

# Chapter 10

## Modes of Open Innovation in Service Industries and Process Innovation: A Comparative Analysis

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### ABSTRACT

*This broad study empirically compares the returns to different open innovation approaches, namely forms of pecuniary acquisition and non-pecuniary sourcing, on both product and process innovation in low-tech service and manufacturing firms. A fixed-effects analysis reveals differing patterns of the effectiveness of open innovation strategies across sectors and type of innovation outcome, along with decreasing returns from being “too open”. In general, the purchase of intangible intellectual property and broad search breadth have greater effects on product innovation, whereas the returns to knowledge embodied in physical artefacts and to drawing deeply from external sources are greater for process innovation. Overall, external sources of knowledge more strongly predict innovation in low-tech service firms than in the manufacturing sector. The final section considers implications for managers and policy makers.*

### INTRODUCTION

Open innovation, which posits that firms should use external knowledge in their internal innovation process, is an approach which is increasingly embraced by firms. In the short time since the term *open innovation* has been coined (Chesbrough,

2003b), numerous academic research projects, conferences, and specialized service providers quickly sprung up dedicated to the topic (Fredberg, Elmquist, & Ollila, 2008; Lichtenthaler, 2011). Many corporations have recently started to formalize open innovation into designated departments and roles; consider, for example, Hewlett-Packard’s “Open Innovation Office” or

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the employees with the job title “Director of Open Innovation” walking the halls of General Mills, Nokia, and Unilever. A number of leading firms have introduced open innovation competitions and initiatives, such as Sarah Lee’s Open Innovation Portal or Cisco’s I-Prize competition (Drakos, 2008). Indeed, authors have observed a bandwagon effect as open innovation gains momentum, with many senior executives “under increasing pressure to justify their refusal to cooperate with the outside world and exploit the open innovation wave” (Gassmann, Enkel, & Chesbrough, 2010: 215). Supported by numerous case studies that corroborate the positive results of open strategies (Chesbrough & Garman, 2009; Huston & Sakkab, 2006; Rohrbeck, Hölzle, & Gemünden, 2009), open innovation has become an imperative for firms over a relatively brief period of time.

However, despite all the excitement as policy makers and firms race to embrace open innovation, most of the research is drawn from case studies on product development in large, multinational high-tech firms or niche business models and open source (Chesbrough & Crowther, 2006). This means that, as a young, emerging theory, it lacks empirical support and generalizability across diverse conditions and businesses (Van de Vrande, Vanhaverbeke, & Gassmann, 2010; West, Vanhaverbeke, & Chesbrough, 2006: 302).

This chapter looks at some of these understudied circumstances by addressing different sectors, modes of open innovation, and objectives. In particular, it (1) compares the effectiveness of various inbound open innovation activities between low-tech manufacturing and service sectors; (2) evaluates the returns to several strategies for conducting open innovation, including different forms of pecuniary (monetary) and non-pecuniary external sourcing; (3) and examines objectives beyond products to include a firm’s process innovation. The chapter also includes a discussion and analysis of the potentially adverse consequences of being “too open”. The analysis links these factors to firm innovation performance by comparing

the “returns” or “effect sizes” across innovation type and sectors. Thus the general aim is to bring these important yet understudied topics into the open innovation discussion. A panel survey of innovation activities in 3,800 Spanish low-tech manufacturing and service firms over a four year period provides the sample for the analysis.

The remainder of the chapter is organized as follows: (1) the first section reviews the literature and generates several hypotheses. This includes a review of process innovation, the nature of innovation in the service industries, the relationship of different modes of inbound open innovation with these factors, and decreasing returns from over-searching. (2) The empirical section presents the data and variables used in the analysis. It explains the methodology and advantages of fixed-effects estimation. (3) The next section discusses the results of the empirical estimations in relation to the hypotheses and the significance of the uncovered patterns. (4) The concluding section proposes implications for managers and policy makers and identifies directions for future research.

## **THEORY DEVELOPMENT AND HYPOTHESES**

### **Product and Process Innovation**

To date, the open innovation literature has focused on the generation of commercial products. Unfortunately, this concentration on product development neglects an important avenue of firm competitiveness and profitability: process innovation (Niehaves, 2010). Process innovation is defined as “new elements introduced into an organization’s production or service operations—input materials, task specifications, work and information flow mechanisms, and equipment used to produce a product or render a service—with the aim of achieving lower costs and/or higher product quality” (Reichstein & Salter, 2006). Process innovation is an important source of firm

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