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Aligning university–industry interactions: The role of boundary spanning in intellectual capital transfer

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ABSTRACT

In the UK, the boundary spanning role has taken on greater significance as successive governments emphasize how universities should play in direct knowledge transfer and changing academics' visions over third mission functions. Studies in the UK have focused on the relative performance of technology transfer organizations (TTOs)/knowledge transfer organizations (KTOs) or their use by academics and external organizations. Compared to their US and international counterparts, TTOs/KTOs at UK universities exhibit low-levels of absolute efficiency. Therefore questions remain relating to how to raise the efficiency and productivity of these units, how to attract and train staff with suitable qualifications/capabilities and how to change adverse attitudes towards knowledge exchange by some academics. Currently, there is a lack of a holistic view of these functions and the way they complement each other or coordinate their activities. This study addresses this gap in theory and practise and advances how universities should provide consistency in both the internal and the external interfaces, by the offer of a framework and key stakeholder insights.

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1. Introduction

This paper offers a holistic framework for the role of technology/knowledge transfer in UK universities operating as a 'boundary unit'. Currently, this interface between academics and external organizations is blurred, but it is indisputable that the performance of these units has a role to play in the overall performance of the university and the external society in which it serves. Such units are well understood in most developed countries, such as the US, where it is clear how and why they contribute to the academic institution. However, while this role has become increasingly more important for universities internationally that share similar ambitions to maximize performance efficiencies, this is particularly more so in the UK where traditional income streams through teaching and governmental research council funding have been squeezed. This begs the general question of how such a role can be best nurtured for enhancing their effectiveness and better defining within UK universities to give them greater prominence.

Knowledge transfer in universities has been the subject of considerable recent interest: from support systems (Hewitt-Dundas, 2012) to specific channels for transfer efficiency (Bekkers and Bodas Freitas, 2008), but the common denominator has rested on the role of the transfer unit itself and their critical success factors (e.g. Berbegal-Mirabent

et al., 2012). Hence, this paper draws on the development of the transfer unit, to which we assign the literary field of 'boundary units'. We identify a lack of ownership and direction for claiming identity to such units, and which require more holistic governance; hence, we draw on theories of organizational alignment to assimilate this area to understand better how consistency can be provided in both internal and external interfaces, and present empirical evidence on this in practise. This relationship between university, industry and government is known in the established literature as the 'triple helix', and its effectiveness in knowledge transfer has been favoured, say over a 'double helix' (e.g. Ivanova and Leydesdorff, 2014) or in general (e.g. Fernandez-Esquinas et al., 2015; Nielsen and Cappelen, 2014). The helix actors are known for their inability to be aligned by common interest, thereby making knowledge transfer more complex and constrained (see Huggins et al., 2012; Serbanica et al., 2015; Rossi and Rosli, 2015). Hence, we use prominent thinking in organizational 'alignment' to assist the present research. We present findings about the value of university–industry (UI) interactions, and offer suggestions for improving this relationship, and hence overall performance, through internal organizational effectiveness.

2. Knowledge transfer organizations in the UK

The effectiveness of knowledge transfer has been broadly researched (e.g. Agrawal, 2001), and their equivalent functions have been compared internationally (e.g. Arvanitis et al., 2008; Chin and Lim, 2012).

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Equally, a lot of attention has been paid by the UK government in supporting technology/knowledge transfer offices in UK universities and changing academics' visions over third mission functions, particularly in the 1980s (Howells et al., 1998) when the right to exploit research results through intellectual property (IP) was transferred from the British Technology Group to academic institutions. Since then, many universities have developed strategies for protecting and using innovations deriving from academic research. Many higher education institutions (HEIs) began setting up specialized IP management and administrative centres, commonly known as technology licencing offices, within or parallel to existing Industrial Liaison Offices. However, many universities found effective management of their IP a problem, especially for smaller units that could not afford dedicated staff. In 2003, the Lambert Review (Lambert, 2003) noted that most universities ran their own technology operations, but only a few had a strong research base capable of building high-quality offices. The Review recommended that the Government use third stream funding to encourage the development of shared services in technology transfer on a regional basis, and also made proposals for improving the recruitment and training of technology transfer staff. This resulted in the third stream initiative by the UK Government – the Higher Education Innovation Funding (HEIF) which allocated significant funding to activities concerned with dedicated knowledge exchange staff, the promotion of knowledge exchange units, institutes and research centre, and projects connected with knowledge exchange generally. Due to the significant amount of funding in the lead up to 2001, KTOs have emerged in almost all of the HEIs in the UK, under a multitude of different names including Business Development Offices, Enterprise Offices and Corporate Partnership Offices.

Several studies in the UK have focused on the relative performance of KTOs or their use by academics and external organizations. Chapple et al. (2005) highlight that those transfer offices at UK universities exhibit low-levels of absolute efficiency, of approximately 26–29%. Siegel et al. (2008) compare the relative efficiency of US and UK transfer offices and find that US universities were more efficient than UK universities and that the production process was characterized by either decreasing or constant returns to scale. Additionally, despite the substantial investments, KTOs are the least frequent mechanism for interactions between academics and external organizations. Only 13% of academics have used KTOs to initiate a contact with an external partner. Abreu et al.'s (2009) survey of 22,170 UK academics similarly found that, in the past three years, 36% had no contact and 21% were unaware that these types of services were available. There was significant variation by discipline (with the highest level of contact being by engineers (67%) and the lowest level by the arts and humanities (36%)), position, age, research activity or type of institution. Simply put, older and more senior academics are likely to know about, and use, their transfer office. Further, academics from Russell Group institutions are much less likely to have their interactions initiated by the university transfer office, whereas initiation by it was highest in the younger universities. The relative minor importance of transfer offices is probably because many of the interactions are informal and people-based and do not always require contractual and transactional inputs. Thus, where a transfer office is likely to have a greater role is where interactions require a significant legal or contractual component.

Similarly, only 37% of external organizations surveyed were aware of HEIs' transfer offices, while only 8% of them claimed that interactions with universities were initiated by the KTOs (PACEC/CBR, 2009). The number of firms citing 'unrealistic expectations of transfer offices' as being a very important barrier to interaction with universities increased from 24% in 2004 to 49% in 2008, which is a striking shift in a short space of time (Bruneel et al., 2009). A survey of top 122 universities in the UK (Lockett and Wright, 2005), as ranked by their research income, highlighted the lack of internal skills in this area and suggests that universities and policy makers needed to devote attention to the training and recruitment of transfer officers, with broad base commercial skills.

Looking for explanations, Bruneel et al. (2009) argue that only after 2008 did UK universities begin to build highly professional systems for technology transfer, and it is likely that a period of adjustments will be required before the consequences of these changes can be fully assessed.

Various solutions are presented from the studies. Chapple et al. (2005) suggest that improvements in performance may require the creation of smaller specialized transfer offices at universities, rather than just increasing their size per se. Consecutively, the development of regionally-based sector focused transfer offices is also advised, together with an upgrade in the business skills and capabilities of UK technology transfer managers and licencing officers. Kitson (2009) argues that individuals or groups playing boundary spanning roles in universities need to understand fully and have experience of the academic and business environment, as well as skills to overcome barriers and foster relations. Therefore serious questions remain unanswered relating to how to raise the efficiency and productivity of these units, how to attract and train KE staff with suitable qualifications/capabilities or how to change adverse attitudes towards knowledge exchange by some academics.

Specific institutional arrangements have varied greatly in the UK and, over the past decade, most KTOs have restructured their organization and, in general, have moved from being part of the research infrastructure to a relative independent entity, and then to a broader focus on innovation related activities (Sharifi and Liu, 2010). This led to the view of Howells et al. (1998) that universities have taken a much more centralized and formalized approach to industry relations over the last two decades. Although ILOs were the first developments within HEIs, they have been supplemented by other specialists within research contract offices or exploitation units.

Following the significant funding received through Governmental programmes, especially after 2001, KTOs have seen major changes in terms of scale, scope, strategic focus and profile. The shift from 'technology transfer' to 'knowledge transfer' has expanded the number of boundary functions for UI cooperation. Apart from those 'classical' boundary structures that are extensively studied in the literature – TTOs, ILOs, science parks and incubators etc. – there are a number of different organizational units that could play a pivotal role in linking universities and industry. For example, Howells et al. (1998) highlighted the role of continuing education and lifelong learning offices. Lambert (2003) pointed out the roles of vice-chancellors, university career services, dedicated enquiry services for SMEs or alumni networks in facilitating better cooperation between universities and businesses. Lock (2009) suggested expanding the role of the Business Development function, possibly in response to government incentives to promote more employer engagement. Yet, until the release of the PACEC/CBR (2011) studies that describe the knowledge infrastructure in the UK, these boundary structures for UI links were only disparately mentioned.

Currently, despite the increased attention paid to the KTOs (e.g. Schofield, 2013), there still remains a lack of a holistic view of these functions and the way they best complement each other or coordinate their activities. While there is some recent research looking at multiple actors within the university–industry relationship (e.g. Ankrah et al., 2013), it has mainly been in the form of understanding key drivers of the holistic relationship, rather than how decisions operate across boundaries. Our study addresses this gap in theory and practise and advances an integrated approach, as universities should provide consistency in both the internal and the external interfaces.

3. Boundary roles in innovation and knowledge transfer

Currently, despite the increased attention paid to the KTOs, there is a lack of a holistic view of these functions and the way they complement each other or coordinate their activities. Schofield (2013) recently recognized the importance to look at the knowledge transfer collaboration between university and industry from a holistic perspective, drawing on critical success factors in the extant literature. Her proposed model

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