Sustainability indicators for the Portuguese cork industry

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Abstract

Sustainable development proves to be an important focus of attention from industries once to modern society the impact of humans on the environment in which it operates is becoming increasingly complex. There is a growing concern for the environment and for the scarcity of available natural resources that are frequently related to the negative consequences brought by the industrial manufacturing system. Therefore, a framework incorporating sustainability indicators is an useful tool for decision making, policy formulation and public communication of economic, environmental and social performance of each organization. The present study aims to conduct a detailed study about the cork industry in Portugal, presenting a proposal of a set of sustainability indicators. These indicators are already being used in the industries in general, and can represent a starting point for the development of indicators that measure sustainability for this sector.

Keywords: Sustainable Development, Sustainability Indicators; Cork Industry.

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1. Introduction

Based on the technological changes and growth of organizations, new requirements and standards were created. Nowadays, the importance of existing suitable processes to sustainability in order to ensure social welfare, economic and environmental is evident. The increasing concern of society with the environment in which is the organization operates, points to the negative consequences of production systems and thereby presses the companies to assume their responsibility in sustainable development. It is important, however, to emphasize that sustainability is not dissociated from economic growth, but can be seen as an important factor of competitive advantage and value creation.

According to Silva *et. al* (2009), the concept of sustainability for the business sector represents a new approach to doing business that promotes social responsibility and reduces the use of natural resources, consequently decreasing the negative impacts on the environment and preserving the integrity of the planet for future generations, without neglecting the economic and financial profitable of the enterprise.

Faced with this problem, stand out in this scene companies that respond to sustainable development with environmental actions formulations with new production practices, with the social concern and the deployment of cleaner technologies. These business organizations developed new tools for sustainable management that generated a range of efficient production and best results. In literature sustainability indicators are found for industries such as mining, developed by Azapagic (2004), or for the wine industry (Callado, 2010). These indicators address the economic, environmental and social issues and its relevance into the sector under study. A recent review of indicators that appear frequently in corporate sustainability reports can be found in Roca and Searcy (2012).

Regarding cork industry the sustainability appears to have a strong relationship from the cork oak tree, where the cork is extracted, until the final transformation in cork products. Cork is a raw vegetable with exceptional environmental qualities: it is a renewable resource that is recyclable, non-toxic and durable, besides being a fixer of CO_2 with excellent physical and mechanical properties, such as thermal and electrical insulating, vibration absorber and practically waterproof (Mestre and Gil, 2011).

Therefore, in order to emphasize these properties inherent to this sector, provide progress and make it more efficient in your production it is of great importance the development of sustainability indicators. These indicators may enable the analysis, monitoring and reporting specific to the cork industry.

In this way this work aims carry out a survey of the sustainability indicators already applied in general industries to further development of specific indicators for the cork sector. For instance, the macro indicators, such as the Global Reporting Initiative is used, along with the specific codes in the sector.

2. Cork sector

As a result of the knowledge development and the industry expansion, products used in households and in a simply manner, became valuable to trade and economy. This change also occurred with the cork (vegetable material from the bark of the cork oak tree), in the past, the usage of cork was prevalent in fishing devices and sealing. Later on, after technical studies about its characteristics, it was possible to use the cork in a large amount of products, and nowadays, several countries have yours owns economy linked to these products.

One aspect to justify the study of cork industry is the strong development of the wine industry. Studies have shown that the wine consumption is growing, mainly due to health issues, and as consequence, more cork stopper are being used, as they are the most famous product in cork industry and used to seal the majority of wines. Furthermore, there is a large amount of applications to cork such as in flooring and covering, decorative items for home and office, shoes, automobile gaskets and military and aviation industry.

The cork industry occupies a prominent place in economy and trade of Mediterranean countries such as Portugal, Italy, France, Spain, Morocco, Algeria and Tunisia. According to Pestana and Tinoco (2009), the cork is one of the typical products from Portugal, since the country had been one of the leaders in cork production and exportation in the past decades, in addition to having one of the greatest areas occupied by cork oak trees forest.

The cork oak trees are distributed nearly across the country, isolated or in spontaneous settlements. There are two kinds of existing stands the cork oaks and the assembled. The assembled have a multiple usage, agriculture, forestry and pastoral, which originate a low density of these settlements, and the cork oaks exhibit higher density, being able to have large trees, which the greatest production is allocated to cork exploration (Pestana and Tinoco, 2009).

It can be noticed that Portugal and Spain are both area and production leaders. It can be highlighted that 85.8% of the world production it is located in Europe and only 14.2% in North Africa. In Portugal, the cork is concentrated in south region, having the localities of Alentejo, Lisbon and Tagus Valley as great powers in cork production, extraction and industrialization (Apcor 2012).

3. Indicators of sustainability

There are countless types of sustainability indicators found in the literature and most of these are still under development, discussion, testing and improvement. The research about sustainability indicators generally occurs at two different levels: macro and micro. According to Gray and Wiedeman (1999) macro indicators attempt to measure the sustainability of a city, nation or the world, while the micro indicators generally are related to the lowest level, with local units such as organization of the business and industries.

Regarding the macro indicators, in line with Souza and Lopes (2010), among the initiatives incorporated by principles of governance, related to environmental issues, social and economic, it can be cited: the Un's Global Compact, the Organizational for Economic Cooperation and Development's (OECD) Guidelines for Multinational Enterprises them, and the Global Reporting Initiative (GRI) and so forth. According to the same authors the GRI stands out from the others, because it aims to satisfying the organizations need of having a clear and transparent communication, in order to the sharing of concepts structures have a language that is coherent and global, in other words, proposing a global communication standard over sustainable business actions.

The sustainable development indicators generally reflect sustainability issues into quantifiable measures of economic, environmental and social performance with the ultimate goal of helping to solve the main concerns. For the development of indicators, at the level of companies and organizations, is necessary to identify the relevant issues, which capture the specific features of each type of industry. The stakeholder analysis should help in raising awareness of the general types of questions, however, to identify specific problems, a detailed analysis of each industrial activity is required (Azapagic,2004). Sustainability is based on three dimensions that must be properly structured to develop efficient indicators of sustainability. To Estend and Pitta (2008) actions of sustainable development must seek to act simultaneously in three dimensions: economic, social and environmental.

The model proposed by Azapagic (2004) is composed by economic, environmental, social and integrated indicators. Economic indicators measure the economic impact of the company on its internal and external stakeholders and economic systems at the local, national and global level. The environmental indicators measure impacts of the company on natural systems, including humans, ecosystems, land, air and water. These impacts may be local, regional or global, affecting a wide range of stakeholders. Social indicators assess the aspects, practices often associated with sustainable employment, human rights, society and product responsibility (Kneipp, 2012).

The use of the sustainability indicators for the industry represents a helping procedure to measure the economic, environmental and social performance of an enterprise, providing information on how it contributes to sustainable development (Azapagic and Perdan, 2000).

3.1 Environmental Indicators

The environmental dimension of sustainability covers the organization's impacts on natural systems and living and nonliving relate to performance in respect of raw materials, biodiversity, environmental compliance and other relevant information (Kneipp, 2012).

For Oliveira (2005), environmental sustainability represents the preservation of natural resources and the limitation of use of non-renewable resources, respect for capacity of self-debugging for natural ecosystems and reducing the volume of waste and pollution through energy conservation and recycling. This author argues that some measures are important such as, promoting self-limiting consumption of materials made by rich countries and individuals

across the planet, the definition of rules for adequate environmental protection, creating an institutional machinery as well as selecting instruments economic, legal and administrative necessary for their achievement.

However, sustainable development seems to require other approaches, not only covering ecological status quo. A coupled ecological, social and economic system can evolve to maintain a level of biodiversity that will ensure the long-term strength of the system. This ecological perspective replaces the narrow economic objective of protecting only the ecosystems that human activities are directly dependent. Sustainable development seeks compensation for lost opportunities for future generations, because nowadays the economic activity of biodiversity changes in ways that affect the flow of future vital ecological services (Munasinghe, 2007).

3.2. Social Indicators

The social responsibility reveals the organization's ethos in the surrounding environment, incorporating important factors such as the appreciation of the employee and measures that provide quality of life. The impacts of business on society and within the organization may be measured by social indicators.

According Bronn and Vrioni (2001) business involvement in social activities in the community began as voluntary actions of companies, focusing on social issues until reaching the current levels of corporate sustainability.

Social development usually refers to the improvement of well-being and individual comfort and welfare of the whole society, a result of the growth of share capital, usually achieved through the accumulation of skill capacity of individuals and communities to work together (Munasinghe, 2007). The union of people in an attempt to develop can be positive to achieve the objective of the actions (Estender and Pitta, 2008).

For Kanji and Chopra (2010) an enterprise presents social responsibility when: commits to ethical practices in employment and at work, improving the workplace, is involved in build and integrate social projects with local communities and communicates with the communities involved about the consequences of their activities and products; invests in building social infrastructure, contributes to a cleaner environment through its protection and sustainability, and contributes through its corporate governance to economic development in general.

According Glavic and Lukman (2007) social principles are exposed as: social responsibility (the human development in form equitable and egalitarian, contributing to humanity and the environment); health and safety (refer to the workplace including responsibilities and standards); polluter-pay and taxation (whoever causes pollution must pay the costs that this cause, in the form of cleaning taxation).

3.3. Economic Indicators

The economic indicators as opposed to just measure the profit generation must mention the efficient allocation and distribution of natural resources and human capital.

According to Pereira (2009), economics should be evaluated more in terms of macro social that only through specific criteria of corporate profitability, aiming to promote structural changes that act as motivators of human development without compromising the natural environment. The aspects of the economic dimension covered by Krajnc and Glavic (2005) firstly refer to the impacts caused on economic welfare of its stakeholders and the economic system at the local, national and global.

According to Steurer *et. al* (2005) an enterprise economic sustainability is classified by the corporate financial performance, the business competitiveness and the economic impact generated by the company and stakeholders. To Glavic and Lukman (2007) economic principles that should be considered are: eco-efficiency, ethical investments and environmental accounting.

4. Proposal of sustainability indicators of the cork sector

The proposal for sustainability indicators specific to the cork industry is based on the Global Reporting Initiative (GRI), on the indicators already created for industries in various other sectors and on the indicators presented in the sustainability reports of a leading company operating in the Portuguese cork sector.

The GRI provides guidelines to build sustainability reports that demonstrate effectively the sustainable development of the industry. According to Lopes and Souza (2010) the GRI provides a reliable framework for sustainability reporting, and can be used by organizations of all sizes, sectors and localities. To do so it relies on the cooperation of experts from various countries, multistakeholder governance structure that come from companies, consultants, employees, non-governmental organizations, public policy, research institutions, associations and universities.

In essence, the GRI indicators and the indicators classified as essential by this organization and that by authors of this study were considered relevant and adapted to the cork industry. From this initial base, GRI indicators were integrated with the ones proposed by Azapagic (2004), Oliveira (2002) and Erol et. al (2008). Also industry's sustainability report Amorim (2011) was reviewed, as this company already uses indicators for the sector. Then the potential set of sustainability indicators for the cork industry was defined, resulting in a total of 46 indicators being 16 related to environmental performance, 23 related to social performance and 7 related to the economic dimension.

Following the final frameworks with the proposal to sustainability indicators are presented, aiming to support sustainable management of the cork industry.

Environmental Performance Indicators		
Aspect	**Indicator**	**References**
Materials	Materials used by weight or volume.	GRI(2006), Azapagic(2004), Amorim(2011)
	Percentage of materials used that are recycled input materials.	GRI(2006),Azapagic(2004), Amorim(2011)
Energy	Direct and indirect consumption by primary energy source.	GRI(2006),Erol. *et. al*(2008), Amorim(2011)
Water	Total water withdrawal by source	GRI(2006), Erol. *et. al*(2008),Amorim(2011)
Biodiversity	Location and size of land owned, leased managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas.	GRI(2006),Erol. *et. al* (2008)
	Description of significant impacts of activities, products, and services on biodiversity in protected areas and areas of high biodiversity value outside protected areas.	GRI(2006)
Emissions, Effluents, and Waste	Total direct and indirect greenhouse gas emissions by weight.	GRI(2006),Erol *et. al*(2008), Azapagic(2004), Amorim(2011)
	Other relevant indirect greenhouse gas emissions by weight.	GRI(2006)
	Emissions of ozone-depleting substances by weight.	GRI(2006), Azapagic(2004)
	NO, SO and other significant air emissions by type and weight.	GRI(2006), Amorim(2011)
	Total water discharge by quality and destination.	GRI(2006),
	Total weight of waste by type and disposal method.	GRI(2006), Azapagic(2004), Amorim(2012)
	Total number and volume of significant spills.	GRI(2006), Amorim(2011)
Products and Services	Quantity and description of initiatives to mitigate environmental impacts of products and services and extent of impact.	GRI(2006), Erol *et. al*(2008), Oliveira(2002)
	Percentage of products and their packaging materials recovered in relation to total sales by product category.	GRI(2006), Erol *et. al*(2008)
Compliance	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations.	GRI(2006)

Table 1. Environmental indicators for the cork industry.

Source: Developed by the authors.

Social Performance Indicators		
Aspect	**Indicator**	**References**
Employment	Total workforce by employment type.	GRI(2006), Erol *et. al*(2008), Oliveira(2002), Amorim(2011)
	Total number and rate of new employee hires and employee turnover by age group, gender and region.	GRI(2006), Erol *et. al*(2008), Amorim(2011)
Management relations	Percentage of employees covered by collective bargaining agreements.	GRI(2006)
Occupational health and safety	Rate of injury, occupational diseases, lost days, and absenteeism, and total number of work-related fatalities, by region and by gender.	GRI(2006),Erol *et. al*(2008), Amorim(2011)
	Number of hours of training and description of educational programs, training, counseling, prevention and risk control.	GRI(2006), Oliveira(2002), Amorim(2011)
Training and education	Average hours of training per year per employee by gender, and by employee category..	GRI(2006), Erol *et. al*(2008), Oliveira(2002), Amorim(2011)
Diversity and equal opportunity	Composition of governance bodies and breakdown of employees per employee category according to gender, age group, minority group membership.	GRI(2006),Erol *et. al*(2008), Azapagic(2004)
	Proportion of wages between men and women, by position.	GRI (2006), Azapagig (2004) Amorim(2011)
Investment and procurement practices	Percentage and total number of significant investment agreements and contracts that include clauses incorporating human rights concerns, or that have undergone human rights screening.	GRI(2006), Azapagic(2004)
	Percentage of significant suppliers, contractors, and other business partners that have undergone human rights screening, and actions taken.	GRI(2006)
Non-discrimination	Total number of incidents of discrimination and corrective actions take.	GRI(2006)
Freedom of association and collective bargaining	Operations and significant suppliers identified in which the right to exercise freedom of association and collective bargaining may be violated, or at significant risk, and actions taken to support these rights.	GRI(2006)

Child Labor	Operations and significant suppliers identified as having significant risk for incidents of child labor, and measures taken to contribute to the effective abolition of children labor.	GRI(2006), Erol *et. al*(2008), Azapagic(2004)
Communities	Level of effectiveness of programs and practices to manage the impacts of operations on communities.	GRI(2006), Erol *et. al*(2008), Oliveira(2002)
Corruption	Percentage and total number of business units analyzed for risks related to corruption.	GRI(2006), Azapagig(2004)
	Percentage of employees trained in anti-corruption policies and procedures.	GRI(2006), Azapagig(2004)
	Actions taken in response to corruption.	GRI(2006), Azapagig(2004)
Public policy	Number and description of holdings on the public policies of social responsibility, health and safety.	GRI(2006), Erol *et. al*(2008), Oliveira(2002)
Compliance	Total non-monetary sanctions due to noncompliance with laws and regulations and monetary value of existing fines.	GRI(2006)
Customer health and safety	Percentage of products and services that create impacts on the health and safety of customers.	GRI(2006), Erol. *et al* (2008)
Labeling of products and services	Percentage of products and / or services containing information required by procedures.	GRI(2006)
Marketing Communications	Quantity and description of programs for adherence to laws, standards and voluntary codes related to marketing communications.	GRI(2006)

Table 2. Social indicators for the cork industry.

Source: Developed by the authors.

Economic Performance Indicators		
Aspect	**Indicator**	**References**
Economic Performance	Direct Economic value generated: revenues, operating costs, employee compensation, donations and other community investments, retained earnings and payments to capital providers and governments.	GRI(2006), Erol et. al(2008), Amorim(2011)
	Risks, financial implications and opportunities for the organization´s activities due to climate change.	GRI(2006), Oliveira(2002)
	Value and description of the organization´s defined benefit plan.	GRI(2006), Amorim(2011)
	Significant financial assistance received from government.	GRI(2006), Amorim(2011)
Market Presence	Practices, proportion of spending on locally-based suppliers at significant locations of operation.	GRI(2006), Amorim(2011)
	Procedures for local hiring and proportion of senior management hired from the local community at locations of significant operation.	GRI (2006),
Indirect Economic Impact	Value of investment in infrastructure and services for public benefit (health, education, security and the like).	GRI(2006),Azapagic(2004), Amorim(2011)

Table 3. Economic indicators for the cork industry.

Source: Developed by the authors.

5. Conclusion

Through the detailed study of the Portuguese cork industry that was possible understand the working of the sector and observe its dimension and its importance. This study is revealed to be essential for further analysis and definition of the indicators that are best suited to this sector.

The survey of sustainability indicators revealed that there are numerous criteria translated into indicators in the literature being applied to generate sustainability reports. The macro indicators are distinguished from micro indicators, and the main difference is that the former is developed for production or services facilities, and possess the aim to address all key aspects of the production chain involving resources (energy, materials and employees), the natural environment in which it operates and the social and economic development.

The main goal of this study was to conduct a detailed study of the cork industry and to raise sustainability indicators existing in the literature from other sectors confronting them with

those already existing in the sustainability reports of companies. From this a framework for possible sustainability indicators for the cork sector was proposed.

The Global Reporting Initiative (GRI) is an international non-governmental organization that demonstrates the guidelines for sustainability reporting and provides support for developing studies of specific indicators. Because it is an organization with credibility and high quality, the essential indicators described in this proposal departed from the GRI sustainability indicators adapted to the specific cork industry.

Therefore these indicators should cover all needs of the cork industry and reveal more clearly sustainable development promoted by this sector. In this way, a total of 46 sustainability indicators were defined, of which 16 related to the environmental dimension, 23 relating to the social dimension and 7 regarding the economic dimension. It is noteworthy that these indicators are a primary study source for subsequent inclusion in industry and verifying the applicability in this industry.

This study is expected thereby to contribute to: (1) possible analysis of sustainability for the sector as a whole, comparable to other sectors, and (2) assessment of companies' sustainability from the cork sector in the national and international level in a unambiguous and impartial manner. Future research targets the proposal of a new tool for supporting the sustainability assessment of the cork industrial manufacturing sector, integrating the full social, environmental and economic cost and benefits (externalities) at local, regional and national levels.

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