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Networks for the commercialization of innovations: A review of how divergent network actors contribute

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ABSTRACT

Successful commercialization is of great importance to innovative firms, and the recent literature has increasingly acknowledged that networks make a contribution not only to research and development but also to commercialization. However, research on networks facilitating the commercialization of innovations is scattered across divergent disciplines. A single company is rarely capable of generating successful diffusion in the commercialization of an innovation; success often requires cooperation between individual actors and organizations, and support from stakeholders. Consequently, the network aspect of commercialization is crucial. The aim of this study is thus to integrate the knowledge on how current research and business has employed the network approach in commercialization, and how contributors external to the innovator firm can facilitate the commercialization of innovations. On the basis of an extensive metatheoretical literature review and a qualitative and quantitative content analysis on articles linking networks explicitly to commercialization, this study produces a conceptual synthesis on network actors' contribution potential to commercialization. The analysis identified divergent network approaches to commercialization and gathered extant knowledge on "commercialization networks" from the multidisciplinary literature of innovation management, marketing, management, technology, entrepreneurship, and other relevant disciplines. Networks for commercialization have been linked to divergent network approaches, such as industrial networks, social networks, strategic networks, and entrepreneurship networks. According to the findings, customers and users, distributors, complementaries, suppliers, investors, associations, public organizations, and policy makers and regulators can support commercialization by performing practical commercialization tasks, facilitating innovation adoption/diffusion and creating markets. We also identified four modes of contribution. In terms of methods, qualitative research dominates current examinations on the topic while longitudinal research and investigations from multiple network actors' perspectives are almost absent. The results also indicate a need to develop coherent conceptualizations and accumulate knowledge that would strengthen the theoretical basis of the research. A pivotal contribution of this article is that it is the first to generate an integrative framework and a research agenda on networks for commercialization — a theme that is emergent, multifaceted, and crucial to innovative companies.

1. Introduction

Innovations are increasingly developed within networks and hence there is a great deal of research being conducted on how networks and collaboration contribute to innovation development. However, commercialization in particular is known to be a critical part of the innovation process and most innovations fail in that phase (Chiesa & Frattini, 2011; Di Benedetto, 1999). Challenges in commercialization originate from the novelty of innovations which complicates the adoption of new solutions by raising adoption barriers, and leads customers and other actors in the business environment to resist new solutions (Chiesa & Frattini, 2011; More, 1983). Few firms have the capability to develop and manage innovations internally; success often requires cooperation between individual actors and organizations (e.g., Story, Hart, & O'Malley, 2009). And especially in commercialization, a new product or service requires acceptance and diffusion among networked market actors; a new product tends to fail if it does not attract support from stakeholders (Talke & Hultink, 2010).

As a single company is rarely capable of generating successful diffusion in the commercialization of an innovation, the network aspect in commercialization is crucial. To have a product with supreme technical features alone is often not enough, and support for commercialization

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from the surrounding network is required for innovation success. Due to the interconnectedness of market actors and technologies, innovation adoption is impacted by many interrelated organizations and individuals who reciprocally influence each other's behavior, and who will not switch to a new product unless they are convinced that most of the other players will also switch — a situation that is highly typical to some industries, such as interconnected high-tech (see Chakravorti, 2004; Chiesa & Frattini, 2011). In sum, network players' support is needed to promote an innovation in commercialization.

So the question is how network actors can support innovator firms in commercializing new products and services. Recent research has increasingly indicated that network actors can contribute not only to R&D but also to divergent aspects of commercialization. In the field of innovation management, research has shown that small innovator firms can commercialize their innovations by combining resources in their networks to enter new foreign markets (Tolstoy & Agndal, 2010), and that adoption networks that may facilitate innovation adoption determine how an innovation might succeed in markets (Chiesa & Frattini, 2011). Investigations have shown that user networks can be activated to support product launch (Harrison & Waluszewski, 2008), and peer networks create community pull effects (Hienerth & Lettl, 2011); thereby emphasizing the users' contribution to commercialization. According to recent entrepreneurship research, a portfolio of network relations with suppliers, distributors and customers helps small, new innovative firms acquire resources to commercialize incremental and radical innovations (Partanen, Chetty, & Rajala, 2011). In the field of business and marketing, recent research emphasizing interorganizational networks (particularly the IMP school) has evidenced that an innovator firm can intentionally activate its divergent network relations to advance commercialization and innovation success as an element of the firm's commercialization competence (Aarikka-Stenroos & Lehtimäki, 2013; Aarikka-Stenroos & Sandberg, 2012). Relational competences of firms developing radical innovations can be deployed also for commercialization (Story, O'Malley, & Hart, 2011). Research emphasizing innovation networks has noted that the shift of resources from in-house commercialization activities towards collaboration with distributors and other actors seems to enhance commercialization success (Perks & Moxey, 2011). Furthermore, the literature emphasizing the strategic network approach suggests that innovative firms' networking creates new fields of business and markets for innovations (Möller & Rajala, 2007; Möller & Svahn, 2009). Our study thus assumes that diverse networks and relations can help overcome commercialization challenges, advancing commercialization by providing manifold complementary support and resources, and establishing a supportive context in which a new product might endure.

Even though findings by previous researchers indicate divergent network actors' crucial impact on commercialization and the relevance of the phenomenon, the extant literature does not provide systematic or integrative analysis of the divergent network actors contributing to the commercialization; consequently, we still lack knowledge on networks for commercialization. Given the centrality of commercialization to innovation success, it is vital that contemporary research generates a deeper understanding on the value of relationships, networks, and interactions to the commercialization of innovations. However, the pace and disconnect of rapidly expanding research also generate a situation in which the knowledge on networks for commercialization does not accumulate. *Therefore, the aim of this study is to aggregate the current knowledge on how contemporary research and business have employed the network approach in commercialization, and construe how contributors external to the innovator firm can contribute to the commercialization of innovations*. We favor the school of thought which states that the innovator firm can intentionally develop and orchestrate its network relations with divergent actors for commercialization; our assumption thus follows the basic notions of the strategic network approach (e.g., Gulati, 1998; Möller & Rajala, 2007). We perceive that knowledge on how to employ networks for commercialization is becoming increasingly important for companies facing ever tighter financial conditions and growing competition, and for researchers who aim to advance understanding on the role of networks in the development and diffusion of innovations.

To integrate and structure the extant knowledge on networks for commercialization, this article conducts an extensive metatheoretical literature review (see Torraco, 2005). To map the multidisciplinary research area, we first answer the following research questions: 1) How are networks for commercialization discussed in the current research (i.e., the main approaches, the key concepts and terms related to networks for commercialization)? 2) What are the current research methods and which kinds of innovation and context are studied with regard to networks for commercialization? We will then be better positioned to answer our ultimate research question: 3) What kinds of network actor contribute to commercialization and how do they contribute? In order to answer these three questions we employed a multidisciplinary database, Ebsco Business Source, to identify articles linking networks to commercialization, and analyzed them through systematic content analysis.

This article makes a pivotal contribution inasmuch as it is the first to generate an integrative framework on networks for commercialization — a theme that is emergent, multifaceted, and crucial to innovative companies. The analysis also seeks to clarify the incoherent terminology that originates from the diversity of approaches to the phenomenon. Mapping this rapidly evolving research, which links networks and commercialization both in content and methods will enable researchers and managers to employ current knowledge in their research and businesses more effectively; for example, researchers could position their studies more appropriately and practitioners become aware of the full contribution potential of network actors in their innovation business. We will also generate an agenda for further research as an outcome of our analysis.

Our paper is structured as follows. First, we present a short theoretical review with definitions of relevant concepts, such as networks and commercialization. The next section explains the methodology associated with the collection of the research data, and the content analysis of the identified research articles. We then identify key findings regarding networks for commercialization, propose a synthesis of commercialization networks, key actors, contributions, and their applicability to diverse innovation contexts, and construct an integrative framework on networks for commercialization. Theoretical and managerial implications follow as the research results enable us to suggest directions for researchers to study commercialization and networks, and to develop terminology; and for managers to develop the application of divergent networks for commercialization within divergent innovation industries. Finally, we discuss the limitations of the paper.

2. Theoretical focus and key concepts on networks for commercialization

The term *network* for commercialization can be linked to divergent network approaches with different thematic emphases and background assumptions. Multiple established network approaches include for example strategic networks, industrial networks (IMP), social networks, innovation networks, network theory, and the economics of networks (see Table 1). The network approaches differ particularly in terms of the respective focal actors, what determines the network, and how the actors are managed (see e.g., Araujo & Easton, 1996). The networks also have internal linkages and confrontations; for example, innovation networks tend to apply strategic network assumptions, and IMP network and strategic network approaches disagree on the aspect of network management. The current divergent network research in relation to commercialization has studied both organizations' strategic or operational collaboration for commercialization (e.g., Möller & Rajala, 2007; Partanen et al., 2011; Perks & Moxey, 2011) and individuals' impact on successful adoption improving commercialization (e.g. Hienerth & Lettl, 2011). In this study, network for commercialization refers to an