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How businesses should govern knowledge-intensive collaborations with universities: An empirical investigation of university professors

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ABSTRACT

In light of the high relevance of universities as sources of knowledge, university-business collaboration (UBC) offers significant opportunities for businesses with respect to making use of external academic research and innovation support. Unlike knowledge-intensive collaboration with other businesses, UBC has particularities which need to be considered, notably the role of professors as individual decision makers. Additionally, to assign intellectual property rights to knowledge and to reduce the danger of opportunistic behavior, mutually beneficial UBC requires adequate governance mechanisms. As previous research has not investigated the effects of governance mechanisms on knowledge sharing (knowledge combination, learning, and co-poiesis) and the achievement of joint goals in UBC, our empirical study covering 415 German professors examines these relations. We find a positive influence of relational governance and a negative influence of transactional governance on knowledge sharing in UBC. Regarding the influence of knowledge sharing on the achievement of joint goals, we find positive impacts of knowledge combination and co-poiesis and a negative impact of learning on the achievement of joint goals.

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1. Introduction

Within the last few years, the relevance of university-business collaboration (UBC) has been increasing remarkably (Perkmann et al., 2013). Collaboration with other organizations in general can provide businesses with external research and innovation support (e.g. Cousins, Lawson, Petersen, and Handfield, 2011; Cruz-González, López-Sáez, and Navas-López, 2015; Feller, Parhankangas, Smeds, and Jaatinen, 2013). Numerous studies show that businesses can significantly increase their innovation performance by collaborating with universities (e.g. Etzkowitz, 2010; Greitzer, Pertuze, Calder, and Lucas, 2010; Perkmann and Walsh, 2007; Rothaermel and Ku, 2008; Winkelbach and Walter, 2015). This is due to the acquisition and generation of external knowledge impossible or more difficult to generate when compared to internal research and development activities (Low and Robins, 2014). Generating and sharing knowledge is a core characteristic of university activities (Rothaermel and Ku, 2008) and knowledge generation was found to be the common factor across various types of UBC (Bozeman, Fay, and Slade, 2013). Interestingly, previous UBC studies tend to understate the actual focus on the process of knowledge sharing in favor of

putting emphasis on how universities contribute to innovation generation (Friedman and Silberman, 2003; Horlings et al., 2006).

Despite the critical relevance of UBC for businesses to acquire external knowledge, unused collaboration potential still exists (Fransman, 2008; Lambert, 2003). This is because UBC, in contrast to other forms of inter-organizational collaborations, is much more driven by individuals (Canhoto, Quinton, Jackson, and Dibb, 2016; Lee, 2000). Professors – in particular in the German context – are in most cases the primary or even only decision-makers concerning UBC projects at the university side (Azagra-Caro, 2007; D'Este and Patel, 2007).

Therefore, it is highly relevant for businesses to understand how professors react to their collaboration management and governance activities. In particular, the so-called “cultural differences” between academia and business practice (Arvanitis, Kubli, and Woerter, 2008; Ylijoki, 2003), which often result in differing attitudes and objectives, might provoke tensions between the actors. Such tensions turn out to be particularly problematic when it comes to the exploitation of UBC results (Canhoto et al., 2016).

Knowledge sharing in UBC typically has to deal with intellectual property (IP) issues and different interests on how the parties plan to exploit the knowledge. While researchers aim to use collaboration outcomes for their research activities, businesses tend to oppose this by non-disclosure agreements claiming exclusiveness (Lee, 2000). Furthermore, as knowledge cannot fully be assigned by IP rights, opportunistic behavior of one party to appropriate the collaboration benefits can take

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place (Bruneel, d'Este, and Salter, 2010). This may hinder knowledge sharing and eventually the achievement of joint goals in UBC.

Considering the potential benefits as well as barriers to successful UBC projects, businesses are well advised to manage UBC in a way that considers the particularities of this kind of collaboration and in particular the role of university professors. Hence, governance mechanisms should be implemented, which serve to define mutual objectives, facilitate coordination, and reduce uncertainties and opportunism (Bradach and Eccles, 1989). However, there is a dearth of literature on how to successfully work with professors in UBC. Few studies deal with the effects of governance from a relational perspective (e.g. trust and communication) (Plewa, Korff, Baaken, & Macpherson, 2013; Plewa, Korff, Johnson, et al., 2013). These show that successful UBC requires a high degree of relational involvement and thus, businesses should set up regular personal interactions and meetings (Canhoto et al., 2016; Perkmann and Walsh, 2007; Plewa, Korff, Johnson, et al., 2013; Winkelbach and Walter, 2015). However, research on inter-organizational collaboration shows that relational governance is not sufficient and should be complemented with transactional governance mechanisms (Abdi and Aulakh, 2014; Bouncken, Clauß, and Fredrich, 2016; Bradach and Eccles, 1989; Cao and Lumineau, 2015; Hoetker and Mellewigt, 2009; Liu, Luo, and Liu, 2009; Poppo and Zenger, 2002). So far, UBC research has largely been ignoring transactional governance mechanisms, although these are critical components of more complex UBC forms (such as e.g. contract and collaborative research) (Freitas, Geuna, and Rossi, 2013). We aim to answer the research question on how businesses should govern knowledge-intensive UBC by examining the impact of both transactional and relational governance mechanisms on various types of knowledge sharing (i.e. knowledge combination, learning and co-poiesis) and indirectly on the achievement of joint goals in UBC (see Fig. 1). Due to the role of university professors as the primary decision makers from the university side in UBC, we analyze this framework from the professors' perspective.

By theoretically developing and testing our model, we contribute to current research in two main ways. First, our findings add to the research stream on governance in UBC (e.g. Freitas et al., 2013; Geuna and Muscio, 2009; Plewa, Korff, Baaken, et al., 2013) as well inter-organizational governance in general (e.g. Cao and Lumineau, 2015; Hoetker and Mellewigt, 2009; Poppo and Zenger, 2002). Second, our research delivers details of knowledge sharing processes in UBC. The separate foci on each type of knowledge sharing provide more differentiated insights into the determinants and the impact of knowledge on the achievement of joint goals. Together, these contributions deliver valuable implications for businesses when designing knowledge-intensive collaborations with universities.

2. Conceptual background and hypotheses development

2.1. Knowledge sharing in UBC

UBC comprises inter-organizational activities between universities and businesses. We use "business" as an umbrella term for all types of organizations external to a university, such as industrial and service companies and non-profit organizations. Particularly for UBC focusing on research and development (R&D) and innovation (Santoro and Bierly, 2006), the sharing of knowledge represents the core activity. Etzkowitz (2010), who regards universities as the predominant actors

in an increasingly knowledge-based society, highlights the linkage between UBC and knowledge sharing. Acquiring external knowledge is one of the core motives for businesses as well as universities to engage in UBC as it drives R&D and academic research (Caldas and Ataíde Cândido, 2013; Fransman, 2008; Lee, 2000). The economic value of knowledge generated within the science system (Horlings et al., 2006) requires a more detailed view on the nature of knowledge sharing.

We define knowledge sharing as the provision or receipt of information, know-how, and feedback (Foss, Husted, and Michailova, 2010; Hansen, 1999) and the development of this knowledge through application and internalization (Grant and Baden-Fuller, 2004).

From a socio-cognitive perspective, knowledge results from shifting or combining cognitive models by observing others in interactions and under the circumstances and rules that define these interactions (Carley, 1997; Sveiby, 1996). Even though cognitive models are individual representations of reality, their emergence is influenced by the social context in which they arise (Beach, 1997). This context provides the basis for organizing and directing knowledge sharing. Hence, knowledge sharing is context-bound and can be influenced by the (inter-) organizational environment and the established governance system (Becerra, Lunnan, and Huemer, 2008).

Table 1 provides an overview of studies conceptualizing knowledge sharing. Many studies differentiate between two types of knowledge sharing in an inter-organizational context. Larsson, Bengtsson, Henriksson, and Sparks (1998) separate the transfer of knowledge from one partner to another from the mutual creation of new knowledge. Buckley and Carter (2000) distinguish between knowledge transfer and knowledge creation. Sveiby (2001) develops a knowledge-based theory of the firm that conceptualizes nine types of knowledge transfers within and across the boundaries of an organization. According to his conceptualization, knowledge transfers are always bidirectional so that knowledge co-creation and knowledge conversion take place. Grant and Baden-Fuller (2004) differentiate between knowledge integration and utilization. The former means that members of an alliance transfer and absorb the partner's knowledge base. The latter states that the partner's knowledge base is used for exploiting complementarities. Bouncken (2008) and Bouncken and Teichert (2013) propose two types of knowledge generation, namely absorption and autopoiesis. Absorption comprises the process of integrating the partners' knowledge, while autopoiesis emphasizes mutual knowledge creation. The four-type classification of Buckley, Glaister, Klijn, and Tan (2009) further supports the twofold nature of sharing knowledge. While knowledge acquisition (supplementary and complementary) is the integration of the partner's knowledge into one's own knowledge base, accession is the shared use of available knowledge for joint task fulfillment. Bouncken and Kraus (2013) highlight the direction of knowledge flows in their model. On the one hand, "inlearning" describes a unidirectional knowledge flow in which partners adapt knowledge of the partner. Knowledge sharing comprises the combination of explicit knowledge and the exchange of individual-bound tacit knowledge. In addition to the dichotomy of knowledge sharing, the literature further differentiates between the mere combination of knowledge and the mutual generation of new knowledge (Paavola and Hakkarainen, 2005).

In his prominent model, Nonaka (1994) proposes that knowledge needs to be converted from tacit into explicit knowledge and back again to successfully share it among individuals or organizations. His model was also adapted by studies in an inter-organizational context

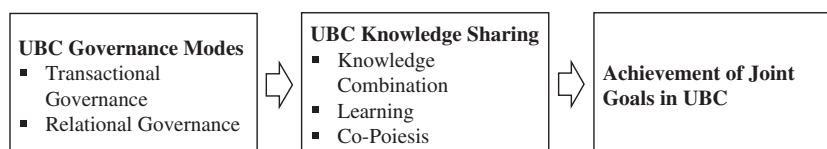


Fig. 1. Conceptual framework.

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