

Academic spin-offs: counting beans or extracting value?

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Abstract

We argue that current approaches do not take into full account the process through which Universities create new spin-offs. Instead, we claim that the overall process through which these arrangements impact on spin-offs' performance can vary considerably and that this process should be interpreted in terms of University-level managerial practices in place for the creation and development of University spinoffs. Managerial practices are likely to play an important role in explaining the systematic difference in performance across spinoffs spun from different Universities.

We rely on a longitudinal dataset comprising more than 800 Italian University spin-offs observed over the period 2000-2011 and additional data collection via questionnaires and semi-structured interviews to 68 Italian University TTOs. The scope is to juxtapose the above issues and to begin to uncover the black box of “managerial practices – spinoff creation/performance” in terms of antecedents and impact of a range of managerial activities not adequately covered by the extant literature. The results of this paper should therefore contribute to fill an important gap in the existing literature on university-industry knowledge transfer and academic entrepreneurship. Implications would inform policy makers and university managers about how to direct investments.

Introduction

Following the point of view of both practitioners and scholars (Etzkowitz 2003; D'Este and Perkmann 2010; Shane 2004; OECD 2003), Universities have started to leverage value from the knowledge they produce in different ways. The last two decades have witnessed an upsurge in the creation of academic spin-offs. This way, Universities hope to translate the results of academic research into tangible entrepreneurial results (Lockett et al. 2005). However, spin-offs are often companies with below-average size, slow growth and modest profit. In addition their contribution to economic development remains dubious (Lambert 2003; Harrison and Leitch 2010).

Research question(s)

Strong advocates of the entrepreneurial role of Academia assume that academic spin-offs are adequate in extracting value and that Universities are well equipped to face the entrepreneurial process (Kirby 2006). These assumptions may just be a mere act of faith, however.

First, there is a lack of evidence on how academic spin-offs perform in the medium-long term. Indeed, existing studies have disproportionately favoured short-term output measures: mainly the number of spin-offs, the amount of capital raised and the rate of survival of new academic ventures (Rothaermel, Agung, and Jiang 2007). Unfortunately, these measures are highly questionable. For example, it may be argued that to extract value Universities instead of focusing on the creation of a high number of academic spin-offs, should pay attention to the creation of a low number of high performing ventures. This would result in a more efficient utilisation of resources and provide a more tangible contribution to local development. Overall, the popular (short-term oriented) performance measures fail to connect spin-offs' outcomes with the entrepreneurial knowledge they need to operate and therefore be quite misleading (Ács, Autio, and Szerb 2014).

Second, current approaches do not take into full account the process through which Universities create new spin-offs. We argue that this process is crucial for several reasons: launching a new company is not an easy task as it requires, among the others, trial and error attitude, strong technological capabilities and an excellent understanding of customers' needs (Zahra 2007; Colombo and Grilli 2005). Moreover, spin-offs may require coaching and assistance. This can be provided directly or with the support of external partners. Direct support mainly occur through TTO and incubators directly managed by Universities. Indirect support is

provided through external partners, such as companies.

In both cases, we claim that organizational arrangements matter (Perkmann et al. 2013) and that the overall process through which these arrangements impact on spin-offs performance can vary considerably. For example, Universities may (or may not) offer classes and courses of entrepreneurship which are likely to stimulate students' entrepreneurial attitudes (Åstebro, Bazzazian, and Braguinsky 2012). Universities can also promote specific actions to foster the process, such as internal awards for new ideas or tutoring and assistance through mentors. Likewise, Universities can train internal units to monitor the process and keep track of the performance of generated spin-offs through time. They can do that by allocating to spin-offs specific targets such as growth targets, value extraction, scientific and technological excellence. Universities may also adopt special compensation systems for spin-offs or use existing ones. Strategic decisions are also at stake as different dedicated internal units can decide to cover one or more phases of the commercialization and spin-off support process (e.g. initial coaching, proof of concept definition, support in the patenting process and fund-raising). These units can even influence spin-offs decision making, by pushing for the appointment of external managers or external directors on the Board. Universities may also search for the help of external partners. Collaboration with existing public and/or private incubators might be beneficial and leverage existing competences but it might also bring about governance issues (Colombo et al. 2012). Universities can also search for new modes of cooperation, such as joint research agreements, secondments to industry labs, etc. (Perkmann et al. 2013).

We contend that most of the examples outlined above refer to strategic decisions in the hands of University managers (at different levels) and can be interpreted in terms of University-level managerial practices for the creation of University spin-offs. We describe managerial practices as a combination of commitment, specialization of resource, and ability to modify internal processes (Benassi, 2015). Commitment identifies the willingness of an institution to enter a programme in contrast with mimetic behaviour. Specialization of resources implies both the amount and the quality of allocated resources. The ability to modify internal processes deals with the motivation to set new rules. These rules ought to be goal-oriented and coherent with the resources available.

Overall, there is a current lack of systematic analysis of managerial practices and their influence on University spinoff performance. We see this as particularly unfortunate, because they are likely to play an

important role in explaining the systematic difference in performance across spinoffs spun from different Universities. Finally, they are often direct critical channels through which University “third stream” activities can impact, both socially and economically, on local and national economic development.

Data and Methods

The empirical analysis is based on a longitudinal dataset comprising more than 800 Italian University spin-offs observed over the period 2000-2011. It combines data from different sources. Our starting point is the list of Italian University spin-offs provided by Spinoff Italia (<http://www.spinoffricerca.it/>), a database comprising the name and affiliation of 1244 companies. We match this list with the ASIA database of the Italian National Statistical Office (ISTAT) to retrieve information on the structural characteristics of the population of Italian companies on a yearly basis. Due to data availability of the other sources, we restrict the period of interest to the 2000-2011. ASIA contains information about economic activity (e.g. industrial sector), number of employees etc. The resulting dataset is then matched with balance sheet information (used to build growth, profitability and productivity measures) obtained from the Bureau van Dijk AIDA database over the same period of observation (2000-2011). Lastly, we collect information at the University level by administering a combination of a structured questionnaire and semi-structured interviews to 68 between Italian University TTOs and incubators. This is done to retrieve the information relating to management practices supporting university spin-offs inside the Italian university system. Our resulting dataset is an unbalanced panel of 813 firms observed over the period 2000-2011.

From a methodological viewpoint, we aim at exploiting the longitudinal nature of the data to address issues relating to unobserved heterogeneity and reverse causality in the data. In particular, we employ a mixture of (dynamic) linear and non-linear panel data models in order to evaluate the relationship between University (mostly management practices) and firm level factors on the outcome measure of University spin-offs.

Expected contributions

The scope of this paper is to juxtapose the above issues and to begin to uncover the black box of “managerial practices – spinoff creation/performance” in terms of antecedents and impact of a range of managerial activities not adequately covered by the extant literature. The results of this paper should therefore contribute to fill an important gap in the existing literature on university-industry knowledge transfer and academic

entrepreneurship. This research has also the potential to derive important policy/managerial implications to be used to inform the relevant stakeholders (i.e. national and local public administrators, managers of Universities and entrepreneurs). In other words, given the large amount of public funding devoted to foster the creation of academic spin-offs, this work seeks to inform policy makers and university managers about how to direct investments to favour the generation of high-impact start-ups.

References

- Ács, Zoltán J., Erkkó Autio, and László Szerb. 2014. "National Systems of Entrepreneurship: Measurement Issues and Policy Implications." *Research Policy* 43 (3): 476–94. doi:10.1016/j.respol.2013.08.016.
- Åstebro, Thomas, Navid Bazzazian, and Serguey Braguinsky. 2012. "Startups by Recent University Graduates and Their Faculty: Implications for University Entrepreneurship Policy." *Research Policy* 41 (4): 663–77. doi:10.1016/j.respol.2012.01.004.
- Benassi, Mario (2015) "Exploring Incubation Performances and its Determinants", *Paper presented at the First Entrepreneurship Workshop Bozen, November 28th and 29th, 2014*
- Colombo, Massimo G., and Luca Grilli. 2005. "Founders' Human Capital and the Growth of New Technology-Based Firms: A Competence-Based View." *Research Policy* 34 (6): 795–816. doi:10.1016/j.respol.2005.03.010.
- Colombo, Massimo G., Evila Piva, and Francesco Rentocchini. 2012. "The Effects of Incubation on Academic and Non-Academic High-Tech Start-Ups: Evidence from Italy." *Economics of Innovation and New Technology* 21 (5-6). Routledge: 505–27. doi:10.1080/10438599.2012.656524.
- D'Este, Pablo, and Markus Perkmann. 2010. "Why Do Academics Engage with Industry? The Entrepreneurial University and Individual Motivations." *The Journal of Technology Transfer* 36 (3): 316–39. doi:10.1007/s10961-010-9153-z.
- Etzkowitz, Henry. 1998. "The Norms of Entrepreneurial Science: Cognitive Effects of the New University–industry Linkages." *Research Policy* 27 (8): 823–33.
- . 2003. "Research Groups as 'quasi-Firms': The Invention of the Entrepreneurial University." *Research Policy* 32 (1): 109–21. doi:10.1016/S0048-7333(02)00009-4.
- Harrison, Richard T., and Claire Leitch. 2010. "Voodoo Institution or Entrepreneurial University? Spin-off Companies, the Entrepreneurial System and Regional Development in the UK." *Regional Studies* 44 (9). Routledge: 1241–62. doi:10.1080/00343400903167912.
- Kirby, David A. 2006. "Creating Entrepreneurial Universities in the UK: Applying Entrepreneurship Theory to Practice." *The Journal of Technology Transfer* 31 (5): 599–603. doi:10.1007/s10961-006-9061-4.

- Kotha, Reddi, Gerard George, and Kannan Srikanth. 2013. "Bridging the Mutual Knowledge Gap: Coordination and the Commercialization of University Science." *Academy of Management Journal* 56 (2): 498–524.
- Lam, Alice. 2011. "What Motivates Academic Scientists to Engage in Research Commercialization: 'Gold', 'ribbon' or 'puzzle'?" *Research Policy* 40 (10): 1354–68. doi:10.1016/j.respol.2011.09.002.
- Lambert, R. 2003. *Lambert Review of Business-University Collaboration. Innovation*. Vol. 1. doi:0-947819-76-2.
- Lockett, Andy, Donald Siegel, Mike Wright, and Michael D. Ensley. 2005. "The Creation of Spin-off Firms at Public Research Institutions: Managerial and Policy Implications." *Research Policy* 34 (7): 981–93. doi:10.1016/j.respol.2005.05.010.
- Nelson, Richard R. 2004. "The Market Economy, and the Scientific Commons." *Research Policy* 33 (3): 455–71. doi:10.1016/j.respol.2003.09.008.
- Nelson, Richard R., and Sidney G. Winter. 1982. *An Evolutionary Theory of Economic Change*. Harvard University School Press.
- OECD. 2003. *Turning Science into Business PATENTING AND LICENSING AT PUBLIC RESEARCH ORGANISATIONS. Organisation for Economic Cooperation and Development*. doi:10.1787/9789264100244-4-en.
- Perkmann, Markus, Valentina Tartari, Maureen McKelvey, Erkko Autio, Anders Broström, Pablo D'Este, Riccardo Fini, et al. 2013. "Academic Engagement and Commercialisation: A Review of the Literature on University-Industry Relations." *Research Policy* 42 (2): 423–42. doi:10.1016/j.respol.2012.09.007.
- Rothaermel, Frank T., Shanti D. Agung, and Lin Jiang. 2007. "University Entrepreneurship: A Taxonomy of the Literature." *Industrial and Corporate Change* 16 (4): 691–791. doi:10.1093/icc/dtm023.
- Shane, Scott Andrew. 2004. *Academic Entrepreneurship: University Spinoffs and Wealth Creation*. Edward Elgar Publishing. <https://books.google.com/books?hl=en&lr=&id=fMRGAgAAQBAJ&pgis=1>.
- Zahra, Shaker a. 2007. "Contextualizing Theory Building in Entrepreneurship Research." *Journal of Business Venturing* 22 (3): 443–52. doi:10.1016/j.jbusvent.2006.04.007.

Zucker, Lynne G., Michael R. Darby, and Jeff S. Armstrong. 2002. "Commercializing Knowledge: University Science, Knowledge Capture, and Firm Performance in Biotechnology." *Management Science* 48 (1): 138–53.

Bio

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Mario Benassi is Full Professor of Management and Business Administration at the Department of Economics, Management and Quantitative Studies, University of Milan. He's Dean of the Master Program in Management of Innovation and Entrepreneurship, where he teaches Business Plan and Start-up as well as Innovation and Entrepreneurship. He has authored and co-authored more than ninety articles and books on innovation. His main research interests are new organizational forms, management of intellectual property rights and start-up companies.

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