

ORIGINAL ARTICLE

The effect of strategic management to minimize pollution for oil refinery (the case of Tehran oil refinery)

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With increasing rates of pollution in major cities, the various concerns that arise from implementing an environmental project are on the rise, while large industries such as oil refining often have adverse effects on the environment. Therefore, the present study examines the effects of strategic management on pollution reduction caused by oil refining processes. This is a descriptive-case study. A practical purpose was conducted in year 2017. The realm of Tehran Oil Refinery Research, and the statistical population of this research, consisted of senior experts, group presidents, and refinery managers employed in the Tehran Oil Refinery, which numbered 35 people. This study, based on cluster sampling. The Delphi method was used to design and prepare the questionnaire. The questionnaires were used to identify and weigh the strengths, weaknesses, opportunities and threats. The validity of the questionnaire was verified using Lavshé method and the reliability of the questionnaire was obtained using Cronbach's alpha coefficient, which was approved. Identification and analysis of strengths, weaknesses, opportunities and threats were performed based on SWOT. In the final analysis, Friedman test was used to determine the significance of each item. All information was analyzed by SPSS software version 18 and the best strategy was determined using a quantitative evaluation matrix. According to the findings of the study, the existence of a strategic plan in the refinery could reduce the pollution from oil refining processes in the Tehran refinery, occupational diseases due to the lack of appropriate protective equipment for Tehran refinery workers. Future development of the plans could reduce pollution from refinery processes in Tehran refinery and destruction of vegetation and land degradation. Strategic management and SWOT approach can be used by using internal capabilities and strengths to exploit foreign opportunities, eliminate internal weaknesses and avoid external threats.

Key words: strategic management; SWOT method; oil refining processes; Tehran refinery

With increasing rates of pollution in major cities, the various concerns that arise from implementing an environmental project are on the rise, while large industries such as oil refining often have adverse effects on the environment (Abdel-Shafy & Mansour, 2016). While, if environmental considerations were considered extensively and comprehensively in all design and planning, the development and construction plans of such large and costly projects would have the least environmental impact (Ahmadi et al., 2003; Cheng et al., 2015; Jafari et al., 2011). Tehran Refinery is an Iranian refineries company, which currently has a refining capacity of 235,000 barrels per day. The refinery was established in 1968 and currently consists of two South and North Refineries, located 15 kilometers south of Tehran (Kouchakzadeh, 2005). Tehran's refinery accounts for about 15% of Iran's refinery capacity, and its products include: 1% petrol, 16% gasoline engine, 30% oil gas, 21% furnace and 5% other products (NIORDC).

Air pollution in refineries is one of the most important environmental impacts of the industry, which results in the release of suspended solids, volatile organic compounds, NO_x, SO_x and other harmful pollutants for environmental health and hygiene (Vries et al., 2015).

Considering the economic importance of the oil industry in the country and the desire to develop and build new refineries, it is necessary to evaluate the environmental impacts before starting the refineries and provide solutions to mitigate the adverse effects (Kleinnijenhuis et al., 2015; Kouchakzadeh, 2005).

On the other hand, despite potential environmental threats, the oil industry has a positive role in society, including the creation of job opportunities and the production of significant tax revenues to governments. Given that in manufacturing processes, the environmental variable is a major and serious challenge for the oil industry, today it is the commitment to promote sustainable development beyond ethical commitments (Sadeghian & Sahba, 2012).

On the other hand, contaminants from human activities, in comparison with natural pollutants, have created serious environmental and human health problems that make life impossible for humans and other organisms. This suggests that the causes of life in today's societies, urbanization and industrialization are causing a large crowd to be concentrated in small areas. One of the most important issues in this field, which we always suffer from environmental issues and the reduction of pollutants, is the lack of environmental perspective in the future, so that, with the emergence of a problem, it begins to operate and at a given point in time an environmental problem arises and its effects are evident (Owin et al., 2002). In other words, the function of planning passivity in solving environmental problems is a problem that the country suffered in the past times (Brayson, 2002). This kind of planning is a response to existing issues, which is clearly characterized by inevitable acceptance of the facts of the day and attempting to regulate the status quo. This is while in other countries this type of planning (passive) has replaced its active planning. In this type of planning, the nature of all sectarian and interrelated activities is heavily reinforced, and through the provision of a suitable and full of true and original content, with prospects and continuity in the implementation of the programs, environmental problems will be solved (Brayson, 2002; Pearce et al., 1997).

Strategic management of integrated decisions and activities to develop effective strategies, implement and control their outcomes, and relying on a dynamic, forward thinking, comprehensive and contingent mentality is the solution to many of the issues of today's organizations. By a careful look at the concept of strategic management can be understood as the necessity of using it. Given the environmental changes that are currently taking place and the complexity of organizational decisions, the need for a comprehensive program to address such issues is more than ever before. This plan is nothing but a strategic plan (David, 1989, 2011; Hanger et al., 1997).

As stated, the development of huge industries such as the oil industry, which has many negative outcomes, needs more systematic evaluations to increase productivity in the sustainable development of the host society and reduce or mitigate their negative consequences in the other industries (Nejad, 2012).

Regarding the subject of this research, which assesses the strengths, opportunities and environmental impacts of the establishment of the oil refinery, this research can play an important role in recognizing the environmental rehabilitation of cities affected by this industry.

Methods

The research method of this research is descriptive-case study and is a practical purpose that was carried out in 2017. The realm of the study was Tehran's oil refinery. The statistical population of this study consisted of group presidents and directors working in Tehran's oil refinery, numbering 35 people. This study based on cluster sampling. An enumeration of group presidents and refinery managers were included in the study. Five individuals were excluded due to the missing data in completing the questionnaires, and the frequency of the sample was reduced to 30, and the final analysis of the research was done on this sample number. In this research, data collection was carried out through documentary and library studies, field studies, interviews and questioning. In order to collect information and design and prepare a questionnaire, the experts 'and experts' opinions were used by Delphi method and a questionnaire was used to identify and weigh the strengths, weaknesses, opportunities and threats. In this research, a questionnaire containing two sections of demographic characteristics and a priority questionnaire on the stages of pollution reduction process of oil refining processes (case study of Tehran Refinery) was used.

The content validity of the questionnaire on the priority of pollution reduction processes of oil refining processes considered via using Lawshe and reliability of the questionnaire were confirmed by Cronbach's alpha coefficient. In order to assess the validity and reliability of the questionnaire at first, the apparent validity of the questionnaire was examined. The validity of the questionnaire was evaluated in two sections. In the first part, a questionnaire was provided to 10 employees of the Tehran refinery, and they were asked about the apparent characteristics of the questionnaire to evaluate the questionnaire in terms of appearance, formulation and understanding of the questions. In the second part, the questionnaires were given to eight experts in the industry and they presented their views on the simple and understandable items of the questionnaires. To evaluate the content validity quantitatively, Lavoshe method was used. This approach is based on the three-dimensional "relevant and important" scale, "can be used but not necessary" and "non-correlated" content validity. Ten experts gave their opinions. According to experts, the least acceptable coefficient of validity based on Lavoshe method was 0.62. Content validity index for the questionnaire was equal to 0.91. The obtained value was greater than 0.62 (minimum value validity), therefore the validity of the questionnaire was confirmed. It should be noted that content validity index is derived from the calculation of the average total content validity ratio.

To measure the internal consistency of the scales, Cronbach's alpha coefficient was calculated for each questionnaire and its sub-scales were calculated. According to Cronbach's alpha coefficient, the strengths of the questionnaire were equal to 0.85, the weaknesses were equal to 0.87, the opportunities for opportunities were equal to 0.9 and the threats were 0.89. To test the reliability of the questionnaire, a re-test method was used. To determine the retest reliability coefficient of the questionnaire, 15 subjects were randomly selected from the statistical sample and the questionnaire was distributed among them. Then, within a week's interval, the questionnaire was again redistributed between the same distribution and aggregate individuals. Then, the correlation coefficient between the obtained scores and the retest test for the questionnaire and its dimensions were calculated. The ICC (correlation coefficient) of the points of strength of the questionnaire is equal to 0.77, the weaknesses are equal to 0.74, the opportunities of opportunities are equal to 0.85 and the threats are equal to 0.83, and the level of meaning of the questionnaire was re-tested and its sub-scales were less than 0.01. The reliability coefficient for all variables is high and acceptable. If a Cronbach Alpha is larger than 0.7, then the questionnaire is more reliable. The Cronbach's alpha value is less

than 0.5 acceptable and lower than it is unacceptable. A review of the questions posed by the questionnaire seems necessary (Powell et al., 2015).

Therefore, considering the above, it is concluded that the reliability and the internal consistency of the items are acceptable. After confirming the validity and reliability of the research tool and after obtaining the necessary authorization from the Tehran Oil Refinery, the questionnaires were distributed among senior experts, department heads and managers operating in the refinery and after completion for ease of respondents, if the respondents had a question about the questionnaire and research, they were able to access the researcher and receive answers to their questions. The variables studied in this study were obtained using raw data of the questionnaire and the final analysis of the research was done on the sample. All information was analyzed using SPSS software version 18 and computer software. Identification and analysis of strengths, weaknesses, opportunities and threats was considered based on SWOT (Amini et al., 2014; Amini & Bavi, 2009). In the final analysis, to explore and identify the weaknesses, strengths, opportunities and perspectives associated with the impact of strategic management in oil refining processes and prioritize and Determining the importance of each item was used by Friedman test and determination of the superior strategy was done using a quantitative evaluation matrix (Abdoli, 2001).

Results and discussions

In this research, the existence of a strategic plan in the refinery to reduce the pollution from oil refining processes in the Tehran refinery is the first priority of the strengths (with an average of 5.45) reduction of contamination from oil refining processes. The ability of managers to optimize chemical processes to reduce their pollution is the final ranking of the strengths (with an average rating of 4.8) to reduce contamination from oil refining processes. Job losses due to the lack of proper protective equipment for Tehran refinery workers ranked first in the ranking of weaknesses (with an average rating of 12/5) and lack of expert staff enough to reduce pollution from refinery processes in the refinery Tehran (with an average rating of 3.75) was placed in the last rank of prioritizing the weaknesses of pollution reduction caused by oil refining processes. Considering the p-value (0.253) between the strength points and p-value (0.199) between weakness points resulting from reducing contamination from oil refining processes we came to conclusion that there is not a significant difference (Table 1).

Table 1. Friedman test to prioritize the internal factors of reducing pollution from refinery processes in Tehran refinery

Strength points	Average Rank	Priority	P-value	Weakness points	Average Rank	Priority	P-value
The presence of active participation of refinery experts in the decision to reduce pollution caused by oil refining processes in the Tehran refinery	4.52	3	0.253	Lack of funds to reduce pollution caused by oil refining processes at Tehran refinery	4.83	3	0.119
Cooperation between different departments and departments in making decisions to reduce pollution from oil refinery processes in Tehran refinery	4.18	5	0.253	Lack of expert staff enough to reduce pollution from oil refining processes at the Tehran refinery	3.75	8	0.119
The ability of managers to optimize chemical processes to reduce their contamination	4.08	7	0.253	Synergy of other sources of water, air and soil to reduce pollution from oil refinery processes in Tehran refinery	4.40	5	0.119
Strategic plan in refinery to reduce pollution from oil refinery processes in Tehran refinery	5.45	1	0.253	Lack of training and justification of personnel to reduce pollution caused by oil refining processes in Tehran refinery	3.83	7	0,119
Annual operating plans to reduce pollution from oil refinery processes in Tehran refinery	4.75	2	0.253	No change in personnel attitude to reduce pollution caused by oil refining processes in Tehran refinery	4.35	6	0.119

Use of technology in advanced and up-to-date processes to reduce emissions from oil refining processes in the Tehran refinery	4.52	3	0.253	Occupational diseases due to the lack of suitable protective equipment for Tehran refinery workers	5.12	1	
Training and updating courses for reduction of pollutants from oil refinery processes in Tehran refinery	4.10	6	0.253	Lack of proper equipment to reduce pollution from refinery processes in Tehran refinery	4.92	2	
Green space development to reduce pollutants from oil refinery processes in Tehran refinery	4.40	4	0.253	The lack of awareness of senior executives regarding the reduction of pollutants from oil refining processes in Tehran refinery	4.80	4	

"Future development plans to reduce pollution from oil refining processes in Tehran refinery" (with a mean of 6.32) ranked first in priority and "government allocations for research and development to reduce pollution from oil refinery processes Tehran Refinery" (with averagely rated 4) is in the last rank of prioritizing opportunities for reducing pollution caused by oil refining processes and "Destruction of vegetation and land degradation ..." (with an average rating of 97/5) ranked first in priority and "inflation and reduction of power supply for reducing pollution in the refinery" and "scientific weakness of environmental management experts" The refinery, in order to reduce the pollution from oil refining processes in the Tehran refinery (with an average rating of 4.10), is in the final ranking to prioritize the threats to reduce the pollution caused by oil refining processes. Considering the p-value, there is a significant difference between the prioritization of opportunities and the threats to reduce the pollution caused by oil refining processes (Table 2).

Table 2. Friedman test to prioritize external factors to reduce pollution from refinery processes in Tehran refinery

Variable	Average Rank	Priority	P-value	Variable	Average Rank	Priority	P-value
Future development plans to reduce pollution from refinery processes in Tehran refinery	6.32	1		Scientific weakness of the refinery's environmental management experts to reduce pollution caused by oil refining processes in Tehran refinery	4.10	8	
Availability of experts To Reduce Contaminations Caused by Oil Refining Processes At Tehran Refinery	5.63	2	0.003	Poor Performance of Oversight Organizations and Related Organizations Implementing the State to Monitor and Control the Pollution Caused by Oil Refining Processes at Tehran Refinery	5.37	4	0.003
Government allocations for research and development to reduce pollution from oil refining	4	9		Lack of funds and low allocation of funds from banks to buy day technology to reduce emissions	5.35	5	

processes in Tehran refinery					
Transfer of technology and knowledge of the country to reduce pollution caused by oil refining processes in Tehran refinery	4.72	6	The lack of attention of regional executives to maintaining environmental quality and understanding the pollution caused by oil refining processes in Tehran refinery	5.48	3
The rules protecting the country to reduce pollution from oil refining processes in Tehran refinery	5.28	4	Political barriers to reducing emissions from oil refining processes at Tehran refinery	4.32	7
Support for new products to reduce pollution by oil refining processes in Tehran refinery	4.70	7	Unavailability of a new expert force to manage the pollution reduction caused by oil refining processes in Tehran refinery	4.60	6
Improving the quality of mother products for reduction to reduce pollutants from oil refining processes in Tehran refinery	5.30	3	Inflation and reduction of supply power sources to reduce pollution in the refinery	4.10	8
Increasing private sector incentives to decrease investment to reduce pollutants from oil refining processes in Tehran refinery	4.15	8	Environmental contamination, soil and the risk of groundwater pollution	5.72	2
Use of powerful and experienced companies to reduce pollution from oil refinery processes in Tehran refinery	4.90	5	Destruction of vegetation and land degradation and etc.	5.97	1

At this stage, internal strengths and external opportunities, internal weaknesses and external opportunities, internal strengths, and external threats and internal weaknesses and external threats were compared with each other, and resulted in several strategies:

1. First type strategy (aggressive). Strategies to maximize the use of environmental opportunities by employing the strengths of the organization.
2. Second type strategy (diversity). Strategies to use the organization's strengths to avoid threats
3. Third Type Strategy (Review). Strategies to take advantage of the potential benefits of environmental opportunities to offset existing weaknesses in the organization.
4. Fourth Strategy (Defensive). Strategies to take advantage of the potential benefits of environmental opportunities to offset existing weaknesses in the organization.

Table 3. Swot Matrix

	Strength Points S	Weakness Points S
	<p>First priority: the existence of a strategic plan in the refinery to reduce pollution from refinery processes in Tehran refinery.</p> <p>Priority 2: existence of annual operational plans to reduce pollution from oil refinery processes in the Tehran refinery</p> <p>Third priority: Use of technology in advanced and up-to-date processes to reduce emissions from refining processes in Tehran refinery and the presence of active participation of refinery experts in the decision to reduce pollution from refinery processes in the refinery of Tehran</p> <p>Fourth priority: green space development to reduce pollutants from oil refinery processes in Tehran refinery</p> <p>Fifth Priority: Cooperation between departments and deputies in decision making to reduce pollution from oil refinery processes in the Tehran refinery</p> <p>Sixth Priority: Training and Knowledge Updates to Reduce Contamination Caused by Oil Refining Processes at Tehran Refinery</p> <p>Seventh Priority: The ability of managers to optimize chemical processes to reduce their contamination</p>	<p>First priority: Occupational Diseases due to the lack of appropriate protective equipment for Tehran Refinery Operators</p> <p>Priority 2: Lack of proper equipment to reduce contamination from oil refinery processes in Tehran refinery</p> <p>Third priority: lack of funds to reduce pollution caused by oil refining processes in Tehran refinery</p> <p>Fourth priority: lack of awareness of senior executives regarding the reduction of pollutants from oil refining processes in Tehran refinery</p> <p>Priority 5: Synergy of other sources of water, air and soil to reduce pollution from oil refinery processes in Tehran refinery</p> <p>Sixth priority: No change in personnel attitudes to reduce pollution caused by oil refining processes in Tehran refinery</p> <p>Seventh priority: lack of training and justification of personnel to reduce pollution from refinery processes in Tehran refinery</p> <p>Eighth priority: Lack of expert staff enough to reduce pollution from oil refining processes at the Tehran refinery</p>
Opportunities (O)	<p>SO strategies</p> <ul style="list-style-type: none"> - Development of courses and training related to the oil industry in higher education centers on technology transfer and knowledge of the day to reduce pollution from oil refinery processes - To take advantage of the knowledge and participation of people and scientific centers to maintain and improve the environment - Training and upgrading technical knowledge of manpower to reduce oil pollution. - Development of investment packages to increase private sector participation in order to implement long-term plans. - To take advantage of the contributions of investors and industrial activists to improve the quality of the environment. 	<p>ST strategies</p> <ul style="list-style-type: none"> - The need to identify and prevent those unfavorable practices in oil refining processes that can have a negative impact on the environment and ecosystem, in order to prevent the destruction of vegetation. - Training skilled human resources in the industrial and environmental sectors to improve the quality of the environment and reduce pollution caused by oil refining processes. - Hold a series of meetings to justify oil industry officials in the field of environmental protection and strengthen cooperation between sectors of the oil industry and the environment. - Construction of national parks
Priority One: Future Development Plans to Reduce Pollution Caused by Oil Refining Processes at Tehran Refinery		
Second Priority: Certified Experts to Reduce Contaminations Caused by Oil Refining Processes at Tehran Refinery		
Third priority: Improving the quality of mother products for reduction to reduce contamination from oil refining processes in Tehran refinery		
Fourth priority: Supportive laws of the country to reduce pollution from oil refining processes in Tehran refinery		
Fifth Priority: Using Powerful and Experienced Companies to Reduce Pollution Caused by Oil Refining Processes in Tehran Refinery		

<p>Sixth priority: Transfer of technology and up-to-date knowledge of the country to reduce pollution caused by oil refining processes in Tehran refinery</p>	<ul style="list-style-type: none"> - Utilize modern and advanced facilities to reduce the pollution of the oil refinery. - Focus on livelihoods of staff, especially informal staff in the operational plan. 	<p>and other natural areas for environmental protection.</p> <ul style="list-style-type: none"> - Developing interagency interactions between the Oil Ministry and other relevant organizations to reduce pollution from oil refining processes
<p>Seventh Priority: Supporting New Products for Reduction to Reduce Pollution Caused by Oil Refining Processes in Tehran Refinery</p>	<ul style="list-style-type: none"> - Contracts with other countries, especially those with modern technology in the oil industry. - The development of a comprehensive oil industry development plan coincides with the socio-economic development of the region 	
<p>Eighth priority: Increasing private sector incentives to reduce investment to reduce pollutants from refining processes in Tehran refinery Threats (T)</p>	<p>WO strategies</p>	<p>WT strategies</p>
<p>The first priority: the creation of environmental pollution, soil and the risk of groundwater pollution</p>		
<p>Second priority: the destruction of vegetation and land degradation, and so on</p>		
<p>Third priority: the lack of attention of executive regional executives to maintaining environmental quality and recognizing the pollution caused by oil refining processes in Tehran refinery</p>	<ul style="list-style-type: none"> - Use future development plans to reduce pollution from oil refinery processes in order to prevent occupational diseases due to the lack of appropriate protective equipment for Tehran refinery workers 	
<p>Fourth priority: weak performance of oversight organizations and related organizations of the country in monitoring and controlling the pollution caused by oil refining processes in Tehran refinery</p>	<ul style="list-style-type: none"> - Use of Government Allocation funds for R & D and provision of equipment and equipment needed to improve the quality of mother products in order to reduce pollution caused by oil refining processes. 	<ul style="list-style-type: none"> - Appropriate budget allocation and provision of appropriate means for reducing pollution and attracting people and officials to control and reduce the pollution caused by oil refining processes.
<p>Fifth Priority: Lack of funds and low allocation of funds from banks to buy day technology to reduce pollution</p>	<ul style="list-style-type: none"> - To use expert experts to eliminate the lack of sufficiently qualified specialists to reduce the pollution caused by oil refining processes 	<ul style="list-style-type: none"> - Training and justification of staff and changing attitude of senior managers in order to eliminate the lack of attention of executive executives to maintain environmental quality and recognize the pollution caused by oil refining processes
<p>Sixth priority: lack of recruiting a new expert to manage the pollution reduction from oil refinery processes in Tehran refinery</p>	<ul style="list-style-type: none"> - Development of international cooperation for the development of clean industry through the exchange of technology, information, human and education and appropriate culture in the field of reducing environmental pollutants and protecting the environment. 	<ul style="list-style-type: none"> - Supplying the required specialist personnel to manage the pollution caused by oil refining processes at the Tehran Refinery
<p>Seventh Priority: Political Barriers to Reducing Pollution Caused by Oil Refining Processes in Tehran Refinery</p>		
<p>Eighth priority: Inflation and reduced power supply for reducing pollution in the refinery and the scientific weakness of the refinery's environmental management experts to reduce pollution from refinery processes in the Tehran refinery</p>		

Conclusions

Among the models and methods available for modeling strategic management, the SWOT matrix method is one of the most common methods for determining and designing an organization's strategy. In this study, the role of contaminating oil refining processes and its negative effects was studied using the SWOT model. Mainly, the SWOT model is generally used as a method for analyzing the organization's internal and external environments in order to achieve a systematic approach and decision support. Also, internal and external factors must not only help identify specific features or competencies of the collection, the special ability, resources available and the main method of using them, but must also be addressed in their exploitation.

In general, it can be noted that conducting studies on the environmental impacts of development projects in identifying the environmental degradation factors and impacts, as well as providing solutions for reducing and mitigating negative impacts, is very important. In particular, in recent years, with the emphasis of the Environmental Protection Agency, this approach has led to the introduction of a management and environmental monitoring program. It's obvious to everyone that many of the environmental threats, resource degradation and pollution are the result of unrealistic activities with the environment. Therefore, informing and educating the community, especially planners, managers and policy makers, is important in order to become familiar with the value and importance of preserving the environment for the survival of the human being. On the other hand, due to the importance of the role of the development of the oil industry and the reduction of environmental pollution, it is necessary for the managers to take steps to ensure that, by adopting appropriate policies and optimal planning, the oil industry can grow along with environment preservation.

According to the results obtained in this study, the suggestions from the findings are presented as follows:

Based on the findings of the investigation into internal factors it is proposed to improve the quality of the environment and reduce the adverse effects of the oil industry on the region, enhancing the technical skills and knowledge of relevant managers and experts, preparing strategic plans and programs to protect and protect the environment, and holding conferences and seminars to identify investment areas.

Among the existing weaknesses, due to the lack of specialist expertise in reducing oil pollution and lack of funding, holding training courses and updating knowledge to reduce the pollution from oil refining processes, the cooperation of different departments and deputies in Decision making and development of green space is recommended to reduce the pollution caused by the refining processes of the Tehran refinery.

The findings of research on external factors indicate that future plans for development and the existence of expert executives and laws protecting the country to reduce the pollution from oil refining processes in order to achieve the objective of reducing pollution of the oil industry, in this regard Supporting the creation and strengthening of the domestic private sector in the country's oil industry and the elimination of bottlenecks in operational units and the updating of existing systems is proposed. According to the results of the research, such as environmental pollution, soil and the risk of groundwater pollution and the destruction of vegetation and land degradation are the most important threats that are proposed in the annual operational programs Oil refinery, measures and reforms to address such threats from oil pollution.

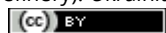
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