



# Firms' innovation benefiting from networking and institutional support: A global analysis of national and firm effects



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## ABSTRACT

Firms' networking for innovation is embedded in institutions of society, where national policies are increasingly designed to provide institutional support for firms' networking and thereby benefit innovation. But, globally, what are the quantitative and qualitative effects of institutional support for networking and, in turn, for innovation? 68 countries with 18,880 firms were surveyed in the Global Entrepreneurship Monitor, enabling generalization to the firms in the countries around the world. Two-level modeling shows that firms' networking benefits both process and product innovation. Institutional support does not significantly affect quantity of networking, but greatly enhances quality of networking in the sense that support for networking in a country enhances the benefits of networking for both process and product innovation. Contrasting low and high support for networking leads to estimating that institutional support for networking can increase the benefits of networking considerably for both process and product innovation.

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## 1. Introduction

During the last two decades much research has considered enterprise networks as the “locus of innovation” (Powell et al., 1996; Ahuja, 2000). Research examines how firms in complex and dynamic business environments have shifted innovation towards inter-firm endeavors in which collaborative networks bridge complementary and increasingly specialized firm competencies and provide for fast and flexible responses to market demands and opportunities (Das and Teng, 1998; Ahuja et al., 2008). In accordance with this view, several reviews confirmed that innovation flourishes within inter-firm networks (Rogers, 2004; Powell and Grodahl, 2005).

However, findings on the impact of firms' collaborative networking on their innovation are ambiguous. Study results have disagreed on the impact of different types of networks; some not being significantly associated with firms' innovativeness, and some network types even showing negative impacts on firms' innovativeness (Nieto and Santamaría, 2007; Lhuillery and Pfister, 2009). Similarly, research on the firms' innovation benefits from occupying different network positions have been inconclusive on the impacts of network size, centrality, cohesion, and other proper-

ties of networks (Zheng, 2010; Rost, 2011). Such inconsistencies have led several researchers to suggest a contingency approach to study the impact on networks on innovation (Tsai, 2009; Rost, 2011; Zheng, 2010).

Contingency studies of innovation networks have so far primarily been focused on moderating impacts from firm characteristics (Tsai, 2009; Zheng, 2010), and difference between industries (Rowley et al., 2000). However, only little empirical research has attended to the potential moderating impact from the institutional environment surrounding firms and their collaborative networks. Such scarcity is surprising given the large interest in examining cross-national differences in innovation, and given the interest of policy makers in designing framework conditions for facilitating inter-firm collaboration through geographical industrial clusters, incubator milieus, etc. play a significant role in boosting innovation within and between regional firms (Lundvall, 1992; Freeman, 2002; Autio et al., 2014). Knowledge of how the impact of networking on innovation is contingent on institutional structures would provide recommendations for the structuring of such framework conditions.

The awareness that firms' networking for innovation is potentially contingent on the surrounding institutional environment has previously been advocated by Owen-Smith and Powell (2004). Since then, several studies have provided important knowledge of how collaborative relationships among firms depend on institutional structures. For example, Chua et al. (2009) found that

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institutionalized arrangements, as they differ among countries, entail different levels of cognition-based trust. Also, countries vary in their development and enforcement of formal institutions such as contract law (Stephan and Uhlaner, 2010). Whether such institutions are culturally grounded or established by formal law, they contribute to a social order holding specific properties that guide and direct the exchange of resources among firms, including exchange of resources for innovation. Following this reasoning, some institutional environments will expectedly be more supportive of innovation through networks, while some will be less supportive.

This embeddedness of innovation in networks along with the embeddedness of networks in institutions have received only scant attention, as lamented in recent reviews (Phelps, 2010; Autio et al., 2014; Stam et al., 2014). A notable exception is a study of the alliance networks of 109 firms in nine countries (Vasudeva et al., 2013a,b). The study found that country differences in underlying norms for collaboration, as reflected in national institutional arrangements for inter-organizational collaboration, was associated with different patterns for partner selection in strategic alliances, and with different innovation potentials from occupying structural holes. Additionally, research on national and regional systems of innovation has generated many case studies and some comparisons, insightfully perceiving local systems, but little evidence on the world's variability and little possibility for globally disentangling and assessing joint effects of institutions and networking on innovation (Andersen, 2012; Guan and Chen, 2012; Rodríguez-Pose and Di-Cataldo, 2014; Guan et al., 2016).

The gap is thus a lack of knowledge about the joint effects of networks and institutions upon innovation. This frames our research question, *How are firms' innovation affected by their networking, as these endeavors are embedded in institutions in society?* The contribution here is to assess not only the separate benefits of networking and institutional support, but to ascertain how benefit of networking for innovation differs around the world depending on institutions. By using a large sample of firms in many countries which are approximately representative of the world, our results can be generalized to the world. We use two-level modeling to ascertain direct and moderating effects of institutions on firm-level behavior, modeling that is increasingly used in research on entrepreneurial and innovative activity (Bosma, 2013; Stenholm et al., 2013; De Clercq et al., 2011; Levie et al., 2014).

The following Section 2 reviews research and argues for a two-level approach to examine direct effects of institutional support for networking at the country level and of networking at the firm level on innovation, and also the moderating effect from a country's institutional support for networking on the benefit of networking for innovation. Section 3 describes our design and data for analyses at the country and firm levels. Section 4 presents the results and discussion. Section 5 summarizes the results, considers implications for theory and practice, proposes directions for future research, and considers limitations.

## 2. Theoretical background and hypotheses

Theorizing combines the macro-level of institutions and the micro-level of firms pursuing networks and innovation, as depicted in Fig. 1. First we review firm-level effect of networking upon innovation, the horizontal arrow. Then we consider national-level institutional support for networking as it affects networking at firm-level, as a cross-level effect, the sloping arrow. Finally, we argue for a moderating effect of a country's institutional support upon benefit of networking, the vertical arrow.

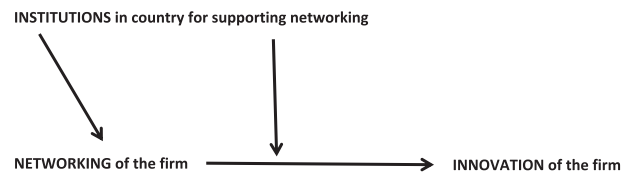


Fig. 1. A two-level perspective on institutions, networking and innovation.

Institutional support for networking is expectedly promoting innovation indirectly, by promoting networking that benefits innovation, but is not expected to directly affect innovation.

### 2.1. Network effects on innovation

During the last decades, networks have become prominent in the innovation literature (Pittaway et al., 2004; Ozman, 2009; Parmigiani and Rivera-Santos, 2011; Leyden et al., 2014). This turn was driven by increasing dynamic and uncertain business environments and changes in inter-firm dynamics around increasing specialization and new management logics favoring inter-firm cooperation (Zaheer et al., 2000; Helfat and Peteraf, 2009; Chesbrough, 2003). The increase in scientific and productive knowledge makes knowledge develop faster outside than inside firms (Huber, 2004). To keep abreast, firms pursue external relationships to gain timely access to new knowledge and to exploit new opportunities within shortened windows of opportunity.

The basic proposition is that networks benefit innovation by linking ideas and resources held by otherwise unconnected actors and thereby bring novelty through processes of recombination (Burt, 2000; Obstfeld, 2005). From this perspective several theoretical approaches have contributed to the understanding of the mechanisms for information and knowledge transfer among actors. Challenges may include high transaction costs and difficulty of acquiring tacit knowledge (Dhanaraj and Parkhe, 2006). Important social control mechanisms in the form of trust and reciprocity may reduce risk of malfeasance and hence transaction costs (Dyer and Singh, 1998). Also, inter-firm complementarity and shared understandings, which are enhanced by relational experience, trust and reciprocity, seem to decrease cognitive barriers to knowledge transfer and to increase benefits of inter-firm relationships (Powell and Grodal, 2005; Jensen and Schøtt, 2015).

Evidence shows how firms' innovation can benefit from collaboration with diverse partners such as clients, customers, suppliers, distributors and even competitors. However, innovation benefits seem to be different from different kinds of partners (Schøtt and Sedaghat, 2014; Zeng et al., 2010), and innovation partnerships may mal-function (Lhuillery and Pfister, 2009; Lokshin et al., 2011). The use of external sources not only enhances combinatory potential, but also enables tailoring products to customer requirements (Lipparini and Sobrero, 1994). Likewise, networks help overcoming liabilities of newness and smallness in commercialization of innovative products (Partanen et al., 2011). Interactions with different types of partners are likely to facilitate various stages of the innovation process (Love et al., 2011), and different types of collaborative partners vary in benefits for product and process innovation (Fitjar and Rodríguez-Pose, 2013). A study found that cooperative arrangement for innovation made with suppliers, customers, clients, competitors, universities, consultants, private research institutes, government institutes and research associations, and research and technology organizations—increased novelty of products for market (Tether, 2002). Another study found that collaboration with suppliers, collaborators, and research organizations benefitted innovativeness, but also found that collaboration with competitors was detrimental (Nieto and Santamaria, 2007). This challenge

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