ABSTRACT

Title: DELVING INTO THE BARRIERS TO GREEN PRODUCT AND PROCESS INNOVATION IN INDUSTRIAL CLUSTERS. AN ANALYSIS FROM A TERRITORIAL FACTORS APPROACH

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Abstract: *(minimum 300 words)*

Green innovation includes changes in the production process or in the product related to recycling, packaging, eco-design, eco-efficiency, waste handling, and life-cycle analysis, among others (Triebswetter and Wackerbauer 2008, De Marchi 2012, Klewitz and Hansen 2014). While green product innovations are related to understanding client needs (Ziegler and Rennings 2005) and a differentiation from competitors (Chen *et al.*

2006), green innovation process tend to imply a reduction in the costs of production by becoming sustainable (Klewitz and Hansen 2014).

In order to foster these green innovations, regulation has been considered a key aspect due to the double externality problem, that reduces firms' incentives to develop green practices for the well-known appropriability problem and to underestimating the social benefits by reducing environmental damage (Rennings 2000, De Marchi 2012, Truffer and Coenen 2012). Complementarily, the perspective of the firm has provided valuable insights by identifying those internal resources that are key for developing green practices (Aragón-correa 2000). In this sense, the lack of information about the benefits associated with green innovations, the willingness of the management toward incorporating these new practices and the required organizational changes, are considered the main internal barriers to develop green innovations (Côté *et al.* 2006, Horbach *et al.* 2012, Abdullah *et al.* 2016).

The development of green product and process innovations has been fostered inside clusters by specific factors. In particular, it has been positively influenced by the access to an informal institutional context that would stimulate green practices (Bridge *et al.* 2013, Ornetzeder and Rohracher 2013), cooperation with suppliers and local institutions that increase the access to relevant knowledge and procedures about green practices (Cainelli *et al.* 2012, Horbach 2014), and the proximity to green competitors that provide a kind of environmental spillovers (Galdeano-Gómez *et al.* 2008) and higher local competition to become green (Martínez-del-Río and Céspedes-Lorente 2014).

Nevertheless, it is not clear how belonging to a cluster affects the regulation and internal barriers to develop product and process innovations. Do firms inside a cluster find the same barriers to develop green innovations than any other firm? How belonging to a cluster affect the firms' perception about internal and regulation barriers to develop green innovations? In order to answer these questions, the aim of this research is to analyse how internal barriers, regulation aspects and belonging to a cluster affect the development of green product and process innovation.

Empirical evidence has been gathered in the Spanish footwear industry. Top-level managers of 175 firms were interviewed, which 90% located in different clusters (most of them in the Vinalopo cluster). We observe that green product innovation and green process innovation face different difficulties, as previous studies have observed

(Abdullah *et al.* 2016). Results indicate that barriers related to regulation problems are relevant in both, but the lack of internal resources, information and knowledge about green practices is only significant for process innovation. Interested, this result is coherent with previous evidence in clusters that points out that process innovation requires much more internal investments that product innovation (Capello 1999, Fitjar and Rodríguez-Pose 2015). Also, we observe that belonging to a cluster benefits more the development of green process innovation than green product innovations. Process innovation is based on tacit knowledge that requires an internal learning process mainly associated to proximate suppliers and local institutions. Contrary to expected from previous studies, we have found that firms developing product innovations do not benefit from belonging to a cluster.

Keywords: *(maximum 6 words)*

Product innovation, Process innovation, green innovation, firms' resources, regulation, proximity.

JEL codes: Q54, O36. L22

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