

ECOLABELS: A TOOL TO ANALYZE THE ENVIRONMENTAL ASPECTS OF CERAMIC COMPANIES



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Abstract

This work aims to carry out an environmental analysis of the Spanish ceramic sector, based on comparative analysis between several companies in the sector that have different size, turnover and turnover. The realization of this work has been motivated by various reasons; one of them is the impact and importance of this sector on the business fabric of our province; also because of the growing trend of corporate social responsibility in financial and business management, as well as the need to implement eco-labels in the ceramic sector.

In short, this work aims to give an overview of the importance of CSR in the ceramic sector of Castellón, based on a quantitative analysis of the level of implementation of environmental ecolabels.

Keywords

Corporate Social Responsibility, ceramic sector, eco-labels, environmental regulations, ISO.

1.- INTRODUCTION

The public debate on Corporate Social Responsibility (hereinafter CSR¹) has grown exponentially in recent years, particularly at European level, where this phenomenon has developed relatively recently in relation to the Anglo-Saxon and American world. An emergence that has not only occurred in the most specialized and academic fields, but has also been reflected in the multiplication of publications and reports from both the business, financial, institutional environment,.... as well as in the media.

In Spain, the interest in CSR is relatively recent, the first initiatives in this regard arise in the late 1970s, however, it is worth noting the great commitment that, in recent years, Spanish companies have adopted in this area, making us the second country in Europe to hold RSC reports, and in one of the countries whose companies are most involved with the new social and environmental demands coming from stakeholders (ASCER, 2020).

By the end of 2018, Spanish companies had developed around fourteen thousand CSR projects, 62% more than 2017, which is supposed to have tripled the number of initiatives since 2014. This result reflects the commitment of our business fabric to the integration of CSR into business strategy, as indicated by the Sixth report of the social impact of companies promoted by the SERES and Deloitte Foundation (Fundaciónseres.org, 2020).

In this context, the present work aims to analyze the degree of implementation and commitment of the CSR² in environmental matters of the ceramic sector of the province of Castellón, proposing a comparison between companies of different size and turnover. This work is characterized by its innovation in the environmental comparison of ceramic companies from an eco-labelling system. The structure of the work is divided into five key parts.

¹ The socially responsible values and practices carried out by organizations are listed under the name Corporate Social Responsibility (CSR) or Business Social Responsibility (BSR). The difference between expressions is not very relevant. While the former alludes to listed corporations or large companies, the second refers more broadly to companies in general, as this also wants to accommodate small and medium-sized enterprises (Ruiz, 2011).

² The concept of Corporate Social Responsibility under the abbreviation CSR and BSR will be used in this work, since the business entities to be analyzed are both large and medium and small enterprises.

In the first part, the introduction is made where the object of study of this thesis (environmental ecological labelling) is presented and discusses the current state of the academic work on the subject.

The second part aims to approximate the concept of CSR, analyzing and defining its conceptual framework from an analysis of the literature. The relationship between CSR and the current ceramic sector is also analysed.

The third part explains the importance of the Spanish ceramic sector from the analysis of current data and information with great relevance in consideration of the international economic framework.

In the fourth part, once the CSR is defined, its rules are presented and as it tries to influence companies to guide their behaviour, the European Commission body, the OECD guidelines for multinational companies, the ISO standard, the International Labour Organization "ILO" and the GRI guide will be examined in addition to the different certificates and regulations most commonly used by ceramic companies. In conclusion with this section, the DAP Project will be analysed.

In the fifth part there is a practical study containing the following structure. First, four ceramic companies chosen depending on the volume of the company will be analyzed and studied and then compared to each other, visualizing the differences presented by companies from lowest to highest volume. The entities analyzed by size are: PAMESA, S.L. and PORCELANOSA, S.A. as large companies, HIJOS DE CIPRIANO CASTELLO ALFONSO, S.L. as median and TERRACOTA PAVIMENTOS DE GRES, S.A. as a small. This analysis will be applied to all the concepts developed in the theoretical part.

Finally, the conclusions are detailed, which explain the highlights of the work, highlighting the actions of companies, which demonstrate a greater commitment to socially responsible aspects, especially those directly linked to the environment and climate change.

2.- CORPORATE SOCIAL RESPONSIBILITY (CSR)

CSR is an aspect that has become part of the financial, economic and business agenda, providing competitive advantages and added value to the market and institutions. The implementation of CSR originates thanks to the high demand of the company for the company to assume its responsibility as part of it, in which it influences its decisions and actions. In short, this concept arises in response to the needs of companies to improve their image to their customers and suppliers, which in equal measure strengthens their market position (Solis, 2008).

This demand greatly affects ceramic companies, because hazardous raw materials are used in the production process, classified as harmful to health and the environment, which negatively affects the sector.

Therefore, ceramic companies take a great responsibility for their negative anti-environmental impact, to counteract this negative aspect of tile manufacturing, the company must ensure that they comply with all the regulations governing the aspects of health, environment and protection. The most generic regulations are regulated and generally specified by the ISO, International Organization for Standardization.

However, some certificates require a number of more restrictive compliances and obligations in terms of environmental toxicity and impact, these certificates are often requested by more restrictive countries, such as China, Japan or Korea. Therefore, if ceramic companies do not have this certificate they cannot export their product there.

This influences the commitment that the ceramic sector of Castellón maintains with the CSR and especially with environmental protection.

2.1.- CONCEPTUAL FRAMEWORK OF THE CSR

According to Davis, Frederick and Blomstrom (1988), the origin of "social responsibility of the company" is in the twenties when it begins to consider that the company is a whole as a whole, that is, corporate action with principles of charity and philanthropy and not as individual action.

However, the first record of the CSR was in the 1950s by Bowen (1953) which stated that the employer and worker possesses a social obligation of responsibility in business decisions as necessity. Likewise, citing this author, the CSR is defined in the 1950s as: "The obligations of the businessman to follow these policies, to make those decisions, or to follow the lines of action that are desirable in terms of the objectives and values of our society" (Bowen, 1953).

On the other hand, authors such as Boatright (1993) also find the roots of the concept of Corporate Social Responsibility in the 1950s, this is linked to the rapid growth of American companies and the role that these large companies faced against urgent social problems between the sixties and seventies; some of which are; poverty, unemployment, cultural relations and pollution.

At this time there was little application to give a definition of the term, but as early as the 1960s it was tried to formalize the concept allowing to provide a more accurate definition.

Thus, in the 1960s the concept of CSR is defined as: "The decisions and actions that entrepreneurs take for reasons at least partially, beyond the direct economic or technical interest of the company" (Davis, 1960)

Subsequently, in the seventies and eighties, more responsible aspects were attempted to incorporate the idea that was previously had, causing a rise of interest in the CSR, with various proposals about social commitment emerging.

However, anti-thought authors also emerge who consider profit to be the sole objective of the company. Therefore, the concept of CSR becomes a matter of business discussion, as recognized by authors such as Milton Friedman (1970) who oppose this concept, considering that "the sole responsibility of the company is the maximum benefit", since the social consequences produced by the activity are related to the payment of taxes and compliance with the laws (Friedman ,1970).

In the mid-1980s, organizations put interest in social issues behind the scenes and focused solely on economic aspects.

Freeman's main proposal (1984) mentions that "Any group or individual that may affect or be affected by the achievement of the company's objectives" (Freeman, 1984). In other words, Freeman's theory is about the influence that all groups related to the company have.

It was not until the early 1990s that concerns about social responsibility resurfaced, and I began the search for a standard model to follow by all companies. One of the most noteworthy authors of the 1990s is Carroll (1991) which suggests the importance of the four types of social responsibilities, establishing a definition of CSR composed of four fundamental parts named below.

According to Carroll (1991), once the existence of social responsibility in companies has been recognized, for them to be considered socially responsible, it is not enough for them to decide to develop the social practices it deems appropriate, but must have a commitment based on a management system in which a number of obligations are fulfilled. Based on this idea, it establishes four concepts of social responsibilities implemented and plot ally raised as a pyramid according to its importance within the company, these responsibilities are reflected in Figure 1.

Its pyramidal form explains that as it falls, the level of responsibility or consideration and involvement of companies decreases.

Graphic 1: Pyramid of corporate social responsibility of the company



Source: Own elaboration, Pyramid of Carroll (1991)

The first social responsibility, corresponds to *philanthropic responsibilities*, is located at the top of the pyramid, this responsibility refers to the contribution with resources to

provoke improvement in the community. In other words, it is desirable for companies to invest some of their resources in the communities where they are implemented, to collaborate on social improvement projects and programmes, which contribute to social development.

The second commitment, called *ethical responsibility*, refers to compliance with ethical and moral principles, norms and behaviors accepted by society and that the company avoids questionable practices.

The third responsibility, called *legal responsibility*, includes law enforcement, based on social reconciliation of what is right and what is wrong. This refers to the rules and obligations that the company owns and wishes to comply with.

The last commitment, *economic responsibilities* located at the bottom of the pyramid and on which all the above commitments are based. This is the traditional activity that companies have to be profitable and make profits which is located above the rest of commitments. The main objective of any company, part of what is necessary to generate resources to be able to give to the members of the company, shareholders and workers among others (Carroll, 1991). In other words, the company must obtain an economic return that supports the other responsibilities analyzed, without this responsibility could not supply the others, which would mean a collapse of the business system.

From this proposal, well-known and used definitions are emerged worldwide, along with not-so-known ones, but which show an evolution of the CSR concept. Two of which are as follows:

The objective of the company is to meet human needs with quality, in exchange for an economic benefit, maximizing the value of customers (García, 1994). Therefore, organizations must make the commitments demanded by so-called stakeholders (employees, consumers, shareholders, environment, governments and society in general) to keep them satisfied, with the group of customers being the first to consider, as it is the main objective of any company.

As can be seen, the CSR's *raison d'être* is that companies have a commitment beyond financial and commercial responsibilities (Hopkins, 1999).

The most common and outstanding definition at the global level is the proposal by the Commission of the European Communities (2001), which defines it as follows: "Voluntary integration by companies of social and environmental concerns in their business operations and their relations with all their partners".

Moreover, the European Commission Green Paper (2001) places more emphasis, however, on CSR practices inside and outside the company, distinguishing two dimensions:

- Internal dimension. Reconciliation between social development and increased competitiveness, through responsible practices in human resources and occupational health and safety, but also in the management of natural resources used in production
- External dimension. Corporate social responsibility must also push the boundaries of the company and ensure respect for human rights and the environment.

Subsequently, Schwartz and Carroll (2003) conceptualize CSR into a model that combines the economic, legal and ethical dimensions of responsibility, analyzing the relationships between them, and classifying CSR's actions under those relationships.

It is in this decade that the term sustainability is beginning to be used, including both economic, environmental and social concepts (Server and Villalonga, 2005).

According to Gan (2006), CSR has become a key activity in many corporations because it is considered "the right way to act".

In addition, the lack of precision of the definition of CSR and confusion with other terms such as philanthropy or even cause marketing sometimes leads to CSR being viewed with some suspicion. For this reason, Freeman et al. (2010) suggest replacing "corporate social responsibility" with "company stakeholder responsibility", in areas of a better understanding of the meaning of this concept. In other words, a lack of consensus has been generated to show a single meaning of CSR, and must always be interpreted as a process or path of integration and permanent improvement (Haro and Others, 2012).

It should be noted that there are other, more current definitions, proposed by different organizations also known at the global level and showing another perspective on the concept.

- "The Social Responsibility of the Company is, in addition to the strict compliance with the current legal obligations, the voluntary integration in its government and management, in its strategy, policies and procedures, of the social, labor, environmental and respect for human rights that arise from the relationship and transparent dialogue with its stakeholders, thus taking responsibility for the consequences and impacts that arise from its actions"

(Forum of Experts of the Ministry of Labor and Affairs" (Forum of Experts of the Ministry of Labor and Affairs Social , 2007).

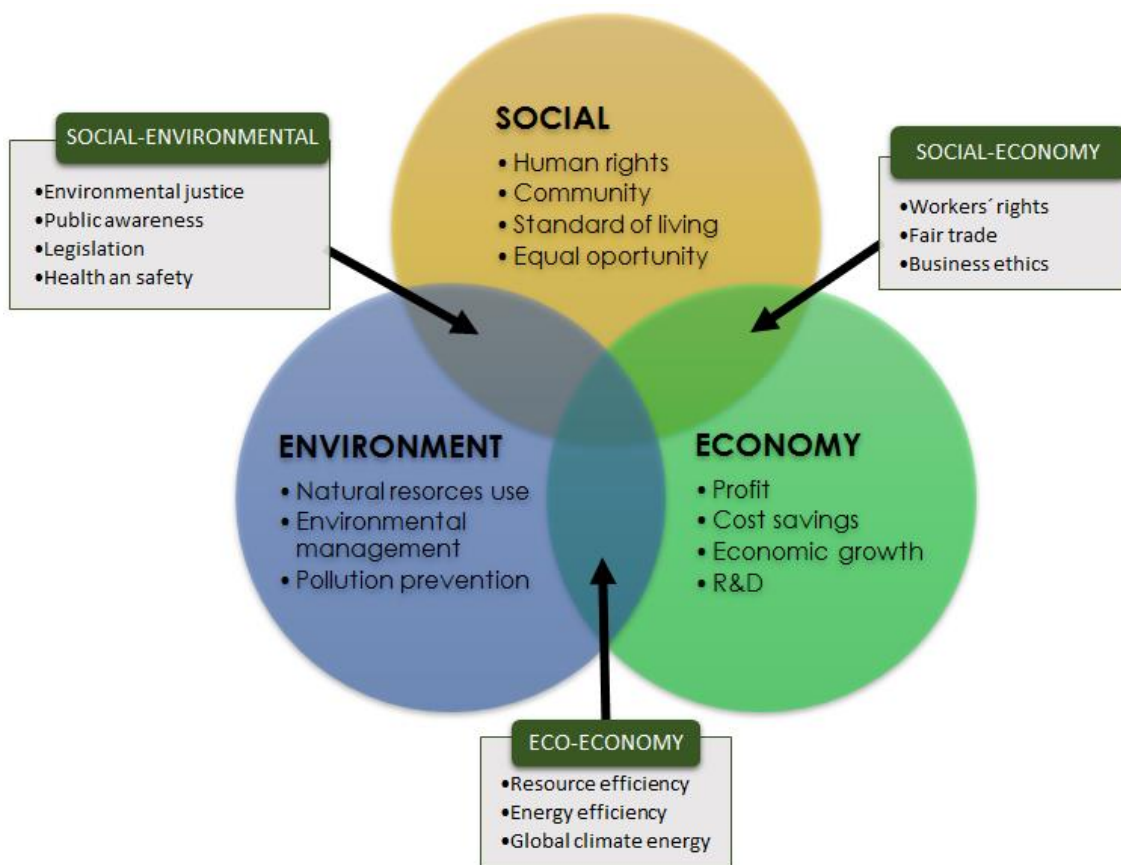
- "Corporate Social Responsibility (CSR) is a way to run companies based on managing the impacts their activity generates on their customers, employees, shareholders, local communities, the environment and on society at large. It implies mandatory compliance with national and international legislation in the social, labour, environmental and human rights spheres, as well as any other voluntary action that the company wants to take to improve the quality of life of its employees, the communities in which it operates and society as a whole" (Corporate Social Responsibility Observatory, 2014).
- "Corporate Social Responsibility or Corporate Social Responsibility (CSR) is a business management model that the company voluntarily adopts that commits them to provide goods and services in a fair, responsible and sustainable manner." (Fernandez, 2018).

2.2.- THE COMMITMENT OF COMPANIES TO CSR

Increasingly, large companies understand the importance of CSR standardization. In practice, however, there is a wide variety of ways in which companies apply these practices (Kolk and Tuldurs, 2010). In this sense, work has been published that raise a wide discussion about variables or indicators that allow to measure the CSR of companies within their field of action.

For companies to carry out these social practices, a continuous commitment to the three basic values or principles is necessary: economic, social and environmental balance. With this idea comes the approach of Elkington (1997), recognized by the term "Triple Balance or The Triple Bottom Line". Graph 2 is shown below.

Graphic 2: The Triple Bottom Line



Source: Own elaboration, John Elkington (1997)

Graph 2 shows a graphical print for clarity of the "The Triple Bottom Line" approach. The three main foundations, which are at once related to each other, are observed. The midpoint between the three would be a point of sustainability and balance. The practical part will analyse companies on the basis of these three fundamental dimensions; social, economic and environmental.

On the other hand, the study of these three dimensions is the basis for identifying the best companies to invest in. So, for example, if we focus on financial markets, the Dow Jones indices, evaluate the dimensions of the so-called "The Triple Bottom Line".

1. *In the economic dimension, the company is evaluated in reference to investment in ethical business management, compliance with regulations and codes of good governance.*
2. *At the environmental level, eco-efficiency and environmental information in companies determine their degree of involvement and respect for the environment.*
3. *At the social level, companies are valued both internally, for the management of their human resources, and externally, for the scope of their social actions for the development and support of different groups and communities.*

Today, to see how the company must act to comply with the Triple Dimension on the basis of the Green Paper, which has designed a general guide to the behavior to be followed by CSR companies and which in its definition clearly mentions the triple dimension. It defines CSR as the integration into companies of social and environmental concerns. (European Commission, 2001).

On the other hand, following the criteria expressed by Forética (2005), there are five the most common instruments that companies must present to be considered organizations that support the idea of CSR:

- Corporate statements. They are simple and brief documents, oriented to business policy, defining the values of the company and its organizational culture.
- Codes of conduct. Need to regulate workers' behaviors according to ethical principles. Some companies, instead of creating their own codes, decide to adhere to the United Nations Global Compact, which rests on ten principles on human, labour, environmental and socio-economic rights.
- CSR policies. Mechanisms proposed by senior management to define purposes and priorities and orient the company towards ethical and responsible management.
- Management systems. Homogeneous instruments applied by companies and facilitate internal and external verification allowing comparison between them. In the specific case of CSR, it is worth noting HS 8000, focused on working

conditions and designed for suppliers and suppliers of large enterprises; ISO 26000, a guide that establishes lines of action on CSR, but is not certification; and SGE21, the first European social responsibility management system that allows, on a voluntary basis, to audit processes and achieve a certification in Ethical Management and Social Responsibility.

- Social and environmental reports. Documents that provide complete information on social and environmental outcomes, allowing comparison of results under common criteria. Sustainability reports, for example, force companies to publicly expose their initiatives and results. There are also two models for non-financial reporting, the international GRI framework or standards and the Spanish framework or AECA model. With the GRI standard and environmental KPIs indicators, both the Spanish Association of Accounting and Business Administration (AECA) and GRI seek to define the impacts of organizations on the environment: water, atmosphere, land, air, ecosystems. However, the RSC's most important international communication initiative is the Global Reporting Initiative (GRI). Investors and consumers' use of triple balance reports, such as those promoted by the GRID, can substantially condition CSR management.

3.- THE SPANISH CERAMIC SECTOR

The ceramic industry is one of the most important and important sectors in Spain, especially in the Valencian Community, since it is located the largest area of ceramic companies, this happens, among other factors, thanks to its abundant wealth of raw materials, highlighting the great variety and abundances of clays.

On the other hand, the Spanish ceramic sector maintains a significant volume of sales both regionally and nationally, in fact, Spain is currently the fifth European producer of tiles and second largest exporter in the world. (World Production and Consumption of Ceramic Tiles, 2019)

Below are several tables that analyze by country the production and export of Spain. Table 1 shows the ranking of the countries that produce the most tiles, and specifies the percentage representing the country based on the world's production and manufacture of tiles.

The objective of this previous analysis is to highlight the importance of this sector, in addition to verifying the information provided by providing the work with a solidity and validity in its structure.

Table 1: Top manufacturing countries / Production by countries

Top manufacturing countries								
Country	2013 (Sq.m Mill.)	2014 (Sq.m Mill.)	2015 (Sq.m Mill.)	2016 (Sq.m Mill.)	2017 (Sq.m Mill.)	2018 (Sq.m Mill.)	% on 2018 world production	% var. 18/17
1. CHINA	5.700	6.000	5.970	6.495	6.400	5.683	43,38%	-11,20%
2. INDIA	750	825	850	955	1.080	1.145	8,74%	6,02%
3. BRAZIL	871	903	899	792	790	793	6,05%	0,38%
4. VIETNAM	300	360	440	485	560	602	4,60%	7,50%
5. SPAIN	420	425	440	492	530	530	4,05%	0,00%
6. ITALY	363	382	395	416	422	416	3,18%	-1,42%
7. INDONESIA	500	420	370	360	307	383	2,92%	24,76%
8. IRAN	340	410	300	340	373	383	2,92%	2,68%
9. TURKEY	390	315	320	330	355	335	2,56%	-5,63%
10. EGYPT	200	220	230	250	300	300	2,29%	0,00%
REST OF THE WORLD	2.146	2.168	2.261	2.365	2.470	2.529	19,31%	2,39%
TOTAL WORLD	11.980	12.428	12.475	13.280	13.587	13.099	100%	-3,59%

Source: Own elaboration, ASCER and Acimac Research dept. "World production and consumption of ceramic tiles", 7th edition 2019.

As shown in Table 1, China continues as the first ceramic producing country, accounting for 43% of world production, but in 2018 demand has been invested compared to the previous year, achieving a negative rate of variation of 11.2%.

According to ASCER figures, production of Spain remained unchanged at 530 million sq.m, corresponding to 5th place in the rankings of world producer countries (ASCER and ACIMAC, 2019).

In terms of exports, the top three exporting countries, China, Spain and Italy, account for 58% of world exports in 2018, while the top ten countries account for 85.6% (ASCER and ACIMAC, 2019).

Table 2: Top exporting countries

Top exporting countries						
Country	2015 (Sq.m Mill.)	2016 (Sq.m Mill.)	2017 (Sq.m Mill.)	2018 (Sq.m Mill.)	% on 2018 world production	value 2018 (million €)
1. CHINA	1.089	1.025	908	854	31,07%	3.756 €
2. SPAIN	378	395	407	414	15,06%	2.729 €
3. ITALY	316	332	338	328	11,93%	4.547 €
4. INDIA	134	186	228	274	9,97%	859 €
5. IRAN	112	126	148	151	5,49%	361 €
6. BRAZIL	77	94	90	100	3,64%	398 €
7. TURKEY	77	81	93	100	3,64%	506 €
8. MEXICO	61	56	53	46	1,67%	237 €
9. POLAND	42	46	45	43	1,56%	265 €
10. UNITED ARAB EMIRATES	54	48	46	42	1,53%	171 €
REST OF THE WORLD	406	399	396	397	14,44%	
TOTAL WORLD	2.746	2.788	2.752	2.749	100%	

Source: Own elaboration, ASCER and Acimac Research dept. "World production and consumption of ceramic tiles", 7th edition 2019.

With a further 1.7% growth in exports to 414 million sq.m in 2018, Spain strengthened its position as the world's second largest exporter country after China, and over Italy. Export revenues rose to 2,729 million euros (+1.6%), while the average selling price remained stable at 6.6 €/sq.m. (ASCER and ACIMAC, 2019).

On the other hand, it is possible to briefly explain the context of the general sales of the Spanish ceramic sector, in order to be able to start from a current context of the situation of the ceramic sector. To speed up this process, a chart has been created based on the economic data provided by the Spanish Association of Manufacturers of Tiles and Ceramic Pavements, ASCER. Shown below is Table 3: Sales of the Spanish ceramic sector.

Table 3: Sales of the Spanish ceramic sector.



Source: Own elaboration, ASCER and Acimac Research dept. “World production and consumption of ceramic tiles”, 7th edition 2019.

According to data from (ASCER, 2019), the Spanish ceramic sector has continued to experience sales growth of 2.5% per year, increasing in both domestic sales and exports. However, this increase has slowed from the increase in the last four years.

Finally, in terms of exports in 2019, they represent 74.87% of total sales, with 25.13% of the total imports of Spain, making it known that this sector is a foreign money creator money enters the country. With this historical framework already raised and concreted, economic comparison is facilitated.

4.- CERTIFICATION OF CSR ENVIRONMENTAL CRITERIA IN THE CERAMIC SECTOR

This heading will highlight the importance of eco-labelling in companies as a tool to measure their environmental commitment. This heading is classified into two sub-headings, the first of which shows the origin and importance of eco-labelling in companies and the second explains the different types and classifications of eco-labels that exist.

4.1.- CONCEPT FRAME OF ECOLABELS

Environmental deterioration and the need to provide veracity in terms of sustainability, has given rise to market mechanisms such as standards, certifications and eco-labels. This section of the work performs a documentary analysis and presents a brief synthesis that addresses the evolution of eco-labels.

The eco-label is a mechanism created by the European Union in 1992 to identify and certify products and services that have correct environmental behaviour. It allows producers to demonstrate and communicate to their customers that their products or services respect the environment (AEC, 2020).

Honey and Rome (2001) claim that the origin of certifications comes as a result of social pressure regarding the environmental deterioration of the 1970s. However, it is first known in the early 1990s.

Thus, the origins of eco-labels emerged from developed countries, thanks to the growing global demand and awareness of protecting the environment by businesses, governments and society. Some companies recognized that this eco-labelling mechanism could create a competitive advantage for certain products.

Ibañez and Grolleau (2008) consider "eco-label" to be a confusing and ill-defined term that can encompass different meanings. On the one hand, they are labels issued by independent bodies and are displayed voluntarily by the manufacturer undergoing inspection, in some way complies with environmental organizations or standards.

In the heading below we will analyze and raise the differences and similarities between the different eco-labels.




4.2.- CERTIFICATION AND CLASSIFICATION ACCORDING TO ECO-LABELING FOR THE CERAMIC SECTOR

Eco-labels are a voluntary badge for identifying products that meet a sustainable life cycle, i.e. following environmental criteria during the course of the manufacturing, use, marketing and end-of-life process. The aim is to use market mechanisms and tools to stimulate continuous environmental improvement.

These labels are also called green labels are a fundamental element of efficient communication that avoids deception or doubts of those organic products that mention but their nature is unknown. With this distinctive tool, it is intended to favour eco-labelled products over others, standing out for being more environmentally friendly.

In fact, eco-labels are an environmental rating system that certifies that certain products have less influence on the environment. This rating system was created in 1992 by the European Union. On the other hand, the International Standardization Organization (ISO) distinguishes three types of environmental labels. Below is a summary table (table 4) that lists the most noteworthy points and features of each label type previously announced.

Table 4: Eco-labelled according to ISO standards

	Type I certified ecolabels	Type II environmental self-declaration	Type III certified ecolabels
<i>Description</i>	Better environmental performance with the same quality	Improvements in some environmental aspect	Environmental profile (Life Cycle)
<i>Carrying out a Life Cycle Analysis (LCA)</i>	It is not necessary	It is not necessary	It is necessary
<i>Third-party certification</i>	Required	Not required, but increases its credibility	Not required, but increases its credibility
<i>ISO regulations</i>	ISO 14024	ISO 14021	ISO 14025; ISO 21930; CEN
<i>Communication with the final consumer</i>	Good	Good	Moderate
<i>Communication between companies</i>	Moderate	Moderate	Good
<i>Beneficial for the environment</i>	Good	Moderate	Good
<i>Example</i>			

Source: Own elaboration, information obtained from the ISO-14020 standard

In relation to Table 4, the eco-labels are divided into different levels. The table above is explained in more detail below.

- Type 1 is a voluntary environmental rating label that officially identifies and certifies products or services that have a minor impact on the environment if the entire product lifecycle is taken into account. These labels give the company a certification that all manufactured products meet strict environmental criteria.

An example of these tags is the CE symbol (refers to the eco-label marked as type 1 in Table 4). The CE Marking symbol is mandatory in order to be able to market any product in the European Union, the CE marking indicates the conformity of the product with the essential requirements of the European Construction Products Directive 89/106/EEC.

On the other hand, not only is there a type 1 label in the world, eco-labels certified and used in the ceramic sector are listed in Table 5, all labels found in Table 5 are classified as type 1 labels.

Table 5: Certified eco-labels in the ceramic sector

<i>Eco-labels</i>		<i>Product categories</i>
EU Ecolabel		Rigid coatings.
Environmental Quality Guarantee Distinctive		Recycled arid products. First raw materials and recycled glass products.
Ecomark (Japan)		Tiles and bricks. Building materials with recycled material content.
Ecolabelling from China		Ceramic toilets. Bricks and blocks for architecture. Dinnerware
Ecolabelling program from Korea		Toilets and pavements.
Ecologo (Canada)		Toilets.
Green Label Hong Kong		Ceramic tiles. Building materials with recycled material content.
Ecolabel from Hong Kong		Building ceramics

Source: Own elaboration, information obtained of ITC-AICE

All labels in Table 5 refer to the global ceramic sector. In fact, this work will not focus on other labels in different fields and sectors, so the existence of other labels that are not directly related to the product manufactured in the ceramic companies is not ruled out. An example of this case would be the imposition of the type two label named above and belonging to the carton companies, the cartons that wrap the finished product of the ceramic companies.

- Type 2 labels are called environmental self-declarations. In this case it is the manufacturer itself that puts the environmental indication on the product. This type of label specifies the biodegradability of the product, whether or not it is designed for disassembly, the energy recovered in the process, whether it is recyclable or not and in what quantity, low resource consumption and whether it

is reusable or not. An example of these Type II labels is the Moebius band, a recycling symbol shown in Table 4 as Type II, indicates that a product or packaging is recycled material and is recyclable once used. Within this label, optionally, the percentage of recycled material used during manufacturing can be indicated.

- Type 3 labels are an environmental statement, called EPD. It consists of an inventory of quantified environmental data based on life cycle analysis and allow comparison between products that perform the same functions.

An example of type III eco-labels is the new label created in Spain called DAPc. However, there are more environmental statements. Below, Table 6 lists the environmental product declarations for ceramic materials, then the recent creation of the type III eco-label called DAPc, developed in Spain, specifically in the Valencian Community will be analyzed in depth.

Table 6: Environmental declarations, type III eco-label.

	<i>Product categories</i>
EDP®Suecia	Other non-metallic mineral products. Roofs
	Other non-metallic mineral products. Clay construction Products
DAPc España	Materiales de recubrimiento cerámico (en proceso)
AUB Alemania	Floor Coverings (No incluye recubrimientos cerámicos)
BRE environmental profiles UK	LCA environmental profiles
FDES Francia	Productos de la construcción
MRPI Holanda	Productos de la construcción
RT Finlandia	Eco-Profile of the product
EcoLeaf Japón	Bidet toilet seat
	Porcelain products
	Toilets and urinals
NHO Noruega	Productos de la construcción

Source: Own elaboration, information obtained of ITC-AICE

Table 6 lists the most prominent environmental statements, some of which are mentioned in the practical part of the work. This table relates the systems used in each country to the product categories affected.

In fact, at present, the AENOR GlobalEPD programme is a voluntary certification system, which allows to obtain Environmental Product Declarations, these certifications are a very important factor for companies that have it, and in addition they promote competitiveness against competition from other countries, as well as facilitate entry to markets with a higher level of environmental sensitivity at the international level.

The most widely used environmental declaration in Spain was GlobalEDP, however, recently the Spanish ceramic sector has been one of the pioneers in the development of environmental product declarations at national and European level and now offers a tool for ASCER partners with which to obtain the labels easily and in accordance with all the required regulations. This label allows the ceramic Industry to position itself in the field of sustainable building, a differentiating and increasingly important element in the commercialization of products in different international markets.

This recent certificate created in Spain is called DAPc, this eco-label is shown in Table 4 in the Type III label column. This eco-label is a European eco-labeling system of products in the construction sector that allows to certify the environmental impact throughout the life cycle of the products and their eco-efficient manufacturing process. Specifically, DAP is a pioneering type III eco-label in Spain that is already applicable in other countries such as Norway, Canada, Japan, South Korea, Germany, the Netherlands, Switzerland or France, and is in the process of being established in Denmark and Italy.

The objective of this tool is to make it easier for companies in the ceramic sector to obtain an internationally recognized ecological badge, minimizing the time to obtain the DAP and the associated economic cost. This project is a pioneer in Europe within the ceramic sector, and will enable ASCER-associated companies to quickly and economically obtain European-recognised eco-labels.

This project, as well as the Life Cycle Analysis (ACV) project, is in addition to the many other initiatives that the ceramic sector has in the environment. Other examples among the most recent and illustrative of this policy for the environment are the publication of the Guide to the Best Available Techniques for the Manufacture of Ceramic Tiles, ASCER's participation in the Sustainable Building Cyclops project or participation in the recently initiated European Lifeceram project, led by ITC.

On the other hand, focusing on type III voluntary certificates, there are also ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018 standards. These certificates will be compared later in the case study to analyze and evaluate the selected companies.

- First, the ISO 9000 set of standards is focused on quality and business management, its certifiable standard is ISO 9001:2015.
- Second, the ISO 14000 family of standards is focused on environmental management. These can be applied in any type of company, regardless of their size or sector, which wants to reduce environmental impacts and comply with existing environmental legislation.
- Finally, ISO 45001:2018 is the new Occupational Safety and Health Management Systems standard, replacing OSHAS 18001. This standard focuses on workers as their most important asset, so the benefits it brings are key to the good development of the activity, and allows companies to understand and treat safety risks at work efficiently, ensuring compliance with each and every law that makes up it.

Before analyzing the advantages and disadvantages of eco-labels, a summary table is presented with the most used eco-labels in the Spanish ceramic sector dividing them into the three types of eco-labels subsequently analyzed. Below is Table 7: Ecolabels and certificates classified according to type I, II and III.



Table 7: Eco-labels and certificates according to type I, II and III

	TYPE I	TYPE II	TYPE III
CE	X		
MOEBIUS		X	
GlobalEPD			X
Ecolabel (EU)			X
ISO 14001			X
ISO 50001			X
ISO 9001			X
CARBON FOOTPRINT			X
DAPc			X
U.S. GREEN BUILDING COUNCIL			X
BREEAM			X
GBC ESPAÑA			X
AEO			X

Source: Own elaboration

Finally, it is worth noting both the advantages and disadvantages of applying these type I, II or III eco-labels. To illustrate in a simple way the advantages and disadvantages presented by the application of eco-labels in companies has been supported by a table with a simple design based on the idea of positive points on the left and the negative points on the right.

Table 8: Advantages and disadvantages of ecolabels

	<ul style="list-style-type: none"> - Demonstrate compliance with certain voluntary and mandatory requirements. - Differentiation in the sector itself. - Improvement of the company's image. - Commercial advantage in customers sensitive to the environment. 		<ul style="list-style-type: none"> - Costs associated with obtaining the label. - Ignorance of the meaning of ecolabels. - Confusion in the consumer when there are several eco-labels.
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Source: Own elaboration

In concluding this section and referring to table 7 above, labels encourage an increase in both the company's liability and competitive advantages. According to the International Organization for Standardization (ISO):

«Type III environmental declarations as described in this International Standard are primarily intended for use in business-to-business communication, but their use in business-to-consumer communication is not included. It is important to consider the information needs of different purchaser or user groups, for instance large businesses, small and medium sized enterprises (SMEs), public procurement agencies and consumers.» (ISO 14025:2006)

In fact, if companies are more considered with the environment, the products sell better, and therefore, all manufacturers have an incentive to incorporate them, getting the overall standards to increase.

All these specifications will help us understand the difference of these labels and identify them when listed in the comparative analysis after the theoretical part, more specifically they will be found in the part of the environmental analysis.

5.- PRACTICAL CASE

To begin this heading, each of the companies chosen for further comparative analysis will be analysed briefly and individually. To do this, we first explain the classification that companies will receive throughout the work, that is, companies will be grouped according to their volume, size and billing indicators, the objective of this initial classification will allow them to be classified as large, medium and small companies, in order to compare these groups with each other.

The ultimate goal of the comparison is to assess the social and above all environmental commitment of ceramic companies through eco-labels. On the other hand, companies have an important international commitment in sustainable aspects as these are companies that are largely involved in environmental pollution. For those companies classified and labeled as small will relate to their disposition in corporate social responsibility, since they are not listed on the stock exchange. The individual analysis of each company is then carried out.

5.1.- DATABASE

Our database consists of 4 companies in the ceramic sector of the province of Castellón. These companies have been chosen for their differences in turnover, production in square meters and in addition to their turnover. The four selected companies will then be briefly explained for further analysis and comparison.

- The company Pamesa Cerámica, S.L. is a company of the ceramic sector founded in 1972 with its official headquarters in Almazora (Castellón), stands out in the manufacture, design and marketing of ceramic products. The company has more than 40 years of experience, with a constructed area of more than 700,000 m² and a turnover of around 415,000,000 euros; it has three smart warehouses with 65,000 locations and a production capacity of more than 61,000,000 m² per year. With a diverse, knowledgeable and committed team of professionals, the Group has 1150 employees.
- Porcelanosa, S.A. was founded in 1973 and is characterized by its designs in the production of pavement and ceramic cladding. Currently Porcelanosa S.A. is a reference company both nationally and internationally, highlighting its high technology, innovation and quality in its ceramic products. Porcelanosa is the leading company in the field of flooring and ceramic coatings. The team of professionals has a workforce of more than 800 workers and has a worldwide

business recognition. It specializes in the production of single-body flooring and coatings, stoneware and porcelain stoneware, in a wide variety of formats and multiple finishes.

- Hijos de Cipriano Castello Alfonso, S.L. (also known as El Molino) was founded in 1922, and is formed by a team of 200 highly qualified professionals, in addition the company is a pioneer in the ceramic sector allowing to distribute its products in the most demanding markets of the five continents and becoming internationally recognized. On the other hand, it is characterized by its innovative energy policy which provides a reduction in its overall energy consumption. It also stands out for its dedication and innovation in aspects of design, manufacture and marketing of ceramic flooring and coatings.
- Finally, the company Terracota Pavimentos de Gres, S.A, which is classified as a small company, has been chosen. Founded in 1973, this company has only a total of 12 people. This is because it is focused exclusively on the manufacture of ceramic stoneware flooring.

To conclude this introduction, a comparative analysis is presented with the main data, of the selected companies, which are listed in Table 9 showing the invoiced economic value of each ceramic company and its classification.

Table 9: Economic comparison of the Spanish ceramic sector

	PAMESA CERAMICA, S.L.	PORCELANOSA, S.A.	HIJOS DE CIPRIANO CASTELLO ALFONSO, SL	TERRACOTA PAVIMENTOS DE GRES, S.A.
Nº Employees (people)	1.150	800	166	12
Annual billing (€)	454.739.000,00 €	170.199.832,00 €	25.308.382,00 €	631.590,00 €
Sector Ranking	1	3	26	123
Classification	LARGE	LARGE	MEDIUM	SMALL
Market level	INTERNATIONAL	INTERNATIONAL	INTERNATIONAL	NATIONAL
National Ranking	402	1.148	8.797	193.853

Source: Own elaboration, information obtained on your web.

Thus, Table 9 shows how Pamesa Ceramica,S.L has a higher economic sales value than other banks, this refers to the higher level of production than the rest of the companies. Followed by Pamesa, S.L. would be Hijos de Cipriano Castello Alfonso, S.L. and Terracota Pavimentos de Gres, S.A., these have a much smaller turnover. It should be noted that having higher turnover does not indicate that they spend more money on sustainability. In this case Porcelanosa having a lower turnover than

Pamesa S.L. we know that it is more involved than Pamesa S.L., this is due to its differentiation in competitive advantage focused on its image to the public, that is, to the public opinion and therefore to society.

In addition recent news and reports published on their own corporate website announce that both Porcelanosa and Pamesa S.L. allocate numerous benefits to social actions. The latest economic-social actions they have taken are:

- Pamesa Ceramica S.L. supports the fight against childhood cancer by contributing 20,000 euros to the solidarity campaign "United for Hope" (Pamesa.com, 2020).
- Porcelanosa S.A. donates health equipment to hospitals, an action that complements the financial support that the company has given to the Valencian Association of Entrepreneurs (AVE) with a donation of 25,000 euros (Porcelanosa.com, 2020).

Due to the limited information presented by Hijos de Cipriano Castello Alfonso, S.L. (El Molino) no evidence of any social investment made has been found, therefore it cannot be compared in depth as expected from the beginning. However, this does not indicate that the company does not allocate resources to the CSR. There is evidence thanks to its official website that devotes time and commitment to establish measures and adapt its facilities with sustainable factors, thus supporting the environment.

We clarify that not all companies classified as large in the ceramic sector invest in sustainable projects. If we compare Porcelanosa S.A. or Pamesa Ceramica S.L. with other ceramic companies, classified in the ranking as large but not so well known, it is noted that there is no record of an economic involvement in social factors. However, these companies are increasingly adapting to environmental factors, especially in their production.

Finally, a classification of companies is included according to the ranking of companies. The ranking of companies is a website where Spanish companies are published orderly according to their sales figure, allowing to know the position held by a company at national, regional and sectoral level.

The data to evaluate the ranking of each company come from the Informa D&B S.A.U. Database (S.M.E.), which is nourished by multiple sources of information, public and private such as the BORME (Official Gazette of the Commercial Register), Deposits of

Official Accounts, BOE (Official Gazette of the State), Provincial and CC.AA. Official Bulletins, National and Regional Press, ad hoc research and diverse publications.

The ranking of companies in Spain orders companies according to their sales figure in the year under study. To obtain this sales figure, the individual financial statements deposited by the company in the Commercial Register are used, with the closing date between July of the year under study and June of the following year, and whose duration is 12 months.

5.2.- ENVIRONMENTAL ANALYSIS AND COMPARATIVE

In this heading we have proceeded to compare the chosen companies and know their environmental commitment. In addition, a study has been conducted on its environmental footprint.

To begin with this heading on the environmental dimension, it is worth mentioning the companies that are providing a sustainability report. Table 10 summarizes more visually that companies have as a future the creation of a sustainability report.

Table 10: CSR Report

	PAMESA CERAMICA, S.L	PORCELANOSA, S.A.	HIJOS DE CIPRIANO CASTELLO ALFONSO, S.L.	TERRACOTA PAVIMENTOS DE GRES, S.A.
SUSTAINABLE REPORT	THERE IS NO RECORD OF A WRITTEN REPORT, HOWEVER THERE IS EVIDENCE FROM ECOLOGICAL MINI-PROJECTS	ECO CONSCIOUS	NO	NO

Source: Own elaboration, information obtained on your web.

With regard to Table 10, we emphasize that large ceramic companies are aware of the need for a report or CSR project that is documented for the company itself.

To speed up the comparison process, a table has been prepared that lists all the most significant social and environmental aspects of each company. These concepts will be essential to compare and evaluate which companies based on their size are most important in society and therefore have more instilled a CSR in their business structure. Table 11: Social Comparison of the Ceramics Sector is displayed below.

Table 11: Social comparison of the Spanish ceramic sector

	LARGE COMPANIES		MEDIUM-SIZED COMPANY	SMALL COMPANY
	PAMESA CERAMICA, S.L	PORCELANOSA, S.A.	HIJOS DE CIPRIANO CASTELLO ALFONSO, S.L.	TERRACOTA PAVIMENTOS DE GRES, S.A.
Accessibility to current information	HIGH	HIGH AND IMMEDIATE	HALFWAY POINT, the Web takes time to update	VERY LOW
Implementation of an Equality Plan	YES	YES	In the process of being created, proposed for the year 2021	NO
Ethics, transparency and in your business system	ALTA	MUY ALTA	MEDIA	BAJA
Sustainability reports and reports, example: GRI	THE COMPANY DOES NOT HAVE IT.	In the process of being created	THE COMPANY DOES NOT HAVE IT.	THE COMPANY DOES NOT HAVE IT.
Annual accounts submitted (Commercial Register)	YES	YES	YES	YES
PRTR-SPAIN	YES	YES	YES	Last record in 2016
Latest social investments	Pamesa supports the fight against childhood cancer by contributing 20,000 euros to the solidarity campaign "United for Hope"	The company has donated 25,000 euros to the Valencian Association of Entrepreneurs (AVE) in support of the Covid-19 health crisis.	No information published	No information published

Source: Own elaboration, information obtained on your web.

In Table 11, it can be seen that the most noticeable differences in sustainability are found in larger companies compared to small ones. The most noteworthy differences are: the elaboration and involvement of the company with its workers, the fulfillment of the latest innovations regarding the elaboration of a policy of equality of the company as well as having a more up-to-date communication and involved with society and its stakeholders through the media. These means or sustainability reports are becoming increasingly an essential form of relationship with their customers.

By making this comparison of the social field we have observed the great difference of the current websites of each company, seeing a significant difference in its transparency and ethics. Porcelanosa stands out for its innovation in the Spanish ceramic sector is also characterized by having a competitive advantage aimed at the image, its website is updated daily informing of each initiative carried out.

On the other hand, the company chosen as a medium "HIJOS DE CIPRIANO CASTELLO ALFONSO, S.L." updates its website once a month, however it presents some errors both in its operation and in its visualization, released that they are not concerned about the impact on social networks.

Today, however, the distinctive differentiator of a good trading image is necessary. So companies that do not consider this differentiator important are forced to make a change in their management system to adapt it to the new demands of the consumer. Hijos de Cipriano Castello Alfonso, S.L. is applying these concepts by creating an equality plan, which will come into force in early 2021.

On the other hand, when analyzing small companies such as Terracota Pavimentos de Gres, S.A. it is noted that being a traditional small company does not present relevant information. This traditional company has no intention of carrying out any project to change and adapt to ecological sustainability.

Finally, we emphasize that the renowned companies Pamesa S.L. and Porcelanosa S.A. are on the cusp for their rapid adaptation and innovation in matters of corporate social responsibility. In this regard, Porcelanosa is expected to produce a sustainability report soon, which will be the first in the Spanish ceramic sector.

It should be noted, that in this industry have always worked mostly men, leaving only women involved in the decorative part, decorating the tiles, for this reason the incorporation of women into this sector has been rather scarce. Today, the reality of women has not made great strides. The incursion of women in this sector has not made much progress.

In summary, Table 11 can see how large and medium-sized ceramic companies have a similarity regarding the implementation of a health and safety department for workers. On the other hand, being private companies it has become impossible to obtain from them their equality plan or other general data concerning the number of employees as well as gender.

The imposition of the equality plan can ensure that equal criteria between women and men are put in place. So it lays down rules and business laws favouring this aspect and instilling in the same sector the principle of equality between women and men.

Currently, Spain is one of the countries with the highest energy efficiency in the manufacture of tiles with a water consumption ratio per square meter well below the optimal of the rest of the European industry. With the introduction of natural gas, the monocooking process was allowed to be applied and thereby reduce cooking cycles from 35-45 hours to 2 hours. In fact, 98% of Spain's ceramic tile and flooring industry uses natural gas, which is the least polluting of fuels. On the other hand, the use of cogeneration has been incorporated, a more efficient way to obtain electricity.

Below is Table 12 where the information obtained from each company is collected, in Table 12 you can see the implementation of environmental policies and projects to minimize emissions and their carbon footprint. After commenting on this table, each company's involvement in having a more efficient and less polluting technology will be compared.

Table 12: Environmental information

PAMESA CERAMICAS, S.L.

- High revaluation of waste from the production process
- selective collection, recovery and recycling of light packaging and cardboard and paper packaging
- Renewable energy: it has three cogeneration turbines for the production of electrical energy and reuse of gases.
- Fight against deforestation through the introduction of the Euro Pallet
- Manufacture of products with environmentally friendly material
- Investment in I+D projects aimed at a more sustainable production system

PORCELANOSA, S.A.

- Ceramic collections have 10% and 20% recycled material and in their Ecologic series reach up to 95%, in addition and in their production 40% less CO₂ is emitted
- Ecocycle range®: 40% of its content is recycled, accredited by the SCS Global Services certificate
- Quercus laminate: it is PEFC (Pan-European Forest Certification) and ensures sustainable management
- reuses 100% of industrial water, + water savings
- first ceramic company to reduce carbon footprint
- ECO aerator: reduction in CO₂ emissions.
- FSC (Forest Stewardship Council) certificate.
- *R-Eco: adhesive with 100% recycled plastic, which reduces plastic pollution, would decrease by more than 800 Tm/year.*
- 30% of the energy consumed by Porcelanosa is generated within its own facilities, thus promoting energy efficiency.
- forest repopulation: 17000 trees were repopulated
- Eco-Conscious Programme meeting the Sustainable Development Goals (SDGs) set by the UN in the 2030 Agenda
- reduced water consumption by up to 20%
- Zero pouring: installation of more than 12 purification plants

HIJOS DE CIPRIANO CASTELLO ALFONSO, S.L.

- Energy Policy and Energy Savings and Efficiency Programs in Industry, promoted by IVACE (Generalitat Valenciana).
- Introduction of more efficient technologies: 192 new furnaces with 2.7% savings in gas, new enamel zone that reduces energy cost by 7%.
- Use of transport machinery with renewable energy.
- The company manages the selective collection of waste to facilitate recycling.
- Complies with current environmental regulations.

TERRACOTA PAVIMENTOS DE GRES, S.A.

- No information is available from any initiative supporting the environment.
- The use of energy-efficient devices as sustainable for the environment is unknown.
- The company makes no contribution to sustainable projects.

Source: Own elaboration, information obtained on your web.

Table 12 indicates all the aspects that each of the companies has contributed to minimise environmental damage. In fact, renowned ceramic companies are those that contribute most to sustainable production, this is because these large companies produce a very large amount of tiles a year, so they feel more responsible than small or medium-sized enterprises in the ceramics sector.

It should be noted, the importance of a competitive advantage aimed at the image, since companies that prioritize the image specialize in engaging more with the environment. One of these cases is the comparison between Porcelanosa and Hijos de Cipriano Castello Alfonso. Porcelanosa has installed a sustainable business structure much more integrated in its production while the company El Molino is supplied with sustainable furniture through grants provided by the Institute for Diversification and Energy Savings (IDEA), so it is observed after consulting its official website.

On the other hand, it should be borne in mind that Terracota Pavimentos de Gres does not make environmental footprint so we do not know the rates of pollution and emission, this is because it is a private company that does not publicly express in the PRTR register its emissions. There is also no record of any environmental involvement or projects within the entity. This is the only drawback in performing and analyzing this TFG. Also with all the other ceramic companies this does not happen, in the Register of the PRTR-Spain website we can find the annual record of their emissions.

To learn more about emissions and the involvement of ceramic companies with the environment, 3 tables have been drawn up divided by the emissions type they expel. Below are several tables where all the information obtained from the PRTR-Spain virtual platform is collected. First, Table 13 contains the air-ejected emissions from each selected company.

Table 13: Pollutant, Releases to air - Total quantity (kg/year)

	PAMESA CERAMICA S.L. <i>Report Year 2017</i>	PORCELANOSA, S.A.	HIJOS DE CIPRIANO CASTELLO ALFONSO, S.L.	TERRACOTA PAVIMENTOS DE GRES, S.A.
Carbon monoxide (CO)	74.711	-	33.588,60	-
Carbon dioxide (CO ₂)	72.034.000,00	63.307.000,00	15.878.000	-
Nitrogen oxides (NO _x /NO ₂)	192.235,22	99.737,57	44.925,85	-
Sulphur oxides (SO _x /SO ₂)	27.007,16	55.195,75	3.711,38	-
Lead and compounds (as Pb)	39,97227691	456,64	208,03	-
Chlorine and inorganic compounds (as HCl)	1.597,08	991,55	15,8	-
Fluorine and inorganic compounds (as HF)	327,468505	878,42	199,85	-
Particulate matter (PM ₁₀)	16.625,36	58.600	-	-
Total suspended particulate matter	24.357,73	26.245,10	2.375,30	-

Source: Own elaboration, information obtained on En.prtr-es.es.

Taking into account the data provided by Table 13, it is noted that the company Porcelanosa is the company that expels more emissions via air than the other.

Co and CO₂ data expelled by the three ceramic companies are common as they manufacture a huge annual amount of tiles.

Pamesa Ceramica, S.L. stands out for its high emission of NO_x/NO₂ and inorganic hydrochloric components (HCl), these gaseous particles can cause skin and eye burns. In addition, if exposed to high concentrations of nitrogen dioxide can lead to heart problems, kidney disease, stroke and cancer cases.

As for its impact on the environment, it is a non-combustible substance but that facilitates the combustion of other substances and can produce fires or explosions.

The high amount of hydrogen fluoride (HF) expelled by Porcelanosa is striking, as porcelanosa generates very strong gases that dissolve easily in water. This substance, either as a liquid or as a gas, causes severe burns.

Finally, the high number of PM₁₀ particles presented by Porcelanosa is also highlighted. PM₁₀ particles are solid or liquid particles of dust, ash, soot, metal particles, cement or pollen that are between 2.5 and 10 microns. These particles have low urban pollution as they do not penetrate deep into the lungs and have no significant

potential health risks. These particles are expelled relatively effectively through mucus or cough, or sedimented directly without penetrating the respiratory tree.

Secondly, all related information on each company's water emissions according to its size has been collected in Table 14.

Table 14: Pollutant, Releases to water - Total quantity (kg/year)

	PAMESA CERAMICA S.L. Report Year 2017	PORCELANOSA, S.A.	HIJOS DE CIPRIANO CASTELLO ALFONSO, S.L.	TERRACOTA PAVIMENTOS DE GRES, S.A.
Mercury and compounds (as Hg)	0,00216005		-	-
Lead and compounds (as Pb)	0,15	0,37	-	-
Zinc and compounds (as Zn)	73,44	7,4	-	-
Total organic carbon (TOC) (as total C or COD/3)	1.911,64	-	-	-
COD	5.734,93275	3.828,23	-	-

Source: Own elaboration, information obtained on *En.prtr-es.es*.

Table 14 shows that the company Pamesa Ceramica, S.L. emits much of its contamination by water, so in the previous table Pamesa S.L. had a lower emission of toxic components. This large difference in emissions between companies occurs because many of the ceramic companies only use aerial means for the expulsion of pollutants, because of problems of obtaining water and geological positioning. It should be said that Hijos de Cipriano Castello Alfonso, S.L. does not expel particles by water only by air.

Thirdly, in order to better compare the differences in the amount of hazardous waste that each company expels, the following table for number 15 has been prepared.

Table 15: Pollutant, Hazardous waste - Total quantity (t/year)

	PAMESA CERAMICA, S.L. <i>Report Year 2018</i>	PORCELANOSA, S.A. <i>Report Year 2018</i>	HIJOS DE CIPRIANO CASTELLO ALFONSO, S.L. <i>Report Year 2018</i>	TERRACOTA PAVIMENTOS DE GRES, S.A.
Other solvents, cleaning fluids and organic mother liqueurs	2	1,57	-	-
Paint and varnish residues containing organic solvents or other hazardous substances	1,67	7,46	-	-
Adhesive and sealant residues containing organic solvents or other hazardous substances	0,90	3,4	-	-
Non-chlorinated engine, mechanically transmitted and lubricant mineral oils	6,70	8,3	0,72	-
Fuel oil and diesel	0,13	-	-	-
Other solvents and solvent mixtures	1,84	0,43	-	-
Packaging containing or contaminated traces of hazardous substances	10,62	9,118	5,02	-
Dangerous metal packaging	0,11	0,44	0,02	-
Absorbents and filtration materials contaminated by hazardous substances	12,95	11,85	0,64	-
Oil filters	0,47	-	-	-
Laboratory chemicals consisting of hazardous substances	4,08	4,3	0,12	-
Waste containing hydrocarbons	0,9	98,76	-	-
Coatings and refractory, from non-metallurgical processes, containing hazardous substances	2,66	-	-	-
Hazardous components removed from discarded equipment	-	24,129	-	-
Lead and mercury batteries and batteries	-	26,342	-	-
Materiales de construcción que contienen amianto	0,6	-	-	-
Waste whose collection and disposal is subject to special requirements to prevent infections	0,006	0,003	-	-
Fluorescent tubes and other mercury-containing residues	0,35	0,22	0,026	-
Total Hazardous waste	45,761	196,31765	6,546	-

Source: Own elaboration, information obtained on En.prtr-es.es.

The data collected in Table 15 contain all the annual waste of the three companies analysed. If you look at the total hazardous waste of each ceramic company, Porcelanosa, S.A. presents four times more than Pamesa Ceramica, S.L., this is due to its great waste in hydrocarbon-containing waste and hazardous components such as batteries and batteries.

The process of manufacturing ceramic tiles, allows the recovery in a very high percentage of much of the residual materials generated in the process itself. Currently, around one million tonnes of non-hazardous waste are valued by recycling, representing about 17% of the weight of the final product.

Referring to the section on legislation and eco-labelling, the differences between the eco-labelling used by large, medium and small enterprises will be seen. This eco-labelling environmental management section is very new today. Therefore, many ceramic companies are unaware of some of these eco-labels. For better visualization and comparison, the image4 that brings together all the eco-labels of each ceramic company has been established.

Figure 1: Ecolabels



Source: Own elaboration, information obtained on your web.

As can be seen in image 4 it is Pamesa S.L. and Porcelanosa S.A. that stand out in environmental certificates and eco-labelling of them. As stated in paragraph four on legislation, the CE marking appears in the four undertakings as mandatory. Hijos de Cipriano Castillo Alfonso, S.L. being larger than Terracota Pavimentos de Gres, S.A. adds other certificates today important when trading their tiles internationally, these certificates are ISO 14001:2015 and ISO 9001.

In order to complete the information obtained on the official pages of the companies on the eco-labelling they use, it has been decided to elaborate in a more schematic way Table 16, which provides the information and comparison of each company on its labelling.

Table 16: Analysis of eco-labels in each of the companies

		LARGE COMPANIES		MEDIUM-SIZED COMPANY	SMALL COMPANY
		PAMESA CERAMICA, S.L	PORCELANOSA, S.A.	HIJOS DE CIPRIANO CASTELLO ALFONSO, S.L.	TERRACOTA PAVIMENTOS DE GRES, S.A.
TYPE I	CE	X	X	X	X
TYPE II	MOEBIUS	X	X	X	
TYPE III	GlobalEPD	X			
	Ecolabel (EU)	X	X		
	ISO 14001	X	X	X	
	ISO 50001		X		
	ISO 9001	X		X	
	CARBON FOOTPRINT		X		
	DAPc	X	X		
	U.S. GREEN BUILDING COUNCIL		X		
	BREEAM		X		
	GBC ESPAÑA		X		
	AEO		X		

Source: Own elaboration, information obtained on your web.

As can be seen in Table 16, all selected companies comply with type I eco-labels, this is because they are mandatory, on the other hand it can be observed that the company Terracota Pavimentos de Gres, S.A does not have any other eco-label of voluntary type, this may be due to difficulties and limitations in terms of the accessibility of technological innovations in its machinery or the simple fact of its limitations in obtaining the label derived from the high cost of achieving them. Finally, we emphasize that the environmental commitment in eco-labelling, Pamesa Ceramica S.L and Porcelanosa S.A. outperforms the company Hijos de Cipriano Castello Alfonso, S.L.

In fact, Porcelanosa S.A. accounts for 84.6% of all eco-labels listed in Table 16, on the other hand Pamesa, S.L. obtains 53.8% of all the ecolabels listed. It can therefore be

said that Porcelanosa has a greater environmental commitment to eco-labelling than the other companies.

In conclusion, the ceramics sector has not evolved as much as other sectors in terms of CSR, but there are already companies and above all the most important ones that note the demand that futures be made to engage in sustainable aspects and establish new business management concepts based on socially sustainable commitments and principles.

6.- CONCLUSIONS

This work has focused on analysing the environmental aspect of CSR, noting that it is still in the process of fully adapting into the company's strategy. Socially responsible enterprises will seek to coordinate both the economic, social and environmental dimension in their strategy.

Companies that incorporate CSR into their strategy must comply, in addition to existing legislation in their area of action, with a series of non-mandatory regulations that will guide the behaviour of companies in responsible matters.

The biggest challenge for CSR is probably its application in SMEs. Today, many SMEs are far from this concept. However, if these companies are to survive in a competitive environment, they will have to be able to demonstrate that they meet certain parameters of social responsibility. Sure that their actions cannot have the reach of a large company but their size and flexibility can also give them advantages to specialize in certain CSR plots.

The Spanish ceramic sector has made great efforts and investments to reduce its emissions in production, water and resource consumption, promoting the circular economy, and be more energy efficient. To this end, in recent years it has been innovated and invested intensely in the production processes to optimize the process of cooking the tiles; introduce waste to replace virgin raw material; cogeneration technology has been used to take advantage of the efficiency of generating both heat and electricity, which are subsequently used in factories; renewable sources are starting to be available for certain parts of production.

On the other hand, the commitment of R&D on sustainability remains not only in the processes but also in the products themselves, in fact, a large number of companies belonging to ASCER offer versatile products that go beyond mere decoration and respond to constructive needs that bring sustainability to the building.

Taking into account the purpose proposed in this work, it can be ensured that the ceramic sector is experiencing and will continue to undergo transformation progress towards a model where CSR and environmental responsibility for a sustainable production process will be essential pillars in the future of the ceramic sector by enabling deeper communication and relationship with its customers, which will require more restrictive terms for more sustainable production for more sustainable production.

7.- BIBLIOGRAFY

Abratt, R., Sacks, D. The marketing challenge: Towards being profitable and socially responsible. *J Bus Ethics* 7, 497–507 (1988). <https://doi.org/10.1007/BF00382596>

Aec.es. (2020). AEC - EtiquetaEcológica. [online] Available at: <<https://www.aec.es/web/guest/centro-conocimiento/etiqueta-ecologica>> [Accessed 14 May 2020].

AECA (2019). Marco Conceptual De La Responsabilidad Social Corporativa. 1st ed. Madrid: Asociación Española de Contabilidad y Administración de Empresas.

ASCER (2020). Un sector competitivo. Available at: <https://www.ascer.es/sectorDatos.aspx?lang=es-ES> [Accessed 9 Jan. 2020].

Assets.kpmg. (2019). Available at: <https://assets.kpmg/content/dam/kpmg/es/pdf/2019/05/informe-azulejero-2019.pdf> [Accessed 14 Jan. 2020].

Blake, David, Frederick, William C., and Myers, Mildred S.. 1976. *Social Auditing: Evaluating the Impact of Corporate Programs*. New York: Praeger.

Boatright, J.R. (1993). *Ethics and the conduct of business*. Englewood Cliffs: Prentice Hall.

Bowen, Howard R. (1953): "Social Responsibilities of the Businessman". New York: Harper&Row.

Carroll, Archie B. (1991): "The pyramid of corporate social responsibility: Towards the moral management of organizational stakeholders", *Business Horizons*, nº 34, pp. 39-48.

Ceramic World Web (2020). Available at: <https://www.ceramicworldweb.it> [Accessed 4 Jan. 2020].

Comisión de las Comunidades Europeas (2001). *Fomentar un marco europeo para la responsabilidad social de las empresas*. Bruselas: COM 366-final.

COMISIÓN EUROPEA (2001): *Libro Verde. Fomentar un marco europeo para la responsabilidad social de las empresas*. COM (2001), 366 final.

Davis, K. (1960). Can Business Afford to Ignore Social Responsibilities? *California Management Review*, 2(3), 70-76

Davis, K.; Frederick, W.C.; Blomstrom, R.L. (1988): *Business and society. Concepts and policy issues*. New York: McGraw-Hill.

Davis, Keith, Blomstrom, Robert L., (1975): *Business and Society: Environment and Responsibility*, third edition. New York: McGraw-Hill, chapter 3.

Elkington, J. (1997). *Cannibals with Forks: Triple Bottom Line of 21st Century Business*. Oxford: Capstone Publishing Ltd.

En.prtr-es.es. (2020). Inventario De Instalaciones - Inventario Completo| PRTR España. Available at: <<http://www.en.prtr-es.es/Informes/InventariInstalacionesIPPC.aspx>> [Accessed 30 April 2020].

Fernández, García R. (2018). La Responsabilidad Social Corporativa como modelo de gestión empresarial. Madrid: WoltersKluwer.

FORÉTICA (2005): Responsabilidad Social de las Empresas. Documento de divulgación (www.foretica.es)

Foro de Expertos del Ministerio de Trabajo y Asuntos Sociales (2007). Informe del Foro de Expertos en Responsabilidad Social de las Empresas. Madrid: Foro de Expertos.

Frederick, William C. 2012. Natural Corporate Management: From the Big Bang to Wall Street. Sheffield, UK: Greenleaf.

Freeman, R.E. (1984). Strategic management. A stakeholder approach. Marshfield, Pitman Publishing Inc., Massachusetts.

FREEMAN, R.E.; HARRISON, J.S.; WICKS, A.C.; PARMAR, B.L.; DE COLLE, S. (eds) (2010): Stakeholder Theory. The State of the Art. Cambridge, UK: Cambridge University Press.

Friedman, M. (1970). The Social Responsibility of Business is to Increase its Profits. New York Times Magazine, 13, 2-6.

Fundacionseres.org. (2020). Informe SERES-Deloitte. Available at: <<https://www.fundacionseres.org/BlogSerres/index.php/14-mil-proyectos-rsc-2018-las-empresas-espanolas-comprometidas-la-rse/>> [Accessed 25 April 2020].

GAN, A. (2006): "The impact of public scrutiny on corporate philanthropy", Journal of Business Ethics, Vol. 69, nº 3, pp. 217-336.

García, S. (1994). Introducción a la Economía de la Empresa. Madrid: Díaz De Santos.

Haro, A., Alarcón, F. y Caba, M. d. (2012). Los determinantes de la divulgación de información sobre responsabilidad social corporativa en el sector financiero: el caso español. Journal of the Faculty of Economic Sciences of the University of Almería: Research and Reflection, 20, 189-205.

Hijos de CiprianoCastello Alfonso (2020). Available at: <<http://www.elmolino.es/>> [Accessed 2 May 2020].

Honey, Martha y Rome, Abigail (2001). Protecting paradise: certification programs for sustainable tourism and ecotourism. Institute for Policy Studies. Washington.

HOPKINS, M. (1999): The planetary bargain: Corporate Social Responsibility comes of age. Macmillan Press, London.

Ibanez, Lissette y Grolleau (2008). "Can Ecolabelling Schemes Preserve the Environmental?" Environ Resource Econ, vol. 40, 233-249 pp.

International Organization for Standardization (ISO). Environmental management systems -- Requirements. ISO 14001:2015

International Organization for Standardization (ISO). Occupational health and safety management systems -- Requirements. ISO 45001:2018

International Organization for Standardization (ISO). Quality management systems -- Requirements. ISO 9001:2015

ISO 14025 (2006). Environmental labels and declarations - Type III environmental declarations - Principles and procedures Available at: <https://www.iso.org/obp/ui/#iso:std:iso:14025:ed-1:v1:en> [Accessed 18 Feb. 2020].

ISO. *International Organization for Standardization*. Available at: <https://www.iso.org> [Accessed 16 Feb. 2020].

KOLK, A.; TULDERS, R. (2010): "International business, corporate social responsibility and sustainable development", *International Business Review*. Vol. 19, nº 2, pp. 119-125.

Observatorio de Responsabilidad Social Corporativa (2006). Boletín Oficial de las Cortes Generales. Congreso de los Diputados. Available at: [Accessed 20 Feb. 2020].

Observatorio de Responsabilidad Social Corporativa (2014). Introducción a la Responsabilidad Social Corporativa. Obtenido de Observatorio de Responsabilidad Social Corporativa. Available at: <http://observatoriosc.org/introduccion-la-responsabilidad-social-corporativa/> [Accessed 21 Feb. 2020].

PACTO MUNDIAL ESPAÑA (2020). Diez Principios: Responsabilidad Social Empresarial & ODS. Available at: <https://www.pactomundial.org/category/aprendizaje/10-principios/> [Accessed 09 Feb. 2020].

Pamesa.com (2020). Available at: <<https://www.pamesa.com/>> [Accessed 2 May 2020].

Porcelanosa.com (2020). Available at: <<https://www.porcelanosa.com/>> [Accessed 2 May 2020].

Ruiz, M. (2011). Un apunte crítico sobre la Responsabilidad Social Corporativa (RSC/RSE). *Electronic journal of the Department of Law of the University of La Rioja, REDUR*, 9, 27-65. Available at: <https://publicaciones.unirioja.es/ojs/index.php/redur/article/view/4081/3331>

SCHWARTZ, M.; CARROLL, A. (2003): "Corporate social responsibility: A three-domain approach", *Business Ethics Quarterly*. Vol. 13, Issue 4, pp. 503-530.

Server, R. J. y Villalonga, I. (2005). La Responsabilidad Social Corporativa (RSC) y su gestión integrada. CIRIEC-España. *Journal of Public, Social and Cooperative Economy*, 53, 137-162.

Weber, J., & Wasieleski, D. M. (2018). *Corporate Social Responsibility*. Bingley: Emerald Publishing Limited, UK.

World Production and Consumption of Ceramic Tiles. (2019). 7th ed. [ebook] ITALY: ACIMAC / MECS - Machinery Economic Studies. Available at: http://www.mec-studies.com/filealbum/807_0.pdf [Accessed 23 Jan. 2020].