Social capital in industrial districts. Influence of the strength of ties and density of the network on the sense of belonging to the district.

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Abstract

A sense of belonging is a crucial factor determining the identification of the firms in industrial districts. From the social capital perspective, this paper analyses how the structural and relational dimensions of social capital determine a firm's sense of belonging to the industrial district. The study analyses a sample of 213 companies belonging to two Spanish industrial districts. Results of the survey offer an important contribution to the specific literature by finding the explanatory factors with which to distinguish between groups according to their level of embeddedness in the district.

Keywords: social capital, industrial district, sense of belonging, embeddedness, social networks.

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Introduction

The literature on the territorial agglomeration of firms assumes that there is a high degree of internal homogeneity in these firms (Becattini, 1979, 1990; Signorini, 1994; Paniccia, 1998, 1999). Nevertheless, according to McEvily and Zaheer (1999), companies can be integrated into the whole group of actors in the network in various ways, each with its own specific and distinctive opportunities and restrictions. In consequence, it can be argued that the development of particular social relations also provides different results for the firms (Aharonson et al., 2008; Kautonen et al., 2010).

In the case of industrial districts, companies and institutions tend to be physically and cognitively close to each other. A recurring argument suggests that this proximity favours better access to (and the dissemination of) knowledge and, therefore, it represents an advantage for companies in their capacity to innovate (Capello, 1999). Nevertheless, being located in the district does not guarantee access to these flows of knowledge, since they are usually restricted to subgroups within the network (Lissoni, 2001; Giuliani and Bell, 2005; Malipiero et al., 2005; Boschma and Ter Wal, 2007). Becattini (1990) expressed this idea by the concept of "sense of belonging" or embeddedness of firms in the district, that is to say, the extent to which participants in the local industrial community identify themselves with the district. Consequently, and in accordance with McEvily and Zaheer (1999), social networks are heterogeneous by nature and there are no two actors or organizations with an identical social network. Therefore, within industrial districts we can also find sub-networks with significant differences between them.

Following on from previous work, the objective of this study is to further our research into the reasons that justify the existence of a certain degree of diversity or heterogeneity among the firms in a district. To this end, we will start from a relational

approach based on the Theory of Social Capital (Granovetter, 1985; Coleman, 1988; Burt, 1992a; Putnam, 1995), where the characterization of the district will be given by the density of its structure and the strength of the established ties. By doing this, we expect to determine whether the dimensions associated with social capital allow us to discriminate between firms with a higher sense of belonging to the district and those with less sense of belonging. The sense of belonging is a crucial factor determining the identification of the firms within industrial districts.

According to Becattini, one of the tasks that has still not been explored properly, but which can be considered essential, is focusing on the sense of belonging, since this guarantees the self-containment of the process of division of labor, on which the whole question of the industrial districts is based (Becattini, 2003). According to the author, the lack of a sense of belonging or an inappropriate form of it make the generation of the specific economies of the district more difficult. Following this argument, one of the distinctive features of the district is, in fact, the differential of trust and solidarity in business, and the presence, within the district, of a widespread network of reciprocal relationships that are not formalized in precisely quantified obligations.

The sense of belonging can be described in terms of social capital. The term social capital was originally used to describe a propensity for individuals to join together to address mutual needs and to pursue common interests. What it describes are elements such as the level of community spirit or sense of belonging (Daly and Cobb, 1989) or people's sense of belonging to a neighborhood (Portney and Berry, 2001). The recognition of social capital as a determinant of local economic development means that more attention has to be paid to the levels of inter-personal trust, feelings of belonging, and responsibility in a community, among other things (Wilson, 1997).

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Thus, this paper analyses how social capital determines a firm's sense of belonging to the industrial district, and it is argued that the structural and relational dimensions of social capital are associated to the firm's sense of belonging to the industrial district.

In contrast to the assumption made in previous research that all firms located within the same place belong to the district, this paper attempts to prove that these located firms show different degrees of belonging to the district. In other words, industrial districts are not an undifferentiated and homogeneous population of firms, as they have traditionally been viewed (Giuliani, 2007). Such evidence contributes to a growing area of research that investigates linkages among firms and the different actors in clusters (Boschma and Ter Wal, 2007; Giuliani, 2007; Morrison, 2008; Samarra and Biggiero, 2008).

Identification of the district members has traditionally been carried out just by discriminating between members and non-members without making any distinction among firms located inside the district. In this study, we question this point. For us, the identification of membership is a question of degree rather than a dichotomy, or simply a choice between yes and no, since the amount of social capital (both structural and relational) is what determines the sense of belonging. As a result, a cluster may embody different competing networks, characterized by structural differences. Since most of the benefits of being a member of the district derive from the relational structures, the ultimate conclusion is that firms geographically located in clusters may not all have access to knowledge, as is often claimed by the literature, but instead access to knowledge may be restricted to just a select group of actors.

We analysed a sample of 213 companies belonging to two Spanish industrial districts: the textile industrial district of Valencia and the ceramics industrial district of Castellón. Working with two districts will help us to increase validity and enable us to accomplish

a more generalized application of the results, because they display very distinct characteristics in terms of the size of their firms, their turnover, technological level, the level of vertical integration, export capacity and so forth. In addition, the use of the discriminate analysis technique is not very common in the literature (with a few exceptions: Hill and Brennan, 2000; Molina-Morales and Martínez-Fernández, 2003; Gellynck et al., 2007; Moreno and Casillas, 2007). Most of the previous empirical analyses are based on the pre-established identification of district members. In our opinion, the discriminate technique provides our findings with additional robustness.

The work is structured in the following way: firstly, we will present the theoretical framework through the integration of the industrial district and views on social capital. We will then state the hypothesis of the research and show the empirical work with the results obtained. Finally, we will present the conclusions and future lines of research.

Theoretical framework

The concept of social capital

Many scholars have worked on defining and establishing social capital as a theory. Some authors have traced the evolution of social capital research as pertaining to economic development and identify four distinct approaches: communitarian, networks, institutional and synergy (Woolcock and Narayan, 2000). In fact, there is no recognized and established definition of social capital. Several scholars have conceptualized it as a set of social resources embedded in relationships (Loury, 1977; Burt, 1992a). Other scholars, however, have espoused a broader definition of social capital, including not only social relationships, but also the norms and values associated with them (Coleman, 1990; Portes and Sensenbrenner, 1993; Putnam, 1995). A more precise definition can be found in Westlund and Bolton (2003: 79), who define spacebound social capital as

spatially-defined norms, values, knowledge, preferences, and other social attributes or qualities that are reflected in human relations. In network terms, this may be expressed as meaning qualities, capacity, objectives and the number of nodes (actors) and qualities, capacity, objectives and the number of links in primarily informal, spatially demarcated social networks. Although to some extent relational and social capital can be considered interchangeable concepts, in our view relational capital can be understood as a part or one of the dimensions of social capital. As we understand it, relational capital includes the nature of the ties (strength) and its outcomes (common norms and values, such as trust). According to Kale, Singh and Perlmutter (2000) relational capital is based on mutual trust and interaction at the individual level between alliance partners. Another definition of relational capital is provided by Capello (2002), who referred to the mutual trust, respect and friendship that reside at the individual level between alliance partners. In the context of the industrial district, relational capital is defined as the stock of relations that a firm can entertain with others.

On the other hand, social capital has a broader scope since it also includes the architecture or structure of the network (density or dispersion) or the existence, or not, of structural holes, cohesion and cultural similarities, and so forth.

The dimensions of social capital

The way in which a company is integrated within a social network may be identified by different dimensions. In distinguishing between the structural and the relational dimensions of social capital, Nahapiet and Ghoshal (1998) relied on Granovetter's (1992) distinction between structural and relational embeddedness (Tsai and Ghoshal, 1998). On the one hand, the structural dimension of social capital includes social interaction. The location of an actor's contacts in a social structure of interactions

provides certain advantages for the actor. We identify the structural dimension that would come from the density or the cohesion of the network. On the other hand, however, there is also a relational dimension which refers to assets that are rooted in these relationships, such as trust and trustworthiness.

In the case of the network's density, the literature suggests that social networks facilitate access to information, resources and opportunities, while also helping the actors to coordinate interdependence in their critical tasks. The traditional approach to social capital (Coleman, 1988, 1990) has stressed the positive effect that a dense and close network has on the production of social rules and sanctions that improve confidence and cooperative exchanges. According to Coleman, the members of a densely woven network can trust each other due to honour obligations. This confidence reduces the uncertainty of exchanges and improves the skills required to cooperate in the achievement of objectives and interests. In this way, the amount of social capital available to an actor depends on how closed the network in which he is operating is. In similar terms, Granovetter (1985) stressed the positive effect of common third parties to engender trust between people and reduce the risk of opportunism that affects cooperative relationships (Raub and Weesie, 1990).

The most important and significant quality of ties is strength. Granovetter (1973: 1361) said that the strength of the ties in a network is probably a lineal combination of the amount of time, emotional intensity, intimacy, confidence and mutual services that characterize the tie. In the past, intimacy and frequency of contact have often been used to evaluate the strength of ties. Frequency indicates the number of times that a person or entity has contact with another person or entity, while intimacy shows the closeness or emotional intensity of the contact (Brown and Konrad, 2001: 443).

The literature suggests that strong ties provide firms with two main advantages: they favour the exchange of high-quality information and tacit knowledge (Hagg and Johanson, 1983; Larson, 1992; Uzzi, 1996) and they are also a mechanism of social control. Therefore, these ties govern the behaviour of the partners in inter-organizational agreements. Nevertheless, despite their alliances, firms are exposed to risks deriving from opportunist behaviour. In this sense, strong ties produce *relational trust* and, at the same time, the ties are governed by this trust as well as by norms of mutual benefit and reciprocity. These qualities grow over time and interactions become stable (Larson, 1992; Uzzi, 1996; Kale et al., 2000). According to some previous authors, the structural dimension has its primary impact on the condition of accessibility, and research suggests that the relational dimension of social capital influences the three conditions for exchange and combination (Yli_Renko, et al., 2001).

In parallel with the conceptual distinction between structural and relational dimensions, other authors have characterized two different forms of social capital. These refer to the close and intense network, which is defined as bonding social capital, and diffuse and extensive networks, which can be identified as bridging social capital (Woolcock and Narayan, 2000).

Social capital in industrial districts

Although we agree that long-distance ties obviously exist, those which are informal in nature are produced within a short radius from home (Malecki, 1995). Many authors have considered the idea of social capital as something that is inherently spatial (Martin, 1994; Staber, 2001). According to some scholars, any research conducted on social capital that ignores spatial considerations cannot offer a full and comprehensible representation of the topic (Kono et al., 1998; Bell and Zaheer, 2007). In bounded

geographical contexts, proximity among similar organizations favours diverse forms of social capital (McEvily and Zaheer, 1999) and has been considered a factor explaining the potential advantages of clustered firms (Trigilia, 2001; Cooke, 2002; Wolfe, 2002).

We have focused on the clusteresd firms. Inside clusters and industrial districts, alliances and collaboration agreements are understood as mechanisms that favour the development of the social network, as are a wide number of social resources that are used to support innovation processes (Asheim, 1996; Parrilli, 2009; Gertler, 2010). In this way, companies inside the same district share a sense of belonging based on both a common culture and a social network that helps to create and reinforce the rules and conventions that regulate local behaviour (Belussi and Sedita, 2009). They are also supported by a group of local and regional institutions that favour the circulation of tacit, high-quality knowledge (Molina-Morales and Martínez-Fernández, 2008).

As suggested in previous research, we have used the network as a metaphor to explain the relationships among firms and institutions in districts. In this context, we understand a district to be an agglomeration of organizations, firms and institutions located in the same place, where competition exists but is combined with a wide range of collaborative agreements. Defined in this way, districts include a *sense of belonging*, which becomes a critical factor for identification. Our initial argument is that social capital comes from the existence of a stable network of relations of an actor and can be analysed through the existence of different (structural and relational) dimensions. Moreover, in the industrial district, geographic proximity exerts an influence on the characterization of social capital.

This idea has found support in some previous research in which districts can be understood as a network of inter-organizational relationships between different actors, such as customers, competitors, suppliers, support organizations, local institutions and

others (Piore, 1990). In this network, geographical proximity and a strong feeling of belonging are primary elements facilitating such relationships, which are based on norms and values such as trust and reciprocity, among others (Antonelli, 2000). The district is a network within a production context inside a geographically bounded area (Branston et al., 2005; Boschma and Ter Val, 2007; Parrilli and Sacchetti, 2008). Through geographical proximity, common learning and knowledge flows among different actors become frequent phenomena. Thus, the physical area and the idea of networks as vehicles of knowledge transfers and diffusion overlap to a large extent (Boschma and Ter Wal, 2007). In these communities, the network of relationships among firms is typically characterized as a web of dense and overlapping ties which rapidly diffuses knowledge throughout the geographical cluster (McEvily and Zaheer, 1999).

Hypotheses

As we noted earlier, it is easy to find arguments in the literature that identify a significant internal homogeneity in industrial districts (Capello, 1999). This means that the knowledge resources and the channels through which they flow are public in nature, that is, they are common to all the members of the district. In this way, the fact of being a member (i.e. membership or belonging) would provide a series of common infrastructures that firms, in principle, could use. Nevertheless, this idea of homogeneity is not confirmed in reality. A more thorough observation of the districts shows that they do not consist of homogeneous communities of business people and technicians sharing both technical know-how and generic information but, on the contrary, knowledge flows are limited to subgroups (Lissoni, 2001; Giuliani and Bell, 2005; Malipiero et al., 2005; Boschma and Ter Wal, 2007). In fact, firms develop their own particular

heterogeneous networks of social relationships, which in turn provide different resources and results (Robinson et al., 2007; Aharonson et al., 2008; De Propris et al., 2008; Kautonen et al., 2010).

In this respect, Sabel (1993) suggested that it is necessary to consider the common feeling of community as a shared purpose. Beliefs can arise in communities that agree to avoid exploitation, where trusting each other is a condition of belonging. This understanding between individuals or companies can come from interactions and common or shared knowledge. Thus, knowledge transfer will be better amongst actors that have quite similar knowledge bases. Therefore, the need for a degree of similarity may be considered an effect moderating the ease with which resources may be shared and transferred inside the network (St. John and Pouder, 2006).

According to Becattini (1990), an essential component of the district is the firm's embeddedness in the local industrial community, which enables the participants to be identified with the district. In fact, the different dimensions of social capital are associated with the nature and structure of the ties in the networks. Moreover, we do not find uniformity and homogeneity in the companies that make up industrial districts. In fact, there may be companies or institutions that, although they are inside the geographical limits of the district, do not feel they are part of it (Molina-Morales and Martínez-Fernández, 2003, 2004). Thus, we suggest that an internal dichotomy can exist in a district between the basic groups of companies that constitute two easily identifiable kinds of networks and different concepts of the sense of belonging to the district.

Thus, we can express the following hypothesis, which in turn is broken down into two sub-hypotheses, depending on each dimension of social capital:

H1: Social capital is associated to a firm's sense of belonging to the industrial district.

H1a: The structural dimension of social capital is associated to a firm's sense of belonging to the industrial district.

H1b: The relational dimension of social capital is associated to a firm's sense of belonging to the industrial district.

Design of the empirical research

The empirical study drew on a sample of companies belonging to the Valencian textile and ceramic tile districts. Due to the massive-scale importation of products from emerging countries these districts are under a great deal of pressure from competitors. Both industrial districts belong to traditional sectors with serious problems of competitiveness which are experiencing a marked decrease in the number of companies and workers.

First, the textile district is located mainly in the districts of L'Alcoià, El Comtat and L'Alt Vinalopó in the province of Alicante and La Vall d'Albaida in the province of Valencia. In 2008, it accounted for 17% of the textile production in Spain. Second, the ceramic tile district is located in the districts of the Plana Alta, Plana Baixa and l'Alcalaten in the province of Castellón and it generated 90% of the Spanish production of ceramic floor tiles in 2008.

Both the textile and the ceramics districts undoubtedly share a number of conditions, since both are located in the same Spanish region and both can be considered "traditional" activities. However, in spite of the similarities, many differences also arise in terms of the characterization of the productive process, the different features of the companies and evolution of the district itself. Despite some relevant exceptions, there is a clear predominance of SMEs in the industrial structure of these two districts. However, there are differences between the two districts surveyed. These differences

may be motivated by the characteristics of the two samples analysed. Thus, while the Textile ID corresponds to a low-tech industry with relatively low levels of innovation, the sample of companies from the Ceramic ID represents the greatest source of product innovation in this district. This may encourage a greater exchange of knowledge than information in tile district and a lower intensity of these exchanges, since these companies usually have their own external (to the district) relationships.

The textile industry involves many activities that, in most cases, are carried out by different firms in an internal division of labour. In contrast, the ceramic tile productive process can be considered a continuous process. This means that it is not easily separated into different phases. One of the main consequences of these dissimilarities concerns the size of the companies: ceramic tile companies are significantly larger than textile ones. For instance, we can observe these structural differences in variables such as the number of employees or total revenues of the firms, as Table 1 shows. Moreover, ceramic tiles have easier access to external district networks of resources as well as greater access to international markets. Finally, regarding the development of the two districts, the textile district is mainly focused on the domestic market and it is just one (and not the most important) of the Spanish textile-producing locations. In the case of the ceramic tile, however, this district accounts for nearly 90% of the total Spanish production, which indicates the strength of the externalities of the district.

Insert Table 1 about here

Defining the sample and sources of information

We considered the whole population of the firms which, due to their geographic position, are part of the two districts and whose main economic activity coincides with the activity that characterizes each district. They were identified using the registers in

the SABI database for the year 2008. SABI is a directory of Spanish and Portuguese companies that collects both general information and financial data. In the case of Spain, it has information about more than 95% of the companies in the 17 Spanish regions. Since the database contains data from companies about characteristics such as employees, assets, investments and so on, some of which were also included in the questionnaires, it therefore serves as a means to complete some missing data and, more importantly, to check any contradictory or doubtful answers that might appear in the questionnaire. When there was a discrepancy between data from the two sources, we verified the information by asking the company again. It must be noted that data and information concerning relational variables included in the hypothesized variables are provided exclusively by the questionnaire. The initial list of firms was refined by deleting those that were not considered to be representative of the sector, due to their small size or type of products.

The fieldwork was carried out from June to September 2009 and the basic source of information used was the questionnaire.

Prior to their distribution, a pilot questionnaire was drawn up to redefine and adjust the variables and indicators, and this was filled in by five firms, which were selected due to their profiles and their relevance in each district.

After receiving the results of the pilot questionnaires and before distribution of the final version, we ran a control of measures by a panel of experts, following Bell's (2005) suggestion. A panel of experts from the local universities and some supporting organizations were submitted to an in-depth interview. These experts were representatives from the knowledge and advanced services providers for the textile and ceramic tile companies (Asociación de Empresarios Textiles de la Comunidad Valenciana - ATEVAL; Agrupación Empresarial Textil Alcoyana - AETA; and

Asociación Española de Fabricantes de Azulejos y Pavimentos Cerámicos - ASCER) and a number of academic colleagues who have previous experience in this field from Universitat Politècnica de València (UPV) and Universitat Jaume I (UJI).

The fieldwork was based on interviews (using a designed survey) with the directors of the selected companies. Specifically, 106 valid interviews were obtained in the textile district and 107 in the ceramics district, which represents 14.4% and 22% of the total population in each district, respectively. Furthermore, the sample of companies was prepared through a two-phase stratification by sector and by size (number of employees) of the companies.

Table 2 shows the data related to the sample and to the total population for both districts that was used to control for possible sampling biases. Through the Student t distribution we realized that there are no significant differences between the averages of the sample obtained and the population for the "number of employees" and "total income" variables.

Insert Table 2 about here

Variables

Dependent variable

    The firm's embeddedness in the industrial district

Due to the difficulty involved in measuring the firm's sense of belonging to the industrial district, following other works, we adopted as a proxy the degree of commitment of the firm to the district, as described by Morrison and Rabellotti (2005) or Molina-Morales and Martínez-Fernández (2008). Geographically close firms are not necessarily members of the same "community" and consequently do not have a strong commitment with the other district members. In fact, depending on the strength of its relationships, a firm can be integrated with other organisations to a greater or lesser

extent. We think that this concept fits the "sense of belonging" that Becattini (1979) underlined as a sociological criterion for identification. Thus, we are referring to a sense of belonging that stresses the importance of the industrial district's characteristics. Such features include the existence of a "local community", which is a homogenous system of shared values and personal relations as elements that favour the presence of an "atmosphere of industrial activity". Such an atmosphere allows information and knowledge to be partially transmitted through channels such as technical schools and training, but mainly through face-to-face relationships. Finally, another factor of vital importance is trust.

We split the sample of firms into two mutually exclusive groups: group 1 (lower sense-of-belonging firms), namely, those which show less sense of belonging than average, and group 2 (higher sense-of-belonging firms), namely, those which show more sense of belonging than average. We used a Likert 1-7 scale where we asked the companies about the degree of their sense of belonging to the district. Consequently, as a dependent variable, we used a dummy variable with a value of 0 for a low sense of belonging and a value of 1 in the opposite case. Dummy variables have been used to identify affiliation in similar studies, among others Hundley and Jacobson (1998), Geringer et al. (2000), Molina-Morales and Martínez-Fernández (2004) and Morrison and Rabellotti (2005).

Independent variables

   Density of the network (Structural dimension)

The structural dimension is related to the network of relationships of a certain actor. In order to measure this concept, we adopted the following set of items based on previous works (Aldrich et al*.,* 1986; Burt, 1992b; McEvily and Zaheer, 1999; Rowley et al.,

2000): (1) the degree to which the exchanges overlap or are similar in their content; (2) the degree of interconnection of the network or level of mutual knowledge between the actors in the district; (3) the district's dependence on obtaining relevant information for its business; and (4) the status or preference of the district when obtaining relevant resources and information.

The strength of ties (Relational dimension)

The relational dimension relates to the characteristics of the ties established in relationships. A useful way to measure this concept is through the strength of the relationship ties. We have outlined a set of items based on previous works (Granovetter, 1973; Hagg and Johanson, 1983; Coleman, 1988, 1990; Krackhardt, 1992; Larson, 1992; Uzzi, 1996, 1997; Rowley et al., 2000; Brown and Konrad, 2001), which we adapted to fit the requirements of our work. These items are: (1) the exchange of high-quality tacit knowledge among the firms in the district; (2) the existence of information and knowledge in the district that is useful for solving problems and helping make decisions; (3) the degree to which the relationships are based on common objectives and aims; (4) the repercussions on the reputations of the firms in the district; and (5) the existence of unwritten rules that prevent opportunist behaviour from occurring.

In order to measure both the density of the network and the strength of the ties, we used a Likert 1-7 scale, where 1 = strongly disagree and 7 = strongly agree. To group each variable in a single factor, we obtained the average of the items for each element in the sample.

Analysis techniques

Since the objective of the research was to identify which social capital variables are critical in explaining firms' sense of belonging to the district, an appropriate way to

obtain these outcomes is to use discriminant analysis. The purpose was to determine the class of an observation based on a set of variables known as predictors or input variables. The model was built upon the basis of a set of observations for which the classes are known. The use of discriminant analysis was preferred to other modelling techniques (particularly to logit) for several reasons, the main one being that when assumptions regarding the distribution of predictors are met, discriminant analysis may be a powerful and efficient analytic strategy (Tabachnick and Fidell, 1996: 79) that provides accurate classification and hypothesis testing (Grimm and Yarnold, 2000: 241). Discriminant analysis is also less restrictive about the size of the sample (Grimm and Yarnold, 2000: 221). Finally, precedents were also found in the previous research in this specific field (Hill and Brennan, 2000; Molina-Morales and Martínez-Fernández, 2003; Gellynck et al., 2007; Moreno and Casillas, 2007).

In order to ensure the soundness of the results from the discriminant analysis, we considered the practical rule noted in Hair et al. (1999: 262-263), which suggests a minimum of 20 observations for each explanatory variable, as well as at least 20 observations per group included in the analysis. Moreover, the groups' sizes are similar and we checked for the multivariate normality of the independent variables, as well as the homogeneity of the variance-covariance in each of the two groups. In consequence, we consider that the critical assumptions needed to be able to apply the discriminant analysis technique are fulfilled.

Results

In Table 3, we present the descriptive statistics, Pearson's correlations and Cronbach's alpha for each variable, separated by district and defined group. We can see that the measurement scales are reliable and that there is also a significant correlation between

the variables of network density and the strength of the ties. Additionally, the values of the Cronbach's alpha statistic for each variable internally validate the scales we used, so we can group each variable in a single factor through the average of the item.

Insert Table 3 about here

Application of the discriminant analysis

The results of the discriminant analysis that will allow us to confirm the suggested hypothesis are shown in Table 4. Firstly, the contrast in the averages of the groups according to the sense of belonging for each of the independent variables allows us to reject the equality of averages and, therefore, consider that these variables act independently. Secondly, Wilks' lambda contrast test for canonical discriminant functions was used to measure the proportion of the total variance of the discriminant scores that are not justified by the differences between groups. As we can see, the significance of the value in the Chi-square allows us to confirm that the variables of the function have a significant influence on the separation of the groups measured with the discriminant function. Next, and in order to analyse the importance of the predictive variables, we evaluated the standardized coefficients and the structure matrix (Moreno and Casillas, 2007). The standardized coefficients of the discriminant function show which variables are better at predicting the sense of belonging to the district. We can observe in the two districts analysed that density is a better predictor than strength, although both present high positive values. In the case of the structure matrix, it represents the canonical correlations between the discriminant function and each predictive variable, representing the discriminant weight of these variables. The values obtained support previous results. Therefore, both the density and the strength have a

high discriminant charge, exceeding in both cases the value of ± 0.30 pointed out in Hair et al. (1999) as the minimum required to be considered relevant.

Additionally, the structure matrix helps clarify the relationship between the discriminant variables and the classification of the individuals. To obtain this, it is necessary to have additional information about the calculation of each group's centroids. A centroid is the average value of the discriminant results of a certain group. Specifically, we want to know how the different predictive variables influence the classification of the firms in the district in one group or another. On comparing the value of the structure matrix with the centroids, we can see that in both districts the centroid corresponding to the group of firms with a partial sense of belonging has a negative sign, while the centroid corresponding to the group of companies with a total sense of belonging has a positive sign. This allows us to confirm our research hypothesis and state that, in our case, the components of social capital determine a firm's level of embeddedness in the industrial district.

Insert Table 4 about here

From the preceding analysis, we can now set out the equations of the discriminant function from the non-standardized coefficients:

(Textile district) *EMBEDDEDNESS = 36.491 + 5.905 DENSITY + 9.132 STRENGTH*

(Ceramics district) *EMBEDDEDNESS = -27.665 + 9.273 DENSITY + 1.508 STRENGTH*

Through this formulation we can conduct an in-depth study of the explanatory or predictive capacity of the variables through a goodness-of-fit test. In Table 5, we show the classification matrix with the values obtained through the discriminant function. The fit is obtained by comparing the number of correctly classified cases with the number of correct randomly predicted cases (51% for the textile district, and 52% for the ceramics

district)[1]. We can see that the percentage of correctly classified cases is 72.6% in the textile district and 76.6% in the ceramics district, which are values that confirm the predictive power of the discriminant functions obtained.

Insert Table 5 about here

Interpretation of the results

In a general sense, the results from the discriminant analysis validate the hypothesis we proposed. Both the discriminant function coefficients and the different tests carried out support the proposal of our work, i.e. that the social capital dimensions chosen are good predictors of a firm's degree of sense of belonging. In other words, they allow us to distinguish between companies with a high degree of sense of belonging to the district and companies with a lower degree.

Firstly, hypothesis H1a can be considered validated due to the confirmation that the structural dimension of social capital has a positive influence on a firm's sense of belonging to the industrial district. The results support the idea introduced by Coleman (1988, 1990) about the effects of dense networks on producing social rules and cooperative exchanges based on trust, which means that density favours a higher sense of belonging to the district.

Secondly, hypothesis H1b can also be considered confirmed, due to the significantly high predictive capacity of the variable *strength of the ties* as a measure of the relational dimension of social capital. In accordance with many authors in the field of social networks (for example, Uzzi, 1996), strong ties favour the exchange of high-quality information and tacit knowledge, thus representing a mechanism of social control and favouring a higher sense of belonging to the district.

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[1] These values were obtained using the proportional randomness criterion (Hair et al., 1999: 273).

However, dissimilarities between the two districts could affect knowledge diffusion within the district. Particularly, larger firms in the ceramic tile industry are expected to be less dependent on the shared resources and interactions of the districts, since they can easily access external networks. Consequently, in the ceramic tile district more firms could be located on the periphery of the district networks rather than in the core of the district.

Discussion

In this research we have used the concept of social capital as a starting point to then study in greater depth its influence on industrial districts, where territory determines relational limits. This work has much in common with previous studies (for example, Molina-Morales and Martínez-Fernández, 2009; 2010), including the objective of combining two different theoretical fields: social capital and territory. Due to the fact that geographic proximity is inherently linked to a relational view, in accordance with the social capital theory, in a restricted territorial context the nature and the structure of the actors' social relations will be strongly influenced. As a consequence of this, territorial models like the industrial district or the industrial cluster suggest important implications for the creation and development of the social capital of the actors participating in these environments.

The results of our research provide empirical support for the idea of the existence of a certain heterogeneity inside the district, in a similar line to other works such as Morrison and Rabellotti (2005) or Boschma and Ter Wal (2007). These researchers offer an explanation of the existence, within the limits of the district, of different levels of implication by the companies that form them, as measured through their sense of belonging or level of embeddedness. This allows us to distinguish between companies

with a higher sense of belonging, characterized by their integration within a dense network, and companies that present a lower degree of sense of belonging, which are characterized by having a network with relations that are more scattered and have weaker ties inside the district.

In our opinion, the main conclusion deriving from findings was that in spite of the structural differences between both district cases, our proposal to connect social capital and sense of belonging as an identification criterion runs satisfactorily. In fact, observed differences in both districts support the hypotheses. We think that taking into account two different industrial districts with totally different characteristics in terms of production processes, markets, innovation processes, products, exportation, companies' size, turnover, and so on, and obtaining similar results offers a higher degree of validity to our theoretical arguments.

However, in spite of structural differences between both industrial districts, the perception of embeddedness in the territory for firms measured by the feeling of belonging does not show a differentiated behaviour. This result can reinforce the validity of the principles of the district literature with respect to the behaviour of the firms that integrate these territorial agglomerations. In our particular case we can confirm the validity of the hypotheses formulated by generalising the results from the two cases. In other words, we understand social capital to be a good determinant of the sense of belonging to the industrial district.

The literature has largely argued reasons to explain the negative effects of the strong ties and dense structure of organizations (Leana and Van Buren, 1999). The need to develop external or bridging links has been theoretically argued by an alternative point of view of the dimensions of social capital offered by the structural holes approach (Burt, 1992b). A structural hole is an opportunity to broker the flow of information between

people and to control the way projects bring together people standing on opposite sides of the hole (Burt, 1992b). In other words, the causal agent determining whether a tie will provide access to new information and opportunities is the extent to which it is non-redundant (McEvily and Zaheer, 1999). In the same vein, Granovetter (1973) argued in favor of the strength of the weak tie, emphasizing how weak ties enable an actor to access new and exclusive information. Weak ties and structural holes are suitable for exploring new and exclusive knowledge, whereas dense and strong ties provide exchanges of high quality tacit knowledge that are suitable for exploiting activities. In any case there is not necessarily a trade-off between dense and strong ties or alternatively disperse and weak ties. What best captures the characterization of the districts is a contingent approach. As a contingency-based argument suggests, both may be beneficial to firms, but under different conditions (Rowley et al., 2000). As Uzzi (1997) has suggested, actors may have to strike a balance between benefits from one and the other. The balance between safety and flexibility, however, may be contingent on the conditions under which they must take place (Gargiulo and Benassi, 2000).

How can firms redundantly connected with other participants in an industrial district gain access to new external information and opportunities? In our opinion districts may include mechanisms to face external changes and establish external linkages that come from their role in global value chains. We contend that some district agents, in particular local institutions and gatekeepers, can help individual firms to avoid the disadvantages that stem from being redundantly tied one to another.

Local institutions include a range of institutions such as universities, research and other academic institutions, regional policy agents, and trade or professional associations. Based on broad experience and by observing others who have previously dealt with similar problems, they compile and disseminate particular capabilities and routines

(Suchman, 1994). Indeed, local institutions facilitate managerial innovation by providing firms with access to new information and resources (McEvily and Zaheer, 1999). In addition, by providing external sources of knowledge and specialized expertise, local institutions can reduce firms' searching costs.

On the other hand, a technological or knowledge gatekeeper can be understood as the role that some agents can play as managers of the interface between district and external networks of actors in districts. Gatekeepers provide each of the actors with a connectivity function that allows them to avoid the cost of maintaining side-by-side relationships (Rychen and Zimmermann, 2008). Nevertheless, as shown by Morrison (2004), in terms of knowledge flows and innovation aims, the gatekeeper role in a local productive system is not always played by the leading firms, since they may redistribute the knowledge collected from outside to only a very small number of the district's members.

We are aware that the work has certain limitations. In the case of the implications of "sense of belonging", it is a complex construct and its subjective nature makes it difficult to establish an objective metric. That said, as Becattini (1979) pointed out, the difficulty of making this sociological criterion operative does not mean that it does not exist or that it is not important. A second limitation would be the number of selected cases. We analysed two industrial districts with different characteristics in order to extend our results, as we explained previously, and avoid the bias of working with a single district. However, we think that the application of this idea to other districts (in Italy, for example) would widen its scope in a compelling way.

Furthermore, the limitations of our research allow us to provide new ideas for future lines of research. Firstly, we would like to add a third dimension, identified by Nahapiet and Ghoshal (1998): the cognitive dimension. We aim to analyse the relative weight of

the influence of the three dimensions on the heterogeneity of the district, and include other factors in order to achieve a better explanatory capacity of the model.

Secondly, we also aim to analyse these same questions at two different moments, thereby obtaining a longitudinal analysis which will allow us to analyse the evolution of the sense of belonging over time.

Thirdly, in the future it would be interesting to analyse the relationship between sense of belonging and the results of innovation in companies. Once perspectives on social capital and social networks have been integrated into the industrial district, access to sources of information and knowledge as well as their exploration and exploitation can be influenced by the structure and content of the ties between companies and their sense of belonging to the district.

A final question is the analysis of the deciding role of the local intermediaries in the structure of the social networks inside the district, as other works have already explored (Breschi and Lissoni, 2001a, 2001b, amongst others). Linking this to our research, we would attempt to evaluate the influence of local institutions on the degree of a firm's sense of belonging to the district.

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