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CORPORATE SOCIAL RESPONSIBILITY IN THE MINING INDUSTRY: CRITERIA AND INDICATORS

RESPONSABILIDAD SOCIAL CORPORATIVA EN LA MINERÍA: CRITERIOS E INDICADORES

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ABSTRACT: Corporate Social Responsibility (CSR) includes economic, social and environmental aspects, and it has particular significance in mining. This paper explores the subject of CSR in the mining industry and the main synergies between CSR and environmental, safety and quality management systems, whose adoption has increased during recent decades. It proposes the establishment of a set of criteria for sustainability, ethics and human capital (to be called CSR criteria). Whilst various international bodies have proposed CSR guides and indicators (commonly used as references for Stock Market investments), there is evidence that the size of the company can act as a moderator factor to the adoption of those systems. The paper offers an easy-to-use CSR performance chart (composed of 31 indicators and a global index), intended as an internal measure for companies of CSR continuous improvement.

KEYWORDS: CSR (corporate social responsibility), management excellence, mining industry, ethics, sustainability.

RESUMEN: La Responsabilidad Social Corporativa (RSC) incluye aspectos económicos, sociales y medioambientales, y tiene especial importancia en la minería. En este artículo se explora la disciplina de RSC en la industria minera y las sinergias principales con los sistemas de gestión medioambiental, de seguridad y de calidad, la adopción de los cuales ha aumentado durante las últimas décadas. Se propone el establecimiento de un conjunto de criterios de sostenibilidad, ética y capital humano (denominados criterios de RSC). Distintos organismos internacionales han propuesto guías e indicadores de RSC (normalmente utilizados como referencias para cotizaciones bursátiles), pero hay evidencias que el tamaño de la empresa puede actuar como factor moderador en la adopción de estos sistemas. En el artículo se presenta un cuadro de control de RSC fácil de utilizar (formado por 31 indicadores y un índice global), pensado como una medida interna de la mejora continua de la RSC de las empresas.

PALABRAS CLAVE: RSC (responsabilidad social corporativa), excelencia empresarial, industria minera, ética, sostenibilidad

1. INTRODUCTION

The last few decades have seen profound changes taking place in the competitive environment, in addition to a growth in the moral conscience of organisations [1]. The related

aspects of ethics and sustainability have increased in importance, and social responsibility has now been added to the traditional objectives of maximising sales (generating value for the consumer) and

profitability (generating value for the shareholders). All this has led to the integration of the triple bottom line, which includes economic, social and environmental results, and that constitutes the basis of Corporate Social Responsibility.

This new business approach has particular significance in mining activities, which while being of great importance for the local economy in areas that are rich in mineral deposits, have traditionally been perceived by society as activities that have a high impact on the environment [2] and on the levels of occupational safety for its workers [3].

Growing regulatory pressure has also arisen in issues concerning waste, pollution and occupational health and safety in particularly dangerous activities. This, together with demands from governments and society in general, has meant that more awareness has been raised with regard to these matters. Consequently, thanks to compliance with the legislation currently in force and to continual improvement, it has been possible to bring about a noticeable change in the situation.

In this respect, management has played an essential role, and various mining companies have introduced systems for quality, environment and occupational health and safety management. It is now the turn of Corporate Social Responsibility, which must be integrated into the mission, values and strategy of corporations [4].

2. CSR: WHAT DOES IT MEAN?

Corporate Social Responsibility (hereinafter CSR) is far from a new concept. Its origins can be traced back to the year 1950, although there are some who would place it in the 19th century by citing the practices of exemplary entrepreneurs such as Owen or Cadbury [5]. That said, the concept has become more widespread and fashionable in the last decade [6], and it is expected to be regularised as a key force in business in the near future [7].

CSR may be defined as a comprehensive business model that is designed to meet the requirements and expectations of the various

stakeholders in a company, as well as to care for and preserve the environment [8]. It can also be understood to be the group of actions which are undertaken by an organisation in order to accept the responsibilities resulting from the impact of its activities on society and the environment [9].

In this study, we introduce the definition of Erkoreka [4] and understand CSR to be a method of managing the company, which is integrated into the strategy and that harmonises profitability (the traditional vision of business) with social and environmental actions (the sustainable vision of development).

CSR does not just consist in the realisation of philanthropic activities such as cooperation with non-governmental organisations, but also involves the whole company and seeks to satisfy all the interested parties of the corporation: consumers, workers, shareholders, governments, suppliers and society in general [10]. In fact, CSR has a multi-faceted composition and incorporates four large areas in terms of responsibilities [11]: economic, legal, ethical and philanthropic. This powerful management tool is oriented at excellence in the long term and is characterised by the establishment of a new business culture [8], based on criteria related to legitimacy, respect, honesty, transparency, responsibility and solidarity.

Its influence is so important that various international bodies have drawn up guidelines and principles for its application in the form of regulations, which are well known to companies, such as the ISO 9000 quality standards. It is possible to cite standards AA1000, SGE-21, SA8000, and ISO 26000 (currently in the preparation stage and whose publication is expected in 2010).

3. CSR IN MINING

Research relating to the subject of CSR in the mining industry is relatively sparse due to the recent popularisation of this management system. However, the literature includes studies analysing the practices involved in different countries [12-13-14-15]. Different authors have studied CSR strategies and their relationship with local communities [16-17-18] and with

stakeholders [19]. Other authors have outlined reasons why CSR is important for mining [20-21], and have concentrated on issues of sustainability [22].

The origins of mining are found in the very origins of the first human beings, who exploited mineral resources in the earth's soil [23]. During periods when civilisations needed new materials for their development, advances were made in mining, and it can be considered an economic activity since the remotest of times. Now, mining plays a fundamental role in modern society and in industrial processes [24], as it provides raw materials and energy sources.

For a considerable time, mining consisted in exploiting a region until its natural resources were exhausted, then moving on to exploit another region and repeating this process. There was an uncompromising approach to mining in these areas, meaning that local communities, while they did view mining activities as an economic engine and even as a way of life, also saw them as a threat to the natural surroundings, with environmental effects on the air, water and soils [25].

Initially, contributing towards society in ethical terms basically resided in philanthropic actions associated with charity. However, the changes brought about by economic globalisation (inequalities in incomes, the markets being opened up and greater awareness in sustainable development issues, among others) have created a new setting, and concern for the environmental effects arisen has increased during the last few decades [26]. Furthermore, a concern centred on a commitment to the environment has evolved into a commitment to the community of the region and country where each company carries out its activities [27].

Now the mining industry must deal with the new challenges of the future, including the fundamental role of sustainable development [28], and the introduction of ethical management based on a management through values [29]. Companies must assume responsibilities in local and national development, and must orient their activities towards satisfying society in general [30].

Various causes have brought about this change of vision, including the greater exposure to diversity of cultures and social issues, demands from consumers and shareholders for responsible practices, and the decentralisation of activities [31], as well as more administrative and international regulations in mining practices [28]. All this has resulted in the inclusion of social and environmental responsibility in the agendas of the mining industry [32], and various companies have initiated social investment processes [33].

With this approach, the International Council on Mining and Metals has promoted sustainable development as a source of competitive advantage. Since 2003, it has formulated 10 basic principles of good practice, including ethical management, sustainable development, and contribution to the social and economic development of local communities [34].

In short, the application of CSR in mining activities must be considered as a means of conciliation between interested parties in the mining industry, the government, and society [35], while at the same being a social investment allowing for development of the company and improving its reputation [36].

4. THE COMPOSITION OF CSR: A PROPOSAL FOR MINING ACTIVITIES

CSR initiatives go further than just the obligation to comply with the law with regard to the environment, human capital and relations with the community [37]. They integrate social and environmental elements which, although they are not considered in legislation, respond to the expectations of society with respect to the company [38].

Consumers make purchasing decisions which are based on the company's image and degree of responsibility, on the respect it has for its natural surroundings, and on its standards of occupational safety [39]. This fact has grown in importance, principally in a market defined by information transparency, and CSR has resulted in being an almost obligatory practice in competitive terms.

Issues concerning the environment, quality, safety and ethics are some of the aspects that are included in the composition of CSR management. Consequently, the principal facets of this business strategy may be defined from various viewpoints. We can identify two facets in this work: internal and external responsibility.

Internal responsibility mainly affects issues that are related to the workers (occupational safety, job security, professional careers), and to shareholders (profitability and economic results). Meanwhile, external responsibility links the company with suppliers, governments, administrations and society, and includes aspects that show respect for natural surroundings (rational and sustainable exploitation of mineral resources, and conservation of ecosystems), and the establishment of productive relations with the community (integration into related social groups, and promotion of the local economy).

On the basis of these two facets, it is possible to create various strategies which allow us to deal with the new demands of social, ethical and sustainable management. One of the first strategies consists in the adoption of instruments of self-regulation, such as good practice codes, which establish a number of principles for environmental and social conduct. Another alternative lies in the incorporation of social objectives into the company's strategic planning. These objectives improve relations with the community and are aimed at progressively decreasing effects on the environment and on society. Finally, it is worth drawing attention to the introduction of a CSR management system, which is integrated into the mission and values of a company and which may include ethics and sustainability relating to all the actions and decisions that may be taken.

The scope of CSR practices will vary according to the strategy that is adopted. For example, it will be more extensive if a management system is introduced rather than solely a code of conduct. In fact, the adoption of self-regulatory mechanisms is a first step towards CSR management as a system, and in general a further step towards the total integration of CSR into the corporation.

In every case, CSR practices must be based on a number of criteria which set out the main guidelines to be followed. For the moment there is no uniform list of criteria. Various bodies have proposed systems for the measurement of the results obtained, and have published CSR indicators (Domini 400 Social Index, Dow Jones Sustainability Index, KLD-Nasdaq Social Index, FTSE4Good Index, or the Global Reporting Initiative -GRI). These indicators are commonly used as references for Stock Market investments [40]. Some of them also contain documents that are specific to the mining sector, which is the case of GRI Mining & Metals Sector Supplement [24], and UNE 22470 Sustainable mining (pilot version).

Some studies on the adherence of different top mining companies to the GRI guidelines can be found in the literature [18]. The results reveal that, due to the size of the company, judgements should be made regarding the extent of the input information. And according to data from the study conducted by Price Waterhouse Coopers, only 49% of the Spanish companies which have defined social and environmental objectives use indicators for managing these aspects [41], a fact that has led us to take the opportunity of creating a more operative and simplified performance chart.

After carrying out an analysis of the application guides and regulations on CSR, we propose the establishment of a set of criteria (Table 1) for sustainability, ethics and human capital (to be called CSR criteria).

Table 1. CSR criteria for mining

CSR criteria
A. Sustainability
A.1. Rational exploitation of natural resources
A.2. Clean extraction technologies
A.3. Mine closure and recovery programs
A.4. Emergency management
A.5. Quality of production
B. Ethics
B.1. Promotion of local community economy and social work
B.2. Fair funds administration
B.3. Job security and dignity
C. Human resources
C.1. Secure working methods
C.2. Training and capability development
C.3. Employee – Manager relations
C.4. Respect for people

5. SYNERGIES WITH MANAGEMENT SYSTEMS

Firstly, it is important to point out that although the voluntary CSR initiatives are varied, there is a common approach in the areas of environmental quality, labour regulations and human rights, and competitive practices [38] - areas which may in turn be related to the management systems concerning environment, occupational safety, and product and service quality respectively. These connections result in the existence of synergies between CSR and management systems. Consequently, the following connections may be highlighted:

1) CSR and environmental management: respect for the environment is one of the fundamental cornerstones of CSR. The practices that are respectful towards the environment are related to the management of natural resources, which constitute the raw material or energy source for industrial processes. In this way, potential damage to the environment is reduced by decreasing resource consumption, adapting it to requirements, and reducing waste and polluting emissions.

2) CSR and occupational safety management: the European Union Green Book cites safety in the workplace as one of the areas in which a company can demonstrate its socially responsible conduct. Within the company, the socially responsible practices primarily affect the workers and concern questions such as investment in human resources, training, empowerment and occupational safety.

3) CSR and quality management: consumers are increasingly socially responsible, and it is predicted that their purchasing decisions will not only be influenced by whether the company fulfils its product and service quality expectations, but also by the conditions in which the latter carries them out, including the CSR practices which are adopted.

The application of the above disciplines is carried out through environmental (ISO 14001), occupational health and safety (OHSAS 18001), and quality (ISO 9001) management systems. The adoption of these management systems in mining companies has grown in importance

during recent decades, and it has been studied by various authors [3-42-43].

Each one of these systems has specific objectives, although they all have a common basis and as a result, it is necessary to establish a policy in addition to action plans in the area of influence. With regard to specific objectives, it is possible to cite the following information included therein: the principal objective of environmental management systems is aimed at obtaining operational control of environmental aspects, ensuring a reduction in negative effects on the natural surroundings. On the other hand, occupational safety management systems hope to ensure the integrity and the physical, mental and social well-being of the workers through the adaptation of the working posts, and the adoption of a preventive policy that takes precedence over a corrective policy. In addition, quality management systems are aimed at satisfying all the interested parties by guaranteeing a high level in the product and service quality that is offered.

Table 2. CSR criteria and management system requirements

Management system:	Related CSR criteria:
Environment	
Environmental policy	A.1
Environmental action plan	A.1; A.2.; A.3; A.4.
Evaluation of environmental impacts. Annual environmental declaration.	A.2
Occupational health and safety	
Health and safety policy	B.3
Safety evaluation and risk assessment	C.1
Preventive action plan and continuous improvement	A.4; C.2; C.3; C.4
Accident and illness investigation	C.3
Quality	
Quality policy	A.5
Quality assurance programme	A.5
Continuous improvement	A.2; C.1; C.2
Total Quality perspective => stakeholder satisfaction	
Consumers: quality and low cost	A.5
Workers: work and health	B.3; C3
Society: responsible administration	A.1; A.3; B.1; B.2; C.4
Shareholders: economic results	+ all previous CSR guidelines

Having confirmed the existence of synergies between CSR and the analysed management systems, and by extension of the concept, we

may relate the principal contents of the management systems to the defined CSR criteria (Table 2).

6. PERFORMANCE CHART FOR CSR

In view of the importance of having an up-to-date and easy-to-use performance chart, we present in this paper a three-level model composed of a set of 31 indicators (1-31) and a global index (32) along with the associated algorithms for the calculation (Table 3). Level 1 includes the main indicators or categories (directly related to the defined CSR criteria). Level 2 and 3 include factors and subfactors.

Each item evaluated receives a score (the result of the algorithm calculation). All factors and subfactors have a predetermined weight. The total score for a category is the combination of these data. For example:

Category “A”:

Factor 1: score 0.8 (calculated), weight 0.4

Factor 2: score (to be calculated), weight 0.6

Factor 2.2: score 0.9 (calculated), weight 0.3

Factor 2.1: score 0.7 (calculated), weight 0.7

The score for category “A” would be calculated as follows (33):

$$0.4 \times 0.8 + 0.6 \times (0.3 \times 0.9 + 0.7 \times 0.7) = 0.776 \quad (33)$$

A company’s global CSR index is the score obtained at the highest aggregate level, and it is calculated as the aggregation of the three main categories considering the weights of categories (32). The higher the value obtained, the better the CSR conduct will be.

Input data can be obtained from quality, environmental and health and security management reports and statistics. The weights represent the importance given to each item evaluated, considering the impact that each category, factor or subfactor has on the concept associated. The sum of all weights within a specific concept must be 1.

All indicators (Table 3) have been defined after a thorough revision of the published CSR guides and after a revision of the more commonly used indicators for the measurement of quality, environmental and security issues in

organisations. They are calculated in terms of contribution towards the sustainable conduct of a company. For example, the “non-conformities” index is computed as the proportion of production tons free of non-conformities, and the “reduction mine waste dumps” rate is calculated as the decrease (or increase) from the previous period value.

In comparison to the existing schemes of CSR indicators (i.e. Dow Jones and GRI), the performance chart pretends to be a more simplified and therefore operative method. The criteria included in the aforementioned guides are very extensive and for small and medium enterprises, which is the profile of the vast majority of companies engaged in the extraction of aggregates and other mineral resources, it could be difficult to obtain all the input data required.

The CSR performance chart is intended as an internal measure for companies of their continuous improvement in CSR practices. Measuring those improvements would be a step towards more sustainable mining. In fact, the aim of the method is not to provide a “pass” or “fail” result. It is to encourage companies to adopt more sustainable working technologies and procedures, and to contribute towards the promotion of local economies, through periodical evaluation of different CSR facets. As it is commonly accepted in other expertise areas such as occupational health and security (see for example NTP 537, a Spanish technical note on integrated risk management and human factor: a simplified model for evaluation), the company will achieve the sufficiency level at a score of 0.5 (50%) and the starting point on the path to Excellence at a score of 0.75 (75%). These threshold values can be employed in the evaluation of the global index, the main categories and the individual factors.

Table 4 indicates the correspondences of the indicators with the defined CSR criteria.

7. CONCLUSIONS

This study has proposed a set of CSR criteria (sustainability, ethics and human capital) which

are applicable to mining, and which are principally framed by a rational exploitation of resources by using clean technologies and safe working methods, a responsible administration of economic funds, information transparency and the promotion of local economies.

All these criteria share a common focus on areas of environmental quality, occupational regulations and human rights, and competitive practices, which will be carried out by means of the application of environmental, occupational safety, and quality management systems. A comparative table for the CSR criteria has been presented, together with the principal contents of the aforementioned management systems.

Companies must have CSR, organise themselves in order that they have it, and show the results obtained. Therefore, it is essential to create a set of criteria that sets out the guidelines to be followed, and to evaluate CSR performance. The performance chart presented in this paper aims to fulfil these needs and to help companies in this endowment. By comparing the global index values recorded, companies can analyse the evolution of their own CSR conduct over time. Hence, the global index can be considered an internal measure of continuous improvement in CSR practices.

In future research, the indicators will be presented in more detail, outlining reference values, weights and primary data sources.

Table 3. CSR performance chart

Ia. Sustainability Index = $(\alpha_1 \times a.1) + (\alpha_2 \times a.2)$	(1)
Ia.1. Rational resources exploitation= $(\alpha_{1.1} \times a.1.1; \alpha_{1.2} \times a.1.2; \alpha_{1.3} \times a.1.3)$	(2)
Ia.1.1. Water consumption (piped water supply, surface water, groundwater):	(3)
$1 - \frac{\text{Liters of water consumed per period \& production ton}}{\text{top reference value}}$	(4)
Ia.1.2. Energy consumption:	(5)
$1 - \frac{\text{Joules of energy consumed per period \& production ton higher than top reference value}}{\text{top reference value}}$	(6)
Ia.1.3. Primary materials consumption:	(7)
$1 - \frac{\text{ton of primary materials per period \& production ton}}{\text{top reference value}}$	(8)
Ia.2. Environmental quality = $(\alpha_{2.1} \times a.2.1) + (\alpha_{2.2} \times a.2.2) + (\alpha_{2.3} \times a.2.3) + (\alpha_{2.4} \times a.2.4)$	(9)
Ia.2.1. Reduction of contaminant emission rates:	(10)
$1 - \frac{\text{contaminant emissions concentration}}{\text{contaminant emission concentration from last period}}$	(11)
Ia.2.2. Reduction of mine waste dumps rate:	(12)
$1 - \frac{\text{tons of mine waste dumps}}{\text{tons of mine waste dumps from last period}}$	(13)
Ia.2.3. % of restored soil:	(14)
$\frac{\text{total square of restored soil}}{\text{total square of mine - degraded soil (closed mines)}}$	(15)
Ia.2.4. Reduction of environmental accidents:	(16)
$1 - \frac{\text{number of environmental accidents}}{\text{number of environmental accidents from last period}}$	(17)
Ia.3. Quality of production = $(\alpha_{3.1} \times a.3.1) + (\alpha_{3.2} \times a.3.2) + (\alpha_{3.3} \times a.3.3)$	(18)
Ia.3.1. Non-conformities:	(19)
$1 - \frac{\text{tons of non - conforming product}}{\text{Total production tons}}$	(20)
Ia.3.2. Machine b	(21)
$1 - \frac{\text{improductive hours by machine breadowns}}{\text{productive hours}}$	(22)
Ia.3.3. Consumer satisfaction rate:	(23)

Table 3. CSR performance chart

$\frac{\Sigma \text{ of survey results (quality of production+ quality of service+ deliveries on time)}}{\text{total surveyed customers} \times (\text{number of questions} \times \text{highest evaluation scale value}) \times 100}$	
Ib. Ethics Index = ($\beta_1 \times b.1$) + ($\beta_2 \times b.2$) + ($\beta_3 \times b.3$)	(15)
Ib.1. Promotion of local economy = ($\beta_{1.1} \times b.1.1$) + ($\beta_{1.2} \times b.1.2$) + ($\beta_{1.3} \times b.1.3$)	(16)
Ib.1.1. Services subcontracted with local companies:	(17)
$\frac{\text{monetary units paid for services subcontracted with local companies}}{\text{monetary units paid for services subcontracted}}$	
Ib.1.2. Primary materials from local companies:	(18)
$\frac{\text{monetary units paid for primary materials offered by local companies}}{\text{monetary units paid for primary materials}}$	
Ib.1.3. Local community workers rate:	(19)
$\frac{\text{number of local community workers}}{\text{total number of workers}}$	
Ib.2. Fair funds administration = ($\beta_{2.1} \times b.2.1$) + ($\beta_{2.2} \times b.2.2$)	(20)
Ib.2.1. Social projects enhancement rate:	(21)
$\frac{\text{benefits (monetary units) invested in social projects}}{\text{annual result (monetary units) without deducting investments in social projects}}$	
Ib.2.2. Donations rate:	(22)
$\frac{\text{monetary units or equivalent of products donated to non - governmental organizations}}{\text{Annual result (monetary units) without deducting social investments}}$	
Ib.3. Work enhancement and disabled workers help rate:	(23)
$\text{yes} = 1; \text{no} = 0$	
Ic. Human resources Index = ($\gamma_1 \times c.1$) + ($\gamma_2 \times c.2$) + ($\gamma_3 \times c.3$) + ($\gamma_4 \times c.4$)	(24)
Ic.1. Security level:	(25)
$1 - \frac{\text{Number of accidents}}{\text{Number of workers}}$	
Ic.2. Training and capability:	(26)
$\frac{\text{real average training hours per worker}}{\text{average training hours planned per worker}}$	
Ic.3. Relations employee / corporation = ($\gamma_{3.1} \times c.3.1$) + ($\gamma_{3.2} \times c.3.2$) + ($\gamma_{3.3} \times c.3.3$)	(27)
Ic.3.1. Collective bargaining:	(28)
$\frac{\text{number of workers receiving collective bargaining}}{\text{total number of workers}}$	
Ic.3.2. Retirement plans (supported by the corporation):	(29)
$\frac{\text{number of workers receiving retirement plans}}{\text{total number of workers}}$	
Ic.3.3. Medical assurance plans (supported by the corporation):	(30)
$\frac{\text{number of workers receiving medical assurance plans}}{\text{total number of workers}}$	
Ic.4. violent or conflictive situations:	(31)
$1 - \frac{\text{number of violent incidents (bad - treatment, aggressions, ...) occurred in the company}}{\text{total number of workers}}$	
Id. Global CSR Index = ($\alpha \times a$) + ($\beta \times b$) + ($\gamma \times c$)	(32)
where α , β and γ (and the corresponding subfactors) are weights.	

Table 4. CSR indicators and criteria

CSR criteria	Area of influence	Indicators
A. Sustainability		
A.1. Rational exploitation of natural resources	<i>Environment</i>	Ia.1.1.; Ia.1.2.; Ia.1.3.
	<i>Quality</i>	
A.2. Clean extraction technologies	<i>Environment</i>	Ia.2.1.; Ia.2.2.
	<i>Quality</i>	
A.3. Mine closure and recovery programs	<i>Environment</i>	Ia.2.3.
	<i>Quality</i>	
A.4. Emergency management	<i>Environment</i>	Ia.2.4.
A.5. Quality of production	<i>Quality</i>	Ia.3.1.; Ia.3.2.; Ia.3.3.
B. Ethics		
B.1. Promotion of local community economy and social work	<i>Quality</i>	Ib.1.1.; Ib.1.2.; Ib.1.3.
B.2. Fair funds administration	<i>Quality</i>	Ib.2.1.; Ib.2.2.
B.3. Job security and dignity	<i>Health and safety</i>	Ib.3.
C. Human resources		
C.1. Secure working methods	<i>Health and safety</i>	Ic.1.
C.2. Training and capability development	<i>Health and safety</i>	Ic.2.
	<i>Quality</i>	
C.3. Employee – Manager relations	<i>Quality</i>	Ic.3.1.; Ic.3.2.; Ic.3.3.
C.4. Respect for people	<i>Health and safety</i>	Ic.4.
	<i>Quality</i>	

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