



University research and knowledge transfer: A dynamic view of ambidexterity in british universities



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ABSTRACT

This paper examines the dynamic interlinkages between the two pillars of ambidexterity in universities, research and knowledge transfer. We propose a theoretical model linking these two pillars at the organisational level. The model is tested using the longitudinal HE-BCI survey data juxtaposed against two consecutive rounds of research evaluation in the UK higher education sector. Results indicate that a university's past performance along the research pillar strengthens the knowledge transfer pillar over time, through both commercialisation and academic engagement channels. This positive impact is negatively moderated by the university's size and reputation, in the sense that in larger or more reputed universities, the marginal impact of research on knowledge transfer declines significantly. Additionally, we find that knowledge transfer reinforces the research pillar through positive mediation between past and future research, but only through academic engagement channels. The results also indicate that contract research routes provide the maximum benefit for most universities in enhancing their ambidexterity framework, both in the short and the long run. For the relatively more reputed universities, it is the collaboration route which provides the maximum benefit. Interestingly, no such reinforcement could be detected in the case of the research commercialisation channels.

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1. Introduction

Universities have traditionally been conceptualised as centres of learning and creation of new knowledge, driven primarily by the traditional Mertonian norms of fundamental research and education (Dasgupta and David, 1994). However, over the last few decades, this traditional viewpoint has undergone a slow but sure change, with centres of higher education now being increasingly viewed as a key player in the entrepreneurial and innovation ecosystem within the broader economy. One of the key reasons behind this is the paradigm shift in the economic, social and technological climate that universities operate within, the challenges they face and consequent change in focus (Siegel and Wright, 2015). Recently, universities in many countries have faced financial constraints (Bhattacharjee, 2006), which have motivated them to explore alternative models of funding research – most notably through increased interactions with industry (Curi et al., 2012; Deiacio et al., 2009). Individual researchers have had to adapt in

response to the organizational changes as well, and to increasing emphasis on impact in research funding and career progression (Hughes and Kitson, 2012).

The shifting paradigm in the environment has led universities to adapt both structurally and strategically. Strategically, universities are increasingly focussing on their “third mission” activities, in parallel to research and education. This refers to all activities involving “generation, use, application and exploitation of knowledge and other university capabilities outside the academic environment” (Molas-Gallart et al., 2002). While this includes a number of parallel strands of activities, “knowledge transfer” to the private and public sectors account for a significant proportion of income generation for the higher education sector (Rosli and Rossi, 2016). Consequently, the structural response has been led through the creation of specialised organisational subunits dedicated to managing these knowledge transfer activities with industry and other practitioners. Referred to as Knowledge Transfer Offices or KTOs, these act as an interface between researchers and research users by establishing procedures and infrastructure in place for taking research to its users (Bercovitz et al., 2001). These shifts in the higher education sector are increasingly being examined in the light of what has been referred to as “ambidexterity” in the organisational literature (Ambos et al., 2008; Chang et al., 2009; Chang et al., 2016).

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Ambidexterity as a concept has its antecedents in the traditional organisational literature (Duncan, 1976; Tushman and O'Reilly, 1996; Tushman and O'Reilly, 1997). In general, ambidexterity in an innovative organisation refers to its ability to develop structures and processes, which allows them to carry out both “exploitation” and “exploration” activities sequentially or simultaneously – either at an individual or at an organisational level (Raisch et al., 2009). In the context of a university, ambidexterity refers to its ability to carry out parallel activities outside its traditional one centred around research and education, typically those lying in the realm of commerce and engagement with practitioners (Ambos et al., 2008). In essence, it conceptualises universities to be standing on two pillars – one which provides the foundation for its traditional role as a centre of education and research (Dasgupta and David, 1994), and the other provides the foundation for its third mission activities encompassing knowledge transfer and other forms of engagement with non-academic stakeholders (Etzkowitz, 2003). The primary purpose of this paper is to explore the relationship between these two pillars at the organisational level, and uncover the mechanisms through which the two interact and possibly feedback on each other. We explore the consequences of these interactions on a university's evolution using an inter-temporal model and explore the implications for universities and the higher education sector.

It is important to uncover how the practice of ambidexterity impacts a university's core performance in its key missions, especially given the recent shifts in the higher education sector (Martin, 2012). Facing increased competition and institutional pressures, knowledge transfer is no longer the preserve of a few universities or a handful of researchers, but is becoming common across the board (Sanchez-Barrioluengo, 2014). Universities are increasingly being viewed as “entrepreneurial”, who can use the knowledge created internally to pursue commercial objectives based on sound financial considerations (Lockett et al., 2015; Siegel and Wright, 2015). In fact, such dual arrangements in the form of KTOs and associated institutional processes have become ubiquitous (Perkmann et al., 2013). While the effect of being an ambidextrous organisation has been seen to positively impact knowledge transfer (Ambos et al., 2008; Chang et al., 2016), the implications of ambidexterity on research and knowledge transfer activities, and more specifically on the dynamic interlinkages between the two are yet unexplored.

Universities have almost universally incorporated ambidexterity within their strategic and structural framework, but still remain extremely heterogeneous in actually reaping its benefits (Geuna and Nesta, 2006; Hewitt-Dundas, 2012; Kitagawa et al., 2016; Sanchez-Barrioluengo, 2014). Previous research finds a degree of correlation in the research performance and performance along various routes of knowledge transfer (Hewitt-Dundas, 2012; O'shea et al., 2005; Valdivia, 2013), although the mechanisms behind it are unclear at the level of an organisation. This paper attempts to uncover these mechanisms by addressing the following questions. First, how do the pillars of ambidexterity interact with each other over time? Specifically, what are the dynamic inter-linkages and the nature of feedback between activities which underpin ambidexterity in a university? Secondly, is there any evidence of path dependence in these pillars? In particular, is the connection between these pillars dependent on university level factors, such as size or reputation?

The tensions between the two pillars of ambidexterity are clear conceptually – research at its heart is a public good (Dasgupta and David, 1994), whereas engagement with non-academic stakeholders involves private ownership of knowledge (Etzkowitz et al., 2000). In practice, this leads to conflicts in terms of the nature of research – blue sky versus applied (D'Este and Perkmann, 2011) – and in terms of time frames for disclosure – academic researchers wishing to disseminate research freely while practitioners may wish for secrecy and control (Dasgupta and David, 1994; Chang

et al., 2016). These tensions become apparent, not just for an individual researcher, but also for departments and very crucially, for the university itself – given the finite availability of resources and capabilities.

To resolve this tension, it is important to uncover the underlying mechanisms of how new research links into new knowledge transfer opportunities, and vice versa. Ambos et al. (2008) show that organisational ambidexterity leads to greater likelihood of knowledge transfer overall. In a recent study by Chang et al. (2016), the authors link individual and departmental ambidexterity to commercial performance. Our contribution lies in understanding the nature of the link between research and knowledge transfer at the organisational level. In doing so, we extend the literature in a number of directions. First of all, we examine the *intertemporal* nature of this relationship, which has been largely ignored in the literature. Second, we attempt to link this relationship to organisational characteristics to uncover the nature of path dependence (if any) in a university's ambidexterity framework. Finally, we focus on this relationship at the *organisational* level, without limiting ourselves to specific disciplines, individual capabilities or specific channels of interaction.

This paper makes a theoretical contribution towards understanding these mechanisms by establishing directional links between research and knowledge transfer, accounting for the fact that these activities may happen at different points in time. Empirical support for the theoretical model is made using data from the UK, which is suitable for two primary reasons. Universities in the UK have not been subjected to high profile Bayh-Dole type of legislations, as seen in the US and many other countries, and which has resulted in a more organic evolution of the sector.¹ Additionally, UK is one of the few countries where publicly available university level data sets are available going back several years, enabling researchers to examine these organisations, their operations and evolution in detail.

The rest of the paper is organized as follows. In the following section, we discuss the existing literature on the topic and identify the gaps therein to motivate our study. Here we also present the hypotheses on which our study is based along and the theoretical model which we attempt to establish. In Section 3, we present the overall empirical design of our study, discuss the data sets used and the methodology employed. This is followed by a discussion of the results in Section 4. Finally, Section 5 concludes with a discussion and policy implications.

2. Background and theory development

2.1. Twin pillars of ambidexterity

As a concept, ambidexterity refers to an organisation's ability to carry out its core functions while at the same time build capacity to carry out tasks outside its core capabilities in order to enhance performance, and has been widely applied in the organisational literature (Cao et al., 2009; Raisch et al., 2009; Tushman and O'Reilly, 1997). Ambidexterity in a university context, implies that it should be able to build capabilities and incorporate processes which encourage and enhance its third mission activities (knowledge exploitation), while simultaneously maintaining its focus on

¹ The United States was the pioneer in creating an institutional framework to facilitate university-industry knowledge transfer through the enactment of the Bayh-Dole Act of 1980 that focused exclusively on a formal intellectual property (IP) driven channel. While there has been a rise in university patenting in the U.S. following the legislation (Mowery and Sampat, 2005), whether this could be attributed to the creation of the Act itself have been hotly debated (Hendersen et al., 1998; Mowery et al., 2001; Thursby and Thursby, 2002).

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