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Breadth of external knowledge sourcing and product innovation: The moderating role of strategic human resource practices

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ABSTRACT

Prior research has argued that external knowledge sourcing can be supported by effective strategic human resource (HR) practices. However, whether and how the adoption of new organizational mechanisms in group settings influences the relationship between external search strategies and innovation performance represents an unanswered question. Therefore, the present paper aims to explore the relationship between the breadth of external knowledge sourcing (i.e., external search breadth) and product innovation by unveiling the moderating effects of strategic HR practices, as represented by the implementation of heterogeneous work groups and brainstorming sessions. On the basis of data from the Italian Innovation Survey, our results reveal that external search breadth is curvilinearly (inverted U) related to product innovation, and its negative effects occur later in the presence of heterogeneous work groups and brainstorming sessions.

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1. Introduction

Product innovation is crucial for firms to survive and improve their overall performance in the current dynamic and competitive market (e.g., Katila, 2002; Smith, Collins, & Clark, 2005; Zhou & Wu, 2010). Specifically, following the OECD (2005), with the term product innovation, we refer to the introduction of a product in the form of a good or service that is novel with regard to the current offerings. To be effective in product innovation, firms require extensive efforts in searching and recombining knowledge. Notably, a core area of research on product innovation draws on the recombinatory search literature (Katila, 2002; Schumpeter, 1934; Grimpe & Sofka, 2009; Fleming, 2001; Savino, Messeni Petruzzelli, & Albino, 2017), which argues that searching for knowledge, while identifying original combinations between past and new knowledge components, is at the basis of product innovation activities. In particular, some studies (e.g., Kogut & Zander, 1992; Rosenkopf & Nerkar, 2001) went deeper into the recombinatory perspective of innovation, highlighting the need to go beyond the original tendency of innovating companies to search for knowledge locally (i.e., within their boundaries), especially

suggesting to employ external knowledge sources. In fact, it is unlikely that all the knowledge needed to innovate can origin and reside within the firm boundaries (Enkel, Gassmann, & Chesbrough, 2009). Rather, for many companies (e.g., Procter & Gamble, Deutsche Telekom, and General Electric), the ability to source and recombine knowledge from the external environment is becoming more and more as the key to sustain internal product innovation efforts, which is in line with the recent principles of open innovation (Chesbrough, 2003; Dahlander & Gann, 2010; Saebi & Foss, 2015).

However, benefiting from external search is not an easy task. Indeed, one of the major issues lies in the fact that the number of different external sources from which firms can acquire relevant knowledge is wide, so they should determine the breadth of external knowledge sourcing that maximizes product innovation performance (Laursen & Salter, 2006). On the one hand, the attitude to rely on a wide variety of external knowledge sources (hereafter, external search breadth) allows firms to overcome cognitive myopia (Levinthal & March, 1993), explore new knowledge areas, and develop mental models that stimulate knowledge recombination in product innovation (e.g., Laursen, 2012). On the other hand, the risks of over-search [i.e., the absorptive capacity problem, the timing problem, the attention allocation problem, and the not-invented-here (NIH) syndrome] (see Katz & Allen, 1982; Kogut, 1997; Laursen & Salter, 2006) can exceed the benefits

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deriving from searching widely. Thus, an inverted U-shaped relationship between external search breadth and product innovation has been claimed (e.g., Laursen & Salter, 2006; Leiponen, 2012; Wu, 2014).

Despite the validity of this argument, organizations cannot themselves search, in the sense that the acquisition and exploitation of external knowledge is a task in charge of the various organizational members. Specifically, prior research (e.g., Leiponen, 2012; Van der Vegt & Janssen, 2003) underlined that the ability of firms to internalize and recombine external knowledge is strongly dependent on the implementation of organizational practices that allow their employees to engage in collective creative thinking and recombination processes. Therefore, external search breadth may be more (or less) effective depending on the firm-specific practices that each firm sets to organize knowledge workers. This recalls insights from the human resource (HR) literature (Beugelsdijk, 2008; Huselid, 1995), claiming that companies need to organize innovation activities by making use of strategic HR practices that can enhance employees' attitude at absorbing new knowledge in a timely manner, sharing information, and paying attention to novel recombination opportunities, with the ultimate aim of achieving the desired work behaviors and efforts contributing to innovation outcomes. Accordingly, it has been proposed that "organizational practices for managing innovation within the firm's boundaries are facilitators of external knowledge sourcing activities as they aim for successful mobilization and application of knowledge" by the firm's employees (Brunswicker & Vanhaverbeke, 2015, p. 1243, Batistic, Cerne, Kaše & Zupic, 2016). Nonetheless, to the best of our knowledge, no empirical research has been conducted to elucidate whether and how the adoption of HR practices influences the relationship between external search strategies and product innovation.

Consequently, knowing that external knowledge sourcing and product innovation are still primarily people processes and that there is a need to know more about which organizational mechanisms and practices managers need to utilize to make innovation search more effective (Laursen, 2012), the main research question of this study is the following: what is the moderating effect of strategic HR practices on the relationship between external search breadth and product innovation? In particular, first, we aim at further proving the assumption of a curvilinear relationship between external search breadth and product innovation, which stands for the baseline hypothesis of this study. Second, by drawing on both the recombinatory and HR literature, we attempt to reveal how the implementation of HR practices devoted to organize knowledge workers in product innovation activities attenuates the downsides of external search breadth.

In detail, HR practices fall into three main dimensions: skill-enhancing, motivation-enhancing, and opportunity-enhancing practices (Jiang, Lepak, Hu, & Baer, 2012; Lepak, Liao, Chung, & Harden, 2006). The first two practices refer to the definition of hiring strategies and incentive systems, respectively. These do not reflect structural organizational choices devoted to improve employees' search and recombination behaviors, and thus, they are not in the focus of our study. In contrast, opportunity-enhancing HR practices are organizational mechanisms directly designed to empower employees for achieving organizational objectives and optimizing their levels and types of skill to handle new knowledge and create market value (Jiang et al., 2012). Thereby, we concentrate on this last set of HR practices, specifically analyzing whether and how the implementation of heterogeneous work groups and brainstorming sessions affects the relationship between external search breadth and product innovation. Work group heterogeneity entails the design of groups characterized by employees with different backgrounds and/or operating in different functional

areas (Stock, Totzauer, & Zacharias, 2014). Differently, brainstorming is a practice that stimulates the interaction between employees for a short-to-medium time period, usually to solve a complex job by fostering creative ideas (Dodgson, Gann, & Phillips, 2013; Osborn, 1957). The interest in these two HR practices is not new in product innovation studies. Indeed, with the increasing appreciation of groups as a source of innovation (e.g., Taylor & Greve, 2006), whether groups represent effective management practices in group settings has gained increasing research attention (e.g., Beugelsdijk, 2008;; D'Alvano & Hidalgo, 2012). Notwithstanding, their role in supporting external search strategies is still an unexplored area of research. As a result, we can reformulate our main research question as follows: what is the moderating effect of the implementation of (a) heterogeneous work groups and (b) brainstorming sessions on the relationship between external search breadth and product innovation?

Drawing on, and combining insights from the recombinatory search and HR literature, the present paper develops hypotheses and tests them on the basis of an econometric analysis of the Italian Innovation Survey. Results corroborate the inverted U-shaped relationship between external search breadth and product innovation. Furthermore, we reveal that the negative effects related to sourcing knowledge from many diverse search channels occur later if heterogeneous work groups and brainstorming sessions are set to conduct product innovation activities. Therefore, this paper contributes to the literature on open innovation and HR by confirming the presence of shortcomings in broad searches and by empirically analyzing an understudied area of research, as represented by moderating effects of strategic HR practices on the relationship between external search breadth and innovation performance.

The remainder of the paper is structured as follows. Section 2 develops the hypotheses. Section 3 presents the research methodology. Section 4 outlines the results. Finally, Section 5 concludes the paper by discussing the main implications, limitations, and future research directions.

2. Theory and hypotheses

2.1. External search breadth and product innovation

Product innovation is a complex problem-solving process that is increasingly influenced by the effectiveness of firms' external knowledge sourcing strategies. These strategies entail the scouting of knowledge from various economic actors (competitors, suppliers, customers, research organizations, etc.), research opportunities, and public information sources, each of which constitutes a separate search channel that allows companies to tap into relevant market, operational, and technological information (Brown & Duguid, 2001; Laursen & Salter, 2006).

In line with this reasoning, many studies contend that external search breadth has a positive impact on product innovation. In fact, the creation and original recombination of knowledge set the basis to market new products (Katila, 2002; Smith et al., 2005), and external search breadth can sustain this process in several ways. First, having access to knowledge from diverse sources promotes variety, in that novel perspectives and research methods may be introduced into the decision-making process of new product development (NPD) projects (Grimpe & Kaiser, 2010). This helps firms to avoid cognitive myopia (Levinthal & March, 1993) and provides stimuli to engage in creative thinking and adopt new problem-solving approaches, which in turn favor the introduction of products that are sensibly different from the current offerings (Laursen, 2012). Second, companies that invest in broad external searches acquire a number of different knowledge components. As a result, their ability to come up with original knowledge

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