When and with whom to cooperate? Investigating effects of cooperation stage and type on innovation capabilities and success

Benjamin Weber, Sven Heidenreich*

Faculty of Law and Economics, Saarland University, P.O. 15 11 50, 66041 Saarbrücken, Germany

**Abstract**

In times of saturated markets and decreasing product life cycles, the continuous development and successful launch of innovations are essential for profit-oriented organizations of any kind. Interorganizational cooperation enables companies to get better access to knowledge and capabilities in order to generate and successfully introduce innovations. While scientific research and management practice have acknowledged the importance of cooperation, little research effort is dedicated to empirically determine the effectiveness of cooperation intensity within different stages of the innovation process (cooperation stage) and with different partners (cooperation type). This article aims to fill these gaps by empirically examining the effects of cooperation intensity with different kinds of partners (horizontal, vertical and institutional cooperation) in different stages of new product development (concept and product development as well as implementation stage) on innovation capabilities and success of individual companies. Drawing upon a sample of 154 high-tech companies from the German B-2-B sector, our results reveal that it is in general beneficial for a company to cooperate. However, cooperation in concept and product development primarily improves a company’s innovation capabilities while cooperation in the implementation stage primarily enhances innovation success of a company. With respect to cooperation type, vertical, horizontal as well as institutional cooperation significantly enhance innovation capabilities and success of a company. However, cooperation with institutional partners was found to be the most important contributor throughout all stages.

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**Introduction**

Developing and selling new products to the customer was always a challenging task for companies. Shorter product life cycles, rising expenditures on R&D and saturated markets are one of the biggest challenges companies are faced with (Diez, 2000; Ghemawat, 2010). To overcome these obstacles companies not only introduce products faster in the market, but also with higher quality and with less costs in comparison to former years (Nieto and Santamaría, 2007). Therefore, the market pressure on companies is steadily growing. If companies want to survive they have to respond quickly to new trends and develop the adequate skills and capabilities to acquire and implement emerging technologies (Zhou and Li, 2010). But often...
an organization is unable to provide some of these mentioned prerequisites (Tidd et al., 2005). Hence, in order to successfully innovate, companies need to engage in cooperation to get access to other entities’ resources and capabilities (Heidenreich et al., 2016; Wissem and Euser, 1991).

While a moderate body of research is concerned with cooperation management in general (Håkansson and Snehota, 1989; Henneberg et al., 2010), research on cooperation that aims specifically at fostering innovation has just recently received more attention (Clauss and Spieth, 2016; Gemser and Leenders, 2011; Rampersad et al., 2010). Several studies have examined how cross-functional and thus internal cooperation throughout the different stages of the innovation process influences project, innovation and/or firm performance (Cuijpers et al., 2011; Leenders and Wierenga, 2008). However, only a few studies have yet examined how external cooperation at different stages of the innovation process affects innovation success. Still, given the rising need of companies to form cooperation outside the organizational sphere to enhance innovation capabilities and success while available resources are shrinking (Jifeng and Di Benedetto, 2012; Wissem and Euser, 1991), it seems of utmost importance to know which innovation stage and which cooperation type is the most effective one to improve innovation performance. However, studies focusing on external cooperation only looked at an isolated part of the innovation process but neglected to examine the effect of external cooperation throughout all stages of the innovation process. For example Becker and Dietz (2004) examined the role of R&D cooperation in the innovation process and showed that innovation input and output is enhanced by collaborative activities in the early stages. Others, like Aarikka-Stenroos and Sandberg (2012) or Soberman (2009) focused on cooperation within later stages and investigated effects on innovation success within commercialization networks. Consequently, knowledge on the effectiveness of external cooperation throughout all stages of the innovation process is scarce.

In addition, several studies have examined the impact of different cooperation types on innovation capabilities and success (Gassmann et al., 2010a,b; Krause et al., 2007; Oum et al., 2004), but mainly focused on horizontal (competitors) or vertical cooperation (supplier and customer) and excluded institutional ones (universities and research institutes). Only Belderbos et al. (2004) used a more holistic approach and included all mentioned R&D cooperation types to determine their effect on innovations success. However, this study did not differentiate cooperation intensity throughout different stages of the innovation process. In conclusion, it thus still lacks empirical studies that simultaneously evaluate the effectiveness of horizontal, vertical and institutional cooperation throughout all stages of the innovation process and assess their individual contribution to the innovation capabilities and success of a company.

In order to fill these mentioned gaps, we conducted a large-scale empirical study to investigate how cooperation intensity within different stages of the innovation process affects innovation capabilities and innovation success while explicitly accounting for all cooperation types (horizontal, vertical and institutional cooperation). To the best of the authors’ knowledge, this study thus represents the first to provide empirical evidence on which cooperation stage as well as type is most effective for external cooperation and what combination maximizes innovation success. The findings of our study are likely to help companies to identify the right moment and type of partner to cooperate with.

The article is organized as follows: The subsequent chapter deals thoroughly with the conceptualization of the cooperation locus as well as the cooperation partner and their effects on innovation capabilities and success. Thereby, the deducted hypotheses serve as conceptual foundation for our research model. In the ensuing section, we describe our data sample and the corresponding measurements before we evaluate our research model and present our empirical results. The paper concludes with the implications of our empirical results and some avenues for future research.

Conceptual foundation and hypotheses development

When investigating innovation networks, prior research often relies on either a relational or transactional view (Cao and Lumineau, 2015; Hoetker and Mellewigt, 2009; Weber and Heidenreich, 2016). Following the transactional view, performance outcomes of cooperation rely heavily on formal principles to predefine and control the roles of participants as well as the rules and objectives of the cooperation (Clauss and Spieth, 2016; Mayer and Argyles, 2004). According to the relational view, performance outcomes of cooperation are strongly determined by repeated interactions and exchange between cooperation partners that establish a mutual understanding, social identification, and trust between the participants (Clauss and Spieth, 2016; Heidenreich et al., 2016). Since relational mechanisms significantly determine the conditions of cooperation to improve innovation capabilities of participating companies (Lavie et al., 2012; Weber and Heidenreich, 2016), we follow the relational view. Accordingly, and in line with open innovation theory (Chesbrough, 2003; Christensen et al., 2005), we propose that cooperation intensity as a proxy of repeated interactions and exchange with external partners to create joint value will principally enhance innovation capabilities and success. However, as outlined in the introduction, we also suggest that the effect of cooperation intensity might vary depending on the cooperation stage and type. Since both theoretical rationales and empirical evidence on the latter proposition are still scarce, we subsequently conceptualize the focal constructs (innovation capabilities as well as cooperation stage and type), before providing theoretical rationales on how corresponding effects on innovation capabilities and success might differ.

Innovation capabilities

Innovation capabilities are defined as a company’s competence to acquire as well as to assimilate novel knowledge and to transfer this knowledge in new products or services. While conceptualizations of innovation capabilities vary quite fairly
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