



# The creation of spin-off firms at public research institutions: Managerial and policy implications

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## Abstract

We consider the managerial and policy implications of the rise of spin-offs at public research institutions (PRIs), based on a knowledge-based view (KBV) of the firm. This framework highlights the importance of knowledge in the creation and development of spin-offs. We argue that in order to understand the development of spin-offs, researchers should focus on “knowledge gaps” these new ventures encounter. Knowledge gaps can occur at different levels of aggregation, including the PRI, spin-off, team, individual, incubator, and at different stages of spin-off development. Based on this framework, we synthesize findings from previous studies and papers in the special issue and offer some suggestions for additional research on spin-offs from PRIs.

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## 1. Introduction

In recent years, there has been a rapid rise in commercialization of publicly-funded research at U.S. and European universities. The key channels for commercialization are patents, licenses, research joint ventures, and the formation of spin-off companies, all of which

have increased substantially on both continents. There has also been a significant rise in the number of science parks, incubators, and other property-based institutions designed to launch and nurture new-technology based firms (NTBFs) (Siegel et al., 2003c; Phan et al., 2005).

In the U.S., legislative initiatives such as the Bayh-Dole Act of 1980 helped accelerate the rate of diffusion of new technologies from universities and federal laboratories to firms. Bayh-Dole established a uniform patenting policy across governmental agencies, lifted

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some restrictions on licensing, and most importantly, enabled research institutions to own patents arising from federal research grants. Additional U.S. legislation designed to promote collaborative research, and a more rapid rate of university-industry technology transfer, included the 1982 Small Business Innovation Development Act (which established the Small Business Innovation Research (SBIR) Program), the 1984 National Cooperative Research Act (which lifted antitrust concerns regarding collaborative research), and the 1992 Small Business Technology Transfer Act (which established the Small Business Technology Transfer Research program).

In the U.K., legislation was also enacted to stimulate the commercialization of university-based research, innovation in small firms, and the development of public-private research partnerships. The British government designed three key programs: University Challenge, Science Enterprise Challenge, and the Higher Education Innovation Fund. University Challenge provides venture capital funding for university-based spin-offs. Science Enterprise Challenge resulted in the creation of 12 Science Enterprise Centres at several U.K. universities which provide educational, training, and financial services to would-be academic and graduate student entrepreneurs. The Higher Education Innovation Fund provides direct financial support for projects that strengthen connections between universities and firms.

The initiatives we have described were undertaken by national governments to overcome innovation market failure (Martin and Scott, 2000), especially for small firms that may have insufficient financial and human capital to thrive in the marketplace (e.g. the U.S. SBIR program). As a result, there is considerable interest among U.S. and European policymakers and university administrators in understanding the managerial and policy implications of this trend (see Poyago-Theotoky et al., 2002).

While there have been numerous studies of university patenting, licensing, and research joint ventures, less attention has been paid to the managerial and policy implications of new firm creation at public research institutions (henceforth, PRIs) or organizations that receive public funds to conduct R&D. Most studies have focused on universities, but that is only a small part of the growth in entrepreneurial activity. The purpose of this special issue is to shed further light on the antecedents

and consequences of efforts at PRIs to transfer technology from the public sector to the private sector, via the creation of spin-off firms.

In the next section, we outline a knowledge-based view (KBV) of spin-off formation at PRIs. This is followed by an application of KBV to the case of the university technology transfer offices (henceforth, TTOs). Section 4 provides a brief review of the papers contained in the special issue. We demonstrate how each study in the special issue sheds new light on an unexplored dimension of this emerging literature. Section 5 synthesizes these findings, which we use to discuss some policy implications. In the final section, we present some conclusions and suggestions for additional research on spin-offs from PRIs.

## 2. A knowledge-based view of spin-off formation at PRIs

Licensing has traditionally been the dominant route for the commercialization of public sector intellectual property. However, the formation of university-based spin-off companies constitutes a potentially important, but as yet, under-exploited option. In the U.S., technology transfer from universities and other PRIs is increasingly viewed by policymakers as playing a significant role in new venture creation, growth of existing firms, and new job creation (Siegel et al., 2003a).

In the U.K., the debate over the role of universities in generating start-up companies has intensified since the publication of reports highlighting the financial and managerial issues that may be critical to their success (Bank of England, 1996; CBI, 1997). In 2003, the U.K. government commissioned the Lambert Review of University-Business Collaboration (Lambert, 2003) which criticized universities for focusing on counts of start-ups, rather than targeting their resources to the development of skills and capabilities that would increase the likelihood that such fledgling firms would be commercially viable. In Europe, there is also growing interest in stimulating new companies that transfer technology from PRIs. Various European Union funded projects, such as PROTON, PRIME, and INDICOM are examining issues concerning the development of these ventures.

The exploitation of inventions, in what has historically been a non-commercial environment, raises new

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