

# The role of university incubators in stimulating academic entrepreneurship

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## Abstract

Many Brazilian universities have technology-based incubators, but there is a small presence of firms created by students, alumni or teachers (spin-offs). Thus, such incubators do not encourage the transfer of technologies developed in universities to society, through the creation of new businesses, one of the main ways of university–industry interaction. To test this assumption, we studied eight university incubators. As a theoretical basis, we used the concepts of open innovation and entrepreneurial university; as a methodology, we adopted a qualitative approach through the use of bibliographical, documental and field research, with in-depth interviews. Results show that there is no priority for companies created from academic research results, despite the incubators' preference for projects that have a high potential for interaction with the university. Also, there are few efforts to attract the academic audience, which leads to underutilization of this important channel for the transfer of research results.

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## Introduction

Closed innovation was the pattern adopted by companies until the early 2000s, in which research and development (R&D) were conducted solely in their own laboratories, using qualified professionals and significant resources. However, in the last decade, open innovation emerged as a new model, in which companies take advantage of the creativity of customers, suppliers, universities, research institutes or independent inventors, through partnerships, thereby obtaining more innovation, faster and with less spending. Inventions generated within companies that are not used may be offered to the market, bringing additional revenue (Chesbrough, 2006).

In the open innovation model, universities are more demanded, and closer ties with the productive sector are considered as their third mission, besides teaching (the first and

traditional) and researching (the second mission), as mentioned by Etzkowitz (2008) and Laredo (2007). The recognition of the third mission has increased during the last decade, and it involves all relationships between the university and non-academic partners, known as *capitalization of knowledge*. The vision of an “entrepreneurial university” is discussed by several authors (Etzkowitz, 2008; Mowery, Nelson, Sampat, & Ziedonis, 2001), in which technology licensing or business creation by researchers are the main forms of transferring the results of academic research.

The generation of spin-offs based on the use of university research results is better accepted by the academic community than the transfer of results to established companies (Kenney & Patton, 2011). In fact, in Brazil there still remains an academic behavior against the transfer of results to large companies (Closs & Ferreira, 2012), whose roots can be found in the organizational culture of public universities, supported by ideological values, and also to different interests - the university seeks academic results and companies want to develop new products and processes (Puffal, Rufoni, & Schaeffer, 2012).

Freitas, Gonçalves, Cheng, and Muniz (2011) consider academic spin-offs a new topic that has received little attention in

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Brazil. The authors consider the Innovation Act of 2004 as the legal framework for the creation of these companies, and mention the higher number of Brazilian researchers in universities than in companies, which justifies the support for this important means of knowledge transfer to the business sector. They searched the SciELO Brazil database, in November 2010, and found only three articles on this subject (Araújo et al., 2005; Costa & Torkomian, 2008; Gomes & Salerno, 2010).

We have updated the research done by Freitas et al. (2011) until December 2014, using the SPELL (Scientific Periodicals Electronic Library) database, a collection of articles published in Brazilian journals of Business Administration, Accounting and Tourism, where we have identified 11 other items under the keywords *spin-off*, *academic spin-offs*, *academic entrepreneurship* and *scientific entrepreneurship*, which will be described in the following item. However, none of them addressed the topic of this article – university–industry relations from the perspective of university incubators, and their role in the transfer of research results by encouraging the creation of academic spin-offs.

This paper aimed to analyze the role of technology-based university incubators on the attraction of companies created by their academic members, based on the study of eight cases. It is divided in five items, including this Introduction. In the literature review, we discuss topics related to the entrepreneurial university and technology-based incubators. Then we present the methodology, the results and their analysis and discussion, followed by the conclusions and the list of references used in the paper.

## Literature review

### *University–industry interaction and the growth of the entrepreneurial university*

Universities and companies are natural partners in developed countries, where firms seek external sources of knowledge to complement their human resources and R&D laboratories. Currently, creating new products and services requires sources of creativity beyond the companies' boundaries, involving cooperation with customers, suppliers, research institutes and even competing companies (Chesbrough, 2006).

In those countries, universities are the preferred partners in new technological fields where business results are uncertain; but this cooperation is even more necessary in developing countries, where universities are the main source of knowledge for innovation.

Perkmann and Walsh (2007) summarize the main forms of cooperation between universities and companies, as shown in Table 1. It is important to note that academic entrepreneurship appears as an important form of collaboration as of the 1990s, with the growth of business incubators located at universities.

Licensing is still the most common tool to market universities' intellectual property, but in recent years the creation of spin-offs has gained importance (Kenney & Patton, 2011; Siegel, Wright, & Lockett, 2007). It results from changes in legislation that transferred intellectual property of research carried out with public funds to universities or researchers, and to the creation

Table 1  
University–industry relations.

Research partnerships	Inter-organizational arrangements for conducting collaborative R&D
Research services	Activities commissioned by companies, including contract research and consulting
Academic entrepreneurship	Development and commercial exploitation of technologies by academic scientists through the creation of firms (alone or with partners)
Human resources transfer	Multi-context learning mechanisms such as training of companies' employees at the university; postgraduate activities in firms; graduate trainees; and temporary transfer of scientists to companies
Informal interaction	Formation of social relationships and networks at conferences, etc.
Commercialization of property rights	Licensing of university-generated intellectual property (patents) to firms
Scientific publications	Use of codified scientific knowledge within industry

Source: Perkmann and Walsh (2007).

of technology transfer offices, which made technology diffusion easier. The generation of companies from research institutions is considered one of the most effective forms of exploration and commercialization of new knowledge and technologies, and is different from licensing models or joint ventures. Named spin-offs, spin-outs or start-ups, they are created through the transfer of people and intellectual property from the home institution. To Pirnay, Surlemont and Nlemvo (2003), academic spin-off arises out of the knowledge generated in universities' research, with the participation of the scientists involved. On the other hand, Djokovic and Souitaris (2008) state that spin-offs evolve from academic knowledge, but are not necessarily created by the same people who developed it. Faculty involved in the research may not be interested, and a colleague or a graduate student can do it, or even a person not connected to the university, who becomes aware of the research and decides to take the risk.

Despite differences in the definition, Araújo et al. (2005) mention some common attributes of academic spin-offs: they are companies that originate from universities; they explore inventions, patented or not, and also knowledge accumulated by researchers in academic activities; they are for-profit entities and independent from the universities; they are companies founded by at least one university member (faculty, student or employee).

Even in developed countries, the creation of spin-offs is quite concentrated in some universities that have a strong entrepreneurial bias. American universities, on average, generate 1.91 spin-offs per year, while MIT [Massachusetts Institute of Technology] has already created 31 companies in a single year, and that is its main way of transferring technology (O'Shea, Allen, Chevalier, & Roche, 2005). One explanation is the availability of venture capital, because such investments are mainly local, to allow a close follow-up of the companies' performance.

According to Etzkowitz (2008), an entrepreneurial university is supported by four pillars: academic leadership, which is able to formulate and implement a strategic vision; legal control over its resources, including buildings, equipment, and also

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