TRABAJO FINAL DE GRADO ADMINISTRACIÓN DE EMPRESAS

4º CURSO

THE CERAMIC CLUSTER IN THE PROVINCE OF CASTELLON

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1. INTRODUCTION

1.1 JUSTIFICATION OF WORK

Currently, there is no consistency across the board of the importance of territorial agglomerations of firms. You tend to know only the large companies in the world while enterprise groups go unnoticed. These agglomerations of firms, industrial districts or clusters, have played an important role in the growth of many regions and countries (Porter, 1990).

Such is the importance of clusters that a lot of studies have been done to determine how they are created and, if possible, to extrapolate it to other regions or sectors (Mansfield et al. 1971). Different works also address issues such as the district effect, innovation processes or the characteristics of this territorial form of organization as compared with the integrated organization of large companies'.

These clusters are in a large number of countries such as Denmark, Japan, Mexico, Italy, Spain, the United States, Brazil, Chile, and so on. The economic sectors that have benefited from being in a cluster are very diverse, both in knowledge intensive activities (Aydalot & Keeble, 1988; Breschi & Lissoni, 2009) and in traditional manufacturing (Staver, 2011).

In Spain, there are 237 different clusters (Boix & Galletto, 2006) of which 54 belong to the Valencian Community. The sectors of this community are, among others, furniture in Valencia, toys and shoes in Alicante, and the ceramic industry in Castellón, which this work is based on.

The importance of this type of economic system lies on the proximity of its actors and their relationship to each other. As will be explained later, proximity encourages the flow of information and knowledge, leading to the creation of social networks, and these are the main sources of capital necessary for the generation of innovation (Boschma & Ter Wal, 2007; Coleman, 1988; Putnam 1993; 1995; Lin, 2008).

Finally, we must notice that the main debate on clusters is the possible limitation that exists on innovation as they are a group of companies that do not tend to be large. As Porter (1990) said: "*in the current economic climate, highly competitive, innovation is one of the key factors for business survival as through it competitive advantages are gained*." It is therefore necessary to know the capacity of innovation that a group of

companies has, who produces those technological advances and if all of them get some kind of benefit from the innovations that occur.

1.2 OBJETIVES OF THE STUDY

The main objective of this work is to determine whether the group of companies located in the province of Castellon, especially in the regions of Alcalatén, the Plana Alta and La Plana Baixa, form a ceramic cluster with the features that contain the agglomerations of specific companies.

To reach a conclusion, I have based this piece of work on the doctoral thesis "The effect of inter-organizational networks on the results of innovation. An application to the Valencian "ceramic industry cluster by Luis Martinez Chafer (2012) to gert to know the data and the characteristics of the Valencian ceramics sector, supporting on the theory of different authors on this clusters. The data will be updated to the latest year in which data related to the date of this work (2015) are aviable. The theory of territorial agglomerations of firms will be compared with such characteristics in the doctoral thesis.

Another objective of this work is to observe the relationships that companies in the cluster have with each other and how much influence public and private institutions have on the cluster. As in the above objective, the data will come from the doctoral thesis of Luis Martinez Chafer (2012) for the impossibility to do a piece of work of this magnitude without resources. We will try to know the amount of inter-company links both of knowledge transfer and information. Thus, we will find the social capital that companies have by being in one specific place and the networks that are formed among the producers, the suppliers of raw materials, the ancillary businesses and the institutions.

Furthermore, I will try to analyse the challenges, both present and future, that companies in the cluster, are bound to face. This objective will be based on empirical experience to perform external practices in the ceramics company Saloni, with the data that I have been provided with to supplement the work and own knowledge based on the different subjects given in the Degree of Business Administration at the Universitat Jaume I, along with readings read on news related to the ceramic industry, many of which appeared in the local Mediterrane newspaper.

The reason for this ultimate goal is to make a proposal on possible improvements that can be implemented, both at micro and mesoeconomic level (at industrial district level).

2 THEORETICAL CONCEPTS

2.1 TERRITORIAL AGGLOMERATIONS OF FIRMS

2.1.1 Introduction

At this point the characterization that turns a group of companies into an economic engine for a region will be explained. The indication of the agglomerations of firms and the reason for how it can be that companies that must compete with rivals benefit from being in a place nearby.

The studies that have been conducted by economists result in a myriad of terminology to name these clusters, such as: technological districts (Storper, 1992; Dalum, 1995), clusters (Porter, 1990; Enright, 1995) industrial districts (Becattini, 1979; 1990), the national innovation system (Lundvall, 1992; Edquist, 1997) or hot spots (Pouder & St.John, 1996), among others. From now on, either cluster or industrial district as described by Porter & Enright, and Becattini will be used.

As Luis Martinez Chafer summarizes in his study, the industrial districts or clusters have been widely recognized as a model of industrial organization that enables SMEs to compete both nationally and internationally. Technological dynamism, capacity for innovation and specialization of the companies that make them confirm that. In fact there are empirical studies that show that companies belonging to an industrial district or cluster do better and get positive effects on competitiveness and employment (Karlsson & Klaesson, 1998; Becchetti & Rossi, 2000, IPI, 2002). The advantages of the industrial district can be divided into two areas: the externalities or economies of agglomeration (Krugman, 1991) resulting from access to labor, specialized suppliers, etc., and local spillovers giving access to knowledge streams within the cluster. This positive effect is the reason why small and medium enterprises can overcome their size limits resulting from their belonging to an industrial district (Galletto, 2008). This positive effect or benefit is called by Dei Ottati (2006: 74) the district effect and it is defined as:

> *The set of competitive advantages of a highly interconnected set of economies external to the firms but internal to the district. These economies depend not only on the territorial concentration of production activities, but also (and this is the distinguishing feature of the industrial district) on the social environment in which these activities are integrated.*

Moreover, authors such as Pouder & St. John (1996) and Molina- Morales and Martínez- Fernández (2009a) suggest in their works that the district effect is limited to benefits.

2.1.2 Types of business agglomerations: the industrial district and the cluster

In the previous section several ways of naming the concept of the study the agglomeration of companies in a territory, as this study deals with the concepts of cluster and industrial district , the others will not be defined so as to focus on only were started these two concepts.

Industrial district

The concept of industrial district, created by Becattini (1990: 111), is defined as: A socio-economic entity characterized by the active presence of a community of people and a population of companies in a natural and historically limited area.

As we are dealing with population of firms the districts must comprise a lot of companies, initially of small and medium size. Because of being in a particular region and pursue a specific economic activity, they have a better predisposition to access all kinds of resources such as labor, technical knowledge, research center, etc., more quickly.

In addition to resources, there is also a sense of belonging to the economic activity of the district by the people who make it, that is, you have an appreciation, a system of values and beliefs by the community of people in the particular region towards the economic sector of the district (Becattini, 1990). These homogeneous values and ideas express the ethics of work, family values, the importance of reciprocity and exchange. Therefore, the work of Italian is important because it changes the traditional approach of analyzing a from these business cluster into a new one, which is analyzing the location first and then reach its industrialization.

Another defining characteristic is trust and cooperation between its actors. It is precisely the experience that makes confidence by means of mutual understanding and the continuing process of hiring and rehiring that limits limiting opportunistic behavior among members belonging to the community (Lorenz, 1992; Dei Ottati, 2006).

Regarding the group of companies, we found a large group of them who are specialized in the same industrial activity or in activities that integrate vertically. These groups of companies work together and are characterized by dividing work in an inter-corporate way. Therefore, the above named trust plays an important role.

Finally, another key element for a district is industrial atmosphere. This concept mentioned by Marshall (1925) means the flow of knowledge, information and shared experiences circulating freely in the district, with hardly any restrictions. This results in a rapid spread of ideas and know-how thanks to geographical proximity, cultural homogeneity, common industrial tradition, reduced transaction costs and easy access to complementary services (Becattini 1979, 1990). It is, therefore, an intangible value inherent in the district.

Cluster

The concept of the cluster is the home expanded by economists to appoint enterprise groups. The most widely accepted definition is that of Porter (1990; 1998b) who defines clusters as:

> *Geographic concentrations of interconnected the companies and institutions belonging to a particular field of activity. These clusters cover a wide range of sectors linked with each other and other entities that are important for competitiveness. These include specialized suppliers of components, machinery, services and infrastructure.* (Porter, 1998b: 78)

Porter (1998b) argues, in the words of Luis Martinez Chafer (2012), that the rapid changes in the environment are not managed efficiently in industrial structures based on vertical integration characterized by lack of flexibility. By contrast, clusters are an effective alternative, through external specialists, as regards production costs and training services. The competitiveness of a cluster is favored by the easy access to skilled and experienced workforce which reduces the costs related to the search and recruitment of those resources. Besides, clusters act as a lure for talents once they begin to show some prosperity as they constitute a source of opportunities for skilled labor.

As with the industrial district, and expanding the list in the definition of Porter, the cluster consists of different agents: manufacturers, suppliers, financial institutions, universities and specialized training centers, research institutes, governments at different levels, business associations, technology transfer agencies, etc.

Thanks to this variety of agents external to the company, the entry barriers are lower because the existence of a community of professionals, suppliers, skills, inputs, etc., creates a greater availability of resources. There are also more opportunities for obtaining financial resources provided by investors and institutions that are already familiar with the risk associated with the activity of the cluster. However, there is a risk associated with this type of business structure that is technological discontinuity. This fact along with a change of customer needs is the main external threats that can neutralize many of the advantages discussed above. Internally, the main threats come from excessive rigidity caused by over-consolidation of relations, excessive regulations, inbreeding, and lack of external monitoring or weak institutions around the cluster such as universities or technological institutes.

2.1.3 Components of clusters

Companies: They play a crucial role since they are the main source of economic activity. This approach comprises both those companies belonging to the main industry cluster and those conducting activities which are related or in the same production line. Since they depend on each other, you cannot make an independent treatment thereof.

If we follow the classification proposed by Brusco (1990), companies in the industrial districts have three categories: Final enterprises, mono-phase or specialized enterprises and integrated companies. Final companies are those that belong to the activity that defines the cluster, its final product or service. For example if we speak about the ceramic industrial district of Castellón, the final enterprises will be those companies engaged in the manufacture of wall and floor tiles. Specialized companies are those in charge of providing the necessary supplies that act as vendors, components, inputs, raw materials etc. Continuing with the same example above specialized companies may be manufacturers of frits, glazes and colors, machinery manufacturers, suppliers of additives, etc. Thirdly, integrated companies are those that belong to a different industry cluster but integrate in it, like those companies engaged in transport, financial services, etc.

The labor market: As argued in most conceptions of territorial agglomerations of firms, the existence of a community of skilled human resources is crucial to the smooth running of the district. To this respects, the industrial districts usually have some stability as regards the available labor force compared with other productive and technological factors (Bramanti and Senn, 1990; Dei Ottati, 1994; Pietrobelli, 1998, Dei Ottati, 2009).

Political institutions: They constitute the formal institutions within the industrial district. They are the ones that determine the infrastructure and attractiveness of a region. Moreover, in many cases, these institutions are the decision makers in the development of research institutes and their research. These institutions, therefore, have a major impact on the district and the set can be influenced, in the same way by the other elements.

Academic institutions: Universities and research centers are elements of great importance within the district as recognized by literature, especially those dedicated to best innovators. These institutions are important for two reasons. Firstly they are responsible for the formation of the community of people who will become the district's human capital and thus the quality of your work depends largely on the economic performance of the companies that make it. Second, by these institutions also play an important role in the creation of knowledge and research through collaboration with companies. Even though these institutions do not restrict their field of action to the regional level, the two aspects we have mentioned do and hence its importance.

The capital market: Despite the strong influence of the global economy and its financial markets, the existence of a local financial offer is very important in industrial districts (Audretsch & Frisch, 1999; Russo and Rossi, 2001; Ughetto, 2009). The availability of investors with knowledge of the district and the risks involved make it easier and faster to get credit favoring the creation of new companies and the operative running of the companies.

2.1.4 Advantages and disadvantages of territorial agglomerations

As mentioned before in the introduction point 2.1, clusters and industrial districts have a number of competitive advantages over those companies that are not in the defined place, if there is an agglomeration as such in that economic activity. Marshall (1925) identifies a number of external economies obtained through certain provisions of common factors such as the existence of qualified human resources, specialized suppliers and broadcasts or technological spillovers (Krugman, 1991). All of it is surrounded by what Marshall called industrial atmosphere which is a compendium of intangible assets based on experience, knowledge, information and know-how which are common to the companies in that particular business district.

The advantages therefore result in cost reductions in different ways: Lower cost both time and economical to obtain and pass on useful information to companies with which a bidirectional relationship is maintained, and also with the institutions that make up the cluster (universities, technical schools, chambers of commerce, municipalities, etc.). Final production and sales companies gain an advantage in storage and transport costs due to the constant relations with suppliers, for rapid communication and a short space means increased flexibility. There are even lower costs for the transport of final companies to the customers due to a better management of loads by logistics companies (OECD, 1999; Porter, 1998).

Outsourcing part of the production process creates a specialization of each company for which each one not can be differentiated not only from other companies in the cluster, but also globally (Garcia Macias, 2002).

As these institutions focused on supporting the cluster, any related company can more easily obtain skilled labor, technological innovation, financial resources, developments at national and international level, consulting, etc. (Alberti, 2001). The advantage of obtaining financial resources comes from the fact that banks are already familiar with that particular sector, the risks involved the capital flows and other variables that determine a loan.

Since, in general, companies that make a district are small and of a medium size, the effort for R & D spending is higher if every company employs it individually and as result can be scarce. The existence of institutions that support and outsource the innovation activity of these companies ensures greater technological progression (Dosi, 1988).

The companies can promote the entire production process of the cluster through trade fairs and conferences organized by institutions. These fairs are a marketing tool that makes it easy to publicize the company and its products both domestically and internationally. Swann (1998) makes a reference to the existence of a strong local demand he also states that the firm that is located in the cluster can take over part of the market share of its rivals that the firms located in the cluster can be found more easily by customers (reducing search costs) and that informational externalities on the characteristics and market trends are generated. The main disadvantage with regard to demand is that increased congestion and competition in markets for outputs lowers prices, sales and business benefits. However, in the end, according to Porter (1998), that increased competition is beneficial, representing the spur for improvement and innovation.

The other disadvantage that is generated by the supply side is that the congestion and increased competition that are generated in input markets lead to an increase in land and labor prices.

2.2 SOCIAL CAPITAL

2.2.1 Definition of social capital

Social capital is the cornerstone of clusters. Its definition, from the sociological to the economic fields varies according to the economist, but it usually has the same meaning. The social capital is used to measure the collaboration between groups of a human collective and individual profiting of the opportunities thus generated. That is, it is the sum of resources, both real and virtual, which an individual or group of individuals collects in maintaining relationships, more or less institutionalized, of familiarity and recognition permanently (Bourdieu 1980; Gargiulo & Benassi, 2000).
From the point of view of a company, the social capital is a network of relationships that constitute a very valuable resource since, through it, access to quality information and new business opportunities is made possible (Molina-Morales presented 2005b). As the bonds are secured within a network, confidence increases, which can even reduce transaction costs (Dosi, 1988) increases.

2.2.2 Aspects of social capital

As the definition indicates, social capital is created from the relationships between different agents. To study the definition in depth the main sources proposed by Lin (2008) will be briefly explained, as well as the sources according to Adler & Kwon (2000) in more detail with the role of institutions, and finally an integration focus on the effects of social capital will be made.

Beginning with Lin (2008), strongly identified with trend that focuses the existence of social capital and networks three main sources are proposed. First he talks about the structural position of a certain actor in the network as the primary source of social capital. This position is defined as the post held, the actor in question within the hierarchy of the network in different social strata. Secondly he discusses the location of each actor in the network based on the characteristics (opening intermediation, etc.) that their bonds have. Finally Lin (2008) gives an important role for the generation of capital to the motivations presented by actors differentiating those who seek power and (instrumental) reputation from those who pursue solidarity and well-being (expressive).

Secondly, according to Adler & Kwon (2000) three main sources of social capital should be pointed out among all those identified in the literature: networks shared norms and shared beliefs; whose contributions are interdependent. For these two authors the rules and formal institutions (government at state level and the hierarchical organization at the organizational level) appear in a different level since it is argued that their contribution to social capital is not of the same nature as that of the other three sources already mentioned.

Social networks. We consider as a social network the all individuals, institutions and organizations interconnected through formal or informal relationships of a significant nature. Therefore, there are two dimensions on which the network concept is based: the actors (individuals, companies or social groups) and the relationships.

Relationships and attributes are the main types of data used in social network analysis (SNA). Attributes are the characteristics, properties and qualities of the elements and groups that are part of a network such as age, sex, income level or political ideology. Moreover, relational data are the specific links between pairs of elements (Wasserman & Faust, 1994). These contacts, connections and bonds connect one agent to another and therefore cannot be treated as mere characteristic of each one of the elements but as properties of the systems to which they belong.

A classification made by Wasserman & Faust (1994) takes into account the nature of the series of actors and the properties of the links between them:

The networks with a single social entity are characterized by the existence of a single group of stakeholders including individuals, subgroups, organizations or groups. The relations under study can be at personal level (those of emotion, friendship, respect, etc.), material transactions (rent, purchase) or intangible (communications, information), etc. In addition to these relationships it is common to use certain attributes that help describe the actors forming the network.

The networks of two social networks are those that include two groups of actors or a group of actors and a set of events. If the network is made up of two groups of actors, the type thereof may be the same as in the case of networks of a social entity with the particularity that the relationship between actors in different groups will be studied here. Each of the actors will be linked to one or more events and their types and characteristics will be the same as those explained above. You can also make use of attributes, as in the networks of a single corporate entity, considering that these attributes also apply to the events (venue, date, etc.) to be analyzed.

Networks, depending on their degree of cohesion, provide access to information and to the detection of new opportunities. Also, they facilitate cooperation and collective coordination. There is, however, some disagreement about the effects caused by the cohesion of the network on individual action, that is, the effect of the networks where individual contacts are strongly linked (Gargiulo & Benassi, 2000).

The networks are differentiated according to their cohesion:

- *Dense networks*. They are characterized by their cohesion. For Coleman (1988, 1990) the amount of social capital available to a company depends a lot on how closed (closure) the network to which it belongs maybe. It is precisely this density of relationships between network members which makes, according to this author, the effective rules and codes, for reducing risk to appear, thereby increasing trust among the different actors and becoming stronger as a result the social capital.

- *Dispersed networks*. They are characterized by the existence of structural gaps that appear when two groups or networks are not related to each other. The actors who act as intermediaries occupy these holes when they are able to connect these unconnected areas (Burt, 1992b; 1997). The main benefit of the social capital comes from the opportunity to mediate the flow of information between different groups and so, since information flows more easily, they are a key source of capital. These holes play a kind of dynamic role as a diversity of information that allows more options on which to make decisions.

In addition, in order to explain the existing possible types of networks it is necessary to analyze the type of relationship or link between the different actors in the cluster. Thus, it is divided into two types of links:

- *Strong links*. They have two main advantage sources. On the one hand, they provide access to high quality information and tacit knowledge. And on the other, they establish an efficient monitoring mechanism especially for the government of the behavior of companies or the agreements that may be established between individuals and organizations (Uzzi, 1996).

- *Weak links*. Facilitate access to new information. They often constitute a kind of link to information that is unique within the group and this occurs by insertion into the structural gaps in the network which are areas not affected by the high density of relationships of the rest of the actors and therefore it is less corseted (Granovetter, 1973).

Standards. It can be defined as a rule that should be respected and that permits the adjustment of activities. When we speak about the standards in a district, we mean some specific rules for determining “the way things are done here", with different characteristics in each of them.

Putnam (1993) speaks of generalized reciprocity as the main condition for the existence of such standards. This reciprocity is described as:

> *It is not 'I will do this for you because you're more powerful than me', or even 'I will do this for you now, if you do that for me now, "it is essentially' I will do this for you now, knowing that at any time you will do something for me '(Putnam, 1993: 182-3).*

Reciprocity is what unites the community as it is a common good and all the members of the community have shared commitments and interests (Adler & Kwon, 2000). Transactions in this area increase confidence through the power exercised by the community and the obligations that derive from it. The threat of ostracism and exclusion makes the intervention of the law or violence unnecessary in these cases (Portes, 1998).

Beliefs. They are understood as shared strategic visions or similar interpretations of the situations and the meaning of things. They play an important role as a source of the social capital because the availability of these common beliefs allows effective communication. Consequently, they are paving the way for a shared vision of reality and generate certain expectations that facilitate collaboration (Adler & Kwon, 2000). Shared experiences create beliefs that enable the sense of belonging to the community and solidarity (Portes 1998).

Role of formal institutions and rules. Ibarra (1992) highlighted the importance of formal institutions and the rules on capital. Norms and beliefs may also be influenced by the institutions through legislative mechanisms managed by governments and administrations. There are examples of this type of influence in human rights laws that seek to eliminate discrimination against certain groups (Adler & Kwon, 2000).

The role of governments on social capital is key since it affects civic behavior through the confidence generated by their performances. In this way those governments with high levels of transparency can create social capital (Levi, 1996). Therefore governments are dealt with as an important source of social capital as long as they meet the needs of the community (Portney & Berry, 1997).

Integration approach of the effects of social capital

After the above classification of social networks, social capital theorists agree that the best connected players in their network have a competitive advantage over those poorly connected (Molina-Morales et al., 2008). Although there is some controversy over which the better of the two networks is, Coleman (1988) & Uzzi (1997) suggest the supremacy of dense networks with strong ties. Moreover Burt (1992b) claims that companies must be connected in dispersed networks with weak ties (Granovetter, 1973) of partners who are disconnected with each other.

After all, the value of any form of social capital depends on issues such as the mission of the organizations involved, the existence of certain shared beliefs and standards and the availability of additional resources (Adler & Kwon, 2002). It is very important, therefore, to meet the objectives of companies in order to determine the best options in terms of the intensity and number of relationships that must be established in the network in which they are immersed. According to Krackhardt & Hanson (1993:110):

> "*What matters is the setting, if the networks are in tune with the objectives of the company*."

Regarding the innovative process we can basically distinguish basic forms two types of requirements: exploration and exploitation (Roberts, 1988; Cohen & Levinthal, 1990). The first one refers to the preliminary phase of a project as the research and development of a new business idea or a new product. In this case, we try to find as much information as possible by identifying the alternatives available. The second requirement is more focused on refining the idea, so the requirements are based on safety and accuracy, deepening on a particular subject. However, it is argued that companies should know how to properly balance the type of bonds that they have favoring one or the other depending on the information needs and environmental conditions (Podolny & Baron, 1997; Rowley et al, 2000).

3 CHARACTERISTICS OF THE CERAMIC CLUSTER IN THE PROVINCE OF CASTELLON

3.1 THE CERAMIC INDUSTRY

The Spanish industry of ceramic tile manufacturers is one of the most dynamic and innovative in Spain and within the worldwide ceramic sector, is positions as a leader in technological development, design and quality of service. Before the crisis in 2007 data were: 584.7 million square meters, amounting to 4.166 million euros and employing 22,300 people directly.

After the crisis, the production increased up to 420 million square meters in 2013, amounting to 2.797 million euros, holding the first place of ceramic production in Europe. Out of global turnover, 80 % were exports and other sales to the domestic market, so it is the first European exporter and third one worldwide.

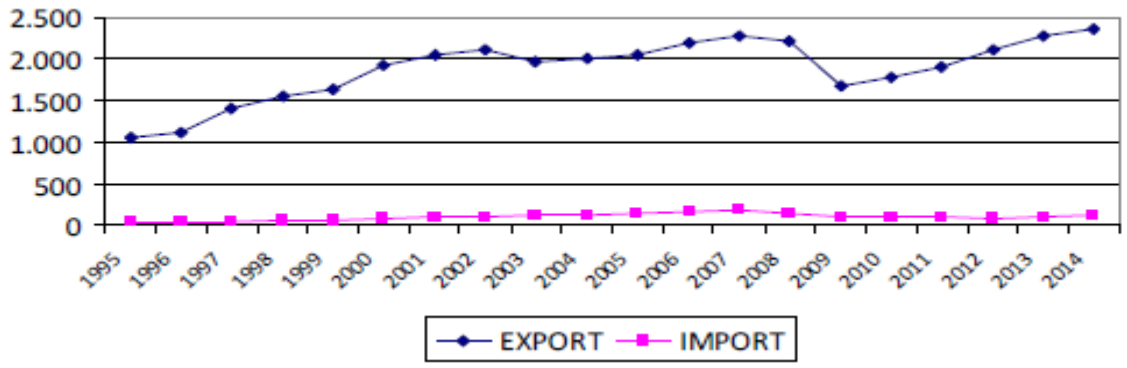

Table 1: Exports and imports of ceramics from 1995 to 2014
Source : Valencian Institute of Business Competitiveness (IVACE)

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 place it among the major export sectors of Spain and it is the second largest surplus industry that contributes to the trade balance of Spain .

On the whole, it is estimated that the Spanish ceramic sector directly employs about 15,045 workers in companies, most of which are small and medium size (IVACE, 2013). It is estimated that the industry generates more than 5.000 indirect jobs.

3.2 MAYOR AGENTS IN THE CERAMIC INDUSTRY

The companies that manufacture the final ceramic products are surrounded by companies which perform all the typical activities of the productive structure of the ceramic industry:

Manufacture of frits, glazes and ceramic colors , machinery manufacturing , special pieces, atomized powder and suppliers of ceramic additives, in addition to other ancillary services related to packaging, logistics, etc. In addition to the companies, within the ceramics sector are the institutions that are particularly important in providing support and representation of the main activities performed in this cluster.

Figure 1: The actors of the ceramic cluster of Castellón

Source : Luis Martinez Chafer (2012) from Fernandez de Lucio et al. (1999)

3.2.1 The productive environment

The Spanish ceramic industry cluster is mainly located in the province of Castellon , where the regions of L' Alcalaten, La Plana Baja and La Plana Alta account for over 90% of the production in a radius of about 30 kilometers around the city of Castellon de la Plana (Budí -Orduña , 2008). Apart from the main activity which is the production of wall and floor tiles, the activities of the companies in the cluster are:

- Producers of raw materials: manufacturers of atomized clays and companies of frits, glazes and ceramic colors.

- Industries that produce the decorations and special pieces to complement their own floor and tile ranges.

- Auxiliary machinery manufacturers.

- Packaging industry; logistics and transportation; maintenance workshops.

According to ASCER, the number of companies in this activity was 174 in 2008. In 2014 and due to the crisis, the figures were slightly lower than the 126 being attached to this association of manufacturers. Employment data for the year 2008 are 22.300 employees in this activity, although estimates for 2015 show a clear decline in employment being 15.045 the number of workers in this sector. In terms of production, in 2014 there were 420 million sgm which improves data from previous years, but even without being 609 million sgm, that they produced in 2005. Finally, the sector's turnover is estimated for 2013 around € 2,797 million for substantially lower than the 4,166 million recorded in 2007.

3.2.2 The technological and ancillary services environament

The technological and advanced service environment includes companies and institutions that have the ability to offer and transmit convertible expertise in innovation. Among these skills there is the machinery, new materials, the know -how, etc. These actors perform a very important function within the sector which t is to connect the scientific environment with the productive environment by intermediation. The activities included here are manufacture of frits, glazes and ceramic colors, manufacture of machinery and chemical additives, various services and external research institutions.

• Frits and enamels: there are 24 companies that manufacture frits, glazes and ceramic colors (ANFECC). They hold the world leadership in the manufacture and marketing of these products, surpassing Italy. The reason for success lies in their permanent investment in R + D + i, which has combined the marketing of their products by adapting them to make them fit for all global markets. A total sale in 2013 was 1,159 million euros, 68,33% from exports. And it employs 3.342 people directly.

• Manufacturing machinery: the manufacture ceramic of machinery is the weakest link in this industrial cluster in Castellon. In Spain it is very small and it is dependent on imports mainly from Italy. This association consists of 71 companies of various professional specializations that make almost all of the sector nationally (ASEBEC, 2015). Activities include machinery manufacturers, maintenance workshops and services, technical assistance workshops and representatives of foreign firms.

• Subsector of chemical additives: this provides the different companies of the productive structure we have described with chemicals and chemical additives that facilitate the production of products and raw materials in the ceramic industry.

• Various services: the ceramic industry needs proximity to be competitive, and consequently the availability of complementary services is also included here.. Hundreds of companies of all kinds offer these services to the companies in the cluster. The services offered are: computer services, consulting, marketing services, exhibitor manufacturing, logistics and transportation, electrical services, plumbing, cleaning, etc.

• IPC: The ceramic Promotion Institute is an autonomous agency of the government created in 1982 with the intention of supporting the ceramic industrial activity, coinciding with the technological changes taking place within these industries and trying to support modernization traditional productive structures. It currently has several functions, like actively collaborating with other organizations and institutions to promote educational activities through the Qualicer Congress. It also promotes the realization of an international group show Netherlands / Spain. Along with public institutions, it has started an initiative called Assembly Project, covering training, information and documentation. And it is also responsible for managing documents and information.

• ITC: The Ceramic Technological Institute's mission is:

> *Leading the processes of technological innovation and design of the Spanish ceramic sector in anticipation of the market's and consumers' needs with regard to the uses and applications of ceramic materials, through professionalized management of a qualified human team committed to excellence in the sector*.

The most important capital of ITC is undoubtedly their human resources, since its objective is based on knowledge and its transmission.

Its activities are divided into:

- *Market Observatory*: providing information to companies so they can anticipate changes. It affects the whole value chain.

- *Habitat Trends Observatory*: it aims to monitor trends in the aesthetic and cultural currents that have a decisive influence on products.

- *Technological and Environmental Observatory*: aims to identify technological changes, particularly those affecting the ceramic industry.

- *Training*: it provides instruction on ceramic technology, quality, innovation, design and architecture, trend, etc.

- *Technological services*: exploration, assimilation and implementation of new technologies used in other manufacturing processes.

- *Enhancing the quality systems in the company*: it collaborates with bodies of accreditation (ENAC) and certification (CSTB-AFNOR-AENOR), mainly in audit work and technical advice, promoting the maintenance and development of systems of quality certification (ISO 9000) and environmental management (ISO 14001) for ceramic companies.

- *Information and documentation*: It attends and manages the information and documentation needs arising both internally, and with companies with which it interacts.

- *ALICER*: the Association for the Promotion and ceramic design integrated into the ITC is responsible for providing the ceramics sector with a supporting center him in their design policy and strategies of product innovation, with the ultimate aim of improving the quality and competitiveness of their companyies.

Environment

The scientific environment of the ceramic cluster of Castellón province is mainly made up of research groups at universities in addition to public and private organizations engaged in these tasks. It emphasizes the role of the Universitat Jaume I (UJI) of Castellón, where some of its departments develop interesting research lines for the ceramic industry in various fields, such as: ceramic technology, chemistry, environmental pollution, ceramic design, ceramic terminology, etc. In addition, we must specially note the importance of the collaboration that one of the technological institutes related to ceramics (ITC) has with the Universitat Jaume I.

It is also included:

- The other four public universities Valencia.

- The Superior Council for Scientific Research (CSIC).

- Research groups: AERT (Strategic Alliances, Networks and Territory) and IMK – Innovation.

3.2.3 The institutional framework

In the institutional section we find several levels of actors. First there are the public institutions that, through different administrations (European, national and regional), develop different policies that can have a more or less intense influence on the industrial activity in the sector. In addition there are the business associations, which are elements of great importance in this sector and which include the manufacturers of the major industrial activities in the sector. Along with the two previous groups of institutions are the fairs and congresses are very important as sources of knowledge and as promotional tools. Finally we will describe the role that certain organizations such as the Chamber of Commerce of Castellón, the CEEI or the official career associations play by providing support services to businesses.

Because of the bib number of related institutions only those associations of manufacturers in the sector and the major events nationwide will be defined.

The associations of manufacturers are divided into ASCER, ANFFECC and ASEBEC.

ASCER: It is the Spanish Association of Manufacturers of Ceramic Tiles, which is responsible for developing and promoting any type of project that may be of interest to its members.

We will focus on the support for the ceramic companies regarding foreign promotion because of the great importance of the export sector as a result of the low domestic demand.

The Spanish ceramic sector exports to 180 different countries. It features a co-funded Sector Promotion Plan with the Spanish Institute for Foreign Trade (ICEX), which aims to promote and consolidate the image of the industry, trying to position the brand as representing the Spanish tile. The 4 tools used are:

- Country Plans: They include communication campaigns for all the market agents related to their products, supported by information campaigns, advertising and publishing, and maintaining databases.
- Fair attendance: The Spanish tile is present in the main fairs and events held throughout the world, being Coverin's and Cersaie particularly important.
- Technical seminars: Initiatives of the sector in the research of alternative uses of ceramics due to the need for information seminars in order to introduce new uses and highlight the hygienic and decorative features of these products.
- Advertising campaigns.

ANFFECC: It is the National Association of Manufacturers of frits, glazes and ceramic colors. It is responsible for defending the collective interests of its members and it is the negotiator of sectorial collective agreements. It also developed standards for the labeling of products to avoid confusion.

One of the petitions to the members of the association is to take action in the prevention of the environment with some guidelines to follow:

- Reduction of particle emissions to the atmosphere generated by the handling, storage and transportation of raw materials, and reduction of particle emissions of SO2 into the atmosphere from fixed sources.
- Enclosure and isolation of all facilities to reduce noise.
- Preserve water quality by closed circuit sewage plants.
- Waste management and recycling.
- To minimize the visual impact.

ASEBEC: It is the Spanish Association of Manufacturers of Machinery and Capital Goods. It acts as employer and is responsible for developing lines of work that will help the industry maintain the growth line. In this way, they have achieved their own technology, which is characterized by conforming perfectly to the needs of the ceramics industry.

The most important events nationwide on the ceramic sector are CEVISAMA and Qualicer.

CEVISAMA: It is one of the most important fairs worldwide. There were 682 exhibitors in 2015, 29% of which were international, ie 196 brands came from 38 different countries. The fair focuses on the areas of frits and glazes, ceramic machinery, natural stone and bathroom equipment showing their contributions to the avant-garde architectural solutions. It is also a showcase of innovation by firms in the sector.

Qualicer: it is the forum that discusses everything connected with the ceramic coating. It also deals with issues related to the quality of the production process, from the placement of the tiles and, in general, the quality of all the elements that make up the industrial fabric of ceramics.

3.3 DATA RELATING TO CAPITAL NETWORKS

3.3.1 Introduction

We can identify the industrial cluster as a social network where space and proximity determine the structure and content of the relations and the generation of tacit knowledge and learning ability that supports local innovation (Maskell & Malmberg, 1999).

There are different types of knowledge flows in clusters, distinguishing between those flows that are freely available (eg information) and those that are not (eg, knowledge). So, for a social network analysis (SNA) we will distinguish between Information Network (IN) and Knowledge Network (KN).

Duly explained above actors that exist in the ceramic cluster in Castellón, Luis Martinez Chafer made in 2011 an empirical study analyzing social networks. The study asked about the relations that the companies in the cluster have with other companies and institutions. The sample consisted of 166 companies of which 83 were ceramic final producers, 36 machinery companies, 21 manufacturers of frits and glazes, 16 manufacturers of special parts, 6 producers of atomized powder and 4 powder atomizer manufacturers. It also enquired of the cluster institutions and the associations ASCER, ANFECC and ASEBEC for other information

The general properties of an analyzed network can be obtained by core indicators. These determine characteristics of the network. The main indicators are:

- *Size*: The size of a network is the number of links or possible links between its actors.

- *Density*: It gives us an idea of the level of utilization of the connection possibilities that a network has. This indicator measures the ratio between the number of links present on a network and the number of logically possible links.

- *Geodesic Distance*: it is the number of relationships in the shortest possible path from one actor to another. When two nodes are adjacent, the distance between them is 1. If actor X contacts Y contacts, Z and X doesn't contact Z, then the distance between X and Z is 2 and so on.

- *Diameter*: This indicator provides information on what the longest geodesic distance is.

3.3.2 Data on enterprise networks

As expected, a first visual examination of the networks (Figure 2 and Figure 3) shows different positioning of the actors in the cluster. In both cases we note a concentration of actors in the center of the network surrounded by others in more peripheral positions.We can also see in the upper left hand area a certain group of actors, more numerous in the case of KN, who are isolated from the rest. It also highlights the existence in the knowledge network of a couple of actors who are isolated from the rest but linked to each other.

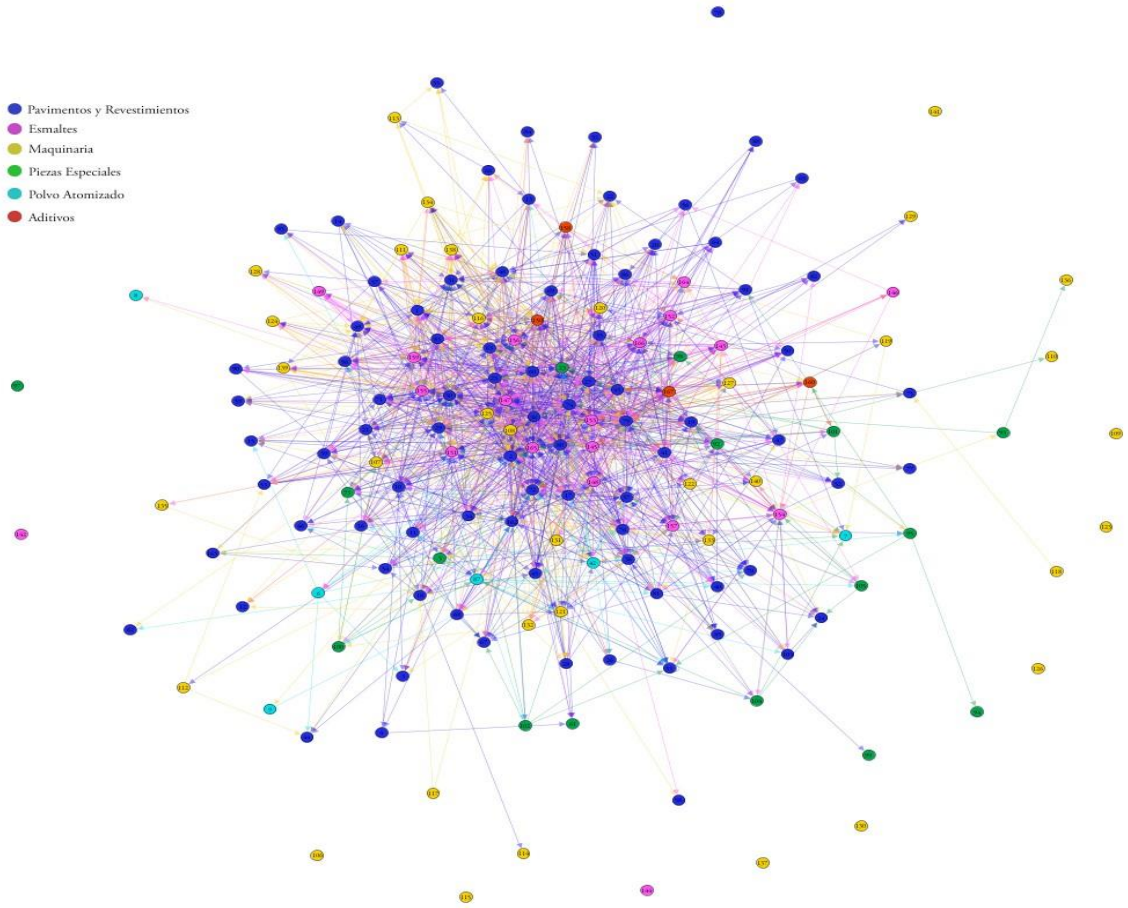

Figure 2: Web of business information (BI)
Source: Luis Martinez Chafer (2012)

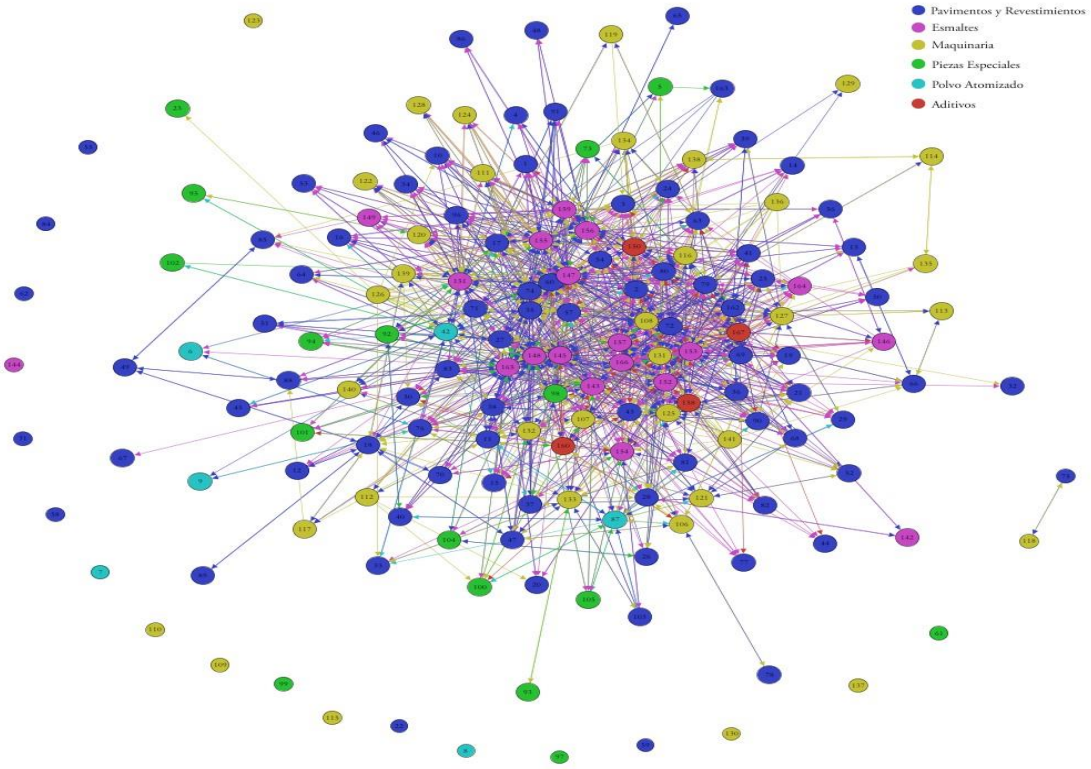

Figure 3: Web of knowledge network (KN)

Source: Luis Martinez Chafer (2012)

The result of the networks on the geographical map shows interesting color differences. In the business information network (Figure 4) a predominance of blue on the other shades can be seen. This implies a predominance of the subgroup of companies formed by manufacturers of floor and wall tiles. In the case of the network of technological knowledge (Figure 5) this dominance rests on companies engaged in the production of frits, glazes and colors ceramic, as shown by the predominance of pink in the middle.

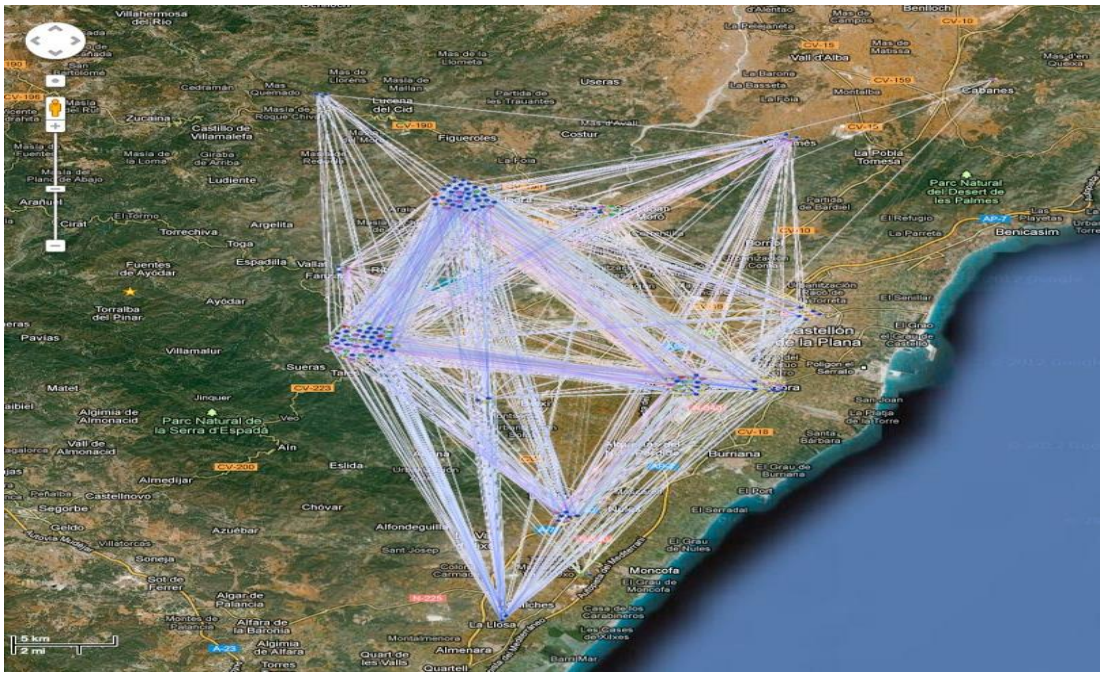

Figure 4: Web of business information about Geographic coordinates

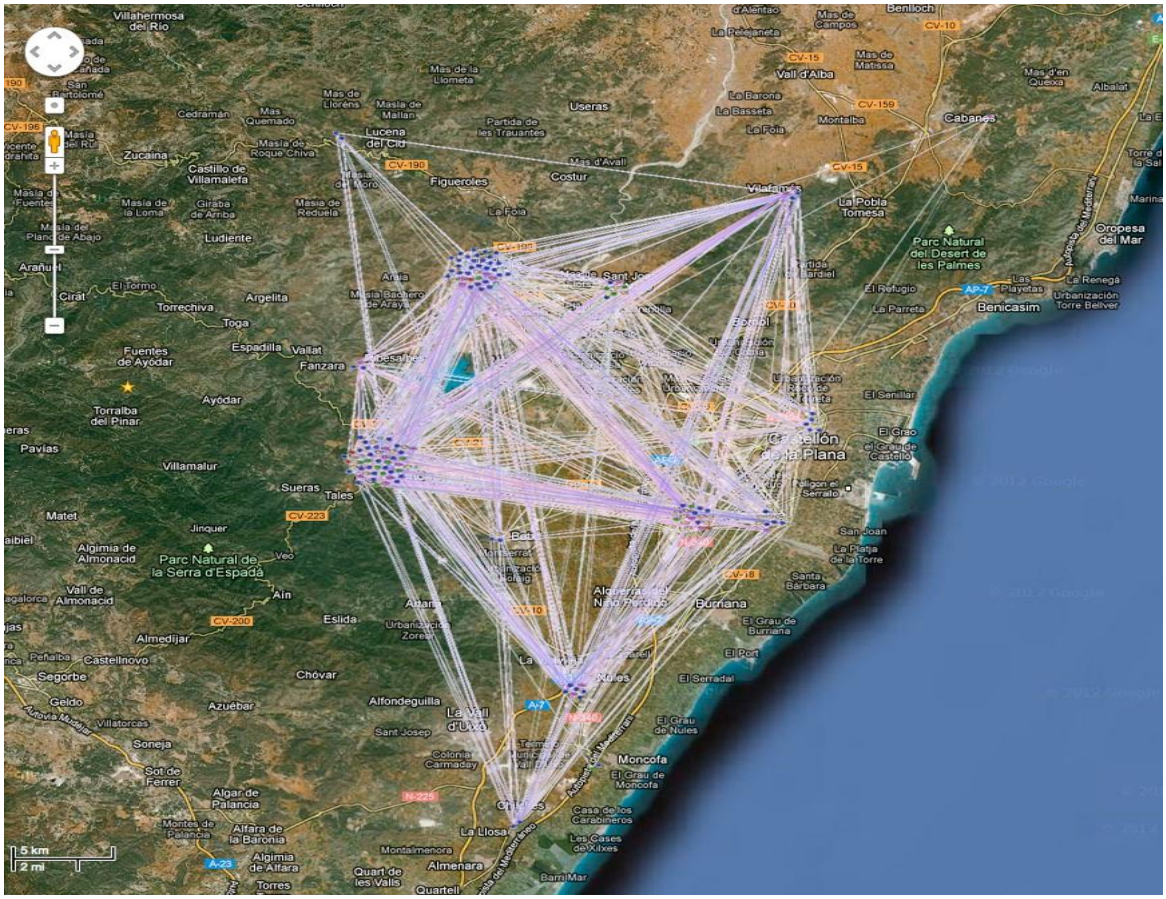

Figure 5: Web of knowledge network about Geographic coordinates

The data with the indicators explained previously are:

Indicator	Business information Network (only firms)	Technical knowledge network (only firms)
Size	27.930	27.930
Density	6,43%	6,31%
Diameter	7	5
Geodesic distance	2,418	2,272

Table 2: Data from the indicators on business networks between companies

The size of each of the networks, that is, the number of possible relationships is 27.930. In our case as the two networks are formed by the same actors, the numbers of technically possible relations match. To learn how the network makes use of its full potential, we look at the density of ties. The overall density, which represents the ratio between the number of existing bonds and the number of possible links to the whole network, is 6,43% for the business information network and 6,31% for the technological knowledge network. In both cases the densities point to an under-utilization of available network connectivity as 10% of the density is not exceeded.

The diameter for the business information network is 7 while for the network of technological knowledge it is 5. This indicates a broader network of business information, so it takes longer to pass information than knowledge from one side of the network to the other. The geodesic distance is 2,418 in the Business Information Network and 2,272 in Technical knowledge network. If a company needs information or knowledge, on average, they will need to contact a company to contact to another one to make it.

3.3.3 Data regarding the role of institutions

The role of institutions is vital for a cluster and its social capital. These institutions make, as we shall see , the relationships that companies have grown, thus improving the results of the indicators.

The following image shows only the networks between companies and they can be compared by adding the institutions. At first glance it can be easily seen that there is a greater focus on companies plus two images institutions. The companies appearing and the institutions and other organizations are shown in green.

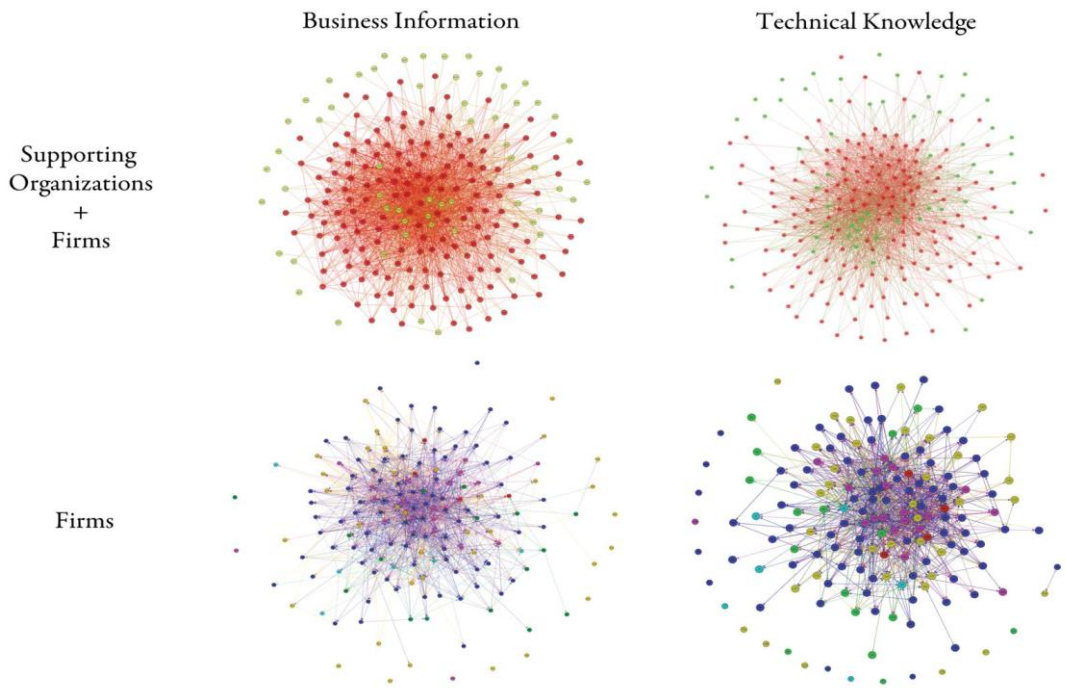

Figure 6: Networks between companies and networks between companies plus organizations

In the network of business information, the institutions and other organizations are in large numbers on the outside, being few of them in the center. While in the Technical Knowledge network are many already concentrating in the center.

The indicators of the network are:

Indicator	Business information Network (firms plus organizations)	Technical knowledge network (Firms plus organizations)
Size	50.400	50.400
Density	9,00%	7,90%
Diameter	4	5
Geodesic distance	2,154	2,215

Table 3: Data indicators on business networks between companies more organizations

The size of the network is expanded to 50,400 possible connections between companies and between institutions. As before, the data match because they are formed by the same actors. The overall density, which represents the ratio between the number of existing bonds and the number of possible links to the whole network, is 9.00% for the business information network and 7.90% for the network of technological knowledge. It remains an under-utilization of available network connectivity as 10% of the density is not exceeded.

The diameter for the business informationnetwork falls to 4 while for the network relateddd to the technological knowledge it remains 5. This means that thanks to the institutions, information business goes through fewer intermediaries than the technological knowledge. And thanks to this the geodesic distancefalls to an average of 2,154 in the BI while in KN it is 2,215.

On table 4 you can compare the indicators better and also have a better view

Indicator	Business information Network (only firms)	Technical knowledge network (only firms)	Business information Network (firms plus organizations)	Technical knowledge network (Firms plus organizations)	*Variation In Business information Network*	*Variation in the technical knowledge Network*
Size	27.930	27.930	50.400	50.400	*22.470*	*22.470*
Density	6,43%	6,31%	9,00%	7,90%	*2,57%*	*1,39%*
Diameter	7	5	4	5	*-3*	*0*
Geodesic distance	2,418	2,272	2,154	2,215	*-0,264*	*-0,057*

Table 4: Comparison of the indicators between firms and firms plus organizations

4 EMPIRICAL STUDY WITHIN THE CERAMIC CLUSTER. ADVANTAGES AND FUTURE CHALLENGES TO MICRO LEVELS AND AT THE LEVEL OF AGGLOMERATION

4.1 EMPIRICAL STUDY AT SALONI COMPANY

4.1.1 Survey methodology

To make my contribution to the study of the ceramic cluster, I will use various sources of knowledge: academic studies of the sector, related to newspapers and news magazines, from teaching material Degree of Business Administration, and own knowledge from working for more than two months in the company of ceramic Saloni.

The contribution to the study consists of three parts:

In the first part the company Saloni, data, mission, types of products that offer differentiation with other companies, historical landmarks and the social networks that have be presented. All these data will be the main source Saloni workers who have the information and the website of the company.

In the second part I will give an overview of the different internal levels that a company of both small and medium enterprises, ceramic industry and propose improvements or new forms of organization that could benefit the future development of the company. I will rely on the university teaching materials of various subjects such as Human Resource Management, Business Management, Fundamentals of Marketing, Operations Management and Design and organizational change.

And in the third part, by reading news and journal articles, I will try to present ideas and proposals for the whole ceramic cluster.

4.1.2 Saloni company

Saloni was founded in 1971 with a clear idea, providing consumers with the products they need. Currently it is located in a facility of 240,000 m2, with a staff that takes care of fulfilling the expectations of our customers on five continents, in more timely. Therefore there is a constant concern to offer innovative products with excellent quality and design, according to market needs, constantly investing in R+D+i, obtaining the most advanced manufacturing methods. Producing a wide variety of types of products from white paste, paste porcelain, colored pastes, technical porcelain... For thus our customers can find the products that suit your desires.

The company belongs to the group of construction OBINESA. It differs because it, along with Porcelanosa, unique in having own physical stores and an R+D+i own, and brand marketing.

The Saloni turnover increased from 75 million euros in 2013 to 82 million in 2014. It currently has 400 employees in its workforce. And contracts for companies that manufacture brand Saloni are: 3 styles, Codicer 95 and Tencer.

Historical Milestones of the company:

1971: Year Established.

1985: Union to Lubasa Group, current Becsa belonging to Ubinesa.

1989: Alpha Gold Cevisama fair.

1999: Certification of Management Systems ISO 9001.

2000: Creation of Saloni Architecture Awards.

2005: Ceramic Award for Architecture and Interior ASCER.

2008: Certification of Environmental labels and declarations UNE-EN ISO 14021.

2012: Certification for Leadership in Energy & Environmental Design (LEED).

2015: Awarded the Coverings trade show in the US in the "Best in show booth Awars".

4.1.3 Social capital of Saloni

Saloni is located in the town of Sant Joan de Moro. This town is located 10 km from the capital Castellón de la Plana and 22,5 km from the port. It is within the area bounded as ceramic cluster of Castellón.

As a result of cluster membership, the company maintains ongoing relationships with other staff and other related companies. Saloni has an extensive network of relationships with suppliers (487 suppliers) which will provide all kinds of raw materials, materials, finished products with Saloni, additives, machinery, etc. The number of companies with which it maintains machinery ratio is 100 because that's able to absorb the improvements that are occurring, besides keeping available. 8 are the transport companies responsible for transporting the products regularly.

Regarding institutions, Saloni has relations with all institutions mentioned above as the ITC or ASCER, and other institutions that are not addressed in this paper but are part of the cluster as the Chamber of Commerce, universities, etc.

Therefore, the business network of the company is more extensive than knowledge. This is due to several factors: the number of suppliers is quite extensive (487), Saloni has an R+D+i own so it is not subject to external investigations and most institutions with which it maintains relations it is for business issues.

4.2 PENDING AND FUTURE CHALLENGES AT THE MICROECONOMIC LEVEL

4.2.1 Organizational challenges

The history of tile sector began in the eighteenth century, but it was not from the 60s and 70s of the twentieth century when it began to grow in Castellon, consolidating in the 80s as a key sector in the local economy.

The major companies in the sector were founded mostly 30 years. The business reality in those years is far from this. At present, the market has been changing and evolving to new ways of managing companies and ways of doing business.

It is understood as an organization or organizational structure the division of labor in different tasks and coordinating them. This division of tasks facilitates knowledge management and innovation, power efficiency, develops and promotes the implementation of the strategy, and may favor the motivation of members (Iborra M. et al., 2007).

Organizational design parameters are three:

- Differentiation: extent to which the activities of the organization are divided into different specialized tasks (horizontal dimension of the division of labor).

- Centralization: degree of concentration of authority in the organization (vertical dimension of the division of labor).

- Formalizing the degree to which written operating procedures (coordination) are.

Another aspect to consider is the control. It is a preventive and corrective mechanism adopted by the administration of an entity that allows early detection and correction of deviations, inefficiencies and inconsistencies in the course of actions. The types of control are:

- Control market: through stock price, return on investment.

- Monitoring performance: control through performance objectives.

- Bureaucratic control: by rules and procedures.

- Social Control: culture influences the behavior of individuals.

- Self: each individual regulates his own behavior.

With these three parameters and control can define the types of organizational structures that exist, but not all companies get to have a clearly defined structure:

- *Organizational structure*. It is the one which has low formalization of activities, high and low differentiation decentralization work. It allows addressing complex tasks where changes and are suitable for the differentiation strategy and to complex and dynamic environments. The normal control is social control and self-control.
- *Bureaucratic/mechanical structure*. It has a high formalization of activities, a high centralization and has a highly specialized work. The workers' control and cost is critical. This structure applies to companies that implements a strategy of cost leadership, with routine and highly standardized and stable environments for simple activities. Control is about performance, bureaucratic control and market control.

Organizational models for the company will depend on the parameters of the types of structures, departmentalization, which is the grouping of individuals and tasks assigned to them in different units within the organization, and control.

By naming them, these are: formal structure, multidivisional structure, matrix structure, adhocratic structure (Nightgown, C.; Dalmau, JI, 2009). The first two are the most traditional structures, while the last two are the newest.

Levels of hierarchy determined decision that each employee depending on their position. The more links there are in a structure, fewer people concentrate power. In the vertical structures, important decisions will be taken in the highest parts of the organization, while less important decisions will be made by middle managers. In horizontal structures, with a maximum of three links, most decisions will be made by middle managers using lower-level workers, and managers will be devoted to establishing long-term goals.

As mentioned at the beginning point, the major companies in the ceramic cluster are relatively old. The organizational system these are the traditional mechanical structures with high ranking, high formalization and high centralization of decision-making. They generally have a multidivisional structure divides the company departments in different activities for greater specialization and efficiency.

The example of the company Saloni and its organization:

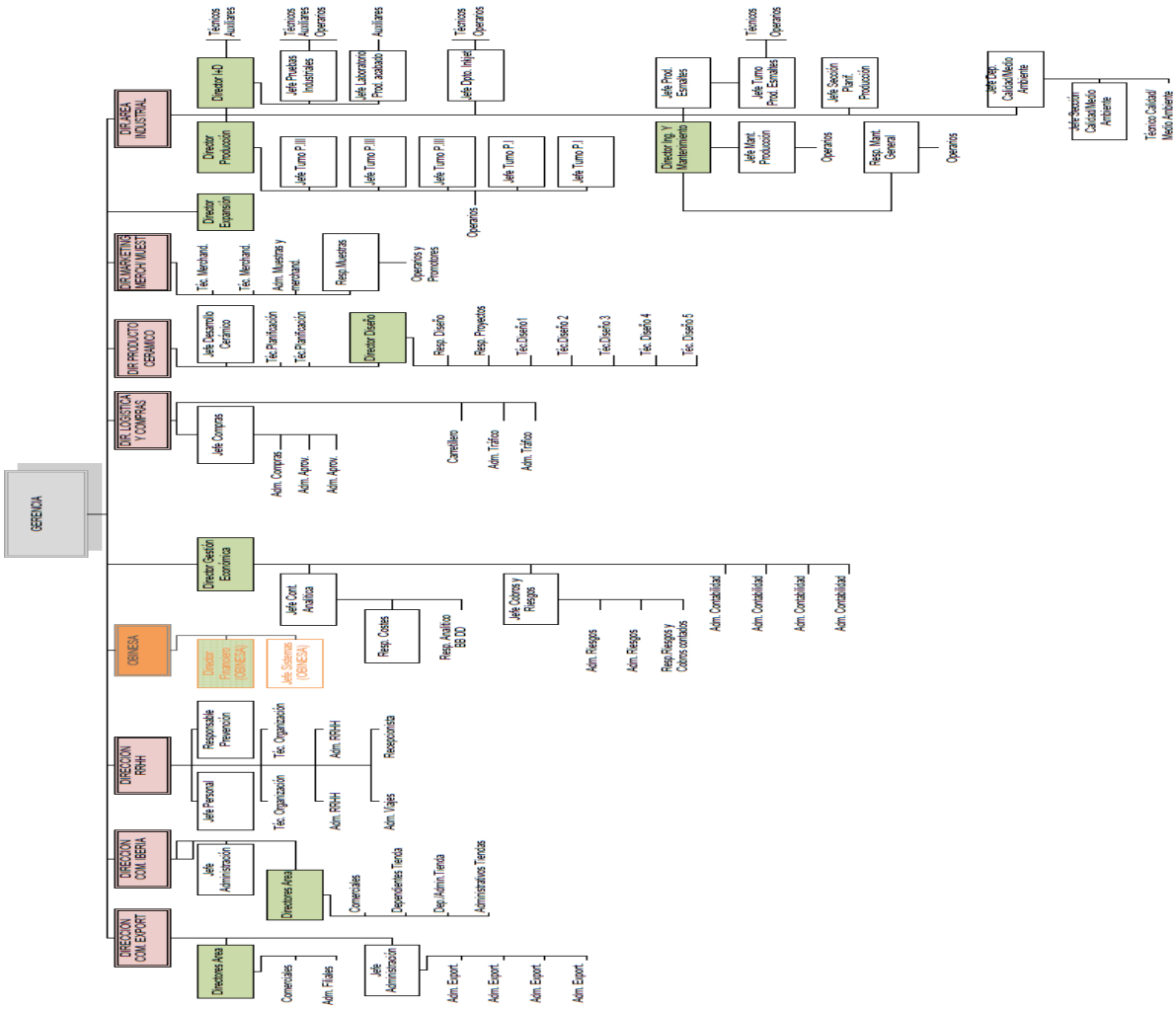

Figure 7: Organization Chart of Saloni

As I said before, is that it is a formal structure in the Management departmentalized top, and 8-way (square pink and orange) or departments that are: Commercial exports, trade of Iberia, human resources, financial branch Obinesa, Logistics and Purchasing, ceramic Product, Marketing / Merchandising / Samples, and Industrial area. The existence of directors (8 green boxes) and the existence of heads of addresses is also observed.

The company is characterized by a strict cost control, control of their business workers, and the decisions of certain executives. The lower level workers have only limited responsibilities to work and are controlled by the chiefs that determine what to do at all times, and schedule. These heads are the decision makers with the approval of the management of the department.

A new type of structure for a business is Boundaryless organization (Jones, G., 2010). It is characterized for being a flexible organization and has an unstructured organizational design that is intended to break down external and internal barriers between the organization and its customers and suppliers.

This removes internal (horizontal) boundaries:

- Eliminates the chain of command.
- Has a limitless span of control.
- Uses empowered teams rather than departments.

Eliminates external boundaries:

- Uses virtual and network organizational structures to get closer to stakeholders.

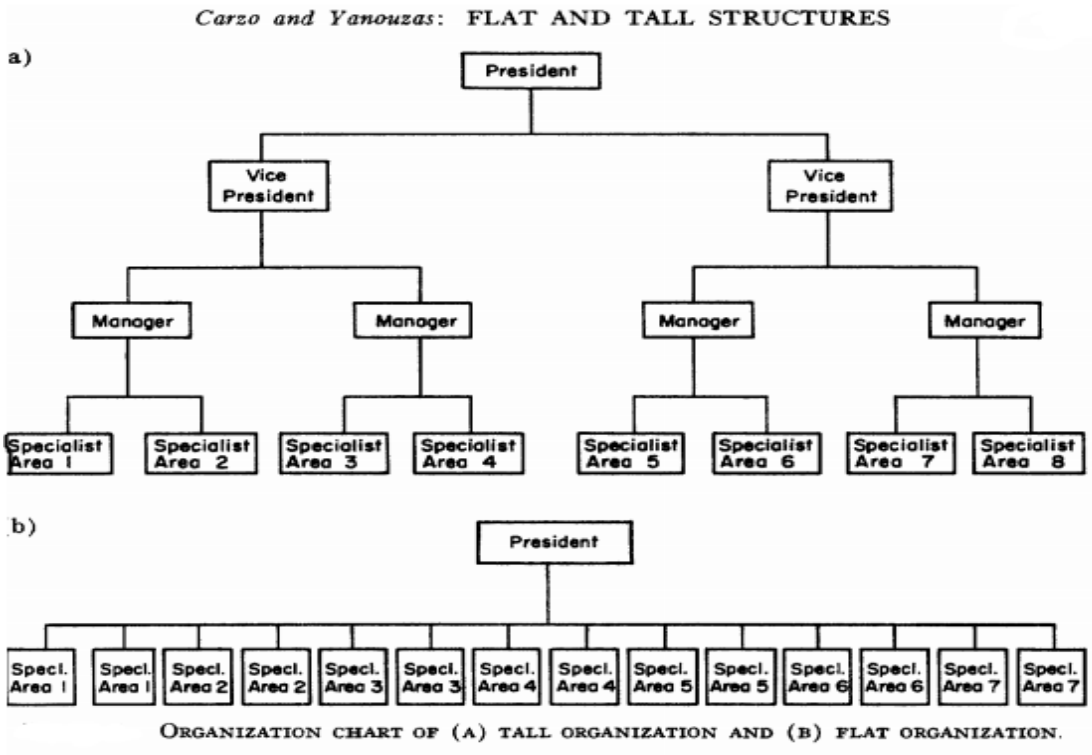

FigurE 8: Types of organizations structures

Source: Carzo & Yanouzas (1969)

This kind of organization eliminates the hierarchy and it changes from a vertical structure to a horizontal once. They are the flat organization. The idea is that well-trained workers will be more productive when they are more directly involved in the decision making process, rather than closely supervised by many layers of management. The flat organization model promotes employee involvement through a decentralized decision-making process.

By elevating the level of responsibility of baseline employees and eliminating layers of middle management, comments and feedback reach all personnel involved in decisions more quickly. Expected response to customer feedback becomes more rapid (Fried, J., 2011).

This type could change traditional departments by groups of workers, which would go changing the roles of head from time to time, giving more responsibilities. Give freedom and autonomy for these groups to take the necessary decisions would be made more quickly. Communication would flow better by not having to go through intermediaries controls and would provide companies greater flexibility and adaptation to the market.

Flat firms tend to have higher wages than the industry average because they avoid hiring executive intermediate positions. The foundation workers have more responsibility and more pay for it, whereas, in general, the ratio of CEO pay is much lower than in a traditional company. As will be seen below, this would help to combat the polarization of society.

Strategies

The ceramic industry is a sector in the mature life cycle. The rate of growth in demand is becoming better, or even does not exist due to greater intensity of competition. Customers are becoming more experienced and demanding better products and additional services. There is an excess of production capacity by investments in the growth phase, the difficulty in developing new products and applications is growing, increasing international competition from countries such as Brazil and China.

Choosing a strategy for companies in the cluster is essential to remain competitive globally. The choice of a strategy of many companies depends on those who choose other cluster because of dependency. That is, a company of fried and glazes to provide a ceramic tile company can not change its market strategy without consulting it before without reaching consensus. The interdependence of enterprises can be an obstacle when it comes to change strategy for smaller companies.

Focusing of the most important businesess of the cluster, they need to get a solid competitive advantage or perhaps a reorientation of the field of activity of the company.

Competitive advantages (Guerras, L.A. & Navas, J.E., 2007) are:

- Cost leadership: increased margin by reducing costs.
- Product differentiation: focus on quality, better services and higher distribution.
- Segmentation: finding more profitable market segments.

To choose a strategy to gain a competitive advantage, they should consider the current and future economic situation.

The economic situation, according to Andrew Haldane, chief economist at the Bank of England, is a bipolar world where the gap between rich and poor grows each passing day. A shocking fact is that the 85 richest people in the world have the same wealth as the poorest half of the population (Oxfam, 2014). From 1990-2002 this inequality increased rapidly, but has now dropped by the emergence of the Chinese middle class. India, China and Nigeria are the three economies where inequality has not increased in the last 30 years (World Top Incomes Database, 2014). Therefore, 7 in 10 people do live in a country where inequality is higher today than 30 years ago.

In the case of Spain, it is the most unequal society in Europe, according to a report that finds three million Spaniards now live in conditions of "extreme poverty", and another study that shows the number of millionaires has increased. A report by the Catholic charity Caritas says more than 6% of Spain's population of 47 million lived on €307 a month or less in 2012, double the proportion in 2008 before Spain was hit by the recession, which has left 26% of its workforce unemployed. A separate study by Credit Suisse finds that the number of millionaires in Spain rose to 402.000 last year, an increase of 13% on 2011, emphasizing the ever-widening gap between rich and poor.

The conclusions from these data are that if anything does not regard the world divided into a rich minority and a majority rich. The strategy of the company to survive in the future must take into account the division of society (or customers).

So, ceramic cluster has to choose a strategy. With all the resources that have been invested in innovation, technology centers, institutions to ensure quality, specialized centers in ceramics... the cluster's strategy and will have to remain, to innovations in the industry and a product of excellent quality. Having as competitors Italian firms, not Chinese or Thail.

4.2.2 Challenge in the HR department

It has been said that the companies in the cluster have a vertical structure in order to determine the work of each person to whom you must obey. This based –on- control structure has a serious long-term problem: the no employee motivation. The little motivation at work results in low productivity.

Bonache & Cabrera (2006) discuss the importance of human resource and its value in the organization. We are going towards a "knowledge society" where workers are the most important resource of a company. The environment will be more complex, uncertain, where he will urge the flexible capacity to adapt and companies. The utmost importance will be given to innovation and knowledge, information and change management.

Motivation is a theoretical construct used to explain behavior. It represents the reasons for people's actions, desires, and needs. There are lots of theories to explain what are the reasons to a person could be motivated in a job.

The most commonly used is *Maslow's hierarchy of needs* from Abraham Maslow (1943). Maslow used the following terms to describe the pattern that human motivations generally move through.

- Physiological needs are the physical requirements for human survival. If these requirements are not met, the human body cannot function properly and will ultimately fail.
- Safety needs include personal security, financial security, health and well-being and safety net against accidents/illness and their adverse impacts.
- The third level of human needs is interpersonal and involves feelings of belongingness. According to Maslow, humans need to feel a sense of belonging and acceptance among their social groups, regardless whether these groups are large or small.
- The need to have self-esteem and self-respect. Esteem presents the typical human desire to be accepted and valued by others.
- Self-actualization. This level of need refers to what a person's full potential is and the realization of that potential. Maslow describes this level as the desire to accomplish everything that one can, to become the most that one can be.

Another theory is from Frederick Herzberg (1964), the *Two-factor theory*:

- Motivators (e.g. challenging work, recognition for one's achievement, responsibility, opportunity to do something meaningful, involvement in decision making, sense of importance to an organization) that give positive satisfaction, arising from intrinsic conditions of the job itself, such as recognition, achievement, or personal growth.
- Hygiene factors (e.g. status, job security, salary, fringe benefits, work conditions, good pay, paid insurance, vacations) that do not give positive satisfaction or lead to higher motivation, though dissatisfaction results from their absence. These are extrinsic to the work itself, and include aspects such as company policies, supervisory practices, or wages/salary…

Expectancy theory of Victor Vroom (1964) proposes that an individual will decide to behave or act in a certain way because they are motivated to select a specific behavior over other behaviors due to what they expect the result of that selected behavior will be. This theory emphasizes the needs for organizations to relate rewards directly to performance and to ensure that the rewards provided are those rewards deserved and wanted by the recipients.

These theories argue that in order to have motivation you need something else apart from working and getting paid for it . It takes a person to develop all their abilities, have responsibilities and be acknowledged for that.

The transformation of the existing organizations into the flat Organizations would reverse this situation of low motivation of workers:

- It would eliminate the tight control of managers over their subordinates.
- It would enable workers to develop and improve their abilities by working in teams.
- It would allow jobs rotations.
- It would increase the responsibilities of workers and theywould feel more important within the company.

The model for a higher return on human resources by increasing productivity is the **management of the personal competences** of each employee. They are the integrated body of knowledge, skills, abilities, attitudes, personality traits, etc., which predispose them to successfully perform a professional occupation, meeting the company’s values (Alles, M. 2000). There are two types:

- Generic skills: These are skills related to competances, abilities, attitudes and personality traits. They collect the know-how (resolve, decide, create...) and knowing how to act (procedural content and skills and attitudes or attitudinal contents). There are the generic company skills (common) and the generic job skills (specific).

- Technical skills: They are skills related to acquired theoretical knowledge (ie conceptual content).

Examples of skills are leadership, communication ability, empathy, initiative, creativity, analytical thinking, etc.

The skills become important because people and their abilities are increasingly important in an organization. They are managed in the area of human resources for a better analysis of each employee's profile. Knowing what the company needs a new employee or develop skills of someone already inside.

Theoretically and empirically , an excess of control by the heads decreases motivation. The model of Blake & Mouton (1964) tries to identify the managers' type of management by means of the variables of concern for people and for production.

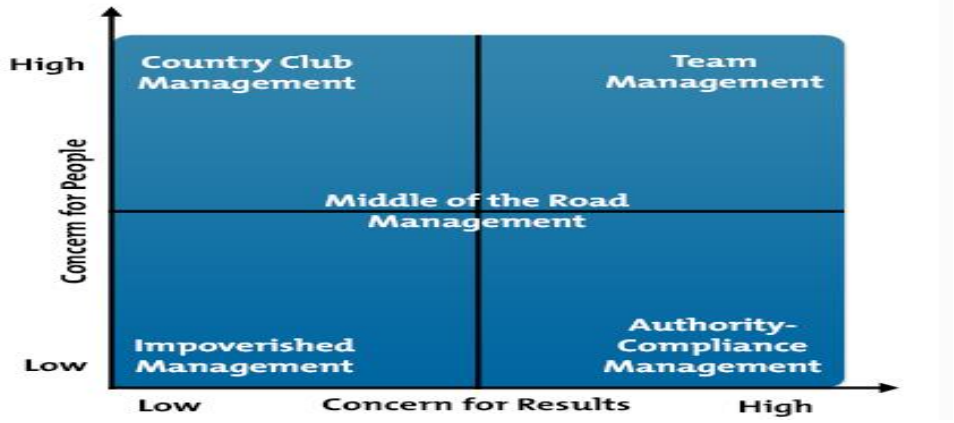

Figure 9: The Blake Mouton Managerial Grid

As we see in figure 9, there are five types of management:

- *Impoverished management*: low concern for results, low concern for people.
- *Authority-Compliance management*: high concern for results, low concern for people.
- *Middle of the road management*: medium concern for results, medium concern for people.
- *Country club management*: low concern for results, high concern for people.
- *Team management*: high concern for results, high concern for people.

Leadership styles in the cluster can be divided into two of the previous five , thanks to my empirical observation while working for Saloni and to the answers by workers of several companies about what their boss like(28 people from 7 different companies) .

The first, and most common type is the *Middle of the Road management*. Managers are concerned about the performance of their employees because the results and the generic control are characteristic of ceramics companies. These managers think that, without pressing their workers,they will attain a good level, but they and product do not trust their staff blindly and tend to show up so that workers know that they are being controlled . Still, these managers often help and seek opinions from their subordinates when needed . The departments that use this type of control are in the officies: traffic department , accounting department, marketing department, etc.

The second type is *Authority-Compliance management*. With a high concern for production, and a low concern for people, managers using this style find employee needs unimportant; they provide their employees with money and expect performance in return. Managers using this style also pressure their employees through rules and punishments to achieve the company goals. The industrial area is where these managers are: department of production, packaging, warehouse.

These results are a general way to differentiate managers , which way vary depending on the company and the department. Each boss has their own way of handling management no matter if it is office or production area. One example is the purchasing department at Saloni, which is more of an authoritarian style than halfway . Other special cases are the receptionists or the IT department , in Saloni , use an impoverished management or Laissez - faire , letting them work in freedom and do their work with little supervision.

My proposal in the previous section was to change the rigid vertical structures of existing enterprises into flexible horizontal ones. The need for this "new" type of structure is full confidence on the workers of the organization because the number of directors would be reduced to a minimum. This type of structure would implement rotations between the leaders of the working groups so that each would lead as they wanted (or were allowed to).

It is important that, when hiring employees, they take into account the skills that each one of them has. The general ones would be: teamwork ability, communication skills, commitment, integrity and sociability. Other specific ones will be: creativity, leadership, initiative, customer orientation, negotiation, analytical thinking, planning and organizing... Everything depends on the employee's profile being sought, or that the company lacks .

Along with a head that can be replaced over time by another person, or by oneself, comprehensive control pressure decreases. As the boss is just another employee, all the decisions are made after a collective discussion. This change of style towards the *Team management*. The premise here is that employees understand the organization's purpose and are involved in determining production needs. When employees are committed to, and have a stake in the organization's success, their needs and production needs coincide. This creates a team environment based on trust and respect, which leads to high satisfaction and motivation and, as a result, high results.

Incentives and compensation:

Incentives, both wage and non-wage, are a source of motivation for employees. The absence of these incentives, as in many companies in the ceramic cluster, creates a climate of demotivation. The purpose of going to work is to make the stipulated hours and be paid for it.

The non-existence of incentives lowers the productivity of employees, as it happens with the lack of short-term objectives. Creating measurable and achievable objectives improves the desire to work and therefore the performance (Hill, C. & Jones, GR, 1996).

Examples of possible objectives: creating a stronger and lighter product throughout the year, improved transportation management to reduce the cost in X%, minimizing costs for defective products in X% , etc.

As for compensation, a significant change would be to change the traditional system of base salary + overtime + sensitity to a fee based on the employee's performance.

This compensation would be based on the evaluation of the results of the working group, the individual performance of each worker and the attainment of "extra" objectives. The remuneration should be fair and equitable. Apart from the traditional system of remuneration, the scheme should include incentives for those groups that get the objectives, and a special reward for the group leader. In addition, at a general level of organization, if certain overall objectives are made, there should be extra monetary or non-monetary payments (bonus food, transportation payment, invitation to leisure, etc.).

The methods to recognize the individual performance of each employee can be differentiated depending on who the assessor is: senior managers, peers, subordinates, internal or external customers, or the 360 assessment (all those mentionate above) (Bonache, J. & Cabrera, A ., 2006).

The 360º system is that one in which multiple sources, such as peers, subordinates, self-assessment, or internal or external customers, are used. It is used to take all possible angles and have as much information on the performance of an employee as possible. It should be primarily to provide feedback for the development, although many organizations also use it as a menas of control (for example to decide on remuneration). They are typically used to evaluate competencies. In this system it takes long to get all the results, and subjectivity plays a very important role. The simplest method is to assess your head and your peers at the same time.

For all the reasons stated in these points, a change in the organizational structure would improve employee motivation and ultimately productivity.

4.3 CHALLENGES OF THE CERAMIC CLUSTER

In addition to proposing a change to improve at a microeconomic level, I will discuss some factors that make the Spanish ceramic cluster lose competitiveness as compared to the Italian cluster and other sectors both in Spain and Europe.

This section will be dealt with as follows: Firstly, we will analyze the cost increase in road transport. Secondly, we will see the technological alternative that the railway involves, in particular the extension of the Mediterranean Corridor. Finally, we will study a proposal by a lobby to the Spanish and European institutions.

4.3.1 Road transport

The ceramic product of Castellon is a building material that is exported to dozens of countries on all continents. The Companies in this sector have very close relationships with transport logistics companies, being able to distribute their products quickly. The traditional means of transportation is by truck to nearby places (Europe) and boat if it is far away (worldwide) on rare occasions it is done by aircraft or railway.

The bulk sales of the cluster 46,5% went to Europe, in 2013 according to ASCER, almost entirely by road.

This distribution has as main advantage the ability to send from origin to destination directly or with few manipulations. As ceramics is a fragile product, the truck is a good choice. The flexibility of this transport is also an avantatge: being able to deliver the right number of trucks for each sale or to change your destination while in transit.

The disadvantages are:

- *Schedules of truck drivers*. Daily driving time limit of nine hours, compulsory stops of 45 minutes every 4 hours of driving, mandatory weekly rest period of at least 45 hours, etc. (EC Regulation 561/2006).
- *Traffic accidents*. Trucks were directly related to fatal accidents by a 13% (DGT, 2013). While security systems in trucks have lowered this percentage (18% in 2000), they still endanger other drivers.
- *Increases in fuel costs*. The costs of thinking of transportation are divided into several aspects such as logistics, the driver, taxes, etc. The types of costs that fluctuate and have increased the price of transport are fuel prices and new tolls by the States. The price of diesel varies considerably (from 2009 to 2013 rose by 40% while from 2013 to 2015 it has fallen by 30% in Spain) making the cost hardly predictable. Besides, it has a different cost in each country.

- *Tolls*. Currently the governments of European countries make difficulties of road transport. One example is the Spanish government's ban on the transit on certain sections of conventional roads, forcing them to run on the toll motorways (*The Economist*). In EU countries such as Holland, Belgium and Germany, there is the eco-tax, which is a tax on trucks using highways and other roads in these countries (*El Diario*). France will also apply it from October 1, 2015, which can increase costs by between 20% -30% (*Cinco días*). These are additional costs faced by companies in the sector that make benefits dwindle as transportation to Europe necessarily passes through France, with the exception of Portugal.

4.3.2 The alternative of the railroad

Knowing the importance of the costs for the sector, seeking an alternative to these costs in distribution is a must.

The technological alternatives by air and sea are initially discorded because the plane has a limited load capacity and the ceramic product is heavy, and the boat is very slow, clearly inadequate for the current economy. We consider, thus, the railway as an alternative for the distribution in Europe.

It the railway is a cheap, fast, efficient and high load means of transport. Its drawbacks are the small rail network in some regions and their inability to reach the final customer (an additional means of transportation is needed). Also in Spain it uses a rail width different from the European one.

The shortcomings of the Spanish rail system make it unprofitable to use this means to distribute the products to Europe for its saturation. The hope to reduce the costs lies in the strengthening of the so-called Mediterranean Corridor, improving infrastructure in eastern Spain, in particular the creation of a new railway line with European gauge. A lobby that aims to make this possible is FERRMED.

FERRMED is a non-profit association that was officially founded and registered in Brussels on 5th of August 2004. It is a multi-sectorial association that came out of the initiative from the private sector in order to enhance the European competitiveness by promoting the so called "*FERRMED Standards*", the improvement of Ports and Airports connections with their respective hinterlands, the conception of Great Rail Freight Axis Scandinavia-Rhine-Rhone-Western Mediterranean, the consolidation together with other associations of the major vectors of progress in the EU and neighboring countries, and a more sustainable development through the reduction of pollution and climate change emissions.

The rail network comprising of the FERRMED Great Axis includes the zone of most important economic and logistic activity of the European Union, including the major ports and airports.

Figure 10: FERRMED Great Axis Network (2009)

The Study of FERRMED takes into consideration all modes of transportation in order to evaluate and to balance them optimally, with the aim of attaining a share for rail of 30-35% from the totality of long distance land transportation.

Specific actions for the empowerment of this project in terms of railway in Spain are the creation of a second track between Valencia and Barcelona with European gauge , the adjustments of the stations for this new route, and the union of the route to seaports.

4.3.3 Creation of a lobby

Creation of a lobby throughout this piece of work we have commented on the importance of a cluster for the territory where it is situated. It has also been said that SMEs make up the majority of enterprises in it. That is the companies in the cluster taken separately have little power to influence public institutions about things like new infrastructure, taxation or public aid in case of crisis. In the Spanish ceramic cluster, the employers' organizations ASCER, ASEBEC and ANFFECC (paragraph 3.2.4.) are responsible for protecting the interests of ceramics. But after the economic crisis that began in 2008 in Spain, it has been seen its power to influence is virtually nil. Examples of "abandonment" of public institutions on the cluster are:

- The multinational Ford, in Valencia, received 25,2 million euros from the government of Spain in 2012, and between 2008 and 2010 some 85 million euros of European funds (El País). Meanwhile, the ceramic cluster in Castellón, which employs more or the same number of people, did not receive any financial aid.
- The sector is dependent on energy costs. In 2012, the Spanish government proposed a rate to gas (The Country), and in 2013 it abolished the incentives to electricity cogeneration (The World), which would mean additional costs to the cluster of 51 million euros. In the end, cogeneration costs increased the impact on the cluster in an increase of 13 million euros in 2014 (El Periódico Mediterráneo), thus lessening the profits and making the R+D+I investment fall.
- The president of the Proave Foundation, Federico Felix, said that the delay in the execution of the works on the Mediterranean corridor conveys the feeling of "*lack of government commitment*" to this infrastructure and hinders the Valencian and national economy (*Periodico Mediterraneo*, 07/06/2015).

A strong lobby of the ceramic cluster would make news like that above disappear and press on negotiations to get what the industry needs to be able to make progress. Binding to other lobbies such as FERRMED [1] would increase the results.

[1] ASCER is on the FERRMED lobby

5 CONCLUSIONS

Theory

In clustering, geographical and cognitive proximity between companies and institutions favors the development of relationships characterized by trust and collaboration. This facilitates the transmission of information and knowledge in addition to the emergence of mechanisms that penalize and limit opportunistic behavior by its members. Access to knowledge flows represents an improvement on the innovative capacity of firms. In this context, local networks play a very important role as they are vehicles for the transfer and dissemination of local knowledge. However, the way in which this advantage is used depends on the skills and characteristics that each one of the actors may have to take in and properly exploit such knowledge.

About the social capital it can be understood as the sum of resources, real and virtual, which an individual or group of individuals collects because of maintaining relationships, more or less institutionalized, of familiarity and recognition permanently. Companies should consider what the right balance is in its relational structure, if it's a denser network that favors the emergence of mechanisms of access and exploitation of such resources, or a more dispersed network if it is necessary to access a type of more novel information.

The ceramic cluster of Castellón

We can conclude that the groups of companies belonging to the province of Castellon, with local institutions, form a cluster after the explanation of all the agents that compose it.

Thanks to the work of Luis Martinez Chafer (2012), it has been possible to analyze two types of networks: those that have to do with the exchange of business information (BI) and the exchange of technological knowledge (KN). First only companies, and then, companies plus institutions. The results are:

Among the most important activities, we find the enamel companies and the additives ones, specialized suppliers of the main activity of the cluster, the manufacture of wall and floor tiles. The interpretation is that the identification of the ceramic industry cluster is confirmed as a reality dominated by suppliers (supplier dominated). This industrial category corresponds to those traditional sectors where the sources and direction of technological change comes mainly from suppliers. Therefore, knowing the characteristics of companies that act as sources of business information and

technological knowledge can provide useful information about how to improve the design of specific services to potential users within the business.

The industrial cluster is a socioeconomic reality where there is an institutional framework that provides a set of services that promote the competitiveness of their companies. The institutions that have a set of links to external networks to the cluster are suppliers of new ideas and knowledge. This fact is reflected in the information networks of business and technological knowledge that we have analyzed. Using the network indicator data, we can see that the density is not very high in either of both networks. Thus, companies must develop close links with local institutions, taking advantage of the fact that social networks facilitate the rapid transmission of knowledge. This is especially important in the analyzed cluster, as it is mainly composed of SME companies, where the small size of these can be a limiting factor when establishing external links.

Empirical study within the ceramic cluster

Microeconomic level

The possibility of having worked for a major company in the cluster such as Saloni has allowed me to observe the number of relationships with companies and obtain data to verify the theory studied. Besides concluding that Saloni has an extensive social network primarily based on business information exchange, it has made me see some shortcomings that the companies in the sector have towards the future times they face: The extinction of the current middle class in many developed countries will make the world bipolarice regarding disposable income. The strategies of the companies in the long term must consider this scenario as more than likely for domestic sales and for the large number of countries where the distribution of the economy is increasingly unequal. Predominant strategies are the investment in R+D+i to have products of a high quality customer-personalized or homogeneous low quality products.

The main problem for most companies in the cluster is the lack of motivation of their employees due to the traditional techniques used.

The sector companies emphasize cost control. A very hierarchical structure with exhaustive controls in all areas makes a demotivating effect on the worker. The change of the vertical organizational structures of companies into the so-called Flat organization would improve the worker's motivation. These structures would change the departments and the middle managers into working groups with a leader and a group of managers they would be subordinated to.

These changes in the organizational structure would lead to other changes at the working level and at the level of human resources. The choice of new employees would be made by analyzing the skills they have and can develop. The leaders of each working group would be chosen among the employees and might be replaced from time to time. And wage incentives would increase productivity due to meritocracy linked to salary.

Mesoeconomic level

The proposal to create a lobby for the Spanish cluster comes after the conclusion that the sector has been badly treated by public institutions.

In this study it is stated that the sector survives thanks to exports. But the main point of departure of goods, which is the road to France, is affected by new toll rates which will increase the cost of exports to Europe. The alternative to reduce costs is clear: the railroad. The creation of a new European-wide route to reach France would improve exports and reduce costs, but the Spanish government continues to delay it, although the European Union has classified it as a priority.

Moreover, during the crisis has been attacked by fees and additional costs by the state government in relation to the energy that the sector uses, facts that have decreased the companies' profits.

And finally, the cluster has seen thousands of jobs and companies disappear for not receive any help from the institutions while other sectors have benefited from large contributions.

The final conclusion is that the companies in the cluster have to bet on innovation to compete globally, supported by local institutions, and create a pressure group to defend their interests. Moreover, internally, they have to restructure to improve employee motivation and therefore productivity.

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