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Creating value in ecosystems: Crossing the chasm between knowledge and business ecosystems

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ABSTRACT

Policy makers take initiatives to stimulate knowledge ecosystems in technology hotspots. It is implicitly assumed that these ecosystems will lead to value networks through which the participating companies can realize a competitive advantage. Value networks refer to business ecosystems where the value proposition is offered by a group of companies which are mutually complementary. The strategy literature suggests that business ecosystems lead to competitive advantages for each of the partners in the ecosystem. Based on a unique hand-collected database of 138 innovative start-ups in the region of Flanders, we analyze the knowledge and business ecosystem and the financial support network. We find that the knowledge ecosystem is well structured and concentrated around a number of central actors while the business ecosystem is almost non-existent at the local level. Further, we find that the financial support network is almost 100% publicly backed and fails to bridge the knowledge and business ecosystem. The implications for policy makers who tend to focus on the development of local ecosystems are discussed.

1. Introduction

The literature has long recognized the advantages for innovative start-ups to be localized in geographical hotspots, usually centered around leading universities and public research organizations (Link and Scott, 2003; Van Looy et al., 2003; Löfsten and Lindelöf, 2001; Pouder and St John, 1996; Saxenian, 1996, 2006; Zucker and Darby, 2001). The flow of tacit knowledge between companies and the mobility of personnel (Saxenian, 1996, 2006) have been advanced as the main advantages of geographic co-location which characterize these hotspots. Such hotspots have been characterized as knowledge ecosystems where local universities and public research organizations play a central role in advancing technological innovation within the system.

In contrast, the strategic management literature focuses on business ecosystems as sources of competitive advantage for individual companies (Iansiti and Levien, 2004). A business ecosystem finds its roots in the idea of value networks (Normann and Ramirez, 1993) and can be seen as a group of companies, which simultaneously create value by combining their skills and assets (Eisenhardt and Galunic, 2000). Business ecosystems create value for an individual participant only when the participant is not capable of commercializing a product or service relying on its own competences (Lin et al., 2010). Such ecosystems are organized as complex networks of firms whose integrated efforts are focused on addressing the needs of the end customer. There is a growing consensus that business ecosystems provide entrepreneurial firms with resources and information to navigate in a constantly changing competitive environment (Zahra and Nambisan, 2012). Quite often, it is implicitly assumed that business ecosystems are the automatic consequence of setting up a knowledge ecosystem. However, to date, it is not clear whether the success factors that lead to knowledge ecosystems are similar to those for business ecosystems. Companies participating in a knowledge ecosystem which can make use of knowledge available in the region may not necessarily mean that these companies will also participate in the same business ecosystem. Hence, in this paper we explore the question of existence of a relation between knowledge and business ecosystems.

This question is of particular interest from a policy perspective as policy makers increasingly invest in regional innovation systems, which foster the creation of innovative start-ups around so-called knowledge hubs, using successful examples such as Silicon Valley as a benchmark (Engel and del-Palacio, 2011). We focus on whether such a knowledge ecosystem translates into a business ecosystem and draw conclusions for innovation policies aimed at fostering business ecosystems.

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We make use of a unique hand collected database of 138 innovative start-ups in the region of Flanders, founded between 2005 and 2011. The companies were those which agreed to collaborate from a total database of 178 companies identified through public innovation advisors as start-ups in this region which could apply for a business plan development grant because they were developing a product or service based on or contingent on novel technologies that did not exist yet in Flanders. Since these innovation advisors receive incentives to identify innovative start-ups and guide them toward channels of public support, we are confident that these companies approximate the total population of innovative start-ups in that period. For each company we constructed the knowledge ecosystem they were embedded in, the business network they participated in, and the financial support network they made use of.

We find that the density of the knowledge ecosystem was much higher than the business ecosystem and was dominated by those knowledge institutes which had developed incubator/accelerator facilities and formal tech transfer offices. The business ecosystem's density was extremely sparse with only dyadic relations and a high amount of international partners, indicating that there is no overlap. Also the density of the financial support network was rather sparse, with only 40% of the start-ups participating in that network. It was dominated by public funds which took a central role while the private sector was almost completely absent. We found that working together with the top central actors in the knowledge network has a positive impact on the innovation output of innovative start-ups, but collaborations with average technology partners typically has a negative impact. Further, our findings show that receiving financial support from public funds, typically associated with these knowledge actors, does not help the knowledge production function of these companies at all. Since neither the knowledge ecosystem nor the financial support network directly contributes to short term survival of innovative start-ups, the lack of a business ecosystem has severe policy implications.

The paper unfolds as follows. First, we review the literature on knowledge and business ecosystems. We subsequently describe the method we used to collect and analyze the data. Finally, we discuss the results and their implications for our understanding of knowledge and business ecosystems and the innovation policies developed to support them.

2. Literature review

2.1. Knowledge ecosystems

The knowledge ecosystems literature has explored the mechanisms by which geographically clustered organizations benefit from their locations (Jaffe, 1986; Almeida and Kogut, 1999). This research stream has identified the reduced costs of moving people and ideas as the primary sources of advantage from being located in technological clusters (Clark et al., 2000). In addition to external economies of scale which allow firms in these ecosystems to benefit from collective resources, local spillovers make their technology development efforts more fertile than those of their isolated competitors (Agrawal and Cockburn, 2002). Both linkages among firms and with universities and public research organizations as well as intense labor mobility across different players facilitate collective learning and increase the speed of innovation diffusion (Baptista, 1998). As a result, physical proximity to knowledge generators such as public research organizations (PROs), universities and large firms with established R&D departments typically have a positive influence on the focal firm's innovative output (Phelps et al., 2012).

Contemporary literature on knowledge ecosystems has analyzed the extent to which a focal company's centrality in a global research network can substitute for not being part of a local technology hotspot (Owen-Smith and Powell, 2004; Whittington et al., 2009). The main findings show that in a biotech environment, participating in a global research network can partly substitute the lack of geographical proximity to a technology hub in terms of its impact on the innovative output of the focal firm. However, being part of a dense knowledge ecosystem such as the Boston, San Diego and San Francisco Bay areas remains the most important predictor of innovative output of a biotech company (Whittington et al., 2009). In other words, from a policy perspective, creating such a dense knowledge ecosystem remains the best guarantee to spur a high degree of innovation in the area.

Powell et al. (2010) analyzed the critical success factors in developing biotech knowledge ecosystems in the San Francisco Bay area, the Boston and Cambridge, MA area, and Northern San Diego County. They consider two features and one mechanism to be central to the development of knowledge ecosystems: (1) a diversity of organizational forms and (2) the presence of an anchor tenant, and (3) the mechanism of cross-realm transposition. First, a diversity of organizational forms generates divergent standards and multiple kinds of rules, resulting in competing criteria for gauging success (Boltanski and Thévenot, 2006). Including groups of organizations in the different parts of the value chain increases the adaptive capacity of the ecosystems more than if the system is dominated in only one area (Baptista, 1998). The availability of different actors such as universities and public research organizations, entrepreneurial firms, established companies, and venture capital firms has also been described in contemporary works on regional clusters (Saxenian, 1996). A second crucial feature is the presence of an anchor tenant. Anchor tenants assist in providing access to subsequent connections and field formation and hence actively spur economic growth (Agrawal and Cockburn, 2003). The anchor tenant is not disinterested, in the sense of being neutral, but does not directly compete with the other types of organizations that inhabit the community. Local universities or PROs can fulfill the role of anchor organizations in the knowledge generation process (Agrawal and Cockburn, 2002). These institutions produce basic and applied research and act as catalysts of technological innovation by transferring this to local industry through R&D collaborations. In turn, firms utilize this knowledge for industrial and commercial purposes (Friedman and Silberman, 2003). Diversity and anchor tenants alone are usually not sufficient to spur the emergence of an ecosystem, however. Some form of cross-network alignment is needed in which ideas and models are transposed from one network of organizational forms to another, for instance when the venture capital logic spills-over into the academic community in the context of spin-off ventures (Wright et al., 2006). This mechanism is called cross-realm transposition.

Powell et al.'s. (2010) analysis focuses on the development of knowledge ecosystems in the particular setting of biotechnology. In the biotech industry, the mere presence of innovation output creates immediate economic value. Organizational growth in this industry results mainly from building an IP portfolio which ultimately gets sold to an incumbent company on the market for technology or firms (Clarysse et al., 2011). R&D alliances between biotech firms and other research active organizations dominate in this environment and are good predictors of exploitative alliances which determine the commercial potential of the biotech company (Rothaermel and Deeds, 2004). As a result, biotech start-ups with a central position in the knowledge creation network of R&D alliances also tend to be successful in setting up exploitative alliances with large pharmaceutical companies to capture the value of their technology.

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