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# Open service innovation and the firm's search for external knowledge☆

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ABSTRACT

The concept of open innovation captures the increasing propensity of firms to work across their traditional boundaries of operation. This phenomenon has largely been studied from the viewpoint of manufacturing businesses while services have received much less attention despite the predominant role they play in advanced economies. This paper focuses on open innovation in services, both as a subsector of the economy and as a component of the activities of manufacturing firms. We study the open innovation practices of business services firms and then consider the implications for open innovation of the adoption of a service inclusive business model by manufacturing firms. Our analyses are based on a unique dataset with information on open innovation activities amongst UK firms. Overall, engagement in open innovation increases with firm size and R&D expenditure. Business services are more active open innovators than manufacturers; they are more engaged in informal relative to formal open innovation practices than manufacturers; and they attach more importance to scientific and technical knowledge than to market knowledge compared to manufacturing firms. Open innovation practices are also associated with the adoption of a service inclusive business model in manufacturing firms and service-integrated manufacturers engage in more informal knowledge-exchange activities. The paper contributes towards a reconceptualisation of open innovation in service businesses and a deeper evidence-based understanding of the service economy.

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## 1. Introduction

Firms are increasingly looking for knowledge outside their organisational boundaries (Chesbrough, 2003a, 2006) and are developing more outward-looking strategic approaches to research and development to source at least some knowledge of potential value from the broader environment in which they operate. Vertical disintegration pressures (Langlois, 2003), modularisation and outsourcing (Prencipe et al., 2003; Sturgeon, 2002), the growth of specialised technology markets (Arora et al., 2001; Brusoni et al., 2001) and difficulties in appropriating internal investments in intangibles (Chesbrough, 2003b) would appear to have strengthened firms' incentives to increase their reliance on external knowledge for innovation.

The importance of external knowledge has been discussed at length in the innovation literature,[3] but interest in open innovation (OI) has been growing very fast especially in the last few years (Gassmann, 2006; Dahlander and Gann, 2010; Huizingh, 2010). Crucially, however, most of the theoretical developments and empirical evidence relate to manufacturing businesses. This is surprising given the predominant role of the service sector in advanced economies. The available evidence shows that services are no less innovative than manufacturing firms, but might, in fact, innovate in different ways (Metcalfe and Miles, 2000; Tether, 2003, 2005). Some quantitative evidence exists that reveals the importance of external linkages for service firms' innovative performance (Leiponen, 2005, 2012; Love and Mansury, 2007; Love et al., 2010) while the link between openness and the adoption of a service business model in manufacturing firms is also coming to the fore (Chesbrough, 2011). Despite these significant contributions, however, studies that analyse OI in services are still scarce. Open service innovation is a relatively unexplored area of research where novel theoretical and empirical investigations can shed new light on the strategic search behaviours of firms.

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[3] This is arguably one of the most important messages to emerge from the relatively long tradition of research on innovation systems (Lundvall, 1992; Nelson, 1993; Freeman, 1995; Malerba, 2004).

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In this paper, firstly we focus on business services, a segment of the service sector characterised by high growth, productivity and innovation rates (Rubalcaba and Kox, 2007). Business services are a diverse group of businesses which include IT support services, design, architecture and engineering consultancies, R&D services, advertising, marketing and other traditional professional services such as legal services and management consultancy. Amongst them we find prominent examples of business models structured to search broadly for external knowledge and to leverage internally generated knowledge.

IDEO is a well-known case of a company whose knowledge-brokering activities are key to its business model and a fundamental source of competitive advantage. Born as a product development company, IDEO now offers a much broader range of consulting services for applications as diverse as health and medical devices and services, energy, food and beverage, education, mobile and digital technologies, and innovation in the public sector. The company thrives on knowledge exchanges with clients, suppliers and the science base in the search for innovative solutions.[4] Active intermediation between users and developers of new knowledge also characterises the operation, for example, of the technology consultancies that have greatly contributed to the growth of the Cambridge (UK) cluster, arguably the most successful technology cluster in Europe. Service companies such as Cambridge Consultants, the Technology Partnership (TTP), PA Technology and Sagentia engage in intense, and typically highly focused, interactions with their local and international clients and research base.[5] But interactions between services and specialist external knowledge sources are found at the cutting edge in many different subsectors, including more traditional businesses such as restaurants. The Catalan restaurant El Bulli, named for several years amongst the world best restaurants and famed as a radical innovator in the sector, developed over time as one component of a broader platform of activities which included upstream collaborations with the science base as well as downstream interactions, amongst others, with food manufacturers and the hospitality sector.[6]

Interestingly, a service approach to business is not limited to subsectors of the economy that are classified as services in standard industry statistics. Services are also economic activities that can be performed by product-based businesses. Several manufacturing firms are significantly expanding the range of services they provide in combination with their core products as a way to enhance value creation and customer retention opportunities. Companies such as IBM, Xerox, and Rolls Royce now derive growing shares of their total revenues from service activities, although they are not considered as service businesses, and they often develop their service profile by partnering with external knowledge sources.

In this paper we study the open innovation practices of business services and show to what extent and in what way these differ from those in manufacturing sectors. Secondly, we take into account the service offer of manufacturing firms and we explore the implications of adopting a service business model for the open innovation profiles of manufacturing firms. We analyse a unique dataset generated through an original survey of open innovation practices amongst UK firms conducted at the UK Innovation Research Centre in 2010. We find that business services are more open users of external knowledge than manufacturers. We show that they are more intensive users of informal relative to formal open innovation practices than manufacturers. In addition, we uncover the importance of scientific knowledge vis-à-vis market knowledge in business services relative to manufacturing firms. When we consider the service activities of manufacturing firms we find that a higher degree of openness, enabling the search and recombination of more diverse knowledge inputs, is associated with the adoption of a service inclusive business model. Finally, and consistently with our prior findings, we show that the degree of service integration is positively associated with engagement in informal knowledge-exchange activities. Overall, the paper contributes to the theory of open innovation by postulating new aspects of the sectoral and firm-specific characteristics of external knowledge searches.

## 2. Exploring open service innovation: theory and evidence

### 2.1. How does service innovation differ from manufacturing?

Traditional industrial economics and technologist approaches to innovation used to fundamentally underestimate the role, extent and effects of innovation in services (Metcalfe and Miles, 2000). The service sector is no longer seen as a technologically backward, 'unprogressive' and passive adopter of technology, but both theory development and empirical evidence on the dynamics of the service economy are still lagging behind manufacturing. The introduction of the European Community Innovation Survey (CIS), where individual service sectors were included in the early 1990s, greatly contributed to the growth of scholarly work on services partly because it enabled the collection of observations on innovation that were not limited to R&D or patenting.

A number of stylised facts distinguish service from manufacturing innovation.

Quantitative analyses based on CIS data show for example that overall R&D plays a less important role in services, even though this does not hold true for all services (Evangelista, 2000; Tether, 2003).[7] The traditional distinction between product and process innovations becomes weaker in a service context since services often consist of processes that are hardly separable from the outcomes they produce. In addition, service innovation tends to imply greater emphasis on organisational and human capital factors relative to more tangible assets (Gallouj and Savona, 2009; Sirilli and Evangelista, 1998; Hipp and Grupp, 2005).

Service firms have been found to rely heavily on information and communication technologies and non-R&D innovation expenditures and seem to use more external knowledge sources than manufacturing (Cainelli et al., 2006; Tether and Tajar, 2008; Hipp, 2010). They also appear to collaborate more frequently with their customers and suppliers (Tether, 2005). There is some evidence that this practice has positive effects on firm innovation performance (Leiponen, 2005; Mansury and Love, 2008; Love et al., 2010). One striking feature of the service economy certainly is the variety existing between and within individual service sectors. This encompasses a broad range of activities with different characteristics (Miles, 2005; Tether, 2002; Rubalcaba and Kox, 2007), although some studies indicate that the degree of similarity between services and manufacturing increases with the level of knowledge-intensity, so that knowledge-intensive services (Leiponen, 2005; Love et al., 2011) will display innovation behaviours similar to those of high-technology manufacturing firms (Hollenstein, 2003; Rodriguez and Ballesta, 2010).[8] Yet, some uncertainties persist. There are, for example, conflicting results on the role of specific types of

[4] Hargadon and Sutton (1997), Kelley and Littman (2001) and Hargadon (2003).
[5] Probert et al. (2013), Kirk and Cotton (2012).
[6] Chesbrough (2011).

[7] With the exception of the recent paper by Leiponen (2012), who finds that R&D activities play a similar role in both service and manufacturing innovation.
[8] In a cluster analysis of the innovation activities of Finnish and Danish firms, Leiponen and Drejer (2007) show that the differences between manufacturing and service firms within clusters are a matter of degree as service firms do not tend to cluster together but alongside manufacturing firms.

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