



REGULAR ARTICLE

The cluster is not flat. Uneven impacts of brokerage roles on the innovative performance of firms

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Abstract This paper investigates whether and to what extent individual firms improve their innovation from behaving as brokers connecting other actors in the Spanish ceramic tile cluster. The effects of the brokerage roles are analyzed for different innovation levels by means of quantile regressions. Finally, we speculate about the indirect and interactive effects of the distinct individual organization attributes and these benefits. Results show that brokerage activities unevenly influence the broker's innovative performance. In addition, the intensity of the impact varies for different innovation levels and the firm's absorptive capacity moderate the final effect of acting as a broker.

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Introduction

The growing interest in the territorial contexts shown by different economic disciplines has led to a major increase in the amount of research devoted to industrial clusters (Henry and Pinch, 2001; Tavassoli and Tsagdis, 2014). Within this vast body of literature, some authors have identified clusters as the network model in order to map and study the actors and

the interactions that take place there (Branston et al., 2005; Boschma and Ter Wal, 2007; Parrilli and Sacchetti, 2008).

Our paper focuses on the network structure and the place individual actors occupy in the global network (see Borgatti and Foster, 2003; Provan et al., 2007; Phelps et al., 2012). As several scholars argued, the position that a firm occupies in the network might condition its ability to access external knowledge, create new value and, consequently, to achieve economic goals, including innovation, on which we focus (e.g. Coleman, 1990; Tsai and Ghoshal, 1998).

More specifically, a rapidly developing part of this literature is focused on knowledge brokers as intermediary actors

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(Cumbers et al., 2003; Bathelt and Gräf, 2008). One particular line of this literature extended brokerage research by distinguishing different roles as set out in the seminal proposal by Gould and Fernandez (1989). In our case, we consider two categories of broker roles, namely the *coordinator* and the *liaison*. These represent the typologies that develop horizontal and vertical relations inside the cluster, respectively, and we expect them to have uneven implications for innovation, as they are different in nature.

In spite of previous advances in the analysis of the knowledge exchanges among network actors, there are still some relevant research questions to be properly addressed.

In fact, considering the cluster networks literature, brokerage roles have been only partially considered. For instance, the gatekeeper's role has been analyzed by Giuliani (2007) and Morrison (2008), among others. In all cases, however, the authors analyzed the links between internal and external actors of the cluster. Conversely, within the context of geographical clusters, different industrial activities of the cluster value system or *filière* can be identified as classes or subgroups of actors and intermediations among them represent vertical and horizontal relationships inside the cluster. Triads formed by a firm acting as a bridge between two others create different contexts with distinct goals and exchanged information. As far as relationships involve the share of information and knowledge, these might play an important role in innovation performance. However, only few papers such as Boari et al. (2016) or Belso-Martínez et al. (2015) have addressed this issue, finding a positive impact of brokerage on innovation.

Whereas these contributions represent an interesting point of departure, much more research is needed in some directions. For example, it should be taken into account that firms in the cluster are different, also in terms of innovative performance. Similarly to Ebersberger et al. (2010) for the case of R&D investment and innovation, this heterogeneity might lead to nonlinear patterns and a varying capability to benefit from brokerage activities. Other contributions in related literature such as Stock et al. (2001), Berman et al. (2002), Coad and Rao (2006) and Molina-Morales and Martínez-Fernández (2009) also give support to nonlinear relationships.

The literature on brokerage so far has completely disregarded this issue, and this may lead to non-appropriate brokerage strategies in some firms. This paper attempts to fill this gap in the literature. Our research question is whether, and if so, to what extent individual firms improve their innovation by behaving as brokers (identified as *coordinator* and *liaison*) that connect other actors in the corresponding cluster network. However, the key contribution of this paper to the existent literature is to address the issue of parameter heterogeneity for companies at different level of innovation, running both OLS and quantile regressions. In case heterogeneous effects are found, the benefits from acting as a broker would be uneven for companies with different innovation levels, and this would provide useful information for a more specific and accurate design of firms' brokerage strategy.

We focus on the specific case of the Spanish ceramic tile cluster, where knowledge creation is conditional on intra-cluster relations (Arikan and Schilling, 2011). In order to compute the values of the brokerage activities, we

collected data from questionnaires completed by 166 firms and applied Social Network Analysis (SNA).

The paper is structured as follows. First, we present the outlines and the conceptual framework, and define the research questions. We then explain the methodology applied and the operationalization of the concepts, and finally results, conclusions, and their potential implications are discussed.

Theoretical framework

Knowledge brokers in clusters

Triads formed by a firm acting as a bridge between two others create different contexts with different goals and exchanged information. Brokerage, as an activity, is defined as a process by which intermediary actors facilitate transactions among other actors lacking access to or trust in one another (Marsden, 1982). Some researchers hold that brokers as intermediaries serve as go-betweens for potential exchange partners who are otherwise disconnected. Intermediaries bridge the social gaps in a network by linking persons who have complementary interests or by transferring information and so on (Aldrich and Zimmer, 1986).

The notion of knowledge brokers and their implications for clustered firms have already been the focus of the literature in this field. The concepts of brokerage and technological gatekeepers were transferred to the spatial context by Giuliani and Bell (2005), Graf (2011) or Morrison (2008). These authors emphasized that in contexts like geographical clusters, rather than all firms being tied to one another, each one can maintain a single connection with the other actors, such as supporting organizations specialized in providing access to information about potential exchange partners.

Being located in the middle of a transaction, as happens to brokers, can be beneficial for the knowledge contribution that fosters a firm's innovative capacity (Becker, 1970; Galunic and Rodan, 1998; Uzzi and Spiro, 2005; Boari and Riboldazzi, 2010). In this brokerage literature one particular extension distinguishes different roles, as proposed by the seminal work by Gould and Fernandez (1989). These authors analytically distinguished up to five different brokerage roles, arguing that a number of qualitatively different mediation structures emerge when actors in transaction networks are differentiated into subgroups. Consequently, the brokerage roles classification proposed by Gould and Fernandez (1989) is very sensible to "the possibility that actors in a social structure are differentiated with regard to activities or interests, so that exchanges between some actors differ in meaning from exchanges between other actors. An obvious way to take such differentiation into account is to partition a system into a set of mutually exclusive (nonoverlapping) classes or subgroups of actors" (Gould and Fernandez, 1989: p. 91). In the case of industrial clusters, this partition can be made by separating companies in different industrial activities embedded in the cluster value system. This type of partition allows also identifying vertical and horizontal relationships that have received most attention in the clusters literature (Schmitz, 2000; Maskell, 2001; Mesquita and Lazzarini, 2008). Vertical relationships

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