SUSTAINABLE DEVELOPMENT OF OIL COMPANIES IN AN UNSTABLE ECONOMY

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ABSTRACT. The Sustainable Development Goals, set by the United Nations in 1992, identified the need to implement an integrated and balanced approach to development in economic, environmental and social aspects. Initially, this concept covered only the state and international levels. However, there is now a consolidated understanding of importance of the role and efforts of businesses, including the oil one, to achieve the global goals set by the UN. It is companies, including oil producers, that are active participants in the economic processes, providing the economy with necessary resources and energy, possess material and intellectual property, form and redistribute financial flows, provide employment, and influence over the state of the environment.
The oil and gas industry in the twentieth century was one of the main drivers of social and economic development. Importance of the industry for the economy retains in the first decades of the 21st century. At the same time, the industry is characterised by such negative phenomena as low coefficients of replenishment and extract of hydrocarbon raw materials, an increase in greenhouse gas emissions, and erosion of natural ecosystems. The formation, implementation and adjustment of strategies for sustainable development of oil companies of Russian origin are considered as exemplified by the sustainable development strategy of PJSC LUKOIL - a vertically integrated private multinational oil company which accounts for 2% of the global oil production and for about 1% of the proven hydrocarbon reserves.

Key words: *sustainable development, oil company, economy, strategy.*

УСТОЙЧИВОЕ РАЗВИТИЕ НЕФТЯНЫХ КОМПАНИЙ В УСЛОВИЯХ НЕСТАБИЛЬНОЙ ЭКОНОМИКИ

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РЕЗЮМЕ. Цели устойчивого развития, поставленные ООН в 1992 году, определили необходимость реализации комплексного и сбалансированного подхода к развитию в экономическом, экологическом и социальном аспектах. Первоначально данная концепция охватывала лишь государственный и международный уровни. Однако в настоящее время утвердилось понимание важности роли и усилий бизнеса, в том числе нефтяного, для достижения поставленных ООН глобальных целей. Именно компании, в том числе нефтедобывающие, являются деятельными участниками экономического процесса, обеспечивая экономику необходимыми ресурсами и энергией, обладают материальной и интеллектуальной собственностью, формируют и перераспределяют финансовые потоки, обеспечивают занятость, оказывают влияние на состояние окружающей среды.
Нефтегазовая отрасль в XX веке стала одним из основных двигателей социально-экономического развития. Значение отрасли для экономики сохраняется и в первые десятилетия XXI века. Вместе с тем для отрасли характерны такие негативные явления как низкие коэффициенты восполнения и извлечения углеводородного сырья, рост выбросов парниковых газов, нарушение природных экосистем. Формирование, реализация и корректировка стратегий устойчивого развития нефтяных компаний российского происхождения рассмотрены на примере стратегии устойчивого развития ПАО «ЛУКОЙЛ» - вертикально-интегрированной частной транснациональной нефтяной компании, на долю которой приходится 2% мировой добычи нефти и вокруг 1% доказанных запасов углеводородов.

Ключевые слова:устойчивое развитие, нефтяная компания, экономика, стратегия.

Introduction

The UN Sustainable Development Goals identify the need to implement an integrated and balanced approach to development in economic, environmental and social aspects. Initially, the concept of sustainable development covered only the state and international levels. However, there is now a consolidated understanding of importance of the role and efforts of businesses, including the oil one, to achieve the global goals set by the UN.

Basics of the concept of sustainable development were formulated in the works by D.H. Meadows and D.L. Meadows (1972, 2002), M. Mesarovic and E. Pestel (1974), E. Barbier E. (1987), H.E. Daly (1992), R. Costanza (1992,1997), as well as N.N. Moiseev (1995), S.N. Bobylev (2017), etc. The concept of sustainable development was created in early and mid-twentieth century with the doctrine of noosphere produced by philosophers and naturalists V.I. Vernadskii (1991, 2012) and P. Teilhard de Charden (1987).

Companies, including oil producers, are active participants in economic processes providing the economy with the

necessary resources and energy, possess material and intellectual property, form and redistribute financial flows, provide employment, and influence over the state of the environment.

A company's development strategy can be defined as a system concept giving answers to the questions about how the company shall develop and what needs to be done for its development.

The works of H. I. Ansoff (1957), R. S. Kaplan and D. P. Norton (1992), J. Bush (1994), M. E. Porter (1996), D. Johnston (1994, 1998), P. F. Drucker (1999), and R. M. Grant (2003), as well as of V. Yu. Alekperov (1996, 2011), S. V. Babak, Yu.P. Belov, and Yu. N. Makarkin (2004), V. V. Dannikov (2006), A.V. Bushuev, A.M. Belogor'ev et al. (2012), V. V. Biryukova (2015), E. Kozachenko (2015), Z. S. Podoba and Yu. S. Lobareva (2017), etc. are devoted to a comprehensive analysis of the formation of company strategies and the specificity of their successful implementation, including companies belonging to the oil and gas sector. Evidences of the relationship between compliance with principles of sustainable development and conducting a commercially successful business are presented in the works of J. Elkington (1994, 2004), T. Dyllick and K. Hockerts (2002), M.J. Epstein (2003), M. van Marrewijk (2003), S.L. Hart and M.V. Milstein (2003), J.D. Sachs (2015), as well as Russian authors I.V. Gerasimchuk (2007), N.V. Pakhomova and A.V. Khoroshavin (2016), E.B. Zav'yalova, E.A. Starikova (2018), etc.

The formation, implementation and adjustment of strategies for sustainable development of oil companies of Russian origin are considered as exemplified by the sustainable development strategy of PJSC LUKOIL - a vertically integrated private multinational oil company, which accounts for 2% of the global oil production and for about 1% of the proven hydrocarbon reserves.

The main goal of the work is to study the advantages of running an oil business in the interests of achieving sustainable development purposes by identifying, analysing and evaluating relationship between financial and non-financial performance indicators of an oil company as exemplified by LUKOIL.

Statistical materials available in reports on the financial activities of LUKOIL, as well as data from the company's non-financial reports prepared based on the Global Reporting Initiative (GRI) standard for 2015-2019 were used as the data base for the study.

The study of the oil company's performance indicators that determine implementation of its strategy in the context of the concept of sustainable development was carried out using general scientific methods (decomposition, comparison, system analysis, synthesis, expert methods) and specific scientific methods (statistical correlation and regression analysis, assessment of financial indicators, and study of the influence of external and internal factors on the formation of the company's development strategy). Graphical methods were used to represent the results.

Oil and gas industry: new challenges and new opportunities

The oil and gas industry in the twentieth century became one of the main drivers of social and economic development. Largely due to that industry, it became possible to achieve such social and economic goals as ensuring access to energy, improving quality of life, worthy jobs and economic growth. The history of that industry, its problems and prospects are studied in detail in the works of D. Yergin (1991, 2011) and V.Yu. Alikperov (2011). The importance of the industry for the world economy remains in the first decades of the 21st century. Experts believe that for at least 20 or 30 years, the importance of the industry within the global economy as well as in the economy of many countries including Russia will retain. This is supported by such factors as continued growth of the world's population, high economic growth rates in the countries of the Asia-Pacific region (APR), high demand for energy in the field of material production, and heterogeneous economic development of different countries and regions.

At the same time, the industry can be characterised by such negative phenomena as low recovery rate of hydrocarbon raw materials (non-renewable natural resources), increase of greenhouse gas emissions, and disruption of natural ecosystems. Meanwhile, the UN concept of sustainable development draws the attention of business entities and society as whole to the idea of "meeting the needs of current generation without compromising future generations' ability to meet their needs" (WCED). It was this wording that in the 1987 report of the UN Commission on the Environment and Development entitled "Our common Future" this concept was presented for the first time.

In the twenty-first century, new challenges and threats for the development of the oil and gas industry have emerged which can significantly affect development of the industry as a whole and the development strategies of individual companies. Such challenges and threats are the following:

- transition of developed European countries to "green" energy and growth of the electric car share;
- political instability, weakening of trust in international institutions, increased competition, complication of the international trade system;
- deterioration of ecological systems, ongoing climate change, reduction of biodiversity;
- cyber-dependency, the gap between the ability to produce and use software products, and to ensure and control the security of their use;
- unpredictable risks such as pandemics, political regime changing, terrorist attacks, technological breakthroughs in related industries.

However, inside the very development of the industry and individual business entities, there are not only threats but also opportunities. The main way to adapt the industry and companies to ongoing changes can be not only to increase production efficiency and increase the pace of technological development, but also to follow the principles and goals of the UN sustainable development.

Strategic goals of LUKOIL in the context of sustainable development

The study of the essence and specifics of the formation of a development strategy for oil companies shows that the elaboration of a strategy is a set of interrelated and mutually dependent elements united by a single global goal – to ensure and maintain a high level of competitive advantages of a business entity. The high dynamism of the external environment leads to the need for a constant adaptation of the company's development strategy and development of ways to manage

changes. Each oil producing company making its own development strategy should take into account features and prospects of the industry for the future.

Under conditions of unstable economy, LUKOIL, an independent vertically integrated oil production company, tries to achieve a balance between socio-economic and natural-environmental development. That means reducing the negative impact on the environment and climate; introducing technological, managerial and scientific innovations in business processes; finding solutions and technological processes that contribute to achieve energy and resource saving objectives; searching for alternative energy sources; and producing environmentally friendly products.

The top priority at all phases of value creation is the issues of industrial, environmental, social and personal safety of employees and improving the culture of supply security.

In 2017, LUKOIL identified four strategic goals: 1) industrial and environmental safety, 2) competitiveness (rational use of resources), 3) social responsibility, a worthy contribution to the development of society, 4) return on capital, return on investment and continuous creation of shareholder value, which correspond to the UN Sustainable Development Goals set out in 2015.

These sustainable development goals are integrated into the overall business strategy and their achievement is ensured through the implementation of purpose-oriented programs and plans for development of business segments.

The main goal of any company is still the continuous making of its shareholder value. Therefore, to analyse the impact of sustainable development indicators on making the company's shareholder value, it is necessary to select indicators that characterise resource availability, social responsibility, environmental safety, and competitiveness. Such indicators, in our opinion, can be the availability of proven hydrocarbon reserves (the ratio of proven reserves to annual production), the replenishment of reserves as a result of geological exploration (the ratio of reserves growth to annual production), the number of accidents with environmental consequences, the accident rate (LTAFR - the number of cases per 1000 people on the list), labor productivity (million rubles/person).

Given the fact that LUKOIL is a company engaged in the extraction of non-renewable natural resources (raw hydrocarbons), for it, as for all raw material companies, the indicator of availability of reserves (the ratio of hydrocarbon reserves to their annual production) is of importance. Despite the fact that this indicator for LUKOIL decreased in 2019, compared to foreign companies, it is still at a fairly high level (18 years against 8-11 years for leading foreign companies, such as Exxon Mobil Corp., Royal Dutch Shell, Chevron Corp., BP PLC).

Of course, one should keep in mind that the amount of reserves calculated according to SEC standards is significantly affected by oil prices, since with low prices, part of the reserves becomes economically unprofitable for extraction. However, the business of resource companies, including oil and gas enterprises, is directly related to constant replenishment of reserves as a result of exploration activities. In this regard, for the analysis of the impact on the company's capitalisation, we have selected the indicator of replenishment of reserves as a result of geological exploration, which not only affects the resource availability, but also largely characterises the company's attitude to the prospects for the development of its business (in our case, awareness of the future development of the industry and its place in it). The initial data for the analysis are given in Table 1.

Table 1. *Input data for analysis of the relationship between capitalisation and replenishment of reserves as a result of LUKOIL exploration activities*

Year	Capitalization, million rubles	Replenishment of reserves as a result of geological exploration, %
2015	323137	68
2016	3227664	77
2017	3490399	65
2018	4073526	79
2019	3973499	84

From the data shown in Table 1, it can be seen that over the past five years, the increase in reserves as a result of exploration did not surpass production.

The company's proven hydrocarbon reserves in 2019 decreased by 4.8% compared to 2015 (from 16,558 to 15,769 barrels of oil and gas), while production increased by 5.0% (from 847 to 889 million barrels of oil and gas).

Capitalisation and replenishment of reserves as a result of geological exploration

Let us analyse the dependence of the company's capitalisation on the replenishment of hydrocarbon reserves as a result of geological exploration.

n=5

$\bar{x}$ = 74,6

$\bar{y}$ = 3599 282

$$b=\frac{1350717\ 765-5*74,6*3599282,4}{28\ 075-5*74,6}= 32846,8 \quad (1)$$

a=3599282,4 -32 846,8*74,6=1 148 908,95 (2)

Standard deviation:

$$Sy = \sqrt{\sum(y - y)}^2/n = \sqrt{\frac{381354644\ 136}{5}} = 276171,92 \quad (3)$$

$$\delta y = \sqrt{\sum(y - \bar{y})}^2/n = \sqrt{\frac{650220057501,2}{5}} = 360616,155 \quad (4)$$

Pearson's criterion:

$$\eta= \sqrt{1 - \frac{276171,92^{\ 2}}{360616,155^2}}= 0,643039 \quad (5)$$

Correlation coefficient

$$r=\frac{8185\ 429,8}{\sqrt{650220057501,2*249,2}} = 0,643039 \quad (6)$$

Linear approximation model:

$$MAPE= \frac{1}{5} * 0,33481634 =0,066963268=6,7\% \quad (7)$$

Fischer Criterion:

$$Fp=\frac{\delta^2}{S^2} = \frac{360\,616{,}155^2}{276\,171{,}92^2} = 1{,}70503 \quad (8)$$

Elasticity:

$$Э= b\frac{\bar{x}}{\bar{y}} = 32846{,}8 * \frac{74{,}6}{3559282{,}4} = 0{,}680795 \quad (9)$$

$$ta = |a| \sqrt{n-2}/Sy =$$
$$= 1148908{,}95*\sqrt{5} - \frac{2}{276171{,}92} = 2\,569\,038{,}518 \quad (10)$$

$$tb = |b| \sqrt{n-2}/Sy * \delta x =$$
$$= 32846{,}8*\sqrt{5} - \frac{2}{276171{,}92} *49{,}84 = 73447{,}742 \quad (11)$$

$$\delta x = \sqrt{\sum}(x - \bar{x})\text{^}2/n = \sqrt{\frac{249{,}2}{5}} = 49{,}84 \quad (12)$$

$$r^2 = 0{,}413499 \quad (13)$$

$$\check{y} = 32847+1148909X \quad (14)$$

The equation (14) shows the dependence of capitalisation and replenishment of reserves as a result of exploration.

MARE < 33%, that means that the model is acceptable for analysis.

The linear correlation coefficient takes values from -1 to +1.

The relationship between the analysed indicators can be weak and strong (close). Their criteria are evaluated with the Cheddock scale:

$0.1 < r_{xy} < 0.3$: weak;

$0.3 < r_{xy} < 0.5$: moderate;

$0.5 < 0.643039 < 0.7$: noticeable, which means that the relationship between capitalisation (million rubles) and replenishment of reserves as a result of exploration is weakly close.

The Pearson coefficient is 0.643039, so we can conclude that the correlation is obvious. The following coefficients characterise the quality of communication:

The coefficient of elasticity is equal to 0.680794996, it is less than the digit; therefore, with the increase of the replenishment of reserves as a result of geological exploration by 1%, the size of capitalisation will increase by 0.680794996%.

To assess the quality of the linear relationship, one should determine the coefficient of determination as the square of the linear coefficient of the pair correlation r^2. Consequently, the 41.3% change in the share of capitalisation is due to the change in the amount of replenishment of reserves as a result of geological exploration and (1-0.413) 59.7% is due to the influence of other factors not taken into account in this model.

Figure 1 shows the field of dispersion of relative indicators of the size of capitalisation (million rubles) and replenishment of reserves as a result of exploration, % for 2015-2019.

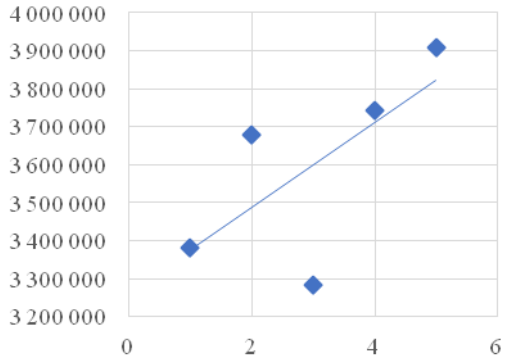

Figure 1. Field of dispersion of relative indicators of the size of capitalisation (million rubles) and replenishment of reserves as a result of exploration, % for 2015-2019

The hypothesis about the direct impact of the replenishment of reserves as a result of geological exploration on the size of the capitalisation has been confirmed.

Conclusion

The development strategy of any company is formed taking into account capabilities of the company and understanding that its current and future success depends on the ability to effectively respond to the emerging challenges of an economic, environmental, and social nature, and foresees specific measures aimed at improvement. The economic indicators, image and reputation of the company, involve the management of existing risks and the use of existing opportunities.

The study of prospects for development of the global oil sector as the most important factor in formation of the development strategy of oil companies allows us to conclude that the demand for hydrocarbon raw materials will gradually stabilise and oil prices will rise after a significant decline in 2020.

At the same time, leaders of the global oil and gas business understand that ensuring a long-term future for their companies is possible only if their markets are economically stable, socially fair and focused on preserving the environment. Achieving the Sustainable Development Goals requires the consent of all stakeholders – employees, management and shareholders of the company, local communities, and society as a whole.

One of the leaders in following the principles of sustainable development among Russian companies is the LUKOIL Public Joint Stock Company (PJSC "LUKOIL").

LUKOIL is one of the largest multinational companies of Russian origin, producing hydrocarbons in Russia, Uzbekistan, Iraq, which performs crude oil refining in 6 countries, geological exploration in 14 countries, and trading operations with more than 100 countries.

Taking into account possible shifts in the resource supply of the global energy sector, LUKOIL has a portfolio of electricity-generating assets based on renewable energy sources (RES), which accounted for 6% of the company's commercial electricity generation in 2019. That means that the company considers the development of generation based on renewable sources as a long-term trend in the development of global energy production, which should be taken into account when developing a development strategy.

However, one should not forget that the main business of LUKOIL is related with oil production. Currently, the company is one of the world leaders in terms of controlled reserves, 76% of which are oil and 24% - natural gas.

In this paper, the relationship between the company's capitalisation and the indicator of replenishment of reserves as a result of geological exploration has been established. The relationship is not only directly related to the availability of hydrocarbon resources for production and the rational use of resources, but it also largely characterises the company's attitude to the prospects for the development of its core business. The hypothesis about the direct impact of replenishment of reserves as a result of geological exploration on the size of the capitalisation has been confirmed.

The impact on the capitalisation of such indicators of sustainable development as the number of accidents with environmental damage, the frequency of accidents, and labor productivity has also been studied. A direct correlation has been established between capitalisation and labor productivity, also, an inverse correlation between capitalisation and the number of environmental accidents, as well as capitalisation and the frequency of accidents. Notably, the correlation between capitalisation and frequency of accidents is less close than the relationship between capitalisation and the number of accidents with environmental consequences. More comprehensive and detailed further studies should be conducted to better assess the links.

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