

PESTEL ANALYSIS ON PETROLEUM INDUSTRY

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ABSTRACT:

In the history of the mankind, the need of resources was the most important factor for political, technological, economic, social evolutions. In modern times need of energy resources become more significant than other industries who were more important during the past like the production of wood, stone, horse breeding, productions of ships, weapons, constructions of buildings and even gold production.

The primary energy source is represented by petroleum, commonly known as oil. Petroleum is most used in transport, energy, petrochemical, agriculture and other industries that need oil products in the production of goods. Example: Metallurgy.

In this paper it will be present the need of a macro-environmental analysis at the petroleum industry and the external factors that have a powerful influence on this industry.

KEYWORD: *environment, factors, oil, resource, PESTEL analysis, influence*

JEL CLASSIFICATION: *L71, L72, N01, N10, N30*

1. INTRODUCTION

In pre-industrial revolution time, oil was used for making and maintaining the fire, in the blacksmith, in constructions and in the period of war as a weapon (fire traps, fire projectiles of bows or siege engines and even a component of the substance used for medieval flamethrower named Greek fire, which was used in naval warfare). With the development of electricity and transport, the need for the oil rise very much and surpasses the need for coal or natural gas, which were used for the same purpose.

Petroleum (oil) industry represents one of the most important components of the energy industry who is like the circulatory system of the human body to the modern economy. Oil industry is divided in: upstream (exploration, development, extraction of oil and natural gas), downstream (transport by oil tanks or pipelines, refineries, retailers and consumers). PESTEL analysis represents of the most important method used to analysis external environment within an organization or an industry sector (Moldoveanu, 2007). Necessity of using the PESTEL analysis on the petroleum industry is represented by the important role that this industry has on the economic, political and social systems around the world.

2. IMPORTANT

In this paper, I want to show the importance of the external factors of macro-environment on petroleum industry and complementary industries. I would use PESTEL analysis because it responds to the questions:

- Are only political, economic and social factors that influence the petroleum industry?
- The oil industry by could be influenced by the modification of a factor that has no direct contact with industry?

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3. PESTEL ANALYSIS ON PETROLEUM INDUSTRY

PESTEL analysis is used by organizations for identifying the factors of external environment of the market that could influence the organization and entire industry. PESTEL analysis is formed by six macro-environment group of factors: political factors, economic, social, technological factors, environmental factors and legal factors. Other authors add new group factors, named international (Moldoveanu, 2007), but I don't want to split to add this factors because all PESTEL groups of factors contain both national and international description. Macro-environmental factors are less influenced by companies than micro-environmental factors (customers, employee, suppliers, shareholders, media and competitors), but companies of oil industry can have bigger influence of macro-environment than companies from other industries. This fact is resulted because of the need for energy resources for political, economic, social, technological, environmental and legal activities.

3.1. Political factors

Political factors are represented by the influence of a political entity (party, country, organizations or other type of faction) on the national level, regional level or international level. Most of the countries consider that the oil industry (upstream and downstream) is a strategic point in political, economic and social needs of a country, because this industry has a great influence on transport capacity, energy production, industrial production, chemical production, agriculture and social welfare. The energy independence is a priority objective of every country who wants to be free from a political blackmail from other countries or international organization. The most influent organization in oil production is OPEC (Organization of the Petroleum Exporting Countries) who has more than 42, 8% of world oil production, other considerable producers of oil or of another substituent, products are United States of America, Countries of European Union, Russia, China, Canada and Brazil. The consumers who have a great influence on the oil markets are United States of America, China and western European Union countries. For mutual gain, some countries make trade agreement for exchanging of energy resources for money, technology other resources or even protection. A powerful influence over the production of oil and the price is made by instable situation from the Middle East, where every conflict could disturb oil production and transport, resulting in the rising of oil price. Another region that has a great influence upon the petroleum market is ex-soviet space, where disputes are likely resolved by energetic and political blackmail. The policy of foreign oil independence of the United States diminished energetic resource imports, because of that in Alaska were build new exploitations of oil or natural gas and development of substitutes. The austerity programs of European Union have reduced the need for fuels, because of declining of the economic activities and the social welfare. The economic crisis made the need for cheap fuels became a priority for the major players of the global stage. Because of this situation, many territorial disputes reappear between countries for oil and natural-gas reserves like: the Falkland Islands dispute between United Kingdom and Argentina; the Arctic plateau dispute between United States of America, Canada, Iceland, Norway and Russia; the Senkaku islands dispute between China, Taiwan and Japan; the South China Sea dispute between numerous Asian countries.

National politic factors are represented by grade of authority of the state, political parties, non-governmental organizations and in some cases different factions (rebels, paramilitary entities). Grade of authority of the state represent the power that have the government upon the society, economy, technology, laws. The authority of the state is higher in authoritarian states like dictatorships, theocracies, non-constitutional monarchies, tribal society and is lower in democratic republics and constitutional monarchies were the political power is given by people of the country to the elected politicians. Political parties influence the petroleum industries by imposing state strategy for electoral or economic gains. The non-governmental organizations influence the oil

market by promoting anti-pollution campaigns or liberalization of the fuel market. Paramilitary factions use influence on oil industry for blackmailing or for imposing some fees in territories that are controlled by them, cutting the transport of oil for political gains.

Oil companies can have influence on political factors in regions or countries where oil is a primary source of making income and in regions or countries where the energy resource is scarce and attracting additional one is needed for good function of economic activities. In modern economic, because of the globalization, the state can't protect the external market like in mercantile system (Strange S., 1996), resulting that companies can occupy new markets or acquire new resources alone.

3.2. Economic factors

Economic factors are represented by the: influences of the supply and demand on the oil price; influences of the supply or demand of the complementary goods; influence of the supply and demand of substitute resources; the USD exchange rate (petrol-dollar policy); the price of the oil barrel on the important stock exchanges; economic situation on regional and global stages; value of the known reserves, interest rate for financing; value of stock market indexes (DOW Jones, Standard&Poor). The demand for fuels is influenced by variation of transport activities (road, rail, aviation, naval) that represent almost 60 % (OPEC, 2011), petrochemical industry, other industries, agriculture and energy production. Variation of need for road transport activities is influenced by the number of the auto vehicles used by population or organizations; the earnings of every car owner, the frequency of using his own car, the customer culture for fuel's effect on the environment, the road infrastructure, seasons, touring activities. Rail transport is represented by trains that use fuels for transport; this kind of transport is used in developing countries that have big oil production. Aviation is one of the transport sectors that grown very rapidly, representing 6% of total oil demand (OPEC, 2011), two thirds been represented by OECD (Organization For Economic Co-Operation And Development).

Table 1. Vehicle and passenger car ownership in 2008

	Name	Population Millions	Auto vehicles Millions	Cars Millions	Cars per 1000
1	North America	457.7	299.9	265.5	580.1
2	West Europe	542.2	274.2	236.0	435.3
3	Pacific OECD	200.8	111.2	85.9	427.8
	OECD	1,200.6	685.3	587.4	489.2
4	Latin America	421.7	76.2	59.7	141.5
5	Middle East and Africa	824.1	35.0	22.4	27.2
6	South Asia	1,595.4	24.9	16.6	10.4
7	South-East Asia	641.5	53.1	33.7	52.5
8	China	1,337.4	49.5	36.0	26.9
9	OPEC	384.8	39.8	28.7	68.5
	Developing countries	5,205.0	278.4	197.0	37.9
10	Russia	142.0	34.8	29.5	207.8
11	Other transition economies	198.8	38.2	34.7	174.6
	Transition economies	340.7	73.0	64.2	188.4
	World	6,746.3	1,036.7	1848.6	125.8

SOURCE: adapted from World Oil Outlook 2011, p. 80

Oil demand for naval transport is represented in big proportion by cargo ships that transport goods from developing countries (goods and resources producers) to developed countries (services producers). Petrochemical industry represents approximately 10% of total oil demand and the products that are produced by this industry are: plastics, synthetic fibers, synthetic rubber, detergents, paints, adhesives, aerosols, insecticides, pharmaceuticals and others. Others industry sectors which demand oil or complementary products from oil are iron and steel industry, cement industry, auto vehicles industry, naval industry, mining, construction and many others. In agriculture demand for oil and complementary products are for a wide range of activities like farming, pasturing, animal husbandry, fishing, hunting, beekeeping and many others.

Table 2. Aviation oil demand prediction

	Name	People that travel with planes Millions in 2008	People that will travel with planes Millions
1	North America	1.7	2.0
2	West Europe	1.1	1.3
3	Pacific OECD	0.4	0.6
OECD		3.3	3.8
4	Latin America	0.2	0.3
5	Middle East and Africa	0.2	0.3
6	South Asia	0.1	0.3
7	South-East Asia	0.5	0.8
8	China	0.3	0.7
9	OPEC	0.3	0.4
Developing countries		1.5	2.7
10	Russia	0.3	0.4
11	Other transition economies	0.1	0.1
Transition economies		0.3	0.5
World		5.1	7.0

SOURCE: adapted from World Oil Outlook 2011, p. 95

The financial system has influenced the petroleum industry in 2008 very much, making oil price to drop from history peak price of 141 USD per barrel, in July, to 33 USD per barrel only at the end of the year. This fact is explained by the beginning of financial crisis that influenced negatively the income of the companies and of the population, making the companies and people to cut the cost, or to become insolvent, resulting to diminish of economic activities across the world who make the demand for transport to fall that making the fall of oil price.

3.3. Social factors

Social factors are represented by demography, culture, ethnic structure, religion structure, inter-cultural relation, structure of family, ideological view, literacy, urbanization, income distribution, migration, use of communication technology, cultural view to the different products.

All around the world, do not exist a culture that is against oil exploitation and for using the oil products, most of the population saw the oil industry like a necessity for development and welfare, but are segments within the population who see the oil industry as an important factor of pollution of the environment. Population which has culture of the protection of the natural environment is located in developed countries, because not need a high rate of developing. In the countries were populations are more friendly with environment; government imposes pollution fees and pollution reduction laws and norms to petroleum industry, and complementary industries. Many companies

which make complementary products, like cars, invest in reduction of fuel consumptions or start to produce hybrid products. In the developing countries, populations from see the need for development and growing rate of welfare more important than environment protection; they accept the pollution like a cost for economic growth.

Table 3. Population level and growth forecast

	Name	Population	
		Millions	
		2010	2035
1	North America	466	555
2	West Europe	547	576
3	Developed countries of Pacific	201	194
Developed countries		1,215	1,325
4	Latin America	431	516
5	Middle East and Africa	882	1,422
6	South Asia	1,644	2,144
7	South East Asia	657	809
8	China	1,354	1,462
Developing countries		5,372	6,939
9	Russia	141	126
10	Other economy in transition (Eastern Europe and Ex-soviet space)	199	201
Economies in transition		340	327
World		6,927	8,590

Source: adapted from Population Division of the Department of Economic and Social

Affairs of the United Nations Secretariat, http://esa.un.org/unpp/panel_population.htm and World Oil Outlook 2011, p. 38

In table above, Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat forecast that the population of developed countries will have a smaller population growth than the developing countries, which will rise from 5372 millions people to 6939 millions people (higher rise been in south Asia) and countries that are in transition will have a population in decrease, resulting in a growth of the population from 6,927 millions in 2010 to 8,590 in 2035.

The populations of developed countries that consume most of the fuels and energy, in these days, are growing slow and are ageing very rapidly, resulting in diminish of the need for oil in future. However, the growth of the population, in developing countries, will impose the rise of the energy resources for growing transport, petrochemical industries and electricity production needs. So de results will be that the need from developing countries for oil will surpass the reducing of need from developed countries, so the demand for oil will grow.

Urbanization is another factor that influences the need for energy, because urban population consumes more energy resources for transportation, electric energy or petrochemicals (plastics, fibers) than rural population. Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat forecast that in 2035 the urban population will grow with 50,69% and rural will decrease with 4,17%. In developing countries growing of urban population will be larger than developed countries with almost 1432 millions. Rural population in developed countries will decrease with almost 16 milions and in developing countries will remain almost the same.

Table 4. Population forecast by urban/rural classification

	Name	2010		2035	
		Millions		Millions	
		Urban	Rural	Urban	Rural
1	North America	384	83	488	67
2	West Europe	398	149	461	115
3	Developed countries of Pacific	145	56	154	40
Developed countries		928	287	1102	222
4	Latin America	362	69	462	55
5	Middle East and Africa	353	529	751	671
6	South Asia	500	1,144	944	1,200
7	South East Asia	284	373	455	354
8	China	636	717	949	513
Developing countries		2394	2978	4001	2938
9	Russia	103	38	99	27
10	Other economy in transition (Eastern Europe and Ex-soviet space)	116	83	134	67
Economies in transition		219	121	232	95
World		3541	3385	5336	3244

Source: adapted from Population Division of the Department of Economic and Social

Affairs of the United Nations Secretariat, http://esa.un.org/unpp/panel_population.htm and World Oil Outlook 2011, p. 43

Petroleum industry has a great impact on social welfare, because it fuels the transports and electricity production, activities that have a great impact on human development, production of goods and services and communication.

3.4. Technological factors

Technological factors are represented by technologies, techniques and methods that influence the activities within an organization (Palmer A. & Hartley B., 2009). The technological factors could influence an organization from inside the industry, by making the need to acquire the last technologies (by buying equipment), techniques and methods (by hiring a trained human resource in new techniques or train the old human resource with the new techniques and methods). Once acquired, these factors will influence the organization from inside. In oil industry, the technologies are used exploration, in exploitation, transport(roads, oil tanks, pipelines), in refineries, in storage, in promoting marketing strategies, in selling; in researching and development of the brand-new products or in upgrading the old ones, in reducing the time of production the losses from the production process. Secondary technologies and techniques could be used in environment protection, worker's protection, in improving the efficiency of the management by using of new software and hardware, improving the maintaining and repairing activities. All these factors could be used against an oil company, if a rival company owns them like a competitive advantage. Because of that will result in a perpetual race (Nicolescu & Verboncu, 2009) for acquiring the news and the most efficient technologies, techniques and methods that will have the results of takings a greater share from downstream market and a greater share from the upstream market, to acquire more oil reserves or to impose the price.

Technologies that influence the oil company from outside the oil industry can influence entire oil industry (upstream and downstream). These technologies are represented by the complementary

products and substitutable products. The complementary products influence the demand for oil by developing technologies that will reduce the consumption of oil products or replaced them with other a substitutable product. The complementary products are represented by auto vehicles, airplanes, ships, petrochemicals (plastics, synthetic fibers, synthetic rubber, detergents, paints, adhesives, aerosols, insecticides and pharmaceuticals), energy, agricultural product or other industrial products. The substitutable products are represented by-products of the rest of energy industries. These industries are: the coal industry, natural-gas industry (which includes the new shale gas industry), nuclear industry, biomass industry, hydro industry and other renewable-energy industry (solar, wind, geothermal). Like the many coal and gas industries, the oil industry in life phase of maturity, because development of the new technologies became very hard and oil reserves are half depleted.

Table 5. Forecast of world supply of primary energy

	level mboe/d (equivalent of a million barrels per day)		Growth % per year	Fuel share %	
	2008	2035	2008–35	2008	2035
<i>Oil</i>	80.6	101	0.8	35.2	28.4
<i>Coal</i>	66.6	101.5	1.6	29.1	28.5
<i>Gas</i>	52	90	2	22.7	25.3
<i>Nuclear</i>	14.3	22.5	1.7	6.2	6.3
<i>Hydro</i>	5.5	10.3	2.3	2.4	2.9
<i>Biomass</i>	8.5	20.3	3.3	3.7	5.7
<i>Other renewables</i>	1.5	10.4	7.5	0.6	2.9
Total	229	355.9	1.6	100	100

Sources: adapted from World Oil Outlook 2011, p. 50

The analysis from table above will result that the need for primary energy will grow from 2008 to 2035 with 51% (from 229 mboe/d to 355,9 mboe/d) The fossil fuels (oil, gas, and coal) will decrease from 87% (199,2 mboe/d) to 82% (292,5 mboe/d) from the total of the energy supplies, but the oil will remain the most-used resource. Nuclear will almost double the production, but more use of atomic energy will be limited because of fear of nuclear disasters like Chernobyl and Fukushima. Biomass will grow with almost 240%, but the principal problem of this resource is that will compete with the need for food production, because plants, which made biomass, are using the same soil that is used in agriculture for cultivating the wheat and corn or pastures of domestic animals. Hydro will almost double in 25 years, but the great difficulty will be to find new efficient places for building hydro centrals, because most of the rivers will also have hydro central. Rest of renewable-energy production will grow will approximately seven times, from 2008 to 2035; the main issues of renewable energy are: investments are high in comparison with fossil fuels, efficiently is lower, in most of the world region renewable energy can be produced only in some seasons, and it has a dependence to weather conditions.

3.5. Environment factors

Environment factors are represented by the geographical position, landform, climate, fauna, flora, rock structure and natural resource that are in case of petroleum companies represented by oil reserves. Geographic position influence the activity of oil companies because it defines the distances between exploitation, refiners and consumers (for example, oil from Middle East can be transported half the world, exploitation to refiners), or could influence the demand for oil because of transports, international trade and migration. Landform influences the difficulty of exploitation, transportation to the refiners and consumers; demand is influenced by the consumption of the fuel

in heavy terrains. Climate influences the difficulty of oil exploitation in time of the cold season in north climates, or hot seasons of desert climate, demand for oil grown in winter because of low speed traffic or energy consumption. Flora and fauna influence cost oil exploitation because of existing of the oil reserves in natural parks, or because of existing difficult access area because of vegetation and dangerous animals. Rock's structure made difficulties of exploration and exploitation oil. World oil reserves are estimated to 1481.526 billion barrels according to OPEC Annual Statistic Bulletin 2012. The biggest oil reserves are in Saudi Arabia, Canada, Iran, Kuwait, Arab Emirates, Venezuela Russia, Libya, Nigeria, United States of America, China, Qatar, Mexico, Algeria and India. These countries have own 95% of oil reserves. One specification of the environmental factors is represented by natural disasters: hurricanes, tornados, cyclones, snow storms, sand storms, extreme temperatures, earthquakes, tsunamis, volcanic eruption that could make material loss and casualties, but could disturb economic activities. Economic activities that could be disturbed are road, rail, naval, air traffic, could decline the demand for unnecessary goods and raise the demand for the primary need goods like water, food, pharmaceuticals, construction materials, fuels, clothes. Petroleum industry influences the natural environment because of pollution and capacity of changing from natural to artificial environment by fueling the developing of modern economy. Pollution is represented by fuel emission from uses of auto vehicles, airplanes, ships and emissions from refineries that produce fuels or other petrochemical products that have a great influence on climate changing. Other pollution events are represented by accidents that can happen in activities of exploration, exploitation, refining and transport, contaminating the water, air and soil with oil, fuels or wastes.

3.6. Legal factors

Legal factors are represented by constitutions, laws, norms and regulations of the local authorities, governments, international institutions, international communities (European Union, the North American Free Trade Agreement, the African Union and the Association of South East Asian Nations). This factors influence the modalities of exploration, of exploitation, of the refiner, of transportation and of commercialization of oil and oil products. The legal factors also impose laws and regulations for pollution, social protection, work protection, work regulation, competition regulation, anti-trust regulation, consumer protection, international trade (trade agreements between nations or embargoes to some countries), subsidies, the taxes(like the excise rates for fuels and oil price or taxes and fees over profit to the energy companies).

Table 6. Tax rate in comparison with price

Country	Oil price USD per liter	Tax rate	Tax
United Kingdom	1.76	65.1%	1.15
Germany	1.53	66.3%	1.02
Italy	1.418	66.3%	0.94
France	1.49	63.7%	0.95
Japan	1.14	49.6%	0.57
Canada	0.90	33.3%	0.30
USA	0.75	16.0%	0.12

Source: Who get What from imported oil (2011)
http://www.opec.org/opec_web/en/publications/341.htm

4. CONCLUSION

In conclusion, the importance of knowing the macro-environment on an industry such as important like petroleum industry is crucial in the modern economy, because these factors represent the opportunities and threats of this economic sector. Many specialists think that the change from fossil

fuels to the renewable resources would resolve many of the problems and threats that the oil industry has. So the transition from oil to renewable resources should be faster, omitting many variables upstream and downstream of this industry. If a change of the principal energy resources will be made, it will be required to take caution steps, because this could make a shortage of the energy resources that could destabilize the entire world social-economic-system. For changing main energy resource will be necessary to reconvert many equipments and machinery, training the human resource, make social campaign to encourage the people to use new fuel, invest in new research about efficiency of the new fuel, the environment impact, search for new reserves and make new regulation for the use of this resource.

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