



MANAGEMENT FOR SUSTAINABILITY AND BUSINESS PERFORMANCE: AN ANALYSIS FROM THE INTERNATIONAL INSERTION IN FIRMS IN THE MINERAL SECTOR

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Abstract

The study aimed to analyze the adoption of management practices for sustainability and business performance, according to the international insertion in firms in the mineral sector. The research, descriptive and quantitative nature, was conducted through a *survey* in enterprises associated with the Brazilian Mining Association (Instituto Brasileiro de Mineração – IBRAM). The results showed that, in general, the behavior of firms differs as regards the adoption of management practices for sustainability and its business performance according to their international insertion, corroborating the central hypothesis of the study.

Keywords: Sustainability; performance; internationalization.

1. INTRODUCTION

Sustainable development comes from assuming a prominent place in the discussions about the future of the planet. Under the deals, the adoption of actions that prioritize environmental preservation, social equity and economic development increasingly relate to business strategies in the face of global competition. Likewise, the international insertion has represented organizations the possibility of expansion of market integration and increased competitiveness. Thus, the adoption of a sustainability-oriented management and performance in the international market are factors that impact on business competitiveness.

In the vision of Pasqualotto *et Ugalde* (2010), the requirements for sustainability are constant within business and require an adaptation to the particularities of each market in which companies operate, so that the requirements are even higher regarding the adaptation of the products to the international market.

Some sectors have bigger challenges with regard to sustainable development, in view of the magnitude of envi-

ronmental impacts negatives associated with its productive activity. In this context, part of the mineral sector, due to its nature and extraction to numerous social and environmental negative impacts related to mining activity. A sustainability-oriented management aimed at minimizing their negative externalities is to a primary factor for their survival and their competitiveness.

The definition of a corporate social responsibility agenda for the mining industry to companies in the industry stems from the need to justify their existence and to demonstrate their performance through dissemination of its social and environmental actions (Jenkins *et Yakovlikha*, 2006).

In addition, the mineral sector provides raw material for a number of industries, being essential for the society. For Giurco *et Cooper* (2012), minerals and metals have a fundamental role in the prosperity of current and future civilizations, making necessary the adoption of sustainable criteria and the inclusion of social and environmental goals in the entire life cycle of the product.



The various requirements in terms of certifications and specific policies for entry into international markets lead to assume the existence of different business approaches with regard to management for sustainability according to its international insertion, influencing your business performance and competitiveness.

It is observed that the Brazil is considered an important *player* in the mineral sector, since the country is one of the largest producers and exporters of ores, in consequence of the richness of its underground, and the minerals occupy prominent role on the Brazilian trade balance (IBRAM, 2012).

Thus, on the basis of the representativeness of Brazilian mineral industry, the challenges inherent in the adoption of management for sustainability and international insertion of companies could be related to adoption of sustainable practices, the present research tries to understand the behavior of firms in relation to management practices for sustainability adopted and its relationship with business performance in accordance with its international insertion.

2. MANAGEMENT PRACTICES FOR SUSTAINABILITY AND ITS RELATION WITH BUSINESS PERFORMANCE

As a result of the numerous social and environmental problems that have been taking place in recent decades in order to ensure survival conditions for current and future generations, are escalating the moves towards sustainable development.

In the context of business, Barbieri *et al.* (2010) state that accession of the companies to the movement for sustainable development took place initially due to external pressures, such as response to criticism and objections from government entities and civil society, who were blaming companies for social and environmental degradation processes that reached the planet, and, recently, represents business competitiveness factor, and can be a source of differentiation or qualification to remain on the market. Savitz *et Weber* (2007, p. 2) corroborates this argument by saying that the “sustainable company is one that generates profit for shareholders, while protecting the environment and improving the lives of people who keep interactions”.

The economic, environmental and social dimensions are inherent in the concept of sustainable enterprise and are represented from the *Triple Bottom Line*, and should be integrated, so that, in the environmental sphere, natural resources are used in a manner not detrimental to future generations, reducing the impacts of action industries. In economic perspective, it is necessary to preserve the profitability of the company and the commitment of its economic development. And, finally, in the social sphere, including the

issue of social justice, the main objective is the development of a fairer world, through relations with all *stakeholders* (Elkington, 2001).

Managing for sustainability on the basis of economic, social and environmental dimensions has as premise enable gains for the company, society and the environment. Aligleri (2011, p. 24) defines sustainable management as “a business approach that considers the organization pattern of ecosystems in the decision-making and management practices contemplating the assessment indicators economic, environmental and social dimensions”.

For Barbieri *et Cajazeira* (2009), sustainable management is standardized by some instruments that facilitate and contribute to the integration of sustainability into business strategy, so as to guide the implementation and maintenance of management systems, programs and activities, as well as ensuring transparency of communications with stakeholders and the compatibility between the systems of management.

Holton *et al.* (2010) consider that the management for sustainability is critical to the development of corporate sustainability, being fundamentally related to the change and organizational development strategy. In this sense, Dunphy *et al.* (2003) point out that the management for sustainability is related to organizational development, strategic change in management structure, systems and skills and availability of an increasing number of tools and guidance documents, with the goal of helping companies to implement the management for sustainability.

In the mineral industry, the incorporation of management practices for sustainability aims to minimize the environmental impacts of this productive activity. For Hilson *et Murck* (2000), sustainable development in the mining industry requires a commitment to continuous environmental improvement and social exploration stages, and closing activities. In addition to the legal instruments, there are also mechanisms of inducing market that have contributed favorably to the big mining companies take greater commitment to sustainable development, such as: shares of mining companies on stock exchanges, voluntary instruments and communication, such as adherence to programs and environmental certifications (Enríquez, 2009; Enríquez *et Drummond*, 2007).

The environmental concern of firms in the mineral sector does not involve only the preservation of an ecosystem and the guarantee of safety of the community, she also believes the human well-being and the rights of locals, the quality of life of current and future generations. The principles of sustainable development require the economic growth and environmental preservation, since the beginning of a project, including the evaluation of the moral and ethical values,



considering the subjective values of the community, instead of only emphasizing the traditional economic value (Amade et Lima, 2009).

Considering the peculiarities of the sector and the importance of their involvement and its commitment to sustainability, are expressive movements in support of sustainable development in the mineral industry. Those moves are intended to get mining their *social license to operate*, from the integration of sustainability into their strategies. For Azapagic (2004), it is important to highlight some important international initiatives with regard to sustainable development in the mineral industry, such as U.S.-Based *United States Sustainable Minerals Roundtable*, the *Canadian Minerals and Metals Initiative* and the *European Industrial Minerals Association*. Another relevant initiative is the creation of the *International Council on Mining and Metals (ICMM)*, forum based in London, founded in October 2001, to represent the major international mining and metals, with the goal of improving the performance of companies in the sector (ICMM, 2010).

The ICMM has developed, in 2003, the *Sustainable Development Framework*, which consists of a tool for the promotion of sustainable development in mining and aims to ensure standardization through the adoption and enforcement of policies set by the model. The *framework* consists of 10 principles, public reporting and independent audit, being among the most advanced voluntary initiatives in its category, in order to contribute to improve the *performance* of the mining industry (ICMM, 2010).

The 10 principles were drawn up on the basis of other global standards as guiding the Rio Declaration 1992, the *Global Reporting Initiative*, the guidelines of the Organization for Economic Cooperation and Development (OECD) for multinational corporations, the World Bank's operational policies, the OECD Convention on combating corruption, the conventions of the International Labour Organization (ILO)-98, 169, 176 – and the voluntary principles on security and human rights (ICMM, 2008).

Figure 1 presents the 10 principles set out by the ICMM.

Principles for Sustainable Development
1. Implement and maintain ethical business practices and sound systems of corporate governance.
2. Integrate sustainable development to the process of making business decisions.
3. Uphold fundamental human rights and respect the culture, customs and values of employees and stakeholders.
4. implementing risk management strategies based on valid data and science.

5. Get the continuous improvement of our performance in the areas of health and safety.
6. Seek continual improvement of our environmental performance.
7. Contribute to the conservation of biodiversity and integrated approaches to land use planning.
8. Facilitate and encourage the development, use, reuse, recycling and disposal of the products in a responsible manner.
9. Contribute to the social, economic and institutional development of the surrounding communities.
10. Establish effective and transparent agreements with interested parties for the commitment, communication and independent verification of the information.

Figure 1 - 10 principles for sustainable development

Source: ICMM (2008)

The 10 ICMM's sustainability principles (2008) represent a consolidated international standard that covers a wide range of aspects for the promotion of sustainable development in mineral industry. In order to verify the applicability of the principles to the Brazilian reality, the *Sustainable Development Framework* will be used in this study as a basis for research of management practices for sustainability in companies in the mineral sector.

The performance indicators seek to assess the results achieved by organizations based on established strategies, in order to allow for the preparation of new plans or proposals for improvements. The indicators are composed of one or more variables that are associated in various ways, reveal wider meanings about the phenomena referred to, enabling the monitoring of the company's interests and enabling the planning of actions aimed at improvements in its performance (Callado, 2010; Villas Boas, 2011).

Several proposals of indicators to measure the sustainability, however, the initiative of the Dutch Organ *Global Reporting Initiative (GRI)* represents one of the most comprehensive scopes and known worldwide. Sustainability performance indicators proposed by the GRI are divided into the following categories: economic, environmental and social. Each category includes information about the form of management and a corresponding set of essential and additional performance indicators. Essential indicators consider aspects relevant to most organizations, and emerging practices represent additional or deal with topics that may be relevant to certain organizations (GRI, 2006).

The *Mining and Metals Sector Supplement* consists of a version of the G3 guidelines of GRI indicators suitable for the mining and metals sector, including sector-specific comments on the content of the guidelines and additional performance indicators, in order to ensure that the sustainability reports encompass sectoral issues effectively. The



supplement covers all major activities such as exploration, processing of metals and minerals, including primary metals manufacturing and recycling, the full project life cycle, from development and operational life until the closure and after-closure of the operations. To do so, are addressed some key issues for the sector, such as: biodiversity/ecosystem services; emissions, effluents and waste; work; indigenous rights; Community; artisanal and small-scale mining; resettlement; Lock planning; materials management (GRI, 2010a).

Managing for sustainability contributes substantially to the development of corporate performance. The sustainable strategic management is oriented to results: concerning innovation, economic, environmental and social, for the organization and its *stakeholders*. The adoption of management practices for sustainability, according to the international insertion, is discussed in the following section.

3. MANAGEMENT FOR SUSTAINABILITY AND BUSINESS PERFORMANCE FROM THE PERSPECTIVE OF INTERNATIONAL INSERTION

Globalization has taken the Brazilian companies to seek an expertise across national borders by means of insertion into the international market, aiming at better performance and greater competitiveness. The performance in the international environment has been a widespread strategy among companies of different sizes and sectors of the economy, which has in practice of internationalization the scope of a considerable range of benefits.

According to Carneiro *et Dib* (2007), different authors with different perspectives are responsible for the development of the traditional theories of internationalization, so that you can assemble them into two groups: one, based on economic criteria, in which the process of internationalization is based on rational criteria and is guided by decisions aiming at the maximization of economic returns; and another, with emphasis on behavioral aspects, which consider the internationalization process is the search for risk reduction in decisions about where and how expand, depending on the attitudes, perceptions and behavior of decision makers.

The companies that operate in the international market are facing an environment of increased competition on domestic markets, which required prior investment in foreign markets, in order to enable the knowledge of products and processes in developing countries, like Brazil, which will ensure the success of exports (Hidalgo *et Da Mata*, 2009). Corroborating this, Arbix *et al.* (2005) point out that the Brazilian companies' exposure to the most demanding markets, both from the consumer side as the competing firms, force changes in exports towards greater differentiation and quality.

Osland *et al.* (2001) point out that the selection of an input mode or the expansion in foreign markets represents a crucial strategic decision for the company. In this way, one can see that the entries vary depending on its complexity, requiring varying degrees of commitment and involvement. The choice of particular entry represents a strategic decision, which should be assessed the positives and negatives of each mode, considering the company's current situation, the objectives of the operations in the foreign market and the expected results.

Complementing this idea, Dias *et al.* (2012) argue that the entry forms in foreign markets can be divided into distinct modes, which offer different benefits and costs for companies. To the authors, the export is characterized as the most basic input mode, and can be directly-without middlemen of the country of origin-or indirect-using intermediaries located in the country of origin of the company.

Exports represent an alternative for obtaining competitive advantage and gains in competitiveness for businesses, and can bring a lot of benefits, such as: the reduction of the dependence on the domestic market, the compensation of any loss of *market share*, the increase in the volume of sales and the achievement of economies of scale by producing at lower costs and higher quality products at competitive prices (Klotzle *et Thomé*, 2006).

A higher level of requirement in terms of certifications and specific policies for the performance of the companies abroad leads to assume the existence of a higher level of adoption of management practices for sustainability. In this sense, Hrdlicka (2009), in their study, proposes to the themes of sustainability and internationalization, in view of the positive development of the performance of Brazilian exports in recent years, in various economic sectors, and growing concerns for the sustainability of the planet under.

Christmann *et Taylor* (2001) highlight that globalization can be seen through different views when associated with the impacts arising from that process. The authors point out that there is a shed which argues that globalization is harmful to the environment, since it promotes the installation of polluting industries in countries with few environmental regulations. On the other hand, another chain suggests that globalization can also have positive environmental effects as a result of the global ties increase the institutional pressures and customers to a self-regulation, i.e. for companies to adopt environmental performance standards or environmental management systems, in addition to the requirements of government regulations. In addition, the international certifications are a self-regulation mechanism essential to develop the principles of sustainability, as well as influence on the company's performance on the issue addressed by the standard (Christmann *et Taylor*, 2001).



Peng *et Pleggenkuhle-Miles* (2009) emphasize the importance of corporate social responsibility of multinational companies in the communities in which they operate and the need to distinguish further the relations between the parties competing in the domestic market, abroad and in global environments, since these organizations, increasingly, change from one country to another and increase its geographical range.

The international activities of the companies in the mineral sector can be related to adoption of management practices for sustainability that minimize negative social and environmental impacts and to ensure greater competitiveness for the industry. From the literature presented, is the central hypothesis of this study: *H1: the adoption of management practices for sustainability and business performance differ according to the international insertion of the companies in the mineral sector.*

In the next section, methodological choices are presented for the development of the study.

4. METHOD OF STUDY

The study, descriptive and quantitative in nature, was conducted by means of a *survey* applied to companies in the mineral sector. The conceptual model adopted in the study consists of a set of variables related to management for sustainability and business performance, as shown in Figure 2.

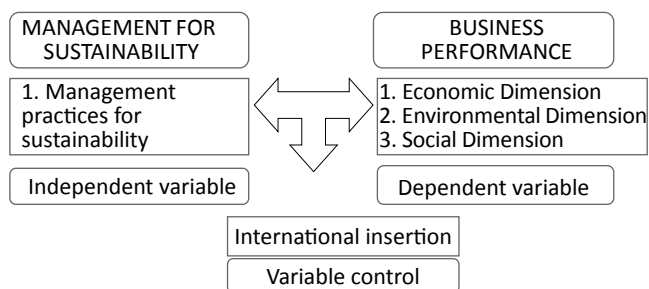


Figure 2 - Conceptual model of quantitative research
 Source: Elaborated from ICMM (2008), GRI (2006; 2010b)

For the study, management practices for sustainability were analyzed based on 10 principles for the sustainable development of mineral industry of ICMM (2008). The business performance was evaluated on the basis of the performance indicators proposed by the *Global Reporting Initiative* (GRI) (2006) and grouped in economic, environmental and social categories. In addition, the indicators were used in the *Mining and Metals Sector Supplement*, containing specific indicators for the mining and metals sector (GRI, 2010b). Were used, yet, the indicators that most relate to the sector study object. The international performance was analyzed from the indicator of the company own activities in foreign markets.

For the collection of data, was prepared a structured questionnaire, with a scale of "in-between" review, in which respondents should indicate the degree (note) that best translate your agreement in relation to the actions taken by the company in the range between 0.1 (smaller agreement) to 1 (maximum agreement). "In-between" scale was adopted in order to permit an assessment of corporate behavior through notes. The questionnaire was validated by experts in the areas of innovation and sustainability. This step sought to verify the adequacy of the data collection instrument with regard to clarity, the format, content and the scales used. From suggestions of the experts, the questionnaire has been enhanced. Following the pre-test was carried out to verify its suitability. Three companies in the mineral sector of Rio Grande do Sul (RS) responded to the questionnaire pointing if any question presented difficulty in understanding. It was established by three companies that there was no need for changes to the questionnaire.

After the adjustments suggested by the companies in the pre-test phase, the start of data collection.

The target population of the study consists of 260 companies linked to the Brazilian Mining Association (Instituto Brasileiro de Mineração – IBRAM), the Brazilian Association of Ferroalloys and Silicon Metal Producers (Associação Brasileira dos Produtores de Ferroligas e de Silício Metálico - Abrafe), the Brazilian Association of producers of Agricultural Limestone (Associação Brasileira dos Produtores de Calcário Agrícola - Abracal), the Union of the Coal Extraction Industries of the State of Santa Catarina (Sindicato da Indústria de Extração de Areia do Estado de São Paulo - Sindiareia) and the Union of the coal mining industry of the State of Santa Catarina (Sindicato da Indústria de Extração de Carvão do Estado de Santa Catarina - Siesc).

The questionnaire was sent by *e-mail* to the business object of the study, and the data were collected in the period from October 2011 to November 2012. Were contacted all companies object of study, the sample was constituted by companies effectively received, responded and returned the completed questionnaires. Produced a return of 51 questionnaires, representing 19.61% of the population surveyed, an index considered to be acceptable according to the average of return of research in General. Second Hair *et al.* (2005), this index can be considered common in auto applied research. The results obtained permit the specific analysis of the characteristics and behavior of the companies studied, so that the evidence cannot be extrapolated to the universe.

The data was tabulated and analyzed with the help of the software Microsoft Excel and *Statistical Package for the Social Sciences* (SPSS), by means of Univariate and multivariate analysis. After the non-parametric test Kolmogorov-Smirnov (K-S), if not the assumption of normality of the data, which led to the adoption of non-parametric statistics.



Finally, in order to verify the existence of average difference in the behavior of companies in relation to the international insertion, using the non-parametric test, Mann-Whitney, an alternative to the t -test for two independent samples. This test is preferable to the t test when there is a violation of the normal, allowing to check the behavior between two groups of cases (Pestana *et* Gageiro, 2008).

5. ANALYSIS AND DISCUSSION OF THE RESULTS

5.1 International insertion of companies

To analyze the differences in relation to the adoption of management practices for sustainability when considered its international insertion, the surveyed companies were categorized into two groups: internationalized companies and companies not internationalized. Following the analysis of the variables in each of the groups of companies, aiming to check the differences and similarities in both types of companies, as can be seen in table 1.

Table 1 - Companies' international insertion

International Insertion	Frequency	%
Internationalized	16	31,4
Not internationalized	34	68,6
Total	51	100

Source: own elaboration

For the definition of the profile of the companies studied, according to its international insertion, the companies were characterized in function of: time of founding, flagship product, location, number of employees and gross operating revenue in 2010.

Figure 3 presents a summary of the profile of the companies considering their international activities.

Variable	Have international insertion	Don't have international insertion
Existence Time	43 years old, on average	37 years old, on average
Principal product	Iron, Kaolin	Mineral aggregates, coal and limestone.
Number of Employees	Over 500 employees	From 100 to 499 employees
Gross operating revenue in 2010	Over R\$ 300 million	Over R\$ 2.4 million and up to R\$ 16 million

Figure 3 - Characterization of the companies

Source: own elaboration

When you look at the profile of the companies studied, considering its international insertion, internationalized companies Act longer on the market, produce products of diverse nature, can be considered to be bigger and have higher gross operating revenue. It is relevant to note that companies evaluated differ in all aspects evaluated, so the significant impact of internationalization on business activity, bringing evidence to corroborate the initial assumption of the study.

It is possible to conclude, on the basis of the data submitted, that the international insertion can be related to adoption of management practices for sustainability and business performance, especially because of the representativeness of the mineral sector in the Brazilian economy and the environmental impacts of mining and the conditions of international action, which leads to the understanding that the analyzed sample can be considered adequate to analyze the behavior of the companies in the sector.

5.2 Description of the management practices of sustainability and business performance according to the international insertion

In table 2, are presented the results of the descriptive analysis of management practices for sustainability.

The comparison of the data in table 2 allows you to observe that, in general, companies internationalized feature higher averages in relation to adoption of management practices for sustainability when compared to non-internationalized.

In order to check possible differences in relation to the adoption of management practices for sustainability according to the international insertion, nonparametric test was used of Mann-Whitney, which proved significant for 14 of the 26 variables analyzed. Thus, from the results of the test, it can be concluded that companies that have international market integration feature a higher level of adoption of management practices for sustainability compared companies that do not have. The variables that presented a greater level of significance (***) $p < 0.01$ refer to the commitment to stakeholders and environmental certifications, such as ISO 14001/SA 8000, demonstrating that the companies that operate in the international market have increased investment in voluntary management practices for sustainability.

The data will meet the vision that confirms the prepositions of Christmann *et* Taylor (2001) and Peng *et* Pleggenkuhle-Miles (2009), by revealing which companies working abroad are more likely to pressure for the adoption of sustainable practices when compared to companies that do not operate in the international market.



Table 2 - Descriptive analysis of management practices for sustainability

Dimension	Variables	Internationalized		Not internationalized		Mann-Whitney test
		Average	s	Average	s	Sig. b
Ethical business practices and integrated systems of corporate governance	Ethical business policies and practices	0,94	0,12	0,87	0,25	0,34
	Involvement with stakeholders	0,86	0,26	0,74	0,35	0,23
	Overall average	0,9	0,17	0,81	0,23	
Integration of sustainable development in the process of corporate decision-making	Integration of sustainable development principles and practices to the policies	0,9	0,15	0,72	0,28	0,02**
	Sustainable development as a priority in the design, operation and closure of mines	0,8	0,29	0,68	0,35	0,25
	Innovations in order to improve the social, environmental and economic performance	0,86	0,18	0,73	0,29	0,07*
	Incentives to stakeholders for the adoption of practices and principles based on sustainability	0,85	0,16	0,69	0,34	0,24
	Training of employees in relation to sustainable development	0,67	0,35	0,74	0,29	0,36
Overall average	0,82	0,15	0,71	0,25		
Management strategies of environmental and security risks	Involvement with stakeholders for the administration of the social and environmental impacts	0,9	0,12	0,77	0,26	0,12
	Effective procedures during an emergency response	0,89	0,13	0,74	0,28	0,09*
	Overall average	0,9	0,12	0,76	0,26	
Effective and transparent agreements with stakeholders	Dissemination to stakeholders of its performance	0,75	0,29	0,51	0,35	0,02**
	Commitment to stakeholders	0,93	0,12	0,69	0,35	0,01***
	Overall average	0,84	0,17	0,6	0,33	
Fundamental human rights and respect for the culture, the customs and values of the stakeholders	Remuneration for all employees in a fair and appropriate working conditions	0,94	0,12	0,9	0,14	0,18
	No use of forced work, compulsory or child	0,99	0,03	0,97	0,17	0,76
	Respect to the culture and heritage of indigenous people and local communities	0,98	0,04	0,81	0,37	0,47
	Overall average	0,97	0,05	0,89	0,15	
Social, economic and institutional development of the communities	Systems of permanent interaction with stakeholders and affected parties	0,8	0,27	0,63	0,34	0,06*
	Development of the surrounding community	0,76	0,33	0,59	0,4	0,19
	Overall average	0,78	0,27	0,61	0,34	
Continuous improvement in the areas of health and safety	Continuous improvement of aspects which may cause significant impact on the health and employees safety	0,98	0,04	0,89	0,19	0,07*
	Continuous improvement of aspects which may cause significant impact on the health and safety communities	0,96	0,06	0,83	0,24	0,06*
	Overall average	0,97	0,04	0,86	0,18	



Continuous improvement in the environmental area	Overall evaluation and periodic environmental impacts	0,9	0,25	0,76	0,31	0,05**
	Environmental management system to manage the environmental impacts	0,93	0,12	0,81	0,24	0,04**
	Environmental certifications as ISO 14001/SA 8000	0,81	0,34	0,3	0,43	0,00***
	Recovery of areas of company operations	0,91	0,25	0,77	0,36	0,12
	Storage and disposal of the waste safely and the tailings	0,98	0,05	0,86	0,27	0,06*
	Overall average	0,91	0,14	0,7	0,22	
Biodiversity conservation and land use planning	Development and implementation of practices for biodiversity conservation and land use planning	0,91	0,11	0,79	0,28	0,23
	Overall average	0,91	0,11	0,79	0,28	
Development, use, reuse, recycling and disposal of the products in a responsible manner	Integrated materials management throughout the mineral chain	0,93	0,1	0,73	0,33	0,04**
	Development, use, reuse, recycling and disposal of products and materials in a responsible way	0,9	0,26	0,81	0,26	0,08*
	Overall average	0,92	0,14	0,77	0,27	

Source: own elaboration

Note: ^a Refers to the average level of the companies' agreement on the implementation of such practices on a scale with range of 0.1 to 1, where 1 is the highest level of agreement. ² The averages of each dimension were calculated from the arithmetic mean of its variables. ^b significance level between: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

The results show that enterprises which have international insertion are more prone to have a consolidated management for sustainability, with a view to integrating the principles of sustainable development policies and practices, to invest in innovation, continuous improvement, environmental certification and environmental management system, storage and disposal of the waste safely and the tailings.

In table 3, are presented the results of the descriptive analysis of business performance.

From the results displayed in table 3 it can be concluded that, in General, companies that have international insertion feature higher averages in relation to business performance indicators when compared to firms that do not have.

In order to check whether there are differences in regard to the average business performance when considered the international insertion, nonparametric test was used of Mann-Whitney, as shown in table 3.

Comparing enterprise performance in the economic, social and environmental dimensions, according to the international practice, the test of *Mann-Whitney* proved significant for nine of the 31 variables analyzed. Thus, it can be concluded that the companies that operate in foreign markets have a superior business performance. The indicators with highest level of significance refer to programs on health and safety at work and an increase in the percentage of contractors and suppliers have undergone human rights screening.

From the above it can be concluded that a third of the indicators analyzed have significant differences when considered the international insertion context variable, leading to the understanding of management practices for sustainability differ in relation to international activities in greater numbers when compared to corporate performance, once again the assumptions that guide the design of the study.

6. CONCLUSION

Based on the proposed objective, the results showed that, in General, companies that have international activities present higher averages in relation to adoption of management practices for sustainability and business performance when compared to companies that do not operate in foreign markets. The Mann-Whitney test result shows that companies with international insertion have significant differences in most management practices for sustainability analysis. In relation to business performance, the test performed significant for only nine of the indicators analyzed.

The central hypothesis that guided the study, that *the adoption of management practices for sustainability and business performance differ according to the international insertion of mineral companies*, has been corroborated, since significant differences were found between the averages that refer to management practices for sustainability and performance when considered the international performance of the companies.



Table 3 - Descriptive analysis of business performance

Dimension	Variables	Have international insertion		Don't have international insertion		Mann-Whitney Test
		Average	s	Average	s	Sig.b
Economic	Increased direct economic value generated and distributed	0,71	0,34	0,58	0,34	0,13
	Greater presence of policies, practices and proportion of spending on local suppliers	0,65	0,31	0,53	0,35	0,32
	Greater proportion of senior management hired from the local community	0,5	0,3	0,46	0,37	0,75
	Infrastructure investments and services provided primarily for public benefit	0,69	0,32	0,45	0,37	0,03**
	Overall average	0,64	0,25	0,5	0,32	
Environmental	Increased use of recycled materials	0,63	0,3	0,53	0,39	0,55
	Reduction of direct and indirect energy consumption	0,74	0,3	0,6	0,34	0,16
	Reduced water consumption	0,79	0,24	0,58	0,4	0,13
	Increase in land rehabilitation percentage	0,76	0,32	0,67	0,36	0,53
	Reductions in greenhouse gas emissions, effluents and waste	0,79	0,22	0,59	0,38	0,1
	Reduction of total amounts of overhead, rock, tailings, and sludges and their associated risks	0,74	0,29	0,64	0,36	0,39
	Initiatives to reduce the environmental impacts of products and services	0,82	0,2	0,77	0,29	0,78
	Increase in the percentage of products and packaging recovered in relation to the total of products sold	0,34	0,35	0,45	0,41	0,4
	Reducing environmental impacts related to the transportation of products, materials and workers	0,65	0,32	0,68	0,35	0,61
Overall average	0,69	0,17	0,61	0,29		
Social	Reduced employee turnover rate	0,74	0,25	0,79	0,23	0,56
	Reduced rates of injury, occupational diseases, lost days, absenteeism and work-related deaths	0,94	0,1	0,83	0,24	0,06*
	Programs on health and safety at work	0,97	0,07	0,81	0,27	0,01***
	Investment in employee training	0,89	0,17	0,76	0,24	0,07*
	Increase in the percentage of contractors and suppliers underwent screening on human rights	0,81	0,17	0,46	0,39	0,00***
	Development of measures aimed at reducing cases of discrimination	0,79	0,28	0,62	0,4	0,31
	Measures developed in order to abolish child and / or forced labor	0,77	0,4	0,69	0,44	0,58
	Reduction operations in or near the territories of indigenous people	0,22	0,4	0,31	0,44	0,28
	Programs and practices to reduce the impacts of operations on communities	0,83	0,27	0,54	0,42	0,05**
	Reducing conflicts related to land use	0,42	0,44	0,34	0,42	0,77
Promotion of resettlement and rehabilitation of the settlers	0,31	0,42	0,17	0,32	0,5	



Increased percentage of operations with closure plans	0,53	0,44	0,33	0,4	0,18
Investment in anti-corruption mechanisms	0,58	0,45	0,36	0,43	0,13
Reduction of significant fines and non-monetary sanctions for noncompliance with laws and regulations	0,78	0,38	0,59	0,43	0,09*
Reducing the impact on the health and safety of customers from the evaluation of the product life cycle and services	0,6	0,43	0,52	0,43	0,63
Adaptation to the requirements of product labeling procedures and services	0,73	0,38	0,44	0,43	0,03**
Programs related to materials management aimed at sustainability	0,81	0,23	0,57	0,38	0,05**
Increased stakeholder involvement	0,79	0,22	0,61	0,36	0,11
Overall average	0,69	0,14	0,54	0,23	

Source: own elaboration

Note: ^a. Refers to the average level of the companies' agreement on the implementation of such practices on a scale with range of 0.1 to 1, where 1 is the highest level of agreement. ². The averages of each dimension were calculated from the arithmetic mean of its variables. ^b. significance level between: *** p < 0.01; ** p < 0.05; * p < 0.10.

The study showed, the main limitation, the number of surveyed companies. Thus, the evidence cannot be extrapolated to the universe of research considered restricting only to participating companies. Notwithstanding the limitations of the present study, it was possible to present evidence of the behavior of Brazilian mineral companies in relation to management for sustainability, its performance and its international activities, identifying key elements for the development of this area of knowledge, considering that a sustainability management aimed at minimizing the environmental impacts arising from the mining activity represents a matter of survival for the companies in the sector.

Thus, the study showed that the international performance refers to an important factor on the management for sustainability in the mineral sector, in view of their economic and representative companies which operate in foreign markets seem to be more heavily engaged with the adoption of sustainable practices when compared to companies that don't act, impacting their behavior in the market and its competitiveness.

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