

# Social impact assessment in the mining industry

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**Abstract.** Social responsibility for sustainability has become an important dimension in the current context. More and more industries are evaluating this responsibility and are actively involved in addressing human resources to increase motivation, communication and reduce negative factors. The mining industry is important, especially from the perspective of sustainability. For these reasons, this paper reviews the social impact in the mining industry and provides a framework of social indicators for this industry. The methodology used is based on a qualitative assessment of the importance of indicators for industry. This framework is developed based on various social impact reporting tools. This approach can be extended to other fields of activity following the adaptation of its applicability. The main conclusions show that social responsibility is important for the mining industry.

## 1 Introduction

Sustainability has been a concern for all industries for a long time. Sustainability involves an approach to economic, social and environmental responsibilities. Each of these responsibilities is of major importance in sustainable organizational development. Initially, the major implications of the companies were in the environmental responsibility. The implications of industries in environmental responsibility were mainly aimed at reducing the negative impact on the environment and reducing non-renewable resources. Gradually, organizational implications in sustainability began to be more complex in all three responsibilities [1,2]. Thus, at present, in many of the industries there is an intense involvement in social responsibility. This responsibility concerns on the one hand the well-being of the company and on the other hand the well-being of the employees and their training. Thus, this social dimension has obtained a major importance, there being a sensitivity in this area of the well-being and well-being of society [3]. An intense involvement in this dimension of the banking and automotive industry can be observed. Mining produces resources for many important sectors that contribute to the well-being of society and the functioning of the economy. Mankind is based on metals due to their

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multiple uses. Often, this industry is perceived as an industry that has a negative impact on the environment through the level of pollution and the amount of waste generated. Mining, in this research includes the exploitation of minerals and all processing operations. This industry is often compared to other industries that exploit the environment (forestry, agriculture, and aquaculture) [4,5,6]. However, many studies show that mining is the least involved in sustainable development. Hence, probably, the biggest concern regarding unsustainable practices. Lately there has been a growing global interest in this industry.

Because this industry has a dual role for the economy, the production of resources for the well-being of society and the functioning of the economy, sustainability is an important step for mining [7].

There are several national and international approaches, policies and regulations that are established for social impact assessment (sustainable development goals - 17 Sustainable Development Goals (SDG), Global Reporting Initiative - GRI, social life cycle assessment, organizational assessment reports) [1-9].

The present paper aims to develop a framework for assessing the social dimension for the mining industry. The methodology used for the development of this research consists in selecting relevant studies conducted in this field and comparing the results obtained. Finally, a social framework for the mining industry is structured. This framework can be extended to other industries by customizing the current framework.

## 2 Implications of the mining industry for the social dimension

The mining industry develops positive and negative impacts. The evaluations made in this industry are neither many nor complex. The complex approach to this issue is to identify the contribution of the mining sector to society over long periods of time [5]. It can be seen that it develops [10]:

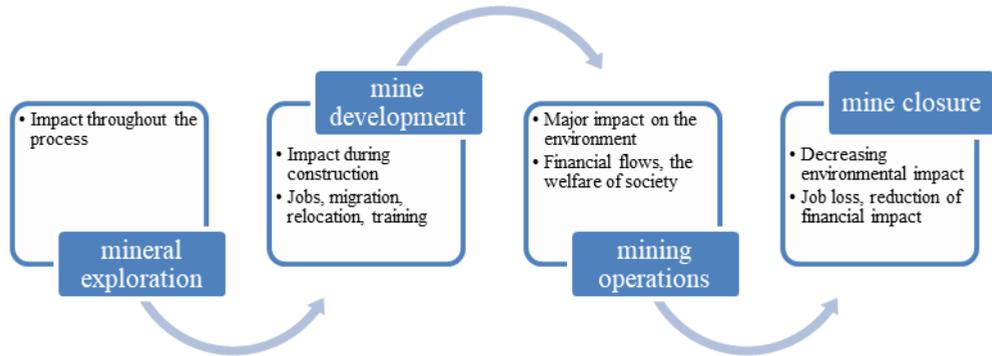
- a negative impact on the well-being of society through land use
- a positive impact on society by creating jobs and important contributions in the development of human resources.

The implications of the mining industry are multiple and with different valences. The positive and negative impacts have been intensely evaluated lately, increasing the interest for this industry [11]. More and more studies show that the main implications are on governments, society, the economy, the natural environment and developed technology, Figure 1.



**Fig. 1.** The implication of sustainable development in the mining industry

If we evaluate the impacts of the mining industry, we must evaluate the impact throughout the life of a mine. This life of mine is shown in the following figure, Figure 2.



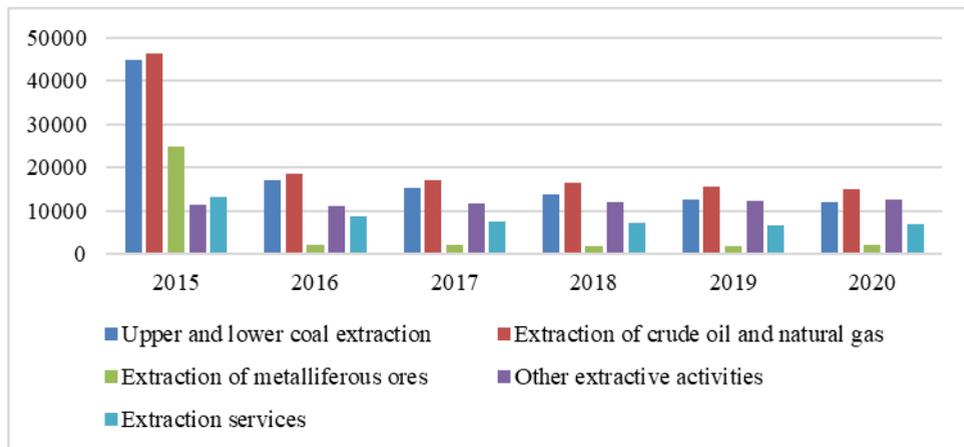
**Fig. 2.** The impacts recorded during the life of a mine.

The number of employees in the extractive industry is presented in the following table for the period 2015-2019. It can be seen in Table 1 that the total number of employees in Romania is increasing, but in the extractive industry the number of employees is decreasing. In 2019, there are 48,313 employees, 17% less than in 2015 [12].

**Table 1.** Number of employees in the period 2015-2019

Employees	2015	2016	2017	2018	2019
Total	4,611,395	4,759,419	4,945.868	5,068,063	5,164,471
Extractive industry	57,863	54,022	51,447	49,025	48,313

The situation of employees by activities of the extractive industry is presented in Figure 3. Extraction of crude oil and natural gas registers the highest number of employees during the analysed period [12].



**Fig. 3.** Number of employees by fields of activity for the period 2015-2020

The rate of jobs in the extractive industry is presented in Table 2. This rate is calculated as the ratio between the number of vacancies and the total number of jobs (occupied and vacant). This rate is

increasing in 2019. The average gross monthly cost of labour per employee in the extractive industry in 2019 is approximately 1700 euros [12].

**Table 2.** Job vacancy rate in the extractive industry

Job vacancy rate	2015	2016	2017	2018	2019
Rate	0.15	0.19	0.16	0.14	0.27

## 2.1 Initiatives to assess the social dimension

Initiatives to address and assess sustainability involvement are diverse and exist at the national and international levels, Table 3 [13-16]. There are no legislative requirements on involvement in achieving sustainability objectives or in reporting organizational involvement. But most organizations are involved in this approach as a condition of existence in the business environment. In the mining industry, the number of reports of involvement in sustainability is lower at the national level, but at the international level the implications are more numerous [5,7,9-11].

**Table 3.** Evaluation of existing initiatives

Initiative	Description
17 SDGs	The UN Sustainable Development Goals are set globally and total 17 goals and 169 targets. It offers a reference and a series of principles for organizational involvement in sustainable development. Industries are involved in achieving goals to increase the performance of their processes and activities.
Global Reporting Initiative – GRI	This approach includes a series of practices and information for reporting and provides guidelines for the sustainable development of organizations. It includes a series of indicators to be reported. These indicators are grouped on the three dimensions of sustainability. It is not a mandatory approach and is used internationally.
Evaluarea ciclului de viata social	The social life cycle evaluates the social and socio-economic impact along the stages. Provides a clear direction of action for each stage of the life cycle.
Rapoarte organizationale de evaluare	Many organizations in different industries report their implications for sustainability. Because reporting is not a mandatory activity, it does not provide a required framework for reporting. These reports can provide additional indicators that are important to the industry.

## 2.2 Studies conducted globally

Globally, a series of studies [8-11] have been carried out which present an inventory of social indicators in the mining industry. Some studies consider indicators related to the well-being of society. These indicators are evaluated at the country level and their impact globally. Emphasis is placed on the global consequences of involvement in the sustainable development of industry organizations. At the same time, these indicators are evaluated to make an inventory of the possibility of involvement in global sustainability. Other studies [12-15] present the implications of the industry in the national and global economic development. These implications take into account financial indicators: turnover, payment of taxes to local authorities, taxes paid and other indicators. Other research [17,18]

considers the impact of the organization on employees and develops a set of indicators for the development of an improved and safe working environment. These approaches develop new opportunities for organizations and are part of the voluntary activities that organizations do [18-21].

### 3 Defining the framework for assessing the social dimension in the mining industry

Following the specialized literature, a series of indicators proposed for the evaluation of the social impact in the mining industry can be systematized. The two important directions of action are taken into account: the well-being of society and the improvement of the economic situation at local level. These indicators are divided into different categories depending on their importance for society and the economy.

**Table 4.** Proposed framework for assessing the social dimension of the mining industry

Category	Direction and impact
Economy and security (Income, business, accidents, social tensions, poverty, equality)	GDP growth Contributions paid locally Reducing the level of poverty Business opportunities Number of mine accidents The number of fatal accidents in the mine Number of labor disputes Intensity of work tensions Conflicts between organizations and miners The intensity of the trainings performed in a given period of time Social objectives known to employees The level of safety offered to the inhabitants of the mining areas Periodic information of the inhabitants of the mining areas
Training and professional development (employees, unemployed, silks, skills, working conditions)	Working conditions Increasing the number of employees (indirect and direct impact on the company) Reducing the number of unemployed at national level Improving the skills of employees and individuals at the national level Child labour or forced labour Severe hazards that can have a negative impact on employees Sensitive stability of the industry due to fluctuations in market demand Sensitivity of the number of employees due to market dependence Number of trainings performed at industry level Non-financial benefits granted to employees Equality offered to employees for promotion on positions
Land use and environment	Improving infrastructure by using new technologies (digitization, communication and automation) Improving access to health Improving access to education Access to financing for technology improvement Expropriation / displacement of population The impact on the environment that can have an effect on society Negative effects on the mining community The amount of contaminated water
Demography, and health and safety impact	Positive impact on population growth Population migration and population growth

	The effects of inflation on accommodations and other employee needs
Human rights (stakeholders, indigenous rights, discrimination, cultural resources)	Gender equality Registered abuses Lack of stakeholder involvement in employee evaluation Indigenous communities Inequality of opportunities offered between genders, levels and, functions Respect for cultural resources

The mining industry must continuously enrich its approach, to increase its degree of transparency and communication. New approaches to sustainability involve the new innovative technologies that are needed in this industry as well. Overcoming existing barriers contributes to increasing the capacity of the industry for sustainable development.

## 4 Discussions and conclusions

Mining industry has a considerable effect on the environment through activities performed on land and large amounts of water used. However, this effect is combined with the social impact that the industry generates. The effects are felt on society, ecosystems and social structures. There are a number of opinions about the benefits and disadvantages of this industry. Some are contradictory.

Providing a general framework for mapping and evaluating the social performance of a mining company based on environmental, economic and technological directions is an important step for industry. This proposed social framework complements the literature and provides support for assessing the implications of the social dimension in this industry. This framework can be extended to other industries.

In order to expand its organizational objectives, the mines of the future should be automated, they should have new technologies for extractive, as well as methodologies for soil exploitation.

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