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Research Policy 34 (2005) 1043–1057

research policy

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Resources, capabilities, risk capital and the creation of university spin-out companies

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Available online 11 July 2005

Abstract

The commercialization of university research has become an increasingly important issue, given concerns regarding licensing and the university's desire to maximize the returns to intellectual property (IP). In this paper, we assess the impact of university resources and routines/capabilities on the creation of spin-out companies. We find that both the number of spin-out companies created and the number of spin-out companies created with equity investment are significantly positively associated with expenditure on intellectual property protection, the business development capabilities of technology transfer offices and the royalty regime of the university. These results highlight the importance not just of resource stocks, but also of developing appropriate capabilities of technology transfer officers in spinning-out companies. The results suggest that universities and policy-makers need to devote attention to the training and recruitment of technology officers with the broad base of commercial skills.

JEL classification: M13; D23; L31; O31; O32

Keywords: Technology transfer; University/industry interaction; Spin-outs; Resource-based view

1. Introduction

Policy-makers have become increasingly interested in the role universities can play in economic development. In particular, there is increasing focus on universities' ability to become more adept at exploiting their own science base and transferring their scientific knowledge to the private sector. The dominant way in which technology has been traditionally transferred from the university sector to the private sector is through technology licensing (Siegel et al., 2003b). This system has the advantage that the academic and the university are able to capitalize on the technology, and the academic is able to pursue his/her research without having to commit large amounts of time to commercial matters. The downsides to this approach are two-fold. First, the nature of the new technology may not be easily patented and transacted via a license agreement.

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0048-7333/$ – see front matter © 2005 Published by Elsevier B.V.
doi:10.1016/j.respol.2005.05.006

Second, universities may not be able to capture the full value of their technology through a licensing arrangement and therefore may seek a more direct involvement in the commercialization of new technology through spinning-out a company (Franklin et al., 2001).

As a result, there is growing interest in the role that university spin-out/off companies may play in the commercialization process. This increased interest is being observed in North America, the UK, Australia and Continental Europe (DiGregorio and Shane, 2003; Wright et al., 2002; Wright et al., 2004a,b; Siegel and Phan, in press). There is a perception that ownership of equity in a university spin-out may increase the potential upside gain, which appears to be an attractive option to universities. Small sample survey evidence indicates that assuming an equity position in a university spin-out company produces a greater average return in the long run compared to the average return available from the average license (Bray and Lee, 2000).

However, most university spin-outs do not generate substantial wealth. For example, the UK Treasury-sponsored Lambert Review of business-university collaboration published at the end of 2003 considered that too many university spin-outs were being created and that greater focus should be placed on identifying whether a university spin-out was the most appropriate means to exploit technological inventions produced in universities (Lambert, 2003). While it is relatively straightforward to create a legal entity, the act of creating a company does not necessarily mean that it will go on to generate wealth. A key constraint on the development of spin-outs is reported by technology transfer offices to be access to venture capital finance (Wright et al., 2003). At the same time, venture capital firms lament the lack of sufficient investment propositions with attractive prospects for future wealth generation (Lockett et al., 2002). A central issue, therefore, is the need to examine the factors influencing the creation of university spin-outs.

Some research attention has been addressed towards the inputs associated with the number of spin-outs created by US universities (DiGregorio and Shane, 2003) and the survivability of start-ups that exploit academic knowledge (Nerkar and Shane, 2003). Case based research on university spin-outs has examined the phases in their development (Vohora et al., 2004) and the strategies adopted by research institutions to develop different types of spin-offs (Clarysse et al., 2005). A key omission from this literature concerns any systematic analysis of the role of the resources and capabilities of universities and their technology transfer offices. The importance of inter-organizational differences with respect to resources and capabilities, and their impact on firm behaviour and performance, is central to the resource-based view of the firm. In particular, issues relate to the presence of sufficient experience and expertise within what are historically non-commercial environments to generate gains from spin-out ventures (Lambert, 2003). There is then a need to examine the extent to which the capabilities of technology transfer offices are important influences on the generation of university spin-outs within the context of universities' resources and environments. Specifically, we seek to fill this important research gap by exploring two research questions:

Q1. What are the most important stocks of resource inputs in the creation of university spin-outs?
Q2. What are the most important capabilities and routines for creating university spin-outs?

We address the above questions in two ways. First, we identify the different resource stocks and capabilities required by universities to spin-out companies and hypothesize their relationships with universities' creation of spin-out companies. Second, we test our model empirically using novel data from two surveys of UK universities' commercial exploitation of their intellectual property through the creation of university spin-outs conducted in 2002 and 2003. The structure of this paper is as follows. Section 2 defines a university spin-out, while Section 3 provides a brief overview of the UK university technology transfer context. Section 4 outlines the theoretical background of the model and outlines the hypothesized nature of the relationships to be tested. Section 5 outlines the methodology and Section 6 presents the results. Section 7 concludes by summarizing the findings, linking the findings to the existing literature, commenting on potential limitations of the research and identifying areas for further research and implications for policy-makers and practitioners.

2. What is a university spin-out?

We narrowly define university spin-outs as *new ventures that are dependent upon licensing or assignment*