



How to commercialise university-generated knowledge internationally? A comparative analysis of contingent institutional conditions



Christos Kalantaridis^{a,*}, Merle Küttim^b, Madhav Govind^c, Cristina Sousa^d

^a De Montfort University, UK

^b Tallinn University of Technology, Tallinn, Estonia

^c Jawaharlal Nehru University, New Delhi, India

^d ISCTE, University Institute Lisbon, Lisbon, Portugal

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ABSTRACT

Our paper sets out to explore the contingent institutional conditions that underpin knowledge transfer, and particularly commercialisation, from universities to enterprises across national borders. We explore the phenomenon in four technology-focused and research leading (in the national context) universities in Estonia, India, Portugal and the UK. We argue that participants in interactions (despite the fact that they maintain their core operations in different institutional fields) possess common knowledge bases, and shared norms and cognitive frameworks. In many cases however, the emergence of organisational rules to facilitate interactions do not lead to the institutionalisation of the processes at work: restricting the scope of both existing interactions and their advancement and offering a central role to nonpracticing entities. The paper advances university-led pooling of intellectual property (geographically or sectorally) as an alternative for institutionalisation.

1. Introduction

The central locus of innovation has become increasingly international and dependent upon linkages between different types of organisations and sources of knowledge (Heitor, 2015). This is partly because of the offshoring of corporate R & D facilities (Karlsson et al., 2006), leading to increased international technological collaborations often as part of global innovation networks (Gassler and Nones, 2008; Li, 2010). These are enabled by the low cost and global proliferation of ICTs that enable more distributed innovation processes (Schwaag Serger and Wise, 2010). At the same time, universities, viewed as sources of competitive edge that can advance innovation through the commercialisation of knowledge generated by the academic community (Wilson, 2012), are increasingly globally-engaged: through rapidly growing numbers of international co-publications, cross-border patenting, and human (scientific) capital mobility (OECD, 2008).

The exploitation of opportunities that come from the international transfer of university-generated knowledge requires participants, i.e. universities and enterprises, to interact effectively outside the institutional terrain (the terms that will be used hereafter is field) of their core operations, education and research in the case of the former and business venturing in the case of the latter. More specifically participants

must interact in institutional fields differentiated by: i) type of organisation that tend to give rise to differences in goals, interests and time horizons informing R & D behaviour of participants in the interaction (Siegel et al., 2003), and ii) country, which influences prevailing regulatory regimes, and a broad range of cultural characteristics (language, religion and other) (Ionascu et al., 2004: 4). Interacting across fields is influenced by sectoral characteristics (as will be discussed in more detail in the following Section): as the effects of between-country institutional differences may vary on account of sector specificities, whilst between-types-of-organisation differences may be shaped by sectoral systems (Malerba, 2005).

The underlying assumption of existing literature is that interacting across institutional fields is important in influencing the incidence and direction of international knowledge transfer (Malik, 2013). Institutions provide boundaries to the interactions, and influence (or according to some scholars determine) choices: facilitating more frequent interaction between participants in the field than with those outside (Scott, 1995). The challenge of interacting across fields may be persistent as institutions are path-dependent, as a result of their evolution in historical time in distinct organisational, sectoral and country contexts (Hodgson, 1988). Thus, in the main, interacting across institutional fields,¹ in the case of our paper transferring university-generated knowledge

* Corresponding author.

E-mail address: christos.kalantaridis@dmu.ac.uk (C. Kalantaridis).

¹ The institutional field is a key concept used in our paper. It is defined as 'a community of organisations that partakes of a common meaning system, and whose participants interact more frequently with one another than with actors outside the field' (Scott, 1995, p. 56).

internationally, may be less frequent even if opportunities exist in bridging such fields (Burt, 2004). Within this intellectual context our paper sets out to explore the contingent institutional conditions that could foster the international transfer of university-generated knowledge, and particularly commercialisation, to enterprises.

The importance of the institutional context (organisational, sectoral and country) prompted us to adopt a comparative approach. Thus, we focus on four national contexts: the UK, Portugal, Estonia and India that vary considerably in terms of historical trajectories, embeddedness of intellectual property (hereafter IP) relating regulation, and knowledge generating capabilities (discussed in more detail in the third Section of the paper). Within each national context we selected one university: focusing on those that possess strong knowledge generating capabilities, and are viewed as leading (nationally) in knowledge transfer (hereafter KT). In each of these organisational contexts we identified two cases of international commercialisation. Deciphering these cases placed emphasis not only at national and organisational institutional factors but also at the implications of sectoral systems (using influences particularly pertinent for the purposes of our study, such as the type of knowledge involved).

The rest of our paper is organised as follows. The next Section engages with the literature on university-industry KT and institutional theoretical constructs. Then we proceed to explain the design of the study, data collection, the analysis processes deployed, and limitations. The fourth Section compares the eight cases of international interaction with enterprises, whilst Section 5 focuses squarely on the analysis of institutional factors. The penultimate Section discusses our findings and develops propositions. Finally, the paper presents some final conclusions and explores implications for future research.

2. The literature

2.1. The internationalisation of knowledge transfer in context

In order to understand the nature of the transfers involved and position our research in the existing body of literature we decided to advance a typology of KT internationalisation. This combines two criteria: i) the nature of the knowledge transfer activity with that of ii) the type of internationalisation. The former draws on the ideas of Perkmann et al. (2013) who advanced an increasingly influential divide between academic engagement and commercialisation. It includes 'formal activities such as collaborative research, contract research and consulting, as well as informal activities like providing ad hoc advice and networking with practitioners' (Perkmann et al., 2013: 424). Commercialisation is defined in this context as 'the patenting and licensing of inventions as well as academic entrepreneurship' (Perkmann et al., 2013: 423). This divide is also reflected upon the degree of the user (i.e. the enterprise) involvement in the process of knowledge generation. Thus, commercialisation revolves around knowledge generated from research that is academically driven, publicly funded, and subsequently owned by the University. The second criterion draws from Jin et al. (2011) who distinguish between i) direct linkages between universities and enterprises operating in different national settings, and ii) indirect ones (for example relationships with (invariably) a multinational through its domestic subsidiary, or those established with foreign companies through universities operating in the same (as the knowledge user) national context. Our paper focuses on the top right-hand corner of Table 1: exploring direct international commercialisation. This invariably involve the development of a new relationship, touching upon a novel area of research in institutional theory as will be discussed in the sub-Section below, as the enterprise is usually not involved in the generation of knowledge.

2.2. Institutional theory

The type of interaction explored in our paper is of particular interest

conceptually for institutional theory: on account of a gradual shift in emphasis from within to between institutional settings. More specifically, this stream of institutionalist thinking poses the question: 'how social choices are shaped, mediated and channeled by the institutional environment' (Wooten and Hoffman, 2008: 130)? Thus, action is not defined by the actor but influenced (or even determined) by a perspective that is common to a group of participants in the interaction. Analysis focuses overwhelmingly within an institutional field. This emphasis on the integrity (though not necessarily the boundaries) of the field underpinned the charge that it over-emphasises homogeneity of the actors involved in specific institutional fields (Wooten and Hoffman, 2008). This, in turn, is viewed as leading to a form of 'institutional determinism': where actors act out institutionally prescribed actions leading to stability and inertia.

More recently however, there is increased acknowledgment of situations where individuals from different institutional fields interact. This constitutes a shift in emphasis away from actors who occupy positions that bridge different fields, enjoy exposure to the institutions that characterise the different fields, are able to distance themselves from these and 'transpose', 'transplant' and 'recombine' institutions across fields (Sahlin and Wedlin, 2008). Instead research focused increasingly on interactions taking place in the boundaries of institutional fields. Boundary work involves creating, expanding, reinforcing, blurring, opening and crossing social boundaries between fields across time, space and levels (Helfen, 2015). The outcome may be the reproduction of the field or the introduction of change in institutions (Gawer and Phillips, 2013). More recently, research focused on interstitial spaces, i.e. 'small-scale settings where individuals positioned in different fields interact occasionally and informally around common activities to which they devote limited time' (Furnari, 2014: 440), exploring the initial emergence of new practices that may eventually become institutionalised. Our inquiry focuses on interactions that, like boundary work and interstitial spaces, take place between institutional fields, thus, involving no common/shared institutional basis. In fact, participants maintain their core activities in different institutional fields: namely market ones in the case of enterprises and open science in universities. However, and unlike boundary work, these interactions are developed 'de novo' (as shown in Table 1). These interactions differ from interstitial places in that they are invariably formal (involving contractual arrangements between participants).

Existing research on the contingent institutional factors that underpin the transfer of university-generated knowledge in general (Bjerregaard, 2010; Hsu et al., 2015), and particularly internationally (Malik, 2013), has remained relatively detached from these debates, with the exception of Taheri and van Geenhuizen (2016). Probably the most coherent treatise of institutional factors is that of Bjerregaard (2010): who draws from Scott's conceptualisation of institutions. This paper follows on this tradition as it allows for the exploration of institutions from the extremely fine grained (i.e. within one organisation) to broad grained (i.e. nationally or even transnationally). Thus, we tapped into the ideas of Scott who distinguished between 'cultural-cognitive, normative and regulative elements that, together with associated activities and resources, provide stability and meaning to social life' (Scott, 1995: 33). Regulative elements emphasise rule setting and sanctioning, whilst normative elements contain an evaluative and obligatory dimension. Lastly, cultural/cognitive factors involve shared conceptions and frames through which meaning is understood (Powell, 2007). These three elements form a continuum moving 'from the conscious to the unconscious from the legally enforced to the taken for granted' (Hoffman, 1997: 36). In the following sub-Section we will try to disaggregate institutional factors further: combining insights from institutional theory (in the tradition of Scott) and empirical evidence from the KT literature.

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