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Listen to the market: Do its complexity and signals make companies more innovative?

Ana Pérez-Luño *, Jesús Cambra

Universidad Pablo de Olavide, Crtra. Utrera, km. 1, 41013—Sevilla, Spain

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ABSTRACT

This paper analyzes four modes of innovation that differ in their scope of newness (innovation generation and adoption) and in their degree of change (radical and incremental). Building a theoretical model based on the market orientation (MO) and contingency theory literature and using a sample of innovative firms, we find that MO positively influences the numbers of incremental generation and adoption of innovations. We also find that environmental complexity moderates the relationship between MO and radical and incremental innovation generation and the number of incremental innovation adoption. That is, we have found that highly complex environments enhance the introduction of radical and incremental internally generated innovations and harm the adoption of incremental innovation for market-oriented firms. These findings add to the innovation and MO literatures. Our results also have important implications for both the commercial activities and R&D policies of firms.

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1. Introduction

In an increasingly complex business environment, an understanding of how firms can successfully adapt to changing marketplace conditions through product and process innovation is of fundamental theoretical and managerial interest (De Luca et al., 2010; Jaw et al., 2010; Varela and Benito, 2005; Wei and Morgan, 2004).

Conventional business wisdom suggests that firms must develop competitive advantages to increase their performance. Drucker (1974) suggested that innovation and marketing are two of the essential activities that create such advantages. The key idea is offering better solutions to the changing needs of customers. However, as authors such as Christensen and Bower (1996) explained, sometimes listen to carefully to current customers may result in losing market positions. This is because too much impetus and resources are allocated to present customers which derive in incremental novelties and improvements that could allow entrant firms to develop new and more drastic proposals to victory over established firms. A market orientation (MO), as superior approach than customer orientation, helps firms better understand their customers and competitors, enabling them to enhance their competitive positions (Narver and Slater, 1990) by satisfying current customers while observing competitors and market movements.

Jaworski and Kohli (1996), however, underlined that innovation had, in many cases, been inappropriately excluded from MO models in the academic literature. Since then, several researchers (e.g., Baker and Sinkula, 2005; Deshpandé and Farley, 2004; Im and Workman, 2004; Salavou, 2004) have included innovation as a factor in MO models and demonstrated a relationship between these constructs. Others (e.g., Ngo and O'Cass., 2012; Dobni, 2008; Aldas-Manzano et al., 2005) have revealed that, consistent with Drucker (1974) assumptions, MO and innovation are not isolated fields but are mutually supportive to strong performance.

The links between MO and innovation, however, have yet to be comprehensively examined. This research probes more deeply the relationships between both elements in an effort to better understand how to obtain and maintain competitive advantages. This is of interest because of the lack of consensus about the nature of the innovation that MO enhances. Innovation has many dimensions and is manifested in many forms. Innovation can be internally generated or sourced externally (Damanpour and Wischnevsky, 2006; Grossman and Helpman, 1991; Mahmood and Rufin, 2005; Pérez-Luño et al., 2007a, 2011). Innovation also varies in relationship to the state of the art, otherwise known as the degree of radicalness (Damanpour and Gopalakrishnan, 1998). Further analysis is therefore warranted on the relationship between MO and the nature of the innovation it could facilitate.

The external environment faced by companies and how they respond to changes in it is another important aspect related to innovation. The interaction of firms with their respective environments is critical to identifying and exploiting potential

* Corresponding author. Tel.: +34 954 34 89 77; fax: +34 954 34 83 53.
E-mail addresses: anaperezluno@upo.es (A. Pérez-Luño), jjcamfie@upo.es (J. Cambra).

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competitive advantages. Dess and Beard (1984) recognize that the competitive environment affects organizations' abilities to obtain and efficiently manage available resources. Environmental conditions can vary because of the nature of competition in an industry, the stage of the life cycle of the industry and its rate of change, the resources available to the firms, and the degree of technological advancement and complexity in the core products and operational processes of an industry, among other factors (García et al., 2008; Jaworski and Kohli, 1993; Khandwalla, 1977; Palmberg, 2006; Pérez-Luño, 2009).

This paper, in agreement with authors such as Hodgson and Knudsen (2006), asserts that the environmental dimension of complexity, defined as the level of complex knowledge and information required to understand the environment, warrants more attention as it relates to the relationship between market orientation and innovation. This is because both environmental complexity and MO are related to information generation processes. As described by Dess and Beard (1984), Sharfman and Dean (1991), Sarpong and Maclean (2012), Sainio et al. (2012) and Verdu et al. (2012) managers perceiving a more complex environment will see greater uncertainty and have greater information-processing requirements about customers, competitors and environment as a whole. Environmental complexity therefore includes a dimension that encompasses the processing of heterogeneous information. Other environmental dimensions (e.g., dynamism, hostility, munificence) are not directly related to the information generation as described in the MO definition. Although environmental complexity considers "the amount of information needed for making strategic decisions" (Khandwalla, 1977), MO is related to how companies generate and monitor the information available about their environments. Market-oriented businesses listen closely to customers to obtain information about their needs and desires, both latent and expressed (Slater and Narver, 1998). Environmental complexity is one of the most important external variables to consider take into account in an analysis of the MO-innovation relationship. Furthermore, although it has been acknowledged that environmental complexity is related to innovation, the mechanisms by which environmental complexity and MO can jointly influence radical and incremental innovation generation and adoption has yet to be fully explored. This represents an important open question in the literature because each type of innovation could be developed based on the complexity and the needs detected in the environment.

Based on the above discussion, this paper addresses two questions: How do MO and environmental complexity influence the nature of innovation developed by a firm? Is there a joint effect between them that enhances or harms different types of innovation? In other words, the purpose of this study is to explain how an internal feature (MO) and an external feature (environmental complexity) influence the generation and adoption of radical and incremental innovations.

To achieve our research objective, this study uses a theoretical framework that, based on a thorough review of the literature, considers the basic concepts of innovation, MO and environmental complexity. In Section 2, the hypotheses for our empirical research are developed. The characteristics of our empirical study are presented in Section 3, and Section 4 presents the research findings. Section 5 discusses the more significant findings and their academic impact and implications. Section 6 contains conclusions, limitations and proposals for future research.

2. Conceptual framework and hypothesis development

2.1. Radical and incremental innovation generation and adoption

Academic literature related to innovation is varied in its scope and emphasis. Innovation has been interpreted in many ways and approaches and definitions vary depending on the context and the scope of the analysis (Damanpour and Wischnevsky, 2006; De Luca et al., 2010; Dobni, 2008; Ortt and van der Duin, 2008; Paladino, 2008; Percival and Cozzarin, 2008).

For our research, we use one of the generally accepted definitions of innovation: "the introduction into the market of technologically new or improved products" (OECD Eurostat, 1997). "Newness" is a central element of innovation definitions, but its scope has not been described consistently in the literature. Whether an innovation is new to an individual adopter, to an organization, to most organizations in an organizational population, or to the entire world reflects substantially different scopes of newness. The literature is either unclear as to whether newness refers to one or several of these dimensions, or has assumed that newness to the organization is equivalent to newness to the world (Damanpour, 1991; Damanpour and Gopalakrishnan, 1998; Kimberly and Evanisko, 1981; Knight, 1967; Li and Atuahene-Gima, 2001). Indeed, lack of clarity of the newness concept has been suggested as a major reason why findings in the innovation literature are inconsistent and why models are characterized by limited explanatory power (Becheikh et al., 2005; Wolfe, 1994).

Damanpour and Wischnevsky (2006) proposed a new way of addressing different scopes of newness in the innovation literature. They differentiate between the generation and the adoption of innovations. As the terminology indicates, the generation of innovation refers to situations in which a firm internally generates a product, process or technology that was previously unknown to the market in which the firm operates. If a firm adopts innovation, however, it assimilates knowledge and technologies that have been developed elsewhere and that are new to the organization only. This distinction between innovation generation and adoption is akin to that made between innovation and imitation (cf. Brozen, 1951; Dell'Era and Verganti, 2007; Pérez-Luño et al., 2007a, 2007b; Schumpeter, 1961).

Damanpour and Wischnevsky's (2006) terminology is also consistent with the classical typology developed by Booz et al. (1982). Booz et al. (1982) typology distinguished customer perspectives on product newness from those of the firm. It categorizes new products along two dimensions of newness: newness to the developing firm as adopted innovation, and newness to the market as generated innovation, as described by Damanpour and Wischnevsky (2006). Both cases may result in radical or incremental innovations.

We rely on Damanpour and Wischnevsky's (2006) distinction and terminology because their definition makes two major contributions. The first is that it provides the vocabulary for a much-needed distinction in the innovation literature depending on the scope of newness (new to the firm vs. new to the world). The second is that it puts both generation and adoption under the common rubric of innovation, viewing them as two means for firms to achieve market newness. The latter is relevant because previous research frequently confused the scope of innovation (generation vs. adoption) with the scale of innovation, which is the degree of newness that the innovation leads to (radical vs. incremental) (cf. Govindarajan et al., 2011; Pérez-Luño et al., 2007a, 2011; Sainio et al., 2012). Therefore, using Damanpour and Wischnevsky's (2006) definition we can analyze the scope of innovation (generation vs. adoption) and determine whether the generation and/or adoption have different degrees of newness or radicalness.

Once we have defined innovation generation and adoption, we can consider the definition of innovation radicalness. Although there are different categories of innovation radicalness (variation vs. reorientation) (Normann, 1971), ultimate and instrumental innovations (Grossman, 1970), incremental, architectural, modular and radical innovations (Henderson and Clark, 1990), we use the most

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