The microfoundations of firms’ explorative innovation capabilities within the triple helix framework

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**ABSTRACT**

In this paper we show how the triple helix model provides an organising regime within which participant firms can extend their capabilities for explorative innovation through funded collaborations with academia. In so doing, we adopt Felin et al.’s multi-level framework to examine the microfoundations of participant firms’ capabilities for explorative innovation in university partnerships. In our qualitative case study of a set of research projects that comprise a national research programme, we decomposed the microfoundations of the processes, interactions and the structures that facilitated the extension of member firms’ explorative innovation capabilities nurtured within each university-industry partnership. We explain the attitudinal and behavioural modifications of the firms’ individuals involved in the research project collaborations with university partners that aggregated into firm-level capabilities. Ultimately, we show that using a microfoundational lens allows for a deeper understanding of how triple helix programmes can influence the capabilities of firms for explorative innovation.

1. Introduction

The triple helix model argues that technological advancement in modern economies increasingly relies on knowledge produced in universities that is accessible and beneficial to industry (Arvanitis et al., 2008; Cassiman et al., 2008; D’Este and Patel, 2007; Godin and Gingras, 2000; Liefner and Schiller, 2008). Academic research can augment industry capacity to create valuable knowledge (Baba et al., 2009) that confers competitive advantage (Grant, 1996). Governments are the third agent in the process, committing significant resources, support and direction for university-industry collaboration to facilitate the knowledge production system for firms with the ultimate goal of increased economic growth and social value.

However, despite widespread adoption of policy initiatives designed to deliver triple helix benefits for the strengthening of national knowledge production systems, the manner in which these interactions manifest as improved innovation capabilities at the firm level remains poorly understood. Research to date on the Triple Helix framework and the embedded entrepreneurial university (Benner and Sandström, 2000; Bramwell and Wolfe, 2008; Colyvas and Powell, 2006; Etzkowitz, 2003; Etzkowitz et al., 1998; Philpott et al., 2011) predominantly address the motives and role of the university partner (Arvanitis et al., 2008; D’Este and Perkmann, 2011).

While universities generate and transfer knowledge, it is firms that translate this knowledge into economically valuable products and services (Bramwell and Wolfe, 2008; D’Este and Patel, 2007). Industry partners participate in university-industry collaborations in order to acquire and develop new knowledge to drive exploratory innovation in emerging areas of technology (Motohashi, 2005; Perkmann et al., 2011). Despite the disproportionate focus on university motives for entering partnerships with enterprise, some research has focused on the motives and benefits to firms (D’Este and Patel, 2007; Arvanitis et al., 2008; Bramwell and Wolfe, 2008; Cassiman et al., 2008; Liefner and Schiller, 2008; Giuliani and Arza, 2009; Ankrah et al., 2013) and how academic research can augment a business’ capacity to create valuable knowledge (Baba et al., 2009). However, this research has primarily looked at the immediate relationship of the firm in the collaboration, examining determinants of participation and modes of interaction. There has been less explanation of the mechanisms by which firms are better able to realise innovation-driven activity because of participating in university-industry collaborations, even though this is the crucial benefit that the triple helix model proposes for these interactions. We argue for a fine-grained understanding of how interactions with universities translate into improved innovation performance in industry.

Additionally, extant research on university-industry relations and the triple helix model has chiefly addressed tangible outcomes such as...
inventions, commercialisable products, patents, licences, royalties and firm spinouts (Baldisser, 2010; Lockett et al., 2005; Pries and Guild, 2011; Rasmussen, 2006; Ratinho and Henriques, 2010). Intriguingly, it has been argued that some high profile patenting successes have skewed value perceptions in favour of hard outcomes (Gilsing et al., 2010). In fact, an over-concentration on hard metrics may be misguided and even counter-productive (Philpott et al., 2011) and lead to a failure to capture the true benefits of university-industry collaboration for the industry partners in the triple helix model. These less opaque benefits are intangible outcomes, such as expanded technological knowhow and enhanced innovation capabilities for the industry partner firms that can serve to enable sustained, enhanced future performance in the longer term (Abramo et al., 2009; Boardman and Ponomariov, 2009; Lucas et al., 2009). More recently, the neglected attention to intangible (‘soft’) benefits has been addressed (Bishop et al., 2011; Philpott et al., 2011) but the process of development of IGs within the collaborating firm remains unexplored. Our focus therefore is not so much on the tangible benefits from transmission of knowledge from the university to industry (Bishop et al., 2011) but on the intangible benefits derived from the development of innovation capabilities and technological knowhow within the firm. There is especially a need for greater insight into those innovation capabilities that enhance exploration activity in the firm (Lisboa et al. 2011; De Fuentes and Dutrénit, 2012).

Our research aim in this study, therefore, is to increase our understanding of how triple helix interactions can lead to the development and expansion of a firm’s innovation capabilities for exploration activities. Taking a microfoundational perspective allows us to unpack the macro-level impact of triple helix interactions by examining the micro antecedents (Felin et al., 2012) of exploratory innovation capability in firms that participate in university research programmes. Microfoundational thinking in management scholarship argues for attention to how the behaviours of individual agents connect and aggregate to higher level constructs (Barney and Felin, 2013), across and between different levels (Devinney, 2013). In our qualitative case study of a set of research projects that comprise a national research programme, we decomposed the microfoundations of the processes, interactions and the structures that facilitated the extension of member firms’ explorative innovation capabilities nurtured within each university-industry partnership. In so doing, we show that the microfoundations perspective serves as a useful lens for the examination of a macro system that seeks and can lead to micro outcomes such as the changed attitudes and behaviours of research staff in the innovative firm.

The paper makes a number of theoretical contributions. We demonstrate the value of utilizing the microfoundations perspective as a useful lens for the examination of a macro system that seeks and can lead to micro outcomes. We develop a theoretical framework of the multi-level microfoundations of participant firms’ explorative innovation capabilities that developed from involvement in the macro triple helix framework, and in particular, collaboration in a research project with university partners. Our findings explain how the firms had first to be receptive to, from then be able to absorb and learn from external knowledge sources. They then had to put this new learning to work, using it to effect a transformation of their explorative innovation capabilities. We explain how the microfoundations at the level of the individual that have the potential to influence the development of capability for explorative innovation in the participating firm are seen in two different ways. First is the change in beliefs and behaviours that can lead to change in choices and actions back in the partner firm. The second way in which the university-relationship influence shapes individuals is in the development of new skills and abilities in explorative innovation. We discerned the imprints of capabilities for explorative innovation in joint research projects in the details of divergent thinking, multiple opinions and expertise around unproven knowledge, the framing and solution of problems and elevated risk-taking propensity. At the micro-level pertaining to individuals’ changed attitudes and behaviours, we identified an increased capacity for creativity within the thinking labs. These became the launchpads for exploratory innovation through the generation of a large stock of ideas.

This article is structured as follows: Section two presents the conceptual background of the study. The third section explains the research strategy employed. The fourth section presents the empirical research findings with a discussion of these findings in section five and some conclusions, limitations and directions for future research in section six.

2. Conceptual background

Microfoundational thinking offers an approach to the explanation of collective phenomena such as firm capabilities through attention to lower-level components and their interactions. The microfoundations approach represents a systematic mechanism to examine the origins and nature of the macro (Barney and Felin, 2013). Felin et al. (2012) provide a research agenda for work on the microfoundations of firms’ capabilities. They suggest that scientific decomposition and/or aggregation results in progress insofar as the analysis of microfoundations considers both initial conditions and evolutionary processes. This microfoundational research approach offers a window into furthering our understanding of the microfoundations of capabilities in the innovative firm.

2.1. Microfoundations of firms’ innovation capabilities

Micro-level phenomena such as individuals, processes and structures, and their interactions, have previously been argued to determine the origins, emergence, development and dynamics of capabilities (Gavetti, 2005; Helfat, 2003; Salvato and Rerup, 2011). The microfoundations of capabilities in the firm can be clustered into three categories: (1) individuals, (2) social processes and interactions, and (3) structure (Felin et al., 2012). These are not discrete components but instead are entangled in internal and external interactions within and across categories. In this microfoundational multi-level focus on individuals, processes and structures, benefit may accrue from both aggregating microfoundational components as well as disaggregating capabilities (Felin et al., 2012) within the context of a social structure. An explanation of such collective phenomena requires forensic examination of those lower-level and multi-level elements: individuals, processes and structures.

2.1.1. Individual-level components

Microfoundational analysis argues for attention to the role and the behaviour of the individual as the origin and foundation of higher level phenomena such as firm capability (Felin and Foss, 2005). Capability evolution in innovative firms is a consequence of the mindful behaviour and interactions of individuals (Salvato and Rerup, 2011). Individuals make choices that are more or less rational (Argote and Greve, 2007; Simon, 1985) based on beliefs, goals, motives, values, skills, creativity, abilities and experience and learning. Firms are essentially collections of individuals who possess valuable information and knowledge that can be shared with and recombined with other individuals’ knowledge. The cumulative knowledge of individuals and their interactions can be aggregated up to firm-level knowledge (Barney and Felin, 2013; Felin and Hesterly, 2007). However, the role of individuals as the microfoundations of capabilities should transcend simple compositional aggregation. Individual-level elements such as choice, agency, characteristics, cognitions, and abilities are all important building blocks in the construction of this collective phenomenon of capabilities that can greatly affect the performance of firms. Capabilities may arise from individuals’ actions and interactions. Differences may lead to tensions between individuals with conflicting objectives and self-interests. Therefore, the relational ability of individuals to engage and interact with other individuals and to integrate knowledge can affect the development of firms’ capabilities (Coff and Kryscinski, 2011; Felin and Hesterly, 2007; Foss, 2011).
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