EXAMINATION OF SUSTAINABILITY PERFORMANCE OF ROMANIAN OIL AND GAD COMPANIES USING MULTICRITERIA DECISION ANALYSIS

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Rezumat. *Obiectivul lucrării este examinarea performanței sustenabilității principalelor companii din industria petrolului și gazelor prezente în România. Analiza a fost realizată folosind metoda deciziilor multicriteriale (MCDA), cu criterii de importanță egală. Companiile selectate au fost descrise și apoi analizate pe baza celor mai relevanți indicatori de sustenabilitate. Conform rezultatelor obținute, au fost identificate cele mai sustenabile companii, oferind o imagine de ansamblu semnificativă asupra dezvoltării durabile a industriei de petrol și gaze din România….*

Abstract. *The objective of the paper is the examination of the sustainability performance of the main companies in the oil and gas industry in Romania. The analysis was performed using the multicriteria decisions method (MCDA), with criteria of equal importance. The selected companies were described and then analyzed, based on their most relevant sustainability indicators. According to the results obtained, the most sustainable companies were identified, providing a significant overview of the sustainable development of the oil and gas industry in Romania*.

Keywords: sustainability; oil and gas industry; sustainable development; multicriteria decision analysis.

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1. Introduction

The first official definition of sustainable development can be found in the 1987 Brundtland Report of the World Commission on Environment and Development, entitled "Our Common Future", and synthetized the concept as "the development that meets the needs of the present without compromising the ability of future generations to meet their own needs" [1].

The principle behind sustainable development is the continuing concern for the systematic integration of the three essential pillars on which it is based: the environmental, social and economic one. It is essential that in all aspects of decision-making over the generations, people, organizations and nations take into account their systemic correlation and inter-dependence [2]:

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1. Environmental sustainability: the ecological component that must be found in every initiative aimed at protecting biodiversity; sustainable organizations aim to reduce their environmental footprint as much as possible;

2. Economic sustainability: ensuring the longevity of the company is a responsibility, regardless of market developments; financial profitability is one component of the business, not the only or the most important one;

3. Social sustainability: companies act for their own interests, but at the same time, they serve the interests of their employees and of society as a whole. It involves the concern for the welfare of employees and the investment of a part of the company's profit for charitable causes in the community in which it operates;

For a more effective pursuit of directives, the 17 Global Sustainable Development Goals (SDGs) have been developed, which reflect a balanced agenda of economic, social and environmental goals and objectives. In order to achieve the SDGs, each country will need to recognize and appreciate the existence of potential trade-offs and develop ways to manage them.

In 2015, at the meeting of the United Nations General Assembly in New York, a historic document was adopted: The 2030 Agenda for Sustainable Development. Through its 17 objectives, this document aimed to achieve a better future, not only for the present generation, but also for the next ones. Built on the three pillars of sustainable development - economic, social and environmental -, the 2030 Agenda is the one that guides the most important decisions regarding sustainability at the strategic level. Hence, it was quickly adopted by Romania and the European Union.

GRI (Global Reporting Initiative) is the first global standard to support organizations in preparing for the sustainable development report. These reporting standards allow organizations around the world to be more transparent about their economic, environmental, and social impacts. They will also help organizations contribute to the 17 United Nations Sustainable Development Goals (SDGs). GRI has been helping companies prepare a report on the socio-economic and environmental impact since 1999 when it published its first draft of the guidelines.

GRI standards are built on the key concepts and information requirements presented in the G4 Guidelines. The difference is that they are now structured as a set of 36 interdependent, modular standards. Their latest version has three Universal Standards and the three series of Specific Standards and was launched in 2016.

2. Research Methodology

2.1. The research method

This research used the multicriteria analysis decision method to ascertain and select the best option available. "The decision is the central point of the management activity because it is found in all the functions of the management process. This is the result of a sequential process of information, analysis and deliberation, called the decision-making process. The decision can be defined as the course of action or the modality, chosen for the achievement of one or more objectives, from a multitude of variants, taking into account certain criteria [3]".

There are several typologies of decisions, but the best known is the classification according to the knowledge degree of the decision-maker regarding the result of different alternatives, which encompasses decisions in conditions of certainty, risk and uncertainty.

In decision-making processes developed in conditions of certainty, complete information is available, there is only one state of nature with a certain probability (pk), (p1 = 1); thus, the decision-maker knows exactly what will be the result of each variant (alternative).

As opposed, in decision-making processes under risk conditions, there are several possible results for the chosen alternatives, while in decision-making processes under uncertainty conditions, of the number of results, values and probabilities are not known.

The multicriteria analysis method is a structured approach used to determine the preferences between several alternative options, which lead to the achievement of the objectives. This method specifies the objectives pursued and identifies the attributes or indicators (criteria) corresponding to each objective.

The most widely used approach to multicriteria analysis is by using a sequence of five steps. Therefore, the stages of the decision-making process are the following:

- Step 1: Formulating the problem to be solved;

- Step 2: Determining the consequences (performance values) for each criterion;

- Step 3: Transforming the consequences into utilities and building the utilities matrix;

- Step 4: Assigning weights to the decision criteria and building the global indicator;

- Step 5: Performing the calculations and choosing the most convenient option.

The objective of this method was the analysis of the sustainable development of companies in the oil and gas industry that operate in Romania in order to rank them according to their sustainability performance. Throughout the paper, the three main competitors in the Romanian oil and gas market were analyzed: OMV Petrom, LuKOil, and Rompetrol KMG International.

2.2. Presentation of the analyzed companies from the oil and gas industry in Romania

OMV Petrom is the largest energy company in Southeast Europe. It produces and supplies energy in all its forms (fuel, gas, and electricity) in a safe and responsible manner. By 2020, the group had sales of EUR 17 billion and a workforce of around 25,000 employees.

LukOil is Russia's largest oil company in terms of oil reserves, production, and refining. It provides about 20% of Russian crude oil production (79.8 million tons) and globally it supplies about 2% of total world production.

Rompetrol Kmg International is the main brand of KMG International, a group owned by KazMunayGas, Kazakhstan’s national oil and gas company. It is a major player in the Black Sea and Mediterranean area, with over 6,000 employees and operating in 11 markets. The company is representative for refining and petrochemical operations, distribution activities in Romania, Moldova, Bulgaria, and Georgia, as well as for upstream drill services.

3. Application of the multicriteria decision analysis

The authors followed the classic stages of the decision-making analysis.

Steps 1 and 2: Formulating the problem to be solved and determining the consequences.

The multicriteria decision-making method was used to investigate the sustainability performance of the three companies. The problem to be solved can be therefore considered a problem of a multicriteria decision in conditions of certainty, using criteria of equal importance. This is an analysis of the sustainability performance of the selected oil and gas companies active in the Romanian market.

For this analysis, the sustainability reports of the companies from the last available year (2020) were taken into account. The selected companies to be studied were OMV Petrom, LukOil, and Rompetrol Kmg International, as they are the most important players in Romania.

Table 1 shows the GRI (Global Reporting Initiative) reporting standards according to which the companies' reports were prepared:

Table 1. Sustainability indicators analyzed (for the year 2020)

No	*Sustainability Pillar*	*GRI Standard*	*Sustainability Indicator*
1	Economic sustainability	201-1	Direct economic value generated and distributed
2	Social sustainability	405-1	Diversity of management structures
3	Environmental sustainability	305-1	Direct (Scope 1) GHG emissions

Along with the three selected sustainability indicators, an additional criterion has been introduced, which refers to the number of SDGs that each company monitors according to their sustainability reports. Table 2 details the indicators and the corresponding consequences (performance values) for each criterion chosen for the analysis:

Table 2. Sustainability indicators and analyzed consequences (performance values)

Crt. no.	*Indicator*	*No. SDG*	*Direct GHG emissions*	*Diversity of management structures*	*Direct economic value generated and distributed ($)*
1	OMV Petrom	11	3,99 (mt)	26%	4.697.505.328
2	LukOil	12	36705 (mt)	35%	77.987.939.356
3	Rompetrol KMP International	11	0,858801 (mt)	7.79%	4.895.047.811

As it can be observed, LukOil has the highest performance values for all four analyzed criteria.

Steps 3 and 4: Transforming the consequences into utilities, assigning weights to the decision criteria and building the global indicator

Transforming consequences into utilities involves transforming the consequences matrix into a utilities matrix. At the level of each criterion, the most favorable and unfavorable (beneficial or non-beneficial) consequences were determined; these consequences were then given maximum and minimum utility, respectively. The four criteria chosen according to their category were cataloged as beneficial or non-beneficial (Table 3):

Table 3: Utilities matrix

Normalization	*Beneficial*	*Non-beneficial*	*Beneficial*	*Beneficial*
Indicator	*No. of SDGs*	*Direct GHG emissions*	*Diversity of management structures*	*Direct economic value generated and distributed ($)*
OMV Petrom	11/12	3,99/0,858801	26/35	4.697.505.328/ 77.987.939.356
Lukoil	12/12	36.705/0,858801	35/35	77.987.939.356/ 77.987.939.356
Rompetrol KMP International	11/12	0,858801/0,858801	7.79/35	4.895.047.811/ 77.987.939.356

Step 5: Hierarchy of variants. Performing the calculations and choosing the most convenient option

The penultimate step followed, in which each analyzed characteristic received a weight depending on its importance. In the case of the current analysis, it was considered that all four analyzed indicators have equal weights (25%). According to these weights, the authors calculated the performance score as shown in Table 5:

Table 5: Performance score calculation and ranking of the analyzed companies

Indicator	*No. of SDGs*	*Direct GHG emissions*	*Diversity of management structures*	*Direct economic value generated and distributed*	*Performance Score*	*Ranking*
OMV Petrom	0.23	0.0538	0.19	0.0151	0.48	3
Lukoil	0.25	0.000575	0.25	0.2500	0.75	1
Rompetrol KMP International	0.23	0.25	0.06	0.0157	0.55	2

The hierarchy of variants was built based on the global indicator. The global utilities indicator (U), also known as the Performance score, represents the sum of all utilities of a variant (Vi) and is calculated using the formula:

$$U = \sum_1^i Vi \qquad (1)$$

The performance score provides the ranking in the multicriteria analysis (Table 5). It provides an overview and a hierarchy of the analyzed companies from the sustainability performance point of view. The objective for each variant is to get

the highest score possible. In an ideal case, the maximum score that an organization can get is equal to 1.

From the current analysis, it can be observed that the highest score (0.75) was obtained by the LukOil company. According to the analysis, LukOil is the most sustainable oil and gas company operating on the Romanian market, taking into account the four sustainability indicators considered as criteria for this analysis.

Conclusions

The objective of the paper was to determine the performance in terms of sustainability for the three main companies present in Romania, leaders of the Romanian oil and gas market. For this comparison, 3 representative indicators were chosen (direct GHG emissions, the diversity of management structures, and the total value generated), one for each of the three pillars that define sustainability: environmental, social and economic. The multicriteria analysis method was used for decision-making, in order to examine the performance of the companies subjected to analysis.

According to the results obtained, the most sustainable company proved to be LukOil, followed by Rompetrol KMG and OMV Petrom. LukOil differed significantly from the other two competitors, in particular in what concerns the indicator 201-1 (Direct value generated), which is representative of the pillar of economic sustainability. The outstanding performance achieved through this indicator is strongly correlated with the size of the organization, which represents about 2% of total world oil and gas production.

LukOil obtained superior performance for the other two sustainability indicators also, proving to be the leader of the Romanian market and a worthy competitor at a global scale.

This analysis provided important information and insight about the performance of sustainable development of the oil and gas industry in Romania. As sustainability is a complex concept, encompassing at least three equally important pillars, even if the companies score higher in economic indicators, this is not enough to secure a high position in sustainability rankings. The companies should dedicate sufficient effort and resources to improving and consolidating their performance in the social and environmental fields also.

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