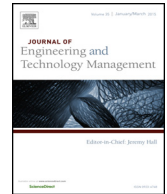




Contents lists available at ScienceDirect

## Journal of Engineering and Technology Management

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



# Absorptive capacity and R&D outsourcing<sup>☆</sup>

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### ARTICLE INFO

#### Article history:

Received 28 May 2015

Received in revised form 31 December 2016

Accepted 9 January 2017

#### Keywords:

R&D outsourcing

Exporting

Importing

Skills

Internal R&D

### ABSTRACT

I analyze the determinants of research and development (R&D) outsourcing, or investments in R&D purchased from external providers. I build on the knowledge-based view of the firm (KBV) and the concept of absorptive capacity to propose a separation between the mechanisms that form the potential absorptive capacity that enables the firm to identify and integrate outsourced R&D knowledge into the firm, from the mechanisms that form the realized absorptive capacity that enables the firm to use and transform outsourced R&D knowledge into innovation. First, I propose that firms that engage with foreign customers and with foreign suppliers develop the potential absorptive capacity, an ability to understand new and complex external knowledge that is useful for integrating it with firm-internal knowledge, and thus invest more in R&D outsourcing. Second, I argue that firms that have more skilled employees and invest more in internal R&D develop the realized absorptive capacity, an ability to use and transform external knowledge, and as a result invest more in R&D outsourcing. Finally, I propose that these relationships are weakened when the firms are subsidiaries of foreign multinational firms operating in the country, because these firms can also build their absorptive capacity by being integrated with other country subsidiaries and the headquarters within the multinational. I test these arguments on a sample of manufacturing firms and find that firms that import, export, have more skilled employees, and have more internal R&D investment tend to invest more in R&D outsourcing. I also find that, for subsidiaries of foreign firms, the impact of skilled employees and internal R&D on R&D outsourcing is lower than for domestic firms. These ideas provide a theory-driven explanation of the determinants of R&D outsourcing that refine the notion of absorptive capacity and its two dimensions, potential and realized.

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## 1. Introduction

R&D outsourcing, that is, the purchasing of R&D or technological knowledge from external providers, can provide the firm with many advantages (for a recent review of international R&D outsourcing, see Contractor et al., 2010). Thus, some scholars argue that R&D outsourcing is beneficial for the firm's competitive advantage, because a firm increases its diversity of knowledge, helping it innovate more (Berchicci, 2013; Bertrand and Mol, 2013; Nieto and Rodríguez, 2011). However, other scholars counter that R&D outsourcing may have a negative effect on the firm's competitive advantage, because the firm is

<sup>☆</sup> I would like to thank Editor Jeremy Hall and anonymous reviewers for their valuable comments and suggestions, the SEPI Foundation for access to the data, and the D'Amore-McKim School of Business at Northeastern University for financial support for this research.

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not developing the capability to create the technological knowledge it purchases since firms typically learn by doing (e.g., Bettis et al., 1992; Helfat, 1994; Pérez-Luño and Valle-Cabrera, 2011; Weigelt, 2009). Thus, it appears that we have a debate regarding the benefits of R&D outsourcing, and this debate may be driven in part by a limited understanding of the drivers that lead firms to invest more in R&D outsourcing.

Therefore, this study fills an important gap in the literature by developing theory to explain firms' investments in R&D outsourcing. I use the knowledge-based view of the firm (KBV) (Grant, 2013; Kogut and Zander, 1992, 1993) and link it to the concept of absorptive capacity (Cohen and Levinthal, 1990; Zahra and George, 2002) to propose a separation between the mechanisms that enable the firm to identify and integrate outsourced R&D knowledge into the firm, and the mechanisms that enable the firm to use outsourced R&D knowledge to innovate. I propose that outsourced R&D knowledge can be viewed as a type of external knowledge and that firms with particular characteristics that build their absorptive capacity are more likely to invest more in R&D outsourcing. Specifically, first, I propose that firms that engage with foreign customers and with foreign suppliers are more likely to invest more in R&D outsourcing. The reason is that these firms develop an ability to understand new and complex external knowledge in their relationships, and this ability becomes useful for integrating outsourced R&D knowledge. These mechanisms reflect the potential absorptive capacity of the firm. Second, I argue that firms that have more skilled employees and invest more in internal R&D are also more likely to invest more in R&D outsourcing. The reason is that these two mechanisms provide the firms with an ability to use outsourced R&D and transform it with firm-internal knowledge into innovation. These mechanisms reflect the realized absorptive capacity of the firm. Finally, I propose that these relationships are weakened when the firms are subsidiaries of multinational firms (MNEs), because these firms can build their absorptive capacity by being integrated within the MNEs.

I tested the above arguments on a sample of manufacturing firms. The results support the arguments. Specifically, I find that firms that import, export, have more skilled employees, and have more internal R&D invest more in R&D outsourcing. I also find that, for subsidiaries of foreign MNEs operating in the country, the impact of skilled employees and internal R&D on R&D outsourcing is smaller.

The above novel arguments and findings contribute to theory and practice. First, to the KBV (e.g., Grant, 2013; Kogut and Zander, 1992, 1993), they provide a theory-driven explanation of the drivers of investments in R&D outsourcing. Instead of just listing different factors that may influence R&D outsourcing, I provide a connection among these factors by using an extended conceptualization of absorptive capacity and its different dimensions, dimensions that can be developed in several ways. In so doing, these ideas also integrate and provide a better understanding of the concept of absorptive capacity (Cohen and Levinthal, 1990; Todorova and Durisin, 2007; Zahra and George, 2002). They go beyond its usual conceptualization as investments in R&D to include other ways in which the company can develop an ability to understand external knowledge to help the firm innovate. The mechanisms I discuss refine the two dimensions of absorptive capacity, potential and realized, providing a better understanding of the firm's ability to use external knowledge for innovation and competitive advantage.

Second, the ideas also contribute to the literature on R&D outsourcing by providing a framework that helps explain the reasons underlying why some firms invest in R&D outsourcing. These ideas extend studies that have discussed the advantages and disadvantages of R&D outsourcing (e.g., Bertrand and Mol, 2013; Grimpe and Kaiser, 2010; Nieto and Rodríguez, 2011). Additionally, I contribute to these discussions by explaining how firms affiliated with MNEs can substitute for some of the mechanisms that lead firms to invest more in R&D outsourcing, thus linking the literatures on technology strategy and international business.

These ideas are also useful for managers. They provide a better understanding of the mechanisms by which a firm can develop an ability to understand external knowledge, and how this ability can lead the company to undertake R&D outsourcing. R&D outsourcing has become a strategy that firms have been increasingly using in recent times, not only domestically but also internationally. However, some of these R&D outsourcing efforts seem to have met with challenges in the firm's ability to use the outsourced R&D knowledge (Grimpe and Kaiser, 2010). The proposed framework in this study provides an explanation of how a firm may be better positioned to use outsourced R&D knowledge to build its competitive advantage based on the capability it has developed to use external knowledge. The ideas also provide managers with a better understanding of how the firm's absorptive capacity may be achieved. This is done not only via the traditional investments in internal R&D, but also through other mechanisms that can provide the company with a better ability to understand complex external knowledge, integrate it with firm-internal knowledge and use it to the firm's advantage. Therefore, managers can build the absorptive capacity of the firm and use external R&D via a variety of mechanisms, not just internal R&D; many companies in fact do not invest in internal R&D, but this does not mean that they cannot use external R&D or cannot create innovations.

## 2. Absorptive capacity and R&D outsourcing

As I indicated before, I propose to explain investments in R&D outsourcing using the concept of absorptive capacity and extending its traditional conceptualization as investments in internal R&D to consider other mechanisms that the firm can use to build an ability to search and use external knowledge. Fig. 1 illustrates the arguments I propose. I consider four mechanisms. Two of these mechanisms, serving foreign customers and using foreign suppliers, help build the firm's potential absorptive capacity because they provide employees with the ability to understand complex and not-easily-available external knowledge. Two other mechanisms, skilled employees and investments in internal R&D, help build the firm's realized absorptive capacity because they provide employees with the ability to understand and establish connections

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