



# **COMPARATIVE ANALYSIS BETWEEN ITALIAN AND SPANISH CERAMIC TILE**

**Author: Iván Vidal García**

**Tutor: Francesc Xavier Molina Morales**

**GRADO EN ADMINISTRACIÓN Y DIRECCIÓN DE EMPRESAS**

**AE1049 - TRABAJO FINAL DE GRADO**

**CURSO 2015-2016**

# INDEX

|   |    |
|---|----|
| <b><u>1. INTRODUCTION</u></b> .....   | 5  |
| <b><u>2. CLUSTER</u></b> .....  | 6  |
| <b><u>2.1. Antecedents</u></b> .....  | 6  |
| <b><u>2.2. Definition of cluster</u></b> .....  | 7  |
| <b><u>2.3. Cluster characteristics</u></b> .....  | 8  |
| <b><u>2.4. Cluster components</u></b> .....   | 9  |
| <b><u>2.5. Advantages of clusters</u></b> .....   | 10 |
| <b><u>2.6. Clusters disadvantages</u></b> .....   | 11 |
| <b><u>2.7. Industrial district.</u></b> .....   | 11 |
| 2.7.1. Definition .....   | 12 |
| 2.7.2. Differences between the cluster and the industrial district. ....                                | 12 |
| <b><u>2.8. Clusters examples</u></b> .....  | 13 |
| 2.8.1.Silicon Valley.....   | 13 |
| <b><u>3.CERAMICS</u></b> .....  | 15 |
| <b><u>3.1. History</u></b> .....  | 15 |
| <b><u>3.2. Definition</u></b> .....   | 15 |
| <b><u>3.3. Techniques and materials</u></b> .....   | 15 |
| <b><u>3.4.Manufacturing of floor and wall in ceramic tiles</u></b> .....                                | 17 |
| 3.4.1.Definition of industrial ceramics.....  | 17 |
| 3.4.2. Parts of a tile .....  | 17 |
| 3.4.3. Process of ceramics manufacturing .....  | 18 |
| <b><u>4. DIFFERENCES BETWEEN THE SPANISH CERAMIC CLUSTER AND THE ITALIAN CERAMIC CLUSTER.</u></b> ..... | 22 |
| <b><u>4.1. Global ceramic sector today.</u></b> .....   | 22 |
| <b><u>4.2.Spanish and Italian economy</u></b> .....   | 23 |
| 4.2.1. Spanish economy .....  | 23 |
| 4.2.2. Italian economy.....   | 24 |
| 4.2.3. Comparison between Italian and Spanish economy.....  | 25 |
| <b><u>4.3. Ceramic clusters</u></b> .....   | 26 |
| 4.3.1. Spanish ceramic cluster.....   | 27 |

|  |    |
|--|----|
| 4.3.1.1. <u>Companies that belong to the cluster</u> .....                                     | 27 |
| 4.3.1.2. <u>Evolution of the ceramic Spanish sector</u> .....                                  | 28 |
| 4.3.1.3. <u>Composition of exports and imports</u> .....                                       | 29 |
| 4.3.1.4. <u>Development and evolution of the ceramic cluster in Castellon</u> .....            | 30 |
| <b>4.3.2. Italian ceramic cluster</b> .....  | 31 |
| 4.3.2.1. <u>Companies that compose the cluster</u> .....                                       | 31 |
| 4.3.2.2. <u>Business strategies</u> .....  | 31 |
| <b>4.4. <u>Comparison between the 21 most important societies of Spain and Italy</u></b> ..... | 32 |
| <b>4.5. <u>Valuation of differences between the two countries</u></b> .....                    | 36 |
| <b>5. <u>CONCLUSIONS</u></b> .....   | 37 |
| <b>6. <u>REFERENCES</u></b> .....  | 39 |



## **1. INTRODUCTION**

The following project consists of analyzing the Spanish and Italian tile sector in the ceramic industry, since both countries are the greatest referents of this industry and also the greatest producers and traders of this product. In the case of Spain, it shows its importance according to the data displayed by ASCER, which produced 440 million square meters of ceramic in the year of 2015 in Spain, reaching a total of 3,095 million Euros with its sales.

There are two relevant factors that motivated the choice of this issue. On the one hand, exists the fact that the ceramic industry has an important relevance in the global economy, as shown by the total global amount of 10,512 million square meter of ceramic that was achieved in 2011. On the other hand, the second reason for this project was the territory in which we live, the province of Castellon, in which we can find up to 95% percent of the total Spanish tile production. Thanks to this, the main economic driver of Castellon is the ceramic sector.

In the next text is going to explain the following topics: first is going to explain the definition of the cluster, types of clusters, advantages and disadvantages. Next is going to explain the ceramic and the ceramic tile, which is really relevant to this kind of clusters, and moreover is going to explain how the industry of ceramic tile works. Then in the text is going to appear a comparative between Italian and Spanish economy, and finish the text talks about ceramic clusters and the differences and similar things that have Italian and Spanish ceramic cluster.

Finally, the objective of this project consists of identifying, analyzing and comparing the Spanish and Italian ceramic industries to show similarities of both them, and, at the same time, it will show the superiority of one of these industries in different matters.<sup>1</sup>

---

<sup>1</sup> This information has been obtained from: (Ascer,2016)

## **2. CLUSTER**

### **2.1. Antecedents**

In the year 1890 it appeared the first concept that describes the characteristics of an industrial district, by defining it as “concentrations of a specialized sector at a certain location”. This concept appears thanks to the publication of a book written by the economist Alfred Marshall called “The principles of Economics”. After almost a century, in 1987, Becattini speaks about the concept of agglomeration, by explaining the characteristics and definitions previously described by Marshall. However, the revolution in enhancing industrial district terminology would appear later, in the year 1990, when there was a change in the definition of this industrial typology and it began to appear the cluster, whose definition is very similar to the industrial district ones, but with some changes that will be explained from now on. This terminology emerged in this time due to the publication of the book “The competitive advantage of nations”, written by Michael E. Porter. In this book, Porter makes an exhaustive analysis of 10 countries and draws as main conclusion that all those countries with companies’ groups were more competitive than those without this kind of group. In the analysis of the companies of these countries it was made an analysis of competitiveness based on the Diamond model of Michael Porter, which focused on four main pillars: factor conditions, demand conditions, related and supporting industries and firm structure. At the same time, it analyzed the rivalry and the strategy. One of the main conclusions he reached was the importance of the relations and the initiative between the private sector and the public sector.

Since the publication of this book, the cluster phenomena has consistently increased reaching the majority of countries in all the global territory and being supported by local, regional and national governments mainly. Furthermore, its creation was spurred by the most important and international economic institutions, such as the European Commission, OCDE and the World Bank. The main motivation of this support is that the essential element of these groupings lies on innovation, and this innovation can’t be reached by a single company in isolation, but it requires a group of companies that share synergies and different abilities to achieve innovation and use this competitive advantage in its favor.

The success of this industrial typology can be seen on the big enterprise clusters such as the one from Baden-Württemberg in Germany or Silicon Valley in USA. Moreover, Spain has also joined to this enterprise movement and it has received political support for the best development of these initiatives.

In 2006 it appeared the first support to the cluster by the Ministry of Industry, Tourism and Trade. This Ministry published the order ITC/2691, regulating the bases, the aid scheme and the management of support measures to innovative enterprise<sup>2</sup>clusters.

---

<sup>2</sup> This information has been obtained from: (Venacio,2007) and (Alyosur Malaga,2016).

Since then, new financial assistance appears every year to promote this kind of industries.

This support given by the Spanish government is motivated thanks to a constant support by the European Union to the industrial districts. An illustrative example could be the Framework Programme (2007-2013) for Competitiveness and Innovation by the EU, whose main goal is to promote the creation and increase of industrial clusters.

Finally, it's important to say that before this phenomenon appears, autonomous communities such as the Basque Country (*País Vasco*) and Catalonia (*Cataluña*) already used this enterprise strategy. Since 1990, governments promoted this enterprises union in order to make use of synergies and to improve its competitiveness with respect to its competition.

## **2.2. Definition of cluster**

Porter defines the industry cluster as a concentration of interconnected businesses and institutions in a particular field for the competition, and it's possible to see in the world a great range of clusters in industries such as the automotive one, communications technology, tourism, business services, mining, oil and gas, agricultural products, transport, manufactured products and logistic, among others.

There's another definition by the SMEs Programme, made by the Secretariat of Economy of the Mexican Government, for which an enterprise group or cluster is a group of companies with the same activity with a common strategy and which are connected to support sectors and keep relationships and service delivery with the supplier. These companies are organized in vertical and horizontal networks with the aim of raising their productivity, competitiveness and profitability levels.

At the beginning of the 20<sup>th</sup> century, the cluster was understood as a group of companies located in the same geographic area. However, this definition has evolved and expanded, and today, the cluster is characterized, apart from sharing the same geographic location, by sharing also the same raw material suppliers, using the same technologic typology and strategy, and sharing the same purchasers and <sup>3</sup>competitors.

---

<sup>3</sup> This information has been obtained from: (Campos and Ramírez,2006)

### **2.3. Cluster characteristics.**

-Competitiveness: in an industrial district, the participating enterprises compete in a very intense way to gain and keep the clients. Moreover, in order to know how the companies of the cluster compete, it's necessary to analyze the way that they work, as well as their competitive advantages, strengths and weaknesses. For this reason, this constant observation by the cluster companies between them strengthens each of these companies, as well as it strengthens the industrial district.

-Geographic area: one of the most important aspects of this business group is its geographic proximity, as this geographic, cultural and intuitional proximity leads to a better relationship between the companies and a better information, productivity and innovation.

-Cooperation: The cluster participants use to collaborate in an active way between them, and for this reason they gain more competence in the Price and the quality of the products their integrated companies offer. Cooperation can be followed in different ways:

Vertical: It consists on the cooperation between clients and suppliers or vice versa.

Horizontal: It's the cooperation between competitors.

Institutional: It consists on the cooperation between the public administration and the cluster companies. In this typology there are different groups:

- Professional Training Centers, Universities and technology centers.
- Centers to seek an improvement of the quality, like certifications or quality controls.
- Marketing campaigns and joint analysis of the market.

-Innovation: one of the most important consequences of the clusters is the improvement in innovation, because a group of companies will have a much bigger power for the innovation of products and performs than isolated companies. This improvement will have a positive impact on the cluster productivity.

-Support structures: to ensure optimal performance of a cluster, it's needed the support of the companies and another kind of institutions or structures that guarantee the growth and stability of the cluster, as well as governments or universities that try to support the cluster by providing capital, public structures or human capital.

-Cluster management: Industrial districts are not managed by a single Company, but by all companies that are part of the cluster. For this reason, it's necessary to fix some global goals in order to keep a good performance of the industrial group.

-Human Resources: The human capital, as it's known, it's necessary for the proper performance of the production process. However, It's more important in the cluster, as



its high qualification and high degree of performance will be a key factor to achieve a greater competitiveness.

-Institutional learning: It's necessary that the managers and the workers have a good knowledge base to get a great cluster competitiveness.

-Cohesion: For the companies, to keep the same goals causes that all the cluster companies are in the same direction, and, at the same it, it causes that they can overcome any obstacles that they wouldn't be able to overcome individually.

-Integration: The participant companies of this industrial typology use to be associated in chambers, trade unions or secretariats, being able to get a greater relationship between the companies and their competitors.

-Link between the companies: there are a lot of relationship between the companies. For example, the case of those suppliers that proliferate inside a cluster due to the client's secure existence, reducing risk and creating this way a link between this supplier and its<sup>4</sup> clients.

## **2.4. Cluster components**

-Large companies and SMEs: It consists on the private companies where competitors, goods suppliers, products suppliers and buyers are included.

-Financial institutions: They are responsible for sharing the liquidity needed to the companies so they can have a great performance. They are composed of traditional banks, risk capital, private companies and commercial banks.

-Public administration: It consists on helps or strategies to boost or develop the clusters, and they are offered by local, autonomic or national bodies.

-Academic organizations: They are composed of universities, vocational training centers or scientific laboratories.

-Private and public-private organizations, such as NGOs, chambers of commerce, etc.

-Press media, which raise awareness of the cluster and it discloses the more influential activities to the <sup>5</sup>society.

---

<sup>4</sup> This information has been obtained from: (García Blanco,2012)

<sup>5</sup> This information has been obtained from: (Serret Alamo,2011)

## **2.5. Advantages of clusters**

-Economic growth and manufacturing concentration.

-Industrial districts contribute to favor the country in which they influence to its economy in a positive way. The competitive advantage that this group of companies causes, leads to an improvement of the urban infrastructure, and it improves the economy in the area where these companies are located. Moreover, the industrial district encourages the attraction of new companies to be established in this area, and thus increasing the size of the cluster.

-Knowledge and Knowledge spillovers.

Within an industrial district there are several information channels through which knowledge through social interaction of the workers flows. This knowledge flow is accumulated in the region and it causes a suitable context for innovation, creation of new products and any change in the manufacturing processes.

-Innovation and the Company.

A research made in any Company belonging to the cluster will increase the knowledge stored in the whole enterprise group. Furthermore, the fact that a company innovates will cause a bigger competence in the cluster, and the rest of the companies will need to improve their efficiency to be able to equated with this increased competition, which will cause an improvement in the total competitiveness of the companies at the same time. On the other hand, it's necessary to highlight that the production process of the cluster will become more efficient, since it concentrates buyers and suppliers.

-Innovation and profitability.

Given the high competence existing in the cluster, it's necessary that the companies are improving their processes and investing in research and development continually, which will cause that the companies belonging to the industrial district become more innovative, competitive and profitable than those companies that don't belong to this district.

-Knowledge institutions and qualified staff.

Industrial districts use to have the necessity to constantly demand skilled labor that is able to participate in the production process. For this reason, some knowledge institutions normally exist in the areas where these groups are located, which provide skilled labor to the companies to continue with the production process, as well as the companies keep strengthen collaboration with this kind of educative centers and vice versa.

-Infrastructure.

For the growth of the cluster it's necessary the investment by the state or private infrastructure companies, specializing in roads and another kind of infrastructures that help to improve the economical and geographical conditions of the industrial area. This is because an improvement in infrastructures will attract more companies and qualified staff, which want to settle in places with favorable conditions. For this reason, the increase of infrastructure and the growth of the cluster are positively<sup>6</sup> related.

## **2.6. Clusters disadvantages**

-Frequently, these enterprise groups don't get all the help they need for its growth and stability, including economic aids, training of qualified staff or creation of infrastructures. Thus, if they don't get these kind of helps, which should be granted by local governments or regional governments, the cluster's continuity will be difficult.

-The cluster's success is really complex, as it required that a group of companies share economic, historic, social and cultural aspects to achieving success on this industrial group.

-If the planning on the cluster is not appropriately done, as well as targets, mission and vision are not clearly identifiable, it could happen that the entrepreneurs don't trust in this project and also that they don't have enough interest to join this industrial group.

-The lack of studies and projects can cause that the number of companies that become part of the cluster were limited, being less attractive for the business sector.

-Over the years, the high competence together with the higher material and labor costs can convert clusters into<sup>7</sup> non-competitive.

## **2.7. Industrial district.**

In the case of Spain and Italy, we can find an industrial cluster in the ceramic sector. However, it exists another enterprise group typology called industrial district, which is really similar to the cluster. Given its importance and because of its similarities to the industrial cluster, the differences with regard to the cluster are going to be defined and shown now.

---

<sup>6</sup> This information has been obtained from: (Universidad de las Américas Puebla, 2016)

<sup>7</sup> This information has been obtained from: (García Blanco,2012)

### **2.7.1. Definition**

The concept of industrial district was introduced by the economist Alfred Marshall in 1890, when he published his book called "The principles of Economics", where he defined industrial districts as "concentrations of a specialized sector at a certain location". Furthermore, Marshall also said that "this district has great advantages as there will be a constant labor market", by referring to the possibility of making a specific educational formation to perform the job that the cluster requires. At the same time, this will provide the industry with qualified and trained workers that will ensure the continuity of the industrial district.

Later, in the year 1901, Alfred Marshall published another book related to the same issue that the other one, and called "Industry and Trade", which adds new statements:

-The fact of living in the same community, also called "industrial atmosphere" by Marshall, makes that those individuals belonging to an industrial district can easily work from one company to other, in addition to ensuring that the so called "industrial secrets" remain into this industrial area.

-Workers are link to this industrial districts and not the companies, which causes that migration to any kind of work outside the industrial district is really poor or even non-existent.

-There's a cooperation between companies and workers in both the economic and social section, which positively impact on the general productivity of the companies belonging to this district.

-There's a needed factor that a group of companies needs to have in order to receive the name of industrial district. This factor is that the companies have to be integrated in the local community of people and they have to share their culture, values<sup>8</sup> and social norms.

### **2.7.2. Differences between the cluster and the industrial district.**

-In the industrial cluster, there's a particular emphasis on the space, namely the number of square meters that the total number of the companies has. However, the industrial district makes reference to the territory, taking into account the society, its culture and values apart from the space. Thus, a cluster is a group of companies located in the same geographical location, and, and industrial district in a group of

---

<sup>8</sup> This information has been obtained from: (Venacio,2016)

companies located in the same territory, at the same time that they share the values of the native society.

-In the cluster, the differences between small and big companies are not taken into account. However, in the industrial district, the role of the small company with regard to the creation of the district is more appreciated.

-In the cluster, it is made more reference to vertical integration of companies, which means the relationship between suppliers and clients, thus reducing the relationship between the producers to be only competitors. However, the district makes reference to both vertical and horizontal integration, thus reaching a relationship between companies by combining cooperation and competence.

-Once we have seen the definition of industrial district and its differences and similarities with regard to the industrial cluster, it's possible to affirm that the industrial district is not an alternative to the cluster, but it's a modality into the<sup>9</sup> cluster.

## **2.8. Clusters examples**

### **2.8.1. Silicon Valley**

Silicon Valley is the name of the south area of San Francisco Bay, located in the north of California, United States of America. This area has a lot of technological companies from all over the world and it has a lot of small and medium companies.

At the beginning, Silicon Valley had this name due to the big number of chip manufacturing companies. However, today it's characterized by the presence of a big number of high-technology companies.

In this case, the location of this high-technology industrial concentration is due to the university professor William Shackley and Frederik Terman. Frederick Terman was a professor of the Standar's University, and he considered that an unused vast area which was owned by the university of Stanford was a good place to both furniture and intellectual development, encouraging the newly graduated students to stay there and granting them access to risk capital so they can start creating their own small companies with their own ideas.

This initiative by the university professors was the beginning of a successful industrial district in the last decade and currently. However, the success of this enterprise group actually began with the creation of the Hewlett-Packart company by two newly graduated students, Willian Hewlett and David Packard, which created the first technologic company in the United States of America that was not related to the NASA or the US Navy.

---

<sup>9</sup> This information has been obtained from: (Venacio,2016)

In the 70's, the whole area was full of companies that manufactured semiconductors, which supplied computer companies. At the same time, both companies supplied programming and services companies. This way, they formed a link between companies inside the same geographical space.

Finally, in this industrial space, it highlights its extent, its cheap accommodation and the easy access to finance by the companies, mainly on the part of risk capital companies. Moreover, this area grew up in an environment that mixed a high qualification, a high innovation level and some great efforts on the part of the components of the companies in order to increase their competitiveness. For these reasons, the Silicon Valley US cluster has been really successful and has become one of the most important high-technology companies all<sup>10</sup> over the world.

---

<sup>10</sup> This information has been obtained from: (Vara,2016)

### **3. CERAMICS**

#### **3.1. History**

First signs in the manufacture of ceramics date from the Neolithic period, when ceramic receptacles were created in order to store harvest surplus. In these signs, ceramics was hand-modeled and the pieces were dried in the sun in hot countries. In cold countries, pieces were dried next to the tribal fires.

Later, the manufacture of ceramics adopted different decorations and its manufacturing became much more sophisticated and perfectionist. Ceramic pieces were considered art pieces. In this decorative mainstream of ceramics, the Chinese people was the main precursor, which transferred its knowledge to the rest of the countries and spread ceramics to Japan and Korea, as well as it became popular in the Middle East regions and it arrived to Western countries, therefore to the Iberian Peninsula.

Centuries later, it appeared the invent that will revolutionize both the ceramics manufacturing process and the final product of its piece, which consists on the potter's wheel. This one is a rotating instrument made from wood, which supports artisans in forming ceramics pieces from mud.

For these reason, it's noteworthy the number of years that ceramics has been accompanying human being and even today it's still really important in the daily life of the global population, especially for housing <sup>11</sup>construction.

#### **3.2. Definition**

Ceramics consists on the art of creating porcelain, earthenware and mud products. Moreover, the concept of ceramics entails many aspects, such as the set of ceramic products created, everything related to the knowledge of the ceramics and everything with regard to the ceramics.

The manufacturing of the ceramic pieces is made from clay, mixed with different kind of material in order to ensure some particular characteristic of the final product. Thus, depending on the characteristics that the ceramic producers wants for the product, they will mix clay with a different kind of material.

#### **3.3. Techniques and materials**

There are different techniques used in producing ceramics, which gave different final product as a result. The most important are the following:

---

<sup>11</sup> This information has been obtained from: (Fatás Cabezas and Borrás,1993)

-Earthenware: It entails the majority of the objects that domestic tableware has. Its creation is made from fired clay.

-Terracotta: It is a clay-based unglazed ceramic made from hardening in a furnace. It's possible to say that terracotta is a common base of all ceramic processes, and from this point emerge the rest of techniques and ceramic materials. Its purpose is very varied, as it has been used for both manufacturing of receptacles and manufacturing of ceramic sculptures.

-Glazed terracotta: Its technique is to cover the terracotta with an enamel created from lead and another kind of substances. It was usually used to decorate the walls, normally used in the Middle Ages by the Islamic people.

-Enameled terracotta: Once the terracotta is formed, it's mixed with water and baked in white. With this material it's possible to create decorations for paintings, and later, it will be baked in a furnace.

-Faience: It is used for the creation of small pieces such as amulets or small statues.

-Majolica: It is a thin glaze used as a chemical mixture that acts as a base for paint by fixing it to the surface. The clay it's created with has a very low natural temperature, and it also has a very high water absorption level, which forces to bake the pieces at low temperatures.

-Porcelain: Properties associated with porcelain traditionally include a white color; considerable strength, hardness, toughness; low permeability and elasticity and a high resistance to chemical attack and thermal shock.

-Gres: It is vitreous ceramic made primarily from stoneware clay, and also from the addition of different kind of materials such as feldspar or silica. Its major use is the manufacturing of floors paved with tiles.

-Bisque porcelain: It consists on baking just one piece, but mainly for objects that are not tableware or clay, but quartz, kaolin or <sup>12</sup>feldspar.

---

<sup>12</sup> This information has been obtained from: (Reyes Labarta,2007)



### **3.4. Manufacturing of floor and wall in ceramic tiles.**

#### **3.4.1. Definition of industrial ceramics**

Industrial ceramics is all the manufacturing of ceramic products that are used for floor and wall tiles. Apart from this ceramic product typology, there are different classes of ceramic products, as we have previously seen. However, ceramics manufacturing in Italy and Spain consists on industrial ceramic, what means performance coatings and wall tiles.

Today, there are no alternatives to coatings ceramic materials, as they have some kind of esthetic, mechanic, cleaning and hygiene characteristics, and they are also in a flux of innovations, searching for an improvement in the functionality of these products and a reduction of manufacturing costs.

#### **3.4.2. Parts of a tile**

1. Support: It constitutes the form of the tile, which is created from the combination of different natural war materials, such as quartz, talc and clay. For this reason, the support is the first step on the manufacturing of tile and the phase when the final characteristic that the final tile will have are created.

2. Engobe: It is a homogeneous mixing of solids, and it's applied in a liquid form in a water base. The engobe's main goal is:

- To hide the natural color of the support.
- To eliminate any imperfection existing in the support.
- To improve the fixation of enamel in the tile.
- To protect the enamel from moisture.

3. Enamel: It's a homogeneous mixing of solids, which are applied in a liquid form in the ceramic piece during the manufacturing process. This provides a range of chemical and mechanical proprieties, and it also provides color to the piece.

4. Serigraphy: It consists on adding a liquid to the ceramic piece, which will provide the ceramic product with different drawings, designs and colors.

5. Protection: A major protection is given to the final product by a layer of final enamel, or by<sup>13</sup> serigraphy.

---

<sup>13</sup> This information has been obtained from: (Fatás Cabezas and Borrás,1993) and (Reyes Labarta,2007).

### **3.4.3. Process of ceramics manufacturing**

To promote better understanding about the ceramics sector, it's going to be an explanation of all those process made when manufacturing the tile, from the obtaining of raw materials until these are transformed into the final product.

The process of ceramic products manufacturing is divided in 3 performance groups. The first one consists on the preparation of raw materials and intermediate product. The second one is related to the obtaining of the final product and the last one is related to the distribution of the product, which consist on the range of steps that need to be followed in order to provide the client with the final product, in this case, the ceramic product.

On the other hand, it's really important to difference between 3 great activities that exist on the ceramic sector and which are the main driver of this industry:

- 1- The extraction and preparation of clay.
- 2- The industry of frits, enamels and dyes.
- 3- The production and reparation of machinery.

Furthermore, it's important to say that every company use to work in one of these three activities, obtaining an interconnected system of companies, which are suppliers and clients between different companies.

However, all the ceramics manufacturing couldn't work without the presence of clay, which is the main material of this process. There are many kinds of clay and, depending on its typology, it's possible to obtain different final products. Finally, it's also important to say that clay also takes its places in the production process, but more less than other kind of raw materials such as quartz, sand, feldspar, granite, etc.

#### **-1-First step: Storage and reception of raw materials.**

For the manufacturing of the ceramic products it's necessary to obtain clay. This clay is obtained from quarries, which use to be located very close to the company where ceramic products will be manufactured, in order to improve logistics. Once clay is obtained, it's transported with trucks to the company, where it's unloaded and storage until it's used again.

## -2-Second step: Milling

The non-used clay obtained on the first step is reduced until it gets an optimal texture. This step can be taken in two different ways, using the dry method or de semi-wet method.

The dry method obtains a homogeneous mass that has a great plasticity. Thanks to this method, the final result is better and the product has an optimal resistance.

About the semi-wet method, the result is an improvement on the plasticity and a great homogenization of the mass, as well as great resistance with regard to the rigors of the drying process.

In some cases, the blender can be mixed with some different additives depending of the characteristic required for the final product.

## -3-Third step: Forming

### 3.1-Kneading

To work with clay, it's necessary that this one is really wet, between 12 and 15 percent of humidity, in order to keep it united while working.

To perform a good kneading function, they use a machine they colloquially call as "mixer", which is a machine designed for the homogenization of a clay mixing, and it also incorporates water and dyes to this mixing.

Furthermore, it's important to say that in this process the water volume of the mass is regulated, adding water directly to the paste or though vapor produced by a boiler.

### 3.2-Moulding:

Once the kneading process is over, the moulding process starts, which consists on shaping the mass in order to obtain the shape required to obtain the final product.

It's important to say the different kind of mounding that exist:

- Natural moulding
- Potter's wheels
- Tapping
- Extrusion

- Semi-dry pressing
- Dry pressing

#### -4-Fourth step: Drying

The main purpose of this step is to remove the water volume the manufactured pieces have before they are introduced into the furnace. Furthermore, in this step it's necessary to take into account a lot of aspects that interfere in the drying, such as the clay type, the homogenization degree or the piece design. All these factor will affect the kind of drying that will be applied to the piece.

The elimination of water from the ceramic pieces will affect these pieces by contraction of their size. For this reason, there will be a serious danger that all these ceramic elements suffer breaks and cracking.

#### -5-Fifth step: Firing

In this step of the ceramic manufacturing process the pieces must be fired with furnaces, with firing temperatures around 875 and 1000 degrees Celsius.

The most common furnace typology for the manufacturing of ceramic floor and coating is the tunnel furnace, although there is also another tunnel typology that is not commonly used.

#### -Tunnel furnace:

It is formed by a tunnel with a fixed fire zone. The goods that are going to be submitted to the firing process are moved to the interior. Inside the tunnel there are three zones with different processes and goals:

Preheating: In this zone, a warm current is applied to the material to eliminate the total content of the piece.

Firing: It's the middle part of the furnace where the material is fired at high temperatures.

Cooling: Pieces gradually cools in order to avoid that the pieces can break.

-6-Sixth step:Preparation and storage of the product.

Once the firing process is over, it's obtained the final product, what means the ceramic product. These pieces are packaged by both natural way or by robots, and then they are stacked over the wooden pallets. Once products are stacked, they are storage outside the company or locked inside the company, where these products wait until being<sup>14</sup> distributed.

---

<sup>14</sup> This information has been obtained from: (Hispalceramica,2016).

## **4. DIFFERENCES BETWEEN THE SPANISH CERAMIC CLUSTER AND THE ITALIAN CERAMIC CLUSTER**

### **4.1. Global ceramic sector today.**

According to the report by KPMG, in 2016 the tile sector produced 11.913 millions square meters all over the world, which caused an increase of 6,7% with respect to the year 2012. It's important to say that 83% of the global manufacturing was made only in 10 countries, which shows the concentration of the companies in some countries (clusters), and it also explains the poor diversity of countries that produce ceramic.

-Ceramic manufacturing:

According to the data shown by KPMG, from the Ceramic World Review, we can see how Asia is in the first position in terms of ceramic manufacturing, thanks to an increase in manufacturing by countries such as China, India, Iran or Indonesia.

On the other hand, it is Europe, which increased its manufacturing up to 4,5% thanks to the increase in Spain and Turkey, unlike the Italian industry, which suffered a slight decline.

America kept a stable manufacturing in comparison with prior periods. Those countries that act like main promoters of this industry in America are Brazil and Mexico.

Finally, we have the African continent, which increased its manufacturing up to 3%, despite the fact that this continent has no country between the top ten

-World consumption:

Supply and demand use to go hand in hand, as it's explained in the macroeconomic discipline in order that an economic imbalance doesn't emerge. For this reason, the world consumption increased up to 6,1% with respect to the prior period. The world consumption concentrates 70,4% in 10 countries compared with the 83% shown on the manufacturing.

The continent that represents a bigger consumption is the Asiatic one, which represents up to 66% of the world consumption, due to the high percentage of China, which has a 40%.

This statistic shows an imbalance between the countries that demand these products and the countries that manufacture the most. So we can see that manufacturing is given by the companies as an answer to the demand of every country.

-World export:

The export rate increased up to 13,6% in the period of 2013. This important increase is positively related to the increase of exports in all the main producer countries, except of the industry located in the African continent, where there was a slight decline.

The main export market was Asia with a total percentage of 55,6%, which corresponds to 1,400 million square meters, followed by Spain with 318 million exported square meters and Italy with a total amount of 303 million, which are a very good numbers in comparison with the dimension of both <sup>15</sup>countries.

## **4.2. Spanish and Italian economy**

### **4.2.1. Spanish economy**

The Spanish economy is today in fifth position in the European area due to the size of its economy, and it's in the thirteenth position of the whole world in nominal terms. About the purchase power, it's also well positioned with respect to the rest of countries in the world. On the other hand, it's important the influence of the services sector in the Spanish economy with respect to the rest of the sectors.

Since the 90's until the year 2008, the Spanish economy had an economic increase, and it overcome the European average. This increase in the Spanish macroeconomic was caused by the insertion of Spain into the Euro zone, because when Spain became part of this zone, it was propitiated a fall of interest rates in Spain, which caused at the same time an incentive for investors and it increased demand. Another reason that caused this boom of the Spanish economy was the massive influx of immigrants, who came here because of the big demand of work mainly existing in the building and catering industry.

However, with the economic crisis that appeared in 2008, Spain suffered a decline of its economy, and its unemployment rate growth to high proportions. Moreover, one of the main reason for the appearance of this recession was the real estate boom, which caused really lower prices of buildings and homes, and the construction of new housing was completely halted. This fact affected to the ceramic industry, as the main purposed for these ceramic products is the coating in housing. Thus, this decline in the ceramic production negatively affected the Spanish tile industry and caused that a lot of companies had to conclude their activities and close.

Today, there are some signs of economic growth, but this is still not reflected on the daily life of Spanish people. Moreover, many economists say that this Spanish economic growth it's due to the decline of fuel price and the depreciation of the euro.

---

<sup>15</sup> This information has been obtained from: (KMPG,2016)

However, despite what we just said, this growth is positive and it will finally impact in medium and long term in the Spanish<sup>16</sup> economy.

#### **4.2.2. Italian economy.**

Italy is in the fourth position with respect to the GDP, so it overcomes Spain. In absolute terms, it's in the eight position of the whole world. Its industrial sector has been and is still today one of the main drivers. However, it's important to say how important the services sector is, because the majority of the European countries depend normally on this sector.

In Italy here are two zones clearly differenced, the north zone where it's a major industrialization and development, where it is located also the main financial driver of Italy, Milan. On the other hand, there is the south part of Italy, where the agriculture sector occupies more positions and the majority of the zone depends on the subsidies by the government. In addition, the unemployment rate is very high.

Before Italy, it was the Kingdom of the two Sicilies, which were united and formed Italy. In the period of this Kingdom, Italy was one of the strongest economies of Europe, and it was a power based on science, technology, arts and law. However, when the Savoia's house arrived to Italy there was a big decommissioning process of the most of the industries located in the south and they were taken to the north of the country. Moreover, industrialization in Italy has been irregular and the difference between the north and the south of Italy is there since a lot of years ago. The north part is more industrialized and in general, it has a higher purchase power, and its population is more progressive. However, the south zone is more rural, conservative and based on agriculture.

In external trade terms, we can see how Italy imports largest amounts of mineral fuels, minerals oils, followed by the purchase of mechanic machinery and motor vehicle and electric machinery. About export, the more important countries are Germany, France, United States and Switzerland, all them European countries except from <sup>17</sup>United Stated.

---

<sup>16</sup> This information has been obtained from: (CIA.Gov.,2016)

<sup>17</sup> This information has been obtained from: (CIA.Gov.,2016)



### 4.2.3. Comparison between Italian and Spanish economy

Respect to the GDP growth, Spain experimented an increase of 3,1% in 2015, compared to 0,8% obtained by the Italian country. This aspect shows the greater economic increase obtained by Spain in the economical period of 2015.

Regarding the GDP per capita, Italy presents a higher number. In 2015, in this country, the GDP per capita was 35,000 dollars with respect to the amount of 35,200 dollars that Spain had. Despite the fact that Italy is greater, this amount is slightly far, so it's possible to conclude that the Italian and Spanish population have similar rents and quality of life.

In terms of the distribution of GDP for a final use, it's possible to see a similar composition in both countries. The home consumption in both these countries represents the higher percentage of the GDP percentage, followed by the government consumption and the investment of fixed capital.

As we have previously said, the division of these countries with respect to the activities sectors, these countries have very similar data. Respect to the distribution of the GDP and sector of origin, these countries have the services sector as main activity, after the industrial and agricultural one. However, regarding the labor, we can see how the Italian industry has 28,3% of Italian labor, but Spain has just 15%.

Finally, the unemployment rate is going to be analyzed, in which Italy represents 12,2% and Spain 22,5%, a remarkable variation, which shows that, despite the fact that Spain has improved its GDP in the last economical period, its social and economic situation is worse than the Italian one.

Thus, it's possible to see that both countries have many similar aspects, as both them are Mediterranean regions and with very similar societies. However, the number so unemployed population in Spain is <sup>18</sup>much higher.

---

<sup>18</sup> This information has been obtained from: (CIA.Gov.,2016)

### **4.3. Ceramic clusters**

The main ceramic “clusters” are located in Brazil, one in Santa Catarina and two in the state of Sao Paulo; in Portugal, in the zone of Aveiro; in *Castellón*, Spain and finally, in the province of Emilia Romagna, in Italy.

Regarding the Spanish industry that manufactures ceramic tiles, this is characterized because it's one of the most innovative and dynamic ones. It also occupies a leadership position in the international concert for both its technological development and its design and quality of materials and services.

One of the main characteristics of the Spanish tile sector is the big geographical concentration of the industry in the province of *Castellon*, especially in the area delimited in the north by *Alcora* and *Borriol*, west by *Onda*, south by *Nules* and East by *Castellon de la Plana*. The sector fits as a cluster or industrial district that has a lot of auxiliary industries and related organizations in a geographical and delimited area. This offers a competitive advantage and it's one of the key factors of its competitiveness worldwide.

Regarding the cluster located in Italy, the ceramic cluster is based in the zone of *Sassuolo*, a small industrial city that is located in the province of Modena, situated in the region of *Emilia-Romaña*. This union of tile companies is normally characterized for selling tiles with a better quality than the competitors, by using a clear differentiation strategy with respect to the leadership strategy in costs used by its competitors. However, in the last years, the price decline of tile in China and Spain has affected to their<sup>19</sup> sales.

---

<sup>19</sup> \*All the information about the point 4.3. has been obtained from: (Tortajada Esparza; Fernández de Lucio and Gabaldón Estevan, 2008)\*.

### 4.3.1. Spanish ceramic cluster.

#### 4.3.1.1. Companies that belong to the cluster.

In the ceramic cluster of Castellon, 27 companies have been identifying, which are responsible for manufacturing and selling frits, enamel and colors. The location of this ceramic industry in the province of Castellon is divided in the municipalities of *Onda*, *Alcora*, *Villareal*, *Almazora* and *Villafames*. The first three of them are those with a bigger proportion of companies. All these companies are located in an area of 400 square kilometers, which means that they are very closed among them. Furthermore, there are only three ceramic companies outside this industrial cluster. Regarding the number of employments, the average is 148 employees and the average of annual profit is 35 million of euros by each company. These level are quite high in comparison with the majority of Spanish companies. It's also important to say that these measures are not totally realistic, because there is a big dispersion, which means that there are some companies with low profit rates. But there are also some companies with annual profit rates up to 500 million euros. Thus, 45% of the companies have 100 workers or more, with more or less 80% of the workers of the ceramic industry.

On the other hand, it's important to mention the classification of the companies that exist in the industrial district of Castellon. There are different companies located in Spain, but its capital comes from external countries and another companies that are located in Spain and receive capital from the same country. Inside the group with foreign capital we can see the group Ferro Corporation, a company of North American origin that supplies ceramic tilings, which was established in Spain and Italy in expectation of new market opportunities. Another enterprise group with similar characteristic is the Group Colorobbia, with Italian origin, located in the zone of Toscana. These group of companies decided to buy Spanish tile companies that already existed and they decided to established in Spain. Finally, we can find some companies like Jhonson Matthey Ceramics and Prempco International, which also have foreign capital, but they are not as relevant as the other ones.

Regarding the group of companies created from Spanish capital, we can find important companies such as Group *Torreid*, which was created in *Alcora*, and after the creation of the company, another one called Al Farben was created, which supplies ceramic colors. Recently, this first company also acquired the ceramic company called "*Colores Cerámicos*", located in *Alcora*.

\*Note\*. In this section, corresponding to the point number 5.2.1, we have seen some data offered by the Spanish National Research Council and the knowledge, which were found in 2008. The reason why this information is important despite the fact that it belongs to 2008 is that the data offered are not really different from the current ones. Furthermore, this data emerges from the analysis of the frits, enamel and ceramic colors Spanish industry.

#### 4.3.1.2. Evolution of the ceramic Spanish sector.

Since 1990 there was a constant growth of the Spanish ceramic industry until 2005, reaching billing levels of 1.000 million euros. This growth is shown in two differentiated phases. The first one was from 1990 until 2002, when the annual economic growth was around 50 and 60 million euros and export occupied two-thirds of the total volume compared to one third of the national consumption. The other phase was from 2002 until 2005, period when the annual growth was of 35 million euros and the national sales considerably decreased.

This was the period when Spain reached its best moment, with a total production of 650 million square meters of ceramic product. This amount had been never reached to date in this sector. Furthermore, it produced around 35.000 direct works, and much other works indirectly related with the ceramic sector.

However, in 2008 it appeared the economic crisis, which was produced largely by the real estate boom, a constant increase of the house price, which was not coordinated with the purchase power of the Spanish population. It was then when the majority of construction companies bankrupted, and the construction of houses drastically decreased. This fact really affected to the ceramic production, as the final product of this industry was tile, and tile was used in paving houses. For this reason, the ceramic production in the Spanish territory decreased by half, and Castellon was the most affected region, whose suppliers owned a lot of debts and this increased the unemployment rate up to 25% of the total labor force.

This difficult situation was constant until 2012, when we started to notice some signs of recovering, and Spain became the first ceramic producer and the second ceramic exporter behind Italy. Until now, this positive movement has continued, but very far from the rates reached during the culminating period of the sector. Regarding the works that the industry creates, the amount continues the same, as the crisis has affected the mentality of the Spanish entrepreneurs, who want to maximize benefits by reducing costs, which mean the workers. Furthermore, it's necessary to add the constant improvement of the new technologies, which causes that the production plants are very automated. This fact causes that a lot of works are not required.

#### 4.3.1.3.Composition of exports and imports

Historically, the Spanish commercial balance in terms of ceramic products presents and has always presented a very high level regarding the surplus. In 2005, the Spanish exports were distributed up to 41% to Europe, 21% to Africa, 27% to Asia and 10% to America, observing a clear distribution of the recipient countries of Spanish ceramic products. Regarding imports, Spain almost didn't need to import ceramic products, due to the important presence that the Spanish ceramic industry had and has into the global ceramic industry. For this reason, it didn't need to supply itself with foreign companies, because the country can supply itself. The main imports in 2005 came from countries such as Italy, Germany and Netherlands, which means that normally they import product from the European zone.

Today, in 2015, the sales of the Spanish ceramic sector increased by 6%, reaching a total billing of 3,075 million euros, a really high amount with respect its competitors. The main destinations of its exports are actually: France, Saudi Arabia, United Kingdom, USA and Algeria.

Export to the European Union represents 37,2% of the total exports. It's also relevant the growth of export with respect to the period of 2014 in the United Kingdom, which has increased by 21,2%, and also the case of France, which has increased by 4%. Regarding the countries located outside the European Union, it's necessary to mention the decline of export in Asia and the Middle East, due to the social-political problems existing in their respective countries and to the fuel price. On the other hand, there's an increment in the Spanish ceramic demand by USA. The purchase level of Spain in terms of ceramic products increased up to 40,3%. Despite the growths shown in the demand of these countries, there are also negative aspects, such as the case of Russia, which decline in 2015 its Spanish ceramic imports up to 40,3%, descending to the seventh position of the Spanish exports.

Finally, in terms of the national market, we can see a slight increase, even though it still represents only 20% of the total billing in the Spanish ceramic.

#### 4.3.1.4. Development and evolution of the ceramic cluster in Castellon

In the 60's, Castellon was a province with a huge amount of companies dedicated to citrus. The surplus that the tile industry and other citrus companies obtained was used to invest in the tile industry, due to the fact that this was a traditional business and an increase of the tile demand was expected because in Spain there was an urbanization process.

In Spain, the first companies to be created were those with foreign capital, Ferro, Pempco and Colorobbia. Once these companies were created with some other companies with Spanish capital, it began to emerge the formation of the cluster in Castellon. Furthermore, some associations to support the Spanish ceramic sector were created, such as the ICV, High school of Ceramic and Glass, which was formed after the autarky period of Spain after the Civil War, which obstructed the supply of the ceramic companies.

Moreover, the cluster of Castellon doesn't have a clearly defined strategy and it's for this reason that it's said that the ceramic cluster learns at the same time that it grows. One of the signs of this learning is reflected in contracting engineers in order to improve the productivity of the companies. It was then when the ITC (*Instituto Nacional de Tecnología Cerámica*) was created, whose main goal was to train techniques for the ceramic industry by university training, professional training and specialized courses.

In 1976 it was created the ATC (*Asociación de Técnicos Cerámicos*). This association had 650 professional technicians in 2005, in order to support the interests of these professionals. Since the 80's, the University *Jaume I of Castellon* and some Institutes promoted the academic training of ceramic technicians by professional training, which positively impacts in both the innovation and the productivity of the sector.

## **4.3.2. Italian ceramic cluster**

### 4.3.2.1. Companies that compose the cluster

The number of companies dedicated to the manufacturing of frits, enamels and ceramic colors in the Italian cluster is 32 companies, a higher amount than the Spanish one. Between the companies with greater billing we can find some companies that are also present in the Spanish market, such as Ferro, *Colorobbia*, Johnson Matthey Ceramics and *Smalticeram Unicer*. All these companies manufactured on their own. Furthermore, there are some subsidiaries that were also in the past and still can be found today, such as *Torreced*, *Fritta*, *Vernis*, *CC Bonet*, which are specialized on import and preparing of enamel that are not manufactured by these companies. There are also different companies belonging to the ceramists (*Ramacolor*, *Garcolor*, *Arco de los ceramistas Marazzi*, *Gadinia* and *Iris*).

In 2005, Italia had a majority production of products destined to floor pavement, and only a small proportion was dedicated to coating. The porcelain stoneware represented 60% of the total Italian production. Around 20-25% of the Italian cluster companies were specialized on the production of technical porcelain, which was considered as the star product of Italy. For the manufacturing of this product, it's necessary to have some especial and expensive raw materials. Finally, in 2005, between 35-40% of the Italian ceramic production was specialized on glazed porcelain. This product needs cheap and less pure raw materials, that's why the technical porcelain will have a higher price than glazed porcelain.

### 4.3.2.2. Business strategies

The Italian ceramic, specifically the frits, enamel and colors industry, has followed two strategies clearly differentiated between them. The first one consists on the continued investment in researching and development, and the other strategy consists on the growth of big companies searching for expanding their activities, growing in both vertical and horizontal ways. This fact was motivated by the high cost of investment in researching that these kind of companies had. In order to make profitably this cost, they try to expand their activities, allowing them to expand their products (frits, enamel, colors, additives, etc.) and the clients: tile sector, pavement producers, etc). Moreover, it's important to mention the vertical integration that Italian companies pursue, as these companies want to control the supply of their raw materials.

The internationalization of the Italian ceramic sector began by exporting to these countries where ceramic companies were located. For this reason, they went to

international forums such as *Cersaie* (Bolnia) and *Cevisama* (Valencia). They wanted to promote their companies and products and also to attract new clients.

Late, between the 80's and 90's, Spain decided to create a lot of companies in the main destinations of their products as a result of the motivation of reducing costs and approaching to their clients. In Italy, Spain created six subsidiaries.

#### **4.4. Comparison between the 21 most important societies of Spain and Italy**

The reality of how any industry works is shown by analyzing the companies belonging to this industry. For this reason, the KPM magazine made an analysis of a sample of ceramic companies. To make, it analyzed 21 of the most relevant ceramic industries in Spain and Italy. Thus, we are going to show now a comparison between both representative groups of each country in order to observe the similarities and differences between both them and show the evolution with respect to previous years.

The information provided below are obtained from the public document by the KMPG company in 2013, called "*El sector del azulejo a través de 21 grandes empresas*" (The tile sector through 21 big companies). This analysis of the data was made about 21 Spanish and Italian companies with more sales, which were dedicated to the manufacturing of industrial ceramic. For the extraction of this data, annual accounts from the business belonging to the economical period of 2012 and 2013 were obtained. The main goal of this magazine was to serve as an indicator of the ceramic economy in Spain, and specifically in the Valencian Community.

The analyzed companies were the following:

-Spanish companies: *Argenta Cerámicas S.L.*, *Azteca Cerámicas S.L.*, *Azulev S.A.*, *Cerámica Nulense S.A.U.*, *Cerámica Saloni S.A.*, *Cerámicas Belcaire* , *Cerámicas Fanal S.A.*, *Grespania S.A.*, *Halcón Cerámicas S.A.*, *Hatz Spain S.A.*, *Hijos de F.Gaya Flores S.L.*, *Keraben Grupo S.A.*, *Keros Cerámica S.A.*, *Marazzi Iberia S.A.*, *Pamesa Cerámica S.L.*, *Porcelanosa S.A.*, *Venis S.A.*

Italian companies: *Ceramica del Conca S.P.A.*, *Ceramica Sant Agostino S.P.A.*, *Ceramiche Ascot S.P.A.*, *Ceramiche Atlas Concorde S.P.A.*, *Ceramiche Caesar S.P.A.*, *Ceramiche Marca Corona S.P.A.*, *Ceramiche Refin SPA*, *Emilceramica S.P.A.*, *Fincibec S.P.A.*, *Florim Ceramiche S.P.A.*, *Gruppo Ceramiche Grismalt SPA*, *Gruppo Ceramiche Piemme S.P.A.*, *Mirage Granito Ceramico S.P.A.*, *Nuova Ri-Wal Ceramiche S.P.A.*, *Opera Group SRL*, *Panariagroup Industrie Ceramiche*, *Serenissima Cir Industrie Ceramiche*, *Sichenia Gruppo Ceramiche S.P.A.*

-Sales:



The group of Spanish companies increased its incoming by 9,2% compared to the decline by 1,9% of the incoming that the analyzed Italian companies<sup>20</sup> had. Thus, Spain increased the number of tile orders, which affected to Italy in the decline of its products' demand.

The Spanish billing in 2013 was 2,800 million euros. 2,240 million euros of this amount proceed from exports, and 560 proceed from the ceramic sale in the national market.

Italy billed 4.726 million euros. 856 million euros of this amount proceed from the national market and 3.870 million euros from exports.

It's important to take into account that Italy sales up to 67% of its total production to Europe. However, Spain presents 43% of its exports to regions with unstable markets and economic-social environments, such as the Middle East, Russia and the North of Africa. This factor causes that there is an uncertainty about the future of the Spanish ceramic. For this reason, the companies should work to improve their billing levels to stable regions.

#### -Size

From the analyzed group of companies, the total billing of the analyzed representative groups highlights. In the Italian region, 9 of the analyzed companies have a billing higher than 100 million euros compared with 4 Spanish companies, which are the only ones that match this billing level. Furthermore, it's important to say that by 43% of the Spanish societies bill less than 50 million euros compared to 5% of the Italian ceramics that fit in this same billing level. This aspect shows the greater size and power of the Italian companies with respect to the Spanish companies. To verify more the difference between the size of both these nations, it's important to say that the Spanish group represents by 57% of its companies with less than 250 workers, which means that they are small and medium companies. However, in the Italian group, only by 24% of the companies analyzed by KMP belong to this collective.

#### -Company staff.

In this case, both nations declined their number of workers, but not in a big proportion. On the other hand, it's possible to see a bigger number of works created by the Italian ceramics (also given by the big size of their companies). It created 5.877 direct work in Spain and 9.740 works in Italy in the economic period of 2013.

In terms of the income obtained by the company thanks to each one of its workers, what means the productivity of each one of them, we can see how Italy keep its income per worker constant, and in Spain there's a very accentuated increment of its workers' productivity. This fact is a direct consequence of the extraordinary growth of the volume of business and the decline of the workers' number, and thus, a decline of costs. This

---

<sup>20</sup> \*All the information about the points 4.4. and 4.5. has been obtained about: (KMPG,2013) and (KMPG,2016)\*.

factor has been a key to improve the competitiveness of the Italian ceramic industry, as the costs decline allows to have a bigger net margin for the company and it also allow to decline the prices and keep the same profit margin.

#### -Operating income.

The operating income is the net income of an entity, obtained by the difference between the income and the costs of each company, not including the impact of any financial activity or taxes. In this case, it's possible to see a big difference between Spain and Italy. On one hand, Spain increased its sales and kept constant its costs, which positively impact in the export results, obtaining better results than previous years. However, the Italian situation was negative, as its volume of business decreased, keeping constant costs, reason why its operating income was less than normal.

#### -Net income

For the calculation of the net income, it's necessary to add the financial costs and the taxes payments to the operating costs.

The 21 Spanish societies obtained a net result of 48 million euros, compared to 29 million obtained in 2012. Furthermore, 5 of these 21 participant companies of the analysis decline at the end of the period. However, this fact is not very relevant as in 2012 they also declined.

Regarding the financial costs, they were reduced due to the less funding with banks and the total refund of loans with banks. Regarding the taxes, in 2013 the Spanish societies taxed together in terms of corporation taxes 16 million euros more than 2012. This fact reflects the positive dynamic obtained by the Spanish tile companies.

The Italian tile group closed its period with a negative variation of its net results by 2,9%, and 9 of its societies had losses in their net results.

In 2013, both Spanish societies and Italian societies decreased their debts. However, the Spanish indebtedness is bigger than the Italian one, 1,18 versus 1. This aspect reflects the big historical indebtedness taken by the Spanish companies. These companies ask for financing to bank entities until the beginning of the economic crisis, without taking into account the risks they had in case that the economic situation decline.

#### -Passive

Spanish tile companies had a self-financing by 45,9% compared to 50% taken by the Italian companies in 2013. This fact ratifies what we have seen in the debt ratio.

#### -Active

The aggregated active of the Spanish ceramic companies had an active of 2.251 million euros compared to 4.150 million euros that Italian companies had in 2013 in terms of active. This amount practically duplicated the Spanish amount, and this fact shows the relevance and magnitude of some Italian companies, which, as we have previously said, are much bigger than the Spanish companies.

#### -Rolling fund

The Rolling fund consists on the capacity of a company to generate short-term liquidity. This capacity in this sector use to be generated by the capacity of the companies in manufacturing stock and managing the average payment and collection period. The Spanish rolling fund was of 330 million euros in 2013, and, in the case of the Italian companies, the amount was 845 million euros, which shows that Italy has a more well-balanced financial structure than Spain.

#### -Average profitability

The average profitability is the resulting calculation of the relations between the net income and the average of net worth, which was situated up to 4,8% in Spain, and 14,3% in Italy. However, this high profitability is caused by the extraordinary high results that just one Italian company had. Thus, if this extraordinary result is not taken into account, the Italian profitability would be up to 3,2%. This fact shows that the Spanish companies, despite the fact that they have dimensions as bigger as the Italian companies, use to profit better its resources, as with less resources they improve profitability.

#### -Product cost

In Italy, the average price of the production of a square meter is 12,5 euros, compared to 6,8 euros in Spain. This fact would show that Italy uses a differentiation strategy compared to this leadership cost strategy of Spain. However, this is not really true because Spain also uses this differentiation strategy and for this reason, it is considered a ceramic producer of big quality. Although, it's important to say that it lower than Italy. The reason for this price difference is that Spain manufacture cheaper products than Italy, because Italy normally produces porcelain and this product is more expensive than the rest of the products. Thus, the average price of these Spanish and Italian ceramic products exist because Spain manufactures cheaper products than Italy, which causes that the price per square meter in Spain is lower, and the differentiation strategy has no role.

#### **4.5. Valuation of differences between the two countries.**

Once the results of the main companies belonging to the Spanish cluster, located in Castellon, and the Italian cluster, located in Sassuolo are analyzed, it's possible to conclude very effective aspects when explaining the operation and differences of both these clusters.

One of the most remarkable aspects is the differences in the price that exists in the square meter. But, as we have previously said, this is because an average of the total price of the products, so the fact that Italy produces more porcelain products makes that the price average of the Italian products increases in a very large proportion. As a result, both these countries use a differentiation strategy, and they can increase their prices and improve their profit margins, and they also acquired an entry barrier for their competitors. In this differentiation strategy we can find the Italian firm. Over the years, this has been possible through marketing for the Italian ceramic products as they are the ones with best quality for the clients. Both strategies, as we can see from the data, are perfectly applied as both these countries are global leaderships with another big country just like China.

Another relevant aspect is the difference in size between the Italian companies and the Spanish companies, as the Italian ones are normally bigger than the Spanish ones, and sometimes, Italy ones can duplicate the size of some Spanish companies. This difference is shown in the number of direct works, the heritage, the operating income and the active of each group of companies. The 21 Spanish companies analyzed have a total amount of 2.251 million euros in the active and Italy has 4.150 million euros. However, this difference doesn't affect to the cluster of Castellon, because with less resources, and despite the fact that this cluster doesn't match the Italian billing, it has been able to capitalize its economic activities and it has obtained a higher profitability than Italy. However, in Spain, not all the aspects are positive. Its indebtedness level is higher than the Italian one, and Spain has a big indebtedness with the financial entities and Italy has a better use of its own resources in terms of self-financing.

Finally, it's important to mention the destinations of the Spanish exports, which are normally countries with political and social instability. For this reason, its continuity as clients is not guaranteed. However, Italy exports to European countries, and the continuity of this exports is much more guaranteed than the Spanish one.

## **5. CONCLUSIONS**

In this work, we have seen the existing difference between Italy and Spain, where we saw that there are more similarities than differences between these countries. These facts can be contrasted in both aspects, such as the division of their economy, the customs of their societies as they have very similar lifestyles because both these countries have Mediterranean customs.

Regarding the ceramics, it's important to highlight the superiority of the Italian ceramic. However, the good use that Spain makes of its resources in the ceramic industry is very effective, because with almost half the resources than its main competitor country, it obtains optimal results percentages, profitability, etc. Although, in terms of results expressed in numbers and not in percentages, Italy is better than Spain by duplicating its numbers, due to the magnitude of its industry.

Furthermore, the functioning of these industries is very relevant, as both them are concentrated in a specific area, and they take benefit of the advantages that this fact offers, which we have introduced in the first section of this project. Furthermore, the collaboration between the companies inside the cluster and their similar search of new talents are very important aspects, as both these companies have been able to participate in training in universities and professional training centers, to train new workers that can be part of the labor market of the ceramic industry and can be able to improve it. Moreover, the public administration has helped these countries to obtain a greater publicity of both industries.

In addition, there is a very important similarity in the ceramic industry of these countries and it's the strategy they used, the differentiation strategy. This fact will cause the fixing of entry barriers for new competitors in the ceramic industry, overall for the new competence existing in countries with cheap labor such as China and Brazil, which won't be able to match this strategy neither in a short-term nor in a long-term. Moreover, it's important to take into account that the main Spanish clients are social and political instable countries, despite the situation of Italy, which sells its products to the rest of European countries.

However, there are not only similarities, as the average price of the ceramic square meter in Spain is much cheaper than the Italian one. As previously explained, this is due to the fact that Italy produces products with a higher cost, and thus, higher prices than Spain. This could be a problem for Spain in a short-term or long-term, because maybe it should think about the possibility of manufacturing more porcelain products, because the emerging economies that use this leadership strategy in costs manufacture cheaper products and not expensive products like porcelain. Thus, maybe Spain should open its market by increasing its manufacturing in products with a major cost, and in short-term or long-term it's possible that some countries like China or Brazil increase their competitiveness with their low-cost products and this may affect Spain negatively.

Finally, it's important to highlight that despite the good position of the Spanish cluster, it's better to take into account the corporative image of the Spanish ceramic to increase

sales and strengthen the industry. However, it's necessary more cooperation than the current one between the ceramic companies of Castellon to achieve this goal.

## **6. REFERENCES**

- Albors Garrigos, J. (2016). El poder del cluster la reestructuración de los regímenes tecnológicos de industrias maduras a través de innovaciones disruptivas. 1st ed. Departamento de Organización de Empresas Universidad Politécnica de Valencia.
- Alyosur Malaga (2016). *Estudio de las posibilidades de formación de clusters o agrupaciones de empresas en la región Tánger-Tetúan y la provincia de Málaga*. Available at: <http://alyosur.malaga.es/media/descargas/Estudio%20de%20clusters.pdf> (Accessed 21.Jun.2016).
- Ascer.es. (2016). *ASCER - Sala de prensa - Información económica - Un sector competitivo*. [online] Available at: <http://www.ascer.es/sectorDatos.aspx?lang=es-ES> [Accessed 15 Jun. 2016].
- Ascer.es. (2016). *ASCER - Sala de prensa - Notas de prensa - Inicio*. [online] Available at: <http://www.ascer.es/prensaNoticias.aspx?id=9879> [Accessed 15 Jun. 2016].
- Campos, M., Garza, J. and Ramírez, C. (2006). The new relational schemas of inter-firms cooperation: the case of the Coahuila automobile cluster in Mexico. *IJATM*, 6(4), p.406.
- Camisón Zornoza, C. and Molina Morales, J. (1998). *Evaluación de la proximidad de una colectividad de organizaciones al modelo ideal de distrito industrial y desempeño empresarial: una aplicación a los casos de los distritos de la industria cerámica de Italia y España*. 1st ed. [ebook] UniversitatJaume I. Available at: <http://www.revistaestudiosregionales.com/documentos/articulos/pdf537.pdf> [Accessed 15 Jun. 2016].
- Cia.gov. (2016). *The World Factbook*. [online] Available at: <https://www.cia.gov/library/publications/the-world-factbook/geos/it.html> [Accessed 21 Jun. 2016].
- De Caldas, F. (2016). *Ahorro de energía en la industria cerámica*. 1st ed. [ebook] Universidad Autónoma de Occidente y Universidad del Atlántico. Available at: <http://www.si3ea.gov.co/Portals/0/Gie/Procesos/ceramica.pdf> [Accessed 15 Jun. 2016].
- Fatás Cabeza, Guillermo; Borrás, Gonzalo (1993). *Diccionario de Términos de Arte*. Madrid: Anaya.
- García Alcaraz, L. (2014). *Análisis económico-financiero del sector azulejero en España. Determinación de las empresas de éxito en el sector*. Graduado/a. Universitat Politècnica de València.
- García Blanco, S. (2012). The evolution and development of the clusters. Universidad de León. Available at: [https://buleria.unileon.es/bitstream/handle/10612/1905/71445967D\\_GADE\\_septiembre12.pdf.pdf?sequence=1%20](https://buleria.unileon.es/bitstream/handle/10612/1905/71445967D_GADE_septiembre12.pdf.pdf?sequence=1%20) (Accessed 21 Jun.2016).

- Hispalcerámica (2016). *Proceso de elaboración de azulejos - Hispalcerámica*. [online] Available at: <http://www.hispalceramica.com/content/9-proceso> [Accessed 21 Jun. 2016].
- Instituto de Tecnología Cerámica-AICE (ITC), (2006). *Materias para la industria cerámica española. Situación actual y perspectivas*. pp.1-30.
- Interempresas. (2016). *Balance económico del sector cerámico español en 2014*. [online] Available at: [http://www.interempresas.net/Cerramientos\\_y\\_ventanas/Articulos/132959-Balance-economico-del-sector-ceramico-espanol-en-2014.html](http://www.interempresas.net/Cerramientos_y_ventanas/Articulos/132959-Balance-economico-del-sector-ceramico-espanol-en-2014.html) [Accessed 15 Jun. 2016].
- IVACE Internacional, (2015). *Productos cerámicos de la Comunidad Valenciana*. Generalitat Valenciana, pp.2-8.
- KMPG, (2013). *El sector del azulejo en España a través de 21 grandes empresas*. Available at: (<https://www.kpmg.com/ES/es/ActualidadyNovedades/ArticulosyPublicaciones/Documentos/sector-azulejero-2012-2008.pdf>) (Accessed 10 Jun. 2016).
- KMPG, (2016). *El sector del azulejo en España a través de 21 grandes empresas*. 1st ed. [ebook] Available at: <https://assets.kpmg.com/content/dam/kpmg/pdf/2016/05/Informe-sector-azulejero-mayo-2016.pdf> [Accessed 9 Jun. 2016].
- Latorre, J. and Vargas, B. (2010). *El Sector del Azulejo en España a través de 21 grandes empresas 2004-2008*. 1st ed. [ebook] pp.3-30.KMPG. Available at: <https://www.kpmg.com/ES/es/ActualidadyNovedades/ArticulosyPublicaciones/Documents/estudio-ceramico-2010.pdf>
- Nager, D. (2016). *Castellón Comarcas Vila-real Comunitat Opinió España Internacional Economía Espectáculos Tema del día Titulares Última Hora "Las azulejeras italianas y españolas son competidoras, pero también aliadas"*.
- Reyes Labarta, J. (2007). *Cerámica industrial: producción de pavimento y revestimiento cerámico*. [online] Available at: <http://hdl.handle.net/10045/13558> [Accessed 6 Jan. 2016].
- Sector de la INDUSTRIA CERÁMICA. (2013). 1st ed. Registro estatal de Emisiones y fuentes contaminantes.
- Serret Alamo, D. (2011). Estudio de la competitividad de clusters. Universitat Politècnica de Catalunya. Available at: <http://upcommons.upc.edu/bitstream/handle/2099.1/11149/PFC2.pdf> (Accessed 21 Jun. 2016)
- Serri, A., Franceschi, L. and Malagoli, S. (2014). *CONOCER LA CERÁMICA ITALIANA PARA UTILIZARLA AL MÁXIMO DE SU POTENCIAL*. 1st ed. [ebook] EDI.CER.S.p.A., pp.2-4. Available at: [http://www.cersaie.it/pdf/CeramicaAmica/CeramicaAmica\\_ES.pdf](http://www.cersaie.it/pdf/CeramicaAmica/CeramicaAmica_ES.pdf)
- Terrada Rubio, A. (2016). *ESTUDIO DEL SECTOR CERÁMICO EN LA COMUNIDAD VALENCIANA*. Universidad Politécnica de Valencia.



- Tortajada Esparza, E., Fernández de Lucio, I. and Gabaldón Estevan, D. (2008). *La evolución tecnológica del distrito cerámico de Castellón: la contribución de la industria de fritas, colores y esmaltes*. 1st ed. [ebook] Available at: [http://boletines.secv.es/upload/20080512114901.47\[2\]57-80.pdf](http://boletines.secv.es/upload/20080512114901.47[2]57-80.pdf) [Accessed 21 Jun. 2016].
- Universidad de las Américas Puebla, (2016). Teoría de los clusters industriales. (online). Available at: [http://catarina.udlap.mx/u\\_dl\\_a/tales/documentos/mcap/soriano\\_m\\_ma/capitulo2.pdf](http://catarina.udlap.mx/u_dl_a/tales/documentos/mcap/soriano_m_ma/capitulo2.pdf) (Accessed 21 Jun. 2016).
- Vara, V. (2016). *San Francisco—Silicon Valley North*. [online] WSJ. Available at: <http://www.wsj.com/articles/SB10001424052702303807404577434281019286006> [Accessed 21 Jun. 2016].
- Venacio, Leandro ;(2007) *Globalización, Desarrollo Local y Sociedad Civil*. Available at: [www.eumed.net/libros/2007a/222/](http://www.eumed.net/libros/2007a/222/) (Accessed 5 Jan. 2016).
- Venacio, L. (2016). *Los distritos industriales: modelo de desarrollo económico local que promueve el capital social*. 1st ed. [ebook] Available at: [http://www.caei.com.ar/sites/default/files/working\\_paper\\_ndeg\\_20.pdf](http://www.caei.com.ar/sites/default/files/working_paper_ndeg_20.pdf) [Accessed 21 Jun. 2016].

