Title: GREEN INNOVATION IN SPAIN. A SOCIAL CAPITAL APPROACH.

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Abstract: *(minimum1500 words)*

In recent times, and related to the industrial activity, sustainability issues are quite common and present in policy agendas. Either from market pressures, regulatory changes or shifts on the corporate social responsibility dynamics, firms are starting to embrace activities and routines aimed at reducing their ecological footprints. However, we are still far from solving the severe sustainability problems affecting our communities. In this line, uncovering the factors that help companies to implement innovations related with environmental issues is an interesting approach that may help governments and companies. In this context, we aim at studying the influence of social capital characteristics of firms on their green innovation performance. In order to do so we have analysed a sample of Spanish firms coming from the PITEC survey. The results of this research effort may contribute to the academic literature related with environmental and sustainability issues as well as the institutions and firms involved in these processes.

Keywords: *(maximum 6 words) Green innovation, social capital, sustainability, environmental innovations*

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Extended Abstract: *(minimum1500 words)*

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Over the last years, concepts related to environmental concerns have emerged, establishing a global response to critical issues that arise from climate change or natural resource preservation. In fact, terms such as: global warming, green-house gasses or carbon footprint and so on, have become common terms in economic and social fields.

In recent times, and related to the industrial activity, sustainability issues are quite common and present in policy agendas. However, we are still far from solving the severe sustainability concerns affecting our societies. In this context, companies are called to play a critical role in developing strategies that provide a response to this major global challenge. In fact, companies are increasingly aware of the importance of environmental issues.

Generally speaking, reasons behind this change on firms' strategic priorities are diverse and coming from varied spheres. The reasons include: first, market pressures from customers or external markets requirements. For instance, some markets are more sensitive to environmental issues than others, the same happen with companies, some of them show higher commitment with these concerns. Companies can adopt the green label to response to the increasing ecological awareness and consumers rising demand for eco-friendly products providing to the company a positive image. However, sometimes companies go beyond the market requirements in order to gain in differencing produces and services.

Second, governmental agencies, under the pressure of public opinions, carry out significant changes in the environmental regulation. In consequence, whatever the company's priority, obligatory requirements from both local and international regularities driving the businesses towards sustainable corporate procedures (Albort-Morant, Leal-Millán, & Cepeda-Carrión, 2016). New regulations, in most of the cases, affect companies' strategies, and the whole range of activities. For instance, the use of certain raw material, energy consumption, product design, channels of distribution or technological attributes of products are just some of the examples we can mentioned.

A third cause of the inclusion of the environmental issues in the companies' agendas come from changes on the corporate social responsibility dynamics. Companies in certain occasions go beyond the regulatory requirements. They are embracing activities and routines aimed at reducing their ecological footprints, and improving their

environmental commitment. It can be recognized as a result of companies' internal consciousness for reducing ecological pressures and taking responsibility to improve environmental conditions (Bird, Hall, Momentè, & Reggiani, 2007).

As a result, companies have already designed strategies in order to respond environmental issues. The green strategies expression has become more and more popular in the Strategic Management field. Specifically, Buysse and Verbeke (2003) using the Hart's (1995) classification defined five domains for the green strategies: (1) Investments in conventional green competencies related to green product and manufacturing technologies. (2) Investments in employee skills, resource allocation to environmental training and employee participation (3). Investments in organizational competencies, involvement of functional areas such as R&D and product design and others (4) Investments in formal management systems and procedures and finally, (5). Efforts to reconfigure the strategic planning process, by explicitly considering environmental issues.

Social Capital

In this context, we aim to study the influence of social capital characteristics of firms on their green innovation performance. In order to analyze social capital, some conceptual distinctions are required. The first refers to the relational dimension of social capital. Nahapiet and Ghoshal (1998) defined the relational dimension as related to the nature of the ties that are established inside a social network. Strength is the most important attribute of this relational dimension. According to Granovetter (1973), the strength of the ties is defined as the degree of emotional intensity, frequency in relations, as well as the range of types of relations they include (Seibert, Kraimer, & Liden, 2001). Some advantages for organizations are associated with strong ties.

Previous literature reveals that the strength of a tie is associated with higher levels of trust between organizations (Krackhardt, 1992). Learning, particularly that involving difficult-to-transfer knowledge, is aided by intensive and repeated interactions. Moreover, trust increases the disposition to openly share information and facilitate forms of interactions between organizations that provide tacit knowledge exchanges (Szulanski, 1996). Thus, when an organization has strong ties with other actors, the process of transferring knowledge becomes more efficient, due to the fact that the focal

organization knows the other organization and easily finds valuable information (Gulati, Nohria, & Zaheer, 2000). Finally, when ties between organizations are strong, they can agree to help each other in joint problem-solving (Uzzi, 1997). These strong-tie networks allow the transmission of tacit knowledge and high-quality information, which is far more difficult to transmit in other contexts (Seibert et al., 2001). Social capital also presents a second dimension, the structural one. According to Nahapiet and Ghoshal (1998), this structural dimension refers to the whole network, rather than individual ties, as was the case of the relational dimension. Density is the main attribute of the structure of the network, which indicates the degree to which a network is interconnected. Social interactions are manifestations of the structural dimension of social overcoming undesirable knowledge redundancy capital (Sparrowe, Liden, Wayne, & Kraimer, 2001). Among the fundamental explanatory tenets of the social network perspective is the idea that the structure of social interactions enhances or constrains access to valued resources (Ibarra, 1993). Resource exchange through informal networks includes work-related resources, such as task advice and strategic information, but informal networks also transmit social identity (norms) and social support (Podolny & Baron, 1997). Social interaction relationships, often established for other purposes, constitute information channels that reduce the amount of time and investment required to gather information. The literature reveals positive effects of social interactions for organizations. In fact, they may facilitate learning processes since interactions provide close, intensive information exchange (Yli-Renko, Autio, & Sapienza, 2001) as well as the creation and diffusion of innovation (Lane & Lubatkin, 1998; Molina-Morales & Martínez-Fernández, 2010; Tsai & Ghoshal, 1998). Similarly, to what happens with strong ties, a dense structure can generate negative effects. Following the approach of Burt (R S Burt, 1992; Ronald S. Burt, 1997), a dense structure limits new and exclusive knowledge resources, and contacts may provide the same information. In contrast, firms may also benefit from sparse networks. Few partners know one another (many indirect ties) in sparse networks, which provides an opportunity for the organization to obtain diverse resources and perspectives.

Social capital and green strategies

In spite of above reported, not all companies are convinced about the necessity to invest resources in environmental strategies. In these cases, they misunderstand green strategies as being an impediment to competitiveness and profitability (Chang & Chen,

2012). Nevertheless, companies have increasing responsibilities since industrial pollution stems from nonproductive manufacturing activities and inefficient use of resources (Hart, 1995).

As environmental management allows for companies to boost their corporate image, they also improve green innovation performance, enhance manufacturing productivity and obtain competitive advantages (Y. H. Lin & Chen, 2017). In addition, these companies increase profitability, and as a consequence more firms are enthusiastic to act as pioneers and to enjoy first-mover benefits in the field of environmental management (Y. H. Lin & Chen, 2017; Porter & Linde, 1995).

Social capital provides means of facilitating particular ends, similar to other assets or capital forms (Coleman, 1990). Consequently, social capital must be considered as a resource and not only as a component of the social structure. The social capital literature emphasized the development and the costs of social capital, and how individuals and organizations invest in social relations (N. Lin & Erickson, 2012).

Individuals and organizations can access to strategic resources (Dayton-Johnson, 2003). In fact, social capital is more and more important with regard to business operations and consequently is a key driver for organizational success (Coleman, 1990).

Although social capital has become an emerging research trend in the fields of strategic management, organizational theory, and knowledge management, few or no studies have explored the social capital in the field of green strategies (Chen, Wang, Chen, Lo, & Chen, 2019).

In spite of the limited previous research connecting social capital perspectives and environmental issues, some interesting precedents can be found. First, Granovetter (1992) and Lewis and Chamlee-Wright (2008) suggested that the concept of green social capital can be considered as a valuable asset that can enable an actor to achieve environmental goals through the actor's own social relationships and subsequently access relevant environmental knowledge, information, or resources. Moreover, Christoforou (2013) used a green social capital model based on social capital theory: network *trait–social capital–outcome*. This research proposed and developed the concept of green social capital and suggested a number of managerial implications, antecedents, and consequences to accommodate the current dominance of environmental issues.

In response to the worldwide green issues dominance, firms should not avoid environmental responsibilities; on the contrary environmental challenges can be view as business opportunities that can be applied to carry out *green social capital*, which can further enhance green innovation performance.

In conclusion, this study applies social capital theory to develop an green model of the company. Our research investigates how social structure and relational characterization of organization affect the development of green strategies and consequently to the potential innovation performance. Thereby, the study explores the positive effects of network embeddedness and network diversity, on the green innovation performance of a firm.

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