

# Chapter 23

## Determinants and Consequences of R&D Strategy Selection

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### ABSTRACT

*Nowadays firms are not able to achieve all innovation in-house due to the specific set of technologies required by most products and processes, obliging firms to access external knowledge. In this context, the aim of this chapter is two-fold with the final goal of increasing our knowledge on firm innovating behavior. First, this chapter analyzes the determinants of the R&D strategy (RDS) selection posting the make, buy and make-buy as the three RDSs. Second, this chapter analyzes the consequences that each of the RDSs has on firm innovativeness. Results show that commercial and organizational resources, jointly with the information sources, influence the selection of the strategy. As for the second part of the analysis, we see that all RDSs have positive effects on firm innovative performance but these effects are not straightforward and simple since they vary depending on firm's type and on the radicalness of the innovation achieved.*

### INTRODUCTION

In order to survive in the competitive scene that companies have faced in recent years and which is characterized by a high level of dynamism (Teece, 1998; López & García, 2005; Diaz et al., 2008),

the continual renewal of competitive advantages through innovation (Cho and Pucik, 2005) and the development of new capabilities (Grant, 1996) has become necessary (Danneels, 2002; Branzei & Vertinsky, 2006). In this context, technology represents one of the most important factors in increasing the national and international competi-

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tiveness of firms, while successful technological innovation in new products and processes is gradually more regarded as being the central issue in economic development (Porter, 1998). Moreover, as highlighted by Shrivastava and Souder (1987) and Bone and Saxon (2000), a key element in the competitive business strategy is the combination of technological innovation and R&D activities.

Since the objective of R&D strategies (RDSs) is to guide the firm in acquiring, developing and applying technology in order to generate sustainable competitive advantages (Swan & Allred, 2003), it is extremely important for the firm to select the best way of achieving the technology needed (Clarke et al., 1995). It is emphasized in the literature that firms establish their boundaries based on the decision regarding the type of R&D activities – whether they should be integrated within the company or not. In fact, Williamson (1975) identified a dichotomous decision between *make* (internal) and *buy* (external) RDS; later on, Veugelers and Cassiman (2006) added a third, complementary one, *make-buy* RDS<sup>1</sup>.

The effect of these RDSs over firms' innovative results has been thoroughly studied; however, there is no general conclusion except that all of them are, in a way, highly significant in a firm's innovative impetus. Explicitly, Diaz et al. (2008) find that the three RDSs have a positive impact, while Veugelers and Cassiman (2006) suggest that only *make-buy* yields the best results, whereas *buy* has the lowest ones. Even more, most of the research studies carried out in this field of investigation focus on the choice between *make* and *buy* strategies, the attention towards a *make-buy* one or to the reasons behind the selection of one strategy as opposed to another being almost inexistent (e.g., Veugelers & Cassiman, 1999).

When referring to the *make* RDS, firms understand a sole source of knowledge and, thus, important sources of competitive advantages achieved with high costs whose results cannot be clearly foreseen. The *buy* strategy, on the other hand, is a relatively low-cost one with more

predictable results, offering solutions to some problems related to a lack of capacity. However, it does not stand for competitive advantages since there is a high probability that competitors attain it as well. As for the combination between them, the *make-buy* strategy, it enhances both the advantages and disadvantages of *make* and *buy* RDSs, being extremely complex to manage it.

Taking this into consideration, this study has a two-fold focus. Firstly, it aims at finding the determinants of the innovation strategy selection and, secondly, it has the objective of understanding which of the RDSs produce the best results in term of firm's innovative performance. In order to reach this objective, data from the Technological Innovation Panel (PITEC) provided by the National Statistics Institute from Spain are analyzed, precisely the period 2004-2007.

As for the main contributions of this study, they are as follows: Firstly, we look at RDSs as a whole process, considering the determinants of selecting one strategy over another, and next their consequences over a firm's innovative performance. Secondly, we consider the R&D Capital Stock Model developed by Grilliches (1979), which emphasizes the relation between RDSs and a firm's innovative performance, employing lagged values of RDSs in order to improve prospects of valid causal inference (Baum, 2006) and to reduce possible endogeneity problems (Bernard and Jensen, 1999; Salomon and Shaver, 2005). Thirdly, we will look at both manufacturing and service industries, aiming at offering a better understanding of the latter, which has not been analyzed in the sense that our investigation does.

The study is organized as follows. First, the advantages and disadvantages of each of the RDSs are presented. Next, the determinants and consequences of RDSs are described, with their respective hypotheses, based on the absorptive capacity and open innovation approaches as well as the resource-based view (RBV) theory. The conceptual model is then presented, followed by the description of the methodology employed in

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