



Impacts of obstacles on innovation patterns in KIBS firms



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ABSTRACT

Factors that impede the innovation propensity of manufacturing firms have been under-studied and under-documented. Obstacles to innovation in KIBS firms are literally not documented at all. Based on a sample of Canadian KIBS firms, this study argues that in KIBS firms, the propensity to innovate should take into account not only product and process innovations, but also other forms of innovation (delivery, strategic, managerial, and marketing). Furthermore, we argue that different obstacles will affect different forms of innovation. The results show that, overall, financial obstacles are negatively related to product and process innovations, and that knowledge obstacles tend to be negatively associated with delivery, strategic, managerial, and marketing innovations. These results carry important managerial implications. Hence, managers of KIBS firms might benefit from remembering that a failure to recognize the differences between KIBS firms and manufacturing firms could lead to an inefficient allocation of the resources invested in innovation activities.

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1. Introduction

A large and still growing empirical literature investigates the factors that increase the propensity of firms to innovate and the intensity of innovation. By comparison, empirical studies on factors that impede innovation in firms are still very scanty. Improving our understanding of obstacles to innovation is important for theoretical and policy purposes (D'Este, Rentocchini, & Vega Jurado, 2014). First, a better understanding of obstacles to innovation would help improve theories explaining why some firms either do not innovate at all or do not engage more intensively in innovation. Second, providing better evidence would help devising policies to aid firms surmount obstacles, thus increasing the innovation propensity of non-innovative firms or the innovation intensity of innovative firms.

The empirical literature on obstacles to innovation in manufacturing firms can be regrouped in two broad streams of studies. A first stream of research uses obstacles to innovation as dependent variables, and it focuses on the relationship between obstacles to innovation and various firm characteristics (Baldwin & Lin, 2002; D'Este, Iammarino, Savona, & von Tunzelmann, 2012; D'Este et al., 2014; Hölzl & Janger, 2011; Tourigny & Le, 2004). These studies document the importance of financial obstacles for manufacturing firms and show that perceived obstacles are more important for small than large firms, and that more

innovative firms are more likely to assess obstacles as important. A second stream of studies uses obstacles as independent variables, and it attempts to show how the propensity to innovate or the innovation intensity is affected by various categories of obstacles (D'Este, Amara, & Olmos, 2016; Mancusi & Vezzulli, 2010; Mohnen & Röller, 2005; Savignac, 2008). The studies of this second stream of research show that financial obstacles have a strong and significant negative effect on the innovation propensity of manufacturing firms. Overall, the results of these two streams of research converge to highlight the importance of financial obstacles in impeding product and process innovation in manufacturing firms.

However, a lack of empirical evidence is still prevalent about innovation in services in general (O'Cass, Song, & Yuan, 2013) and, more particular, about obstacles to innovation in service firms (Thakur & Hale, 2013). This article attempts to fill this gap by looking at a sample of Knowledge-intensive business services (KIBS) firms. The ultimate aim is to show how different obstacles affect the capacity of KIBS to innovate. To do so, we build and extend from the second stream of research on obstacles to innovation in order to argue that in KIBS firms, the propensity to innovate should take into account not only product and process innovations, but also delivery, strategic, managerial, and marketing innovations (den Hertog, van der Aa, & de Jong, 2010). Furthermore, we argue that different obstacles will affect different forms of innovation.

The rest of the article is organized as follows. Section 2 reviews prior studies on the variety of forms of innovation likely to emerge in KIBS firms and factors increasing/hampering their innovation propensity. Section 3 deals with methodological issues, including data collection and descriptive statistics regarding obstacles to innovation. Section 4

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introduces the analytical plan and the statistical results regarding the influence of different types of obstacles on different forms of innovation. The last section briefly summarizes the results, and discusses implications for the management of innovation in KIBS firms.

2. Prior studies on innovation and obstacles in KIBS firms

2.1. On the definition of KIBS

According to Doloreux and Shearmur (2010: 611), “KIBS refers to establishments that are characterised by high knowledge intensity and that offer predominantly non-routine services to their clients.” KIBS combine various types of highly specialized knowledge in order to develop (either innovative or non-innovative) problem-specific solutions (Koschatzky & Stahlecker, 2006; Muller & Zenker, 2001). Miles (2008) proposed a working definition of KIBS that distinguishes between “professional service firms” (P-KIBS) and “technical service firms” (T-KIBS). P-KIBS provide traditional professional services based on specialized knowledge of administrative systems and social affairs (e.g., business and management services, legal accounting and activities, market research, etc.), while T-KIBS provide services mainly concerned by information and communication technologies, as well as by the production and transfer of knowledge regarding technology (e.g., IT-related services, R&D services; engineering services). Some sub-sectors of activities providing services and displaying high levels of qualified labor and of use of new technologies are usually not considered as KIBS (e.g., agriculture, forestry, mining, and gas extraction) (Muller & Doloreux, 2009).

2.2. The multifaceted forms of innovation in KIBS firms

Prior studies on obstacles to innovation have focused on technological innovations. However, it is now widely recognized in the literature that service innovation cannot be reduced to technological innovations (Hidalgo & D'Alvaro, 2014; Vang & Zellner, 2005). Consequently, the *assimilation approach*, which rests on the idea that innovation in services is similar to innovation in manufacturing industries, is more and more discarded (Bryson & Monnoyer, 2004; Drejer, 2004).

The *demarcation approach* contends that service innovation is distinctively different from innovation in manufacturing, and then, new definitions and new measures need to be developed in order to capture the particularities of the non-technological dimensions of innovation in services (Doloreux & Shearmur, 2010; Tether, Hipp, & Miles, 2001; van der Aa & Elfring, 2002). Consequently, many researchers on service innovation called for the development of a *synthesis approach* that would integrate the two previous approaches (Amara, Landry, & Doloreux, 2009; Drejer, 2004). Such an approach offers two significant advantages. First, it takes into account technological innovations and thus, allows comparisons between innovation in manufacturing and service industries. Second, by integrating the demarcation approach into a new synthesis one, it allows the integration of technological and

non-technological dimensions of innovation into a single perspective that is likely to shed new light on the multidimensional facets of innovation.

In this article, we adopt the synthesis approach to build and extend from prior studies in order to differentiate two technological and four non-technological forms of service innovation (Amara et al., 2009; den Hertog, 2002; Howells & Tether, 2004; OECD, 2006; Sundbo & Gallouj, 2001; Tether et al., 2002).

Product and process innovations represent technological forms of innovation, while delivery, strategic, managerial, and marketing innovations represent non-technological forms of innovation that largely overlap with organizational innovations since they represent various dimensions of organizational innovations.

We hypothesize that different forms of service innovation will be influenced by different types of obstacles. These six forms of service innovation are operationally defined in Table 1.

2.3. Explaining the different forms of service innovation and the influence of their obstacles

KIBS firms provide services based on professional knowledge. In a knowledge-intensive industry, transactions consist of knowledge and outputs that are often intangible. Innovations result more often from new combinations of knowledge rather than from new combinations of physical artefacts (O'Cass & Sok, 2013; Rubalcaba, Michel, Sundbo, Brown, & Reynoso, 2012). Hence, the core competence of KIBS resides in their capability to combine, in a new unique body of knowledge, codified scientific and technical knowledge with tacit knowledge based on extensive experience to “help other organisations deal with problems for which external sources of knowledge are required” (Miles, 2005, p. 39). Similarly, Leiponen (2006, p. 444) claims that KIBS “...almost exclusively consist of transferring knowledge and skills to clients' organisations”. In such a context, we postulate that, contrary to manufacturing firms, KIBS' innovation capabilities are likely to be less hampered by financial obstacles than by knowledge obstacles. Building and extending from this rationale, we articulate the independent variables of this study around three categories: knowledge factors that contribute to increase innovation propensity, knowledge and financial factors that hamper innovation propensity, and control factors.

2.3.1. Knowledge factors that contribute to increase innovation propensity

In the literature on innovation and knowledge management, four categories of knowledge assets are considered important to explain the innovation propensity of firms: the variety of knowledge sources, knowledge creation, knowledge embodied in managerial practices and advanced technologies, and knowledge embodied in the strength of ties.

Variety of knowledge sources. The importance of external sources of knowledge used in the innovation process occupies a central place in studies on open innovation (Amara & Landry, 2005; Dahlander & Gann, 2010; Gassmann, Enkel, & Chesbrough, 2010; Laursen & Salter, 2006; Lee, Park, Yoon, & Park, 2010). Innovative firms increasingly rely on

Table 1
Descriptive statistics.

Dependent variable: types of innovation	Description: <i>During the last three years, did your business unit ...</i>	% within types of innovation (N)
• Product innovation	introduce onto the market any new or significant improved products (goods or services)?	59.7 (671)
• Process innovation	introduce any new or significantly improved production processes?	29.5 (332)
• Delivery innovation	implement changes in how the enterprise delivers its products (goods or services) to its customers?	52.4 (589)
• Strategic innovation	Implement new or significantly modified business strategies?	54.9 (617)
• Managerial innovation	implement new or significantly modified managerial techniques?	42.9 (482)
• Marketing innovation	implement new or significantly modified marketing strategies and concepts?	43.0 (483)

Note: The total number of observations is 1124.

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