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A stage model of academic spin-off creation

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Abstract

The commercialisation of scientific and technological knowledge produced within publicly funded research institutions such as universities, laboratories, research centres, and so forth, is increasingly considered by policymakers as raw material for developing and sustaining regional economic growth. This paper focuses on one of the most promising ways to transfer research results to the market place, namely, the creation of academic spin-offs. Its main aim is to identify, understand, and distinguish the major issues raised by the creation of such companies from the point of view of both public and academic authorities. To achieve this, some well-known international spin-off support programmes have been benchmarked. We used these observations to build up a general model that puts forward the major issues involved in the transformation of research results into the creation of economic value within the perimeter of universities. Based on inductive research, the model is composed of four successive stages interacting in a sequential manner. © 2002 Elsevier Science Ltd. All rights reserved.

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1. Introduction

In the USA, the birthplace of academic entrepreneurship, the spin-off phenomenon achieved its first success many years ago. Popularised by the development of the legendary ‘Silicon Valley’ and ‘Route 128’ around prestigious universities such as Stanford and MIT, academic spin-offs (ASOs) have been part of the American academic landscape for decades (Alistair et al., 1991; Roberts, 1991). In Europe, the phenomenon is still in its infancy. Although the first university spin-offs appeared in the mid-1970s, they were considered as epiphenomena; universities were often totally indifferent to them and sometimes even opposed to their development (Stankiewicz, 1994).

More recently, universities and politicians have realized the strategic role that laboratories and research centres can play, through their ability to create and diffuse knowledge, in fostering a region’s capacity to innovate (Doutriaux, 1991). Since a significant proportion of the products and processes that are currently sold and

used could not have been developed without academic research (Mansfield 1995, 1998), most universities and research centres are aware that they can exploit their own research results by promoting and sustaining the creation of new ventures.

In a recent report titled ‘Fostering Entrepreneurship’, the Organization for European Cooperation and Development stresses that universities need to develop structural and formal policies to facilitate the transition from research to the creation of new ventures (OECD, 1998).

2. Objectives and methodology

Since the drive for entrepreneurship within university laboratories is recent, research on how universities are trying to promote the creation of spin-offs is still in its infancy (Radosevich, 1995; Roberts and Malone, 1996; Carrayannis et al., 1998; Steffensen et al., 2000). In particular, the different issues raised by the creation of value from university research amount largely to a black box (Fig. 1).

The objective of this paper is to open that black box in order to identify, understand and distinguish the major issues raised by the creation of such companies from the standpoints of both public and academic authorities.

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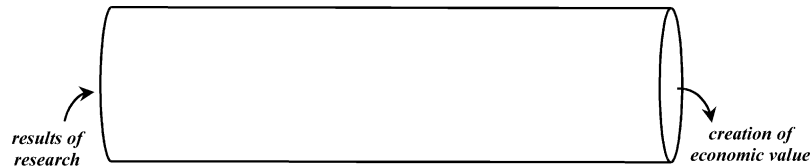


Fig. 1. The black box of economic value creation from university research.

Our research method relies on a two-step approach. First, we identified and analysed some well-known international spin-off support programmes, and then used our observations to build up a general model that set out the major issues involved in the transformation of research results into the creation of economic value within the universities.

The research relies on field studies conducted within universities. Three main criteria guided our choice of sites: the site must: (i) have successfully implemented a spin-off programme (condition of renown); (ii) be comparable with most European universities (condition of scale); and (iii) have taken original and interesting initiatives (condition of originality).

The following 15 universities were visited between February and July 1999:

University of Turku, Finland
 Helsinki Technology University, Finland
 Linköping University, Sweden
 University of Twente (Enschede), The Netherlands
 Strathclyde University of Glasgow, UK
 Katholieke Universiteit Leuven, Belgium
 University of Liège, Belgium
 Université Technologique de Compiègne, France
 Weizmann Institute of Technology, Rehovot, Israel
 Ben Gurion University, Israel
 University of Maryland, USA
 University of Pennsylvania, USA
 North Carolina State University, USA
 Duke University Medical Centre, USA
 Laval University, Quebec, Canada

At each site, we interviewed officials from local development agencies, managers of universities liaison offices and incubators, and founders of spin-off firms. In-depth semi-structured interviews were conducted, addressing issues that deal with the problematic of research valorisation. In every site, we progressively built up a picture of the situation that was cross-validated by different actors looking at problems from very different angles (Eisenhardt, 1989).

It is worth noting that the following analyses consist of common tendencies observed in different sites we visited. For the sake of conciseness we do not give these experiences in more detail. However, while describing our model, sometimes we briefly supply some pertaining

empirical facts that underline our model. In so doing, we emphasize or illustrate some specific topics.

3. The four stages of the global spin-off process

From the in-depth analyses of our data, four stages emerged as relevant in explaining the transformation of academic research results into economic value. The black box of Fig. 1 can be specified as an input–output model with the four following stages (Fig. 2):

- Stage 1: to generate business ideas from research;
- Stage 2: to finalize new venture projects out of ideas;
- Stage 3: to launch spin-off firms from projects;
- Stage 4: to strengthen the creation of economic value by spin-off firms.

Each of these four stages has a specific function in the global spin-off process. The first stage generates and assesses ideas with regard to possible commercialisation; the second stage considers these ideas and translates the most promising of them into genuine entrepreneurial projects; the third stage realizes the best projects by creating new spin-off firms; and the fourth stage consolidates and strengthens the economic value created by these new firms. A selection process occurs at each stage, which suggests that the model is an ecological one (Hannan and Freeman, 1987). Indeed, not all research results generate business ideas; not all ideas amount to opportunities for new venture projects (Timmons, 1994); attractive opportunities do not necessarily lead to the creation of spin-off firms; and such firms, ultimately, do not all generate economic value. A note of caution must be made with respect to the model's suggested assumption of linearity. The four stages are not wholly independent of each other. Economic value depends on the quality of firms, which depends on the quality of finalized projects, which themselves depend on the quality of the initial ideas. In fact, 'the efficiency of this multi-stage process depends on its weakest link'.

This four-stage model identifies the various changes of status that research results have to undergo to generate economic value; thus, 'research results→business ideas→new venture projects→spin-off companies→economic value'.

The process is neither straightforward nor spon-

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