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The effect of firms' relational capabilities on knowledge acquisition and co-creation with universities

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ABSTRACT

This study examines how firms' relational capabilities influence two main approaches to sourcing knowledge from universities, namely, acquiring and co-creating knowledge. By adopting a sequential mixed methods design to gather empirical evidence from firms that interact with universities, it contributes to unravelling the puzzle presented in the literature on the positive effects and drawbacks of relational capabilities. We find that the balance between the opposing effects of relational capabilities differs depending on the knowledge sourcing approach. While capabilities for aligning goals, objectives, and routines/practices between firms and academics are of significant importance only for knowledge co-creation, communication capabilities are important for both, with greater significance for knowledge acquisition. We highlight implications about what relational capabilities firms should nurture in order to best source knowledge from universities.

1. Introduction

The increasing pace of technological change, the growing complexity of new technologies, the rapid growth of markets for technology, and the increasing modularisation of knowledge, have increased firms' reliance on external knowledge in their innovation processes. In the context of a widening range of channels through which firms accrue inbound knowledge, interactions with universities play a central role, mainly owing to the latter's unique ability to produce frontier scientific knowledge (Brusoni et al., 2001; Etzkowitz, 2016). Evidence suggests that, although universities do not generally constitute the most frequently used sources of external knowledge (Abreu et al., 2008; Arundel and Geuna, 2004; Cohen et al., 2002), firms, particularly those with high research and development (R&D) intensity, rate them as very valuable (Bishop et al., 2011; Petruzzelli, 2011).¹ There is a growing literature about firms' knowledge sourcing from universities, which explores the characteristics of firms that are more likely to source university knowledge – focusing on variables such as

size, R&D expenditure, financial slack, geographical and organisational proximity to the university, search strategies (Bruneel et al., 2015; Laursen and Salter, 2004), as well as the channels that they use in order to do so (Perkmann and Walsh, 2007; D'Este and Patel, 2007; Boardman and Ponomarev, 2009). Nonetheless, the understanding of what internal capabilities help firms to draw on different approaches to knowledge sourcing from universities remains underdeveloped (Appio et al., 2017; Bruneel et al., 2015).

By addressing this knowledge gap, this study extends the current literature in several ways. First, it differentiates between two approaches to the process of sourcing knowledge from universities. Building on the literature on interfirm strategic alliances² – which has highlighted different processes through which firms source external knowledge – a distinction is made between: (i) knowledge acquisition, whereby firms receive knowledge from universities, which may be integrated within their own knowledge base independently of the interaction (Friedman and Silberman, 2003; Siegel et al., 2007); and (ii) knowledge co-creation, whereby firms combine their market

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¹ For example, Arundel and Geuna (2004), focusing on the European firms that spend more on R&D (excluding France), found that > 50% of firms in the aerospace and energy sectors considered research funded by the public sector as their main source of technical knowledge, while in pharmaceuticals, foods, plastic and rubber this share exceeded 20%

² Such alliances are defined as “agreements characterised by the commitment of two or more firms to reach a common goal entailing the pooling of their resources and activities” (Tece, 1992: 19).

knowledge with the university's advanced scientific and technological knowledge, in order to jointly solve specific challenges (Curley and Salmelin, 2013). In the former case, the university and the firm play well-defined roles as knowledge producer and knowledge receiver respectively, since knowledge flows unidirectionally from one to the other; while in the latter case, although firms and universities remain specialists in their own domains, the knowledge producer and receiver roles are blurred (Osei-Frimpong et al., 2016; Taheri and van Geenhuizen, 2016; Yip et al., 2015).

Second, among the various capabilities that might explain firms' heterogeneity in acquiring and co-creating knowledge (Colombo et al., 2011; Lucena and Roper, 2016), the study focuses particularly on the role of firms' capabilities to manage their relationship with universities. The interorganisational literature has investigated the influence of relational capabilities on the success of strategic alliances or supply chain interactions (Kale et al., 2000; Yli-Renko et al., 2001), showing that firms' relational capabilities play a crucial role in supporting external knowledge sourcing (Carmeli and Azeroual, 2009; Dyer and Singh, 1998; Lee et al., 2003). However, the influence of relational capabilities on knowledge sourcing has not been explored in connection with university-firm interactions (Appio et al., 2017). It might not be possible to generalise the findings of this literature to university-firm interactions without empirical testing, due to inherent differences between universities and firms in terms of their knowledge bases (Bartunek, 2007; Mindruta, 2013; Petruzzelli and Rotolo, 2015), culture (Lockett and Wright, 2005; Sauermann and Stephan, 2013), motivation and reward systems for interaction (Bruneel et al., 2015), approaches to innovation (Barnes et al., 2002), research orientation (Petruzzelli and Rotolo, 2015), and acceptable time frame for addressing problems (Rynes et al., 2001).

Third, in line with recent studies on relational capabilities our study assumes that all types of relational capabilities are not equally important to support different approaches to knowledge sourcing (Zhang et al., 2017). We explicitly investigate the relationship between different relational capabilities and the acquisition and co-creation of knowledge with universities. Since the literature has highlighted that relational capabilities may have drawbacks as well as advantages (Anderson and Jap, 2005; Spitzberg and Cupach, 2009), the appropriate balance between them may differ in the context of different approaches to knowledge sourcing. Hence, we develop theoretical hypotheses on the relationship between each type of relational capabilities and firms' acquisition and co-creation of knowledge with universities. These hypotheses are then tested empirically using a sample of 190 British firms.

The investigation of how different relational capabilities enable knowledge acquisition and co-creation is a highly original aspect of the present analysis. The findings have implications for firm and university management: better understanding of which relational capabilities best support firms in sourcing different types of knowledge can guide firms, and to some extent also universities, in assessing and further developing the relational capabilities they need. They also have implications for policy, since the findings can help policymakers to develop effective measures to support firms' relational capabilities to foster knowledge acquisition and co-creation.

2. Theoretical framework

2.1. Knowledge acquisition and co-creation as different approaches to sourcing knowledge from universities

The study focuses on the factors that support two distinct approaches to sourcing knowledge from universities: knowledge acquisition and knowledge co-creation. This distinction builds on typologies of knowledge-based interactions developed in previous studies of university-industry interactions and interfirm strategic alliances. The literature, in fact, has proposed numerous knowledge sourcing typologies,

including: knowledge transfer and knowledge creation (Agrawal and Henderson, 2002; Bartunek, 2007; Geuna and Muscio, 2009; Rynes et al., 2001) or knowledge co-production (Knights and Scarbrough, 2010; Orr and Bennett, 2009); knowledge exploration and knowledge exploitation (Bruneel et al., 2015; Laursen and Salter, 2004; March, 1991); and knowledge acquisition and knowledge access (Grant and Baden-Fuller, 2004; Lui, 2009). Studies of university-industry interactions often take the university's perspective, focusing either on knowledge transfer processes (e.g. investigating how universities transfer knowledge to stakeholders outside academia) or on knowledge co-production (sometimes called knowledge creation or knowledge exchange) processes (e.g. investigating how academic researchers' engagement with practitioners helps to shape both research and practice). The concept of knowledge co-production is deliberately vague with respect to the interactions through which such engagement occurs, ranging from very close collaborations to less close working relationships, e.g. knowledge creation during joint symposia (Amabile et al., 2001; Rynes et al., 2001), without consensus on their boundaries (Geuna and Muscio, 2009). Those studies that look at university-industry interactions from the firm's perspective place greater emphasis on how (for what objectives) the sourced knowledge is used by the firm, often contrasting knowledge exploration with knowledge exploitation (Bruneel et al., 2015; Laursen and Salter, 2004), rather than on the processes through which the sourcing occurs. Studies of interfirm strategic alliances (Grant and Baden-Fuller, 2004) investigate knowledge sourcing processes and their drivers, but they do not account for the participants' intrinsic diversity that is often observed in university-firm interactions.

Knowledge acquisition and knowledge co-creation identify two contrasting approaches to sourcing knowledge, characterised by different objectives and different sourcing processes. Knowledge acquisition involves the unilateral sourcing of knowledge from university on the part of the firm, whose objective is to internalise and absorb (Grant and Baden-Fuller, 2004) university knowledge in order to integrate it within its own knowledge base.³ Once knowledge has been acquired, the firm can use it in order to create value, either for experimentation (Laursen and Salter, 2004; March, 1991), or exploitation, within the firm (Yli-Renko et al., 2001) or collaboratively (Laursen and Salter, 2004). However, such exploration and/or exploitation processes occur separately from the acquisition process, which involves a unidirectional flow of knowledge from the university to the firm. Knowledge acquisition occurs when, for example, firms acquire basic scientific knowledge by reading scientific publications (Caloghirou et al., 2001), or when they license university intellectual property and technology (Balconi and Laboranti, 2006; Geuna and Nesta, 2006).

Knowledge co-creation⁴ refers to the joint generation of new knowledge by both the university and the firm (Garner and Ternouth, 2011; Perkmann and Salter, 2012), with the objective to combine their knowledge bases in order to jointly solve a specific challenge. The firm and the university would not be able to produce this new knowledge independently, because the challenge they are trying to address requires their knowledge bases to be innovatively combined. The process necessarily involves joint exploration in order to produce new knowledge (Bruneel et al., 2015; Laursen and Salter, 2004; March, 1991). Very often, it also involves the subsequent joint exploitation of the newly created knowledge to address a specific challenge (Blumenthal

³ While the term 'knowledge transfer' is often used to indicate the unidirectional transfer of knowledge from universities to firms (Agrawal and Henderson, 2002), knowledge acquisition emphasises the firm's perspective (Grant and Baden-Fuller, 2004; Yli-Renko et al., 2001).

⁴ The term 'co-creation' was initially used in the marketing literature to highlight close interactions between producers and buyers, in which the customer becomes a co-innovator (Payne et al., 2007). More recently the research focus has shifted from customer-business co-creation towards co-creation by a wide array of actors in an ecosystem (Gemser and Perks, 2015; Hienerth et al., 2014; Perks et al., 2012).

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