



Customers involvement and firm absorptive capacity in radical innovation: The case of technological spin-offs



Laurent Scaringella^{a,*}, Raymond E. Miles^b, Yann Truong^c

^a Rennes School of Business, 2 rue d'Arbrissel, CS, 76522-35000 Rennes Cedex, France

^b Haas School of Business, University of California, Berkeley, 545 Student Services Building, University of California, Berkeley, CA 94720-1900, USA

^c Univ. Bourgogne Franche-Comté, Burgundy School of Business – CEREN, 29 Rue Sabin, 21000 Dijon, France

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ABSTRACT

This study investigates how the absorptive capacity of scientific spin-offs affects the benefits and challenges of customer involvement in the development of radical innovations. We conducted 36 interviews in 3 spin-offs over 4 years to collect data regarding customer involvement in the development of radical innovations. The findings show the importance of spin-offs developing both potential and realized absorptive capacities to internalize customer knowledge and technology emergence awareness and to simultaneously offset customers' lack of technical knowledge in formulating their needs. Both market and technical knowledge appeared to be important for spin-offs, and these were available from both customers and the parent research center. The findings' main implication is spin-offs need a blending capability to balance between (1) market and technical knowledge, (2) market-pull and technology-push approaches, (3) the involvement of customers and parent research centers, and (4) potential and realized absorptive capacities. This study contributes a conceptual framework on the blending capability of customer involvement in the development of radical innovations and a set of propositions for future research.

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1. Introduction

The role of customers in new product development (NPD) is well documented in the innovation literature. Firms can gain from knowledge exchanges with customers (Fang, 2008; Noordhoff et al., 2011; Truong et al., 2012), and these exchanges improve their capacity to research and develop new products that fit market needs (Coviello and Joseph, 2012) and increase the probability of financial returns (Danneels, 2007; Levinthal and March, 1993). This logic posits that firms should do their best to serve their customers (Govindarajan et al., 2011; O'Cass and Ngo, 2011).

Although customers may help companies bring incremental innovation in NPD, researchers have contended that involving customers may be ineffective or even detrimental to radical innovation, which is defined as a product that is new to both customers and the focal firm (Markides, 2006) and follows a substantially different technological trajectory than existing products in the same category (Abernathy, 1978; Anderson and Tushman, 1990). When a firm overemphasizes its focus on existing customers, it may not recognize opportunities that arise in emerging markets (Day, 1999). Similarly, some innovative firms limit

their attention to their best customers, who tend to drive innovation along the path that best serves their own needs (Christensen, 1997; Christensen and Bower, 1996). Indeed, given the degree of newness and different technological trajectory, radical innovation is rarely driven by demand, and it may be counterintuitive to involve mainstream customers in the development of this type of innovation. On the basis of this assumption, Markides and Geroski (2005) posited that radical innovation often results from a supply-push process rather than a market-pull process for new technologies. Such an assumption is more relevant to Business to Consumers (B2C) rather than Business to Business (B2B) or Business to Research Centers (B2RC) markets, as these latter tend to embrace newness and possess sufficient advanced technical capabilities to co-innovate with suppliers.

However, several recent studies have suggested that under certain conditions, customer orientation can play an important role in the radical innovation process. Customers can foster the innovation process if (a) the customer portfolio is diverse; (b) customers are willing to commit financial and technological resources; and (c) customers are involved early in the creation stage (Coviello and Joseph, 2012). The success of radical innovation may be more closely related to customer orientation in mainstream markets than in emerging markets (Govindarajan et al., 2011), in which the high risk of investing in radical innovation may satisfy mainstream customers offering immediate market opportunities, even though emerging customers constitute a smaller

* Corresponding author.

E-mail addresses: laurent.scaringella@esc-rennes.com (L. Scaringella), miles@haas.berkeley.edu (R.E. Miles), yann.truong@bsb-education.com (Y. Truong).

market that offers long-term opportunities. This current debate encourages us to investigate the conditions under which customer involvement can help firms develop or stall radical innovations.

We argue that, in the absence of organizational learning, customer involvement is not efficient at helping the firm develop radical innovations. In our study, successful customer involvement in the development of radical innovations is related not only to a firm's intrinsic qualities but also to its ability to develop an absorptive capacity to exploit new knowledge and increase the likelihood of commercialization success. Consequently, we use Zahra and George (2002) notion of both potential and realized absorptive capacity to investigate how acquiring knowledge from customers can either facilitate or hinder a firm's quest for radical innovation.

This research's contribution to the area of customer involvement in the radical innovation process is twofold. First, our study provides further insight into the dynamics of customer participation in the NPD process and the marketing capabilities of young firms seeking to manage customer involvement, both identified as major gaps in the literature (Coviello and Joseph, 2012), by examining how the level of customer involvement at different stages has improved or impeded the process of developing radical innovations within young technological firms. Specifically, we examine the firm's role of absorptive capacity in internalizing the knowledge gained from customers. Past studies show that customers can bring valuable insights for product creation and development, but few have addressed the challenge of a firm's capacity to internalize these insights from the perspective of absorptive capacity.

Second, we focus on a particular type of new ventures which has received limited attention in the past, namely scientific spin-offs. Spin-offs are relatively common in science-based high-technology industries (e.g., biotechnologies, Arts et al., 2013; c.f. Capaldo et al., 2014), and a growing number of public institutions, including universities and scientific institutions, establish spin-offs to market their scientific knowledge (Fini et al., 2016). Spin-offs' salient impacts make them a relevant study subject because of their strong influence on the economy (Bolzani et al., 2015; O'Shea et al., 2008; Scaringella and Chanaron, 2016; Vincett, 2010), society (O'Shea et al., 2008; Scaringella and Chanaron, 2016), and future entrepreneurial initiatives (Ciuchta et al., 2016).

Scientific spin-offs are also different from regular start-ups or SMEs. Spin-offs rely on different knowledge bases (Colombo and Piva, 2012), have access to unique capabilities from parent institutions (Basu et al., 2015; Chatterji, 2009; Klepper, 2001), benefit from learning in dyadic relationships (Agarwal et al., 2004; Chatterji, 2009; Phillips, 2002), enjoy privileged access to "local searches" (Rosenkopf and Almeida, 2003), benefit from parental heritage (Agarwal et al., 2004; Basu et al., 2015; Klepper and Sleeper, 2005), achieve superior potential absorptive capacity (Colombo and Piva, 2012), may suffer from transmitted inertia (Ferriani et al., 2012), are rather long-term oriented (Fini et al., 2016), do not necessarily rely on customer involvement (Fini et al., 2016), have a better survival rate (Agarwal et al., 2004; Basu et al., 2015; Bolzani et al., 2015; Fackler et al., 2016; Phillips, 2002; Smith and Ho, 2006; Stinchcombe, 1965), and achieve superior performance (Chatterji, 2009). Given these major differences, studying potential and realized absorptive capacities in the specific case of spin-offs would be a valuable contribution to the existing literature.

Among scientific spin-offs, there are major differences between spin-offs that may emerge from: research centers, universities, and corporations. Each category of spinoff is differently able to use technology and to identify and exploit opportunities. The commercialization of technologies, the trajectories of growth, and the performance are category specific, and Fini and Toschi (2015) emphasized the differences between academic and private start-ups in term of organizational blueprints and cognitive abilities.

Despite new ventures' importance in these high-technology industries, our literature review has identified little existing research concerning them emerging from research centers; however, they deserve more attention from scholars because of their specificities.

Scientific institutions' technological spin-offs are distinctive from other types of spin-offs because they often spring from the parent institution's intention to market an advanced technology. Thus, these spin-offs primarily focus on technology-push processes and are less inclined to possess and develop customer management skills. Our findings focus on science-based spin-offs emerging from research centers and are not generalizable to university spin-offs or corporate spin-offs.

In the following sections, we first introduce the theoretical background and then describe the qualitative method used to investigate three spin-offs created from a research center in the Grenoble area. Finally, we analyze and discuss the benefits and challenges of customer involvement in radical innovation and the duality of market and technology absorptive capacity for spin-offs.

2. Theoretical background

We study customer involvement in a spin-off's pursuit of radical innovation from the lens of absorptive capacity by first discussing the distinction between potential and realized absorptive capacity according to Zahra and George (2002) in Section 2.1, followed by a review of customer involvement's benefits and challenges in the development of radical innovation across acquisition in Section 2.2, assimilation in Section 2.3, transformation in Section 2.4, and exploitation in Section 2.5 in line with the four dimensions of absorptive capacity. Finally, we consider absorptive capacity in the particular case of technological spin-offs (see Section 2.6) using existing works solely related to university spin-offs, which are far more abundant than existing researches conducted in research centers (Section 2.7).

2.1. Potential and realized absorptive capacity

Zahra and George (2002) argued that it is important to distinguish potential from realized absorptive capacity. Potential absorptive capacity characterizes the effort made by a firm to identify and assimilate external knowledge; realized absorptive capacity characterizes how knowledge is transformed and exploited.

Potential absorptive capacity, which consists of knowledge recognition and assimilation, appears as a popular possibility for firms to explore new sources of knowledge (Lau and Lo, 2015) and depends on prior knowledge, specific decision process, availability of slack resources, and openness to the external environment (Burcharth et al., 2015). Conversely, realized absorptive capacity has attracted limited attention from scholars, although it can make newly acquired knowledge valuable for enhancing commercial ends (Lau and Lo, 2015). External openness and prior knowledge are important antecedents to realized absorptive capacity (Burcharth et al., 2015), and therefore, according to Volberda, Foss, & Lyles (2010), commercialization requires further attention.

Potential and realized absorptive capacity have been considered as complementary (Ebers and Maurer, 2014; Xia, 2013), distinct (Cepeda-Carrion et al., 2012; Ebers and Maurer, 2014), and even as opposites (Jansen et al., 2005; Martini et al., 2015).

Yet, the complementary view contradicts the distinctive view. Cepeda-Carrion et al. (2012) distinguished potential from realized absorptive capacity and in studying the positive effect of absorptive capacity on innovativeness in information systems in 286 large Spanish firms, they argued that both concepts are distinct and cannot be taken together. They further argued that "while potential absorptive capacity requires change, flexibility and creativity, realized absorptive capacity requires order, control and stability" (p. 111) and suggested potential and realized absorptive capacity should be balanced to benefit from innovation.

Further contradicting the complementary view and the distinctive view, Jansen et al. (2005) argued a negative link exists between potential and realized absorptive capacities. They found that focusing on potential absorptive capacity by acquiring and assimilating external knowledge may be counterproductive to firms because the costs

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