



REGIONAL PERSPECTIVE OF SUSTAINABILITY ROLL OF MINING COMPANIES INTEGRATED INTO INDUSTRIAL CLUSTERS

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Abstract. Economic, political and social crisis having taken place in Ukraine for the last year has evoked a great challenge for the country and Europe, which can be referred as economic collapse covering eastern regions. The main problem here is that almost 50% economy of these regions is dependent on mining and metallurgical industries. Besides, a wide range of mines and other production facilities serving mining industry constitutes industrial clusters, as highly interdependent network of companies working together and contributing to the regional development. One of the key contemporary trends around the world is a concept of sustainable development implying a balanced integration of economic, social and environmental elements.

Previous publications have already dealt with the issue of sustainable development of mining companies. Some important outcomes are as follows. Anchoring practical mechanisms and instruments by mining companies in transitive economies based on natural resources trade is of great importance. How to make sustainable development attractive for investors and owners of mining facilities remains a topical issue. There is a fundamental difference in the postulates of the market economy and the view prevailing among business persons and managers about the importance and necessity of implementing socially and environmentally effective projects. This is reflexively expressed in their personal neutral or even negative attitude to these projects in the past and positioning them within the hierarchy of priorities designed for a company to be developed in the long-run perspective at the lowest levels. In other words, the process of sustainable development, as it is seen by the leaders, has a high level of cost and a low level of profitability. Thus, investments in the sustainable development projects are either too low productive or not productive at all.

At the same time, the company operates under the rules of the market economy – that is, the company is oriented on financial benefits gained as a result of the implementation of environmental and social projects. Among such projects are rendered public services (education, health, culture and recreation), which do not bring direct financial benefits to the enterprise in the form of revenue.

The above issue would have been perceived as not so influential if we considered a single mining company. However, in case of considering a mining cluster occupying the territory of the whole region, this challenge stops being local and should be treated as national. Thus, this article deals with the concept of sustainability roll previously revealed from the perspective of regional economy and industrial clusters.

Keywords: industrial cluster, mining, industrial company, social responsibility.

Introduction

Lack of indicators to measure a company's image enhanced due to socially responsible policy leads to unclear and vague evaluations of sustainable development efficiency. Increasing market value of a sustainably developing enterprise and its improving position in the rankings on sustainable development are relevant to the case if the company has a public form of ownership, is preparing for merger or acquisition and meets a number of financial indicators and indicators of scale to participate in the process of rating. Otherwise, the implementation of social and environmental projects now requires incurring additional costs and cuts of net profit. In this case, the opportunity cost calculated as the effect of other possible projects, which could have been implemented if these costs would have been incurred for other projects, may exceed the resulting non-economic social and environmental effect of sustainable development estimated by experts.

All this increases the risk that an enterprise will refuse to implement social and environmental sustainable development projects especially under conditions of changed owners or top managers and without possible grants from public authorities.

Therefore, the conceptual platform of the sustainable development of mining companies must be integrated into the free market model so that a company may be profitable and follow the principles of economic, social and environmental sustainability. In addition, benefits gained through sustainable development activity should be measurable in monetary units.

What does it mean for the regional sustainable development? It means that the regional system is quite vulnerable due to unbalanced economic, social and ecological elements. It means that a human element accompanied with pragmatic strives to achieve the best business results play key role in the process of making decisions by companies' managers. Consequently, the regional policy should be aimed at developing and delivering clear benefits of sustainability for all representatives of all industries using resources of the region. Otherwise, the regional economy being mono structured is expected to sustainably roll.

Results

It was previously found that a mining company by its nature violates the principles of sustainable development not only during active operation stage of its life cycle, but also after its liquidation as an economic entity. Regional economy, in turn, falls into the trap of mining industry. Continuing or refusing mining operations will equally lead to the collapse of sustainability. Then, a dilemma arises. What way to choose? The difficulty of the decision is doubled by cluster effect being reduced to the simultaneous equal actions performed by many mining companies at a time. It was proposed to call this phenomenon as Sustainability Roll in Transitive Mining. However, if we see it from the regional and cluster perspective, we will find it necessary to introduce additional concept of the Intensity of the Sustainability Roll in Transitive Mining (Fig. 1). The intensity comes into relevance through a large number of economic agents playing in the region and united into clusters.

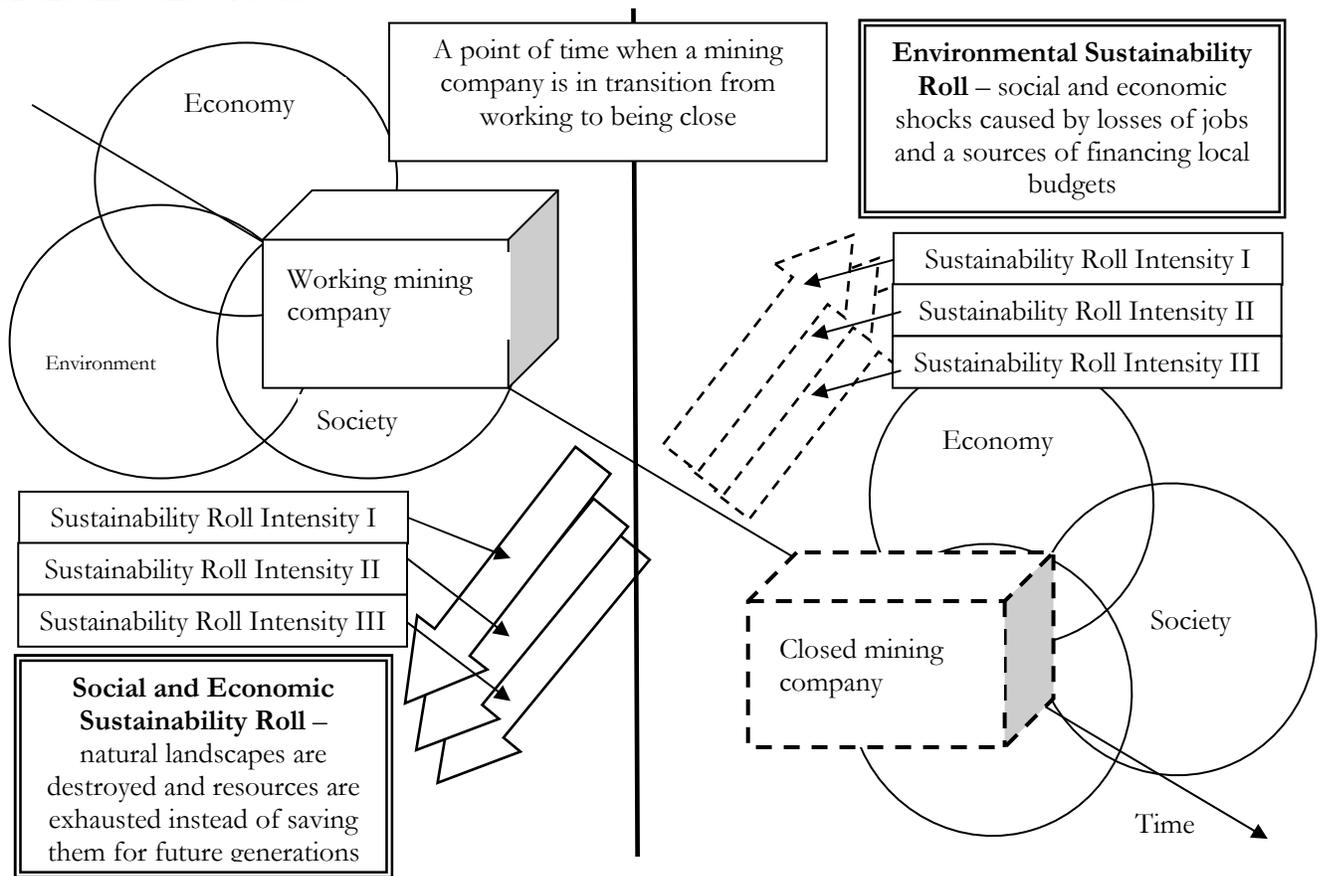


Fig. 1 Intensity of the Sustainability Roll in Mining Transition

The economic essence of sustainability roll observed during the development of the mining enterprise can be determined as a concentration of resources to perform more tasks in one or two areas – that is, economic, social and environmental. It accordingly allows satisfying the interests of certain groups of stakeholders to a greater extent than others. If a mining company is active in the economic area, then its standing could not be called absolutely sustainable due to the significant ecosystem disruption (social and economic sustainability roll). In turn, the termination of the process of destroying the ecosystem causes social and economic shocks in the territorial development (environmental sustainability roll). Therefore, in this regard, it can be concluded that both the actual mining activities and its termination shall not contribute to the achievement of sustainable development of internal and external environments of the company. This precedes the question of the possibility to ensure sustainable development of a mining company even after its liquidation, as an economic entity.

Sustainability roll is a dynamic characteristic of the mining enterprise development, which is explained by its shift and especially clearly observed in the transition from active mining enterprise economic activity to its termination. This suggests that the roll of the enterprise agile in time. At different points of time, at different stages of development of the enterprise we can see deterioration in the economic, social or environmental internal and external subsystems of the company due to a specific variant of the reallocation of resources.

In turn, intensity of the sustainability roll of a mining company and regional economy is referred to as the share of resources allocated for performing tasks of either one or two areas out of possible three in the total amount of resources used in all operations. The higher this share is, the more intensive sustainability roll is observed.

By employing the methodology of investment multiplier (Keynes, 1924), we may suppose the sustainability roll multiplier. The principle of its effect is in the chain reaction of companies united in a cluster towards incurring expenses on business, social and environmental projects. If a company has certain amount of income, I , it will be able to spend it for business, B , social, S and environmental, E , projects. Spending for business, social and environmental projects means that those firms involved into the supply chain for the initial company will also spend their income for other business, social and environmental projects. Thus, money spent on social and environmental projects will return more money totally spent for social and environmental projects in the region. However, it largely depends on the marginal propensity to spend on business, $MPSB$, social and environmental projects. Mathematically, it will look like the following equations.

$$I = B + S + E,$$

$$B = I \cdot MPSB,$$

$$MPSB = \frac{B}{I},$$

$$I = I \cdot MPSB + S + E,$$

$$I(1 - MPSB) = S + E,$$

$$I = \frac{1}{(1 - MPSB)} \cdot (S + E),$$

$$\Delta I = \frac{1}{(1 - MPSB)} \cdot \Delta(S + E)$$

Therefore, the statement about useless investments in social and environmental projects for a single company from business point of view becomes incorrect for the entire regional economy. Here, at the higher level of economy, each investment amount given for implementation of social and environmental projects returns more total income of the whole region. However, it depends on the marginal propensity to spend money on such projects had by top managers of companies working in the region. Due to the low productivity

of investments in social and environmental projects, the marginal propensity to spend money on business is high enough.

If outcomes of the research laid the regional policy, it would be aimed at stimulating investments in social and environmental projects to avoid intensive sustainability roll of the regional economy. Stimulations could have a form of grants and donations from public and governmental funds towards those business units which are ready to implement projects for sustainable development. By extension, to make budgetary expenses productive, we may use the following equation for calculating optimal grant amounts.

$$PG = \Delta I \cdot (1 - f) = \left[\frac{1}{(1 - MPSB)} \cdot \Delta(S + E) \right] \cdot (1 - f),$$

where PG is an amount of public grants and donations provided by the local regional government to companies and public organizations engaged into sustainable development activity; f is a tax rate paid by companies located in the region.

Thus, all participants and stakeholders of the regional development will have their own benefits and compatible contributions.

Discussion

By analyzing clusters, values of revenues and costs of economic objects of the mining companies relating to internal and external parts of the relevant economic, social and environmental systems can be determined. Then, the development of the company will be characterized by a roll of sustainability regarding relative or absolute stability. As a result, the approach to mathematical formalization of sustainable development of mining enterprises and to efficient resource allocation and processes management to achieve economic stability was approved. It is proved that the point of sustainable development of the enterprise is characterized with objects regardless of the system to which they belong that generate the same amount of revenue and are maintained by the same amount costs. However, the methodology used in the research can be regarded as disputable given the huge amount of methods and techniques employed for determining sustainable development of a company.

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