtained results, the following items are recommended for future research:
- Use TOPSIS method to rank the most important operating factors
- Use ANP method in ranking the most important factors of operational planning
- Use the trapezoidal fuzzy numbers in the conversion of verbal variables to the fuzzy numbers
- Identify the most important factors in strategic planning through questionnaires

REFERENCES

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