



Current and future challenges of the ceramic tile firms

Business administration degree

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INTRODUCTION

The importance of choosing this topic about "Current and future challenges of the ceramic tile firms" stems from the impact of this industry on our continent. The Spanish manufacturer industry of ceramic tiles is one of the most dynamic and innovative of Spain and in the global ceramic sector it is the leader in terms of technological development, design and quality of service with countries like Italy and Brazil.

Given the economic crisis in Spain, it is interesting to study this issue, because it is an industry that has been handled pretty well in this period, being one who has dealt with the situation, despite being affected as many of the Spanish industries. Another reason is because this sector is characterized by high investment in R + D + i. Currently, this sector is making significant efforts to consolidate the ceramic product among prescribers. In addition, the world consumption growth of this industry is guaranteed and the Spanish tile industry has solid foundations and positive future due to its global leadership in R + D + i and its high degree of internationalization. It is also interesting to study the competitiveness since the Spanish ceramic industry is one of the most competitive on the international scene, thanks to its quality and constant commitment to innovation and development of new products and applications. Therefore, it is interesting to compare the Spanish industry with the two major world producers: Italy and Brazil.

We need to understand that it is a sector that has always been in turnover, number of companies and number of patents per group growth, except the period of the economic crisis.

In Spain, Valencia is the main source of the Spanish ceramic sector, as almost all industry concentration it is located in this territory. We can say that the heart of this area is located in Castellon and its environs, making even more interesting our object of study.

To work this issue I will focus on the main objective of this work, which consists on collect different items until the actual date of our country, researched from different studies, and also from Italy and Brazil to make a solid conclusion of this industry. This is because we treat the "TOP 3" of the sector, which will help us to collect proper data for further information on the ceramic sector. The exclusion of China as an object of study of this work is followed by the following reasons: lack of information and language.

Finally, the structure I am going to carry out in this work will be in the next order: First, I will introduce the theoretical framework of our study, which is going to focus on the global definition of the Spanish, Italian and Brazilian ceramics industry with the most relevant concepts of the sector that will guide us for along this study. Secondly, I will explain the study's methodology, highlighting the main tools of this work and also providing various analyses from the investigation of items. Finally, I will discuss and conclude the study's findings with the compilation of a list of forty five items. Twenty-five of them are from the ceramic industry of Spain, eight from Italy and twelve from Brazil.

I. THEORETICAL FRAMEWORK

The final goal of this section is to know all the basic information of this work, which are the main concepts used throughout it.

Before beginning, we must remember the concept of the industry, which is a group of companies that, after a certain technology, provide the full range of functions carried out by certain products to all groups of potential customers. From now we focus on the ceramic tile industry in the three countries mentioned above. Industrial ceramics are defined as all production of ceramic materials designated for the flooring (pavement) and walls (lining). The other type is called ceramic ware (or handmade pottery) and it involves the production of ceramic utensils such as cups, plates, trays, tiles, pipes, etc... The main difference between the two ceramics is how they produce. The production in the industrial ceramic process is fully continuous and complex (in terms of the number of variables that affect the final result), while in the ceramic ware is usually discontinuous. Another key concept is innovation. When we talk about innovation, we refer to all change, based on any kind of knowledge that generates value as it has direct economic consequences. Industrial innovation could be summarized as a set of unprecedented technological resources, human resources and financial resources (capital). Obviously, these include technological innovations, which are the most studied and also the riskiest.

On the other hand, when we refer to the ceramic industry in those three countries we are always highlighting clusters and districts concepts. This is because most of the production in this sector is concentrated in a particular territory of the country. We must differentiate those two main concepts. We need to know that the clusters are concentrations of interconnected companies, specialized suppliers, service providers, companies with related activities and associated institutions (eg. universities, public agencies, business associations, etc.) in a particular activity where they compete and also cooperate (Porter 1998: 197-198). Instead, the concept of industrial district (DI) has traditionally been as a socioeconomic entity characterized by the presence of a community of people and a population of companies in a natural and historically limited geographical area (Becattini, 1990: 39).

II. METHODOLOGY

Our data collection for analysis of this study covered the three main producing countries in this sector, which are: Spain, Italy and Brazil. Most of the data obtained from the sector by the companies proceed from the following institutions:

- ASCER: “Asociación Española de Fabricantes de Azulejos y Pavimentos Cerámicos”, founded in 1977 under the Law 19/1977 of Professional Organizations. At present day, it represents about 95% of the production sector, becoming one of the most representative industry associations in Spain. Its headquarter is located in Castellon de la Plana because the industry is concentrated in this province, forming a cluster or industrial district. Of the total turnover, 80 % were exports and other sales are designated to the national market. The Spanish tile industry is a strategic industry in the Spanish economy, providing a clear trade surplus to the entire country, with a coverage rate of over 2,100% (in 2013). Its large export capacity places it among the major export sectors of Spain and is the second largest industry that contributes to the higher surplus trade balance of Spain.
- CONFINDUSTRIA CERAMICA (ASSOPIASTRELLE): Renamed and restructured as "Confindustria Ceramica" from 1 January of the 2007 is the association of Italian ceramic industry that represents the main links, information and assistance to Italian manufacturers of ceramic tiles, refractories, sanitary ware, tableware and ceramics of industrial use. In this organization also participate, as aggregate partners, Italian companies performing industrial activities, as well as commercial enterprises. The association has more than 40 years and directs its activities according to the needs of member companies, in order to affirm and safeguard their interests, the role and image of each company.
- ABC: “Associação Brasileira de Cerâmica”, It is a civil non-profit association, with headquarters and jurisdiction in the city of São Paulo, with the mission of promoting the interaction of individuals and companies involved in the communication media in the ceramic sector and related areas, as well as conduct courses and events; to maintain scientific and technologic publications, to promote exchanges with experts and associations in the country together with foreigner, to participate in staff training, research, development and technological innovation; and to promote and defend the ceramic in the

following areas: artistic, scientific, cultural, educational, corporate, industry and technology.

Table 1. Comparison of economic data. Ceramic tile industry in recent years

	SPAIN	ITALY
Turnover (millions €)	2,895	4,910
Production (mill. squared meters)	420	382
Direct employees	14,300	19,430
Number of firms		150
Exporting rate	80 %	83 %
Main source	ASCER	CONFIDUSTRIA CERAMICA

	BRASIL
Turnover (millions\$)	3,786
Production (mill. squared meters)	844
Direct employees	
Number of firms	418
Exportation (mill. squared meters)	69,2
Main source	ABC - ANFACER

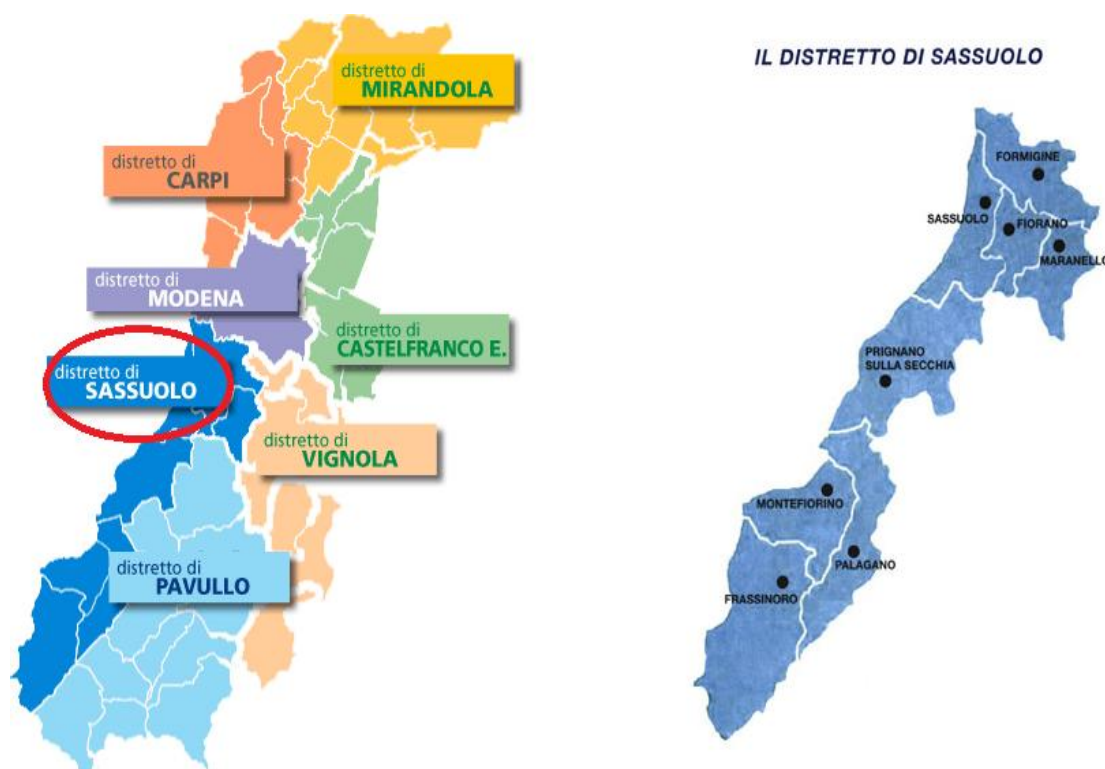
**Source: Compiled by author*

It is a brief introduction to the most important districts of the three countries analyzed in this paper below:

Spain. The finding of existence one or more DI in Castellon begins with the pioneering work of Ybarra (1991), which makes a first identification of the Valencian DI. The study, realized in the period 1975-1986, focuses on the variable investment as a way of demonstrating the existence of a more dynamic economic activity within the potential DI. With this methodology, a total of eleven DI are identified in Valencia, including the ceramic industry. This first map of Valencia DI opened the door to the other studies of identification of districts, all with the common feature to take Valencia as one of the starting points. Other studies, meanwhile, have focused on detecting the differential element or district effect to explain the geographical concentration of some of these activities. The Ceramics Industrial District of Castellon (DIC) is a clear example of

Italy. Sassuolo DI is one of the main production centers worldwide for producing ceramic tile, achieving 80% of domestic production. It is located in the foothills between the provinces of Modena and Reggio Emilia. The ceramic district center is located along the Sassuolo-Fiorano and has gradually extended to the cities of Modena Fiorano Modenese, Formigine, Maranello and Castelvetro and Reggio Emilia Scandiano, and Rubiera Casalgrande. Sassuolo area is characterized not only by the expansion of ceramic enterprises, but also by the concentration of other productive activities and additional services linked to the cycle of the tile. In particular, is where it is located the heart of the Italian ceramic mechanics, the world leader in the sector. Then, there are main activities related to the planning, design and decoration of tiles, with the production of glazes, colors, product packaging and distribution logistics. The DI Italian production model it is also characterized by complex networks of relationships established between companies and between them and their environment. On the one hand, there are formed bonds of cooperation and sharing of resources and experiences between the companies involved in the same production, on the contrary, it is generated a strong competition between companies in the same local system that compete in the same markets

Figure 2. Ceramic industrial district of Sassuolo



**Source: Compiled by author*

Brazil. The Brazilian ceramic industry is one of the four largest producers in the world. National production is distributed in five regions, but mainly concentrated in the South and Southeast, with 92% of its total. The state of Santa Catarina is the main producer in the Park Country South Region, which represents for about 30% of the national production of ceramics. In this state, production is highly concentrated in medium and large-sized companies located in the southern region, about 100 kilometers in places like Criciúma, Urussanga and Imbituba. This concentration was initially linked to the existence of raw materials - clay, kaolin and quartz - in the region and the diversification of the business processes of the extraction of coal and structural ceramics for ceramic coating which contributed to the formation of groups with a base of specialized production. The main hypothesis is that a revolutionary innovation, combined with specific local conditions, can originate a new cluster.

Santa Gertrudes cluster had an evolutionary trajectory according to the dynamics of production process paradigms adopted. Nowadays, the cluster is passing through the turning point from the growing phase to the maturity phase. The cluster was born at the beginnings of 70's due to the adoption of an alternative production paradigm - the dry mixture -, which combined with specific local conditions as raw material supply and competencies in a related sector - roof tiles and bricks - created extraordinary economies of scale which enabled the Santa Gertrudes firms to compete with low cost strategy. At the end of the 80's, a series of innovations enlarged the economies of scale, beginning the cluster growing phase. At present it is observed that the cluster had reached the limit of low cost competition and is going through the maturity phase. In this new phase the firms of Santa Gertrudes cluster need other competencies to face this new competitive pattern.

The methodology used in this work to identify all items studied has been searching through "Google Scholar". This search engine allows searching diverse sources from one place, find papers, abstracts and citations, locate the complete documentation through the library or the web and learn about key papers in a field of investigation. All objects of study have been identified through this search engine. The search has been performed in several ways¹:

¹ It should be noted that some translators have been used, as WordReference and Google Translator, to translate the articles that were in Italian and Portuguese as main languages. Translations of those articles tried to be in the most appropriate way compared to the main languages

- Introduction by keywords belonging to various ceramic industries of the three countries and selecting the most suitable items for the requirements of our investigation.
- Introduction by date, selecting works with various historical studies to get our study more enriched and to have greater time margin in this one.
- Introduction by authors, selecting the most relevant, intending to incorporate more work of these ones.

I need to highlight that the sample obtained in which the content analysis of this paper is based, has covered 45 articles about various topics of the ceramic industry in Spain, Italy and Brazil in the next order: 25 of them are Spanish, 8 Italian and 12 Brazilian articles.

I need to emphasize that the limited data of foreign journals and studies, in special Italian case, is due to the privacy of information that has limited access because of: confidential information with access from specific institutions, payment information and information requiring copyright permission and direct contact with the main source/author. Two main obvious theories why Italy restricts access to information of ceramic tile industry are:

- Profit. The restriction of the information by payment is because many of the companies of leading industries want to take economic advantage giving the information to the reader.
- Fear of major international competitors. Another factor is that the country does not want to publish their articles because they want to continue taking the leadership position which prevents the publication of the most relevant articles of some Italian districts to all readers.

Figure 3. Restriction by of research information by payment

The screenshot shows a journal article page. A red circle highlights the button 'scarica qui l'articolo' (download the article) which requires 'download credits'. On the right side, there is a 'MERCATI e COMPETITIVITÀ' logo and a 'Per scaricare gli articoli Pdf acquista i download credit' button. The article title is 'Internazionalizzazione, performance delle imprese e crisi economiche: i produttori di piastrelle di ceramica del distretto di Modena e Reggio Emilia'. The page also features a sidebar with navigation options and a top navigation bar with social media icons.

In this illustration we see such an interesting article which lacks of accessibility because the website orders the registration and then a payment for that item.

Figure 4. Restriction of research information by author

The screenshot shows a thesis record page for 'Sistema ETD (Electronic Theses and Dissertations)'. The university name 'UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA' is circled in red. The record title is 'Tesi etd-02192015-102313'. Below the title is a table with the following data:

Tipo di tesi	Tesi di laurea magistrale
Autore	REINA, MAURO
URN	etd-02192015-102313
Titolo	Come creatività e innovazione si fondono nell'industria di piastrelle ceramiche: il caso Marazzi Group
Titolo in inglese	
Struttura	Dipartimento di Economia
Corso di studi	Management internazionale (D.M.270/04)
Commissione	Nome Commissario Qualifica NARDIN GIUSEPPE Primo relatore
Parole chiave	<ul style="list-style-type: none"> • creatività • design • innovazione • piastrelle • prodotto
Data inizio appello	2015-03-19
Disponibilità	Accesso limitato: si può decidere quali file della tesi rendere accessibili. Disponibilità mixed (scegli questa opzione se vuoi rendere inaccessibili tutti i file della tesi o parte di essi)

In this example, I want to emphasize that almost of all the theses of the Italian ceramic district are restricted by the institution and in 100% of cases we need to contact the author to receive a copy of the document.

To conclude this section I will make some comparisons of various types to help this work to reflect the analysis of data to, later, be able to draw more precise conclusions from this study. Also, this will help us better understand the purpose of our work. Comparisons are made from the presented articles used throughout this work. Most of them have consisted in comparing several variables along the period, countries and percentages as shown in the tables below:

Table 2. Reviewed publications and number of papers by countries

SOURCE	Period	Number of studies	%
SPAIN	1998-2014	25	55.5
Economía industrial	2001-2014	2	8
Revista de estudios regionales	1998	1	4
Colección Mediterráneo Económico	2008	1	4
El País	2014	1	4
Boletín de la Sociedad Española de Cerámica y Vidrio,	2001-2013	7	28
Revista Innovar Journal	2012	1	4
Investigaciones geográficas	1998	1	4
SATIE	2012	1	4
ALTEC 2005, XI Seminario Latino Iberoamericano de Gestión Tecnológica	2005	1	4
Revista de treball, economia i societat	2007	1	4
Revista de la Economía	2007	1	4
X Congreso de Ingeniería de Organización	2006	1	4

VIII Encuentro de Economía Aplicada	2005	1	4
Revista Electrónica de Comunicaciones y trabajos de ASEPUMA	2008	1	4
27 Congreso Nacional de Estadística e Investigación Operativa	2003	2	8
X Congreso Español de Sociología	2010	1	4
QPT-España	2004	1	4
ITALY 1985-2014		8	17.7
Università degli Studi di Modena e Reggio Emilia	2004	1	12.5
Atti 25 – Congresso della Società Italiana di Ecologia	2001	1	12.5
Journal of Cleaner Production,	2007	1	12.5
Institute for Development and Peace	2001	1	12.5
Gerhard-Mercator-University of Duisburg			
Research Policy	1985	1	12.5
Applied Clay Science	1999	1	12.5
Centro di Ricerca sulla Logistica LIUC	2012	1	12.5
Master's Degree Thesis, LUISS	2014	1	12.5
BRAZIL 1999 - 2011		12	26.6
Cerâmica industrial	2000 - 2010	4	33.3
BNDES sectorial	1999	1	8.3
X Encontro Latino Americano de Iniciação Científica e VI Encontro Latino Americano de	2003	1	8.3

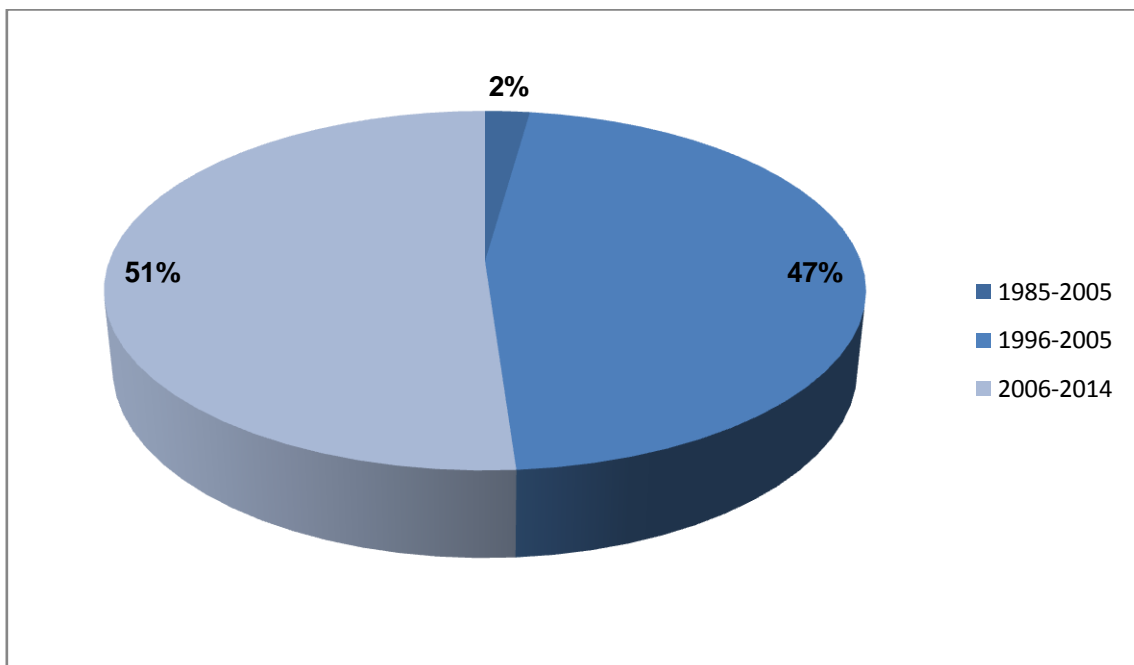
Pós-Graduação			
Ambiente Construído	2005	1	8.3
Cerâmica	2008	1	8.3
XXII Encontro Nacional de Engenharia de Produção, ABEPRO	2002	1	8.3
10ª Mostra Acadêmica Unimep	2012	1	8.3
European Business Review	2011	1	8.3
Ensaaios FEE	2000	1	8.3
TOTAL	1985-2014	45	100

In this table we can see the items that we used divided by countries and limited for periods. It is observed that older articles are in Italy, while Spain and Brazil are more recent. According to this analysis, in Spain dominated the publication by “Boletín de la Sociedad Española de Cerámica y Vidrio”, in Brazil most interesting articles were published in the journal “Ceramica Industrial” while in Italy there is no predominant source. Finally, I note that most of the articles analyzed are Spanish (55.5%) while the minorities are from Italy (17.7%).

Table 3. Number of articles by periods

	Number of articles
1985-1995	1
1996-2005	21
2006-2014	23
TOTAL	45

Figure 5. Number of articles by periods in percentages

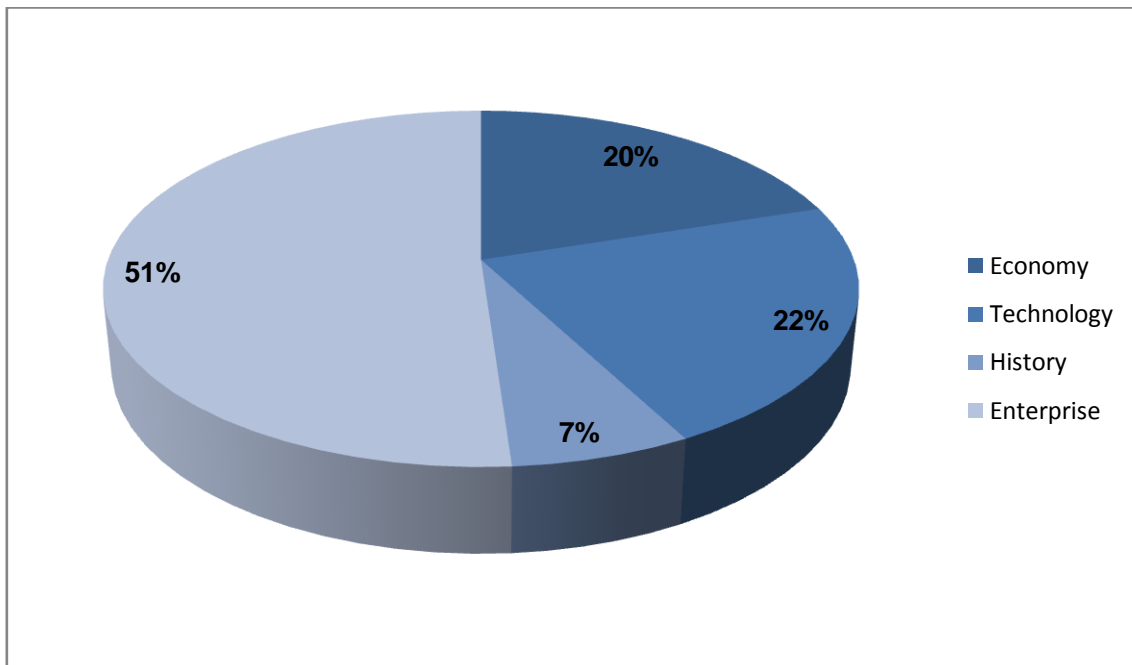


In this analysis we can see how a little over half of the items are recent, being the 2006-2014 period at a rate of 51% of the total items. Between of 1985-1995, periods we can observe that only was published one article, contrasting the difficulty of finding old items online. Moreover, Articles published in 1996-2005 period also play a big role in the total of articles due to the contrast form almost half of them.

Table 4. Thematic study by countries

Country/Type	Economy	Technology	History	Enterprise
Spain	7	5	3	10
Italy	0	3	0	5
Brazil	2	2	0	8
TOTAL	9	10	3	23

Figure 6. Thematic study in percentages



Here the division of the subject is clearly seen by country on all analyzed items. We need to highlight that 51% are items of "enterprise" character while the minority are historical, which are given only in the Spanish articles. In third place there are economic articles, it is noteworthy that these items are not present when we talk about Italian articles because it is a more focused on technology and business networks sector (3 economic items compared to 5 of "enterprise" with a total of 8). We can conclude that Spain is much more focused on economic and entrepreneurial items, while Brazil focuses more on entrepreneurial items and equally on the economic and historical items.

Table 5. Geographical scope. Total and by periods

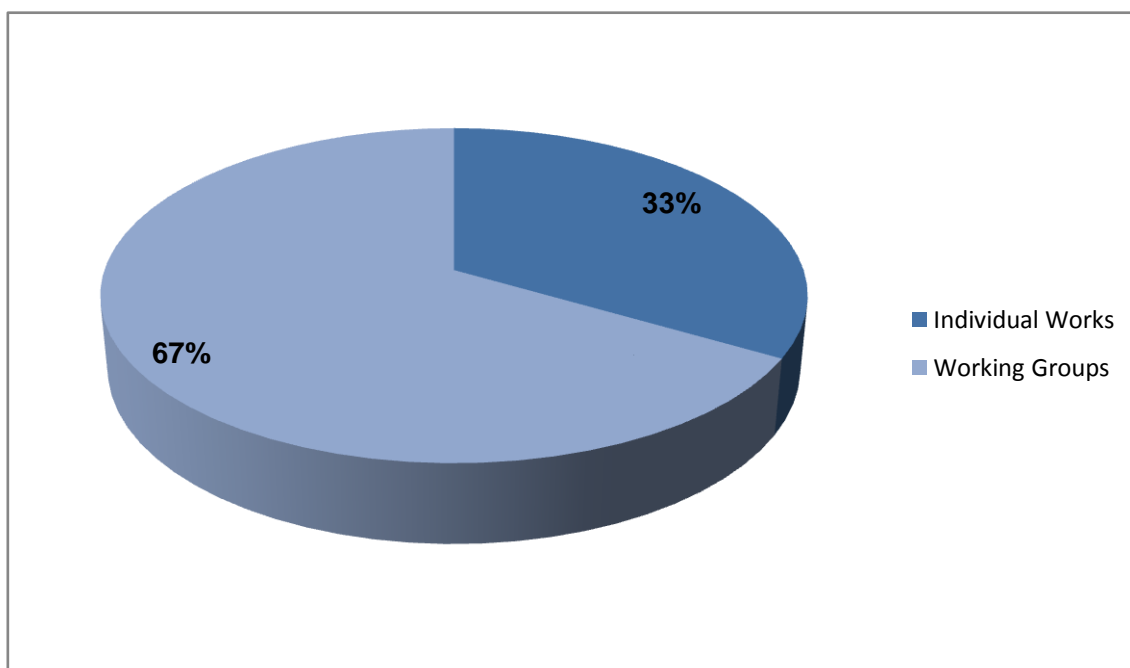
Period/Country	Spain	Italy	Brazil
1985-1995	0	1	0
1996-2005	10	4	8
2006-2014	15	3	4
TOTAL	25	8	12

Here have focused on the most recent articles in Spain while Italian and Brazilian items in have been of major importance over the 1996-2005 period. The oldest item of this work resides in Italy proving that is the pioneer country in this sector.

Table 6. Type of study realization. Total and by periods

Period/Type	Individual work	Working groups
1985-1995	1	0
1996-2005	6	14
2006-2014	8	16
TOTAL	15	30

Figure 7. Type of study. Realization in percentages



In this analysis, I compare individual work with the working groups of all items from all countries. We can see that only 1/3 of the published papers are individual. This proportion has remained virtually unchanged from 1996 to 2014 of the articles in the last point.

Table 7. Origin of articles by countries

Country / Origin	Journal	Institution/thesis	Meetings and conferences
Spain	17	2	6
Italy	3	4	1
Brazil	9	1	2
TOTAL	29	7	9

To conclude this analysis, I created another table where are shown the origin of the publications. We can see that the vast majority are journals (29 of 45 of the total). Also, journals have played a very important role in the analysis of articles in Spain and Brazil, and that much in Italy. In Italy we can see that the publications are made directly from an institution, most of them are universities, highlighting research and doctoral theses. Finally, there are those that are originated from national conferences or meetings in each country, emphasizing in Spain and, in minor importance, in Italy and Brazil.

III. CONCLUSIONS

In this section, I will divide the conclusion of two parts: according to the analysis methodology and personal analysis of the items placed in the Annex.

The reason of including conferences and meetings as an object of study is because in each edition reports of the subject, not without be so extended and being quite specific. In the “Table 2. Reviewed publications and number of papers by countries”, the two associations that have more publications (Spanish and Brazilian associations) are the one of the publishers of the sector, while in Italy there is another but it has restricted nature. The difficulty of finding recent articles in Italy is not due to the absence of such items, but the Italians are less likely to publish their articles on free sites, publicly and on websites. Analysis of Spanish items is greater due to the best performance that could give the author, and partly by the ease of access. If I could these two factors from highest to lowest, by country, it would be: Spain> Brazil> Italy. The importance of choosing the 1985-1995 periods despite the fact that there is only one publication is to show that Italy is a veteran sector and world leader in the ceramic industry. The analyzes have been divided in two periods, 1996-2005 and 2006-2014, equally, to take more set, united and diversified information. According to “Table 4. Thematic study by countries”, it is observed that Italy does not emphasize on historic and economic articles because it follows a leading role, and instead, Brazil is keeping a follower role of the Italian ceramic industry, despite being one of the world's largest producers. The order is as follows:

Figure VIII. Comparison of roles



It is also true that there are many historical mentions of Italian ceramic industry, but they are collected in books and in smaller amounts. Instead, Spain is a country that has been positioned within the leading countries in the sector, but evolving a little less advanced way, in terms of technological innovation, to Italy. In the “Table 6. Type of study realization. Total and by periods” we can see that most of our analyzed articles are written in Workgroups. This is because: most of them not institutional (remember, for example, almost all theses are individual) and the information that can provide a

working group is always larger and richer than the individual studies. For periods, it is always following the same proportion because the forms of studies realized in this sector have not changed that much over the years. In the last "Table 7. Origin of articles by countries" it is shown that Italy does not perform many conferences and meetings, because most publications are from institutions. Instead, there is a huge amount of free access virtual journals in Spain, making high cooperation within our industry and "feedback" to make to grow and innovate our industry. Spain and Brazil always bet on the joint-growth of the sector.

However, my personal analysis is based directly on the information items, it is as follows. As mentioned above, Italy is committed to restricted technological innovation and publicity of studies because they want to keep a leadership role. We can see some critical conclusions about Spain along some Italian items and, in many cases, compared to DI of Castellon. This is because our industrial district is getting closer conditions to Italian industry, offering a similar economic data. Moreover, we can see that Brazil focuses on obtaining and management of raw materials, environment, internationalization and comparison of Sassuolo and Castellon industrial districts. According to analyzed articles, Spain focuses more on entrepreneurial issues, relations with "stakeholders" of the company, the expansion of the sector, etc ... and to a lesser extent on innovation, while the Italians focus on the environment, technological and productive innovation, improvement of logistics and distribution systems, and continue playing a leadership role in the global ceramics industry, that is, remain an example of "benchmarking". All of this is because Brazil is starting to export their production while Spain has been internationalized and is strengthening its structure, intra and inter business, to facilitate the research of technological innovations and Italy is already in the last industrial phase of the industry which is called innovation. I found some limitations of this study due to lack of information from Italian and Brazilian articles, and also, with the difficulty which has been the language and the translation of these items. I need to highlight that the items, both Spanish and Italian, somehow, have dual translation, which consists to publish the issue with the origin language and in English. It seems that in Brazil do not use it much, due to their studies always published only to national readers.

Finally, I need to remark that this topic was entertained, but I would like to give some suggestions. I would like to emphasize on the restricted information. The number of limited information should be decreased for all countries. I will note that this sector is crucial in global industry, so the co-operation between all countries on data-flow would facilitate the growth and road to innovation instead of seeking for only a national profit.

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COD	Author/year/ source	Article	Thematic	Objectives	Methodology	Results and conclusions
1	Albors-Garrigós J. and Molina- Morales F. X. (2001) / Economía industrial, N°339, pages 167-175	La difusión de la innovación, factor competitivo en redes interorganizati vas. El caso de la cerámica valenciana	Economy	To show within the context of Spanish ceramic sector, how the crowds of cluster companies have developed such high competitiveness compared to other models of the enterprise inter- organization	It has been approached from two perspectives: - Economic growth and network cooperation perspective - Technological development perspective This study was based on: - The analysis of existing economic data and bibliography about the sector - The visit to the most important trade fairs held in Europe - Fifty interviews with leading professionals from various subsectors on the Spanish and Italian ceramic	It is intended to show how business clusters of industrial districts have a great competitiveness compared to the other types of business organization. Within these advantages of its existence, it is remarked those that refer to the creation and diffusion of technology innovation. It is argued that the complex structure of internal relations, which is stable between the different participants, allows not only an incremental improvement, both products and processes, but thanks to the technological capacity developed by the companies, it allows the use of the

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					industry	opportunities that technological discontinuities keep offering. The result is that the system appears as suitable for the generation of new market opportunities
2	Molina-Morales F. X. and Camisón-Zornoza César (1998) / Revista de estudios regionales, ISSN 0213-7585, N°50, pages 15-38	Evaluación de la proximidad de una colectividad de organizaciones al modelo ideal de distrito industrial y desempeño empresarial	Enterprise	To review some of the contributions, which provide the framework for empirical research that involved the comparison of two emerging industrial districts located in: Emilia Romagna (Italy) and Castellon (Spain) belonging to the ceramic industry	It is proceeded to an empirical investigation in which the comparison was made based on the analysis of the financial results obtained by the companies (ASCER and ASSOPIASTRELLE as a main sources) of both districts and compared for a specified period of time	<ul style="list-style-type: none"> - Firstly, it seems to be strong empirical evidence of the superiority of Spanish DI against the Italian DI - The second group of results suggests the evidence that smaller companies are precisely those with more favorable differences to Spanish case - The last set of results shows that Italian companies which are specialized in higher value-added products, get relatively better results(especially the case of porcelain stoneware) - Finally, with this comparative

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						analysis, it was found that the size distribution resulted useful to explain the relative effectiveness of a DI
3	Molina-Morales F. X. (2008) / Colección Mediterráneo Económico, N°13, pages 183-201	Los distritos Industriales en la Europa Mediterránea. Las diferencias entre Italia y España	Enterprise	To propose a model where districts are no longer self-contained and that the firms and institutions within them must open themselves up to the outside world and undergoing a restructuring process of the remaining internal activities	<ul style="list-style-type: none"> - Firstly, after theoretical conceptualization, it has proposed a model of district more adequate to the new conditions of the international markets - Afterwards, it has been illustrated the theoretical development which compares four pairs of districts, in Spain and Italy: ceramic tile, furniture, footwear and textile - Finally, there are suggested recommendations at institutional and individual levels in order to be 	<p>All analyzed cases confirm the defining elements of industrial districts:</p> <ul style="list-style-type: none"> - In the first point, they are characterized by high degree of geographical concentration. In the all cases also the degree of specialization , with a significant relative importance of the districts regarding to national totals of the respective industries - Secondly, there is a predominance of micro and small enterprises, but this is not supposed to be a rule on the districts. The companies develop one or more phases of

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					successful in the new competitive arena	production process, and it is not appreciated a process of significant vertical integration
4	Caja P. and Martí J. (2014) Economía Industrial, ISSN 0422-2784, N°391, pages 151-162	La evolución de clústers en España: Comparando los casos del juguete-plástico y la cerámica	History	To analyze two industrial clusters in Valencia: the toy cluster “Ibi”, compared to the evolution of the ceramic district in Castellon	- Analysis of 1,837 patents generated in Ibi for more than 70 years - Analysis of 361 patent in 1959-2012 period, in the ceramic case of Castellon	For the patents generated in Ibi, it is observed how the territory and its companies have experimented a transformation that could be defined as related diversification, from the viewpoint of the enterprise , and relation variety, from the viewpoint of geographical economy, due to the combination of related technologies in one territory. In the ceramic case, it is obviously a marked productive specialization where technology has not diversified nor has searched alternative markets to the traditional ceramic-building
5	Blasquez S.	España	Tecnology	To show how the	Interview taken to members	The change has been vital to

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	(2014) / El País: Economía, Recuperated from http://economia.elpais.com/economia/2014/12/19/actualidad/1419012736_875098.html	digitaliza la fabricación de cerámica		innovation in the production of ceramic tiles in Spain returns the competitiveness in global ceramic sector led by "Kerajet", world leader in the giant digital printer industry	of senior management from various industry organizations:: - Ángel Michavila - Antonio Querol - Juan Mulet - César Beltrá, - Jesús Fernández - Isidro Zarzoso - Javier Portales - Daniel Sánchez - Vicente Lázaro	overcome the crisis. Three quarters of the machines in Spain were sold between 2008 and 2010. Digitization has made the sector more cost, performance and design competitive against the other surface coating sectors. There is a demand from professionals with multiple languages. It is sold to 185 countries, which makes the company to be the first European volume producer and third largest exporter in product value
6	Escardino A. (2001) / Boletín de la Sociedad Española de Cerámica y Vidrio, ISSN	La innovación tecnológica en la industria de la cerámica de Castellón	Technology	It is studied the role played by entrepreneurship and availability of technology and qualified personnel	Analysis of three components: - Innovation - Technological resources + Human Resources - Financial resources	This paper has allowed the extraordinary growth in the last ten years by those industrial subsectors. Development which has been contributed to the existence of a socio-economic

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	0366-3175, Vol. 40, Nº1, pages 43-52			needed to implement industrial innovation	Following next, it is related the analysis with the experimented development in recent years in the Spanish ceramic industry	and institutional framework that has acted as a catalyst of the interactive process between such factors. The interaction of all these activities that have been developed, have contributed decisively to the innovative process in the ceramic industry in Castellon
7	Molina-Morales F. X., Martínez-Fernández M. T. and Coll-Serrano V. (2012) / Revista Innovar Journal, pages 111-127	La eficiencia y la innovación en las subredes de empresas. Un estudio del distrito cerámico español	Enterprise	The main aim is to investigate, for the case of the ceramic industrial district of Castellón, the existence of significant differences in technical efficiency and innovation among "core	In the first sections, it is proposed a theoretical framework from the integration of the perspectives of the industrial district and the capital and their relationships with significant differences in outcome measures. From this theoretical development, it	The study results support the idea that it is not enough to be a membership in an industrial district to guarantee a certain benefit, but instead, various levels of results can be found inside the industry. The empirical study has shown that the "periphery network" presents significantly higher values than the "core network" regarding

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				network" and a "periphery network"	is proposed another research hypothesis for develop an empirical work	outcome measures studied, which are: efficiency and innovation
8	Gómez-López J. D. (1998) / Investigaciones geográficas, Nº19, pages 31-48	La articulación y estrategia de la industria azulejera: de la tradición local a la internacionalización de las actividades	History	To analyze the different factors that have contributed to the positioning of the tile industry of Castellón to an extraordinary expansion in the global market		The Spanish ceramic tile subsector is configured as highly internationalized. The export motivation is largely due to many investments made by companies in equipment and technology, which has favored the production of a product with high technological content and low cost. But we need to remark that modernization of the productive apparatus has not been attached by a corporate restructuring of the subsector
9	Gobert D., Domínguez E. and Veral S. (2012) / SATIE	Escenarios prospectivos del sector español para los fabricantes	Enterprise	This paper aims to present the results of research conducted by the "Market Area of	The methodology used in the prospective exercise that becomes from two very relevant prospective schools :	Existence of first phase of construction or development of scenarios (Scenario Building) that allows considering the future, it generates a thought on

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		de baldosas		Ceramic Technology Institute” using the foresight as a method of future exploration for the Spanish tile manufacturing industry	the Anglo-Saxon school of Shell and the French school of Lispor	the existence of the "problem". This is followed by a second phase of a scenario-based strategic planning. It is proposed a planning model which divides the business into nine blocks and interaction rules between them. It constitutes a tool that facilitates and gives clarity on the design activities, evaluation and innovation of business models, both for its holistic nature as the simplicity of the concepts
10	Peiró-Signes A., Segarra-Oña M. V., Modejar-Jiménez J. and Vargas-Vargas M. (2013) / Boletín de la Sociedad	ISO 14001 y variables económicas, ¿hay alguna relación? Análisis de las empresas certificadas del	Enterprise	It is analyzed the relationship between the implementation of an environmental management system, ISO 14001 and economic	- Displays and data collection. Mainly, it has been used IHOBE2 database, and databases available on the websites from different certification entities and listing of certified companies	Firstly, there are no significant differences in the percentage of increases in operating in any of three temporal horizons, short, medium and long-term. Moreover, analyzing profitability ratios, it is observed that the effect of the first year of

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	Española de Cerámica y Vidrio, Vol. 52, Nº1, pages 15-24	sector cerámico español		performance in the short, medium and long-term business of the Spanish ceramic industry	provided to the authors by certification entities - A methodology for estimate effects in the short, medium and long-term: procedure established by Hendricks	certification is positive; however, it is showed that the results reverse the trend in the long-term with positive values worse than those corresponding to the comparison groups. Finally, it is noted that the average cost per employee significantly deteriorates in the long-term
11	Gabaldón Esteban D., Fernandez de Lucio I. and Tortajada-Esparza E. (2005) / ALTEC 2005, XI Seminario Latino Iberoamericano de Gestión Tecnológica	Distritos Industriales: estructura e innovación. Una aproximación empírica a los distritos cerámicos españoles e italiano	Enterprise	To explain how the structure of the Industrial Districts determines its innovation capacity	It was performed a comparative study of ceramic districts of Sassuolo and Castellon and then it was proceeded to the realization of two dozen semi-structured interviews to people representing both districts	Firstly, it is observed a high level of competition among companies in the ceramic district of Castellón that are not accompanied by an equivalent cooperative effort. Then, the shortage of technology providers and advanced services in the Castellon district remarks that innovations need to be made mostly in Italy, giving to the

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						Spanish district a follower role. Finally, the existence of horizontal technology companies increases the innovative activity as a result of the diffusion of technology among districts, and favored by the mobility of qualified workers
12	Oltra-Badenes R.F. and Gil-Gómez H. (2014) / Boletín de la Sociedad Española de Cerámica y Vidrio, pages V-VII	El sector cerámico español: Una oportunidad de negocio para empresas de consultoría ERP	Enterprise	This article identifies this business opportunity and presents one of the most specific problems of the sector, absence of ERP system, with the main objective to be known and be able to develop a right by the ERP consulting		On the one hand, from a business standpoint, it should be studied how to make the entry to the market of new ERP consulting company On the other hand, from a technical point of view, it must to be developed a complete vertical ERP solution including full development requirements identified in this article and the rest of the specific requirements of the ceramic industry

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				companies		
13	Gallart-Camahort Valentín (2007) / Revista de treball, economia i societat, N°46, pags 10-25	El sector cerámico español: un enfoque de mercado	Economy	To give an overview of the Spanish ceramic sector, rather from the perspective of its positioning in the global market compared to the other major producing countries	It is referred to the characteristics of the type of production, pricing, market segments that can be taken as an objective, etc. all from a comparison with the offer of other producing countries. From this situation analysis, it is intended to provide different marketing strategies	The absence of necessary local conditions to produce with lower costs, indicates that the only option that is presented to industry is to develop a strategy of quality products in which the added value involve the factor that allows the identification and differentiation of Spanish ceramics in those markets where it is going to compete. For this, it will require a constant evolution in R + D + I, so the rest of competitors in the market will have difficulties in innovation and copy, not only products, but also strategies
14	Albors-Garrigós J, Márquez-Rodríguez P and Segarra-Oña M.	Internet como herramienta de creación de valor en	Technology	In this work it is concluded if ICT can affect equally to mature sectors,	Evaluation of commercial websites. Analysis units: it is followed the proposed model by Miranda and	Most of these websites provide just a little more information than the business card of the company, offering basic

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	V. (2010) / Boletín de la Sociedad Española de Cerámica y Vidrio, ISSN 0366-3175, pages 279-288	sectores maduros. El caso de los productores y distribuidores cerámicos en España		considered as low-tech, analyzing the relationship between the degree of implementation of ICT and the generation of profits in the ceramic cluster of Castellón	Bañeguil which includes the following aspects: accessibility, speed, navigability and content quality. This study was complemented by extensive interviews realized to manufacturers, traders and distributors.	information about the company and its products and utilities. The service offer is quite limited, while the contents that allow trading activities are practically nonexistent
15	Navarro-García F. (2007) / Revista de la Economía, pages 123-139	La promoción sectorial española a través de las ferias internacionales : El caso del sector de baldosas cerámicas	Economy	This paper analyzes the promotion at international fairs from a sectorial point of view, and its importance for increasing exports and brand positioning in international	Comparison of Promotion Sectorial Plans for the six years 2001-2006 with the evolution of sectorial exports to major markets	<ul style="list-style-type: none"> - Sectorial participation in international fairs is based on a strategy to promote country-brand-image, at medium and long-term, proportional to the size of the market and its growth potential - The sectorial grouping in one area of the fair and joint promotional actions represent a significant added value to the

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				markets		<p>exhibitor at an international trade fair</p> <ul style="list-style-type: none"> - The fairs are used to investigate and promote the product in new markets - The criteria are based on short-term profitability of the fair-market; including the geographical location of production and market, and costs of going to a fair
16	<p>Martínez-Carrión J. M. (2001) / Boletín de la Sociedad Española de Cerámica y Vidrio, ISSN 0366-3175, pages 355-362</p>	<p>El sector de cerámica y vidrio en la región de Murcia y España durante el siglo XIX</p>	<p>History</p>	<p>This work aims to deepen the understanding of the historical process of industrialization in the ceramics and glass sector in Spain, and highlight, Murcia contribution to the</p>	<p>It is presented a balance sheet of regional industrialization of the sector through tax sources that yield very important information about the industrial structure in Spain in the second half of the nineteenth century. Industrial and Trade Contribution</p>	<p>The region is characterized by early specialization. The sector had a greater role in peripheral regions and at end of period due to they had income situation and comparative advantages resulting from the favorable factors of offer and demand. Between the first factors, were decisive, access to fuels, the provision of quality raw</p>

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				Spanish industry in the second half of the nineteenth century	Statistics(hereinafter ECI) of 1856-1905 are the basis for weighting	materials and the existence of transport routes and marketing. Between the secondary factors, there was a growing urban and industrial network which required various building materials and some social groups with higher incomes and lifestyles
17	Segarra-Oña M. V. and Segura García B. (2006) / X Congreso de Ingeniería de Organización	Cómo aplicar un modelo de análisis competitivo en el sector cerámico valenciano	Economy	The classification of companies, definition of typologies and analysis of the industry structure, prior to the application of the competitive analysis model to the ceramics industry of Valencia	It is conducted a case study. Several companies are studied without separating them from their context that has been selected according to behavior and explanatory power criteria (not randomly). The selection of cases was made according to Rouse and Daellenbach model (1999)	It is found the validity of the model of competitive analysis and synergistic industrial concentration (Segarra, 2003) for its application in this sector

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18	Bengochea-Morancho A. and Budí-Orduña V. (2005) / VIII Encuentro de Economía Aplicada	Objetivos de reducción de emisiones en la Unión Europea: repercusiones en la industria cerámica	Economy	This paper analyzes the impact on the ceramic industry by the commitments under the Kyoto protocol	Review of the major policy elements of this protocol	Index of low level of specificity as to the effects that the implementation of the Kyoto agreement will have on the ceramic sector. This situation reflects the fact that most of the aspects to consider are in early stage of implementation (emission rights market), technical knowledge is limited (ability to reduce CO2 emissions) and this with the own dynamics of the productive sector, difficult to predict with the temporal horizon applied in the analysis
19	Hernández Sancho F. and Sala Garrido R. (2008) / Revista Electrónica de Comunicaciones	Medida de la eficiencia ambiental en la industria cerámica española	Economy	To measure environmental efficiency in Spanish ceramic tile industry	It is supposed a production process in which from an input vector, a vector of desired outputs is obtained and undesirable, by using the T Technology	If the calculations of rates of individualized efficiency relate to a number of indicators of location, investment in clean technologies, membership of a Technological Institute or

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	y trabajos de ASEPUMA, N°9, pages 87-100					external waste management; it is shown that there is a strong link between the so-called good environmental performance especially with the implementation of environmental investments and, less important, the membership of a Technological Institute
20	Chiva-Gómez R., Lapiedra-Alcamí R., Devece C., Alberto C. and Gil I. (2012) / Boletín de la Sociedad Española de Cerámica y Vidrio, pages 231-238	Gestión del diseño de producto y capacidad de aprendizaje organizativo en varios tipos de empresas del sector cerámico	Enterprise	This paper studies the relationship between product design management and organizational learning capability in the Spanish ceramic sector	It is performed a study of multiple cases	The case study demonstrates a direct and positive relationship between the factors that facilitate learning and management of product design. Specifically, four of them are associated with obtaining market knowledge, the business and technology, which is linked to the analytic conceptual phase of product design
21	Molina-Morales F. X., Gabaldón-	¿Hacia dónde evoluciona el	Enterprise	To analyze the Spanish ceramic	Realization of semi-structured interviews to	The turnaround is confirmed in the Spanish production model in

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	Estevan D. and Fernandez de Lucio I. (2010) / X Congreso Español de Sociología	modelo español de producción cerámica?		District of Innovation System with an analysis of industry statistics	people representing national and European ceramic industry	response to increase competition from their competitors. Also it is predicted that the gradual reduction of production, the largest investment in design and innovation, the assimilation of the distribution and development of the servicing associated to the product will be crucial to the strategic position in the new scenario
22	Corma P. (2004) / QPT-España , Recuperated from http://www.qpt-consulting.com/cms/upload/documentos/20120319191954.innovaciones_y_proceso_innovador_en_el_di	Innovaciones y Proceso Innovador en el Distrito Cerámico de Castellón	Technology	The aim of this work is to study the innovation process in the ceramic business district of Castellón de la Plana	<ul style="list-style-type: none"> - Thesis published by ITC staff - Other works published by the UJI and referred to the district - Works published in journals listed in the experimental part - Studies presented in Qualicer 	It can be concluded that the innovations carried out in the ceramic cluster do not have their direct origin in studies of the indicated knowledge centers. These innovations originate from: Technology providers and Internal development of companies. Finally, if defined innovations

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	strito_ceramico_d e_castellon.pdf				<ul style="list-style-type: none"> - The “Alfa de Oro” delivered by the SECV - The R & D projects approved by the CDTI - In total there is analyzed, correlated by dates and topics, over 1000 entries 	are separated from the most rupturist, all stem from internal developments or technological offer of suppliers
23	Rubén-Ruiz M. A. E. (2003) / 27 Congreso Nacional de Estadística e Investigación Operativa	Análisis y previsión de ventas en el sector azulejero	Economy	To solve the problem of anti-stock production and the mismatch between the forecasts that need to be produced and how much of these are sold	<p>There are used the following methods :</p> <ul style="list-style-type: none"> - Linear Regression. - Quadratic Regression - Moving Averages. - Exponential Smoothing. - Holt method - Holt-Winters Method 	It is proposed a Decision Support System (DSS) that allows solving the problem of sales forecasts in a simple, efficient and effective way. This way, companies can make more reliable forecasts than those made earlier, by not using statistical techniques and / or software packages
24	Torrecid G. (2013) / Boletín de la Sociedad Española de Cerámica y	Innovadoras soluciones digitales para generar las nuevas	Technology	Develop the following digital solutions in the ceramic industry: D.G-CID, T.M-	This work is made in different fields of action, on concrete, for each enamel and ink, covering, among others, elements such as	The different digital solutions that Torrecid Group has incorporated in recent years in the sector have brought a revolutionary change in the

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	Vidrio, Nº52, pages V-IX	tendencias de futuro en el sector cerámico (Premio Alfa de Oro)		CID, SMART-CID y DECAL-CID	development of special fried, the selection of the most suitable solvents or optimization of the compositions	aesthetics of ceramic products, reaching its peak with STYLE-CID, the New Ceramic with which the company marks future trends. STYLE-CID represents the new gateway to the future that TORRECID GROUP offers to its customers, so they can compete globally with the best competitive advantages
25	Vallada E., Maroto C., Ruiz R. and Segura B. (2003) / Congreso Nacional de Estadística e Investigación Operativa	Problemas de programación de la producción en el sector cerámico español	Enterprise	To know the operations system of different companies in the industry and characterize the problems of production scheduling	Analysis of the results of a survey obtained from companies of the ceramic industry. Survey formed by forty-seven questions, some of them devoted to general characteristics of the company, and the others to the operating system strategy and the largest group directly related to the	It shows that the configuration of machines in businesses allows us to characterize the problems as flow shop with setup time dependent of the sequence. Finally, the survey results show that even the biggest companies use optimization methods to schedule production according to the goals set by the company, and there is no software on the market to satisfy this need,

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					production process	therefore, it is proposed a development of methods and tools to facilitate these companies flexibly schedule their production
26	Russo M. (2004) / Università degli Studi di Modena e Reggio Emilia, pages 1-25	Il distretto industriale della ceramica di fronte alla sfida cinese	Enterprise	To answer the following questions: What elements will be the factors of competitive advantage of Italian districts? How local characteristics remain important in the sector? To compare the Italian ceramic industry with the Chinese "challenge"		It is probably that in the medium-term, China will continue exploiting the internal conditions at low costs of production which are representing 10 percent of those incurred by the Italian companies that sell machines for the production of tiles. Forecast business and systemic view of the effects of actions are very rare, and the possible effects on the district by an exploitation strategy of Chinese outsourcing can be negative

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27	De Leo G., Golferini M., Busani G. and Capuano F. (2001) / Atti 25 – Congresso della Società Italiana di Ecologia	L'impronta ecologica del distretto ceramico di sassuolo (Modena- Reggio Emilia)	Enterprise	To calculate the environmental impact (ecological "IE") of the ceramic district of Sassuolo to promote sustainability of the industrial process	Various technical calculations with the support of Excel, ACIMAC, Tyedmers approach and Assopiastrelle	The 80 per cent of IE is attributable to the electrical and thermal energy. The control of dust emissions and wastewater in the ceramic district of Castellón is much more primitive compared to Sassuolo
28	Bredveld L., Timellini G., Casoni G., Fregni A. and Busani G. (2007) / Journal of Cleaner Production, pages. 86-93	Eco-efficiency of fabric filters in the Italian ceramic tile industry	Enterprise	To submit a simplified LCA to evaluate the overall environmental effects of tile filters in the production of Italian ceramic tiles	It has been proposed: "costing methodology" and "cross-media methodology"	There is no clear conclusion whether the plant filters may be identified as "BAT". The proposed methodology is an attempt to understand the environmental performance and eco-efficiency in the IPPC context
29	Meyer-Stamer J., Maggi C. and Seisbel S. (2001) / Institute for Development and Peace Gerhard-	Improving upon Nature. Creating Competitive Advantage in Ceramic Tile	Enterprise	To demonstrate and evaluate the combination of value chain in the world's largest ceramic industry		Sassuolo is the most mature industry cluster, and yet it is represented by a less advanced model than industrial organization of Castellón. Sassuolo is still very much

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	Mercator-University of Duisburg	Clusters in Italy, Spain, and Brazil		clusters		experience-based (as opposed to science-based), and tacit knowledge plays a much larger role than a scientific approach. Castellón moved from craft to industrial production at a later point in time. The technology-oriented paradigm which is one of its main features was not deliberately chosen but rather emerged out of necessity. From a technology- and production-angle Castellón appears as the most competitive place in the tile industry. But over the last years, in the clusters in Italy and Brazil government has played hardly any role, and in Spain it has rather managed to remove obstacles than trying to be a strategic actor
30	Russo M. (1985)	Technical	Technology	To present the	The analysis was performed	- First, there are the competitive

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	<p>/ Research Policy, pages 329-343</p>	<p>change and the industrial district: The role of interfirm relations in the growth and transformation of ceramic tile production in Italy</p>		<p>results of a technical change study in the ceramic industry in Italy. This paper considers two aspects of technical change in the ceramic tile industry in Italy: firstly, the process of invention, adoption and diffusion of new techniques in the industry; secondly, the impact of forces of a technical nature in shaping the industrial structure</p>	<p>by comparing the two techniques for the production of ceramic tiles:</p> <ul style="list-style-type: none"> - A technique used in the early 60's in the factories of "Comprensorio delle Ceramiche" - Recent technique used in the late 70's in the same area 	<p>pressures, including those on the ceramic firms to expand their output, or to face new market conditions; and those on the engineering firms to invent new techniques in an effort to diversify their own output and expand the market for their inventions</p> <ul style="list-style-type: none"> - Secondly, there are the constraints of a technical nature that inhibit the process of modification of the various stages of the production process - There are the constraints imposed by labour resistance as expressed in the desire of the Trade Unions to control the pace of work - Constraints imposed by decision-making bodies outside the firms: the State
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						- The actual working of those constraints in stimulating the process of technical change in the ceramic tile industry is better understood where the unit of analysis is the industrial district
31	Dondi M. (1999) / Applied Clay Science, pages 337-366	Clay materials for ceramic tiles from the Sassuolo District Northern Apennines, Italy .Geology, composition and technological properties	Technology	To analyze the clay material used for manufacturing ceramic tiles in Sassuolo (Italy)	The literature includes some 90 chemical analyses of the major elements obtained in large part by XRF and spectrometry, accompanied by qualitative mineralogical analyses conducted by X-ray powder diffraction	The local clays, which in the past constituted the sole mineral resource of the District, now supply only 40% of the demand for clay materials. They are extracted from different geological units and distinguished in two principal types: - “Marly clays” with the main source in Ranzano Formation and the Torrente Tiepido, Marano and Rio del Petrolio Formations - “Red shales” derived from “Montepiano Formation and of

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						some units of the Ligurian Complexes
32	Dallari F. and Leone F. (2012) / Centro di Ricerca sulla Logistica LIUC, pages 20-26	Soluzioni per la distribuzione del materiale ceramico	Enterprise	To suggest an improvement for the distribution system of the ceramic material in Italy together with the analysis of logistics	Interviews with various clients of the logistics system in Italy, after analyzing the value chain of the ceramic industry in the country	<ul style="list-style-type: none"> - Freight transport by the ceramics companies to the final customer have lower control of the producer, so the shipment is be free - It is performed a cycle of order "order to delivery". The order is processed in-line: with commercial data and delivery options, a confirmation is sent to the client indicating his order date to pick up the product in the manufacturer's service station - The average deliveries usually occur on Tuesday and Friday in the morning, in particular, at ten o'clock - From the customer interviews, it is indicated that : it is needed

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						to improve delivery time, deliveries must be performed by a single contact, but not always by the same manufacturer, greater responsibility in case of anomalies and tracking orders, better service with more precision and better established relationship with the conveyor
33	Angela S. (2014) / Master's Degree Thesis, LUISS Guido Carli, pags 1-158	Innovazione tecnologica nei distretti industriali e nei cluster tecnologici: analisi dello sharing di knowledge nel distretto ceramico di Modena e Reggio Emilia	Technology	To analyze the technological clusters to allow their comparison with the industrial districts. To get the similarities and differences between the two systems of agglomeration. To investigate and study the presence	Data study reported by the AIDA data base. Data collected from 741 selected companies, 283 are in the provinces of Emilia (204 in Modena and 79 in Reggio Emilia). EPO analysis of the inventors of the 38 local patents, submitted for the period 2003-2011 and belonging to the class of C04 product	Analyzing the different phases of the innovation process at the district level, the transfer of knowledge seems to be favored not only by the local network and technological clusters, also by the mobility of human resources, which act as a support for knowledge, observation and imitation. In cluster technology, however, in addition to absorption drivers of capacity of the district also it is

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				transfer channels of local knowledge		added the quality and quantity of investment in R & D and human resources, which are responsible for prior knowledge of the organization and, therefore, there is the ease of absorption of external knowledge. 19 of the 46 inventors have patented at least one other business district, establishing not only direct relations with other inventors, but also indirect with all the resources that have previously worked with the same inventor
34	Motta-Bustamante G. and Bressiani J. C. (2000) / Cerâmica industrial, 5 (3), pages 31-36	A industria cerâmica brasileira	Economy	To perform and study the various segments of the Brazilian ceramics industry	Study realized by analyzing the following sections: <ul style="list-style-type: none"> - Structural Ceramics - Ceramic coating - Refractory - Sanitary ware - Electrical Ceramics 	Brazil has a large industrial park in the ceramics industry, with high quality products and competitive prices worldwide. It has in abundance almost all raw materials, technical highly qualified and management

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					<ul style="list-style-type: none"> - New ceramic materials - Raw materials 	resources and good research infrastructure
35	<p>Cabral-Junior M., Ortega-Boschi A., Marciano-Motta J. F., Tanno L. C., Sintoni A., Mário-Coelho J. and Caridade M. (2010) / Cerâmica industrial, 15 (3), pages 7-18</p>	<p>Panorama e Perspectivas da Indústria de Revestimentos Cerâmicos no Brasil</p>	Enterprise	<p>It is presented a profile of the Brazilian tile industry by addressing the characteristics of the production and the market, and summarize some of the major challenges to advance their level of competitiveness</p>	<p>The study was based on: update and revision of secondary data from censuses of main business representatives in the tile industry, specialized publications in journals and conferences, and technical reports from research centers. Consultations performed to professionals with extensive experience in the sector</p>	<p>The ceramic tile industry has undergone a major change from the 90s. The expectation for the Brazilian ceramic tile segment is the sustained growth of national sales and the gradual increase in exports, consolidating its position as the second largest producer in terms of volume. To meet the challenge of global expansion it will require investment in:</p> <ul style="list-style-type: none"> - Continuous improvement of product quality - Development of national design - Implementation of marketing plans and strategies in the international market - Supply of minerals on a

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						sustainable basis
36	Fontenelle-Gorini A. P. and Raposo-Correa A. (1999) / BNDES sectorial, pages 202-252	Cerâmica para revestimentos	Enterprise	To present the profile of the ceramic tile industry in Brazil and worldwide, as well as its perspectives and main problems, types and characteristics of ceramic coatings and raw materials used in the manufacturing		<p>Main problems: structural and systematic order in the company.</p> <ul style="list-style-type: none"> - It is vital to have a better integration between mining, ceramic manufacturers and R & D of raw materials, with joint action between companies and research centers - The distribution logistics must be better studied so the costs will not be higher than the current (1999) - Lack of skilled labor manpower negatively influenced the value chain - Main types and raw materials: Fluxes clay, plastic clay, kaolin, talc, phyllite and various carbonates (calcite and dolomite)

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37	Teixeira-Moreira-Lima M. M. and Camarini G. (2003) / X Encontro Latino Americano de Iniciação Científica e VI Encontro Latino Americano de Pós-Graduação – Universidade do Vale do Paraíba, pages 2451-2454	Silicose em trabalhadores do setor cerâmico: avaliação da poeira em processos de fabricação de revestimentos cerâmicos	Technology	Present a methodology for evaluating the breathable dust within ceramic tiles companies due to it may contain silica crystalline which can cause silicosis in workers within the company	It is used an environmental assessment methodology available only in Brazil	This methodology should be applied by companies to characterize the dust in the manufacturing processes for ceramic tile materials for find the presence of crystalline silica. It is necessary an update of the existing rules at national level, and expanding the application of diffraction of X-ray analysis of dust samples, with a greater number of laboratories. The results allow establishing reliable causal relationship between the occurrence of silicosis and the exposure to dust. It is suggested a parameter for monitoring the effectiveness of engineers measures, a surveillance program, seeking continuous improvement of working
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						conditions and industrial processes
38	Manfredini C. and Aloysio Sattler M. (2005) / Ambiente Construído, v. 5, n.1, pages. 23-37	Estimativa da energia incorporada a materiais de ceramic vermelha no Rio Grande do Sul	Enterprise	Identify the quantitative and qualitative environmental impacts originated by bricks, blocks and tile production in the State of Rio Grande do Sul	There are shown the main results of a research project. It is based on collected data by interviews and visits to twenty plants of diverse range of sizes (producing 40000-1500000 bricks per month)	Most of the energy used in industries is originated from biomass. The weighted average energy is: 0.682 kWh / kg for small businesses; 0.580 kWh / kg for medium-sized; and 0.822 kWh / kg for large ones. So we need to emphasize that large industries are those with the most efficient equipment. Finally, the amount of energy consumed in the tile industry among its products is 1,553 kWh / kg
39	Fernandes P.F., Oliveira A.P.N. and Hotza D. (2003) / Cerâmica industrial, 8 (2), pages 26-34	Reciclagem do Lodo da Estação de Tratamento de Efluentes de uma Indústria	Enterprise	Try to develop a way to reuse treatment plant effluents in the ceramic tile industry. The final	Analysis of the preliminary results obtained in the laboratory	<ul style="list-style-type: none"> - Sludge tests qualify this waste as inert - The results of the laboratory tests showed that the incorporation of up to 5% by mass of standard sludge did not

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		de Revestimentos Cerâmicos. Parte 1: Ensaios Laboratoriais		goal is to reduce costs of mass production, less waste thrown into landfill and improve the environmental impact		affect the water absorption characteristics, linear shrinkage and mechanical strength
40	Alves H. J., Melchíades F. G. and Boschi A. O. (2008) / Cerâmica, N°54, pages 326-331	Consumo de gás natural na indústria de revestimentos cerâmicos brasileira	Enterprise	To determine the specific consumption of each consumer equipment, and also identify the “energetic necks” presented by the same	It is presented a survey of the consumption of natural gas done in a factory of the productive pole of Santa Gertrudes-SP	The ongoing monitoring of the natural gas consumption of the plant through periodic measurements and the study of these variables in furnaces and dryers, It is absolutely necessary for perform a management and energy efficiency in the work within the company
41	Rodrigues-Brochado M., Gomes de Souza C., Wilhelm-Grimme F. and	Rio 92+10: Um exemplo bem sucedido de cooperação norte-sul no	Technology	To focus on the high porosity of the brick for various structural applications, that	Development and results of a research project entitled: “An interdisciplinary approach in the area of technological innovation: a	The application of scientific knowledge to solve practical problems, has not proved to be good enough to date (2002) seeking alternatives to

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	Laar M. (2002) / XXII Encontro Nacional de Engenharia de Produção, ABEPRO, pages 1-8	desenvolvimen to sustentáveñ na área da cerâmica vermelha		combines low thermal conductivity with low weight, high resistance to pressure and energy input scarce during production	case study of the tile industry” which took place between 1999 and 2001, sponsored by CAPES and DAAD	environmental impacts
42	Sanches C. (2012) / 10ª Mostra Académica Unimep, pages 1-4	Análise econômica do setor de cerâmica brasileiro e as possibilidades de exportação	Economy	Analyze the viability of exportation of ceramic products in Brazil, given the current economic paradigm (2012) and, in particular, focus on small and medium enterprises	To perform this analysis was used provided material from books and articles from government websites, associations, studies and magazines used	The current economic climate (2012) encourages businesses of tile industry to export their products. The data show that small or medium-sized producers in the sector can not only reach the domestic market, but export their products through quality, investments, knowledge and technology. Have to note that not only economic issues are influential factors for a company seeking to

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						internationalize its business. There are other aspects as logistics, law and custom, which interfere directly or indirectly in the export potential of the company, that influence the costs and mechanisms for exportation
43	Molina-Morales F. X., Emil-Hofmann V. and Martínez-Fernández M. T. (2011) / European Business Review, Vol. 23, No. 1, pages 87-105	Evaluation of competitiveness in ceramic industrial districts in Brazil	Enterprise	The purpose of this paper is to evaluate the competitiveness of the Brazilian ceramic tile industry using a conceptual model that the authors developed which integrates two contemporary approaches: industrial districts	A quantitative study was carried out, using a survey with firm CEOs	The results indicate that companies present in industrial districts have greater access to the strategic resources they share, such as knowledge transfer, access to information, and collective reputation. This fact results in higher levels of competitiveness, from the resource-based view, since companies outside the district do not have the same resources available to them

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				and the resource-based view		
44	Seibel S., Meyer-Stamer J. and Maggi C. (2001) / Cerâmica Industrial, 6 (6), pages 28-38	Globalização e os Desafios para as Indústrias Italiana, Espanhola e Brasileira de Revestimento Cerâmicos	Enterprise	Comparisons of the three international leading countries for achieve success in the ceramic business.	Summary of the results of an international study on three ceramic tile sectors with the most importance in the world: - Sassuolo, Italy - Castellón, Spain - Santa Catarina and Santa Gertrudes, Brasil	The results highlight how clusters are being developed based on the main concepts of this study. These concepts allow a better understanding of the challenges to guide the industry toward modernization, the government structure, value chain, rules and technical standards. It is observed that the Cluster / Local Government and the Value Chain / Global Government combination generates valuable ideas into the working of the ceramic tile industry
45	Ramos-Campos R., Nicoiau-Sílvio J. A. and Ferraz-Cario A. (2000) /	Cluster e capacitação tecnológica: a experiência na	Enterprise	This paper presents some thoughts about three thematic	Division into 3 sections: an initial section, which presents a brief review of the literature on the concept	The characteristics of the technological regime in the ceramics industry influence the development of technological

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	<p>Ensaio FEE, Porto Alegre, v.21, pages 144-161</p>	<p>indústria de cerâmica de revestimento de Santa Catarina</p>		<p>blocks: territorial agglomerations of industry groups "clusters", technological experience that can elapse from these agglomerations and an illustration of an experience of the local innovation system in Brazil</p>	<p>and characteristics of industrial clusters, another section dedicated to the technological variable and its implications for the analysis of industrial systems and, finally, an analysis of cluster cases in ceramic coatings industry located in the southern state of Santa Catarina</p>	<p>capability based mainly on learning processes through the practice of "learning-by-doing", "using" and "interacting". For large companies in the cluster, these processes also interact with structured training forms, with more formality to develop products. Such processes are carried out in a competitive environment where product differentiation is an important element of the rule of competition. This environment facilitates the absorption of new technologies in the industry, but does not provide autonomy in generating new technologies as external flows of technological information between headquarters and the branch of suppliers of raw materials and</p>
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						the searching for new technologies by large companies outside the group are key elements for the local system
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