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Knowledge creation and absorptive capacity: The effect of intra-district shared competences

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Summary This paper takes a cross-level approach in contributing to defining the competences accumulated and shared in an industrial district, and to explaining how they differ from firm-specific, knowledge-based capacities. From a dataset of 952 Spanish firms and 35 industrial districts, we provide empirical evidence that industrial districts are spaces with dense networks of information and knowledge transfer, inter-personnel relationships and a strong specialised stock of human capital, which are accessible and shared by all firms embedded in such a district. However, we explain the complementarity between district and firm-specific capacities in order to develop the notion of absorptive capacity, by indicating that the diffusion of shared competences is neither easy nor direct and that it requires a firm's internal learning effort to better absorb localised knowledge spillovers. Results enable us to shed new light on how firms' knowledge creation and diffusion processes benefit from these external knowledge flows.

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Introduction

From the open innovation approach, Chesbrough (2003) identifies winner firms as those making the best use of internal and external ideas simultaneously. It is generally accepted that no firm can entirely rely on its own internal knowledge capacities and sources to create competitive advantages through innovation, and it needs to both develop its capacity (Cohen & Levinthal, 1990; Volberda, Foss, & Lyles, 2010; Zahra & George, 2002) to absorb new external knowledge, and to combine inflows and outflows of knowledge (Prahalad & Hamel, 1990; Teece, Pisano, & Shuen,

1997). An extensive body of literature argues that innovation must be regarded as resulting from distributed inter-organisational networks, rather than from single firms (Coombs, Harvey, & Tether, 2003; Douglas & Ryman, 2003; Dyer & Singh, 1998; Powell, Koput, & Smith-Doerr, 1996). Other research lines have focused on how knowledge creation and diffusion processes might benefit from localised knowledge spillovers between firms in the same industry (e.g., Verspagen & Schoenmakers, 2004; West, Vanhaverbeke, & Chesbrough, 2006). The most interesting case of firms' spatial co-location is that of industrial districts. However, as Volberda et al. (2010) point out in their bibliometric analysis, the inter-organisational antecedents have been relatively neglected in absorptive capacity literature and the emergence of absorptive capacity from the interactions of its distinct level antecedents remains unclear. This paper enables us to shed new light on how intra-district firms' knowledge creation and diffusion processes benefit from the knowledge flows within a

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cluster, and how they differ from firm-specific, knowledge-based capacities, by adopting a cross-level approach to this end.

The canonical approach (e.g., Becattini, 1979) defines industrial districts as ideal environments with rich, localised knowledge spillovers, within which firms can access knowledge exchanges that flow more smoothly (Malipiero et al., 2005) or free of charge (Boari & Lipparini, 1999). This view neglects the coexistence of cooperation and competition relations within the cluster (Dei Ottati, 1994; You & Wilkinson, 1994), the empirical evidence of strong intra-district heterogeneity in knowledge-based capabilities and performance (Camisón, 2004; DeCarolis & Deeds, 1999; Lazerson & Lorenzoni, 1999; McEvily & Zaheer, 1999), and the uncertainty over whether intra-district knowledge flows are so free and straightforward (e.g., Ferreira & Serra, 2009). The relationship between intra-district shared competences and firms' internal knowledge creation remains equally controversial, with positions which predict that location in a cluster could reduce intra-district firm R&D investment (Bernstein & Nadiri, 1989; Henderson & Cockburn, 1996) in contrast to other scholars who anticipate a stimulating effect (Harabi, 1995; Maskell & Malmberg, 1999; Veugeliers, 1997). Thus, the understanding of the dynamics of the knowledge creation and diffusion flows within industrial districts and their relationships with firms' internal processes (substitution versus complementary effect) still remains unclear (e.g., Arian, 2008; Camisón, 2004; Pouder & John, 1996; Tallman, Jenkins, Henry, & Pinch, 2004). Therefore, there is an ongoing debate on how firms inside an industrial district absorb the knowledge that may be flowing freely within its boundaries, and how they benefit from this cluster-based knowledge to create advantages in their internal knowledge stock.

Among other reasons, advancement on the concept and drivers of knowledge-based capabilities has been halted by the lack of a specified level of analysis (e.g., Glick, 1988; Glick & Roberts, 1984; Rousseau, 1985). Failing to specify a theory level can cause problems because the researcher does not describe the target for which theoretical generalisations are made, or the methodological and/or statistical analyses are incongruent with the level of theory and thus the results may misrepresent the theoretical relationship the research would have uncovered (Klein, Dansereau, & Hall, 1994, p. 199). The relevance and meaning of the level-of-analysis issue within the industrial districts literature have not been explored, despite its value for a better understanding of the different theoretical approaches to the topic and their explanatory mechanisms. A given construct – firm-specific, knowledge-based capabilities in our case – may be explicitly or implicitly conceptualised with alternative assumptions, predicting that members located in an industrial district are homogeneous, independent or heterogeneous; and consequently, the relationships between different categories of capabilities (firm-specific versus shared competences) are a consequence of differences among clusters, among independent firms located in clusters, or among firms within clusters. We try to explain the firm's stock of knowledge-based capabilities by using suprafirm-level variables in our theoretical discussion, as proposed by the Scandinavian Approach (Foss, 1996; Foss & Eriksen, 1995). This new research line predicts competitive asymmetries between firms within the same

industrial district derived from their different patterns of appropriation of shared competences (Arian, 2008; Camisón, 2004; Foss, 1996; Lorenzen, 2007, 1998; Lorenzen & Foss, 2003; Lawson, 1999; Maskell & Malmberg, 1999; Maskell et al., 1998), which are in turn connected with their heterogeneous firm-specific capacities.

The concept of shared competences is still extremely ambiguous. Our first contribution is to provide a theoretically based concept of shared competences accumulated in an industrial district, differentiated from firm-specific, knowledge-based capacities, together with valid measurement instruments to capture the conceptual frontiers existing among these constructs. Shared competences are a collective concept dealing with factors shared by all firms located in an industrial district, and therefore it is a higher level concept (Foss, 1996; Foss & Eriksen, 1995; Lorenzen, 1998). This theoretical approach to the topic entails the development of a multi-level study (Klein et al., 1994; Mossholder & Bedeian, 1983). This cross-level approach can make an interesting contribution to the understanding of knowledge creation and diffusion flows by firms located within an industrial district, and to the multi-level nature of the capabilities concept (Peteraf, 2005). Second, this article also extends previous research by offering new empirical evidence to show that industrial districts are pools of shared competences to which intra-district firms have common access. A third contribution is empirical evidence on the complementarity between cluster-based and firm-specific knowledge capacities aimed to develop the firm's external knowledge absorptive capacity (Volberda et al., 2010; Zahra & George, 2002; Cohen & Levinthal, 1990). The results are interesting in that they raise certain questions about the definition of intra-district shared competences as free and public goods, and they add value to the existing literature on absorptive capacity from a cross-level perspective.

In order to obtain accurate, significant empirical evidence of the relationship between the variables studied, we first conceptualise firms' absorptive capacity, their internal knowledge creation capacity, and intra-district shared competences. Having determined this theoretical framework, we then construct our theoretical model and propose the research hypotheses. In the following section, the general guidelines are established for the design of the empirical study. We test the hypotheses proposed in the theoretical model using structural equations models. This is followed by a statistical analysis of the results. The final part of the paper discusses the study's conclusions, academic and managerial implications, together with its limitations and suggestions for future research.

Theoretical framework

Understanding on how intra-district firms absorb the knowledge that may be flowing within its boundaries, and how the competences accumulated and shared in a cluster differ from firm-specific, knowledge-based capacities has been halted by the lack of specified levels of analysis. In the literature on levels, this problem is defined as committing a fallacy of the wrong level (e.g., Glick, 1988; Rousseau, 1985; Glick & Roberts, 1984). Following Klein et al. (1994, p. 198), a level issue refers to a specific organisational context described as "individuals within groups". The term "group" is used

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