Chapter 8

Radical Innovation and Technology Diffusion in Traditional Clusters: How High–Tech Industries Reinvented a Traditional Cluster

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ABSTRACT

Academic literature has emphasized how firms in regional clusters exploit both place-specific local resources as well as external, world-class knowledge respectively to strengthen their competitiveness expanding the influence of regional systems of innovation. Innovation based in more complex technologies tends to be based in more open systems utilising the clusters external networks. However, in general, cluster literature has associated clusters with incremental innovation. This chapter analyses the determinants of radical innovation development in traditional (low and medium tech) clusters caused by high-tech located industries. It analyses the case of the development of breakthrough innovation and its diffusion in the tile ceramic Spanish cluster. It examines how market demands, customer orientation, technology diffusion from other industries, and industry competitiveness, as well as cluster internal and external networking facilitate the development of a complex technology within a common set of social capital, shared cognitive schemes, and understandings.

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INTRODUCTION AND OBJECTIVES

Academic literature has outlined the industrial specialized approach of clusters versus the wider approach of regional innovation systems (Asheim and Coenen, 2005). It has also emphasized how firms in regional clusters exploit both place-specific local resources as well as external, world-class knowledge respectively to strengthen their competitiveness expanding the influence of regional systems of innovation (Asheim, 2002). The clusters’ local buzz have been analysed as well to understand cluster competitiveness and sustainability (Hervas-Oliver and Albors-Garrigos, 2011). Clusters are also the proper “open innovation” places where knowledge creation and diffusion becomes stronger. Nevertheless, some literature has also pointed out how specialized knowledge circulation seems to be limited to certain firm communities within clusters according to the specialization of suppliers and actors (Lissoni, 2001).

However, in general, academic literature have associated clusters with incremental innovation (Asheim and Coenen, 2005; Asheim and Gertler, 2004; Steinele and Schiele, 2002; Lissoni, 2001), especially those related to traditional industries (e.g., Giuliani, 2007; Hervas-Oliver and Albors-Garrigos, 2009). Thus there is a gap in relation to the outcome of breakthrough technology and radical innovation in traditional (low-medium tech.) clusters. Is it possible or rather it is due to serendipity effects?

The object of this paper is analysing the determinants of radical innovation creation, development and diffusion in traditional low and medium tech clusters. We leave the study of clusters’ features to others and we focus on a fertile cross-field study of clusters as frameworks which support and foster rapid breakthrough creation and diffusion. The case of the development of digital printing technology is analyzed, a global breakthrough event, in the decoration phases of the tile ceramic process that has taken place in the tile ceramic Spanish cluster. It will examine how market demands, customer orientation, technology diffusion from other industries and industry competitiveness as well as cluster internal and external networking did facilitate the development of a complex technology in spite of the existing barriers in the cluster such as a predominant mechanical culture, a low training level in information technologies and the prevalent low innovative culture in this cluster.

RESEARCH METHODOLOGY

The paper is based in a case study of a small company - Kerajet®- based in Castellon in the heart of the Tile Ceramic Cluster. This company was founded by two electronic engineers and a chemist with ample experience and background in mechanical engineering, tile ceramic process and information technologies. These entrepreneurs had a clear vision of the digital future of tile ceramic decoration which could facilitate the introduction of just in time production in the tile ceramic processes and the development of avant garde decoration designs. The innovation –ink jet- tile decoration has meant a radical innovation which is changing the industry and its value chain. We conducted more than ten formal and informal interviews with the entrepreneurs to fully understand the product and its impact with the cluster. In addition, we analyzed the important process of diffusion and adoption by different groups of user in the cluster.

Due to its global impact in the industry, the analysis of this case must shed some light on the development of radical innovation its causes, barriers and facilitating factors. According to Yin (2003) a single case analysis can be useful as a critical test for an existing theory. It can provide a holistic approach by dealing with a larger unit analysis. Furthermore the case study allows identifying clear research questions and clear rationales for discussion (Dube and Pare, 2003).
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