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Managing research and innovation networks: Evidence from a government sponsored cross-industry program[☆]

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ABSTRACT

Important innovations are increasingly produced based on research engagement and fertilization across industries. However, we know little about the challenges associated with managing innovation networks in specific contexts that involves researchers in cross-industry collaboration. Against this backdrop, we draw on theory on design and orchestration of innovation networks to analyze a large-scale government sponsored program, “ProcessIT Innovations” that was designed to increase competitiveness and accelerate economic growth in Northern Sweden. The program was initiated and led by firms from the traditionally strong local process industry and engaged local researchers and firms from the emerging IT industry. Based on our analyses, we offer two contributions. First, we provide a detailed analysis of the challenges related to configuration of the network, orchestration of partnerships between participants, and facilitation of innovation in dedicated development projects. Second, we propose a model of managing research and innovation networks through fertilization across industries and between firms and research institutions.

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1. Introduction

Contemporary innovation processes do not necessarily take place within the boundaries of the firm or within single industries. Instead, they are increasingly distributed among a large number of networked actors (Jacobides and Billinger, 2006) with diverse and complementary capabilities (Asheim and Isaksen, 2002). Hence, networks of innovators (Pittaway et al., 2004; Vanhaverbeke and Cloudt, 2006) and cross-fertilization between firms and research institutions (Cooke et al., 2004; Asheim et al., 2007) have become significant contexts for innovation. Also, research on innovation systems (Lundvall, 1992) with a particular geographical focus (Storper, 1995; Padmore and Gibson, 1998) has been identified as important to policy makers trying to facilitate the emergence of such systems (Oughton et al., 2002; Asheim et al., 2007) and to firms striving for competitiveness through innovation and networking in a globalized world (Porter, 2000; Cooke et al., 2004). In particular, government sponsored research and innovation

initiatives typically involve a large number of distributed and networked actors and they are launched when market mechanisms are not seen as enough to produce a change in innovation performance. Public interventions, in the shape and form of government sponsored initiatives, are intended to facilitate this transformation process, making it faster and more flowing.

Despite the upsurge in interest in supporting research and innovation, we know little about the challenges associated with managing networks that support cross-industry collaboration based on government sponsoring (Doeringer and Terkla, 1995). This holds true even if we include evidence from the fast growing stream of literature on technology and innovation management (Linton and Thongpapanl, 2004). Against this backdrop, we draw on theory on design and orchestration of innovation networks (Dhanaraj and Parkhe, 2006) to analyze a large-scale government sponsored research and innovation program, “ProcessIT Innovations” (in short, *ProcessIT*) that was initiated by the process industry and designed to increase competitiveness and accelerate economic growth in Northern Sweden. The program was launched in 2004 as a joint venture between commercial and public interests, and it engaged the traditionally strong local process industry as well as the emerging local IT industry in a network with many participating firms, public authorities, and local universities.

Grounded in the case and drawing on extant innovation research, we investigate the following research question: *what are the challenges associated with managing government sponsored research and innovation networks to improve firm competitiveness*

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and stimulate growth through cross-industry collaboration? Insights into this issue can contribute to current theory on research and innovation and provide useful guidance for firms seeking to increase their innovation capability as well as policy makers and funding agencies facilitating economic growth.

In the following, we review the literature on innovation and innovation management, followed by a presentation of the theoretical framing we used to analyze the case. Next, we present our research design, the context of the case and the results from the analyses. In conclusion, we discuss the challenges associated with designing and orchestrating the observed research and innovation network. In addition, we propose a model of managing innovation networks through fertilization across industries and between firms and research institutions.

2. Theoretical background

Van de Ven (1986, p. 590) pointed out that “few issues were characterized by as much agreement as the role of innovation and entrepreneurship for social and economic development”. This statement echoes early work of Schumpeter (Schumpeter, 1942) about the utmost importance of innovation for firms and society as a whole. Today, this still holds true. In order to stay competitive, firms have to continuously find new ways to conduct and stimulate competitive innovation processes (Van de Ven et al., 1999; Chesbrough, 2003; Van de Ven, 2005; Chesbrough et al., 2006; Tidd and Bessant, 2009). Such efforts require collaboration with external partners (Van de Ven, 2005; Chesbrough and Schwartz, 2007; Chesbrough and Prencipe, 2008) in more open (Chesbrough, 2003; Chesbrough et al., 2006), diverse (Van de Ven, 2005), and distributed configurations (Coombs and Metcalfe, 2002; Boland et al., 2007). Hence, in order to stay competitive, firms must manage innovation processes in increasingly complex situations with growing numbers of diverse actors (Van de Ven, 1986; Roberts, 1998; Van de Ven et al., 1999).

Innovation that targets economic growth in a specific geographical area is typically constituted through ongoing interactions between industrial partners and supporting institutional infrastructures that include research, higher education, business associations, and technology transfer agencies (Asheim and Isaksen, 1997; Lundvall and Borrás, 1997). The value of such innovation systems depends on their ability to help firms address the dilemmas they face, for example when projects require extraordinary investments in situations where outcomes remain uncertain (Heidenreich, 2004). Such value may indeed be created because “close inter-firm communication, socio-cultural structures and institutional environments may stimulate socially and territorially embedded collective learning and continuous innovation” (Asheim and Isaksen, 2002, p. 83). Also, due to the geographical proximity dimension of the participants, firms within such systems can create, acquire, accumulate, and utilize knowledge faster than outside firms (Maskell and Malmberg, 1999) knowing it is difficult to transfer local capabilities built over time to other types of contexts (Lawson and Lorenz, 1999, p. 310).

Innovation research has in this way moved beyond the firm level to help understand the role of interdependencies between firms and how larger networked environments can facilitate innovation. This has exposed an inherent tension between local and global firms, and between the interest held by public policy makers and the commercial interest held by firms and venture capital. As firms increasingly collaborate and operate at national and international levels, locally created values increasingly transform into global values (Teece, 1986; Wright et al., 2005; Yamakawa et al., 2008). The increasing globalization has, at the same time, reinforced an interest in geographical innovation systems to help understand how unique types of local knowledge can help firms compete globally.

Accordingly, the increased appreciation of innovation systems relates to their importance to local and global economies (Porter, 1996, 1998, 2000) as well as to the competitiveness of the involved firms (Lundvall, 1992, 1994; Storper, 1995; Malmberg et al., 1996; Maskell and Malmberg, 1999; Ffowcs-Williams, 2000; Boschma, 2005). Extant research has combined disciplines such as regional science, policy studies, and innovation economics to focus on economic development and innovation performance across different parts of the world and to inform politicians and policymakers on how to handle innovation challenges (Cooke et al., 2004). However, few studies have examined how innovation can be managed from within particular collaboration configurations. Specifically, we found no studies that investigate the challenges associated with designing and orchestrating innovation in specific contexts that involves researchers in cross-industry collaboration.

Government sponsored research and innovation efforts are common, especially in Europe. As a result of the importance of firm-level innovation for economic development, they are politically relevant for governments. Therefore, governments grant subsidies to help firms overcome market imperfections (Schwartz and Clements, 1999). These subsidies are typically aimed at supporting research and innovation activities and reducing existing financing gaps. By doing so, governments attempt to stimulate the economy and ensure economic development. The granted subsidies are expected to have higher social returns than the funds invested by governments (Kleer, 2010), justifying the expenditures of governments on subsidies for firm-level innovation. Schwartz and Clements developed the following definition of subsidy:

In most general terms, a subsidy can be defined as any government assistance that (i) allows consumers to purchase goods and services at prices lower than those offered by a perfectly competitive private sector, or (ii) raises producers' incomes beyond those that would be earned without this intervention (Schwartz and Clements, 1999, p. 120).

This definition distinguishes two kinds of subsidy recipients: consumers and producers, and gives a very broad description of subsidies: any government assistance. As governments try to encourage private expenditures on research and innovation by offering public subsidies (Gonzalez and Pazó, 2008), they may actually experience the opposite: public expenditures reduce private expenditures because firms use public funds as a replacement for their own investments, a phenomenon known as ‘crowding out’ (Cumming and MacIntosh, 2006). As a result, researchers have investigated the effects of public subsidies on private research and innovation expenditures (Clausen, 2009).

Turning to the general literature on innovation management, we also found limited focus on fostering innovation in specific contexts by involving researchers in cross-industry collaboration. Parts of this literature discuss innovation management in open innovation processes and innovation networks, but the perspective taken is almost exclusively from the view of single firms (Tidd, 2001; Chesbrough, 2004; Dhanaraj and Parkhe, 2006; Vanhaverbeke and Cloodt, 2006; Ojasalo, 2008) rather than from broader geographical systems of innovation. Some notable exceptions include Tidd (2001) who argues for the need to take a broader view on innovation management, and Vanhaverbeke and Cloodt (2006) who discuss aspects of innovation in dyadic and inter-organizational settings. More specifically, Tidd and Bessant (2009) provide four major arguments to why organizations might want to push for greater levels of networking in their innovation processes. These arguments relate to collective efficiency, collective learning, collective risk taking and the intersection of different knowledge sets. Also, a review of characteristics of high value innovation networks in the UK identified the following success factors: highly diverse partners, third-party gatekeepers, financial leverage, and proactive partner engagement

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