



Contents lists available at ScienceDirect

Research Policy

journal homepage: [www.elsevier.com/locate/respol](http://www.elsevier.com/locate/respol)

## Standard vs. partnership-embedded licensing: Attention and the relationship between licensing and product innovations

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### ARTICLE INFO

#### Keywords:

Licensing

Product innovation

Bottom-up attention

Top-down attention

### ABSTRACT

This paper examines the relationship between the licensing of knowledge and the creation of product innovations. We consider that firms organize licensing activities in different ways and that licensees are heterogeneous with respect to the attention available to apply and transform in-licensed knowledge to create new product innovations. We suggest that standard licensing, which typically entails a simple exchange of knowledge for money, is less likely to lead to a product innovation than licensing embedded in a broader partnership. However, we also reveal that standard licensing can lead to an innovation outcome similar to that of partnership-embedded licensing once we take into account the levels of attention of both the R & D unit receiving the licensed knowledge (bottom-up attention) and the licensee organization's top-level managers (top-down attention). Examination of 555 bio-pharmaceutical-industry licensing agreements from 1997 to 2015 yielded support for our theoretical framework. The paper showcases the value of connecting the literatures on licensing and attention to develop a more comprehensive understanding of how licensing affects innovation.

### 1. Introduction

To cope with a rapidly changing technological environment and to support their innovation activities, many firms rely on licensing knowledge from external sources (Arora and Gambardella, 2010; Conti et al., 2013; Hagedoorn and Heslen, 2007; Steensma and Corley, 2000; Van de Vrande, 2013). Licensing consists of a contract that affords the licensee the right to use patented knowledge, scientific insights, or proprietary databases of a licensor in exchange for an up-front fee and/or royalties to the licensor (Jensen and Thursby, 2001). Prior research has shown that licensing allows firms to add variety to their knowledge repertoire, facilitate exploratory searches and learning, and can substantially speed up innovation cycles (Laursen et al., 2010; Leone and Reichstein, 2012; Markman et al., 2005). However, still missing is a comprehensive understanding of how licensing knowledge in the form of technologies, intellectual property, or scientific know-how ultimately leads to the creation of product innovations.

While much empirical literature has examined licensing as a uniform type of external knowledge-sourcing strategy (e.g., Leone and Reichstein, 2012; Mowery and Ziedonis, 2015; Nicholls-Nixon and Woo, 2003), researchers have recently suggested that firms across a

number of industries approach licensing in two fundamentally different ways (Kranenburg et al., 2014; Luo, 2008; Reuer and Devarakonda, 2015; Steensma and Corley, 2000). On the one hand, many licensing agreements embed licensing in a broader partnership or an alliance that includes the mutual sharing of resources and joint R & D efforts between the licensor and licensee.<sup>1</sup> On the other hand, a simpler form of licensing gives the licensee the right to use the knowledge developed by another firm in exchange for money but without mutual interactions and resource sharing between licensee and licensor and with little ex ante commitment of resources to the licensing activities (Agrawal, 2006; Hagedoorn and Heslen, 2007). Following prior research (Hagedoorn et al., 2009), we label the first type “partnership-embedded licensing” and the simpler type “standard licensing.” While we know that those two types of licensing are qualitatively different, a key unanswered question is whether they have a different impact on the licensee's ability to use and transform licensed knowledge into new product innovations. More precisely, is partnership-embedded licensing more likely than standard licensing to lead to product innovations? As we suggest below, the answer is both “yes” and “no.”

Building on the knowledge- and attention-based views of the firm, we model product innovation as a lengthy and resource-intensive

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<sup>1</sup> Hagedoorn et al. (2009) identify that 70% of all licensing agreements are in this category. In the context of our study, the bio-pharmaceutical industry, about 60% of licensing agreements were embedded in a broader partnership.

<http://dx.doi.org/10.1016/j.respol.2017.07.013>

Received 3 October 2014; Received in revised form 28 July 2017; Accepted 30 July 2017  
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process in which pieces of knowledge are recombined and transformed to create product innovations (e.g., Carlile, 2004; Dougherty and Hardy, 1996; Galunic and Rodan, 1998; Luo, 2008; Mudambi and Swift, 2009; Ocasio, 1997, 2011).<sup>2</sup> We suggest that while both standard and partnership-embedded licensing add knowledge variety to the licensee's repertoire, the two types of licensing fundamentally differ in terms of how knowledge is transferred between the licensor and licensee and the extent to which scientists and managers are assigned to support and carry on the product innovation process (Agrawal, 2006; Arora, 1996; Eisenhardt and Schoonhoven, 1996; Steensma and Corley, 2000). Standard licensing is characterized by lower coordination and setup costs because it relies on fewer interactions between the involved licensor and licensee and commits fewer resources (in the form of scientists and managers) ex ante to support the innovation activity (Contractor, 1990). In the context of new product development, however, the characteristics of standard licensing may limit the application of licensed knowledge and may constrain the support needed to facilitate the product innovation process in the long run. Thus, when compared to partnership-embedded licensing, standard licensing appears less likely to lead to the creation of a product innovation.

In this paper, we go beyond examining the direct impact of these two types of licensing on product innovation and conceptually develop and show how standard licensing's limitations can be overcome once the licensee's organizational context is taken into account (Bierly et al., 2009; Eisenhardt and Santos, 2002). Specifically, we examine the role of organizational attention that shapes the processing and application of knowledge in organizations and the allocation of resources to organizational activities (Ocasio, 1997, 2011). Building on previous literature, we distinguish "bottom-up attention" from scientists in R&D units, who are responsible for receiving the licensed knowledge and applying it toward productive uses (Ghosh et al., 2014; Hansen and Haas, 2001; Nonaka, 1994; Ocasio, 2011:1287), and "top-down attention" from top managers who influence R&D units' activities and help sustain the innovation processes within the organization (Cyert and March, 1963; Eggers and Kaplan, 2009; Li et al., 2013; Ocasio, 2011:1287). We argue that both bottom-up and top-down attention are particularly relevant for standard licensing agreements, as the responsibility for applying external knowledge more likely lies with the licensee (Bierly et al., 2009; Kapoor and Klueter, 2015). As a result, bottom-up and top-down attention within the licensee's organization can attenuate some of the limitations inherent in standard licensing and allow those agreements to yield product innovation results similar to those of partnership-embedded licensing agreements.

We test our hypotheses in the global bio-pharmaceutical industry using a sample of over 500 licensing agreements by the world's Top 50 global bio-pharmaceutical firms over two decades. In the bio-pharmaceutical industry, product innovations (i.e., new-to-the-industry molecular entities) are central to firm survival and success (Roberts, 1999), and the availability of high-quality, detailed data allows us to clearly distinguish between standard and partnership-embedded licensing agreements. Drawing on multiple data sources (e.g., ReCap, Pharma-projects, Adis R&D Insights, Scifinder, and Factiva), we examine each licensing agreement separately and determine whether the agreement resulted in a product innovation in the form of a new molecular entity in clinical trials. Our results reveal the importance of unbundling licensing into standard and partnership-embedded licensing. The impact of standard licensing on the creation of product innovations is statistically inferior to that of partnership-embedded licensing agreements, even when controlling for the initial selection into the licensing type. However, standard licensing can bring about the same innovation

benefits as partnership-embedded licensing if there is availability of top-down and bottom-up attention within the licensee.

To the best of our knowledge, this study is one of the first to systematically contrast the differences between standard licensing and partnership-embedded licensing in terms of their effect on product innovations. Prior studies have predominantly contrasted the learning benefits of joint (equity) alliances with various forms of knowledge sourcing, including licensing (Mowery et al., 1996; Oxley and Wada, 2009), or have focused on the commercial performance of different knowledge-sourcing agreements (Mulotte, 2013; Mulotte et al., 2013). Our study focuses explicitly on heterogeneity between two types of licensing activities and demonstrates the consequential differences in outcomes of these licensing types with respect to the lengthy, resource-intensive product innovation process. The findings therefore stress the value of disentangling different types of licensing in future innovation studies.

Second, besides revealing the differential direct effect of two licensing types, we show that innovation benefits from licensing agreements not only depend on the licensing activity per se, but are also determined by the licensee's organizational context. In particular, bottom-up and top-down attention are both valuable for standard licensing. Our study makes a novel contribution by combining two previously disconnected research streams: the licensing literature (e.g., Arora et al., 2001; Laursen et al., 2010; Leone and Reichstein, 2011) and the attention literature (e.g., Li et al., 2013; Ocasio, 1997; Ocasio, 2011). With respect to bottom-up attention, we reveal that the innovation activities in standard licensing depend substantially on the R&D unit receiving the knowledge and that the availability of attention in such a unit is a key catalyst for innovation when licensing is a simple exchange of knowledge for money. With respect to top-down attention, we find that top management attention is critically important for standard licensing as it allows the licensee to sustain the innovation process. This contributes to the broader discussion on how attention from top-level managers shapes innovation behaviors and outcomes (Eggers and Kaplan, 2009; Li et al., 2013; Ocasio, 2011).

Overall, the study reveals an intriguing set of results. On the one hand, our findings show that standard and partnership-embedded licensing differ substantially with respect to their (main) effect on product innovations. On the other hand, the results also suggest that under specific organizational conditions (i.e., when bottom-up or top-down attention is available), standard and partnership-embedded licensing can lead to similar product innovation outcomes. In the following sections, we develop a more nuanced examination of how licensing affects product innovation as we take into consideration (a) heterogeneity in the type of licensing used by firms and (b) heterogeneity with respect to the attention available within the licensee.

## 2. Theory and hypotheses

### 2.1. Licensing external knowledge and innovation

The ability to generate product innovations lies at the heart of firms' competitiveness in environments characterized by rapid technological change (Ahuja and Morris Lampert, 2001; Li et al., 2013; Roberts, 1999). An important prerequisite for the creation of product innovations is the recombination of knowledge from a range of disciplines that no single firm is likely to possess (Carlile, 2004; Steensma and Corley, 2000). In response, many established firms increasingly license knowledge from young firms or universities that work on the scientific and technological frontiers (Hagedoorn, 1993; Laursen and Salter, 2004, 2006; Rothaermel, 2001). In the early 1990s, for example, most bio-pharmaceutical firms lacked competencies in the rapidly emerging field of genetics. Established firms responded by licensing knowledge from universities and smaller startups to augment their own knowledge in an attempt to better understand information derived from genes (Gilsing and Nootboom, 2006).

Research has found substantial benefits from licensing knowledge (Laursen et al., 2010; Leone and Reichstein, 2012). Licensing allows firms

<sup>2</sup> We examine the effect of licensing as an input to knowledge creation and, in particular, the transformation of knowledge into specific product designs, which researchers refer to as product innovation (Carlile, 2004; Smith et al., 2005; Zhou and Wu, 2010). It is beyond the scope of this paper to examine product innovation performance, which relates to the commercial performance once products are introduced to markets (e.g., Köhler et al., 2012; Mulotte et al., 2013).

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