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Appropriate Strategies for Enhancement of Petrochemical Sales

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Abstract: The main question of this study is why with 17 percent of global gas reservoirs existing in Iran, the advantage of having the relatively inexpensive raw material and the geographical location of our nation, we cannot become the regional and the world petrochemical hub. The reason is the lack of the appropriate strategies. Therefore, the main goal of the present paper is to identify the appropriate strategies which will contribute to the production and sales of petrochemicals in Iran. To achieve the goal of the research first, a survey has been conducted. Second, the independent and dependent variables have been identified. The independent variables of the research include market development strategy, market penetration strategy, product development strategy, vertical integration strategy and assimilated diversity strategy. The dependent variable of the research is the enhancement of petrochemical products. Finally, the relational analyses have been implemented. The findings indicate that the strategies of market development, market penetration, product development and assimilated diversity are the appropriate strategies for the enhancement of petrochemical production and sales.

Key words: Petrochemicals · Strategy · Development · Sales · International market

INTRODUCTION

Hundred years ago crude oil was used only for illumination. Today, a trace of crude oil and its refined products can be observed in every industry. Now, the strategy of single-product economy relying on crude oil production and generally Sales of Crude, do not make our country with its history of hundred years a leader in oil industry.

The fulfillment of the national outlook and reaching to the first position of the regional petrochemical production in 1404 horizon calls for production strategies that will help to understand the target markets, optimize targeting, use opportunities, reduce threats, empower the strengths and minimize the weaknesses in order to achieve the sustainable economic development using the capital resources (knowledge-based human resources and economic capital).

Besides Iran, other Middle Eastern countries also intend to dominate the global petrochemical market until 2012. These countries, Saudi Arabia, Qatar and Russia, attempt to take out the competitors from the field through the opportunities of cheaper feedstock and natural gas.

According to the forecasts of Meed economic journal, Iran intends to increase its global market share of producing petrochemicals in the upcoming years (probably until 2012) to about 15%. Meanwhile, about 40% of the increase in petrochemicals' capacity is supplied by China and Far East, about 40% by Saudi Arabia and its five adjacent countries; i.e. Cooperation Council for the Arab States of the Gulf.

The lack of the strategy of developing petrochemical productions and industries not only prevents the raw sales of hydrocarbon materials (crude oil and natural gas), but also leads to slow down of the unemployment growth in our country as well as continuing and strengthening job creation policies of the country. The implications of new strategies will reduce our country's dependence on single-product economy of exporting crude oil and will provide the sustainable and symmetrical economic development. Therefore, the main purpose of the present study is to present the appropriate strategies for the enhancement of Iranian petrochemical sales and the sub-purposes include the exploration of the effective strategies.

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Appropriate Strategies for Petrochemical Sales Enhancement: The enhancement of petrochemical products sales calls for the adoption of some appropriate strategies as well as recognition and analysis of the special environmental factors such as the market, rivals, economic and financial businesses, syndicates etc. and the general environmental factors such as technology; social, political and economic conditions; analysis of the opportunities and threats; and the recognition of the role and importance of the important players of the regional and international markets.

Market Development Strategy: Market development strategy is aimed to the geographical diversification of the target market for the production and export of petrochemical products and polymers to be in priority [1, 2]. The following table demonstrates the fact that the Asian countries are the largest market for Iranian petrochemical products sales and the African countries are the smallest markets with a share of lower than one percent [3].

According to market analysis, the strategy of developing the market and exporting Iranian petrochemical products to the African countries, such as Egypt, Morocco, South Africa (Regarding the population and special location of Egypt), can be among the appropriate strategies. Besides considering African markets, the development of the target markets in Europe and Asia becomes necessary [4].

Market development in more than 17 European countries and exporting petrochemical products to the European markets can be another compiled strategy. In this direction, because of the geographical distance of Iran and Europe and the necessity of competing with some "Agile" organizations, the creation of saving, distribution and sales agency facilities for petrochemical products in Eastern and Western Europe is prioritized. In order to achieve development objectives, the strategy of creating a "Petrochemical HUB" in Europe as well as selling and distributing 200-300 thousand tons of petrochemical products and polymers annually in the first phase is important. In order to benefit from the opportunities and the competitive advantages of our country and with respect to the fact that 26 types of our petrochemical and polymer products bear the Reach Environmental Code and are listed in the EU after registration procedures, the "strategy of target markets development in Europe" can be among the strategies for the sales enhancement of our country's petrochemical products [2].

Table 1: Iranian petrochemical products sales based on geographical regions in 2011

Location	Sales percent
India	10.7
Far East	41.5
Middle East	23.9
South and Southeast Asia	9
African countries	below 1
Others	About 14

Product Development Strategy: In petrochemical production, the raw material, expert workforce, capital, technology, technical knowledge and standards observance are among the important factors for the process of petrochemical production and development process. Meanwhile, using the prevalent standards in the industry, the modern and compatible technologies and their development and localization are especially important. Using the technical knowledge of the catalysts is one of the important processes of Iranian petrochemical production [5, 6].

As well as leading to the enhancement of petrochemical products inside the country, using the dehydrogenation catalysts, producing Acetic Acid and heavy polyethylene can be exploited as the export goods. The production and development of the catalysts based on platinum in order for dehydrogenation of heavy and light kinds of paraffin can be a part of petrochemical products marketing, production and sales enhancement strategies [7].

The subject of production technology in petrochemical industry is different from other industries. The technology for manufacturing a mechanical machine is not naturally similar to the technology for producing a petrochemical substance. Evan buying the production license and permission in Iran is not considered as the petrochemical technology transfers since it was done many years ago. In fact, what is defined as the actual technology transfer is "License and its development". The license purchase cost is very low in comparison with the total cost of the project and constitutes only its 2-5 percent since the foreign party earns the license profit from selling equipment and apparatus and the project machinery of its country [8].

Vertical Integration to Top: In this strategy, the increase in control of the industrial raw materials is discussed. In petrochemical industries cycle, the price of the feedstock has a significant effect on the amount of investment, the cost, the profit margin and its competition in the region and the world against the regional and global rivals of petrochemical products [9, 10]. After the

enforcement of subsidiaries reform law in Iran, the natural gas feedstock holds a higher advantage than the liquid feedstock such as naphtha, kerosene and natural gas condensates. Currently, about 9% of Iran's petrochemical industry feedstock belongs to natural gas [11]. Therefore, the strategy of establishing petrochemical units using the advantage of natural gas feedstock, with regard to the type of production in Iran and existence of rivals such as Russia, Saudi Arabia, Qatar and UAE, can lead to the attraction of capital to produce a competitive product in the international target markets (Europe and Far East) as well as the regional markets. Typically, the production units of urea, ammoniac and methanol require the natural gas, the olefin units require ethane and other petrochemical units require natural gas condensates, NGL and naphtha as their liquid feedstock. It should be noted that the price of subsidized feedstock causes the quality decline, lack of a complete competition and facing with "anti-subsidiary" law in Europe and outside of the country. On the other hand, high feedstock price leads to the decline of regional and global competitive power. Therefore, a medium and reasonable regional price with the observance of the engineering economy is necessary. The government, instead of increasing feedstock price, can benefit from the tax leverage as the float balance instrument. Using the feedstock advantage of the petrochemical units in Iran as the raw material of the industry has a special importance in the international competition. Thus, coordination and increase in the control of the raw material can be regarded as the important strategies of the petrochemical industries.

Based on the research of Times oil, the success in petrochemical industry calls for the symmetrical access to the important factors of feedstock, technology, capital and market. Middle East will be the most inexpensive supplier of olefin and polymer production of the world; however, the global economic crisis and the current developments may change the development plans strategies. To date, chemical production in Middle East has been based on the advantage of cheap and abundant feedstock, but the cheap production opportunities are fading away and finding such opportunities seems to be difficult in the future as such the companies will inevitably adopt more global strategies. The petrochemical map of the world will be revolutionized. The petrochemical industry in Latin America, Central and Eastern Europe demonstrates a faster growth. Being the feedstock available, the plans being closer to the markets will have more attraction. The methanol and olefin plans in China and Caribbean and the development plan of the natural gas fields in the central Asia are among the examples of such plans. In long-term, the large players of the energy market try to carry their chemical and refined products to the consumption market. Here, the appropriate strategy will be the "integration to bottom" and the search for feedstock expands. It won't be incredible that the future large plans of the global energy masters such as Shell and Exxon Mobile will be executed in China. Further, because of the current developments, the governmental plans will be affected. Meanwhile, with the operations of gas conversion to the chemical substances in Eastern Russia, the Russian giant, Gazprom, can have an advantageous competition with other countries through pouring its polyolefin products to the Chinese markets [12-14].

In a similar study, three kinds of strategies including cost leadership strategy, differentiation strategy and focus strategy were mentioned. In this study, cost leadership strategy, which consists of investments, domestic and foreign capital attraction in petrochemical industry, marketing etc. was recognized as the most important strategy of petrochemical production export enhancement [15].

Research Methodology: The present research is practical regarding its purpose since the studied organization (Iran's Petrochemical Company and other Iranian petrochemical companies) can implement the obtained results. Regarding methodology, the research is a descriptive-analytic-survey in the form of a documentary-field study since no intervention was imposed by the researcher on the research variables and they have merely been analyzed through statistic methods from the data obtained from the examined sample. The instrument for collecting data was library studies and investigations, surfing the internet, interviewing the experts, using the questionnaire and using central indices and multivariable and single-variable regression.

Besides statistic methods and SPSS software program, the method of investigating various strategies through SWOT matrix and the main strategy matrix was also used.

The population consists of 140 experts, managers and directors who are active in National Iranian Gas Company and Iran's Petrochemical Company. The sample consists of 57 out of the above individuals. The stratified random sampling based on a special formula was used to gather the sample.

Based on the research purpose as well as its independent and dependent variables, the hypotheses are offered as follows:

Hypothesis 1: The strategy of Market Development is effective on the enhancement of petrochemical product sales.
Hypothesis 2: Adopting the strategy of Market Penetration is effective on the enhancement of petrochemical product sales.
Hypothesis 3: Compiling the strategy of Product Development (Establishment and development of chemical cities, chemical parks and petro-refineries) is effective on the enhancement of petrochemical product sales.
Hypothesis 4: Achieving the strategy of Vertical Integrations is effective on the enhancement of petrochemical product sales.
Hypothesis 5: Compiling the strategy of Assimilated Diversity is effective on the enhancement of petrochemical product sales.

RESULTS AND DISCUSSIONS

Step 1: The null hypothesis and the alternative hypothesis are composed statistically.

$\begin{cases} H_0 : \mu \le 3 \\ H_1 : \mu > 3 \end{cases}$ "Market development" strategy is not effective on petrochemical products sales enhancement.
"Market development" strategy is effective on petrochemical products sales enhancement.

$\begin{cases} H_0 : \mu \le 3 \\ H_1 : \mu > 3 \end{cases}$ "Market penetration" strategy adoption is not effective on petrochemical products sales enhancement.
"Market penetration" strategy adoption is effective on petrochemical products sales enhancement.

$\begin{cases} H_0 : \mu \le 3 \\ H_1 : \mu > 3 \end{cases}$ "Product development" strategy compilation is not effective on petrochemical products sales enhancement.
"Market development" strategy compilation is effective on petrochemical products sales enhancement.

$\begin{cases} H_0 : \mu \le 3 \\ H_1 : \mu > 3 \end{cases}$ "Vertical integration" strategy fulfillment is not effective on petrochemical products sales enhancement.
"Vertical integration" strategy fulfillment is effective on petrochemical products sales enhancement.

$\begin{cases} H_0 : \mu \le 3 \\ H_1 : \mu > 3 \end{cases}$ "Assimilated diversity" strategy compilation is not effective on petrochemical products sales enhancement.
"Assimilated diversity" strategy compilation is effective on petrochemical products sales enhancement.

Step 2: This step deals with the calculation of the test statistic and its statistical distribution. The test statistic has the t distribution (almost normal for these data) and its value is calculated according to the following Table 2.

Step 3: According to the previous step (statistical distribution determination) as well as the acceptable error rate, the confidence level for the rejection or support area of the null hypothesis is determined. The confidence level is considered 95 percent.

Step 4: According to the previous sections, the statistical decisions are made in this step. The test statistic value is located in the area of null hypothesis rejection, except for the vertical integration strategy and assimilated diversity. Thus, except the fourth and the fifth hypotheses, all of the hypotheses are confirmed.

In the previous section, each of the hypotheses has been analyzed separately. Now, we are going to discuss which factors or strategies are more effective on the enhancement of petrochemical products sales. In other words, the rate of the mentioned factors' effectiveness on the enhancement of petrochemical products sales is ranked. With regard to the interdependence of the responses, the best test to compare the effectiveness rate of the factors is "the non-parametric Friedman Test".

Table 2: Hypotheses testing statistic

Hypothesis	Number	Mean	S.D.	t value	d.f.	Sig.
"Market development" strategy is effective on petrochemical products sales enhancement	57	3.30	0.96	2.34	56	0.023
"Market penetration" strategy adoption is effective on petrochemical products sales enhancement	57	3.79	1.03	5.78	56	0.000
"Product development" strategy compilation (establishment and development of chemical cities, chemical parks and petro-refineries) is effective on petrochemical products sales enhancement	57	3.79	0.84	7.10	56	0.000
"Vertical integration" strategy fulfillment is effective on petrochemical products sales enhancement	57	3.07	0.94	0.56	56	0.576
"Assimilated diversity" strategy compilation is effective on petrochemical products sales enhancement	57	3.28	1.15	1.85	56	0.070

Table 3: Rank mean of strategies' effect

Hypothesis	Ranke mean
Product development strategy	3.54
Market penetration strategy	3.38
Assimilated diversity strategy	2.82
Market development strategy	2.68
Vertical integration strategy	2.58

Table 4: Test Statistic

Test Statistic	
Number	57
X^2 Value	22.048
d.f.	4
Sig.	0.000

The null hypothesis and its alternative hypothesis are formulated in the test as follows:

$$\begin{cases} H_0 : \overline{R}_1 = \overline{R}_2 = ...\overline{R}_S \\ H_1 : \overline{R}_i = \overline{R}_j \ \exists i \neq j = 1,2,...,5 \end{cases} =$$

$$\begin{cases} H_0 : \text{The rank mean of the factors is equal.} \\ H_1 : \text{The rank mean of the factors is not equal.} \end{cases}$$

Thus, the null hypothesis is rejected with the confidence level of 95% because the X^2 statistic values have been calculated as 22.05 which are located at the null hypothesis rejection area. This means that the relationship degree (effectiveness) of the strategy factors is different in the enhancement of petrochemical products sales. The product development strategy and market penetration strategy have the highest level of effectiveness on the enhancement of petrochemical products sales. The assimilated diversity strategy and the market development strategy are placed at the third and fourth position of effectiveness. At the bottom, the vertical integration strategy has been located with the lowest score (effectiveness).

CONCLUSION

Iran is one of the countries in the world that has the largest portion of petrochemical reserves. However, the country is unable to utilize them in a way to prosper and develop because of the lack of the appropriate marketing strategies. The goal of the current study was to conduct a proper research to find the best strategies that would help to promote petrochemical sales. All of the tested strategies in the current paper proved to have impact on the sales increase, though some of them turned to be more effective than the others. Hence, if petrochemical companies face some difficulties to implement all of the suggested strategies, they can at least select the most important ones. The application of the strategies proposed by the current research would enhance significantly petrochemical sales in Iran.

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