

Butnaru, Gina-Ionela; Parasca Vornicu, Alexandra Georgiana; Butnaru, Rodica Cristina

## Article

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## Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics  
Düsternbrooker Weg 120  
24105 Kiel (Germany)  
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)  
<https://www.zbw.eu/>

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## EES Triangle of Roşia Montană Mining Project

**Gina-Ionela Butnaru<sup>1</sup>, Alexandra Georgiana Parasca Vornicu<sup>2</sup>, Rodica Cristina Butnaru<sup>3</sup>**

**Abstract:** This article analyses the Environmental, Economic, and Social impact (EES triangle) of the mining project proposed by Roşia Montană Gold Corporation (RMGC). The results show that this project is not truly favourable for Romania, taking into account that the environment would be strongly affected if technological errors occurred, and if cyanide were used to separate the gold from ore. At the same time, the number of places of work created would be for a determined period of 25 years, and the profit obtained by Romania is minimum, compared to the profit of the company. In this context, the mining project would also bring prejudices to the local archaeological site, by removing elements which could elucidate certain historical aspects from the past. Therefore, *is this mining project according to the concept of sustainable development?*

**Keywords:** Roşia Montană; mining; impact; sustainable development

**Jel Classification:** M19

### 1. Introduction

A Management and Reporting System regarding Sustainable Development should become the key element for many world organisations. This is the implementation of a strategic frame integrating the up-to-date planned initiatives with Environmental, Economic, and Social management programmes (*EES triangle*). The organisations continuously tried to monitor, measure, report, and improve performances in 3 directions: environmental responsibility, financial responsibility, and social responsibility. (Jayawardena, Patterson, Choi & Brain, 2008) From the point of view of sustainability, some issues became an essential part of social and economic politics of most of the countries. Consequently, there was an emphasis on the youth education concerning the environmental protection and assimilation of essential values to make the world a better place. (Jayawardena, 2003) From the point of view of sustainability, business is seen as the effort of a company or of an organisation to manage its impact over life on Earth, and also over the ecosystem and its business network. (Svensson & Wagner, 2012) Sustainable development criteria are much more important regarding mining exploitations. Some natural resources are not regenerable, and their exploitation involves a special attention regarding national interests, like economic and social development, and also the

<sup>1</sup> Faculty of Economics and Business Administration, Department of Management, Marketing and Business Administration, Alexandru Ioan Cuza University of Iaşi, Iaşi, Romania, Corresponding author: gina.butnaru@uaic.ro.

<sup>2</sup> Doctoral School of Chemistry, Life and Earth Sciences, Alexandru Ioan Cuza University, Iaşi, Romania, E-mail: alexandra\_parasca@yahoo.com.

<sup>3</sup> Department of Business Strategy and Social and Environmental Responsibility School of Management Sciences, University of Quebec in Montreal, Montréal, Canada, E-mail: reteaca.rodica\_cristina@uqam.ca.

encouragement of life quality improvement. (Asalos, Hlaciuc, Bostan, Roman, Mates & Manolica, 2016)

This research has in view the analysis of Roşia Montană locality in order to determine the Environmental, Economic, and Social impact as a result of the implementation of RMGC mining project. Therefore, the concept of *good practices for mining exploitations* developed, including some advantages and disadvantages of the mining project. Also, we performed an observation on the site in order to learn different mining aspects, so as to be able to identify if *this mining project is according to the concept of sustainable development*.

## 2. Materials and Methods

The purpose of this research is to identify if Roşia Montană mining project is according to the concept of *sustainable development*, by reaching the following *Research Objectives*: **O1**-The analysis of some models of good practice for mining exploitations; **O2**-The analysis of *EES triangle*; **O3**-Identification of advantages and disadvantages of the mining project. As research method we used *the theoretical analysis* (the study of specialty documents), and *the practical documentation* (by field research on the site of RMGC company in Roşia Montană, at the Information Centre of Roşia Montană Project, at *Pro Dreptatea* Centre, at Tourist Information Centre, at Roşia Montană Cultural Foundation, and at Roşia Montană City Hall).

## 3. Results

### 3.1. Identification of Tourist Development Perspective and Good Practices of Mining Exploitations

In one of the many interpretations, tourism is understood as a communicational scenario, a space to which to relate, to become closer or farther from it. When tourist activity is focused on heritage and culture, the relationship between tourism and identity is even higher. (Ballesteros & Ramirez, 2007) *Cultural tourism regarding the mining heritage* is suitable for the identity approach in tourism. Identity and seeking to symbolically redefine the community could support the continuity of local mining community. (Edwards & Llorde's, 1996) A special case is that of Spanish towns Linares, Alquife, Seron and Villanueva del Rio y Minas, where mining activity represented the basis of economic and social life for the 20<sup>th</sup> century. Later, this industry was abandoned, making room for the cultural, social and economic effects frequently met in the decommissioned mining areas. However, these towns in South Spain are characterised by geographical, social and economic isolation of mining areas (enclaves), specific work techniques, environmental degradation, presence of big factories and of infrastructure with a major impact on the landscape (Ballesteros & Ramirez, 2007). Due to this phenomenon, there were decommissioning processes of the exploitations in the area, crises, periods of social protests, search of socio-economic alternatives, which culminated in most of the cases with abandonment of the mining sites. (Hampton, 2005) In this kind of situations, the mining identities and communities are created by political discursive processes. (Mina Santa Barbara, 2016) Among all these towns, the only with a surface mining exploitation was Alquife, an iron ore exploitation, the mine being closed in 1998 with



no protection measures. The company owning the factories does not allow tourists' presence, however in some cases there are exceptions for students and groups of specialists. (Gomariz, 2015) In Andalusia, tourism heritage and development has a priority axis for the regional government, the role of the state being decisive by direct investments in tourism development. However, tourism development was unsuccessful (This is Andalusia, 2016), and the local identity did not allow the advance in the strategic plans of tourist development of the mining heritage. (Ballesteros & Ramirez, 2007) Consequently, for cultural tourism development, the existing heritage must be capable to convert in tourist resources. (Hospers, 2002) While mining is an economic activity admitted in many regions, tourism is also admitted as one of the sectors capable to offer economic development opportunities. For instance, in Australia tourism is a great contributor to national economy, being important especially in rural areas. (Tourism Research Australia, 2016) A study performed on the mining sector of Weipa-Queensland reached the conclusion that local tourism sector received very little concern until the beginning of the 1990's. At the same time with Sydney Olympic Games in 2000, the interest for local tourism increased, leading to the formation of Indigenous Tourism Australia. (ITA) (Tourism Australia, 2016) Historically, mining industry was associated with the negative social and environmental impact, but it was also blamed for leaving the communities in an economically non-viable stage, once the resource extraction process is completed. Indigenous people were the most affected by the mining activities, taking into account that over 60% of the Australian mining operations were at a close distance. (Banerjee, 2001) Such a problem was the uranium mine in the Northern part of the territory, uranium being exploited since 1981, and Kakadu National Park, included on UNESCO heritage list, was located in the proximity. Consequently, mining companies became more responsible, and considered the rights of the indigenous people, trying to satisfy their needs. Training courses were organised for the indigenous population, the employees were instructed regarding the indigenous culture, there were polls regarding the cultural heritage, recording thus over 260 archaeological sites. (Bultjens, Brereton, Memmott, Reser, Thomson & O'Rourke, 2009) Then there were arrangements regarding post-mining activities (what could have been done after closing the mine?), and different tourist attractions related to mining were developed, museums with mining equipment were opened, mining galleries tours, theme parks, and geocatching (finding precious stones) were organised, etc. In Australia, there is a perspective concerning tourism based on mining, but the indigenous people's implication makes this approach difficult. (Tourism Australia, 2016) Also, in Weipa there is a bauxite exploitation mine. Researchers state that it has potential to become a tourist destination, being recognised locally by Tourism Queensland. The locality is owned by Comalco mining company, a subdivision of Rio Tinto company, and it is one of the biggest bauxite exploitations in the world (the profit in 2002 was over 360 million dollars). Comalco financed the infrastructure in the locality (Rio Tinto, 2016), which consisted of an airport, road networks, a port, utilities, and housing. The town also has a hospital, supermarkets, police units, administrative centres, high-schools, and sports centres. (Kapelus, 2002) The aboriginal population participates in courses of professional formation by mentoring internships, planning, feasibility analyses, operations, marketing, accounting and strategic development (Dyer, Aberdeen & Schuler, 2003). They say that the number of tourists in Weipa increased from 5,000 visitors in 1980 to almost 30,000 visitors in 2008. (Australian Government, 2016) The accommodation units are scarce (a caravan, a camping area, a hotel, a motel, and a resort). The main activities consist of fishing, tours with jet ski, motorcycles, 4x4 vehicles, croc spotting (watching the crocodiles in their natural environment), etc. Tourists can visit a series of mining



galleries and a mining museum with mining equipment used ever since the first exploitation in 1963, located in the Lion Park. (Cegielski, Janeczko, Mules & Wells, 2000) Consequently, mining and tourism can coexist (a mining exploitation with responsibility, where mining activities do not affect the environment aggressively, they help and involve local population, and offer the possibility to practice tourism).

### **3.2. EES triangle in Rosia Montana**

#### **3.2.1. Environmental Impact**

The brochure of RMGC Information Centre published the title *Cyanide. Safe technology*. Is it possible to analyse in the same context the words *cyanide* and *safe technology*? According to the declarations of the specialists of the company, these methods of exploitation by cyanidation are very safe. *Safe for whom?* Maybe it is *safe* for gold extraction, but surely it is not *safe* for the inhabitants of this area, and for the environment. RMGC states that *people come into contact with cyanide almost every day* without being aware, and still *they are not affected at all*. Thus, cyanide can be found in: cosmetics, food industry, plastic products, etc., and also in almonds, coffee, beans, apricots, cherries, and cigarette smoke. Here is a hypothesis supported by the specialists: *the cyanide remaining after gold processing will be transformed in harmless substances, and one way or another, it will go through a process of neutralisation by oxidation, and the sterile with low content of cyanide will be stored in a decant pond prepared especially for this*. In this project there are no clear indications on *how much the environment will be affected while the cyanide is still harmful or until neutralisation*. Consequently, we consider that *the cyanide from the sterile could infiltrate into the soil and into the water*. However, if the cyanide-based technique is a safe method, why then the information brochure contains the phrase that *cyanide will be transported on the road blocked with two locks?* The company states that it will be delivered in especially designed containers, with extremely resistant double walls. For the emergency situations, there will be cars escorting these containers, for a quick intervention. Cyanide will never be manipulated in open space, only in a storage and distribution system, and the containers will be returned to the provider (RMGC, Cianura. Tehnologie sigura, Octombrie, 2011). *If it is a method which does not affect the environment and the society, why take then so many precautions?* All this brief presentation from the information brochure raises several questions - *is cyanidation truly a safe method for environmental protection and for the inhabitants?* RMGC is also responsible for *water management*. Consequently, there are 4 directions of action: collection and treatment of polluted waters, leak control, water recirculation, and elimination of the source affecting the waters. The reddish colour of the water is given by pollutants (zinc, iron, arsenic and cadmium). A collection dam for acid waters will be built in order to treat and use them as industrial water. (RMGC, *Să ajutăm apele curgătoare să-și regăsească transparența*, October 2011) Consequently, *is the treatment for the use of the community, or for the use of the company in what concerns the industrial water?* The latest information showed that RMGC emitted the plan for extractive industry waste management and sent it to the Ministry of Environment and Climate Changes (MECC), and on May 31<sup>st</sup> 2013, the relevant risk scenarios and cost estimation were presented (Ministerul Mediului, Apelor și Pădurilor, 2016).

### 3.2.2. Economic Impact

RMGC specialists consider that they are among the biggest investors in Romania. As a result of the economic planning, the total sum invested in this business plan is supposed to reach 4.2 billion dollars: 1.8 billion dollars for the state budget – as dividends obtained by the Romanian state (19.3% of the shares), royalties paid by RMGC, fees and taxes paid to the budget, and 2.4 billion dollars invested in human resources, constructions, electrical power, transport etc. (RMGC, *Rosia Montana*, Rodotex, Iasi, Romania, 2010).

**Table 1. Investments in Roșia Montană project (RMGC, Rosia Montana, Rodotex, Iasi, Romania, 2010)**

	Millions USD		Millions USD
<b>Investment performed</b>	<b>386</b>	<b>Development/replacement investments</b>	<b>366</b>
Design, impact study, other costs	221	Sterile decant pond	152
Property acquisition	71	Mining-Processing	102
Geology	42	Property acquisition/ Relocation areas/Others	71
Taxes (on property, wages, profit)	30	Infrastructure/Utilities/Engineering	41
Mining equipment	22	<b>Investments at mine closing</b>	<b>137</b>
<b>Construction phase</b>	<b>876</b>	Closing the mine – processing plant	62
Infrastructure/Utilities/Engineering	349	Tailings	30
Property acquisition/ Relocation areas/Others	223	Continuation water treatment and mine closing	44
Mining- Processing	204	-	-
Sterile decant pond	99	-	-
<b>Total investment: 1,765 million USD</b>			

In what concerns the heritage, the company invested over 15 million dollars with the objective of research and conservation of the locality cultural heritage. The investment necessary is 70 million dollars (RMGC, *Rosia Montana*, patrimonial cultural, October, 2011). The operational expenses are 2,701 million dollars, including processing, mining, administrative, transport, treatment, general expenses, royalty, interest, warranties for environment rehabilitation, liquidation and impairment of assets. The profit of 10,367 million dollars includes the raw profit of exploitation, profit tax, and net profit with the dividends of the Romanian state and with dividend tax (table 2).

**Table 2. Total expenses and profit obtained from the project (RMGC, Rosia Montana, Rodotex, Iasi, Romania, 2010)**

	Mil. USD		Mil. USD
Total Operational Expenses	2,701	Raw Profit	2,334
Profit from exploitation	4,779	Net Profit	1,946
Total other expenses	2,445	Profit for Gabriel Resources	1,308

### 3.2.3. Social Impact

RMGC states that it is the biggest employer in the region, proposing 2,300 places of work for mine construction, 4,200 indirect places of work, and 3,600 direct and indirect places of work for the period of mine functioning (RMGC, *Proiectul minier Rosia Montana*, October, 2011). Consequently, *could relocation be a benefit for Roșia Montană inhabitants?* The company intends to narrow the industrial area in order to reduce the area from which the inhabitants should be relocated (reducing the relocation impact). The relocation process is called Community Development Project. *What does the inhabitants' relocation process imply?* Of course, promises like: 25% subventions for the houses, and 50%

subventions for the field, in the area proposed by them – Recea district, in Alba Iulia Municipality, assistance for families according to the difficulties appearing in the process, integration in the new community by legal and real estate assistance, courses of professional qualification and guidance. At present, 125 families moved to the new area, the company motivating that this is how the community values would be kept alive. Some families decided to move to Arad, Timișoara, Cluj, Bihor and Hunedoara (RMGC, Strămutare și relocare, October, 2011). We consider that at the same time with this relocation and removal from the rural area, and implicitly with the integration in the urban area, the cultural values, the rural identity, the customs, and the traditions will be lost, all this leading eventually to the loss of a culture preserved for hundreds of years.

#### **3.2.4. Rosia Montana – historical site**

The village is remarkable by the presence of several historical buildings, its historical centre, funeral monuments from Tău Găuri in a restoration process, Illyrian colonists' settlements dating from 2<sup>nd</sup> and 3<sup>rd</sup> century A.D. Also, 4 Roman sacred areas were identified, with 40 votive altars, necropolises of Roman incineration, at Jig, Tarina, etc., Roman, medieval and modern galleries inside the mountains Cetate, Jig, Orlea, several artificial lakes, a Roman mausoleum, etc. (RMGC, Amintirile României sunt și ale noastre, November, 2009, 2-3). Several churches of different religions can be visited, being attested in 17<sup>th</sup>–18<sup>th</sup> century documents (Asociația Alburnus Maior. *Vizitați Roșia Montana!*). In the Roman galleries, 25 coated plates were discovered, the most important being the plate no. XVIII, discovered in 1854, with the inscription of the date February 6<sup>th</sup> 131 A.D., and the name of Alburnus Maior, attesting the age of the village (Turism Rosia Montana, 2016). At present, the project to include Roșia Montană on UNESCO world heritage list has been started by the Ministry of Culture and Ministry of Environment, Waters and Forests (Ministerul Mediului, Apelor și Pădurilor, 2016).

#### **3.3. Advantages and Disadvantages of Rosia Montana Mining Project**

The mining project proposed by RMGC could have a series of advantages, as follows: creation of places of work, generation of over 1.8 billion dollars to the state budget, rehabilitation of some areas of local interest, and creation of objectives of tourist interest. We cannot refer to any advantages in relation with the environment. Consequently, once this project is started, the use of cyanide as method of separation of gold from ore would bring prejudices like: irreversible environmental degradation, water, air and soil pollution, destruction of mountain landscape, etc. Also, the inhabitants of Roșia Montană should be relocated. Most of them agreed, but what happens with the people who refuse to be relocated, and who remain in the area proposed for exploitation? In this category we could also include the damages produced to the archaeological site, because a few mining galleries dating from the Roman period were discovered there.

#### **4. Conclusions**

In order to discuss about sustainable development in reference to the mining project proposed by RMGC, a series of requirements should be accomplished, and the three basic components should be reached (environment, economic and social aspects). From an economic point of view, the project could have an advantage, though the profit for Romania would be extremely low. The social component is reached



by the fact that new places of work would be created, however on a limited period of time – 25 years – taking into account that after closing the exploitation, the chances of rehabilitation of Roşia Montană would be smaller. However, in what concerns the environment, it would only be affected negatively: degradation of the landscape and pollution. Therefore, we conclude that the mining project proposed by RMGC is not according to the concept of sustainable development. Considering the historical context of the village, a subsequent mining exploitation could affect the site. Any intervention on the village would remove the historical prints left by the Roman Empire, and it would be more difficult to learn about the historical past. At present, the situation is uncertain, due to the fact that the approaches are difficult and need years of evaluations in order for this area to become truly protected by law.

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