THE INDUSTRIAL DISTRICTS OF CASTELLÓN DE LA PLANA AND SASSUOLO, A HISTORICAL AND ECONOMIC COMPARISON

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0. INTRODUCTION

The decision to develop my final work degree analysing the ceramic industrial district of Castellón de la Plana, comparing it with the one of Sassuolo is born during the last year of my degree. In Italy, I am studying Economics and International Marketing within the Universitá di Modena e Reggio Emilia (UNIMORE), in 2015 the University offered to some students the possibility to study one year abroad, within a double-degree project in collaboration with the Universitat Jaume I (UJI), I applied and I become also an Administration de Empresas student. Thanks to this Erasmus project, I have the possibility of being graduated in Spain too, but this implicates that I had to develop my stage and my final work here is Spain. At October, the titles of final works came out and I found really interesting the one called “Current and Future Challenges of the Ceramic Tile Firms”, this because also in Modena, specifically in Sassuolo, there is one of the main ceramic districts of all the world and it is really important for the economy of my region and my country too. Another point that helps me choosing this thematic was that the tutor of the project would have been Francesc Xavier Molina Morales, I worked with him during the first part of the year inside the signature “Análisis Industrial y Redes de Empresas”, so after reading his publications about the district and attending his classes I have decided to apply in order to develop this theme.

We discuss with professor Molina about the project, because I wanted to change the structure of the arguments I would have worked on within the paper, my will was to make a historical and economic comparison between the ceramic industrial districts of Castellón de la Plana and Sassuolo. This was my interest because I wanted to link the two periods of my economic formation, the first two years of studies in Modena with the last one in Castellón. I chased to express my study’s and life’s experience within the final work of the degree connecting one of the most important industrial activities of my fatherland with the one of the lands that has adopted me during the last year. The result of these ideas has been this resource, I have worked for it the last six months.

The theme is really important because I have analysed the two main ceramic district of all Europe and all the world. Sassuolo and Castellón de la Plana are within the top 10 producing site worldwide and within the top 3 exporters, following only Chinese producers. I have wanted to work on this theme also to underline as the structure of the districts has changed during the history, especially within the last 10 years, when the global recession hardly proved them. I also have underlined the threat of China for Italian and Spanish producers, pinpointing the evolution of Asian competitor and its growing importance. As I have said I didn’t want to do just an economic comparison, my will has been also to underline the similitudes and differences within the historical evolution of the two district, considering that this would have been interesting due to the substantial lack of publication about this issue.

So I have developed the resource starting from a theoretical contextualization of the concerns, I have based this part directly on the works of the main scholars, Marshall and Beccatini concerning the industrial district and Porter for the cluster's part. Oslo Manual for Measuring Innovation and Schumpeter studies have been really useful explaining the concept and the importance of innovation. With the aim of these materials, I have started my paper explaining the concepts of industrial district, cluster (underlining the differences between them) and innovation.

Then, I followed with chapter two and three that share the structure, I have made this decision in order to facilitate the following comparison. These two chapters start with a contextualization of the territories that host the district, the Valencian Community and Emilia-Romagna. Then I focused the analysis on the histories of the industrial agglomeration starting from their birth in 18th century, within this part it can be found the only difference in the structure of the two chapters, in fact I needed to divide the period between 1900 and 1945 inside the third chapter due to the participation of Italy within the two World Wars that affected significantly the economy of the Italian district. The main documents in order to write these part have been some publication done from scholars of UJI for the Spanish side and a document provided directly from Confindustria Ceramica for the Italian one. After the history of the district, the paper has been focused on the economics aspects, it has analysed the products and the different activities done by the district, underlining the different importance the related industries (ceramic machines and frits, glazes and ceramic colours) have in Italy and Spain. Within these part has been fundamental the aim of the publications done by the different associations as ASCER, Confindustria Ceramica, ACIMAC, ANFFECC, Ceramicolor, ASEBEC, Tile Italia and Tile of Spain. A paragraph has been dedicated also to Inkjet Technology due to its substantial importance for the tile production.

The final chapter is just a comparison between the two districts done using the material exposed within the previous three parts. It starts with the application of the theoretical concept of the industrial district to the realities of Castellón de la Plana and Sassuolo, then, it follows comparing all the main aspects explained within the previous chapters, the territories, the histories and finally the economic structure. It ends whit a digression about the Chinese threat for both of them.

I CHAPTER: THEORETICAL FRAMEWORK

Introduction

This first chapter would introduce the reader to the theoretical framework behind the concept of Industrial District, Cluster and Innovation. The target is to get the reader aware of the concepts at the base of the Industrial district of Castellón and Sassuolo and to explain what innovation is to understand in a better way why it is so important in the economy of the district.

1.1 INDUSTRIAL DISTRICT

The main objective of this first part of the work is to explain to the reader the concept of Industrial District because it is the theoretical base of all the work. For it, it is divided into several sections: first an analysis of the origins of this economic idea has been conducted, by following the ideas of the economist Alfred Marshall and later the ideas of Giacomo Becattini, considered the engine of the current Industrial District, as well as the interpretations of the most contemporary scholars.

To carry out this section several secondary sources have been reviewed. First, the works done directly by Marshall and Becattini, then a crucial aim has been given by CajaMar publications, a collection of articles specialised in industrial districts and their characteristics, finally the work of specialised economists as Molina Herrera, Soler and Marco Bellandi, Lazzeretti or Molina (2008) authors. Their aim has been crucial to better understand the impact of industrial districts in the economy and its beginnings.

1.1.1 Alfred Marshall

Alfred Marshall was one of the most influent economists of his time and maybe of all times. He was born on 26th July 1842 in London. He was a professor at University of Cambridge (1885-1908). His major book, "Principles of Economics" (1890) dominated the British economics' panorama for many years, Marshall nowadays is considered one of the founders of the neoclassical economy[1]. He died on 23rd July 1924 in Cambridge at the age of 81.

[1] **Neoclassical economics** is an approach to economics focusing on the determination of goods, outputs, and income distributions in markets through supply and demand. Neoclassical economics dominates microeconomics, and together with Keynesian economics forms the neoclassical synthesis which dominates mainstream economics today.

The concept of industrial district born thanks to Marshall in his book "Principles of economics" (1890). Firstly, the idea born thanks to Marshall's observation of the British economy of the nineteenth century, he noticed how many firms, concentrating on the manufacture of certain product, were geographically clustered.

The mains characteristics of a Marshallian industrial district are two simple concepts, they have a high level of horizontal and vertical specialisation linked with a great reliance on the market's mechanism for their exchanges. Marshall in his studies about the British economy of the IX century saw that the firms were located in a specific geographical area and they were small businesses with a huge specialisation in a single function of the production chain. The major advantages for this system born from their propinquity, thanks to their geographical location this firms could share commercial and technical information through informal channels. The proximity allowed the enterprise find skilled labour and this characteristic created specialisation also in the people who leave in the district's area. Finally, the Marshallian district is an example of the competitive capitalism in his better and most efficient form, with the transaction costs between firms reduced to the practical minimum, but this transaction became possible only when the scale's economies are limited.

Marshall disputed the standard view of his époque that factory systems were necessarily better than production systems that were technically less integrated but concentrated geographically. Marshall reached the conclusion that there is, *at least for certain types of production*, another efficient manufacturing system.

Marshall wasn't the first one using the concept of "business network"; this appeared for the first time in an article entitled *The Nature of the Firm* in 1937, written by Ronald Coase[2], a British economist. Coase explains that when someone wants to operate a transaction in a market he will run into costs, mainly information's costs, but creating a "business network" these costs could be cautiously lowered thanks to strategic partnerships and relationships of trust.

In the 19th century Alfred Marshall noted an "industrial atmosphere" within geographic concentrations of skilled workers, he writes in his treatise *Principles of Economics* (1890) that in districts where manufacturers have long been domiciled, a habit of responsibility, of carefulness and promptitude in handling expensive machinery and materials becomes the common property of all. In this way the mysteries of industry become no mysteries; but are as it were in the air, and children learn many of them unconsciously.

[2] **Ronald Harry Coase** (29 December 1910 – 2 September 2013) was a British economist and author. He was for much of his life the Clifton R. Musser Professor Emeritus of Economics at the University of Chicago Law School, where he arrived in 1964 and remained for the rest of his life. After studying with the University of London External Programme in 1927–29, Coase entered the London School of Economics, where he took courses with Arnold Plant. He received the Nobel Prize in Economics in 1991.

The concept of the industrial district born with this treatise and what makes the industrial district model so special, in Marshall's account, is the nature and quality of the local labour market, which is internal to the district and highly flexible. Individuals move from firm to firm, and owners, as well as workers, live in the same community, where they benefit from the fact that "the secret of industry are in the air" (there is an industrial atmosphere, as he defines it). Workers appear to be committed to the district rather than to the firm, and moreover labour out-migration is assumed to minimal, there is a "sense of belonging" not only with the companies and the organizations but also with the society inside the district, in fact, it is seen as a relatively stable community which enables the evolution of strong local cultural identity and shared industrial expertise. All of these features described by Marshall in the model of industrial district are subsumable under the notion of agglomeration, which suggests that the stickiness of a place resides not in the individual locational calculus of firms or workers, but in the external economies available to each firm from its spatial conjunction with other firms and suppliers of services.

Clearly, in the industrial district there is not only one form of organisation but coexist various forms, the three different types of organisation that dominate industrial districts are the individual company, the companies who are in the same sector and companies from multiple related sectors.

In the 10s/20s the economic theory of Fordism[3] group up and the scientific and political communities adopt it like the most valuable economic system, setting aside Marshall's idea of the district.

Toward the end of the 60s some Italian economists, first among everyone Becattini, noticed in certain regions of Italy some eccentricity. In a context where large private and public-sector companies in capital-intensive were showing, like high-tech industries, clear signs of weakness, there was an unusual growth in some small manufacturing businesses which were increasing their affairs. The interesting thing is that those SMEs were not being created inside the industrial cities and across the full range of industrial sectors, they were geographically concentrated in small non-attractive areas using forms of business considered obsolete. But they ran better that the greats industries. The idea of the industrial district was running another time 40 years after Marshall's death.

[3] **Fordism** describes modern economic and social systems based on industrialized, standardized mass production and mass consumption. The concept (named for Henry Ford) is used in social, economic, and management theory about production, working conditions, consumption, and related phenomena, especially regarding the 20th century.

1.1.2 Giacomo Becattini

Giacomo Becattini was born in Firenze in 1927 and he died on 21st January 2017. He was an Italian economist, an economics professor at Siena's University (1963-68) and after that at Firenze's University (1968-99). His studies are very important in the economics panorama because he sustains the necessity to take advantage of the industrial districts' wealth, represented by the know-how accumulated inside it from the workers and from the entrepreneurs to promote the development of the country in general. He based his studies mainly on the works of J.S. Mill[4] and A. Marshall.

Italy during the phase defined "economic miracle[5]" saw the development of its middle-class lifestyle thanks to the new economics possibility given by the great expansion of the economy in general. Those conditions were similar to the ones seen in many British cities and towns during the first great expansion spawned by the industrial revolution and studied by Marshall. In both cases, there was an increase of middle class' acquisition power, in Italy this produced a rebirth of the Industrial district theory.

Giacomo Becattini, in 1990, defined the district as a social and territorial entity that is characterised by the active presence of both a community of people and a group of enterprises in a natural and historically determined area.

Becattini started studying the Italians industrial district in the mid of 1970s when this model become economically successful. In Italy there were three economics models, the first model was the traditional artisan and it prevailed in undeveloped south Italy, the products of those artisans were been replaced over the next 20 years by mass-produced goods. The second model was the one of a dependent subcontractor, born due to the decentralisation that had taken place in the country at the end of the 1960s. The most important model for this work is the third one, the industrial district. This concept grew up in the mid of 1970s when some small located industries become economically successful, like the textile industry of Carpi and Prato or the furniture industry in Brianza.

Becattini and also other authors like Markusen[6] (1996) pinpointed some differences between Italian industrial district and the Marshallian ones, one of the most important is that while inside Marshallian districts it wasn't necessary that actors co-operate consciously to develop the

[4] **John Stuart Mill** (20 May 1806 – 8 May 1873) was an English philosopher, political economist and civil servant. One of the most influential thinkers in the history of liberalism, he contributed widely to social theory, political theory and political economy.

[5] The **Italian economic miracle** or the **Italian economic boom** is the term used by historians, economists and the mass media to designate the prolonged period of strong economic growth in Italy between the end of the Second World War and the late 1960s, and in particular the years from 1950 to 1963.

[6] **James R. Markusen** (1948) is an American economist, professor of economics at University of Colorado.

district in the Italians ones that was necessary in order to create governance structures would have improved the stickiness of the district.

The aspects of Marshallian and Italianate industrial district are summarised in Table 1:

Table 1. Features of the main industrial districts' types.

Marshallian Industrial District
- Business structure dominated by small, locally owned firms - Scale economies relatively low - Substantial intra-district trade among buyers and suppliers - Key investment decisions made locally - Long-term contracts and commitments between local buyers and suppliers - Low degrees of co-operation or linkage with firms external to the district - Labour market internal to the district, highly flexible - Workers committed to district, rather than to firms - High rates of labour in-migration, lower levels of out-migration - Evolution of unique local cultural identity, bonds - Specialised sources of finance, technical expertise, business services available in district outside of firms - Existence of 'patient capital' within district - Turmoil, but good long-term prospects for growth and employment
Italianate variant (in addition to the above)
- High incidence of exchanges of personnel between customers and suppliers - High degree of co-operation among competitor firms to share risk, stabilise market, share innovation - Disproportionate shares of workers engaged in design, innovation - Strong trade associations that provide shared infrastructure, management training, marketing, technical or financial help - Strong local government role in regulating and promoting core industries

Source: Own elaboration on Markusen, 1996.

1.1.3 Genesis of the concept

Like it could be understood by the lines written before, Becattini develops his concept of Industrial district moving from the studies of Marshall. The real question is why where the

others researchers have seen only localised enterprise with technological spillover[7] Becattini has seen a community specialised in the production of determinate goods.

There are many reasons, the first one is that Becattini tents to understand what Marshall really want to say in his book *Principle of Economics* not only searching words in order to confirm his theoretical and scientific convictions, by this way Becattini can find inside Marshall's book the theoretical base not only to explain the small and medium enterprises' competitiveness in the Italian context, but especially to solve the problem of the industrial's concept related to the theory of the value from a theoretical point of view.

So the crucial point for Becattini studying Marshall's theories is the work seen as the final target of the human life, so Becattini and Marshall doesn't see the work as an asset but they tempt to get the worker's point of view. Marshall build his studies over the ideological bedrock that work is one of the highest self-expressions of the human being, for this reason, in his book *Principles of Economics* he defines economy like a part of the study over the humans inside the society.

Finally, reading the IV book of the Principles with the mind influenced by the awareness of the Marshallian social philosophy, Becattini has been able to explain the industrial organisation from the social community's point of view.

1.2 CLUSTER

In this second part the reader could find an analysis of a similar concept, Cluster, driven by the English economist Michael Porter, this part is important to witness the differences between the two concepts. The main source of information has been the work done by Porter himself "Clusters and the New Economics of Competition" in 1998 and published by the *Harvard Business Review*[8].

1.2.1 Michael Porter

Michael Porter was born on 23rd May 1947 in Ann Arbor, Michigan, United States, and he is still alive. He is a researcher, author, advisor, speaker and teacher and one of the most influence economists of our era, he is the Bishop William Lawrence University Professor at

[7] **Spillover effects** are economic events in one context that occur because of something else in a seemingly unrelated context. For example, externalities of economic activity are non-monetary effects upon non-participants.

[8] ***Harvard Business Review*** (***HBR***) is a general management magazine published by Harvard Business Publishing, a wholly owned subsidiary of Harvard University. It is published 10 times a year and is headquartered in Watertown, Massachusetts.

Harvard Business School (HBS). He earned an M.B.A.[9] from Harvard Business School and a PhD[10] in Business Economics from the Harvard's Department of Economics. His research approach, applying economic theory to complex systemic problems, reflects these multidisciplinary foundations.

Porter is important for this work because of his studies about the clusters, Porter (1990) defines the cluster as a geographic concentration of companies and interconnected institutions acting in a particular field.

The most important characteristic is the location, although the importance of this aspect has mutated over the years. Many years ago the competition was driven by input costs but nowadays the economy is more dynamic and companies are able to mitigate input-costs disadvantages thanks to many skills created inside them during the years.

Porter said within an article published by the Harvard Business Review (1998) that untangling the paradox of location in a global economy reveals a number of key insights about how companies continually create competitive advantage.

Porter talks about a paradox because in the current economy, companies tend to be globalised but cluster bases his strength on the proximity of the firms and on the immediate business environment outside companies that plays a vital role, overlooked for a long time. Clusters represent a new way of thinking about the role of location in the nowadays economy.

The firms inside the same cluster use the same marketing media and compete in similar customer segment creating a cluster image or cluster identity, the boundaries of this entity are defined by the linkage and complementarities across the firms and the institutions, like the universities, the government and the social around. Those factors are fundamental to create the competition and they contribute to the growth of the cluster, so the boundaries are not defined by political or geographical factors and a cluster could extend itself over the national borders.

Another point underlined by Porter is that cluster promote at the same time cooperation and competition and he studies how those two factors could create the strength of the cluster. Rivals compete intensively inside it and with the industries outside the cluster in order to win and retain customers. There is also cooperation between the firms inside the system, especially thanks to the high vertical integration and thanks to the cooperation of the industries with the local institution and with other companies. So cluster could be seen as an alternative

[9] **M.B.A.**: Master in Business Administration.
[10] **PhD**: Doctor of Philosophy from Latin Philosophiæ Doctor.

way to organise the value chain, the proximity of firms and social institution in one place fosters better coordination and trust.

Inside the clusters “environment factor” is one of the concept’s bases. Porter identified three ways of cluster’s influence over the competition, first of all, cluster system increases the productivity of companies based in the area, then it influences the innovation and finally, it stimulates the formation of new businesses.

Within the same article previously cited Porter (1998) underlined that a cluster allows each member to benefit as if had greater scale or as if had joined with other without sacrificing its flexibility.

Being part of a cluster gives companies some advantages that they could not reach operating alone. They could operate more productively thanks to an easier way to find inputs, a shared database of information, technology, know-how and overall thank to the links between the enterprises and the social background (university, government, public policies) and between the same firms.

Cluster contributes to creating a net of linkage among cluster members that results bigger than the sum of his parts. Thanks to the local rivalry the companies are more motivated to have success and the proximity of those firms allow to measure and compare near competitors’ performances because they share general circumstances.

Cluster plays a primary role also in the creation of innovation because it gives to companies the strength and the flexibility to act rapidly and it is an aim to the creation of new businesses because it is easier for a new company grow up in a context where all the needs are yet existing and they are tested.

Once a cluster is created a “self-reinforcing cycle” starts and it is stronger if local institutions are collaborating and competition inside the cluster is strong. Finally, a cluster could lose his competitiveness due to external and internal factors like technological discontinuities or internal rigidities that not allow fitting the companies to the changing world outside the cluster. The most important aspect to avoid the decline of the cluster is to keep the level of rivalry between the firms high.

1.3 DIFFERENCES AND SIMILARITIES BETWEEN THE TWO CONCEPTS

The two concepts of the cluster and industrial district are dynamics because they are continuously evolving but it could be identified some differences and similarities between the two models.

First, it is important to underline the two definitions to do this study, the cluster is defined by Porter (1998) as a geographic proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and externalities. In this model, it could be seen also universities, studies' centres, technical and professional formation systems that integrate the activity and the development of the cluster. With his studies, Porter was searching for key issues in the competitive advantage of individual firms.

On the other hand, the definition of Industrial district done by Becattini (1990) is that it could be defined as a social and territorial entity that is characterised by the active presence of both a community of people and a group of enterprises in a natural and historically determined area. The differences and similarities between the two concepts have to be underlined starting from the study of the two definitions and from the works done by Michael Porter and by the Italian school of the industrial districts formed by Giacomo Becattini, Sebastiano Brusco and Arnaldo Bagnasco. The original proposal of Becattini was designed to overcome, with his studies over the districts, the limitation of the conventional classification of firms, introducing the sense of belonging as a criterion to group firms.

The first difference is the use of the "space's concept", in Porter's studies space is something natural (space geographically defined) where enterprises, thanks to their close localisation, are able to share know-how and resources. In the definition of the industrial district, the space is more interrelated with the concept of territory where societies live with their own characteristics, it is thanks to those characteristics the development, the concentration and the specialisation of those productions could be possible.

The second difference it could be found talking about the size of the businesses operating in the cluster and within the industrial district. Looking at the cluster there are no differences between big and small enterprises but this difference is important talking about industrial district because the small enterprise is the base of the development of the district.

Then another important difference is the importance of the verticals and horizontals connections. In the cluster, it could be noticed that vertical connections are more important and more common than the horizontals, in the Italian model they have the same importance.

The two models look in a different way to the social issue, for Porter they are the result of the economic success of private firms, for Becattini is the opposite, the success of economic

issues is the result of the social cohesion within a community of people. In the district the institutional settings have to play an active role in the success of the system, in the cluster, they act indirectly or as subsidiary improvements on the diamond.

The common factor between clusters and industrial districts is the net of linkage and connections created through the enterprises inside the territories. This element is the reason of the attraction developed by those businesses' models.

Summarising, the district is a socio-cultural identity characterised by the simultaneal and active presence, in a delimitated geographical area (from the natural and historical point of view), of a people's community and of many enterprises linked each other's. the cluster is a geographical concentration of linked enterprises, specialised suppliers, socially interrelated organisation and skilled workers. The district's analysis is more sociological, historical and political, the cluster's analysis is more focused on the productive organisations and over their competitive advantage in the worldwide economy. While the community of people is what matters for Becattini, Porter's point of departure is an analysis of the firm's value chain. After that, they converge in giving territory a prominent role.

1.4 INNOVATION

Albert Einstein said: *If I had an hour to solve a problem I'd spend 55 minutes thinking about the problem and 5 minutes thinking about solutions.*

Innovation is a particularly sticky problem because it so often remains undefined, defining the innovation problem is often overlooked, but it's absolutely essential to understand the dynamics of innovation itself inside the companies.

This second part of the first chapter has the target to help the reader understanding the meaning of the concept and the different types of innovation operating inside the cluster and the industrial district.

The first part of the paragraph has been written mainly with the aim of the works done by researchers like Schumpeter (1942), Damanpour (1987), Simmonds (1986) and using a study done by researchers of the West University of Timisoara. It explains various types of innovation and in this part the main aims has been given by the "Oslo Manual for measuring innovation" and by articles extracted by Cajamar and others publications.

1.4.1 Concept

There is not a unique definition of the innovation concept because scientists and industries use a different approach from many perspectives about this topic so innovation process is something complex and multidimensional since many factors interact to make possible the emergence of this process. Define the concept of innovation is so important because the ability to innovate is one of the key factors for the success of a business; it represents the ability to create new products, process and systems starting by knowledge and ideas.

According to the Oslo's manual (2005), innovation is defined as:

> *The implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method inbusiness practices, workplace organisation or external relations.*
>
> *OECD[11]; 2005, pg. 46*

One of the customer's decision parameter is the degree of innovation proposed by a product, process or service. So, if a company is able to innovate better than its competitors it has a competitive advantage in the market.

Innovation nowadays is maybe the most important feature within a firm, innovation gives to the company a competitive advantage over his competitors. The world is constantly changing and only the enterprises that are able adapting them self to these changes could survive and increase their revenues or keep their market share.

The importance of innovation can be seen by the politic of the worldwide enterprise, they destine a good part of their revenues to their R&D departments in order to keep high the level of their products and keep themselves competitive in the market.

1.4.2 What and how we innovate?

Talking about innovation it can be done a first distinction about what is the final object of the innovation itself. There are four mains possibility, product innovation, process innovation, marketing innovation and finally organisational innovation. To clarify this concept, it can be used the definitions given by OECD's "Oslo Manual for measuring innovation".

[11] The **Organisation for Economic Co-operation and Development** (**OECD**) is an intergovernmental economic organisation with 35 member countries, founded in 1960 to stimulate economic progress and world trade.

A product innovation it is defined as a *good or service that is new or significantly improved* within its *technical specifications, components and materials, software in the product, user friendliness or other functional characteristics.* This innovation differs from a process innovation where is the production or delivery mood to be new or improved in a significant way, the changes can include new techniques, equipment and software. Then it can be founded marketing innovation that involves the changes in *product design or packaging, product placement, product promotion or pricing*. Finally, there is the organisational innovation that is defined as a *new organisational method in business practices, workplace organisation or external relations*. (OECD, 2005, pg. 47-52).

These are not the unique methods to classify innovation. It can be identified other two main innovation's moods, the technological and the administrative innovation. This distinction is related to a more general distinction between social structure and technology (Evan, 1966), it portrays the differences in the nature of innovation itself and these two types of innovation can represent a wide range of changes that could be introduced within a firm.

Basically, technological innovation goes to change products and services and the moods those are produced or rendered. On the other hand, administrative innovation affects only indirectly products and services. It is the implementation of an idea or a new method that changes the way to conceive the firm's organisational structure and so it changes also the way the enterprise does things and in final vision products and services.

1.4.3 Ways of innovation

Schumpeter (1942) says that radical innovation creates major disruptive changes whereas incremental innovation advances the progress in a continuous process of change.

The distinction between radical and incremental innovation is one of the simpler to be understood but also one of the most important. While radical innovation concerns something completely new that could modify deeply the position of a firm in the market and in consumers' mind, incremental innovation is about an existing product with some new features. Incremental innovation is the most common and the dominant one. Innovation differs by sector, some sectors are characterised by rapid and consequently radical innovations (as a high-technology sector) other are more inclined to slower process and to the incremental ones (as LMTs[12]).

[12] **LMTs:** low and medium technology enterprises

Radical innovation uses to require more time to be elaborated by the R&D department and also require a bigger budget than the incremental ones because of their complexity. Incremental innovation could be considered as a previous step to the radical innovation because to create this last type the context has to improve gradually the complementary technologies and process. Only by this way a radical innovation can be reached.

1.4.4 Innovation's sources

Sometimes innovation grow up in the mind of a genius transfixed by a new idea but most of the times innovation is the fruit of a long-planned process inside a company or the result of the combination of the feature of a specific environment mixed with the ability of some actor within this context

To explain the sources of innovation it can be used the ideas exposed by Peter Drucker[13] within an article published in August 2002 by Harvard Business Review.

Drucker identifies 7 sources of innovation distinguishing between two areas of opportunities, the ones existing within a company and the ones existing in the environment of the company itself.

1. Opportunities existing inside the firms, created by unexpected occurrences;
2. Incongruities defined as everything that not goes as planned;
3. Processes' needs;
4. Changes within market and industry;
5. Changes within the environment (as demographic changes);
6. Changes within people's perception;
7. New knowledge.

1.4.5 Innovation within the district and differences with other models

In this part it will be analysed the phenomena of innovation within the district, the most important types of innovation and the concrete innovation introduced inside the district over the years.

[13] **Peter F. Drucker** (November 19, 1909 – November 11, 2005) was an Austrian-born American management consultant, educator, and author whose writings contributed to the philosophical and practical foundations of the modern business corporation. He was also a leader in the development of management education, he invented the concept known as management by objectives, and he has been described as "the founder of modern management."

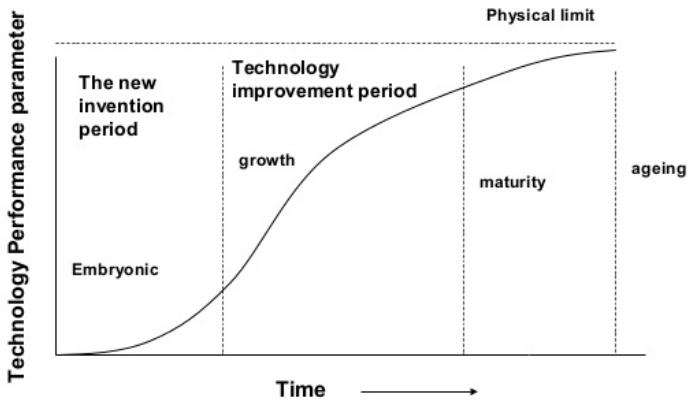
First of all, it has to be underlined that the most important source of innovation operating in the district is the technological one. Like the products also the companies and the ceramic title district of Castellón itself has an own life cycle divided into three phases: embryo, growing or marketing stage and maturity.

This process is continuous and when a cycle ends another one start from is the first phase because as seen in the previous paragraph, the continuous innovation is a source of competitive advantage and in a changing context also an obligation for the company to stay competitive on the market.

In this context it can be noticed that when a radical innovation comes up in the district it replaces the "dominant" technology of this specific period, this change takes the name of "technological discontinuity" and this concept is very useful in the analysis of the innovation within the ceramic tile firm of Castellón because the technological discontinuities marks the "era" of the district. In this sense, it can be affirmed that the contemporaneous era is the "Inkjet era". These discontinuities are important because they represent a drastic improvement, they create new niches market and reduce costs by new skills.

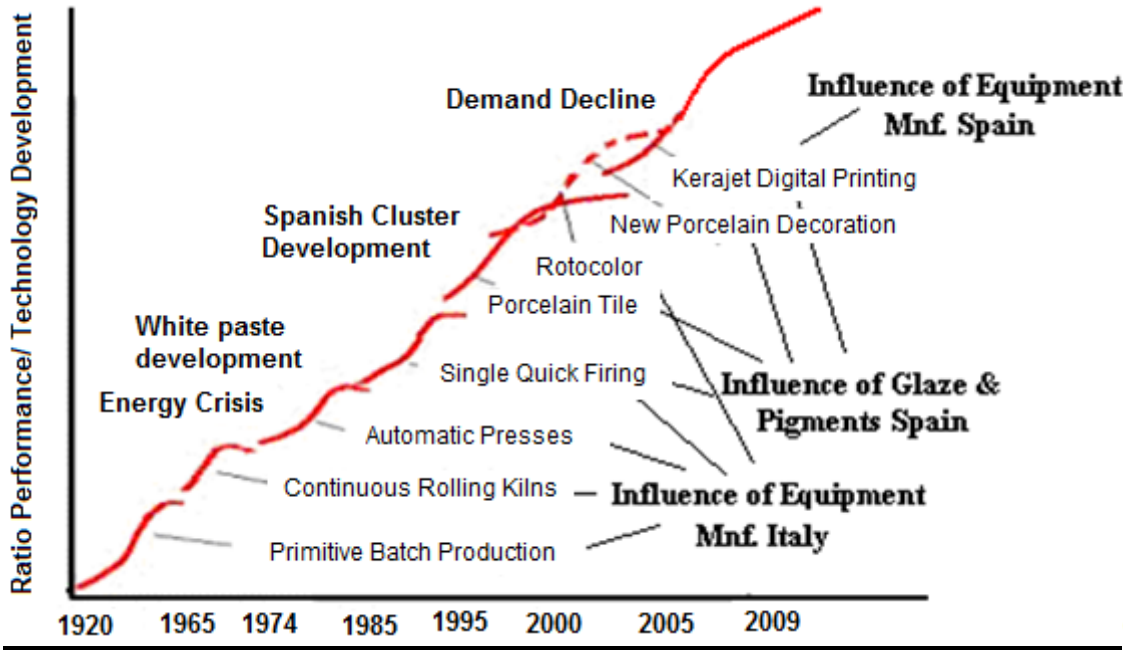
The innovation inside district is not created by a single player but is the result of "a diffused ability to innovate" (Becattini, 2000; Bellandi, 1989), it means that innovation inside the district is the ability to learn by experience and innovate by it, this factor can be seen as the substitute of R&D department of great enterprises.

Illustration 1. The S-Curve of Technological Process



Source: Personal elaboration from Steele, 1989

Illustration 2. Technological Discontinuity within Castellón's district



Source: Albors-Garrigos et al., 2014

Many experts have studied the existing relationship between the industrial district of Castellón and the diffusion of innovation, it can be interesting underline the work of Albors and Molina (2000) *The diffusion of centralised inter-organizational innovations.* The case of ceramic industry, in this work it can be found the concept of knowledge sharing routines[14], it refers to the fact that routines within a production process help to share knowledge and to assume an inter-organizational learning. This inter-organizational learning is due to the net of the relationship existing among the different members of the district.

Without any doubts the agglomeration of SMEs producing the same goods helps the diffusion of innovations, so the structure of the district itself supports enterprises' ability to innovate and innovation processes. Garofali (1989) has said that innovation within the industrial district is a continuous process, with an accumulation and an interdependence between the effects of a large number of little technological changes, so it can be seen like a constant incremental innovation process.

Sometimes this element can be seen also in great enterprises but this one prefers radical innovation to incremental ones. The peculiarity of the innovation inside the district is that the development process is not localised in a single firm but it is diffused inside all district through informal mechanisms. This propagation is attributed to two main features, "epistemic communities" and "technological spillover". The epistemic communities are defined as a community of people that, using the same knowing methodology, have the

[14] **Knowledge sharing routines:** concept coined by Dyer and Singh (1998).

ability to give a common sense to the work of the entire industry, understanding the different point of view and coordinating them in order to work to the same target.

This is not possible in the enterprise operating outside the district because the majority of the times they work alone and they don't want to share their progress in order to anticipate their competitor on the market. So sometimes the district reaches the level of technological progress thanks to its net of connection that is not possible to reach for a single R&D department.

The "technological spillover" are created by an involuntary process, they are produced when an enterprise inside a district creates new knowledge but thanks to the net created between the enterprise and the context this knowledge sticks out the enterprise and becomes of public dominion inside the player of the district. For Castellón, as underlined by Molina (2002), these spillovers have been fundamental for the innovation processes. In the great enterprises, the spillover is rare because the firm tempt to avoid the exit of information in order to keep an advantage over the other competitors.

II CHAPTER: THE CERAMIC DISTRICT OF CASTELLÓN DE LA PLANA

Introduction

In this second chapter the work will begin speaking about the first of the two district analysed, the Castellón de la Plana one, it will start with a brief description of the territory where is situated the district and then it will explicate the history of its born and its growth during the years. After this sociocultural contextualization, the work will be focused on the economics aspects and it will analyse the strength and the weaknesses of the agglomeration.

2.1 THE TERRITORY

This first part of the second chapter is going to contextualise the territory within the district has grown up over the years. Firstly, the territory will be analysed by a natural point of view, talking about the geography, then the paper will speak about the concentration of the enterprises in the territory and then it will contextualise it from a socioeconomic point of view. Finally, it is important to underline the infrastructures that connect this territory with the rest of Spain and the world.

2.1.1 Localization

The province of Castellón is settled in the northern part of the Valencian Community and its capital is Castellón de la Plana.

The Valencian Community is an autonomous community and it is one of the most important regions in Spain, it is one of the most industrialised territories and it is the fourth major economy of the country, it produces the 9,6% of the entire national GDP. The industrial district of Castellón contributes creating and keeping this position. In this community, Castellón is the third major province after Valencia (the capital of the community and the biggest city) and Alicante. It is the eighth bigger community in Spain (23255 km²) and it represents the 4.6% of the nation.

Castellón is the 38th largest province in Spain with a surface of 6632 km² (1.31% of the total of Spain). The province counts 135 commons and the population raises 582327 inhabitants (1.25% of the total of Spain).

The geography of the province is prevalently mountainous but the territory of Castellón isn't constituted only by mountains, talking about the industrial district of Castellón it can be seen that is situated in the flat part of the province, between L'Alcorá, Onda, Vila-real, Borriol and Castellón. The DIC (Industrial District of Castellón) is developed within a range of 30 kilometres, it is situated in the Mediterranean part of the territory and it includes 25 commons with an area in which live 250000 citizens where is concentrated almost the entire Spanish ceramic production.

2.1.2 Concentration

The concentration is one of the most important features for the industrial district of the Castellon, within the agglomeration it can be found a great concentration, in a radius of 30 km it is situated almost the entire Spanish tile production (95%) and the 40% of European one (10% at worldwide level).

According to the Spanish Association of Manufacturers of Ceramic Tiles (ASCER) in 2015, the Spanish ceramic sector produced 440 million m2 being the first European producer's (total sales amounting to 3,1 billion euros). Currently, Spain is the first European exporter and the second largest worldwide. The district creates 14,500 direct jobs and it is collocated as the third industrial sector creating more surplus for the country's trade balance.

To understand the huge concentration within the district it has to be underlined that it is geographically located in a small area with not more than 450000 inhabitants. In this small context can be found a highly developed producing net with a huge number of interconnection between enterprises, at a vertical and horizontal level that gives to the district a notable efficiency.

Furthermore, inside the area, there aren't only final producer, the district includes also firms that provide to the raw material, producers of glazes and frits and machinery producers. So within the district, it can be found all the part of the productive process and a high integration.

There is a concentration not only for the producers but also for the subsector connected with the ceramic one, in the territory it can be found institutions, created by privates and also by the public administration during the years with the intent to foster innovation and the connection between enterprises like the Universidad Jaume I or the ITC (Instituto de la Tecnologia Ceramica – Institue for Ceramic Technology), this could be pointed as an intellectual concentration.

For all these reasons the ceramic district of Castellón is studied as a canonical example of the industrial district and the geographical concentration of the industrial activity, as well as the supporting institution of the main sector, contribute to that. The geographical concentration has also fostered the diffusion and the implementation of the connections between the different actors within the cluster.

2.1.3 Socio-economic profile

In this region in addition to Castellón ceramic district, there are others important districts that give an important contribute not only to the Valencian economy but also to Spanish economy in general.

It's important to talk about the economy of the Valencian community in order to understand the context of great dynamism wherein the district grow up and wherefrom the district has beneficiated. It can be said that within the Valencian community there is a great entrepreneurial spirit that united with the sources and the economic availability of the region have created one of the most developed territories of Spain.

During 2015 the resident population in the Community of Valencia was 4,977,171, this data represents the 10.68 % of the total Spanish (4th more populated region in the country). The GDP of Valencian Community is more than €99 billion representing 9.5% of the Spanish GDP. Services represent 72.68% of regional GDP and they are the more productive sector, followed by Industry at 18.78%, Construction at 6.34% and finally, the Agricultural sector at 2.20 %. Spanish GDP is similar to the Valencian one. 69% comes from the service sector, 14.3% from industry, 11.4% from construction, and 2.6% from agriculture.

The ceramics and tiles, the shoe industry and leather goods, the games and toys, the wood and furniture, textile and clothing industry and finally the automotive industry are the strategic sectors of the community, these sectors are important not only for Valencia but for the nation itself. The crisis affected Valencian community more than other places because of the huge dependence of its economy on the construction sector, a study has revealed that before the crisis 80% of community's economy was related to construction industry.

At the end of 2015 within the community, there were two and a half million people employed, the 72,9% of them in the services sector. Unemployment rate within the community was 22.37%, higher than the national one (21.18%)

2.1.4 Infrastructure

Through the territory of Castellón, it can be found a highway and two dual carriageway that connect the city with the outside, there are also many different secondary ways that cross the city.

The main highway is the AP-7 (Autopista del Mediterráneo – Mediterranean Highway) that connect all the Mediterranean coast from France to Algericias. Then there is the CS-22 that is one of the two dual carriageways that connects the port of Castellón with the N-340, that connects Cádiz with Barcelona along the all Mediterranean coast passing through 10 provinces. The second dual carriageway is the CV-10, an autonomous street of Valencian community that links the north with the south of the community. After that it can be cited so many secondary streets that are important for the district because they connect the enterprises and the businesses of the different parts of the supply chain, they are the CV-149, CV-150, CV-151, CV-16, CV-17 and CV-18.

The transport of ceramic products happened mostly by streets with camion, so this type of infrastructure is the object of continuous investments. The others important media that connect Castellón with the rest of the Spain and the world are the railways and the port of Grao. There is also an airport but it is used only for civil transport and it is secondary.

2.2 HISTORY OF THE DISTRICT

In this second part, the paper will analyse the history of the ceramic district of Castellón, starting from the first little factories of the XVIII century and arriving to contextualise the situation of the district nowadays. A special focus has been given to the years after the Stabilization Plan for Spain of 1959. This year, and especially this plan has been crucial because it opened the Spanish economy to the foreign trades.

Writing this part, the main aims have been given by a publication of Vincent Ortells Chabrera, a professor at the Jaume I University, titled *La indústria ceràmica a la Plana de Castelló. Tradició històrica I mundialització actual* (The ceramic industry in the plane of Castellón. Historical tradition and actual mundialization), the publication of Cajamar, especially *El Distrito de la cerámica de Castellón* written by Vicente Budi and finally, a crucial aim has been given also by ASCER that has given directly some information about the creation and the growth of the district during the years.

2.2.1 18th Century

The XVIII century is dominated by the figure of the *Real Fábrica de Loza Fina y Porcelana*. The first industrial precedent of the Castellón ceramic was the factory founded in 1727 by the count of Arlanda and l'Alcora, born during the plan to industrialise Spain and protected by the mark of *Real Fábrica* (Royal Factory). The investment done by the count Buenaventura Arlanda was really important but without any doubt, he has beneficiated of strong fiscal tax breaks.

The territory of l'Alcora offered to the count friendly conditions, the majority of the workers were from the little towns near the factory, in order to grow the level of the production there was also specialised workforce from France.

When count Buenaventura died the factory passed to Pedro Pablo, he impulsed the porcelain production introducing technical innovations as mills and new types of furnaces. He also augmented the number of the employees. The production raised and it started to be exported not only in Spain but also to America.

When Pedro Pablo died, in 1798, the firm passed to Hijars and a period of decadence started. The Girona family, Catalan entrepreneurs, took the direction in 1858, finally ended the connections between the firm and the royal house.

2.2.2 19th Century

During the XIX century, the focus over the ceramic production passed from l'Alcora to Onda, another town within the territory of Castellón. The geographical situation in this place was similar to the one in l'Alcora. In these years a lot of new firms born and grown up in the territory, the production started to be elaborated and in testimony to this, the Castellón firms received many awards for the quality of their products.

Between the last decade of XIX century and the first of XX one, new enterprises appeared in Onda's scenario. This happened thanks to the creation of the railway that connected Onda with the production centre of Villareal, with the Spanish railway system and finally, with the new port of Castellón. They exported millions of ceramics in South America. The main market was Barcelona, followed by Andalucia, Americas and North Africa.

In the XIX century also in Castellón started the implantation of new firms. At the end of the XIX, there were no distinctions between the productions of architectonic ceramic artistic one, the two types of production were made in the same plant but from the end of the century the things started to be discerned and the different ceramic industries were differentiated. The main

phases of the production process were hand done and require a lot of time and forces, this system of production persisted until the '60s of XX century when the first industrial reconversion came out with new types of combustible and furnaces.

2.2.3 1900-1970

During the years between 1900 and 1970 in the territory of Castellón happened a first territorial expansion of the district. At the beginning of the century, the territories of the Plana were mostly devoted to agricultural functions.

Onda was the main Spanish production centre for tiles and ceramic products, this situation was created mainly thanks to the low costs to implant new production factories and the creation in 1925 of the *Escola de Ceràmica d'Onda* (Ceramic School of Onda). During the years of the civil war (1936-1939) the production was slowed down but it never stopped. In 1946 respect to 1929 there were 3 plants less but the production was incremented thanks to the operate of the specialised workforce. Between 1946 and 1956 there was a huge crisis in the citrus production and a lot of agricultural producers preferred to pass to the ceramic sector in spite of rebuilt their businesses around orange and mandarins.

In January 1958, Spain became an associate member of the Organisation for European Economic Cooperation (OEEC), the actual OECD, then in 1959 Spain joined the International Monetary Fund (IMF) and the World Bank. These bodies immediately became involved in helping Spain to abandon the autarkical trade practices that had brought its reserves to such low levels and that were isolating its economy from the rest of Europe. In this context, Spanish government actuated the Stabilization Plan for Spain (1959) to open the country to the trade with the rest of Europe and fill the gap with the others economies. Obviously, the industry beneficiated by this change and grew.

The most important technical progress were the use of totally automated presses (1962) and the first tunnel-furnaces for the cooking process of the tiles (1964). A first role was played by the change of the combustible, from the carbon to the fuel. Furthermore, the new factories were vertically integrated and the productivity during these years was constantly increased.

At the end of this period the ceramic industry of Castellón was ready for the great change of the seventies, during this decade there was the final expansion of the Spanish district that started to fill the gap with its main competitor, the Italian district of Sassuolo.

2.2.4 1970-1980

After the decade of the sixties, characterized by an important industrial take-off with the rapid growth of the industry in its complex also and especially thanks to the domestic market opportunities given by the Stabilization Plan for Spain (1959) that gave to the Spanish citizens an increased economic power, the economy of the district known during the seventeens a huge technological restructuring and improvement. In these years, due to the increased number of enterprises, born the association of the ceramic producers, exactly in 1977, the ASCER (Asociación Española de Fabricantes de Azulejos y Pavimentos Cerámicos).

The growth of ceramic industry during this decade was constant and it experimented huge numbers, between 1969 and 1983 opened more than 40 new plants and obviously, also the number of the workers increased, from 5571 to 11046 with a quintuplicated industrial capacity. Thanks to the Stabilization Plan of 1959 now Spanish industry was open to foreign markets and during these years Spain was the second worldwide fastest growing economy after Japan. Thanks to this contextual situation within the cluster started an important industrial take off and the technological level improved consistently.

Twenty new municipalities were incorporated to the geography of the district and also new firms born, the characteristics of the new plants were a longitudinal extension due to the continuous line for the tiles production and the great size of the plants in order to take advantage of scale economies and increase the production.

The boom came to an end with the oil shocks of the 1970s and government instability during the transition back to democracy after Franco's death in 1975. The district of Castellón was partially affected by the energy crisis but it was able to overtake it.

2.2.5 1980-1990

After the technological restructuring and improvement of the ‘70s, during the eighteens started the huge process of internationalisation of the district that began to propose a huge quantity of its product also in the foreign markets. The main technological improvement was due to the introduction of the gas pipeline and thanks to the creation of the technological institute ITC-AICE that gave a great impulse to the innovation within the district.

At the beginning of the eighteens within the territory of Castellón de la Plana started the process called by the economists “Second Industrial Reconversion”. During this period the district passed through many important changes that transformed the production processes and the value chain, accelerating the time to market and the quality of the products. The first

important introduction was represented by the gas pipeline built in 1980. This green energy led the innovation and the growth in the following years, the majority of the firms in the district adopted electric cogeneration systems in order to take the maximum advantage of the gas.

The “Second Industrial Reconversion” was mainly marked by the introduction of the single-fire process in large scale. The main changes introduced by the single-fire processes respect the double one were the creation of specialized firms that took care only about the atomization process needed by the single-fire, and the huge trend to automate all the part of the production process, possibility increased by the features of the single-fire process that fit perfectly to these needs.

During these years also born the ITC-AICE, the Technological Institute for Ceramics, this was, and still, it is, a strategic partner for the ceramic district, it helps the technological processes with the SMEs, connecting them and creating a net of shared information.

2.2.6 1990-2000

Thanks to the great technological improvement during the eighteens the district within the following decade, the ‘90s one, experienced a strong growth of production and revenues. That allowed Castellón to play an international competition with the main producer of that time, the Italian district of Sassuolo and became one of the world leaders in both ceramic tiles and frits and glazes.

During the ‘90s within the district born, or remarkably grew, a great number of complementary and supporting industries, like glaze, fries, bathrooms or sanitary and a huge number of enterprises started englobing the production of the entire ceramic offer taking advantage of great scale economies, firms like Porcelanosa, Pamesa, Taugrés or Vives.

During the ‘90s the only field where Italy kept a huge leadership was the machinery one. The diversification of the production, the business concentration and the opening of the new international market were the main trends of these years. The district settled in the Plana represented the 99% of the ceramic production capacity of the entire nation, hosting the 75% of the enterprises and the 87% of the workforce. It started a commercial international challenge between the two districts, Catstellón and Sassuolo. In 1999 Castellón exported its production all over the world, mainly in the European Union (45.15% of its exportation) and outside EU the two main markets were United States (11.57% of the exportation) and Middle Orient (10.59%).

2.2.7 Nowadays

The period going from the beginning of the millennium to 2017 has to be divided into two parts, before 2007 and after 2007. This year is very important for the analysis of the district because it signs the beginning of the international financial crisis that has affected the majority of the sectors in every developed country. It has been the major crisis since 1929 one.

Before 2007 it can be underlined a stationary trend in the workplace's world. The decreasing numbers are the production ones; during this period has entered in the worldwide scene a new important competitor, China. The problem is that China has not to respect the energy challenges proposed by the Kyoto agreement about the environment, so it can produce almost the same product with fewer costs and using a cheaper workforce. These factors caused the dominance of China in the worldwide market, it had more than the 30% of the entire production, with Italy and Spain stopped only around 10%, and this data were decreasing for the two European countries.

This situation created a disequilibrium between Europe and China. Spain solved the problem betting on the quality of its product fronted with the Chinese ones and on its two main ceramic sectors, the frits and the tiles. Then in 2007 came the worldwide crisis, this crisis affected the structural condition of the district because it was strictly interrelated with the construction sector and this one has been the sector that more had been affected by the crisis. So the construction sector fell down and with it also the national demand for the ceramic district. From 2007 to 2012 national sales constantly decreased. To find a solution to this problem the district augmented the exportation in order to find new markets and respond efficiently to the crisis, so the exportation started rising from 2010. The ceramic sector that was more affected by the crisis was the tiles one, due to its huge dependence on the construction sector, the fries and the machinery sectors, thanks to the augmented exportation, restored more rapidly the situation and from 2012 they come back to the 2007 results. This goal has not been achieved by tiles sector yet. From 2007 to 2012 the national market fell by 66% and the exportation augmented only of 6.8% with an overall exportation rate of 79%.

Finally, it is easy to understand how the district exited really mutated by the crisis and nowadays it has to front many challenges, from the climatic ones to the emergence of new producer countries like China, passing through the energetic Spain's dependence and the maturity of the market.

2.3 INTERNAL STRUCTURE

Within this part of the work, the paper is going to analyse the structure of the ceramic industrial district of Castellón. Firstly, it will explicate the different typologies of product done by the industries of the sector, the ceramic tiles, frits, glazes and colours one and finally the machines utilised for tiles production. Then it will examine the financial data of the two main activities, the tiles production and the frits, glazes and colours one, in order to use the most actualized data it will be used the documents given by the two producer associations ASCER and ANFFECC. The document od ASCER will be fundamental also for the following paragraph that locates all the tiles producer of the district inside the territory in order to understand the geographical concentration of the companies. Finally, it will be explained the different importance of the three industries operating within the district's borders, the final markets for the Spanish tiles and the delocalization and internationalisation of the production.

2.3.1 Products

Within the industrial district of Castellón, there is not only the ceramic production, there is a series of related industries that give their support for the creation of the final ceramic product creating an ecosystem of enterprises.

2.3.1.1 Ceramic products

The main part of the district's activity is focused on the elaboration of ceramic final products, mainly tiles, floors and ceramic covering. So the production of the district is based on the product for the construction, these products are various and their utilisation too.

The district of Castellón produces approximately the 95% of the entire Spain's manufacturing of these types of product, with a production of 440 million m² in 2015 and revenue for €3095 million. Within the district it can be found firms that manage the entire production process, the average number of employees for this ones is around 150. It has to be underlined the presence of others smaller entities that are specialised in the production of special pieces, and also artisans that, with their high-quality product, complete the offer of the ceramic district giving to the final customer a complete choice.

2.3.1.2 Frits, glazes and ceramic colours

This sector is literally vital for the agility of the district in a changing worldwide context. The final product of this one is the differential element for the tiles and the ceramic covering, a good part of the R&D of the entire district is developed within this sector, to have an idea just think of the Inkjet technology that has completely revolutionised the ceramic world. This part of the district is characterised by the presence of a small number of enterprises with a huge size. The constant investments in R&D of that enterprises have allowed the Spanish frits and glazes production became the first in class worldwide, overtaking Italian one, internationalising its production plants and exporting its products all over the world.

The numbers of this part of the sector are constantly growing up and in 2015 the revenues reach more than €1194 million, with the exportation representing the 71.46% of this number.

2.3.1.3 Machines

The machinery production is the weakest part of the district due to the great Italian advantage in this part of the sector. Spanish ceramic firms import their machines from Italy but it is not correct talking about an absolute dependence from Italy because in this context it is fundamental the interaction between machinery suppliers and the ceramic firms in order to meet the necessity of the two ones and adapt the machines to the production specificity of the different enterprises.

2.3.2 Financial data

In this part, the text is going to show the financial data of the ceramic sector. The main focus will be centred on the ceramic product and on the frits, glazes and ceramic colours ones, due to their major importance within the ceramic district. In order to do that the paper will use the documents elaborated by the sector associations, ASCER, ANFFECC and ASEBEC.

2.3.2.1 Ceramic products

First of all, it has to be said that Spain is the first European ceramic producer and the second worldwide exporter for square meter commercialised outside national territory. The ceramic sector is the third one for the generation of national surplus (€2.253 million in 2014). The district of Castellón has unique characteristics that give to it an advantage over the majority of

the others worldwide competitors. One of the main features is the high territorial concentration of the firms, another point that contributes giving success to the firms inside the district is the high investments in R&D.

Castellón represents the 94% of the entire national production and the 81% of the ceramic enterprises is settled here, the district is also vital for the Valencian community, in 2013 it represents the 2% of the entire industrial enterprises, the 7% of the employers and the 5% of the entire financial quote of the Valencian industry. The ceramic product is the third more exported in the community (9% of the entire community's export).

During 2016 the sector has growth thanks to the exportation but also to the internal market. The total sales have growth by a 7,1% reaching €3.316 million. The national sales have kept the recovery experienced during 2015, during 2016 they grew by 16% with a total amount of €746 million, this data is significant because the amount is not so high, it is a relevant increase related to the data of the previous year. The analysts think that this recovering trend for the national market will follow during the next years thanks to the recovery of the entire national economy after the crisis' years. During 2016 the ceramic production has grown by an 11.8% and 500 new employees were hired.

As it has been said during the explication of the history of the district after the crisis of 2007 the structure of the sector has been totally modified. Nowadays the exportations represent the crucial point for all the district and their share is continuously rising.

Table 2. Tile Sales (2009-2016) - Spain

YEAR / € MIL	2009	2010	2011	2012	2013	2014	2015	2016	2016/15
EXPORT	1673	1747	1897	2082	2240	2328	2452	**2570**	**4.8%**
NATIONAL	918	801	700	575	557	574	647	**746**	**16%**
TOT. SALES	2591	2548	2597	2657	2797	2902	3100	**3316**	**7.1%**

Source: ASCER, 2017

As it can be underlined from the economic balance of the sector, the document did yearly by ASCER, during 2016 the export has grown by a 4.8% and in this moment it represents the 80% of the total ceramic's sales.

During 2016 the exportation has grown by a 4.8%, they represent €2.570 million in 2016. This growth is due mainly to the good evolution of the European market (+10.3%) and the United States one (+28%) that have balanced the falls registered in some important markets like Maghreb (-7.1%), Near Est (-1%) and East Europe (-7%).

2.3.2.2 Frits, glazes and ceramic colours

This related sector is the main one, the Spanish ceramic frits, colours and glazes have a worldwide leadership, thanks to the investments done by the companies in R&D nowadays this sector leading the global innovation and it overtake, since the '90s, Italian producers, the pioneers of this industry. The quality and competitiveness of the products done thanks to that technologies has been one important key for the spectacular growth of the ceramic industry in Spain. One of the most important points is the synergy between firms and tile industries and ceramic frits, glazes and colours producers in a single front has catapulted the Spanish ceramic industry to be one of the few worldwide leaders of this market.

Table 3. Frits, Glazes and Ceramic Colours Statistics - Spain

STATISTICS	
TOTAL SALES 2015	1.194.786.756 €
TOTAL EXPORTS 2015	853.770.828 €
% EXPORTS OVER SALES	71.46%
TOTAL NATIONAL SALES 2015	341.015.928 €
% NATIONAL OVER SALES	28.54%
TOTAL LABOUR FORCE 2015	3610
% VARIATION:	
TOTAL SALES	-0.61%
EMPLOYEES	+4.03%

Source: ANFFECC, 2016

Actually, the total sales of the sector overtake € 1194 million, showing an evolution trend since 2009, that represents the first year of recovery during the worldwide crisis. The export represents the 71.46% of the entire sales with more than € 853 million. The national market reaches € 341 million representing the 28.54% of the sector's sales. The number of employees is growing since 2009 and in 2015 they were 3610 (+4.03% over 2014).

Export represents the majority of the sales since 2000, this characteristic helped the industry during the crisis. Through the years between 2007 and 2014, Spain suffered the effects of the global recession more than other countries but the ceramic frits, glazes and colours sector, thanks to their great exportation rate were able to restore the situation in 4 years, more rapidly than the ceramic tile industries and the machinery ones.

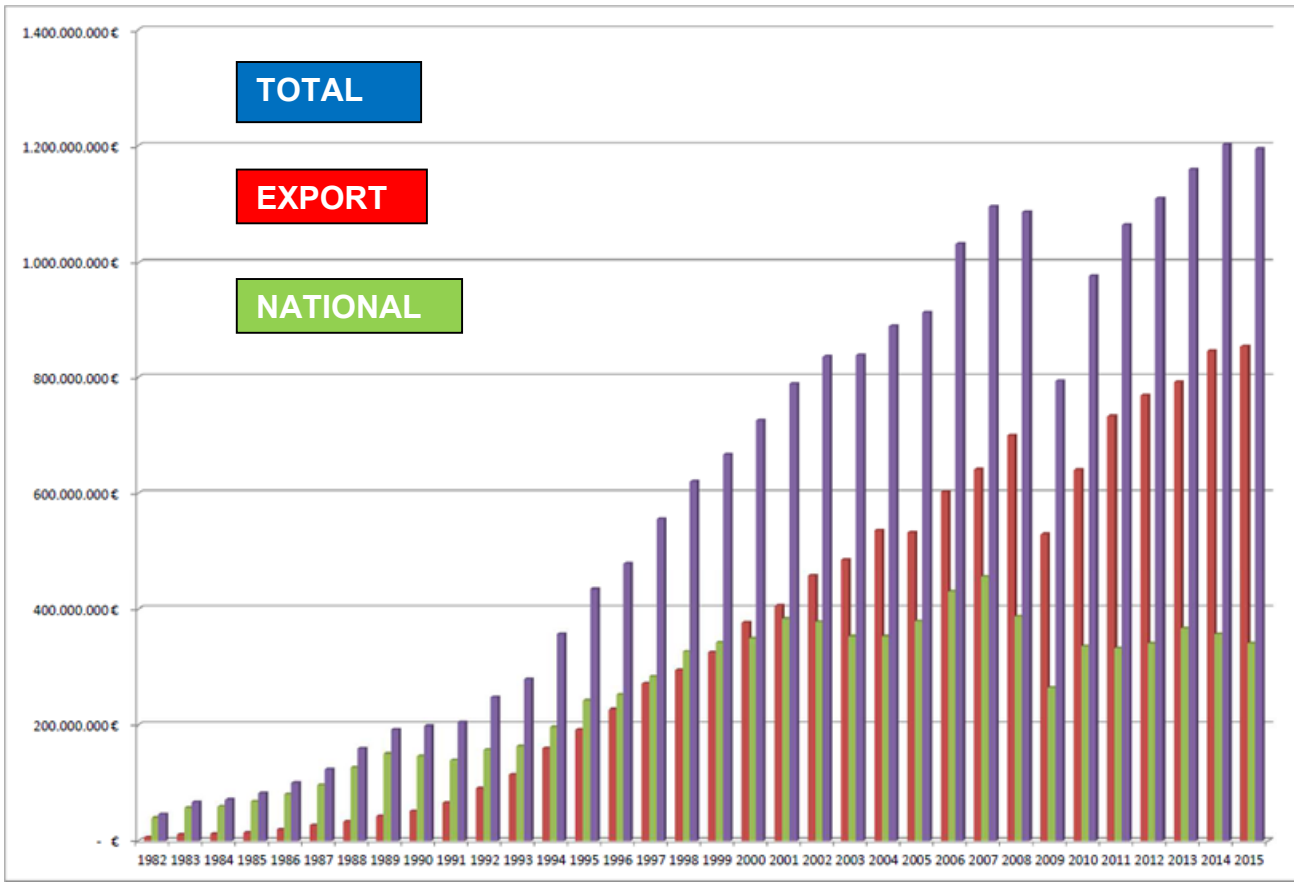
Actually, the Spanish ceramic frits, colours and glazes are exported all over the world, mainly in Italy, China, Egypt, Algeria, Russia, Morocco, India, Turkey, Emirates, Morocco, Germany, Poland, Russia and Brazil. Not only the production in exported, a lot of firms have decided to create subsidiaries in other countries to be nearer to their customers.

Table 4. Frits, Glazes and Ceramic Colours Sales - Spain

YEAR / € MIL	2007	2008	2009	2010	2011	2012	2013	2014	2015
EXPORT	641	700	529	640	733	768	792	845	**853**
NATIONAL	456	387	264	336	332	340	367	356	**341**
TOT. SALES	1097	1087	794	976	1065	1109	1159	1202	**1194**

Source: ANFFECC, 2016

Illustration 3. ANFFECC Historic Evolution of Sales - Spain



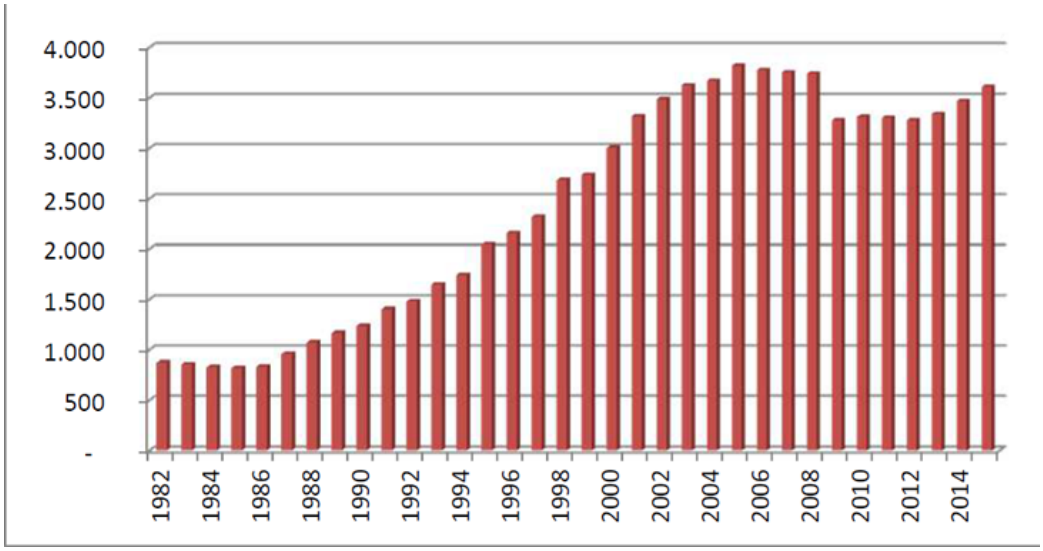
Source: ANFFECC, 2016

Table 5. Frits, Glazes and Ceramic Colours Workers - Spain

WORKERS	
YEAR	**WORKERS**
2007	3754
2008	3741
2009	3278
2010	3310
2011	3302
2012	3279
2013	3342
2014	3470
2015	3610

Source: ANFFECC, 2016

Illustration 4. Frits, Glazes and Ceramic Colours Workers - Spain



Source: ANFFECC, 2015

2.3.3 The firms and their location

In this paragraph, the work is going to analyse the localisation and the offer of the tiles firms of the district in order to understand the importance of their activity and the distribution of the same enterprises over the territory. This part of the work is focused only on the tile firms and it will not consider the machinery and the glazes, frits and colour producers. This choice has been done in order to better focus the work on the main activity of the district, the tiles' production.

First of all, it has to be underlined that all the firms are in the territory of the Castellón province, they are distributed within 10 municipalities:

1. Alcora;
2. Alzamora;
3. Betxi;
4. Cabanes;
5. Castellón de la Plana;
6. Lucena del Cid;
7. Moncofa;
8. Nules;
9. Onda;
10. Villareal.

These municipalities are settled within a limited area with a radius of 30km, this means a great concentration of the firms, commented in the previous paragraph "the concentration". It can be seen that the municipality with the major number of firms it is Alcora, followed by Onda and Villareal, but this not means that the most important firms are settled within this ones, in fact, groups like Pamesa, Ceramica Nulense, Keraben o Grespania are settled in the other municipality of the district.

Within the annexes (Annex 1), it can be found the list of the major tiles enterprises divided for location within the district.

2.3.4 Importance of the activities

Within the industrial district of Castellón, there are three main industrial activities, tile production, machinery production and finally, frits, glazes and ceramic colour production. Obviously, not all the industries have the same importance for the life of the district, the main target of this paragraph is to underline the different importance of the different industrial

activities. To do this it will be used the data given by ASCER, ANFFECC and the publication of Vicente Budi, *El Distrito de la cerámica de Castellón* (2008).

The most important activity is the ceramic manufacturing one, nowadays Spain is the first European tile producer with 440 million square meters produced. Tile production is important only for the entire Spanish economy, the majority of the production is exported abroad; specifically, the 80% of the entire production is sold in 186 foreign countries. This contributes determinately to the creation of Spain's surplus in its commercial balance, the tile sector is the third one for surplus given to the Spain's commercial balance. This sector is also important for the work creation within the Valencian community, it gives directly work to 15000 employees and it creates 7000 indirect workers.

The second fundamental sector within the district is the frits, glazes and colours production, it represents the global leader and its products are used by the tiles producer all over the world. It is important for the district not only for the turnover generated but mainly for the constant innovation of their product. The products are mainly exported (70%) and this benefits the surplus of Spanish commercial balance. The subsector gives work to more than 3600 employees.

Finally, there is the machinery producer sector, it is the smallest and the weakest part of the district. This weakness of the Spanish ceramic machinery industry is due to the great power and predominance of the Italian machinery producers that export all over the world their products.

In conclusion the importance of the tile producers is predominant, also the frits, glazes and colours producers are very important and they represent the global reference of their sector, the only part of the district that is underdeveloped is the machinery production, the district for this part depends on from foreign machinery producers and it imports the majority of their machines.

2.3.5 Final markets

The Spanish production is exported to 191 countries all over the world, the main markets are Europe, that represents the 45.8% of the total exportation (38.6% inside EU) with an increase of 7.7% in this zone. The sales inside the European Union has grown by a 28%, obviously, the analysts expect that this trend will continue during the next years but with rates more restrained.

Another important zone is the Near Est, representing the 20.5% of the entire export, although the fall registered during the last year. Other zones where the exportation registered falls are Russian Federation (-20%) and Saudi Arabia (-14.8%).

Table 6. Spanish tiles export zones

(million €)	2015	2016	16/15	% value
Europe	1092.1	1175.9	7.7%	45.8%
UE 28	897.9	990.7	10.3%	38.6%
UE 15	744.3	822.6	10.5%	32.0%
Eurozona	606.6	680.1	12.1%	26.5%
UE New Members	153.6	168.1	9.5%	6.5%
East Europe	162.4	150.9	-7.1%	5.9%
Near Est	532.2	526.0	-1.1%	20.5%
America	312.9	383.5	22.6%	14.9%
North America	197.3	257.3	30.4%	10.0%
USA	147.0	187.9	27.9%	7.3%
Central America	62.3	77.7	24.7%	3.0%
South America	53.2	48.4	-9.1%	1.9%
Asia	621.2	619.9	-0.3%	24.1%
East Asia	56.5	57.4	1.5%	2.2%
South-East Asia	26.6	27.4	3.1%	1.1%
Africa	402.1	365.8	-9.0%	14.2%
Maghreb	264.1	245.3	-7.1%	9.5%
Oceania	23.9	24.9	4.4%	1.0%
Total	**2452.2**	**2569.7**	**4.8%**	**100%**

Source: ASCER, 2017

Table 7. Spanish tiles export countries

MAIN COUNTRIES			
	2015	**2016**	**16/15**
France	233.8	257.0	9.9%
USA	147.0	187.9	27.9%
United Kingdom	157.5	165.6	5.1%
Saudi Arabia	171.8	146.4	-14.8%
Algeria	130.1	123.4	-5.2%
Israel	93.4	97.7	4.6%

Germany	85.9	93.3	8.7%
Italy	80.7	90.7	12.4%
Morocco	69.6	78.9	13.3%
Lebanon	65.3	76.2	16.8%

Source: ASCER, 2017

2.3.6 Internationalisation and delocalization

Talking about the delocalization and the internationalisation within the ceramic district of Castellón have to be distinguished two different situations, the ceramic producers one and the frits, glazes and colours one. Also, it has to be done a differentiation between the two concepts that could seem the same but they are deeply different.

The differences between internationalisation and delocalization are in the different grade of control by the home producer over the different production phases and especially in the phase of the creation of new products, so basically the main difference is in where is located the R&D process, that means where the new products born.

In the sector of the frits, glazes and ceramic colour, as Budi explicated in his paper *El Distrito de la ceramica de Castellón*, there is a trend since some years for direct investments outside Spain, with the direct presence of the producers in the main countries where the ceramic producers are located, with a model of commercialization for raw materials, processes and final products. The main point is that all the R&D process stays inside the borders of the district, so this is a process that represents an alternative to the exportations; the decision to maintain the R&D process inside the district of Castellón has been taken due to the advantages that this one gives to the enterprises of this sector. The situation for the tile producers is quite different, almost the totality of the tiles production stays inside the borders of the district, just a few producers have decided to take a part of their production outside the district (like Pamesa with Pamesa Brazil).

It can be concluded that the trend to the internationalisation and delocalization of part of the production process is really contained for the tile producers, it is more common with the frits, glazes and colours ones due to their necessity to be nearer to their final customers and improve with them new solutions.

2.4 TECHNOLOGICAL DISCONTINUITY

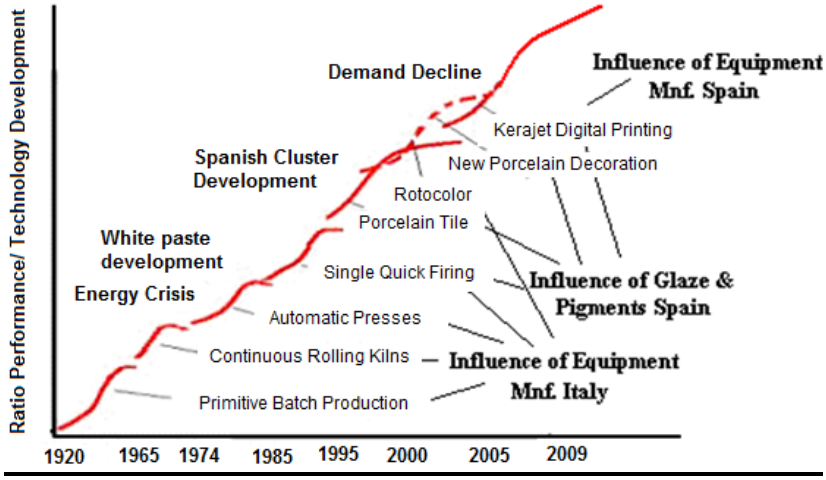
In this paragraph it will be analysed the evolution of the technology used within the district during the last century, the paper it will focus over the period started with the '60s, the period of the first great expansion of the district, as it has been explicated in the historical contextualization. In order to explicate this part of the work have been used mainly two studies, the article *Positioning in the Global Value Chain as a Sustainable Strategy: A Case Study in a Mature Industry* (Albors-Garrigos et al., 2014) and the study *The diffusion of decentralised inter-organizational innovations. The case of the ceramic industry* (Albors and Molina, 2000).

Within the district of Castellón it can be noticed the application of the theory of innovation system based on networks, exchange of knowledge of routine and discontinuous nature created by Dyer & Singh (1998) with the name of "Knowledge sharing routines". Basically, this means that through the routine performed by the different players of the district in their production processes it has been created a shared knowledge and an inter-organizational learning has been developed.

As it can be seen by the illustration, the majority of the innovation has been created after 1980, this is because the district of Castellón is a young district and only the 10% of the firm has more than 35 years, that is due to the significant growth occurred in the district during the '80s.

The innovation within the ceramic industrial district of Castellón is discontinued, with the peculiarity that extends and spreads to all members of the district through informal channels, being the "spillovers" of these innovations very important, as Molina ensures (2002), in the way of working of the ceramic industrial district of Castellón. The paradigm followed here to explicate the life cycle of these innovations is the S curve one by Foster.

Illustration 5. Technological Discontinuity within Castellón's District



Source: Albors-Garrigos et al., 2014

It has to be underlined that in the first phases of its life the technology used within the district was strongly influenced by Italian machinery producer but during the last 10/15 years the district acquired more independence by Italy. Nowadays the main technological paradigm in the district is the Inkjet technology, that will be analysed in the next paragraph.

2.5 INKJET TECHNOLOGY

Inkjet technology is the actual technological paradigm of the industrial district of Castellón. Inkjet technology for ceramic purpose started its success in 1998 when it was founded Kerajet, the company that developed this new technology.

Before this company adapt the concept to the tile industry the Inkjet technology was used only for conventional printers in sectors dedicated to graphic printing. Then in 1998 Kerajet started thinking about using this technology also for decorating ceramic products and this form of non-contact tile decoration was born. By this new mood of decorating the tiles the process was completely revolutionised, now the procedure starts with the design chosen for the decoration of the piece, that it digitises and a computer is responsible for directing the ink through tiny channels and form patterns of small dots representing the chosen design at the end.

Before the exploitation of Inkjet technology, there were some techniques to decorate the tiles: aerography, rotogravure, flexography, serigraphy; all these methods were rigid and old fashioned. With the Inkjet technology, the majority of problems brought by that methods were solved, it eliminates the phases of manufacturing templates, make the machines ready with the required template and it cut also the final phase of cleaning up the tiles after the printing process.

Obviously, also Inkjet technology presents some problems, the main one is the cost of the machines. In the district of Castellón, the majority of the firms are SMEs and they have not the resources to front a huge investment like the one required for an Inkjet machine. The second problem is that in order to get a full advantage by this, technology enterprises need operators with the knowledge, to mitigate this issue ASCER has developed training programs for their associates. The last big issue is the constantly evolving process of the technology and the colours used, for the company, this means constant spent and testing in order to adjust the design to the new parameters. The advantages given by Inkjet technology are really higher than the problems, as its global success testifies. The major advantages given by Inkjet are saving time, material, reducing costs and overall it allows a great complexity in the tiles' design.

Another important point that has to be underlined is that Kerajet is a Spanish enterprise located in Castellón, it made the patent for this technology and exports it all over the world. This was

the first time that Spanish companies are not adapting to an Italian innovation and it was one of the first innovation developed by Spanish companies within the sector that deeply influenced also Italian ceramic producers.

III CHAPTER: THE CERAMIC DISTRICT OF SASSUOLO

Introduction

In this third chapter the work will follow analysing the second district, the Sassuolo one, as the previous chapter it will start with a brief description of the territory where is situated the district and then it will explicate the history of its born and its growth within the years. After this sociocultural contextualization, the work will be focused on the economics aspects and it will analyse the strength and the weaknesses of the agglomeration.

3.1 THE TERRITORY

This first part of the third chapter, like the second one, is going to contextualise the territory that includes the district of Sassuolo. Firstly, the territory will be analysed by a natural point of view, talking about the geography, then the paper will speak about the concentration of the enterprises in the territory and then it will contextualise it from a socioeconomic point of view. Finally, it is important to underline the infrastructures that connect this territory with the rest of the nation and, more in general, the world.

3.1.1 Localization

The territory within is settled the industrial district of Sassuolo is the Italian province of Modena, inside Emilia-Romagna region.

Emilia-Romagna is considered one of the richest region not only in Italy but also in Europe with an occupational rate that overtakes 70% (80% in Modena and Sassuolo). Emilia-Romagna is one of the leading regions for GDP creation in Italy (+1.1% in 2016) and it contributes in a determinant way to the development of the country producing the 6.84% of the entire national GDP. The region covers the 7.45% of the country and it contains the 7.34% of the inhabitants. The capital of Emilia Romagna is Bologna, in this context Modena is the third city for a number of citizens and Sassuolo, who is contained in Modena's territory, is only 14th.

Sassuolo is a municipality with 40780 inhabitants, it is sited on the border between Modena and Reggio Emilia and it covers a surface of 38,4 km². The territory is characterised by the presence of the "calanchi", typical hills constituted by clay fundamentals for the development of the district. The ceramic district of Sassuolo is situated prevalently in the homonymous

municipality but it is also extended others ones within the provinces of Modena and Reggio Emilia.

3.1.2 Concentration

In Sassuolo is produced the 80% of the entire Italian ceramics production in a territory relatively small.

According to the Confindustria Ceramica in 2015, the Italian ceramic sector produced 394.8 million m2 being the second European producer's, total sales amounting to 5.1 billion euros (first in Europe). Currently, Italy talking about quantity is the second European exporter and the third largest worldwide (after China and Spain). Italian economy assuming for 19143 direct jobs.

More than geographical proximity in the ceramic district of Sassuolo has to be underlined that during the years the number of enterprises is gone reducing and this fact has implicated a higher industrial concentration in term of production (in the last 10 years more than 30 cases of mergers and acquisitions). In this district, the 5 largest groups represent the 55% of the entire production.

The majority of the firms are distributed in an area delimitated in a radio of 20 km from Sassuolo, and within this area live about 160,000 people. In this contextualised situation there aren't only the final producers but all the supply chain, from the raw material to the final product. This proximity has contributed to spread the innovation and to grow up the district in the years giving it a huge portfolio of possibility.

3.1.3 Socio-economic profile

Within Europe, Emilia-Romagna is one of the leading regions in terms of entrepreneurship and economic dynamism. Active people in working age are more than 70%, and the women activity rate is the highest in Italy. The unemployment rate is under 8% in 2015 with respect to the national average (12.8%).

The total GDP of the region is over € 146 billion and with a GDP per capita of € 33238, it is one of the best in the country after Lombardy and some autonomous region in the Alps.

During the crisis (2008-2014), Emilia-Romagna economy was deeply affected by the effects of the global recession and the unemployment rate grew up to 8.5% from 3% pre-crisis, export and GDP fell (25% and 5% respectively), but after the hard years of crisis Emilia-Romagna's

entrepreneurs were able to restore the situation and going back to data higher than the 2008 ones.

With € 55 billion export (37.5% of regional GDP), Emilia-Romagna is the Italian region with the highest exportations propensity, the firms of the region contribute to creating an export rate per capita about € 12500.

Within the region there are more than 387000 enterprises, the majority of them are SME and have less than 10 employees. A great part of the firms belongs to manufacturing industry (45000), the majority of the firms are organised in a cluster or industrial district models, they seem to belong to traditional manufacturing activity but in the reality of the facts they activate medium and medium-high technology activities and high innovation capabilities. Mechanical engineering and automotive are the two main fields. Other powerful clusters are agri-food, construction materials and technologies, biomedical industries, fashion.

Within the region, it can be found a huge utilisation of cooperative economy models in a lot of fields, especially the agricultural ones. Other original features of the region are the presence of a large number of micro enterprises that coexist with an increasing presence of multinationals, this increasing presence is due to the constantly higher number of mergers and acquisitions of existing firms and in the last period by green field investments.

3.1.4 Infrastructure

Talking about infrastructure within Sassuolo's territory is a bit more different from Castellón because Sassuolo is not a province but only a municipality within the province of Modena.

There are two main streets that links Sassuolo with the principal routes, the provincial street 467 R Nuova Pedemontana and the state street 742. The Nuova Pedemontana is important because it connects the players inside the district and it allows exchanges between them, it isn't a huge street and there are many projects to modernise it and improve the viability considered the main role that it plays in the district. The second important street is the state street 742, it connects Sassuolo with Modena, from here pass the main highways that connect the province with the north Europe (A22 – Highway of Modena and Brennero) and with the rest of the Nation (A1 Highway Milano-Napoli).

Near Sassuolo there is one of the most important Italian junctions for goods trade, the customhouse of Campogalliano. It is fundamental for Sassuolo's district to be well connected with Campogalliano for two main reasons, the presence of the customhouse and the junction with the A22 present in this town, the A22 is the main highway to connect the East-norther

Italian cluster and district with Austria and overall Germany. Nowadays the connection between Sassuolo and Campogalliano are not so efficient and trucks have to use the old street because of the lack of a highway but there is a project supported by the players of the district to create a highway connection, that is considered a strategic infrastructure for the develop of the local territory and also for the region.

3.2 HISTORY OF THE DISTRICT

In this second part, the paper will be focalized on the history of the ceramic industrial district of Sassuolo, since the first furnaces, planted in the territory during the XVIII century to the modern times, with the crisis and the new structure of the district. A special regard has been given to the years of the Italian economic boom (the '60s) and the following ones because the district, as nowadays is worldwide known, was formed in that years.

The main sources in order to write this part has been a paper written in 2006 by Tiziano Bursi, professor at UNIMORE[15], titled *L'industria ceramica Italiana: trasformazioni, competitivitá e internazionalizzazione*, and a resource given directly by Confindustria Ceramica, the association of ceramic producer of Sassuolo.

3.2.1 18th Century

The Sassuolo's manufactures born thanks to the political support of local governors and of the Duke of Modena. In these valleys, the natural conditions of the territory, rich in clay and marbles, have contributed to the creation and the success of the ceramics and bricks manufacturing systems. All started during the XVII century with the *Fornace Giovanardi*, this plant worked with local workforce producing only bricks. Then, in 1712 this furnace improved its quality and started producing with continuity ceramics.

In the second half of XVIII century, a lot of small businesses were growing up. Sassuolo was one of the most important production districts (in the Marshallian sense) of the entire Modena and Reggio Emilia dukedom. Thanks to its collocation, between the mountains and the level ground, Sassuolo was rapidly becoming an intersection point for the trades. In 1753, the duke Francesco III d'Este gave to the territory of Sassuolo the title of "Noble Land". Thanks to this title the volume of the Sassuolo productions grew up because of the increased demand.

[15] **UNIMORE:** Università degli Studi di Modena e Reggio Emilia

The main characteristics of the production of the Sassuolo's productions during those years were that they imitated the ceramic production more fashionable but they were commercialised at lower prices, with a really good quality-price ratio. In this moment was born also another firm that created a product more popular for a lower market segment.

3.2.2 19th-20th Century

After the Napoleonic parenthesis, the previous order was established and the Este dukes came back to govern the region. They gave back to Dallari's family the exclusive right to produce the fine majolica for other 10 years. In 1836 there was another ceramic producer in Sassuolo, the count Francesco Ferrari Moreni, buying the *Fabbrica delle majoliche*, started a production of a daily-use object with a good price and an elegant aspect thanks to the use of pottery.

In 1851 the two Sassuolo's ceramics were bought by Giovanni Maria Rubbiani but Carlo and Antonio Rubbiani, the second and third generation of the family impulsed a great change, the quality and the output grew incredibly and Sassuolo was ranked as one of the most important production sites in Europe. Since 1907 it could be found testimonies of exportation in Europe and South America. To them, the merit to have started the industrial production of tiles done with clay.

In 1911 there were 5 factories with overall 130 employees. The First World War was a trouble for the ceramic industry of Sassuolo, the German market was closed for the Italian product and also the German products were not allowed to enter in Italy, Germany was a strategic market for Italian producers. After the first problems, the industry was able to adapt the production to the new context and followed with its rhythm. From 1918 to 1939 Sassuolo had a notable economic growth due overall to the development of the ceramic industry thanks to:

- The necessity of reconstruction after the war;
- New hygienical norms that imposed to put tiles in some places where food was elaborated (as butchery, dairy or slaughterhouses);
- The new trend to install tiles in bathrooms.

The presence of the ceramic production allowed the creation and the growth of related industries, the most important was the machinery one. The Second World War proved hardly the industrial district of Sassuolo, and after the September, 8th 1943 (date of Italy's Armistice) the Germans suspended ceramic production.

3.2.3 1945-1970

After the Second World War, Italy was destroyed by the conflict but in this context, there was a great will to rebuilt the country. The reconstruction process was a great opportunity for the ceramic tile district because this business was strictly related to the industry of construction.

Between 1960 and 1962, thanks to the new huge demand created by the “economic miracle”, in the district were created 100 new plants, and after a little period of crisis in 1963/64, the growth restarted with regularity and strength. Also the production and the productivity were incredibly increased. The growth rate of the production in this period (since 1958, year of the first survey) was 50% a year.

During this growth, the sector passed through different phases, alternating good periods to difficult ones and changing ones of its most important characteristics. There were happened huge changes from the technical and structural point of view, the main ones were been:

- Introduction of the tunnel furnace during the ‘50s, this innovation incremented incredibly the final quantity of tiles and bricks produced;
- The separation between the units producing the WIP (Work In Progress) product, The “biscuits” and the units producing the final one (the glazes). This separation created a major specialisation in the production process during the ‘60s and cut down the costs and so the barriers to the entering of new competitors in the district.

A common denominator of all these years was a constant process of automatization searched by the enterprises of the sector in order to save costs and increase the production.

3.2.4 1970-1980

During the seventies, the ceramic district of Sassuolo was affected by the international energetic crisis of 1973. Throughout this period there was also a contraction of the production level within the construction sector after the boom of the ‘60s.

The fall in the demand affected the sector during a period of transformation and strengthening of the production capacity, in fact there were the ingress of new enterprises due to the attraction of the developing sector, the passage to the mono-cooking process, which reduced the time to market of the tiles and increased the productivity of the factors. All these factors contributed to increasing the offer in a period of stagnation of the demand; the phenomena take the name of production overcapacity.

The seventies represent a period of changing from the district, with the introduction of the tunnel and roller furnaces, the firms invested a lot of money to increase their productivity, reducing the time to market and wastes. The businesses started a process of vertical and horizontal integration in order to be more independent and enlarge their products range.

This process of increasing in the number of ceramic enterprises accelerated the concentration within the district of Sassuolo that affirmed itself as one of the main districts in all the national territory. The increasing quality and variety of the tiles contributed to increase the level of differentiation of the product and to seek for the highest quality slots of the market.

At the end of the decade, the Italian ceramic production concentrated the 55% of the European production and the 40% of the worldwide one. Italy was the first worldwide exporter and within the area of Sassuolo was located the 74% of the entire national production.

3.2.5 1980-1990

After the great expansion experienced during the ‘70s, the district of Sassuolo entered within the ‘80s in its phase of maturity. The production was automated, the use of capital was intensified and the presence of human labour during the production phases was reduced.

During this phase of its life cycle, the district of Sassuolo experienced the common features of the maturity. There was a decline in the demand with an excess of the offer. So the district searched new markets outside to propose its products. In this process of internalisation was helped by the ceramic machinery industry that was the global leader and it was exported all over the world, the tiles producers took advantage of the channels of the machinery manufacturers ones. This period was characterised by the exit from the market of the less efficient competitors and the strengthened of the main ones.

There was an improvement in the plant’s productivity with the born of new production techniques as mono-cooking process and the consecration of the rapid-cooking process accompanied by huge investments in order to improve this technique.

The area was assuming the definitive characteristics of an industrial district. There was a net of related manufacturing services to support the ceramic production. In the area was generated also a huge concentration of actors involved in the innovation process that created a virtuous circle and the district was the main beneficiary of this one.

This “exclusivity” of the district did not during for a long time because after some years the enterprises felt the necessity to externalise some secondary processes to be more focalized on

the production moment and also the auxiliary industries breaded their action range outside the borders of the district.

3.2.6 1990-2000

During this decade the sector was deeply modified by the huge investments done in the previous one. The production base of the sector was simplified and the number of enterprises and workers was decreased due to the mergers of the previous years and the higher productivity of the plants unit to an increasing use of automatic machinery. The firms were looking for increase the level of productivity and efficiency of their plants.

The market followed with the same tendencies of the end of the previous decade. There was a decreasing in the demand for new constructions but an increase in the demand for tiles for the renovation of the old ones. The new market was the United States one that it was experiencing great growth rates and in this situation, there was the comparison of a new international competitor in the market.

The first main problem was the low capacity to adapt the offer to the fluctuation in the demand and this overcapacity produced huge unsold merchandises in the stocks of the firms. In this context, the competence stayed high and this situation created a process of rationalisation and concentration of the production between the different firms.

In this decade there was also the affirmation of the porcelain gres that passed from the 42 million square meters of 1990 to the 218 million square meters of 1999, rising from being the 10% of the entire district production to represent the 36% in 9 years.

The sector during the ‘90s consolidated his national supremacy producing the 80% of the entire national tiles production, within the district, there was a rise of the processing under contract (15% of the entire production). Italy, thanks to the contribution of Sassuolo, during the ‘90s was consecrated as the principal worldwide ceramic producer, followed by Brazil, Japan and Spain (in 1999 China would been the first one).

3.2.7 Nowadays

The situation in the district of Sassuolo during the last 17 years can be divided, like for the Castellón one, in two parts, before and after 2007, the first year of the global crisis.

During the first years of the new millennium, the main trend was the internationalisation of the enterprises. In this context, the firms had to compete with new and more aggressive competitors on a larger scale due to the expansion within new markets. This was the moment for the Italian ceramic firms to redrawing another time the lines for their strategic route and their growth trend. So, to the other two traditional growing input, the competence and the technical progress, during this year a third input was added, the internationalisation.

During 1998 the acquisition outside the district, and especially outside the national borders, were only 5 in 2005 they were 22. This acquisition had as a final target to put in contact the firms with the new final markets and overtake the main barriers to the exportation directly from Italy. Italy during this period was outdone by China in overall production but it maintained the primate in the exports. During the last years before the crisis, the trend was to create a commercial and services internationalisation in the foreign markets.

Then come 2007. During the crisis, the situation got really difficult for the Italian ceramic producers, during the first two years of crisis the production low of a 30% and the sales of a 20%. A lot of employees were let without work and 93 furnaces were cut off just in the two-year period 2008/2009 with a great damage to the industry and lot of firms failed.

The response from the players of the district to this huge fall was to increment the investments in new technology and to search new market outside. From 2009 the exportation began to rise another time, at the same time the rates of the internal market were getting lower every year more. Also, the market for the machinery was affected by this huge crisis due to its high relationship with the tiles one, its response was the same of the other ceramic sectors, higher investments in research and looking for new foreign markets.

Nowadays the ceramic sector is growing up, the things got better since 2014, but it is still far away from the pre-crisis results, the exportation are pulling the sector and there are huge investments to modernise the plants and stay competitive worldwide, preserving the position of ones of the worldwide leaders in the sector.

3.3 INTERNAL STRUCTURE

The main purpose of this part is to better understand the importance and the structure of the district nowadays. In order to do that it will be analysed different variables, the paper will start with an explication of the different typologies of products done within the borders of the district, then it will expose the financial data of the two main activities of the ceramic industry in Sassuolo, the tile production and the machines one. In order to do that it will be analysed the document given by the two sectorial associations, Confindustria Ceramica and ACIMAC. Then

it will be exposed the location in the territory of the various firms, in order to do that it will be used the official directory of the Italian Ceramic Industries done by Confindustria Ceramica. Finally, the last three paragraphs will analyse the different importance of the different industries operating in the district, the final markets for Italian tiles and the delocalization and internationalisation of the Italian firms.

3.3.1 Products

The ceramic production is not the only industry, there are also a good number of related firms and industries that are complementary with the ceramic one in order to create the final product. The main part is obviously played by the ceramic firms that are the principal actors of the district, they produce mainly tiles, floors, ceramic covering but also sanitaryware, ceramic for ornamental use and refractory materials. Then it can be found the producers of frits, glazes, ceramic colours and finally, the machinery industry, that is also the worldwide leader in its field.

3.3.1.1 Ceramic products

Ceramic products are the main output of the district, especially tiles. Within the territory of Sassuolo is created the 80% of the entire national ceramic production. Tiles production gives employment to more than 19000 people and the production overtakes 394 million m² with a total turnover higher than €5.1 billion. After the tiles production, other uses for Sassuolo's ceramic are sanitaryware industry and ceramic for ornamental use, also important because they complete the offer of the district giving to the consumers the choice for a higher quality product and they increase the reputation of Sassuolo's production. Finally, there are also refractory materials, this sector is important because it creates innovation, the refractory materials require a constant increasing of the level through the years.

3.3.1.2 Frits, glazes and ceramic colours

The second part of the district is represented by frits, glazes and ceramic colours. The frits are basically vitreous masses that through a chemical process becomes a cover for the ceramic tiles, mixing some frits with other elements can be obtained the glazes that also will integrate the ceramic production and finally, the ceramic colours give to the ceramics products a better look. It has to be underlined that this industry in Italy is not so strong and it is a follower of Spanish products.

3.3.1.3 Machines

Talking about the Italian machinery industry is fundamental because it represent the worldwide leader in this field and it contributes to the development of the technology level and the reputation of all the district in a crucial way.

There are more than 150 enterprises occupied in this field with 6000 employees and an annual revenue of €1700 million. Within these enterprise has been reached a really high level of know-how that made the Italian machinery producer the first in class worldwide. The success of this industry is guaranteed by the constant innovation acted by the firms and this sector is showing a constant growing during the last years with the export representing the 2/3 of the entire revenues.

3.3.2 Financial data

In this part, the text is going to show the financial data of the ceramic sector. The main focus will be directed to the ceramic product and on the machinery ones, due to their major importance within the ceramic district. In order to do that the paper will use the documents elaborated by the sector associations, Confindustria Ceramica, Ceramicolor-Federchimica and ACIMAC.

3.3.2.1 Ceramic products

The ceramic sector is showing data of restore after the crisis period started in 2007. The growing trend was confirmed also in 2016, the sales reached 416 million square meters, with an increment of 4.6% over the previous year, this data is due to the great contribution given by the export, that is continuously increasing (+4.4% in 2016) and also thanks to an inversion in the tendency within the national market, that during 2016 is grown by a 5.5%.

In this context the district has to face important challenges within the international market, the key points of the success of the district in this market are a constant innovation and a continuous flux of capitals invested in the development of the entire production chain, in order to propose a high-quality product, competitive within the worldwide scenario. Although this situation of expansion in the external market the district is also facing various risks, two overall; the first one is the possibility the WTO recognises to China the status of “Market Economy” and the increasing bureaucracy that is going to slow down the competitiveness.

During 2016 Italian production has been back overtaking 415 million square meters and this trend is expecting to follow during 2017/18, this reborn of the national market is due to a good policy for the loan obtainment, this is giving new power to the construction sector and from this situation also the ceramic industrial district of Sassuolo is beneficiating. In the Italian market were sold 85 million square meters (+5.5% respect 2015).

Table 8. Evolution of Italians Tiles' Sales (2007-2016)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	% 15/16
Production (m²)	559	512	368	387	400	367	363	382	395	415	+5.4%
Total sales (€)	547	506	408	413	413	382	389	395	397	416	+4.6%
Internal market	168	151	127	124	115	93	87	81	80	85	+5.5%
Exports	379	355	281	289	298	289	303	314	317	331	+4.4%

Source: Confindustria Ceramica, I dati 2016; 2017

The export is following being the towing of the sector with data in a continuous grew. The exportation during 2016 reached 331 million square meters, growing by a 4.4% respect 2015, with sales in a growing trend in all the major areas except from Russia where the exportation registered a -10%. In the NAFTA area sells have grown up a 5%, +4.7% within Gulf and Balkans, +3.3% in the Far East, +2.7% in East Europe, +2.1 in Latin America and finally +1.7% within North Africa.

3.3.2.2 Machines

Within this sector, there were, at the end of 2015, 148 active firms in Italy, 4 less than 2014, but with an increment in the workforce over the previous year with a total of 6229 employees (+0.4% over 2014). The majority of the firms have a turnover lower than € 2.5 million (51.4%) and only 19 enterprises, that represent the 12.8% of the total, have a turnover higher than € 10 million. A lot of enterprises have relocated a part of their production, buying foreign firms; at the end of 2015, 67 foreign enterprises were controlled by Italian groups, with a turnover of € 492.5 million.

The total turnover of the industry at the end of 2015 has reached a historic record with € 1982.8 million, with a growth of +8% over 2014 and +2.3% over 2007, the first year of crisis and year of the previous record. These data testify the total recovery of the sector and the good trend also for the next years. The major contribute to this result has been given by the export, that represents the 76.8% of the total turnover with € 1522 million, also a good trend within the national market has been registered, the Italian market totalized € 461 million during 2015 (+4.3% over 2014).

Export represents the majority of the sector's turnover also because Italian machines for ceramic industries are the undisputed worldwide leader. The export during 2015 has grown by a 9.1% over 2014 reaching the record of the industry's history. Between the major destinations for Italian machines, at the first place it can be found Asia (China excluded) with € 278 million (18.3% of the total and +29.3% over 2014), then there is the European Union with the 18.2% of the total turnover (€ 277.3 million) and a growth of 22.6% over 2014, Africa is following with € 203.8 million (13.4% of the total). At the fourth place, we find Middle Orient that loses 25.1% over 2014 and registers a turnover of € 186.6 million. The last five position are filled by South America (€ 185.9 million - +8%), North America (€ 160.9 million - +92.8%), East Europe (€ 152.9 million - +7.9%), East Asia (€ 75.5 million - -34.9%) and finally Oceania (€ 1.2 million).

The main clients are the tiles producers, the 82.5% of the sales is destined to them with a growth of 6.1% respect 2014 and a turnover of € 1222.4 million, then it can be found the glazing machines with a +38.3% and € 156.1 million and finally the sanitaryware machines with a turnover of € 126.9 million and a growth respect 2014 of 25.9%.

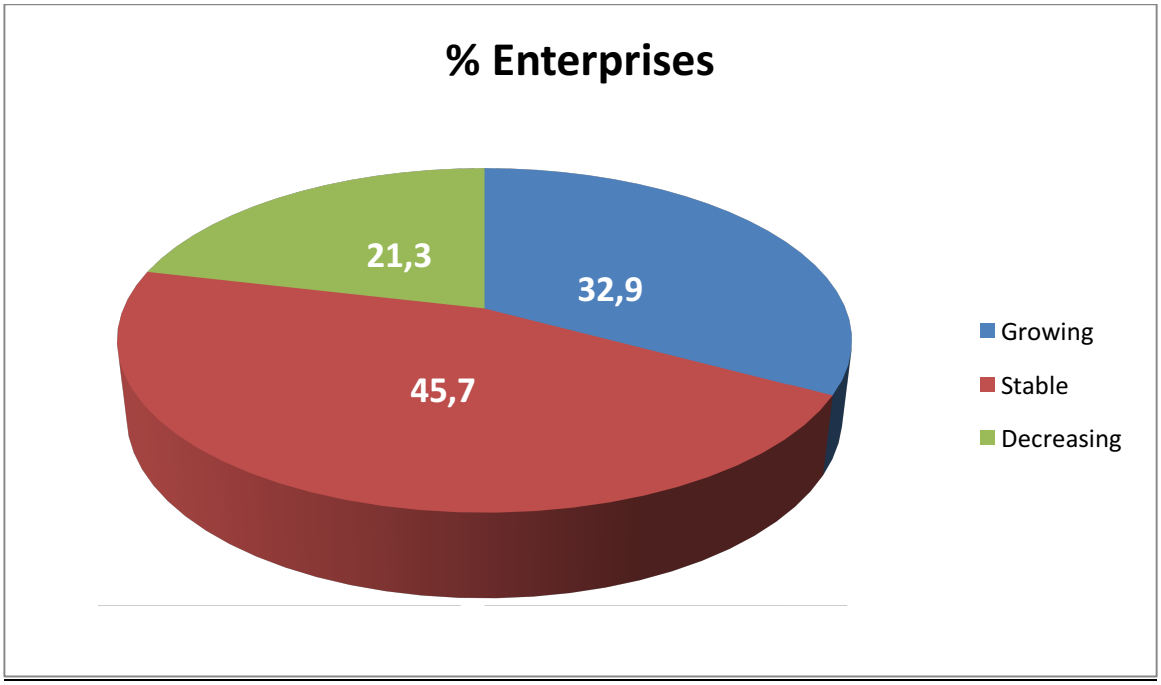
Table 9. Evolution of Italian Machinery Sector (2011-2015)

	2011	Var 11/10	2012	Var 12/11	2013	Var 13/12	2014	Var 14/13	2015	Var 15/14
Enterprises	**150**	**-7**	**151**	**+1**	**146**	**-5**	**152**	**+6**	**148**	**-4**
Employees	**6343**	**1.9%**	**5973**	**-5.8%**	**6091**	**2.0%**	**6203**	**1.8%**	**6229**	**0.4%**
Tot turnover.	**1774.8**	**26.6%**	**1672.7**	**-4.1%**	**1715.6**	**2.6%**	**1836.2**	**7%**	**1982.8**	**8%**
Italian market	353.3	10.2%	381.4	0.1%	344.7	-9.6%	441.7	28.1%	**460.8**	**4.3%**
% ITA	20.3		22.8		20.1		24.1		**23.2**	

Foreign market	1391.5	31.7%	1291.3	-7.2%	1370.9	6.2%	1349.6	1.7%	**1552.0**	**9.1%**
% EXP	79.7		77.2		79.9		75.9		76.8	

Source: ACIMAC, 2016

Illustration 6. Evolution of Italian Machinery Firms



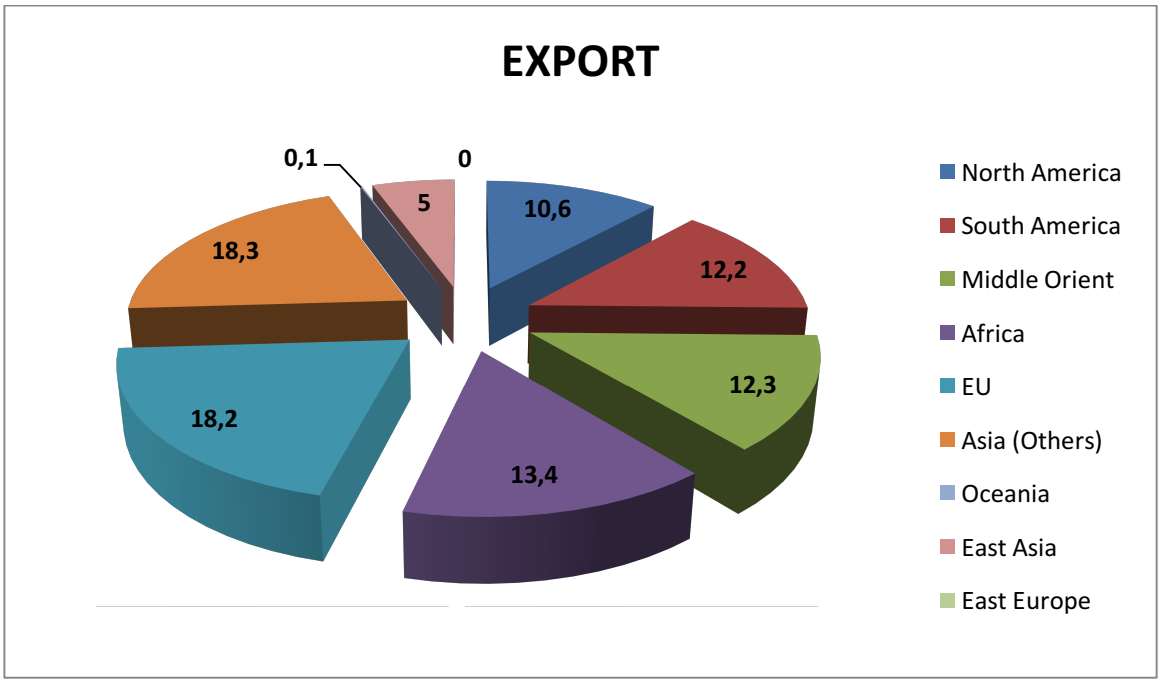
Source: ACIMAC, 2016

Growing: >+10% over turnover 2014

Stable: between -10% and +10%

Decreasing: < -10%

Illustration 7. Final Markets for Italian Machinery Sector



Source: ACIMAC, 2016

Table 10. Main Final Markets for Italian Machinery Sector

		2015	
Area	**€ million**	**%**	**Var % 2014/15**
Others Asia	277.9	18.3%	29.3%
EU	277.3	18.2%	22.6%
Africa	203.8	13.4%	22.8%
Middle Orient	186.6	12.3%	-25.1%
South America	185.9	12.2%	8.0%
North America	160.9	10.6%	92.8%
East Europe	152.9	10.0%	-7.9%
East Asia	75.5	5.0%	-34.9%
Oceania	1.2	0.1%	31.9%
Total	**1522**	**100%**	**9.1%**

Source: ACIMAC, 2016

3.3.3 The firms and their location

Here the text is going to analyse the number of the ceramic tile firms operating within the ceramic district of Sassuolo, like in the previous chapter the analysis will be focused only on the tile firms that represent the main part of the district turnover. In this analysis it will be seen the distribution of the firms in different municipality, the location of the municipality itself in the

district, in fact, the district is spread in two provinces, the Modena and the Reggio-Emilia one. By this way, it can be underlined the geographical size of the district itself and the different location of the major firms.

The district of Sassuolo covers two provinces, the Modena and the Reggio-Emilia one, and 19 municipalities divided within this two provinces, within the Modena one it can be found 13 municipalities:

1. Castelvetro;
2. Finale Emilia;
3. Fiorano Modenese;
4. Formigine;
5. Frassinoro;
6. Maranello;
7. Modena;
8. Montefiorino;
9. Pavullo nel Frignano;
10. Prignano sulla Secchia;
11. Sassuolo;
12. Savignano sul Panaro;
13. Serramazzoni.

Within the Reggio-Emilia one the remaining 6:

1. Baiso;
2. Casalgrande;
3. Castellarano;
4. Correggio;
5. Rubiera;
6. Scandiano.

Within the Annex 2, it can be found the list of the major tiles enterprises divided for location within the district.

3.3.4 Importance of the activities

Like in the dissertation done for Castellón, this paragraph will underline that not all the industries have the same importance in the economy of the district; the main target of this paragraph is to underline these differences in order to better understand the dynamics that

regulate the life of the district. In order to do that it will be used the documents and the data given by Confindustria Ceramica, ACIMAC, Federchimica and Tile Italia.

The main activity done within the district is the ceramic tile production. This sector is the second biggest in Europe if the focus is posed on the square meters produces, just after the Spanish one, with 393 million square meters in 2015, but it is the first for turnover, in fact, the Italian tiles cost 13.6€/m², more than the Spanish one. The majority of the production is exported, the 84.4%, this help not only the economy of Sassuolo but also the Italian one, contributing with €4.3 billion to the improvement of the Italian commercial balance. The sector contributes also to the creation of new workplaces in Emilia-Romagna, during 2015 the employees of the tile industries have been more than 15000. Within the district of Sassuolo is concentrated the 80% of the entire national production.

Then it is important to spend some words for the machinery producers, this is the second most important business within the district and the Italian ceramic machinery producers represent the worldwide leader in that sector. The Italian ceramic machines are exported all over the globe and they create a turnover of € 1982 million, the 76.8% of them are destined to foreign markets; like the tile producers also machinery producer contribute to the improvements in the national commercial balance. This industry gives work to 6229 people in 2015 and the trend is growing because the 78.6% of the enterprises are stable or in an expansion phase.

Finally, there is the frits, glazes and colours industry that is very retarded respect the rest of the district, in fact, the majority of the firms import these types of products from Spain because of the great technical ability of the Spanish producer in this field.

In conclusion, it has to be underlined the great strength of Italian tile producers that are able to create a higher turnover producing less square meters than Spain, this is due to the high specialisation within quality tiles and a higher reputation created during the years. The second fundamental sector is the machinery one that is the worldwide leader thanks to the unstopped innovation and the continuous inversion from the firms. The weak sector is the frits, glazes and colours one that Is the more undeveloped within the district.

3.3.5 Final markets

The Italian ceramic tile production is exported all over the world, mainly in west Europe, that represent the first buyer (specifically France). To explain the main final markets, it can be distinguished between glazed tiles and non-glazed tiles, in order to better understand the different request from the different market. Firstly, here it can be seen the global report of the tile export with the trends during the last 3 years and the prediction for 2017 and 2018.

Table 11. Italian Industrial Ceramic Export (2015-2018)

ITALIAN INDUSTRIAL CERAMIC						
	2015	**2014**	**2015**	**2016**	**2017**	**2018**
	Million sm.		% Variation			
Sales in Italy	**80**	**-6.6**	**-0.6**	**5.5**	**2.2**	**2.0**
Total exports	**317**	**3.6**	**0.9**	**4.4**	**3.3**	**3.8**
West Europe	159	5.3	1.9	4.9	2.7	3.3
East Europe	31	-2.2	-17.3	2.7	3.4	3.6
Balkans	15	4.9	5.0	4.7	3.8	3.8
NAFTA	45	2.5	5.9	5.0	3.3	3.8
Latin America	5	-5.4	-4.8	2.1	5.0	6.3
Gulf Area	12	-1.5	4.9	4.7	4.8	5.1
Nord Africa and Middle Orient	11	-4.2	-8.6	1.7	3.1	3.7
Far East	19	8.5	14.3	3.3	4.8	5.2
Rest of the World	19	12.9	8.1	4.1	4.8	5.0
Total sales	**395**	**1.4**	**0.6**	**4.6**	**3.1**	**3.4**
Production	**382**	**5.0**	**3.4**	**5.4**	**3.4**	**3.7**
National consume	**96**	**-3.3**	**1.6**	**6.0**	**2.4**	**2.1**
Imports	**15**	**182**	**13**	**8.3**	**3.3**	**2.5**

Source: Confindustria Ceramica, I dati 2016; 2017

Now the paper is going to analyse the 10 major buyers of non-glazed tiles, it can be underlined that France and Germany are the two mains importers, this underlines the importance of the presence of a common market within the European Union.

Table 12. Non-glazed Italian Tiles Export

NON-GLAZED TILES		
	% SHARE	% VARIATION 2015/14
WORLD	100	8.1
France	16.1	-1.6
Germany	13.3	8.2
USA	12.4	35.6
Belgium	4.9	0.2
Switzerland	4.1	7.9
UK	3.4	18.0
Benelux	2.9	3.4
Austria	2.5	-2.3
Canada	2.4	24.3
Australia	2.0	7.7

Source: Bureau Van Dijk – Centro studi Unioncamere Emilia-Romagna over data Trade Catalyst and ISTAT, 2015

Then it will be analysed the export for the glazed tiles, it has to be underlined that the first four places of the ranking remain the same.

Table 13. Glazed Italian Tiles Export

GLAZED TILES		
	% SHARE	% VARIATION 2015/14
WORLD	100	4.3
France	20.1	-9.7
Germany	15.1	34.5
USA	13.1	3.8
Belgium	3.6	9.8
Canada	2.9	4.9
Switzerland	2.9	6.8
Russia	2.8	-32.7
Austria	2.7	-0.8
UK	2.6	16.8
Benelux	1.9	24.7

Source: Bureau Van Dijk – Centro studi Unioncamere Emilia-Romagna over data Trade Catalyst and ISTAT, 2015

3.3.6 Internationalisation and delocalization

Within the district of Sassuolo, the phenomena of internationalisation and delocalization are very used and a lot of company during the last years has decided to settle a good part of their production abroad. There are many reasons that explicate this trend; nowadays the majority of the entrepreneurs think that there is a necessity to be nearer to the customers producing directly within the final markets the tiles, in order to meet the necessity of the main international market. Another common thought, as Bursi has underlined in his study *L'industria ceramica Italiana: trasformazioni, competitività e internazionalizzazion*e, is that there are no more reasons to produce in Italy, the important part that has to stay in the district of Sassuolo is the R&D process but nowadays the location of the production plant is no more a fixed point, is a variable.

Nowadays, as underlined Confindustria Ceramica, there is 16 foreign society controlled by 9 Italian ceramic firms, during 2015 the employees of this ones were 3091 with 82.3 million square meters produced abroad (+6.6%) and a turnover of € 792.2 million (+9.8%).

It is important to speak about the case of Marazzi that was the main Italian competitor before 2013, in this year the company has been acquired by Mohawk Industries Inc. that has become with this acquisition the biggest tile manufacturer in the world. The rest of the major Italian tile firms is possessed by Italian capitals, these firms are also buying foreign companies to expand their businesses and reach in a better way their final markets.

3.4 TECHNOLOGICAL DISCONTINUITY

Talking about the technological discontinuities happened within the ceramic industrial district of Sassuolo it can be identified five different periods:

- 1945-1965;
- 1965-1975;
- 1975-1980;
- 1980-1990;
- 1990-Now.

During the first one (1945-1965) the growing ceramic industry is moving through the resource of a large scale production, this it can be possible thanks to:

- Adoption of the first tunnel furnace;
- First attempts of using a glazing line;

- An improvement in the first phase within the elaboration of the clay;
- The introduction of the electric mobility within the movement or the presses.

But the major innovation of this period is the automatic press, initially imported from Germany.

The second period is from 1965 to 1975, here thanks to the growing demand the innovation has been related mainly to three fields:

- Mechanisation of the polychromatic painting process;
- Mechanisation of the transport and stock during the phases previous to the cooking process;
- Improving the tunnel technology.

This last aspect has been the most important of the period with the automatization of the production process.

During the decade 1975-1980, there was the energetic crisis and a little fall in the demand, these circumstances take the district's players to adopt some innovations:

- Reduction of the time to market through the diminution of the dead times and of the technical cooking time;
- More flexibility within the product mix;
- The introduction of new machines as the one for the automatic stock, and the one for the automatic charge and the discharge of the production lines.

Then in 1980-1990, there was the introduction of more automatization, new techniques to produce the gres and finally the ongoing importance of the micro technologies.

Nowadays, the predominant paradigm is the Inkjet technology one, and the paper will explicate its importance during the next paragraph.

3.5 INKJET TECHNOLOGY

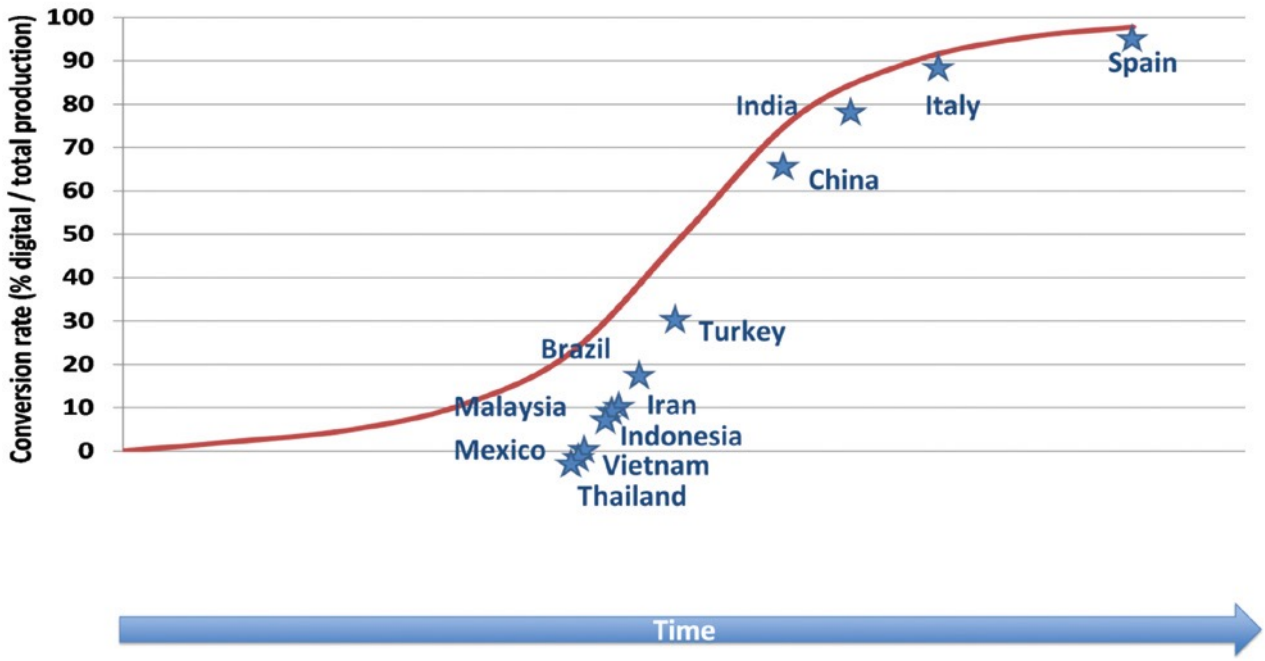
Inkjet technology, that has been explicated in the previous chapter, is also fundamental within the district of Sassuolo. The introduction of Inkjet has been defined as one of the biggest evolution in the history of the ceramic sector, it has helped the ceramic producer to diversify their product and be more competitive in the worldwide market. This technology also allowed the producers to have a major flexibility, a better management of the stocks and it allows the producers to front the challenge of smaller and more differenced orders. In this paragraph, the

paper is going to explain the rate of adoption of this technology in Italy and to do that the main aim has been given by the publication *I quaderni di ACIMAC* (2016).

Whit this technology for the first time Spain influenced Italian producers with an innovation, historically the trend was exactly the opposite. Since 2008 the technology has incredible growth also in Italy, due to the importance of this market, Kerajet has decided to establish a plant also within Sassuolo's district in order to stay nearer to a huge part of its customers. Nowadays in Italy, there are more than 300 digital printers in function.

The rate of adoption of this technology in Italy is near to the Spanish one, with a 90% of the enterprises using Inkjet systems. This trend indicates that that digital printing technology nowadays is without any doubt the dominant decorative method and it is the segment within the ceramic industries with the higher investments rate in R&D.

Illustration 8. Rates of Inkjet Adoption



Source: I quaderni di ACIMAC, 2016

The Inkjet technology is not important only for Italian producers but nowadays is globally utilised. ACIMAC has estimated that the 72% of the ceramic firms in the world use it, the main users are Spain followed by Italy with more than the 90% of the firms using it, then there are India and China that are two of the main worldwide producers, the only big ceramic producing country with a relatively low rate of adoption of Inkjet is Brazil (lower than 20%).

In the following table, it can be highlighted the diffusion of the digital printer in the world during the last 6 years.

Table 14. Diffusion of Industrial Digital Printer (2010-2015)

	2010	2011	2012	2013	2014	2015
Digital printer installed during the year	-	397	951	2049	1537	1216
Total digital printer in function	333	730	1681	3730	5267	6483
Rate of conversion to digital	5%	9%	21%	45%	60%	72%

Source: I quaderni di ACIMAC, 2016

It can be underlined that the crucial year for this technology was 2013, also thanks to the better global economic condition, in fact since this year the recession ended and the economy started growing again.

IV CHAPTER: THE COMPARISON

Introduction

Within this last chapter, it will be analysed the differences and the similarities between the two industrial districts of Castellón de la Plana and Sassuolo. In order to do that it will be used the material elaborated within the first three chapter. At the end of this part, it will be dedicated a space to analyse the Chinese threat for the two districts.

4.1 CASTELLÓN AND SASSUOLO, EXAMPLES OF TWO INDUSTRIAL DISTRICTS

Castellón de la Plana and Sassuolo are two clear examples of territories that have developed industrial districts. The two district are really similar by many points of view; the main one is obviously, the production, both of them are specialised in the production of ceramic tiles and they are the European leaders in this sector.

During the years Castellón and Sassuolo's tiles production systems are been taken as an example by the economics researchers as clear real industrial district for the main fact that all the most important characteristics of this type of economic organisation, underlined by scholars as Marshall and Becattini, can be found in these territories.

In order to pinpoint the main features that contribute to defining Castellón and Sassuolo as an industrial district, it is a good start point retaking the definitions created by Marshall and Becattini, analysed in the first chapter.

Marshall (1890) said that it could be underlined that some of the advantages of division of labour can be obtained only in very large factories, but that many of them, more than at first sight appears, can be secured by small factories and workshops, provided there is a very great number of them in the same trade. The manufacture of a commodity often consists of several distinct stages, to each of which a separate room in the factory is devoted. But if the total amount of the commodity produced is very large, it may be profitable to devote separate small factories to each of these steps. If there are many factories, large or small, all engaged in the same process, Subsidiary Industries will grow up to meet their special wants.

And Giacomo Becattini, in 1990, defined the district as a social and territorial entity that is characterised by the active presence of both a community of people and a group of enterprises in a natural and historically determined area.

Firstly, it has to be underlined the geographical proximity of the firms within the districts. In Castellón the district covers an area no bigger than a radius of 30km, Sassuolo's district is bigger than Spanish one but this is due to the higher number of firms, the density stays remarkable, with an average of 62 firms for square kilometres, this proximity, as explained within the first chapter, has been fundamental for the development of the links between the different enterprise and it has beneficiated the diffusion of "technological spillovers", these have spread the innovation during the years for Castellón, as underlined by Molina (2002), these spillovers have been fundamental for the innovation processes. The physical proximity has also contributed to the creation of strong relations not only between tiles firms but also between these ones and their suppliers, operating within the borders of the district.

The second point that emerges from the definitions is the high presence of SME (Small and Medium Enterprises). Both in the territories of Castellón and Sassuolo, the majority firms are SME, obviously, there are also the big players in the sector, like Pamesa and Porcelnosa in Spain or Marazzi and Iris in Italy, but the majority of the enterprises are classified as SME. It is important to underline the presence of the SME because this represents a difference from clusters. Talking about clusters there is no difference between SMEs and great enterprises, this difference is fundamental in the industrial district concept because, as Becattini has underlined, they are the base of the district's development.

Then an element of great importance is the presence of an intra-district trade among buyers and suppliers. During the years within the borders of the districts the suppliers of raw materials, machines and frits, glazes and ceramic colours have specialised their productions, as it has been underlined in chapter II and III, and nowadays all the firms of the district benefit from this situation. They have the possibility to use providers near to them and with these ones they have developed long-term contracts, this is another peculiarity of the industrial district. Within great enterprises not operating in a district, normally, the trend is to avoid long-term contracts with the majority of their suppliers, but within the district by these commitments and long-term relationship, the firms can cooperate with the providers in order to improve the processes and adjust their mutual necessities. This is also a way to create innovation, most of all within the machinery sector and the frits, glazes and ceramic colours one.

The majority of the key investments are done within the districts, this feature is more respected in Spain where almost the bigger firms are not delocalizing their production abroad, in Italy is different because the majors competitors of the ceramic sector have started since some years a process of internationalization of their production, as it has been underlined during chapter III, done with mergers and acquisition of foreign plants in order to be nearer to their final customer (it has to be remembered that both districts export more than the 80% of their production). But

without any doubt, the majority of the production, and most of all, all the R&D processes stay inside the districts.

It is important to analyse the labour market and the social aspect, in fact, one point that differentiates the district from the cluster is the importance of the community that lives within the territory. For Porter space is something natural (space geographically defined) where enterprises, thanks to their close localisation, are able to share know-how and resources. In the definition of the industrial district, space is more interrelated with the concept of territory where societies live with their own characteristics, it is thanks to those characteristics the development, the concentration and the specialisation of given productions could be possible. So it is also thanks to the people that the presence of the industrial district is possible, the first point to underline is that the workers are committed to the district rather than to the firms, it is common both in Spain and in Italy that workers during their labour life change workplace from one firm to another many time, also in this way the technological spillovers can prosper. A common aspect of the two districts is also the low rates of workers out-migration.

All these factors contribute to creating a unique district identity, in fact nowadays both Spanish and Italian tiles producers are creating the idea of a high developed and high-quality producers, in this way they can differentiate their production from the Chinese, Indi or Brazilian ones that are invading the world's markets with low quality and overall low-cost products.

One of the most important aspects of the district, in Castellón as well as in Sassuolo, is the presence of a net created during the years and composed by firms, associations, public institutions and the government itself. Thanks to this net the cluster can benefit from some important advantages. Associations like ASCER, ANFFECC and ASEBEC in Castellón and Confindustria Ceramica, ACIMAC and CERAMICOLOR in Sassuolo helps the firms be stronger, they provide shared infrastructure, management training and they gives to the firms a technical and sometimes also financial help. They also promote the image of the firms abroad creating events and publications. Then there are the public institutions like the UJI (Universitat Jaume I) and UNIMORE (Universitá Degli Studi di Modena e Reggio-Emilia) that provide to create the professional figures for the future of the districts, the collaboration between all these players is fundamental because it make the district stronger, it creates a net of relationships that allow share know-how inside the territory reaching in this way results comparable with the great industries' ones. Other two institutions that are important to mention due to their importance within the innovation processes in Castellón are the IVACE (Instituto Valenciano de Competitividad Empresarial) and the ITC (Instituto de la Tecnologia Ceramica).

4.2 THE TERRITORIES

In order to compare the two districts, it is important to overview also the differences and the similarities between the two contexts within the districts have grown, the Valencian Community for Castellón de la Plana and the Emilia-Romagna region for Sassuolo. In this way, it can be understood the physical and business atmosphere that surrounds tiles companies in the two countries.

There are many similarities between the two territories, first of all, the Valencian Community and Emilia-Romagna are two leading regions in their national context for GDP creation, the Spanish one creates the 9.6% of national GDP and the Italian one the 6.84%. Both of them can boast being one of the 4 best economies in their respective countries. These results can be achieved thanks to the great entrepreneurial spirit in both region, within these two territories the ceramic is not the only industrial agglomerate. Within the Valencian Community can be found the shoe industry and leather goods, the games and toys, the wood and furniture, textile and clothing industry, organised within cluster or industrial district. The same happened in Emilia-Romagna, where can be underlined the presence of important district as the luxury cars one. Then both territories host great enterprises like Ford in Spain, Ferrari and Ducati in Italy. Agriculture is an important part of the regional economy both in Spanish and Italian territories, with the citrus cultivations in Spain and the wines ones in Italy.

The unemployment rate is higher in the Valencian territory with a 22.37% (higher than the national too – 21.18%), in Emilia-Romagna this rate is attested at 8.5% (3% pre-crisis) and this represents the best data in all the country.

Within these contexts, the district of Castellón and Sassuolo have been developed during the years. One difference is the spread of district's territory, Castellón's district is contained in a radius of 30km and cover just one province, the Castellón's one. Sassuolo's one in bigger, it covers two provinces, Modena and Reggio-Emilia ones and it is spread for a radius bigger than 40km. Despite the district of Sassuolo is bigger than Castellón one, the concentration of the enterprises is similar due to the higher number of firms in the Italian agglomerate. A large part of the production in both districts is handled by the major competitors, this phenomenon is stronger in Sassuolo where during the last years have been done a great number of mergers and acquisition (during the last decade there were more than 30 cases), nowadays the 5 major firms handle the 55% of the production. Both districts contribute to the creation of the majority of their national production (95% for Castellón and 80% for Sassuolo) and thanks to their number are the two major European producers. So it can be underlined that within the Spanish district there is a higher geographical concentration, while in the Italian one the concentration is more referred to the production shares.

It has to be underlined in both district the presence not only of final firms but also the existence of specialised institutions that gives support to the innovation process within the ceramic world, as the universities, UJI in Castellón and UNIMORE in Modena. These two institutions have similar finalities within the district ecosystem, they provide to create a specialised workforce for the future of the agglomerates and they also offer support within the R&D phases. This phenomenon is more articulated in Castellón that offers to the firms specialised institution like the ITC (Instituto de la Tecnólogia Cerémica).

Another important point to compare is the presence of efficient infrastructures that connect the district with the rest of the world. By this point of view, Castellón is better connected than Sassuolo, through its territory it can be found a highway (AP-7) that connect the entire Mediterranean coast and that goes directly to France, one of the main markets for the district. Then there are two dual carriageways and a huge number of secondary streets that linked all the enterprises of the district. This one can also benefit from the presence of a commercial port in Grao, connected with the district directly thanks to the CS-22, one of the two dual carriageways. Sassuolo doesn't have the direct availability of a highway, the nearest is in Modena, the main problem is that the only dual carriageways that connect Sassuolo with Modena are always saturated during the main times of the day. Another problem is that the firms located far away from Modena don't have adequate infrastructures to reach the mains highway junctions. For this reason, has been implemented a project for a new highway that will connect Sassuolo directly with Modena and so, with the A1 and mainly with the A22, the highway that goes directly to the north of Europe, where the mains markets of the district are located.

4.3 THE HISTORIES

The following passage is to analyse the differences and the similarities between the stories of the two districts, in order to understand the main events that have contributed to the development of the industrial agglomerates within the two regions during the time.

As it has been underlined during the previous chapters the district of Castellón started as an artisan production like Sassuolo's one. When the first plants were installed within the territories, the *Real Fábrica* in Spain and the *Fornace Giovanardi* in Italy, they were small artisanal businesses. The production started in Castellón during 1727, in Sassuolo all began at the beginning of 1700 but the first plant was implemented in 1712. So the origin of both districts can be placed at the very beginning of XVIII century. Another common characteristic is that the productions were protected by the respective royal houses, the royal family in Spain and the

Este dukes in Sassuolo; the main purpose was to implement this production in order to avoid the importation for others kingdom to satisfy the necessity of the local (and national in the case of Spain) aristocracy. One difference is that Castellón production started to be exported from the very beginning not only in Spain but also to the Americas, Sassuolo stayed more localised.

During the XIX century, both districts experimented a phase of great expansion, passing from an artisanal status to an industrial one. In Castellón this passage started during the middle of the century when the major production plants were settled in Onda, and in Sassuolo the expansion happened when Rubbiani family become the leading producer in the zone, pushing the industry. During this century, and overall at the beginning of the following one, the situation changed within the two districts. In Castellón, thanks to the law interest of Spain during the First World War and the absence of it during the Second one the production followed growing without big problems, also during the civil war (1936-1939) the production wasn't stopped, it was just slowed. In 1946 respect to 1929 there were 3 plants less but the production was incremented thanks to the operate of the specialised workforce. In Sassuolo the situation was quite different due to the big impact of the two world wars on the district. At the beginning of the century the district knew a phase of great expansion, then in 1916 started the First World War and the production was consistently slowed because the district couldn't export to Germany, one of the mains clients, then, from 1918 to 1939 (the period between the two World Wars) Sassuolo had a notable economic growth due overall to the development of the ceramic industry due to the necessity of the country after the conflict. The growth followed until 1939 when started the Second World War that proved hardly the industrial district of Sassuolo, the production was stopped and that represented the lowest point in the ceramic history of the territory. The main point in common of this period for the two district has been that both of them had become the respective national reference for the ceramic production.

In the period after the Second World War different facts changed the economies of the two districts but the main thing that has to be underlined during this period is the great boom in the productions during the decade of the sixties, the boom was caused by different factors within the two countries. In Spain, the Valencian Community knew a great citrus crisis (the citrus cultivation was one of the main businesses in the territory), a lot of agricultural producers preferred to pass to the ceramic sector in spite of rebuilt their businesses. Then, in 1958, Spain became an associate member of the Organisation for European Economic Cooperation (OEEC), the actual OECD. In 1959 Spain joined the International Monetary Fund (IMF) and the World Bank, in this context Spanish government actuated the Stabilization Plan for Spain (1959) to open the country to the trade with the rest of Europe and fill the gap with the others economies. This helped enormously the ceramic district, it started trading with foreign countries and in general, all the Spanish economy was benefited by this new crime of growth, this helps

also the sales within the national market. In Italy, after the war, the country was destroyed but there was a great will to rebuilt the country and the state, helped by the winning nation (the United States overall), incentivised the reconstruction process and the restart of the economy. The reconstruction process was a great opportunity for the ceramic tile district. Between 1960 and 1962, thanks to the new huge demand created by the “economic miracle”, in the district the growth rate of the production since 1958, year of the first survey, was 50% a year. Sassuolo was stronger than Castellón that needed to fill a technical gap with the Italian producers.

The decade of the Seventies was characterised by the two energetic crisis of 1973 and 1977 and a vertical integration of the plants, these two situations were present in both district. There were also some differences, the district of Castellón suffered after Franco’s death in 1975 government instability during the transition back to democracy that was summed to the growth in oil prices, despite this unstable situation the district followed growing and all the main producer’s associations were created. Sassuolo suffered more than Castellón the energetic crisis and during these periods the production was slowed down and a situation of overcapacity come off, but then the producers were able to restore the situation and at the end of the seventies, the Italian ceramic production concentrated the 55% of the European production and the 40% of the worldwide one becoming the world leader. The main common points within the two districts during these years were the introduction of huge technical improvements, as the mono-cooking process.

The ’80s were different for Italian and Spanish producers, while Sassuolo was experiencing its phase of maturity, with the stabilization of the production and of the market shares detained by the major players thanks to a good number of mergers and acquisitions, in Castellón there was another growing phase thanks to the introduction of the gas pipeline and thanks to the creation of the technological institute ITC-AICE that gave a great impulse to the innovation within the district. Spanish producers were expanding their businesses and they started an important phase of internationalisation that was possible thanks to the new technologies, there were all the prerequisites for starting trying to compete with Italian producers on the foreign markets.

During the ‘90s started the real competition between the two district, consecrated as the two main European players, thanks to the technical improvement of the previous decade Castellón was now able to seriously compete with Sassuolo in European markets, Sassuolo during this period started exporting also in the United States, enlarging its borders and becoming the worldwide leader. The numbers of the two district become impressive and the major firms that also nowadays lead the markets were growing. It can be said that this was the period of the consecration of Castellón as one of the most important worldwide tiles producers.

In the first years of the new millennium, the main fact was the entrance in the tiles panorama of Chinese producers that could offer low-cost products, so Italian and Spanish one betted on the better quality of their products, Italian producers started also an internationalisation of their businesses until Spanish ones stayed more local. Then come 2007, the worst economic crisis since 1929 one. The response to this situation acted by the two district was the same, the national markets fell due to the lower acquisition power of Italian and Spanish population, in Spain the situation was also worst due to the great relationship between the tile district and the construction sector, that suffered the highest fall. In this context, Italian and Spanish producers started to invest more money in R&D programs and gave a great impulse to exportation. At the end of the crisis, the economic structure of the district was really different, the export was now more than the 80% of the revenue and thanks to this Castellón and Sassuolo were able to restore the situation, starting to growing up another time since 2014.

Nowadays the two district represent the two European leaders and they are the second and the third country worldwide for exported tiles, following only China.

4.4 THE STRUCTURES

4.4.1 Importance of the activities

Comparing the importance of the different activities done within the two district it can be underlined some similarities and some differences. First of all, it has to be said that in both districts it can be identified three many activities: tile production, machinery production and frits glazes and ceramic colours one. The differences are in the weight of these activities over the economy of the district.

In Sassuolo and also in Castellón the main activity is obviously the production of ceramic tiles, then there are the supporting activities. Tile production in both districts is the major source of revenue, as it will be explicated in the following paragraph, Sassuolo and Castellón are the two main European players in this field and also in a worldwide context they are the major producers, it has to be underlined in order to understand the next graphic that they also represent more than the 80% of their national production (80% for Sassuolo and 94% for Castellón).

Table 15. Tiles Production for Country

PRODUCTION FOR COUNTRY	
Country	% over worldwide production
1. China	48.4
2. Brazil	7.3
3. India	6.6
4. Spain	**3.4**
5. Indonesia	3.4
6. Iran	3.3
7. Italy	**3.1**
8. Vietnam	2.9
9. Turkey	2.5
10. Mexico	1.9
Rest of the world	**17.2**

Source: Ceramic World Review 2016, 2016

The data is really different talking about exportation, in this case, Spain and Italy are respectively the second and the third country in the worldwide ranking following China.

Then it can be underlined some differences and interdependencies within the others two main activities. Talking about the machinery production it has to be said that historically Italian machinery producers are the worldwide leader in this sector exporting their machines all over the world. As seen in the previous chapters Spanish tile producers import Italian machines and the Spanish machine industries are very limited and it develops mainly a support function for tiles producers when they have some problems with their machines.

In the frits, glazes and ceramic colours sector the situation is exactly the opposite, here Sassuolo is really retarded compared with the Castellón one. Spanish frits, glazes and ceramic colours producers are the worldwide leaders and they export their product all over the world, also in Italy where tiles producers use these products and these technologies, that are the best in the world. In this paragraph has to be underlined the last innovation of the sector, it has totally changed the world of the ceramic printing, the Inkjet technology. As explicated in the previous paragraph this product has been developed by Kerajet, a Castellón's enterprise that has applied the concept of the digital printing to the tiles production. Nowadays this is the worldwide new technological paradigm.

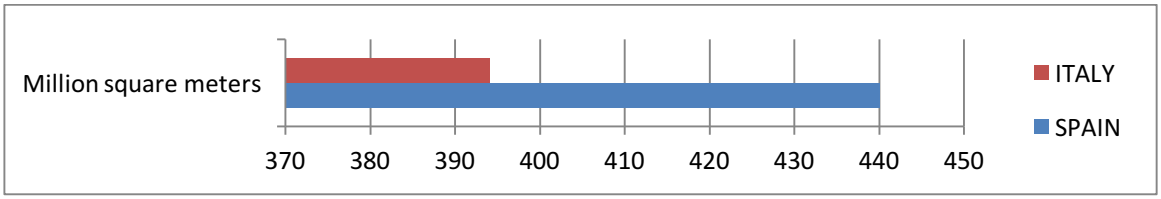
4.4.2 Financial data

Within this paragraph the main purpose of the text is to compare the financial situation within the two district, in order to do that it will be analysed the data of tiles production, the other two related sectors will not be compared because the differences are too big and because the main target of this paper is to focus the attention on tiles production, the main activity of the districts.

The first data that will be compared are the sales within the two districts and how to export and national sales influenced these data. The first thing that has to be underlined is that Italian ceramic sector produces 46 million m² of tiles less than the Spanish one, despite this, its total revenue is 84.4 million € higher than the one of its principal competitor. The explication of this singularity has to be searched in the composition of the production of the two district.

Sassuolo's one is focused on the production of tiles for interior and for this reason, the production process is more complex than the ones done for the exterior, like the Castellón tiles, obviously, the second type of tiles is cheaper than the first one. So the average prize for one square meter of tile in Italy was 13.1€ (12.77€ in 2013) during 2014 while in Spain the average was only 6.9€ in 2014 (7€ in 2013). This data does not mean that Italian tiles are better than the Spanish ones, it is only the result of the different type of choices of specialisation within the production.

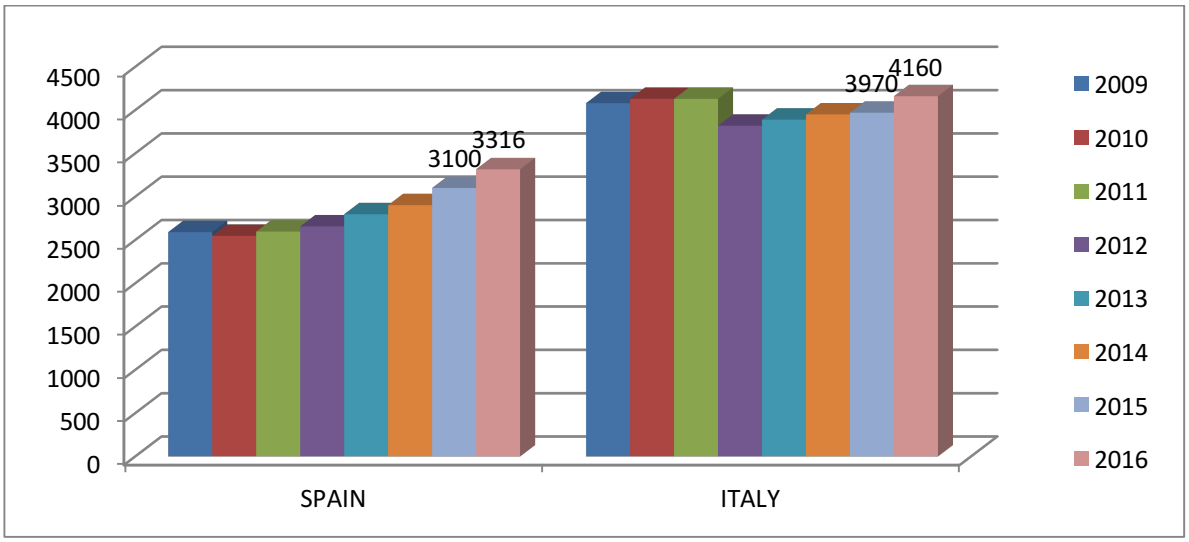
Illustration 9. Square Meters Produced



Source: Own Elaboration

During 2016 the growth experienced by the two district was different, Sassuolo improved its sales of a 4.6% over the previous year and Castellón improved a 7.1%, achieving a better result than its Italian competitor, this was mainly due to the strong increase of national market during the last year in Spain. Another important aspect that has to be underlined is that Castellón restarted its growth period after the crisis faster than Sassuolo, during 2011 in Spain the total revenues start to rise again while in Italy it has to wait until 2013, two years later, that was due to the comportment of the exportation.

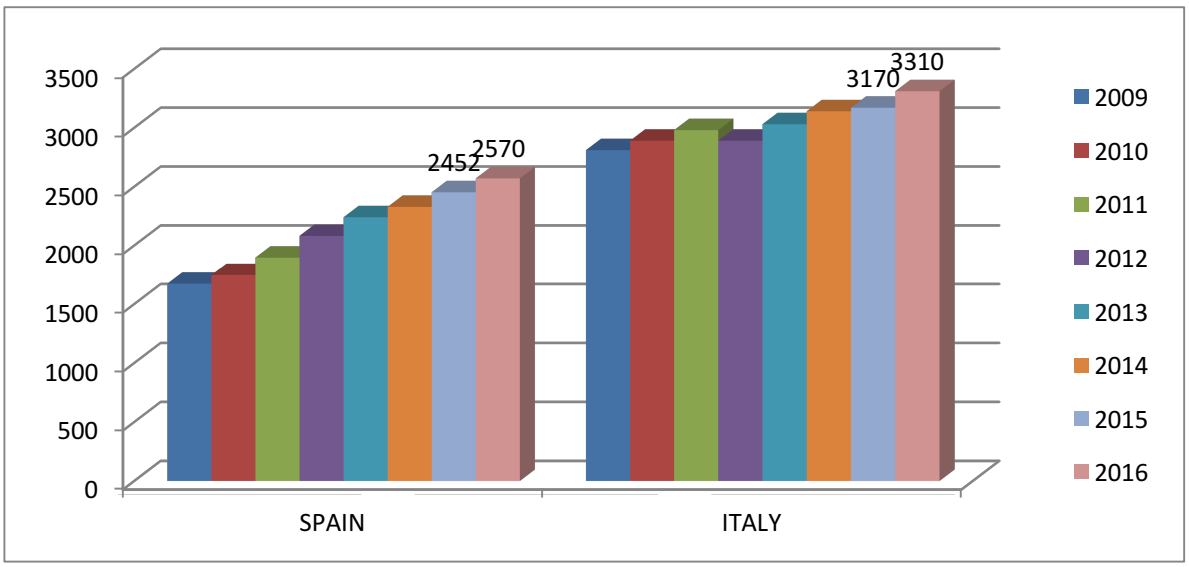
Illustration 10. Total Sales



Source: Own Elaboration

Exportation started to rise within Castellón district since the first year of crisis, this is due to the vertical fall of the national market in Spain experienced during that year strongly connected with the collapse of the construction sector. In this context Spanish producers started to bet massively on foreign markets, also Italy has faced a fall in the internal market and a connected increase in the exportation but during 2012 this growth trend was stopped and it restarted in the following year, 2013. During the last year, exportations rise of a 4.4% in Italy and of a 4.8% in Spain.

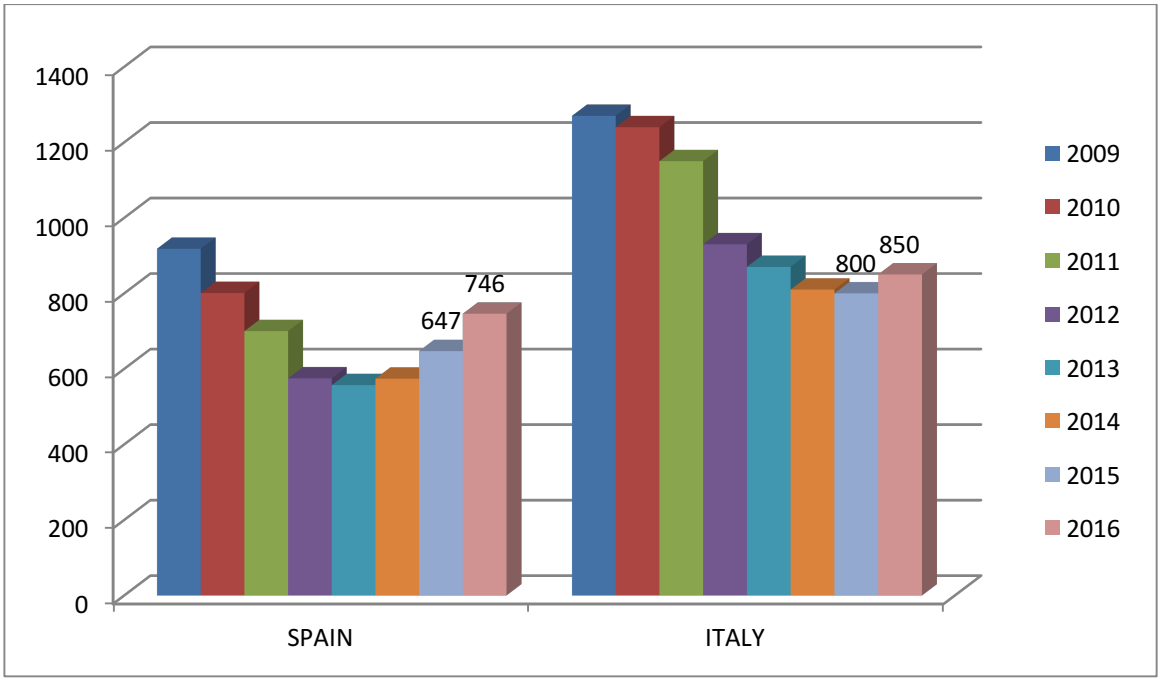
Illustration 11. Export



Source: Own Elaboration

In order to understand the higher growth experienced by Spanish sells during the last year, it is important to look at the internal market data of the two districts. Both Castellón and Sassuolo are living within a period of growth of their respective national markets, these situations follow a period of high crisis for these markets. During the crisis there was a continuous decreasing of sales within Italy and Spain, these economies were deeply affected by the consequences of the global recession and also the acquisition power of their citizens and enterprises were consistently lowed. The situation started to get better and the national market to rise again during the last years. The first positive years for the national market in Spain was 2013, in Italy only 2016. The national market grows of a 16% between 2015 and 2016 for Spanish producers and only of a 5.5% for Italian ones.

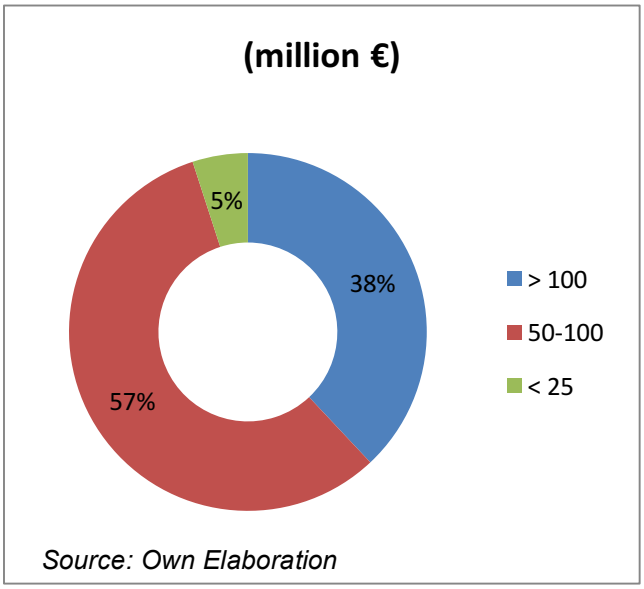
Illustration 12. National Market



Source: Own Elaboration

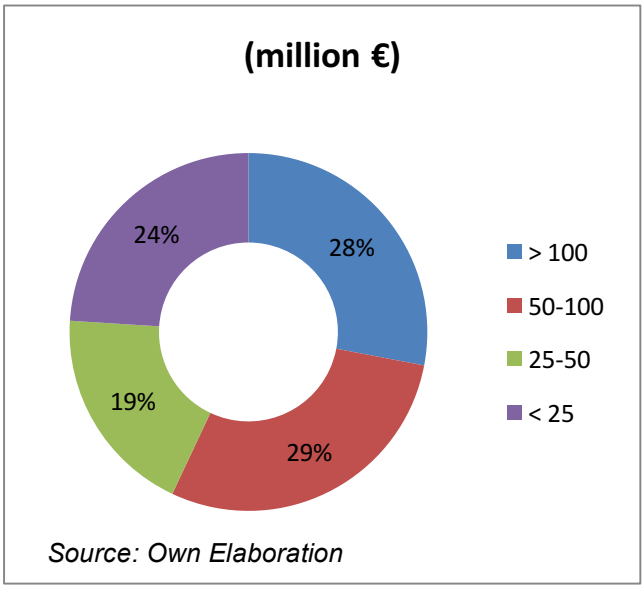
Looking at the enterprises operating in the two district it has to be noticed that the average size of the top competitors is bigger in Italy, looking at a study done by KPMG over the 21 major competitor within the two districts in 2016 it can be underlined that in Spain the 57% of the enterprises studied are SMEs compared with the 24% in Italy, the 28% of these 21 enterprises in the Italian agglomerate have more than 500 workers, in Spain just the 10%. Also the average revenue is higher, 119.9 million € within the Italian group and only 73.2 million € in the Spanish one.

Illustration 13. Revenue Italian Enterprises



Source: Own Elaboration

Illustration 14. Revenue Spanish Enterprises



Source: Own Elaboration

Looking at the exportation it can be underlined that France is the main tiles importing country for both districts, within the top 5 importers for the two districts the other common zone are the United States of America.

Finally, talking about the internationalisation and the delocalization of the productions there is a common trend within the two districts, in both territories, the R&D processes are not externalised and are developed inside the borders of the same districts, the arguments are different looking at the production processes. Within the Spanish district the trend it is to keep the production locally and just a few firms, like Pamesa and Porcelanosa, have delocalized a part of their plants abroad, this represents an alternative to exportation because the firms only settle in the foreign country the production process and not the R&D one. In Italy the situation is different, the majority of the great competitors of the district possess foreign firms and they have internationalized their production, as underlined Confindustria Ceramica, there is 16 foreign society controlled by 9 Italian ceramic firms, during 2015 the employees of this ones were 3091 with 82.3 million square meters produced abroad (+6.6%) and a turnover of € 792.2 million (+9.8%).

4.5 CHINESE'S THREAT

During 2015 the world tile production has been 12355 million sq. m., the part of the world that mainly contributes to this data is Asia. Actually, Asia creates 69.8% of the world tile production, with 8627 sq. m., Asia is also the main consumption area with the 67.1% of the world consumption.

Table 16. World Manufacturing Areas

WORLD MANUFACTURING AREAS			
AREAS	***2015 (Sq.mt Mill.)***	***% of world production***	***% var. 15/14***
EUROPEAN UNION (28)	***1,218***	***9.9***	***+2.2***
OTHER EUROPE (Turkey included)	***572***	***4.6***	***+0.4***
NORTH AMERICA (Mexico included)	***327***	***2.6***	***+6.2***
CENTRAL-SOUTH AMERICA	***1,193***	***9.7***	***-0.1***
ASIA	***8,627***	***69.8***	***-0.9***
AFRICA	***413***	***3.3***	***+3.0***
OCEANIA	***5***	***0.0***	***0.0***
TOTAL	***12,355***	***100.0***	***-0.1***

Source: ACIMAC, World production and consumption of ceramic tiles, 2016

Table 17. World Consumption Areas

WORLD CONSUMPTION AREAS			
AREAS	***2015 (Sq.mt Mill.)***	***% on the world consumption***	***% var. 15/14***
EUROPEAN UNION (28)	***910***	***7.5***	***+5.0***
OTHER EUROPE (Turkey included)	***532***	***4.4***	***-2.0***
NORTH AMERICA (Mexico included)	***505***	***4.1***	***+9.3***
CENTRAL-SOUTH AMERICA	***1,279***	***10.5***	***-0.5***
ASIA	***8,166***	***67.1***	***+0.6***
AFRICA	***731***	***6.0***	***-2.7***
OCEANIA	***52***	***0.4***	***+8.3***
TOTAL	***12,175***	***100.0***	***+0.8***

Source: ACIMAC, World production and consumption of ceramic tiles, 2016

As it can be underlined by the tables the output has remained more or less stable or it has seen improvements within all the areas with the exception of Asia where for the first time the production has dropped (-0.9% over 2014). This little fall has been due to significant ones in Iran, Indonesia and China but compensated for growth in Vietnam and India.

In this context, China remains by far the main worldwide tile producer with the 48.3% of the world production in 2015, China in the last year has shown a constant growth interrupted for the first time only in 2015, with a decrease of 0.5% over the previous one. China is not only the largest producer but also the largest exporter and consumer of ceramic tiles, it has a production capacity calculated by official Chinese sources at more than 10 billion sq.m, spread over some 1400 companies and 3500 production lines. Domestic consumption is estimated at 4,885 million sq.m, 40.1% of world consumption.

Table 18. Top Manufacturing Countries

TOP MANUFACTURING COUNTRIES								
	COUNTRY	2011 (Sq.m Mill.)	2012 (Sq.m Mill.)	2013 (Sq.m Mill.)	2014 (Sq.m Mill.)	2015 (Sq.m Mill.)	% of 2015 world production	% var. 15/14
1.	CHINA	4,800	5,200	5,700	6,000	5,970	48.3%	-0.5%
2.	BRAZIL	844	866	871	903	899	7.3%	-0.4%
3.	INDIA	617	691	750	825	850	6.9%	3.0%
4.	SPAIN	392	404	420	425	440	3.6%	3.5%
5.	VIETNAM	380	290	300	360	440	3.6%	22.2%
6.	ITALY	400	367	363	382	395	3.2%	3.4%
7.	INDONESIA	320	360	390	420	370	3.0%	-11.9%
8.	TURKEY	260	280	340	315	320	2.6%	1.6%
9.	IRAN	475	500	500	410	300	2.4%	-26.8%
10.	MEXICO	221	231	230	230	242	2.0%	5.2%
TOTAL		8,709	9,189	9,864	10,270	10,226	82.8%	-0.4%
TOTAL WORLD		10,626	11,224	11,958	12,373	12,355	100.0%	-0.1%

Source: ACIMAC Survey dept. World production and consumption of ceramic tiles, 4th edition 2016

After growing at a significantly slower pace since 2012, China's exports experienced the first real downturn in 2014 (-3.3%) and fell again in 2015 from 1,110 to 1,089 million sq.m (-1.9%), equivalent to 39.8% of world exports. The mains Chinese exports' markets are:

1. Saudi Arabia (64 million sq.m, +0.9%),
2. South Korea (54 million sq.m, -20.3%)

3. Philippines (53 million sq.m, +12%),
4. Nigeria,
5. USA
6. Thailand.

Asia accounted for 55.5% of China's exports, Africa 21.6%, North America 8.5% and South America 8.4%; exports to the EU region fell to 20 million sq.m (-15.7%), while sales in non-Europe plummeted to 11 million sq.m (-49.5%).

Table 19. Top Exporting Countries

TOP EXPORTING COUNTRIES										
COUNTRY		2012 (Sq.m Mill.)	2013 (Sq.m Mill.)	2014 (Sq.m Mill.)	2015 (Sq.m Mill.)	% on 2015 national production	% on 2015 world exports	% var 15/14	value 2015 (million €)	average export price (€/sq.m)
1.	CHINA	1,086	1,148	1,110	1,089	18.2%	39.8%	-1.9%	n.a.	n.a.
2.	SPAIN	296	318	339	378	85.9%	13.8%	11.5%	2,452	6,5
3.	ITALY	289	303	314	317	80.2%	11.6%	0.9%	4,318	13,7
4.	INDIA	33	51	92	122	14.4%	4.5%	32.6%	498	4,1
5.	IRAN	93	114	109	112	37.3%	4.1%	2.8%	380	3,4
6.	TURKEY	92	88	85	77	24.1%	2.8%	-8.9%	451	5,9
7.	BRAZIL	59	63	69	77	8.6%	2.8%	11.0%	265	3,4
8.	MEXICO	63	64	62	61	25.2%	2.2%	-1.6%	320	5,2
9.	EAU	54	58	55	54	71.1%	2.0%	-1.8%	297	5,5
10.	POLAND	42	48	42	42	30.4%	1.5%	0.0%	222	5,3
TOTAL		2,107	2,255	2,277	2,329	24.2%	85.1%			2.2%
TOTAL WORLD		2,524	2,666	2,695	2,735	22.1%	100.0%			1.5%

Source: ACIMAC Survey dept. World production and consumption of ceramic tiles, 4th edition 2016

As it can be seen by the previous table Spain and Italy contribute with a really reduced quote to the global tile production fronted with China, but they are within the top 3 as top exporting countries and they are by far the two nation that export the highest rate over their total production, in fact, the 85.9% of Spanish production is exported and in Italy this share reaches 80.2% (in China it is just 18.2%).

Actually, China is the biggest exporter in the overall quote and it can be a threat for the Spanish and Italian exportation. As the paper has explicated in the previous chapters the majority of Italian and Spanish production are exported within the UE and as it has been underlined in the previous paragraph Chinese exports to the EU region fell to 20 million

sq.m (-15.7%). This is mainly because Chinese economy has not obtained the status of the market economy given by the WTO (World Trade Organization).

A market economy is an economic system in which economic decisions and the pricing of goods and services are guided solely by the aggregate interactions of a country's individual citizens and businesses. There is little government intervention or central planning. So if WTO gives to China the status of the market economy a huge quantity of underpriced tiles will enter the European market representing a huge trouble for the Spanish and Italian producers that propose products with a higher price.

The main problem is that Chinese producers don't have to respect labour regulation precise like the European one, they have the availability of a huge number of underpaid worker that allow lowing the price of the final product. Another point is that China doesn’t respect also the rules for the preservation of the environment; all these characteristic allow Chinese tiles maker produce tiles down the market price and entering in the market economies system means that they can commercialize with very few regulations these tiles also in Europe, seriously damaging the Italian and Spanish economies.

In order to avoid this possibility Spanish and Italian producers, with their respectively associations and rulers, are asking the European Union not to give China this status and they also ask for introducing taxes over the Chinese importation in order to enforce their export and dominate in the European market, this also because as it has been underlined before these two tiles district depends for more than the 80% by their exportation.

5 CONCLUSION

As it has been underlined within the introduction of the work, the main target of the resource was to do a historical and economic comparison between the two industrial districts of Castellón de la Plana and Sassuolo. Now that the work is ended it can be argued some important conclusions.

Within the first part of the work the concepts of industrial district and cluster have been presented from a theoretical point of view and then within the fourth chapter, the paper has applied this characteristic to the realities of Castellón de la Plana and Sassuolo. It can be concluded that both of them are two clear examples of industrial district thanks to:

- The geographical proximity of the firms;
- The high presence of SMEs and their crucial importance within the innovation process, representing this feature a difference from clusters;
- The presence of intra-district trade;
- The key investments stays within the district;
- The crucial importance of the community that lives within the territory;
- The creation of a district identity;
- The presence of a net composed of firms, association and public institutions.

All of these aspects have been found within both of the territorialities and this helps us to define them as industrial districts rather than clusters.

The second important conclusion is that there is a substantial similarity not only between the two district but also between the two territories that host the industrial agglomeration. Valencian Community and Emilia-Romagna share an unexpected number of characteristics, both of them are best in class for the GDP creation within their nations, there is a great entrepreneurial spirit lingering through the regions that contribute creating a prosperous growing context for economic activities. Within this context the two districts have grown during the last decades and they too share important features, as the concentration of the national ceramic production within their borders and the existence of an efficient infrastructure net that connects the territory with the rest of the word, however this characteristic is better developed in Castellón rather than Sassuolo.

As also the final comparison has underlined, also the histories of the districts share some features that are important to pinpoint also in this conclusion. Both of them have benefitted by the protection of the political power (the King of Spain and the Duke of Modena) during the first years of their growth, and during the XIX they experienced a great phase of expansion. Then Spain didn't participate at the two World Wars, that hardly proved the district of Sassuolo, but it was involved in a civil war that created in the country a dictatorial regime that survived until 1975. Then from the

‘80s, the history of the two districts started to follow the same route. It is interesting underlining the historical similarities and differences between these two industrial agglomerate because they explain to us how they have achieved the same final results, becoming two of the worldwide tile producers leader passing through different ways, especially during the first decades of the last century.

The main point that has to be underlined looking at the structure of the two industrial district is the presence of the main activity, tile production, supported by two main related ones, the frits, glazes and ceramic colours production and the machinery production. The substantial difference is the importance of the related industries, in Spain, there is a predominance of the frits, glazes and ceramic colours industry that is the worldwide leader and it exports its products all over the world, also in Italy. In Sassuolo it is appreciable the same situation talking about the ceramic machinery industry, this is the main structural differences between the two district with the specialisation in the production. As it has been pinpointed within the work Spain produces more square meters than Italy but it has a lower turnover. This is due to the different production’s decision done during the years, in fact, Italy produces more glazed tiles that have a major price due to the longer and more complex production process. Despite these differences, it is incredible the similarity between the two industrial agglomerate, these results have surprised me because when I started working at this project I knew that Sassuolo and Castellón de la Plana have some common features but I didn’t know all of the historical, structural and economics points shared by the two district.

At the end of the work I have also underlined the threat represented by the possibility China obtains the status of market economy, I think that if this possibility will come true it will be a disaster not only for the economies of Sassuolo and Castellón but for European economy in complex because that would mean all European producer would have to front an unfair competition against cheaper Chinese products done following environmental and labour normative really weaker than European ones.

Working on this project has been stimulating and interesting from many points of view, it has improved my knowledge about my home region economy and also about Valencian Community one. My level of English is improved and I fronted myself for the first time within the elaboration of a complex resource about a real issue. However, during the work I found some limitation, the main ones have been the lack of information about the historical part. I have tried to solve this concern asking help to the association ASCER and Confindustria Ceramica; they replaced me underlining the substantial shortage of material but, luckily, they have some documents that have kindly shared with me. Another problem was the lack of an economic budget in order to read some actualized report done by economic analysts about the last financial data of the sector, obviously, with that information, this work would have been more actualized and complete. The last limitation

of the work was the lack of time and the restriction of a maximum number of words in order to complete the work.

The recommendations for further resources are to working deeply on Chinese concerns, I think that this will be the main problem in the future for both the districts of Sassuolo and Castellón de la Plana so I recommend further and deeper investigation about this issue in order to clarify the things. Another point of this work that could be improved in following moment is the importance of the third industrial activity within the two district, the machinery production in Castellón and the frits, glazes and ceramic colours production in Sassuolo. I have not developed it for a lack of time and also a lack of actualized sources but I think that it would be really interesting have some more information about them.

Finally, I want to thanks all the people who have supported me during the last year, starting from my parents, my friends and all the ones who have believed in me. I want also to thanks professor Molina for the constant support during the development of this resource.

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ANNEX I. THE FIRMS AND THEIR LOCATION – CASTELLÓN DE LA PLANA

CASTELLÓN

ALCORA:

1. Alcalaten S.A. (Enameled Stoneware)
2. Azteca (Tiles, Glazed and porcelain stoneware, Special and Complementary pieces)
3. Azulejos Alcor. (Tiles, special and complementary pieces)
4. Azuliber (Tiles, Glazed and porcelain stoneware, Special and complementary pieces, Special geometries: regular hexagon, Products and services sector)
5. Bestile (Tiles, Glazed and porcelain stoneware, Special and complementary pieces)
6. Ceracasa S.A. (Tiles, Glazed and porcelain stoneware, Special and complementary pieces, Glazed and porcelain stoneware, Special and complementary pieces, Mosaic, Constructive solutions)
7. Ceramicalcora S.A. (Tiles: red paste, Glazed Stonewere: Paviment red paste, Special and complementary pieces)
8. Ceramicas Aparici S.A. (Tiles, Glazed and porcelain stoneware, Special Geometries: irregular hexagon, other products)
9. Caramicas Mimas S.L. (Tiles and Glazed stoneware)
10. Ceramicas MYR S.L. (Tiles and Glazed stoneware)
11. Ceramicas Vilar Albaro S.L. (Tiles: red paste)
12. Ceranosa (Tiles, Glazed stoneware, Special and complementary pieces)
13. Colorker (Tiles: white paste, Glazed stoneware and porcelain stoneware, Special and complementary pieces: Special parts, complementary parts, Constructive solutions, Special geometries)
14. Elfos Cerámica (Tiles and Glazed stoneware)
15. Guibosa (Tiles, Glazed and porcelain stoneware)
16. Halcon Ceramicas (Tiles, Glazed and porcelain stoneware, Special and complementary pieces, Mosaic, Constructive solutions)
17. Inalco (Tiles, Porcelain stoneware, constructive solutions and other products)
18. Incoazul (Tiles and Glazed stoneware)
19. La Platera Distribución S.L. (Tiles, Glazed and porcelain stoneware)
20. Mayolica Azulejos S.L. (Tiles, Special and complementary pieces)
21. Plaza Ceramicas (Tiles, Glazed and porcelain stoneware, constructive solutions and other products like ecological tiles)
22. Porcelanite Dos S.L. (Tiles, Glazed and porcelain stoneware)
23. Porsixty (Tiles, Glazed and porcelain stoneware)

24. Superceramica S.A. (Tiles, Glazed, porcelain and rustic stoneware, Special and complementary pieces, Constructive solutions)
25. Tecniceramica S.A. (Tiles: red paste)
26. Undefasa (Tiles, Glazed and porcelain stoneware)
27. Unicer (Tiles: red paste, Mosaic: glazed ceramic, Special and complementary pieces)
28. Vives Azulejos y Gres S.A. (Tiles: red paste
29. Glazed and porcelain stoneware, Special and complementary pieces, Constructive solutions, Special geometries: irregular octagon, Other products: ecological tiles)

ALZAMORA:

1. Azulejera Alcorense (Tile, Stoneware and Porcelain Stoneware)
2. Pamesa Ceramica S.L. (Tile, Stoneware and porcelain, special and complementary pieces and Constructive Solutions)
3. Terracota pavimentos de Gres, S.A. (Tile, Stoneware)
4. Thesize (Porcelain stoneware and constructive solutions)

BETXI:

1. Exagres S.A. (Porcelain stoneware: extruded, Rustic stoneware: Spalplatten, rustic stoneware, Mosaic: ceramic glazed, Special and complementary pieces, Constructive solutions: systems for pools, systems for stairs, modular systems, compositions)

CABANES:

1. Tendencias Cerámicas S.L. (Complementary and special part)

CASTELLÓN de la PLANA:

1. CE.VI.CA. S.L. (Complementary and special part)
2. Grespania S.A. (Tiles, Glazed stoneware and porcelain, Mosaic Special and complementary pieces, Constructive solutions Other products: urban pavements, tactile tiles, or rectified, Products and sector services)
3. Marazzi España (Tiles, Stoneware and porcelain, Special and complementary pieces and constructive solutions)
4. Tau Ceramica (Tiles, Stoneware and porcelain, Special and complementary pieces, Mosaic and Constructive Solutions) – acquired by Pamesa Group
5. Oneker (Glazed stoneware and Porcelain stoneware)

LUCENA del CID

1. Mosavit (Glass mosaic)

2. Fabresa (Tiles and Special complementary pieces)
3. Grayen S.L. (Tiles and Glazed stoneware)

MONCOFA:

1. Alttoglass S.A. (Glass mosaic and Ecological Tiles)
2. Embeplast (Manufacturer of profiles and accessories)

NULES:

1. Keraben Gupo S.A. (Tiles: white paste, Porcelain stoneware: glazed, Mosaic: glazed ceramic, Special and complementary pieces: constructive solutions)
2. Keros Ceramica (Ceramic tiles: red paste, Glazed stoneware: red paste pavement and other products like ecological tiles)
3. STN Cerámica (Tiles: red paste, Glazed and porcelain stoneware, other products)
4. Venus (Tiles: red paste, Glazed and Porcelain stoneware and constructive solutions)

ONDA

1. Azulev S.A. (Tiles: white paste, Porcelain stoneware: glazed and Special geometries)
2. Azulindus & Marti S.A. (Tiles: red paste, Glazed and porcelain stoneware, Special and complementary pieces and Constructive solutions)
3. Ballester Porcar S.L. (Tiles: white paste, Porcelain stoneware: glazed and Special geometries, Special and Complementary pieces)
4. Cerámica CAS S.L. (Tiles: red paste, Glazed stoneware, Special and complementary pieces)
5. Cerámica Da Vinci S.L. (Special and Complementary pieces)
6. Cerámica Estilker S.L. (Special and Complementary pieces)
7. Cerámica Ribesalbes S.A. (Tiles: red paste, Glazed stoneware, Special and complementary pieces)
8. CERLAT S.A. (Special and complementary pieces)
9. CERPA S.L. (Tiles: red paste, Glazed and porcelain stoneware, other products)
10. Cristacer (Tiles: red paste, Glazed and porcelain stoneware and other products)
11. Decocer S.A. (Tiles: white paste, Porcelain stoneware: glazed, Mosaic: ceramic glazed, Special and complementary pieces)
12. Duel Gres S.A. (Glazed stoneware)
13. El Barco S.L. (Tiles: red paste, Glazed stoneware)
14. El Molino (Tiles: red paste, Glazed and porcelain stoneware)
15. Fanal Ceramicas S.A. (Tiles: red paste, Glazed and porcelain stoneware)

16. Gayafores (Tiles: red paste, Glazed and porcelain stoneware, Special and complementary pieces, Special geometries)
17. Natucer S.L. (Tiles, Porcelain and rustic stoneware, Earthenware, Mosaic, Special and complementary pieces, Constructive solutions, Special geometries, Other products)
18. Onix Mosaico (Mosaic, Special and complementary pieces, Constructive solutions and ecological tiles)
19. Peronda (Tiles, Porcelain and rustic stoneware, Constructive solutions, Ecological tiles)
20. Realonda (Tiles, Porcelain and rustic stoneware, Special and complementary pieces)

VILLAREAL

1. Argenta Cerámica S.L. (Tiles: red and white paste, Glazed and porcelain stoneware)
2. Keramex S.A. (Tiles; red paste)
3. Mainzu (Tiles: red paste, Glazed stoneware, Special and complementary pieces)
4. Niro Cerámica España S.L.U. (Tiles: Red and white paste, Glazed and porcelain stoneware)
5. Novogres (Tiles; Red and white paste, Glazed stoneware)
6. Porcelanosa S.A. (Tiles: white paste, Glazed and porcelain stoneware, Special and complementary pieces. Constructive solutions, Special geometries: irregular octagon, curvaceous base part Other irregular polygonal pieces, Other products: ecological tiles)
7. Rocersa (Tiles: white paste, Glazed and porcelain stoneware, Special and complementary pieces, Constructive solutions, Special geometries)
8. Todagres S.A. (Glazed stoneware, Special and complementary pieces, Constructive solutions)
9. Togama S.A. (Mosaic)
10. Venis S.A. (Tiles and Glazed stoneware, Special and complementary pieces, Special geometries)

ANNEX II. THE FIRMS AND THEIR LOCATION - SASSUOLO

MODENA

CASTELVETRO

1. Ariana (Glazed porcelain stoneware)
2. Ceramiche Ascot (Glazed porcelain stoneware, Biscuit to be glazed and Tiles: double fired)
3. Ceramiche Astor (Glazed porcelain stoneware)

4. Ceramiche CCV Castelvetro (Porcelain stoneware and glazed porcelain stoneware and other products)
5. Ceramiche Daytona (Glazed porcelain stoneware, Mosaic and Full cycle double fired tiles)
6. Dom Ceramiche (Glazed porcelain stoneware, Bisque to be glazed and Full cycle double fired tiles)
7. Edimax (Glazed porcelain stoneware)
8. Flaviker (Glazed porcelain stoneware)
9. Nuovocorso (Glazed porcelain stoneware and other products)

FINALE EMILIA

1. ABK Group (Glazed porcelain stoneware)
2. Ceramiche MOMA (Full cycle double fired tiles, Construction products)
3. Fiordo (Porcelain stoneware and glazed porcelain stoneware, Mosaic, Construction products and others products)
4. Panaria Group (Tiles: white paste, Porcelain stoneware and glazed porcelain stoneware, Mosaic, Construction products and others products)

FIORANO MODENESE

1. Caesar (Porcelain stoneware and glazed porcelain stoneware and construction products)
2. Ceramiche Gardenia Orchidea (Glazed porcelain stoneware, Tiles: white paste, Glazed double fired)
3. Ceramiche Atlas Concorde (Tiles: white paste double fired, Porcelain stoneware and Glazed porcelain stoneware, Other products)
4. Boxer (Mosaic and Construction products)
5. Il Cavallino Ceramica Artistica (Construction product and Ornamentalware)
6. Cedit (Porcelain stoneware and glazed porcelain stoneware, Tiles: white paste and full cycle double fired tiles)
7. COEM (Porcelain stoneware and glazed porcelain stoneware)
8. Elios Ceramica (Glazed porcelain stoneware)
9. Elle Ceramica (Glazed porcelain stoneware)
10. Emil Ceramica (Porcelain stoneware and glazed porcelain stoneware, Tiles: with paste double fired)
11. Ergon (Porcelain stoneware and glazed porcelain stoneware, Tiles: with paste double fired)

12. FAP Ceramiche (Porcelain stoneware and glazed porcelain stoneware, Mosaic, Tiles: white paste double fired)
13. Ceramica Fioranese (Porcelain stoneware and glazed porcelain stoneware)
14. Florim Ceramiche (Porcelain stoneware and glazed porcelain stoneware, Tiles: white paste, Full cycle double fired tiles)
15. Granito Forte (Porcelain stoneware and glazed porcelain stoneware)
16. Laminam (Porcelain stoneware)
17. LEA Ceramiche (Tiles: white paste, Porcelain stoneware and glazed porcelain stoneware, Construction products and others products)
18. Novecento (Tiles: double fired white paste, Porcelain stoneware and glazed porcelain stoneware, Construction products)
19. Nuova Rival (Tiles: white paste, Porcelain stoneware and glazed porcelain stoneware, Mosaic, Construction products and others products)
20. Franco Pecchioli Ceramica (Tiles: white and red, single and double fired tiles, Porcelain stoneware and glazed porcelain stoneware, Mosaic, Glazed double fired and full cycle double fired tiles, Construction products and other products)
21. Industrie Ceramiche PIEMME (Porcelain stoneware and glazed porcelain stoneware, Tiles: double fired white paste, Construction products and others products)
22. Savoia Italia (Porcelain stoneware and glazed porcelain stoneware, Construction products)
23. Settecento Valtresinario (Tiles: white paste, Porcelain stoneware and glazed porcelain stoneware, Mosaic, Construction products, Glazed and full cycle double fired tiles)

FORMIGINE

1. Ceramiche Grazia (Glazed double fired tiles)
2. Italgraniti Group (Porcelain stoneware and glazed porcelain stoneware)

FRASSINORO

1. Ceramica Alta (Glazed double fired tiles, Construction and other products)

MARANELLO

1. Ceramica Fondovalle (Glazed porcelain stoneware)
2. ITIEMM (Porcelain stoneware, Construction products and others products)
3. SIMA (Other products)

MODENA

1. Etruria (Porcelain stoneware, construction products and Full cycle double fired tiles)

2. Polis Manifatture Ceramiche (Porcelain stoneware, Full cycle double fired tiles)

MONTEFIORINO

1. Exportceram (Full cycle double fired tiles)

PAVULLO NEL FRIGNANO

1. Gold Art Ceramica (Porcelain stoneware and glazed porcelain stoneware, Mosaic, Tiles: red paste, Construction products)
2. Mirage (Tiles: white paste)
3. Opera Group (Tiles: red paste, Porcelain stoneware and glazed porcelain stoneware, Full cycle double fired tiles)

PRIGNANO SULLA SECCHIA

1. Ceramica Artistica Due (Glazed porcelain stoneware)

SASSUOLO

1. Abitare la Ceramica (Porcelain stoneware and glazed porcelain stoneware)
2. Fincibec Group (Porcelain stoneware and glazed porcelain stoneware, Mosaic, Tiles: white paste double fired, Construction products)
3. Blustyle (Porcelain stoneware and glazed porcelain stoneware, Construction products)
4. Ceramica Mediterranea (Porcelain stoneware and glazed porcelain stoneware, Construction products)
5. Cotto d'Este (Porcelain stoneware and glazed porcelain stoneware, Construction products)
6. Forme 2000 (Porcelain stoneware and glazed porcelain stoneware, Mosaic, Glazed double fired, Full cycle double fired tiles, Products for construction and Other products)
7. Ceramiche di Frassinoro (Porcelain stoneware and glazed porcelain stoneware)
8. Gruppo Ceramiche Gresmalt (Porcelain stoneware and glazed porcelain stoneware)
9. Marazzi (Tiles: white paste, Tiles: double fired white paste, Porcelain stoneware and glazed porcelain stoneware, Mosaic, Construction products and other products)
10. Ceramiche Marca Corona (Porcelain stoneware and glazed porcelain stoneware, Mosaic and others products)
11. Oscar (Glazed porcelain stoneware)
12. Sichena (Porcelain stoneware and glazed porcelain stoneware)

SAVIGNANO SUL PANARO

1. Pastorelli (Porcelain stoneware and glazed porcelain stoneware)

SERRAMAZZONI

1. Kamares (Porcelain stoneware, Construction products and others products)
2. Ceramiche Serra (Tiles: red paste)
3. Tuscania (Glazed porcelain stoneware)

REGGIO-EMILIA

BAISO

1. Ceramiche MAC 3 (Tiles: white paste, Glazed porcelain stoneware, Construction products)

CASALGRANDE

1. Casalgrande Padana (Tiles: white paste, Porcelain stoneware and glazed porcelain stoneware)
2. Cercom (Porcelain stoneware and glazed porcelain stoneware)
3. Cerdisa (Porcelain stoneware and glazed porcelain stoneware)
4. Cipa Gres (Porcelain stoneware and glazed porcelain stoneware)
5. CIR (Porcelain stoneware and glazed porcelain stoneware)
6. EXE Activity (Porcelain stoneware and glazed porcelain stoneware)
7. Faro Ceramiche (Glazed porcelain stoneware)
8. Gambini Group (Glazed porcelain stoneware, Tiles: white paste, Glazed double fired)
9. Gruppo Romani (Glazed porcelain stoneware, Glazed double fired tiles, Mosaic, Construction Products)
10. ITA (Porcelain stoneware and glazed porcelain stoneware, Tiles: white paste)
11. Ceramiche Keope (Porcelain stoneware)
12. Ceramiche Refin (Porcelain stoneware and glazed porcelain stoneware)
13. Gruppo Ceramiche Ricchetti (Porcelain stoneware and glazed porcelain stoneware)
14. Ceramica Valsecchia (Porcelain stoneware and glazed porcelain stoneware)

CASTELLARANO:

1. Alfa Lux (Tiles: white paste, Porcelain stoneware and glazed porcelain stoneware, Mosaic, Products for construction)
2. Cotto Petrus (Porcelain stoneware and glazed porcelain stoneware)
3. Granitifiandre (Porcelain stoneware and glazed porcelain stoneware, Tiles: double fired red paste, Other products)

4. Ceramiche Mariner (Glazed double fired tiles)
5. Novabell (Tiles: double fired white past, Glazed porcelain stoneware)
6. San Valentino (Construction products and others products)

CORREGGIO

1. Ceramica Mandrio (Tiles: double fired red paste)

RUBIERA

1. Antica Ceramica Rubiera (Porcelain stoneware and glazed porcelain stoneware, Mosaic, Products for construction)
2. Domus Linea (Other products)
3. Ceramica Gazzini (Tiles: white paste, Glazed porcelain stoneware, Mosaic, Construction products)
4. Keradom (Construction products)
5. Rondine (Porcelain stoneware and glazed porcelain stoneware, Construction Products)

SCANDIANO

1. A.R.P.A. (Tiles: double fired white paste and Glazed porcelain stoneware)
2. Greslab (Glazed porcelain stoneware)