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Environmental sustainability in the mining sector: evidence from Catalan companies

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ABSTRACT

This paper examines the adoption of environmental practices in small and medium sized companies in the surface mining industry in Catalonia (Spain). To fulfill this aim, a survey of 41 items concerning environmental management systems and environmentally sustainable practices has been conducted. Results show that companies have committed themselves to environmental and sustainable issues. The majority of companies claim to understand the effects of their activities on the environment and they care for responsible access and management of natural resources. Restoration plans and the annual waste declaration are mandatory in Catalonia, and rational resources exploitation practices have been adopted by a high percentage of mines. Finally, some examples of good environmentally sustainable practices are introduced.

1. Introduction

Mining activities have important economic, environmental, labor and social repercussions on local and global scales (Escanciano et al., 2010). While the sector provides vital raw materials and energy for a large number of industries, its activities are still commonly considered as a threat to the natural surroundings, with environmental effects on the air, water and soils. In this sense, the first decade of the 21st century in particular has seen a renewed debate about mining and its sustainability (Mudd, 2010) owing to public concern about the current degradation of the environment (Hilson and Murck, 2000). Examples of potentially serious environmental impacts of mining include chronic soil erosion, heavy metals overloading and acid mine drainage (Hilson and Nayee, 2002). Hence, the main challenge for the sector is to demonstrate that it contributes to the welfare and well-being of the current generation without compromising the quality of life of future generations (Azapagic, 2004).

Nowadays, enterprises are expected to respond positively to these challenges by assuming responsibilities in local and national development. They must adapt existing strategies or adopt new strategies to attend to these demands and to deal with the compatibility between the productive activity and environmental (Claver et al., 2004) and social protection (Wheeler et al., 2002). Companies have to comply with the law currently in force and have to satisfy the demands of external stakeholder groups.

There is evidence in the literature that since the early 1990s, the mining industry has shown increasing interest in social and environmental issues and it has been seeking ways to integrate the challenges of sustainability into its core business practices (Hilson and Murck, 2000). Sustainable development has been included in the agendas of the mining industry (Cowell et al., 1999), and various national and international initiatives have developed frameworks for sustainability. For instance, the European Union (CEC, 2000) has promoted priorities based on four broad pillars (environmental protection, economic issues, social performance and employment, and research and technological development). The Mining Association of Canada (MAC) has developed an initiative called "Towards Sustainable Mining (TSM)" to enhance the sector's reputation by improving its environmental, social and economic performance (Ford, 2005). Another instance is that the International Council on Mining and Metals (ICMM) has formulated 10 basic principles of good practice, including ethical management and sustainable development (ICMM, 2005).

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Environmental management includes a wide variety of practices to be adopted, both mandatory (i.e. rehabilitation of mining sites and payment of taxes) and voluntary (i.e. environmental management systems and life cycle assessment). Nevertheless, different obstacles may difficult the implementation of such practices as for example the short-run compliance costs and low levels of environmental awareness by staff (Nikolaou and Evangelinos, 2010).

The adoption of environmentally responsible practices (Driussi and Jansz, 2006; Kapelus, 2002) may assist companies to minimize their negative impacts on the environment and also to improve their accountability in environmental issues. Several mines worldwide have implemented a comprehensive environmental management system (Hilson and Nayee, 2002), which has helped them to anticipate environmental problems and secure the support of local communities. Other mines have adopted codes of conduct and internal policies. For example, many Spanish companies, especially the largest ones, have introduced ethical and sustainable policies, and the adoption of green business practices is increasing (Fernández and Melé, 2005). Sustainability is also encouraged by the European Union (European Commission, 2011).

Under this context, this work aims to explore environmentally sustainable practices by focusing in the aggregate mining industry and the ornamental stone quarrying in Catalonia (Spain). Environmental sustainability may be defined as the maintenance of natural capital (Goodland, 1995), that is the maintenance of the factors and practices that contribute to the quality of environment on a long-term basis.

In the next section, the paper introduces a brief description of the current discussions on sustainability and environmental practices in the mining industry. The research methodology is then introduced. Next, the results obtained from a descriptive statistical analysis are presented. Discussions and conclusions follow.

2. Literature review

The study of environmental and sustainable issues in the mining industry has gained importance within the academic community during the last few years. There are several studies regarding the extensive interest on this topic which explore strategies of companies on sustainable issues (Sinding, 1999; Cowell et al., 1999; Warhurst and Noronha, 2000; Hilson and Murck, 2000; Warhurst, 2001; Hilson and Nayee, 2002; Newbold, 2006; Suppen et al., 2006; Van Zyl et al., 2007; Enríquez and Drummond, 2007; Mudd, 2010; Fonseca, 2010, 2011; Dutta et al., 2012; Hassan and Ibrahim, 2012).

While different authors have depicted the positive impacts that mining activities can have (Mikesell, 1994; Walker and Howard, 2002; Wheeler et al., 2002), the link ‘sustainable development and mining’ seems to be still somewhat controversial. A major argument against the mining sector contributing to sustainable development is that mineral resources are finite and non-renewable (Cowell et al., 1999) and therefore the opportunities for future generations to access these resources are reduced (WCED, 1987). Moreover, the main environmental disasters that have increased public concern over the last 40 years have mainly taken place in the mining and petroleum industries (Warhurst, 2001).

Other academics argue that mining operations have an important effect on their surroundings and on local communities (Hilson and Murck, 2000; Jenkins and Yakovleva, 2006; Blinker, 2009). Morphological changes in the exploited areas, noise, dust, and surface and groundwater pollution are the main environmental hazards produced by mining operations. These, together with the risk of professional diseases and accidents in mining activities have contributed to a questionable reputation for social responsibility (Lambert, 2001). On the other hand, primary examples of positive contributions of mining to sustainable development include caring for the country, people and culture (Howitt, 2001).

From an environmental perspective, the debate is now centered on the enterprise–environment relationship (Banerjee, 2002) both at the global and national scales. For instance, Warhurst (2001) has concentrated on sustainability issues, and Jennings and Zandbergen (1995) have analyzed institutional approaches to sustainability through different aspects including the construction of social and organizational contexts, the value assessment of organizational sustainability, the introduction of sustainability in regulative rules, and the diffusion of sustainable practices. Different authors have conducted case studies of mining companies in different countries. For instance, Macedo et al. (2003) have analyzed the historical and present conditions of the Brazilian non-metallic small-scale mining industry in relation to environmental practices. Ghose (2003) has analyzed the environmental management plans in the small-scale mining industry in India. Evangelinos and Oku (2006) have examined the corporate environmental management of Greek mining companies and the process of gaining permission to operate. Berkel (2007) has defined an eco-efficiency framework for the Australian mining industry. Das (2009) has compared the environmental and sustainable performance of public and private mining companies in India. Nikolaou and Evangelinos (2010) have conducted a SWOT analysis of the Greek mining industry in adopting sustainable practices. And Jia et al. (in press) have defined an evaluative framework using the Fuzzy AHP model to assess a cleaner production in the vanadium extraction industry.

In fact, literature seems to indicate that mining companies have increased their environmental consciousness and they start to adopt cleaner production and environmental management systems (Zhu et al., 2010). Hilson and Murck (2000) point out that the mining industry can contribute to sustainable development by minimizing the environmental and social impacts throughout its life cycle. Gibson (2000) suggests that any negative effect should be immediately remediated, which would improve the reputation of mining. And Barbara-Sánchez and Atienza-Sahuquillo (2010) suggest that environmental strategies focusing on energy conservation, waste reduction, pollution prevention, recycling and ecological product design lead to improvements in product quality, manufacturing cost reduction and entrance into new markets. Similarly, Driussi and Jansz (2006) state that some specific management practices such as environmental management systems, pollution prevention technologies and environmental training may assist companies to improve their accountability in relation to environmental issues.

Other authors have studied the connections between environmental degradation and conflict, and have analyzed the relationships between environmental and social variables (resource scarcity, population growth, resource abundance, democracy, and poverty). They concluded that those countries undergoing important economic and political transitions (Esty et al., 1999), and those with limited economic and political resources (Timura, 2001), are more prone to internal violent conflicts. As Walton and Barnett (2007) state, environmental conflicts in developing countries are basically the result of unequal distribution of outcomes arising from environmental degradation and its related causes.

Environmental issues have increasingly more influence on business strategies and therefore, in strategic decision-making (Rugman and Verbeke, 2000). Companies may seek only to comply with the law currently in force, or they may go further and adopt more proactive environmental practices that allow for sustainable competitive improvements (Barba-Sánchez and Atienza-Sahuquillo, 2010).

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