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The Impact of Industrial District Affiliation on Firm Value Creation

F. XAVIER MOLINA-MORALES and M. TERESA MARTÍNEZ-FERNÁNDEZ

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ABSTRACT This article reviews ideas from the industrial district literature. In particular, it compares industrial district members and non-members in terms of value creation capacity. We have proposed a set of explanatory factors including common reputation, intensity of exchange and combination of resources, and participation of local institutions. This model has been applied to a sample of 350 manufacturing firms in order to test the case of the Valencia region. Findings suggest a positive association between district membership, possession of competitive factors and value creation measured by innovation. Implications of the article have relevant prescriptions for regional planners and individual entrepreneurs.

1. Introduction

It is argued that geographical agglomerations (i.e. industrial districts) benefit firms in very different ways. Indeed, this presumption has been argued theoretically throughout the economics tradition (Marshall, 1925) and evidence of the advantage of clustered firms has been shown in both theoretical and empirical research. However, researchers have rarely investigated and contrasted with precision the existence of factors explaining the advantages of these firms.

Marshallian or external economies were the first justification of the benefits industrial districts offered firms (Marshall, 1925). More recently, authors have used terms like untraded interdependencies (Storper & Scott, 1989) in order to capture intangible and more sophisticated internal resources and relationships. In this vein, Harrison (1991) pointed out that the most important implication of the industrial district goes beyond the agglomerations economics and refers to the presence of a community of people. Furthermore, strategy researchers have attempted to integrate the explanation of the competitive advantage of districts (or regions) within the 'theory of the firm' (i.e. the resource-based view). According to this approach, districts vary in terms of the shared or collective local resources they possess and consequently differences in local income can be explained. These shared resources have been theorized through higher order capabilities (Foss, 1996) and similarly through the advanced factors of Porter's diamond model (Porter, 1990). Factors like local intangible resources, interactions among firms or participation of local institutions have been traditionally discussed in the literature.
As regards empirical research, although in this field the greater part of the research conducted up to now has been based on case studies, mention must be made of some attempts at offering a more precise measurement of the superiority of district performance (for instance, Paniccia, 1998, 1999; Decarolis & Deeds, 1999).

In spite of theoretical and empirical developments, generally speaking, studies still consider the industrial district as a whole, without investigating what is happening at the individual firm level and without exploring the structure and nature of shared resources. Consequently, several important research questions still need to be properly addressed (i.e. What exactly are these shared resources? Moreover, can they be operationalized? To what extent do the characteristics of industrial district firms differ with respect to non-district firms? and so on). This study attempts to address these research questions through an empirical study that draws upon a sample including district and non-district firms, and by analysing their endowment of shared resources and their creation of value.

The article is structured as follows: in the second section we offer an overview of the concept of the industrial district and we focus on the theoretical framework linking recent strategy theories and regional analysis. In the third section, we formulate hypotheses, then we explain method and findings of the empirical research and finally we discuss the implications of the research findings.

2. Theory

2.1 The Industrial District

As can be seen in economics literature over the last two decades, the amount of attention given to the concept of the industrial district has been growing steadily, probably due to the success observed in similar economic activities that are geographically concentrated. This interest has produced a large number of contributions by scholars from a wide range of disciplines. As a result, we are faced with a great variety of concepts with which to explain the phenomenon.

Yet, while the extended relationships that develop under circumstances of physical proximity may vary considerably in their details, their underlying logic is constant. Industrial districts in south-western Germany or northern central Italy are based on a set of local circumstances, but the principles of mutual organization on which these districts are based are more widely applicable. Similar inter-firm cooperation is often found in economic activities based in a particular region (e.g. Scandinavia) or in locales where firms from similar industries are spatially concentrated, such as Silicon Valley in the US.

But what exactly do we mean by 'industrial district'? In this article, we use the term as defined by Becattini (1990s p. 39), namely, “A socio-economic entity which is characterised by the active presence of both a community of people and a population of firms in one naturally and historically bounded area”. Thus, we may say that an industrial district is comprised of numerous small firms engaged in related activities and which are located in a clearly identifiable community. This ‘togetherness’ implies a cultural homogeneity that gives rise to an atmosphere of cooperative and trusting behaviour in which economic action is regulated by implicit and explicit rules (Lazerson & Lorenzoni, 1999).

2.2 The Industrial District and the Theory of the Firm

We argue that the competitive factors of the industrial district can be related to recent firm strategy research. This argument clearly coincides with a number of other studies, of which some of the more interesting include those by Foss (1996), Lawson (1999) and Lawson and
Lorenz (1999). Moreover, in order to link the idea of the industrial district with firm strategy perspectives, we use the notion of shared resources, taken as referring to those intangible resources and capabilities shared by industrial district firms. These shared resources have been theorized through the concept of higher order capabilities (Foss, 1996) and, in the same vein, the advanced factors included in Porter’s diamond model (Porter, 1990). They are neither exclusive to nor the property of the individual firm and they are not made available to outside firms. In addition, these shared resources may yield rents for industrial district firms.

There is nothing inherent to firm resources and capabilities perspectives that prevent them from being applied at the industrial district level. In fact, shared resources may fulfill the conditions established by the ‘resource-based view’ (Barney, 1986, 1991) for strategic resources and are often found to be valuable, rare and difficult to imitate and substitute (Maskell & Malmberg, 1999). This is the case, for example, of access to factors belonging to the district that provide market opportunities that are not made available to external companies.

The predominance of resources associated with social networks has been used increasingly in the regional literature. It is argued that factors like knowledge, social and relational capital and institutions may be more important than the traditional consideration of economic development (Cooke, 2002; Capello, 2002). These factors are what Malecki (2000) called soft variables in the districts. In this vein, Hansen (1990) had already reported some French experiences supporting the idea that non-economic factors can better explain why some regions are successful and others fail in their development strategies.

In order to carry out a more accurate analysis of the explanatory factors of industrial district superiority we focused on reputation, intensive exchange and combination of resources among firms and participation of the local institutions. All of these are frequently discussed in the industrial district literature. First, within the industrial district there exists a collective or common reputation (Becattini, 1990). This reputation possesses similar attributes to reputation at the firm level. Likewise, the industrial district has been viewed as a dense network of actors providing an intense social interaction and relational trust that allow the intensive exchange and combination of resources among firms (for instance, Uzzi, 1996, 1997 developed this argument for networks giving the industrial district as an example of them). Finally, the industrial district is a field of political actions due to the participation of the local institutions that provide support and services to the whole district (McEvily & Zaheer, 1999).

Regarding the empirical research, although in this field the greater part of the research carried out has been based on case studies, mention must be made of some attempts at offering a more precise measurement of district performance superiority. For instance, in the field of the European industrial district and more particularly in the Italian case, Paniccia (1998, 1999) offered a comparative study of a number of Italian industrial districts. She used macro-economic and social variables of performance. Likewise, Signorini (1994) included statistical tests and comparisons of various aspects of performance of Italian industrial districts. In addition, in the field of research into the American regional cluster, Decarolis and Deeds (1999) used a two-step method to calculate the localization variable: firstly, according to the address of the central office, and secondly, through a variable of eight indicators representing the number of research institutions located in each cluster.

All this research provided empirical support in favour of performance superiority for localized agglomerations of firms. However, some further developments are required for a more precise measurement of industrial district performance.

3. Hypotheses

In the formulation of our hypotheses we agree that industrial districts vary significantly from one case to another. However, for the purpose of comparing members and non-members
within one particular regional/national economy, we assume a certain degree of homogeneity within the economic system (in terms of technological endowments, availability of institutions, and so on), which enables us to isolate the effect of industrial district affiliation.

3.1 Industrial District and the Reputation

Reputation has been used in related ways in strategic research (Dollinger et al., 1997). Most of the research focuses on the firm level of the analysis, where reputation reflects what stakeholders think about the firm. Different types of reputation have been studied but the most frequent may be that acquired for having quality products (Shapiro, 1983). Generally speaking, reputation provides information about expected future behaviour (Alchian & Demsetz, 1972; Weigelt & Camerer, 1988).

In addition to firm reputation, authors have proposed different aggregate levels of reputation, for instance, the industry, strategic group or ethnic networks levels (Peteraf & Shanley, 1997; Ferguson et al., 2000). They reason that strong identity will increase reputation since it is more visible to outsiders and serves as a differentiation signal.

In particular, within the industrial district there is an image of itself that is independent of the individual firms. The identification of a firm is not present in the same way it is produced in areas where a large firm dominates. The industrial district assumes the existence of a community of people where participants share a feeling of belonging or common identity. In fact, participants share a system of values and beliefs that acts as a restraint for individual behaviour. The industrial district, as a homogenous group sharing similar cultural values, enjoys a collective reputation (Becattini, 1990). The homogeneity of the members means that there is an incentive for all members to be aware of each other's behaviour.

Thus, this negative impact may encourage some indirect or social control, and penalties. It is true that cheating and opportunistic behaviours of the industrial district members is difficult to control when they are produced in relationships with external firms. However, we have observed that there is an important negative impact of this malfeasance on the rest of the industrial district firms. Thus, this negative impact may justify some indirect or social control, and penalties.

If there is an outflow of information on the working of the district (club), greater homogeneity enhances the tendency for non-club members to generalize about the standard level of quality of the club members' products. The effect of negative reputation externalities in the case of cheating becomes greater than it would otherwise be if club membership showed a higher level of homogeneity. However, maintaining quality standards enhances the reputation of all club members. This points to the fact that reputation of the club is essentially a signal of quality. Consequently, we can expect to find a relation between a firm's affiliation to the industrial district and its common and shared reputation with the other firms. This hypothesis may be expressed as follows:

Hypothesis 1: In the context of one particular regional/national economy, the common and shared reputation will be significantly higher for industrial district firms than for external (non-district) firms.

3.2 Industrial District and the Exchange and Combination of Resources Among Firms

Researchers have discussed different mechanisms to generate intensive exchange and combination of resources in organizations. We focus on social interactions and trust, which are frequently discussed in the literature. Social interactions are channels through which information and resources flow. Through social interactions one actor gains access to another
actor’s resources. Within networks, social interactions between firms dissolve the boundaries between them and stimulate the formation of the common interest. Consequently, a firm with a central position in the social interactions is likely to have a higher capacity to combine and exchange resources with others (Tsai & Ghoshal, 1998). However, trust may be considered as an antecedent of cooperation. When two partners begin to trust each other, they are more likely to share resources without worrying about being taken advantage of by the other. This cooperative behaviour implies that combination and exchange of resources emerge when trust exists.

Despite the presence of long-distance interaction, most contacts, especially of an informal nature, are within a short radius of one’s home base (i.e. within the industrial district) (Malecki, 1995). Proximity produces spontaneous social and professional interaction (i.e. both at home and at work) between entrepreneurs and employees engaged in the same industry, facilitating the diffusion of information (Lazerson & Lorenzoni, 1999 p. 258).

Moreover, cultural homogeneity in the industrial district produces an atmosphere of cooperative and trusting behaviour in which economic action is regulated by implicit and explicit rules (Lazerson & Lorenzoni, 1999). Within the districts, a set of assets is collectively generated which take the form of shared norms and values. Relational and individual trust emerge with reinforcement mechanisms such as reciprocity, experience, repeated relationships and a long-term perspective.

If trust can be better built through learning from the idiosyncrasy of the interdependent actors and if that requires repetitive interactions, then these are likely to be facilitated by personal contacts, which are more probable and intense with geographical proximity. Lorenz (1992) emphasized the emergence in territorial agglomerations of informal ties, which go beyond and are deeper than mere formal contracts. The intensity of the relationships and the existence of informal relations produce fined-grained information and tacit knowledge transmission. The transcendence of the informal ties is in consonance with the active role that Granovetter (1985) concedes to concrete personal relationships.

It can be expected that firms in the industrial district possess an intensive exchange and combination of resources through social interactions and trust. We express the hypothesis as follows:

Hypothesis 2: In the context of one particular regional/national economy, the exchange and combination of resources will be significantly higher for the industrial district firms than for external (non-district) firms.

3.3 Industrial District and the Participation of the Local Institutions

The existence of local institutions in industrial districts has been widely discussed in the literature. Indeed, the industrial district has been viewed as a field of political action. Although a great variety of arrangements exists, in general, there is a set of both private and public institutions within the industrial district that develop supporting activities. For the purposes of this research, we define local institutions as locally-oriented organizations that provide a host of collective support services to firms in the region. Examples of local institutions include technical assistance centres, universities, vocational training centres, local research institutes, and trade and professional associations.

Institutions having links with external networks may feed the industrial district with new ideas and concepts that are continually refined because of internal redundancy, proximity and transactional intensity. Consequently, firms can take advantage of having networks of ties with local institutions that provide a feasible source of information on the options to enhance the firm’s capabilities. This implies a high propensity for experimentation, monitoring,
information-processing and knowledge extraction and, furthermore, requires network man-
agement of the kind described in Cooke and Morgan (1998).

One of the main strengths of industrial districts is their capacity to combine heterogeneity
and homogeneity. In the industrial district a large number of specialized firms perform similar
but slightly different functions, which forces firms both to mimic each other and, at the same
time, to distinguish themselves by developing incremental processes and product improve-
ment.

Individual firms in the industrial district can employ a substantial part of their time in
developing other activities (Galaskiewicz, 1985). Therefore, rather than having many contacts
with different external networks, a firm can maintain a single connection with the intermedi-
ary that specializes in providing access to information and resources. It can be said that local
institutions serve as go-betweens for potential exchange partners that have complementary
interests and transfer information, but who are otherwise unconnected. Rather than all firms
being linked to one another, each can maintain a single connection with the local institution
that specializes in providing access to information about potential exchange partners.

Local institutions fulfill a role as network intermediaries for participating firms by serving
as a repository of knowledge and by reducing search costs. Hence, firms in the industrial
district may benefit from the participation of the local institutions. We can express the
hypothesis as follows:

Hypothesis 3: In the context of one particular regional/national economy, the
participation of the local institutions in the industrial district firms' activities will be
significantly higher than in external (non-district) firms.

3.4 Industrial District and Net Value Creation

We have argued for the association between the degree of involvement of the firms within an
industrial district, and the possession and control of the shared resources. Within these shared
resources we have included common reputation, intensive exchange and combination of
resources, and the participation of the local institutions. We now argue that these shared
resources are associated to net value creation for the firms.

Reputation. At the firm level, research in the Resource-based View of the firm proposed that
reputation may be a resource leading to superior performance (Dierickx & Cool, 1989;
Barney, 1991; Hall, 1992). In addition, some authors have also argued that reputation, as a
non-contractual self-enforcing safeguard (Weigelt & Camerer, 1988), is a more effective and
less costly mechanism of protection of the specialized investments (Sako, 1991; Smitka, 1991;
Hill, 1995).

Exchange and combination of resources. Moran and Ghoshal (1996) argued that the new sources
of value are generated through new exploitations of resources, particularly through new ways
of combining and exchanging resources. To create new and better products, firms need to
reallocate resources, combine new resources or produce new combinations of the already
existing resources. Similar propositions appear in the organizational literature, where some
authors have suggested that innovations require inputs of different resources (for instance,
Kanter, 1988) and capacities of combination (for instance, Kogut & Zander, 1992). Hence, the
processes of combination and exchange of resources may be associated with innovation and
may serve as an indicator of the creation of value.
Local institutions. As intermediaries, local institutions facilitate net value for firms by compiling and disseminating knowledge, and by reducing search costs. Beyond providing specific support services and other resource benefits to local firms, they also act as repositories for knowledge and opportunities concerning innovations. Because these institutions interact with a large number of firms, they are exposed to a wide variety of solutions to organizational challenges. Based on broad experience from observing others who have dealt with similar problems, local institutions compile and disseminate summaries about capabilities and routines (Suchman, 1994). Indeed, they facilitate managerial innovation by providing access to information and resources, which in turn enable firms to acquire new, and extend existing, innovation capabilities (McEvily & Zaheer, 1999). Local institutions also reduce search costs associated with locating external sources of the knowledge and specialized expertise that is crucial for the district firms. By maintaining an extensive network of ties, intermediaries (local institutions) generate search economies.

Since the extent to which a firm is involved in the industrial district is associated to the possession of the shared resources and these resources create value for firms, we can express our last hypothesis as follows:

Hypothesis 4: In the context of one particular regional/national economy, the net value creation of the industrial district firms will be significantly higher than that of external (non-district) firms.

Figure 1 summarizes the two sequences of relations between competitive factors, industrial district affiliation and net value creation, as suggested by the hypotheses.

4. Research Methodology

The empirical research drew upon a sample of Spanish industrial firms located along the east coast of the country (Valencian region). In spite of some relevant exceptions, there is a clear predominance of small and mediumsized enterprises (SMEs) in the industrial structure of the Valencian region. Moreover, the industrial district model can be considered as a key factor in the regional development. In fact, Ybarra (1991) had identified as many as 11 different industrial districts using a quantitative criterion. In particular, Valencian industrial districts are basically in mature or traditional sectors. The similarities with respect to the Italian model are frequently mentioned, even as regards the goods they produce (textiles, footwear, toys, furniture, ceramic tiles, etc.). Although there are certain differences between one Valencian
Table 1. Descriptive statistics, mean, standard deviation (SD), Cronbach’s alpha (α) and bivariant correlation for all pairs of variables (district firms)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>α</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Product innovation</td>
<td>1.90</td>
<td>1.36</td>
<td>0.61</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Process innovation</td>
<td>1.36</td>
<td>0.77</td>
<td>0.61</td>
<td>0.298***</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Common reputation</td>
<td>3.14</td>
<td>0.74</td>
<td>0.69</td>
<td>−0.069</td>
<td>0.001</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Exchange &amp; combination</td>
<td>3.28</td>
<td>0.64</td>
<td>0.68</td>
<td>−0.080</td>
<td>0.095</td>
<td>0.408***</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Local institutions</td>
<td>3.22</td>
<td>0.82</td>
<td>0.85</td>
<td>0.068</td>
<td>0.148***</td>
<td>0.406***</td>
<td>0.434***</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>(6) Size</td>
<td>1.26</td>
<td>0.47</td>
<td>—</td>
<td>0.060</td>
<td>0.049</td>
<td>0.039</td>
<td>0.209***</td>
<td>0.083</td>
<td>1.000</td>
</tr>
</tbody>
</table>

N=259.
Pearson’s correlation is significant at the levels: *p < 0.10; **p < 0.05; ***p < 0.01; ****p < 0.001.

industrial district and another (Benton, 1992), overall and in contrast with other Spanish regions, they are relatively successful with an important projection in the international markets.

The firms selected for our empirical research were intended to be representative of manufacturing firms in the Valencia region. Using a public database (ARDAN)1 enabled us to identify the address and four-digit Standard Industrial Classification (SIC) of the companies involved in the study. We used firms from 18 different industrial segments or SIC epigraphs and to define the sample we used a random, stratified process to select firms with proportional assignment according to size and product segments.

Data were collected using a questionnaire distributed among firms. They were face-to-face questionnaires and were addressed to the general manager of each firm or, if this were not possible, the person to whom the manager had delegated his powers and duties. We collected complete data for 350 firms whose basic characteristics are shown in Tables 1 and 2.

With regard to the non-respondent firms bias, there are no significant differences in terms of size and product and technological attributes. Since little empirical precedent was available to guide the development of indicators, fieldwork helped to refine the choice of constructs and identify the most relevant items. The item selection was also based on the feedback obtained from a pilot questionnaire. Fieldwork was conducted during autumn and winter of 2001.

Once we had classified firms in two clusters according to their industrial district affiliation,

Table 2. Descriptive statistics, mean, standard deviation (SD), Cronbach’s alpha (α) and bivariant correlation for all pairs of variables (non-district firms)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>α</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Product innovation</td>
<td>1.55</td>
<td>1.25</td>
<td>0.65</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Process innovation</td>
<td>1.21</td>
<td>0.82</td>
<td>0.61</td>
<td>0.352***</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Common reputation</td>
<td>2.76</td>
<td>0.79</td>
<td>0.67</td>
<td>−0.075</td>
<td>−0.213**</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Exchange &amp; combination</td>
<td>2.97</td>
<td>0.68</td>
<td>0.66</td>
<td>−0.182</td>
<td>−0.103</td>
<td>0.468***</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Local institutions</td>
<td>2.89</td>
<td>0.96</td>
<td>0.85</td>
<td>−0.027</td>
<td>−0.135</td>
<td>0.390***</td>
<td>0.507***</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>(6) Size</td>
<td>1.25</td>
<td>0.51</td>
<td>—</td>
<td>0.024</td>
<td>0.058</td>
<td>0.053</td>
<td>−0.014</td>
<td>0.073</td>
<td>1.000</td>
</tr>
</tbody>
</table>

N=91.
Pearson’s correlation is significant at the levels: *p < 0.10; **p < 0.05; ***p < 0.01; ****p < 0.001.

α = Cronbach’s alpha for all multiple-item variables.
we checked them to investigate significant differences with respect to size and product segments. However, none were found.

4.1 Variables

**Industrial District Affiliation.** When we collected data from managers, we provided them with a list of industrial districts. We asked managers directly whether their firms belonged or not to one of the listed industrial districts. On that point we have followed Becattini (2002), who suggested that scholar classifications must take into account classifications made by the actors concerned. We used a dummy variable to represent affiliation in the Valencian districts. Dummy variables have been used in similar studies to identify membership, such as those by Hundley and Jacobson (1998) and Geringer et al. (2000), among others.

**Reputation.** To operationalize reputation we proposed a number of questions based on previous definitions of the concept (Hall, 1992; Ferguson et al., 2000). Our aim was to measure the extent to which firms were identified with competitors and shared a common reputation with them. The following items were used to perform this measurement: (1) there is a high degree of identification among firms in your local area; (2) customers perceive a common image of firms and products from your local area; (3) there is common local brand for products from the local area; (4) firms are aware of each other's behaviour; (5) there are negative reputation externalities if a local firm cheats. We used a five-point Likert scale where 1 = fully disagree and 5 = fully agree. To measure the variable, we obtained an average of all the items for each firm. We ran Cronbach's alpha to validate the aggregation of items.²

**Exchange and Combination of Resources.** We investigated flows among units of different types of resources, including information, products, personnel and support. To assess exchange and combination of resources we used a number of items following previous definitions of the related concepts of social interactions and trust (Uzzi, 1996; Ghoshal & Barlett, 1994) and previous measurements (Tsai & Ghoshal, 1998). These included: (1) local origin and common academic background of employees of local firms allow social interactions to take place; (2) generally speaking, there is a trusting climate among local firms in the local area; (3) there is a significant exchange of information about products and technologies with other local firms; (4) there is a significant exchange of information about markets and customers with other local firms; (5) there is an informational network among customers, suppliers and competitors. We used a five-point Likert scale where 1 = fully disagree and 5 = fully agree. To measure the variable we obtained an average of all the items for each firm. We ran Cronbach's alpha to validate the aggregation of items.

**Participation of Local Institutions.** To operationalize this variable we based ourselves on McEvily and Zaheer's (1999) definition and we adapted the items to our specific case: (1) you received support for R&D activities from local institutions; (2) you or your employees received specific training by local academic institutions; (3) your firm received benefits from research activities carried out by academic institutions; (4) you consider that you cannot receive support from external firms directly instead of from local institutions; (5) you consider the role played by the trade associations in the local area as strategically important. We used a five-point Likert scale where 1 = fully disagree and 5 = fully agree. To measure the variable we obtained an average of all the items for each firm. We ran Cronbach's alpha to validate the aggregation of items.
**Net Value Creation.** As Hitt et al. (1997) have pointed out, innovation in the firm is important for the creation of value. We decided to assess the product and process innovation in the different units. Previous research focused on theoretical and empirical developments of collective learning and the concept of innovative milieu (Maillat, 1998) has already described territorial organization in which innovation processes originate. As a consequence of a constant and direct exchange of knowledge between diverse actors we expect incremental innovations take place more often than radical ones. In fact, it is the face-to-face interactions between incrementally innovating actors that allows for the exchange of implicit knowledge. This process can be expected to accelerate as an industry becomes mature (Malmberg & Maskell, 1997; Steinle & Schiele, 2002).

In order to assess innovation two indicators were included in the questionnaire and consisted in asking respondents to report the number of innovations in their field of activity over the last 3 years. This measurement of innovation is based on Tsai and Ghoshal (1998). We used the following items as a product innovation indicator: (1) number of developments or introductions of new materials; (2) number of developments or introductions of new intermediate products; (3) number of developments or introductions of new components; (4) number of developments or introductions of new attributes of the products. As a process innovation indicator we used the following items: (1) new developments or introductions of new equipment; (2) improvements in the level of automation; (3) number of new organizational methods of the productive activities; (4) use of new energy sources. To measure the variables, in each of the two cases, we added up the number of innovations reported for each item over the period of time under consideration. We ran Cronbach’s alpha to validate the aggregation of items.

**Control Variable.** *Size.* Following Grant et al. (1988), we also controlled for other variables, such as firm size, that are likely to affect dependent variables. We consider that it may be easier for larger firms to acquire innovation capacities. In fact, the use of size as a control variable is strongly supported by previous studies (for example, Hitt et al., 1997). We have used the number of employees per firm to operationalize this control variable.

### 4.2 Analysis Techniques

First, we calculated descriptive statistics (mean and standard deviation) for all multiple-item variables and, in order to find the validity of the aggregation, we calculated the value of Cronbach’s alpha for the same variables. Secondly, using Pearson’s correlation matrix we analysed the correlation of all pairs of variables. Finally, in order to test the hypotheses, we used ANOVA variance analysis to compare means between district firms and non-district firms. We ran two different analyses: first, we compared indicators of the common reputation, exchange and combination of resources and local institution participation, and then we compared indicators of net value creation between both groups of firms. *t*-Tests showed whether these mean values were significantly different or not.

### 4.3 Results

Tables 1 and 2 describe descriptive statistics, Cronbach’s alpha for the multiple-item variables and Pearson’s correlation for all combinations of variables. For district firms (Table 1), the least favourable Cronbach’s alpha value corresponded to the multiple-item scale measuring product innovation and process innovation, with a score of 0.61. With respect to Table 2, the least favourable Cronbach’s alpha value for non-district firms corresponded to the multiple-
item scale measuring process innovation, which also scored 0.61. Considering that the scale had not already been used, the values of the alpha were within the limits of tolerance suggested in the literature (Nunnally, 1978; Malhotra, 1997). We thus considered the feasibility and coherency of the scales as valid.

Regarding Pearson’s correlation matrix, we will only comment on the most notable relations among different groups of variables. In Table 1, for district firms, the local institutions variable is significantly correlated to process innovation and, as expected, size is correlated with the exchange and combination of resources dependent variable. With respect to Table 2, for non-district firms, common reputation is negatively associated to process innovation and, as expected, no relations are significant between the rest of independent variables and innovation. In particular, size is not correlated to innovation. However, as expected a significant and positive association between size and exchange and combination of resources was found for the industrial district firms.

Overall, the results in Table 3 favour hypotheses 1, 2 and 3. Differences in means were statistically different for all variables used since the least favourable was significant at \( p < 0.01 \). Hypothesis 1 can be considered to have been confirmed since members of the industrial district have a significantly higher common reputation in comparison with external firms for all items used. Findings supported the idea introduced by Becattini (1990) that, in addition to the individual (firm or product) reputation, firms also have a common reputation at district level.

Hypothesis 2 can also be considered to have been confirmed since members of the industrial district have a significantly higher intensity of exchange and combination of resources in comparison with external firms for all items used. As many authors from the social networks approach have suggested (for example, Uzzi, 1996), the industrial district, as a dense and strong tie network, develops an intense exchange and combination of resources among members supported by the intensity of social interactions and the trusting climate (Tsai & Ghoshal, 1998).

Finally, hypothesis 3 can be considered to have been confirmed, since the local institutions participate to a significantly higher degree in the activities of the members of the industrial district in comparison with external firms for all items used. Findings confirm the association between district location and the participation of the local institutions in some strategically relevant firm activities, as suggested by McEvily and Zaheer (1999) among others.

The results in Table 4 give support to hypothesis 4. As the hypothesis predicted, there is an association between the involvement of the firm in the industrial district and the net value creation of the firm measured in terms of the number of innovations. The results of the comparison between members of the industrial district and external firms indicated statistically significant differences between means for both measurements of innovation. Consequently, findings suggested that district firms benefit from the existence of these common factors and present a higher creation of value. Findings supporting the competitive superiority of district firms are in line with other previous studies (for example, Decarolis & Deeds, 1999).

5. Discussion

The findings of the article give support to the existence of a number of specific conditions in the industrial district under which innovations are produced in collective processes, and consequently in the creation of value. Findings are in line with previous research focused on theoretical and empirical developments of collective learning (Capello, 1999; Lawson & Lorenz, 1999) and the concept of innovative milieux (Maillat, 1998), which described the territorial organization in which innovation processes originate. Findings also favour an explanation of the competitive advantage of the district or regional firms based on the
Table 3. Descriptive statistics, means, standard deviation (SD) and comparison of means

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
<th>t Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Common reputation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) There is a high degree of identification among firms in your local area</td>
<td>3.14</td>
<td>0.74</td>
<td>2.76</td>
<td>0.78</td>
<td>17.509****</td>
</tr>
<tr>
<td>(2) Customers perceive a common image of firms and products from your local area</td>
<td>3.34</td>
<td>1.19</td>
<td>2.95</td>
<td>1.21</td>
<td>8.257***</td>
</tr>
<tr>
<td>(3) There is a common local brand for products from the local area</td>
<td>2.85</td>
<td>1.25</td>
<td>2.51</td>
<td>1.34</td>
<td>5.294**</td>
</tr>
<tr>
<td>(4) Firms are aware of each other's behaviour</td>
<td>2.83</td>
<td>1.27</td>
<td>2.43</td>
<td>1.34</td>
<td>6.798***</td>
</tr>
<tr>
<td>(5) There are negative reputation externalities if one local firm cheats</td>
<td>3.17</td>
<td>1.17</td>
<td>2.88</td>
<td>1.31</td>
<td>3.997**</td>
</tr>
<tr>
<td><strong>Exchange and combination of resources</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Local origin and common academic background of employees of local firms enable social interactions</td>
<td>3.28</td>
<td>0.63</td>
<td>2.97</td>
<td>0.68</td>
<td>9.550***</td>
</tr>
<tr>
<td>(2) Generally speaking, there is a trusting climate among firms in the local area</td>
<td>3.67</td>
<td>1.16</td>
<td>3.43</td>
<td>1.30</td>
<td>2.921*</td>
</tr>
<tr>
<td>(3) There is a significant exchange of information about products and technologies with other local firms</td>
<td>2.91</td>
<td>1.23</td>
<td>2.57</td>
<td>1.38</td>
<td>5.130**</td>
</tr>
<tr>
<td>(4) There is a significant exchange of information about markets and customers with other local firms</td>
<td>3.32</td>
<td>1.12</td>
<td>3.05</td>
<td>1.24</td>
<td>5.601***</td>
</tr>
<tr>
<td>(5) There is an informational network among customers, suppliers and competitors</td>
<td>2.96</td>
<td>1.27</td>
<td>2.67</td>
<td>1.23</td>
<td>3.747**</td>
</tr>
<tr>
<td><strong>Local institutions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) You received support for R&amp;D activities from local institutions</td>
<td>3.24</td>
<td>0.97</td>
<td>3.15</td>
<td>1.11</td>
<td>6.527**</td>
</tr>
<tr>
<td>(2) You or your employees received specific training by local academic institutions</td>
<td>3.20</td>
<td>1.17</td>
<td>2.87</td>
<td>1.22</td>
<td>5.443**</td>
</tr>
<tr>
<td>(3) Your firm received benefits from academic institution research activities</td>
<td>3.17</td>
<td>1.13</td>
<td>2.74</td>
<td>1.14</td>
<td>10.003***</td>
</tr>
<tr>
<td>(4) You consider that you cannot receive support from external firms directly instead of from local institutions.</td>
<td>3.21</td>
<td>1.04</td>
<td>2.86</td>
<td>1.20</td>
<td>9.228***</td>
</tr>
</tbody>
</table>

ID members (N=259); non-ID members (N=91).

* Difference between district members and non-members significant at p < 0.1.
** Difference between district members and non-members significant at p < 0.05.
*** Difference between district members and non-members significant at p < 0.01.
**** Difference between district members and non-members significant at p < 0.001.

possession and control of the number of collective or shared resources (as has already been suggested by, among others, Maskell et al., 1999). This approach can be viewed as an extension of the knowledge and innovation theories of the firm at the territorial level (Foss, 1996; Keeble & Wilkinson, 1999).

However, findings may contradict some arguments on exploring the disadvantages of the district and, in particular, on questioning the capacity of the district to gain access to new
Table 4. Descriptive statistics, means, standard deviation (SD) and comparison of means

<table>
<thead>
<tr>
<th></th>
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<th>SD</th>
<th>Mean</th>
<th>SD</th>
<th>t Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product innovation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Number of developments or</td>
<td>2.08</td>
<td>1.42</td>
<td>1.54</td>
<td>1.24</td>
<td>10.011***</td>
</tr>
<tr>
<td>introductions of new materials</td>
<td>0.56</td>
<td>0.50</td>
<td>0.37</td>
<td>0.49</td>
<td>9.769***</td>
</tr>
<tr>
<td>(2) Number of developments or</td>
<td>0.50</td>
<td>0.50</td>
<td>0.49</td>
<td>0.50</td>
<td>0.008(n)</td>
</tr>
<tr>
<td>introductions of new intermediate products</td>
<td>0.52</td>
<td>0.50</td>
<td>0.35</td>
<td>0.48</td>
<td>7.713***</td>
</tr>
<tr>
<td>(3) Number of developments or</td>
<td>0.50</td>
<td>0.50</td>
<td>0.33</td>
<td>0.47</td>
<td>8.004***</td>
</tr>
<tr>
<td>introductions of new components</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Number of development or</td>
<td>0.50</td>
<td>0.50</td>
<td>0.30</td>
<td>0.47</td>
<td>8.004***</td>
</tr>
<tr>
<td>introductions of new attributes of the products</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Process innovation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) New developments or</td>
<td>2.15</td>
<td>1.04</td>
<td>1.79</td>
<td>1.16</td>
<td>7.484***</td>
</tr>
<tr>
<td>introductions of new equipment</td>
<td>0.72</td>
<td>0.45</td>
<td>0.58</td>
<td>0.50</td>
<td>5.682**</td>
</tr>
<tr>
<td>(2) Improvements in the level</td>
<td>0.76</td>
<td>0.43</td>
<td>0.71</td>
<td>0.45</td>
<td>0.733(n)</td>
</tr>
<tr>
<td>of automatization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Number of new organizational methods of</td>
<td>0.58</td>
<td>0.49</td>
<td>0.46</td>
<td>0.50</td>
<td>3.670*</td>
</tr>
<tr>
<td>the productive activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Use of new energy sources</td>
<td>0.09</td>
<td>0.30</td>
<td>0.03</td>
<td>0.18</td>
<td>3.745*</td>
</tr>
</tbody>
</table>

ID members (N=259); non-ID members (N=91)

* Difference between district members and non-members significant at p < 0.1.

** Difference between district members and non-members significant at p < 0.05.

*** Difference between district members and non-members significant at p < 0.01.

Accompanied by (n) indicates non-significance.

information and on pointing out its vulnerability to external technological changes (Glasmeier, 1991). In the same way, they may be in disagreement with others that emphasize generic problems of the existence of the internal homogeneity of the districts (i.e. Lazerson & Lorenzoni, 1999).

As a result of these propositions some strategic prescriptions can be presented. Firms should interact with local institutions and other district participants in order to improve environmental conditions. Dynamics between the formation of tacit and codified knowledge and other elements of the innovation processes call for a reassessment of institutional arrangements. Firms may pursue diverse strategies for knowledge and skills acquisition that include, among others, strategic partnerships with key institutions in order to gain early access to research. Finally, the creation of hybrid research organizations between firms and institutions to develop common research programmes should be encouraged.

This article may contribute to industrial district research in several ways. Firstly, we have defined, both conceptually and operatively, the shared resources at the district level, thus extending concepts of the Theory of the Firm at district level. Although this theoretical proposition has already been suggested (by Maskell et al., 1999, among others), for the first time we have introduced and operationalized a model including a set of factors such as reputation, resource exchange and combination, and local institution participation. Moreover, this article offers empirical evidence of the competitive superiority of district member firms as compared with external firms.

Although there were some previous attempts at offering measurement of industrial district performance (among others, Signorini, 1994; Paniccia, 1998, 1999; Molina, 2001), this study goes further in addressing the need to detail and to test theories of the creation of value.
The limitations of our study may provide ideas for extension and improvement. Among these limitations perhaps the most important refers to the scope of the net value creation construct. The construct of net value creation is complex and multidimensional, so the collective factors included in our model may only partially explain it. Consequently, the first extension of the study may be to analyse the relative weight of district competitive factors and to capture other factors in order to achieve greater explanatory capacity of the model. A second extension may consist in increasing the number of case studies and analysing other organizational units. This extension would enable us not only to analyse a greater number of cases but also to analyse to what degree the findings of this study are contingent to a specific context or not, and they can be extended to other competitive environments.

Notes

1. ARDAN database provides productive and financial information about all manufacturing firms except those that have an annual revenue of less than 40 million pesetas (Euros 240,000).
2. The 1–5 Likert’s scale is used for scoring the questionnaire’s responses from 1 to 5. However, Cronbach’s alpha tests the coherence of the multi-item scales to indicate reliability and internal consistency (Nunnally, 1978). In other words, this test allows us to control the adequacy of the items used in defining factors.

References


