

## **Academic Entrepreneurship in Italy**

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### **Abstract**

The establishment of academic spinoffs is a multi-faceted phenomenon, involving individual-, institutional-, and contextual-level factors. In this manuscript, we review the literature on the motivation to establish academic spinoffs and link it to the regulatory and policy framework. We document the evolution of this phenomenon in Italy, where 1,626 academic spinoffs have been established between 1981 and 2018. We argue that it is likely, for some of these spinoffs, that graduates or PhD students establish spinoffs out of necessity entrepreneurship rather than opportunity entrepreneurship, as a "pushed alternative" considering the small opportunities of stable jobs or career progress. The academic career is indeed a highly selective job path and who cannot remain in the system may be interested in spinning out a company to exploit to some extent the knowledge previously developed (D'Este & Perkmann, 2011; Perkmann et al., 2013). The evidence of a high survival profile of this type of firms, despite not high growth rates, is coherent with the motivation leading to their establishment.

## **Introduction**

Science-based entrepreneurial firms play a key role in the modern knowledge economy since they contribute to the creation and enhancement of regional high-tech clusters and the transformation of investments in basic science into economic growth, employment, and competitive advantage (Murray, 2004). Among science-based entrepreneurial firms, academic spinoffs have been considered especially important for national economies. Academic spinoffs are companies created by academic personnel (Colombo et al., 2010) to exploit technological knowledge that originated within universities (Fini et al., 2011). They have received great attention from scientists and policymakers (Perkmann et al., 2013). Indeed, although they are unlikely to generate major short-term shifts in macroeconomic performance on their own, their indirect effects on technology-using sectors are significant (Ljungberg & McKelvey, 2012). Therefore, these firms are expected to act as engines of development, resulting in economic and social spillovers above the private returns (Griliches, 1992).

National governments showed interest in academic spinoffs, implementing laws to foster their establishment (Clarysse et al., 2007). The European Commission recommends research institutions to set incentives for researchers who take part in such knowledge transfer activities. The growing interest of policymakers is paralleled in the high number of research publications seeking to better understand and address the forces that shape this activity. The literature is divided into three main streams: the characteristics of individual academics who become entrepreneurs (Landry et al., 2006), the factors in the university environment that facilitate the creation of business activities (O'Shea et al., 2005), and the institutional conditions under which spinoffs are incubated (Lockett et al., 2005).

In this chapter, we first review the literature and discuss the regulatory aspects. The review of the literature presents the determinants of the establishment of academic spinoffs at three levels, namely the individual, the institutional, and the contextual level. Then, we focus on the Italian context, which has been extensively studied in the academic entrepreneurship literature. The academic spinoff phenomenon has indeed increased significantly starting in Italy from the 1990s (Fini et al., 2009), following the introduction of a new dedicated regulatory framework focused on supporting scientific and technological research, knowledge transfer, and researchers' mobility (Law 297/1999 and Ministerial Decree 593/2000). Since then, public researchers can be involved in technology transfer projects while keeping their university positions and wages. We discuss the main characteristics of the Italian academic spinoffs, by shedding light on the rationales behind their diffusion and their configuration. In particular, we include information on the sector, the technological level, as well as the survival rate of these companies.

## **Literature review**

### *Individual-level determinants of the establishment of academic spinoffs*

Several studies emphasize the impact of individual attributes and dispositions on the creation of academic spinoffs. Landry et al. (2006) by considering a sample of 1,554 Canadian researchers in natural sciences and engineering, finding that 16.8% of the sample exhibits entrepreneurial behavior through attempts to create spinoffs, whereas 32% use diverse types of mechanisms to protect their intellectual property. Estimates show that a complementary set of resources needs to be mobilized by researchers to launch university spinoffs.

The multi-faceted nature of the resources and assets researchers need to become entrepreneurs is confirmed by D'Este & Perkmann (2011). They examine what motivates academics to engage with industry using both informal collaboration and formal models of interaction by surveying a sample of 4,337 research grant holders from the UK's Engineering and Physical Sciences Research Council (EPSRC) covering 1999 to 2003. Factor analysis identifies four factors as motivations: commercial exploitation of technology or knowledge; learning intended as expected benefits from gaining new insights, receiving feedback on research, and accessing new knowledge through engagement with industry; access to private funding complementing public research monies; and access to in-kind resources such as industry-provided equipment, materials, and data for research.

Only one of these factors (commercialization) is related to the intention to be entrepreneurial. Scientists may start a business for different reasons (Hayter, 2011; Lam, 2011). Within this set of factors, the enhancement of academic status is perceived to be the most important incentive for fostering the creation of a new company. By establishing a spinoff, researchers expect to achieve desired outcomes such as the generation of further stimuli for research activities, gaining prestige and reputation as leading academics, the creation of funding opportunities (grants) for students or research assistants, and the possibility of obtaining new infrastructure and facilities for research activities.

The existence of non-financial motivations for the creation of firms is highlighted by the entrepreneurship literature's classification of "push" and "pull" factors. In the pull approach, or "opportunity" entrepreneurship, incentives for the creation of a firm are driven directly or indirectly by the desire to increase the founder's wealth (Baumol, 1996); in the push approach, also known as "necessity" entrepreneurship, individuals are moved to create a firm to escape an unsatisfactory situation. Among push factors, unemployment is typically the most important (Ritsilä & Tervo, 2002; Storey, 1991). Different motivations correspond to a different performance, as necessity-oriented academic spinoffs are associated with higher survival profiles, while opportunity-oriented spinoffs exhibit higher post-entry growth rates (Civera, Meoli, et al., 2020).

The founding team of the academic spinoffs needs to be developed according to the motivations and the desired performance. If the ultimate goal is creating a financially successful company, a team composed of scientists only may have downsides, as the academic founders of a company may not have enough business and

commercial experience to properly exploit their innovations. Hmieleski & Ensley (2005) underline this deficiency by examining differences in the composition of top management team (TMT) and performance between matched samples of 256 university-based and 500 independent high-technology startups. They demonstrate that university support tends to focus on technology and marketing instead of spending adequate time developing the TMTs of the new ventures. Zahra et al. (2007) provide further evidence of a lack of commercial experience within universities through a comparative study between 91 corporate spinoffs and 78 academic spinoffs. The results indicate that corporate spinoffs benefit from the skills transferred through the founders and employees who have worked for their parent corporations and have maintained contacts, whereas the opposite was found regarding academic spinoffs. Science-based firms do not reap the same benefits from their parent universities, which may not be skilled enough to commercialize new technology or develop appropriate capabilities. Indeed, higher education institutions often lack the mindset and commercial skills to actualize their discoveries. Moreover, they may not have a complete awareness of marketing issues related to the success of technology commercialization. Academic spinoffs which reflect the characteristics of their academic founders instead, are oriented not to the market but to survival.

#### *Institutional-level determinants of the establishment of academic spinoffs*

Another stream of literature addresses as enabling factors for academic spinoff creation identifies the overall university system (Clarysse et al., 2005; Clarysse & Moray, 2004; Degroof & Roberts, 2004; Di Gregorio & Shane, 2003; Lockett et al., 2003). The role of the university has been widely debated in the literature. Some scholars argue that university involvement is beneficial for the success of newly established ventures in terms of survival rates, performance, and reputation (Audretsch et al., 2015; Civera & Meoli, 2018; Clarysse et al., 2005; Degroof & Roberts, 2004; Di Gregorio & Shane, 2003; Harrison & Leitch, 2005).

Clarysse et al. (2005) explore the incubation strategies for spinning out companies employed by European Research Institutions. They use a two-stage approach to answer two research questions: the first focuses on the modeling of incubation strategies, whereas the second is dedicated to the resources employed, and the activities are undertaken within the model categorized. In the first step, they identify three distinct incubation models of managing the spinoff process (Low Selective, Supportive, and Incubator) through an in-depth analysis of seven cases in five European countries. In the second phase, they determine differences in resources relating to finance, organization, human resources, technology, network, and infrastructure by validating them through 43 cases. The first model, predominantly service-oriented, supports the creation of self-employment-oriented spinoffs, while the second model stimulates the creation of economic profitability-oriented spinoffs. When the amount of necessary money is too small to be efficient or the market is simply too small to be attractive to financial investors, the third model is preferable.

At the same time, other scholars underline the negative consequences of strong ties with parent universities, such as dependency, non-beneficial reputation effects, and delayed graduation from incubators (Rothaermel & Thursby, 2005). Rothaermel & Thursby (2005) employ the resource-based view of the firm and the absorptive

capacity construct to confirm that knowledge flows enhance incubator firm performance. Drawing on longitudinal and fine-grained firm-level data on 79 technology ventures incubated between 1998 and 2003 at the Advanced Technology Development Center, a technology incubator sponsored by the Georgia Institute of Technology, they provide empirical evidence that incubator firms' absorptive capacity is an important factor in transforming university knowledge into a firm-level competitive advantage. Their analysis focuses on two mechanisms by which incubator firms can access this knowledge: the license to develop and use a university invention and the citations of university research found in the patents associated with incubator firms. The dependent variable investigated is the probability of obtaining VC funding, a mechanism that appears to assess the performance of new technology ventures satisfactorily.

Given that scientist-entrepreneurs are actively involved in knowledge creation and dissemination, and given the importance of the complementary resources they can access, their academic affiliation is expected to influence the performance of their business ventures. Affiliation with a university is beneficial for academic spinoffs because it signals that a firm has access to specific resources and contacts, enhancing the valuation of the firms in the eyes of investors (Cattaneo et al., 2015; Meoli et al., 2013). The signal can be stronger for more eminent universities because the affiliation with a prestigious institution provides a connection to more qualified resources (Civera & Meoli, 2018). Prominent higher education institutions

are expected to possess the best faculties, instruments, and equipment and to provide high-quality research that may result in leading-edge innovations (Wang & Shapira, 2012). Stuart & Ding (2006) examine the conditions prompting university-employed life scientists to become entrepreneurs, focusing on biotechnology. The orientation toward entrepreneurship is stronger when academics work in university departments that have employed other scientists who had ventured into the commercial sector and when these scientists are prestigious. Kenney & Patton (2011) contribute to the literature by investigating the role of inventor ownership in generating spinoffs instead of the probability of becoming an entrepreneur. The results of their empirical analysis on 515 academic spinoffs from one Canadian and five US universities with several characteristics in common covering 1957 to 2009 show that eminent institutions have a greater propensity to generate spinoffs at the technological field level. However, low-status universities may be able to increase their performance by stimulating entrepreneurship since inventor ownership seems to be a powerful intervening variable that can mitigate the role of status. More recently, Avnimelech & Feldman (2015) exploit the online professional networking resource LinkedIn to identify researchers at 124 universities (83 public and 41 private) who have established a new firm. The data collection conducted in September 2013 leads to a sample of 18,127 faculty founders of spinoffs.

Their evidence confirms that the founder-spawning rate is positively affected by the quality of the institutions and their departments, besides R&D expenditure and the strength of local clusters. From a different perspective, Meoli & Vismara (2016) argue that academics may also choose to launch an independent company by pursuing alternative business engagement activities when their university provides inadequate support.

Drawing from hybrid entrepreneurship and necessity entrepreneurship, they model the individual decision to spin off as a reaction to the organizational characteristics of the parent university rather than to its outcome. Through a longitudinal study of 559 spinoffs from 85 Italian universities covering 1999 to 2013, they find that, although stronger administrative support from the parent university leads academics to create more technology spinoffs, a U-shaped relationship exists between the number of administrative staff within a university and the rate of establishment of non-technology spinoffs: when the level of administrative staff is too low or too high relative to the fitted amount estimated using several university-level factors, academic staff reacts by establishing firms to achieve improved cash and human resource management.

#### *Contextual level determinants of the establishment of academic spinoffs*

Several studies highlight the role of holistic conditions in fostering the creation of academic spinoffs, particularly high-tech spinoffs.

Bekkers et al. (2006) analyze and compare data from 23 Dutch universities and 13 other PROs together with data from 168 US universities and 10 other PROs to better understand the role and relevance of a variety of factors concerning national, sectoral, regional, and managerial institutions and how they interrelate. These authors implement a two-step analysis to determine, first, the key factors affecting the potential to establish a science-based spinoff and, second, to identify the main factors affecting their success. Comparing the Netherlands and the US shows that the combination of national and sectoral institutions is the key influence on the probability of establishing an academic spinoff whereas managerial institution conditions determine the chances of success.

The characteristics of the universities can also contribute to the social and economic development of regions and countries in their role of fostering entrepreneurial attitudes. Braunerhjelm (2008) detects whether and to what extent universities influence regional productivity, focusing on the age of higher education institutions. The author creates a unique dataset by collecting information from Sweden Statistics covering 1975 to 1999 and measure the impact of the university on the region, intended as a correspondence between a university's research specialization and industrial specialization in the region hosting the university, through a Heckman regression analysis. The results suggest the existence of correspondence in the specialization as well as a positive effect in terms of productivity created by the universities. Differences are seen across regions but are not due to the age of the universities.

Patton & Kenney (2010) underline the importance of universities in fostering regional development by arguing that the external environment makes the difference. Analyzing two clusters in which the universities of Wisconsin and Illinois are located, the authors conclude that higher education institutions plant seeds that fructify only if planted in a dynamic entrepreneurial context. The university cluster of Wisconsin (UW-M) performs better by virtue of several characteristics that the cluster of Illinois (UIUC) lacks. The first institution is deeply involved in the management of the cluster, whereas the activity of the second is more recent.

Moreover, the University of Wisconsin can count on the support of private organizations, which are almost completely absent in Champaign.

## **Regulation**

The creation of spin-off companies is allowed to Italian universities since the enforcement of the ministerial decree 297/1999. This policy change aimed at facilitating knowledge and technology transfer from the universities to the market i) by abolishing the incompatibility between the academic and entrepreneurial career for scholars working in an Italian university and ii) by introducing financial incentives to support applied research. Several relieves were meted out to these companies and the involved scholars to incentivize the exploitation of academic research results. For instance, professors, PhD students, and/or holders of research grants can gain income subject to tax exemption from the assignment of shares, quotas, or financial instruments granted by the company to its directors, employees, or permanent collaborators as well as option rights for the purchase of financial instruments (Law 221/2012). Law 221/2012 introduced also fiscal deduction that reduces the tax burden for the subjects that invest directly or indirectly in the share capital of spinoffs to foster companies' ability to attract private financial capital that nurtures their growth.

In addition, Law 134/2012 introduced subsidies to facilitate the recruitment of highly qualified personnel as well as the permanent employment carried out through an apprenticeship contract. The ministerial decree 297/1999 devolves also to the individual universities/research institutes the regulation of the relationship between individual scholars and the institution, the issues related to intellectual property, and limitations aimed at preventing conflicts of interest with the spin-off company. Accordingly, every Italian university regulates autonomously some aspects of its own academic spinoffs activity. Nevertheless, common patterns regarding the formal powers/authority of university leaders and governing bodies are identifiable.

The Administrative Board holds the legislative and deliberative powers within the Italian state universities (Boffo et al., 2008; Boffo & Dubois, 2005). It is thus the governing body responsible for the approval of the establishment of every academic spinoff. The Rector - who is elected from among full professors according to a weighted voting system wherein the academic staff hold the absolute majority through administrative staff and students cast a vote as well (Capano et al., 2016; Donina et al., 2015b) - carries out the executive function, that is, implementing change and putting into practice the decisions taken by the legislative and deliberative bodies. S/He is the governor and external legal representative, performs both strategic and managerial tasks with powers regarding strategic direction, financial matters, teaching and research activities, and is responsible for pursuing university objectives and day-to-day management. In addition, s/he is an ex officio member of the Administrative Board and Academic Senate and chair both bodies, thus holding agenda-setting powers (Donina & Paleari, 2019). Due to these governance arrangements, Boffo & Dubois (2005) stress that the Rector has several means to dominate the decision-making process, while deliberative bodies simply ratify Rector's decisions. Following the enforcement of the Law 240/2010, the Rector is now involved in the appointment of Administrative Board members in most Italian state universities (Donina et al., 2015a). As a result, the

Administrative Board of Italian state universities is now more tightly-controlled by the Rector. Specifically, regarding the spin-off activity, the Rector is directly involved also in the appointment of at least one member of the ad-hoc committee that monitors and reports her/him at least once per year about the activity of the spinoffs. Accordingly, through a longitudinal study of 1176 spinoffs from 59 Italian state universities over the period 2001 and 2015, Civera, Donina, et al. (2019) find that the university leaders foster the creation of academic spinoff, especially the mobility of university leaders positively affects the rate of establishment of academic spinoffs. Rectors that experienced international mobility in their career develop networks and collaborations that facilitate the business involvement of their institutions.

From the legal point of view, academic spinoffs are considered in Italy a fully-fledged start-up, according to the Report “Restart, Italia!”<sup>1</sup> drawn up in 2012 by the Task Force established by the Minister of Economic Development and the consequent Legislative Decree 221/2012, commonly called Startup Act.<sup>2</sup> Specifically, Italian startups are defined as enterprises that are not listed on the stock exchange, reside or are subject to taxation in Italy, and fulfill the following criteria:

- Owned directly and for at least a 51% share by individuals, also in terms of voting rights;
- Established for no longer than 5 years
- No turnover or have a turnover that does not exceed 5 million euros (according to the last approved financial statement).
- No distribution of profits.
- Their social goal is the development of innovative goods or services of high technological value.
- Their bookkeeping is transparent and they do not use cash – except for the expenses related to reimbursements.

Even more, academic spinoffs are classified as an innovative start-up because the R&D dimension required to be an innovative startup had been mainly developed before the establishment. Being a university spinoff is indeed the third out of three criteria to be considered innovative startups. This criterion is complementary to that concerning the possession of a patent since not all the innovations which were the result of business projects have already been patented (they may never be). In any case, the time-frame for patents is often too long and is not compatible with establishing a startup. The other two are (1) a percentage of R&D expenditures greater than 15%; (2) a percentage of PhD students, PhD holders, or staff highly qualified in research activities greater than 30%.

Due to their inclusion in the innovative startups' category, academic spinoffs can benefit from several fiscal incentives. Especially, at the time of foundation, startup companies can freely register to the Chamber of Commerce's Business Register with a consequent reduction of administrative burdens. All startups must pay tax (VAT and corporate tax) depending on their real cash-flow rather than fixed taxation rates. They benefit from a very flexible short-term contract, which is exempt from as many taxes as possible (IRAP, payroll income tax). Startups can issue stock options with a tax advantage regime to attract talented people from Italy



and abroad into startups. During their growth phase, investments in startups are encouraged by the creation of two ad-hoc funds, the Fund of Funds and the Fund for seed investments, by tax reductions for private investments in startups, for crowdfunding and social lending activities. Finally, in the maturity phase, the industrial acquisition of startups is incentivized, as well as the listing of startups on the Stock exchange by excluding from corporate taxation part of the investments made acquiring the startup in the first case and by reducing listing costs in the second case. In case of failure, a simplified liquidation process is provided to speed up the liquidation. The startupper himself is appointed as liquidator and the consequences of the declaration of bankruptcy for the entrepreneur are limited.

This implies that the supportive program policy does not end when startups stop being in their startup phase (i.e. five years since the establishment). A new portfolio of fiscal benefits is set up for the so-called innovative small and medium enterprises. Due to the way the incentive is set up, startups in general and academic spinoffs, in particular, are incentivized to survive even in the absence of economic activity, giving birth to the phenomenon of “zombie firms” (Broughman & Fried, 2012; Kane, 1990).

### **Empirical evidence**

The phenomenon of academic entrepreneurship became relevant in Italy from the 1990s, when public researchers were allowed to be involved in technology transfer activities without negative consequences for their jobs or wages, according to the Law 297/1999, followed by Ministerial Decree 593/2000. Nonetheless, the phenomenon began to take shape some years before. The first academic spinoff indeed was established in 1981 from the University of Florence.

Table 1 presents the evolution in the number of academic spinoffs established annually, from 1981 to 2018, [as reported by the Ministry of Education database, Spin-off Italia.](#)<sup>1</sup> More than 65% of the spinoffs were established after 2008, as in Italy, like in other countries, academic entrepreneurship has been a response to the financial crisis. The five years between 2010 and 2015 are particularly noteworthy for the high number of companies created. The economic crisis has been enumerated among the push factors associated with necessity entrepreneurship as, after the economic upheaval represented by the economic crisis in 2008, in Italy entrepreneurship has become a special mean to avoid the unemployment of highly skilled human capital, academics included (Civera, Meoli, et al., 2020; Horta et al., 2016; Vismara & Meoli, 2016). In particular, the study from Horta et al. (2016) demonstrates that the rate of academic spin-off creation is positively associated with the skilled unemployment rate. That longitudinal study of 559 spin-offs launched between 1999 and 2013, showed that a higher level of unemployment reduced the probability of academic spin-off creation up to a

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<sup>1</sup> [The database is created by the collaboration between the Center for Innovation and Entrepreneurship of the Polytechnic University of Marche, Netval and the Institute of Management at the Sant'Anna School. It contains information on companies that the group has decided to associate the concept of spin-offs from public research. In particular, in the database you can select the companies that have been accredited as a spin-off from research parent institutions \(http://www.spinoffitalia.it/\).](http://www.spinoffitalia.it/)

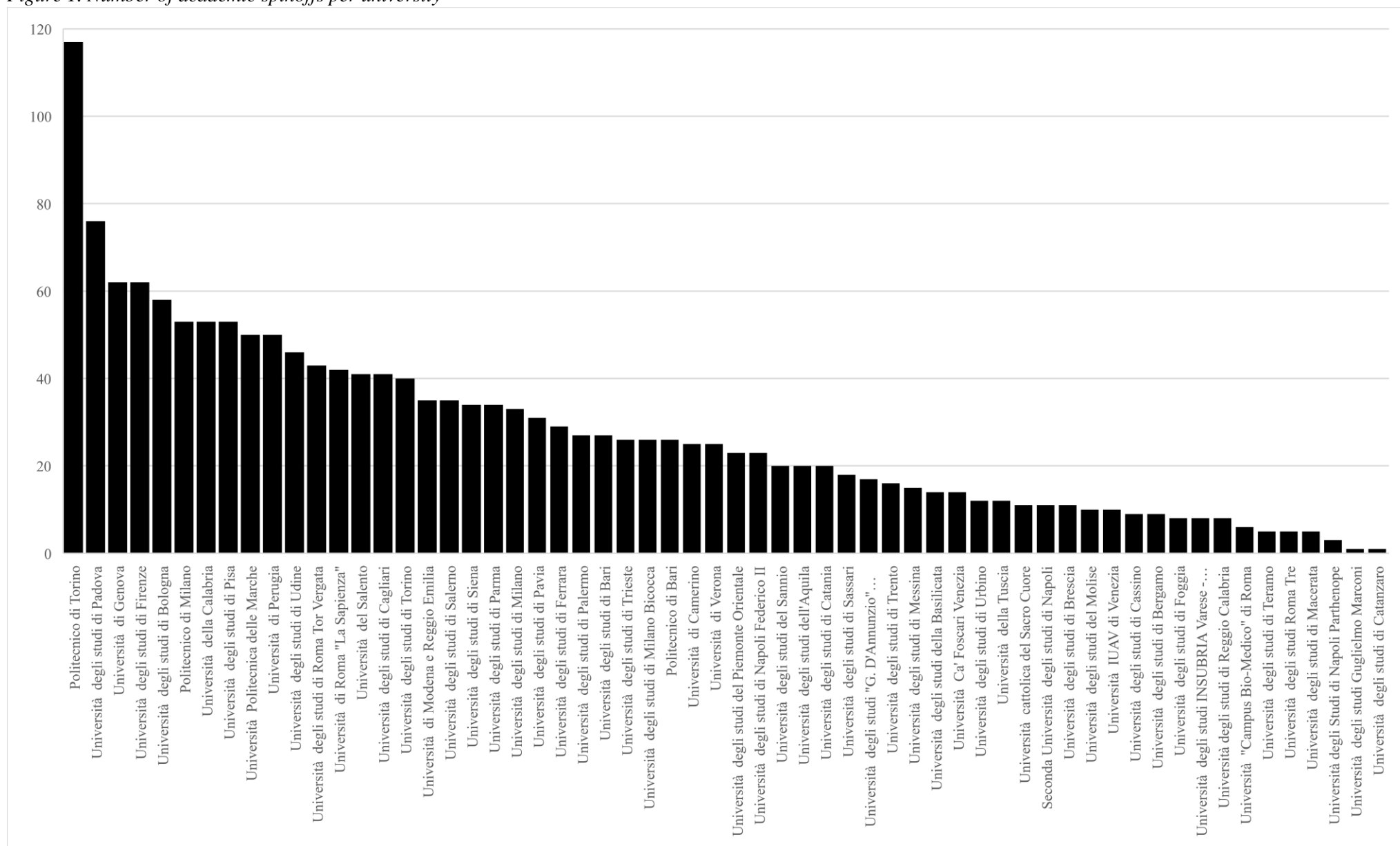
threshold, beyond which the effect was reversed. By contrast, the relative skilled unemployment level was related positively to the probability of academic spin-off, particularly high-tech spin-off, creation.

*Table 1. Number of academic spinoffs per year.*

<b>Year of establishment</b>	<b>Number of spinoffs</b>	<b>Year of establishment</b>	<b>Number of spinoffs</b>
1981	1	2005	69
1984	1	2006	76
1993	2	2007	106
1994	1	2008	97
1995	3	2009	93
1996	3	2010	114
1997	3	2011	94
1998	4	2012	142
1999	13	2013	113
2000	19	2014	129
2001	22	2015	129
2002	18	2016	96
2003	44	2017	110
2004	68	2018	56

Despite the University of Florence has been a pioneer in the establishment of academic spinoffs, the Technical University of Turin is the most prolific, followed by the University of Padova. It is not a coincidence that the first 6 universities in Figure 1 devoted high attention to the technical disciplines in both their teaching and research activity. The presence of control variables at university and regional levels such as technical universities, STEM (Science Technology Engineering and Math) graduates and faculty testifies the importance of technical knowledge and competencies for the creation as well as the performance of academic spinoffs (Civera et al., 2019; Meoli & Vismara, 2016; Vismara & Meoli, 2016).

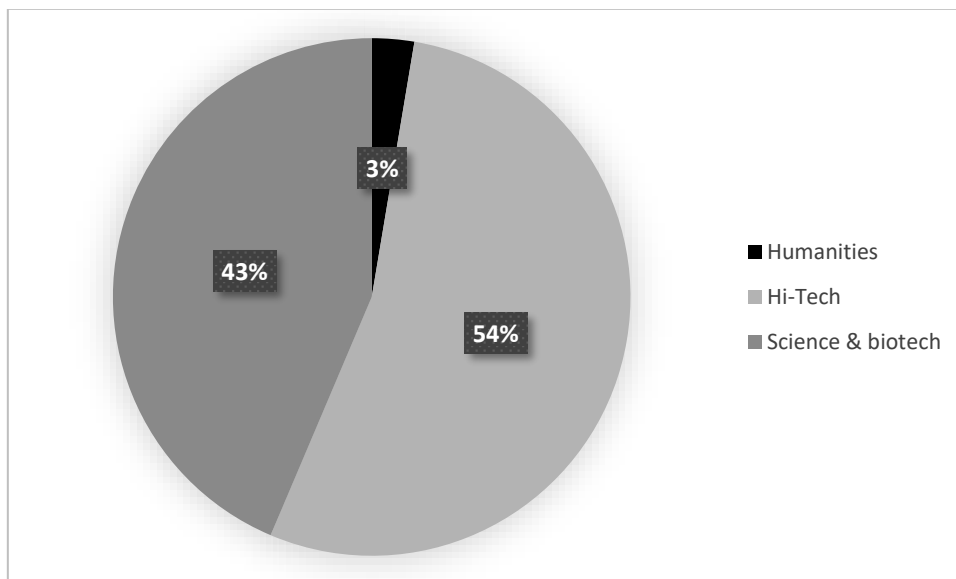
Figure 1. Number of academic spinoffs per university



The supportive role of universities depends on the nature of academic spinoffs. Through a longitudinal study of 559 spin-offs from 85 Italian universities from 1999 to 2013, Meoli & Vismara (2016) find that although stronger administrative support from the parent university leads academics to create more technology spin-offs, a U-shaped relationship instead exists between the number of administrative staff within a university and the rate of establishment of non-technology spin-offs. When the level of administrative staff is too low or too high relative to the fitted amount estimated using several university-level factors, academic staff reacts by establishing firms to achieve improved cash and human resource management.

With regard to the sectors where the academic spinoffs operate, Italian academic spinoffs can be distinguished in a) biomedical and life science sector, which engages 43% of the total population; b) high-tech sector consisting of aerospace, industrial automation, electronics, ICT, nanotech, and automation services, which 54% of the total academic spinoffs belongs to; c) humanities, e.g. cultural heritage, which involves only 3% of academic spinoffs. Figure 2 represents graphically the concentration of academic spinoffs in the sectors.

Figure 2: Percentage of academic spinoffs by sector



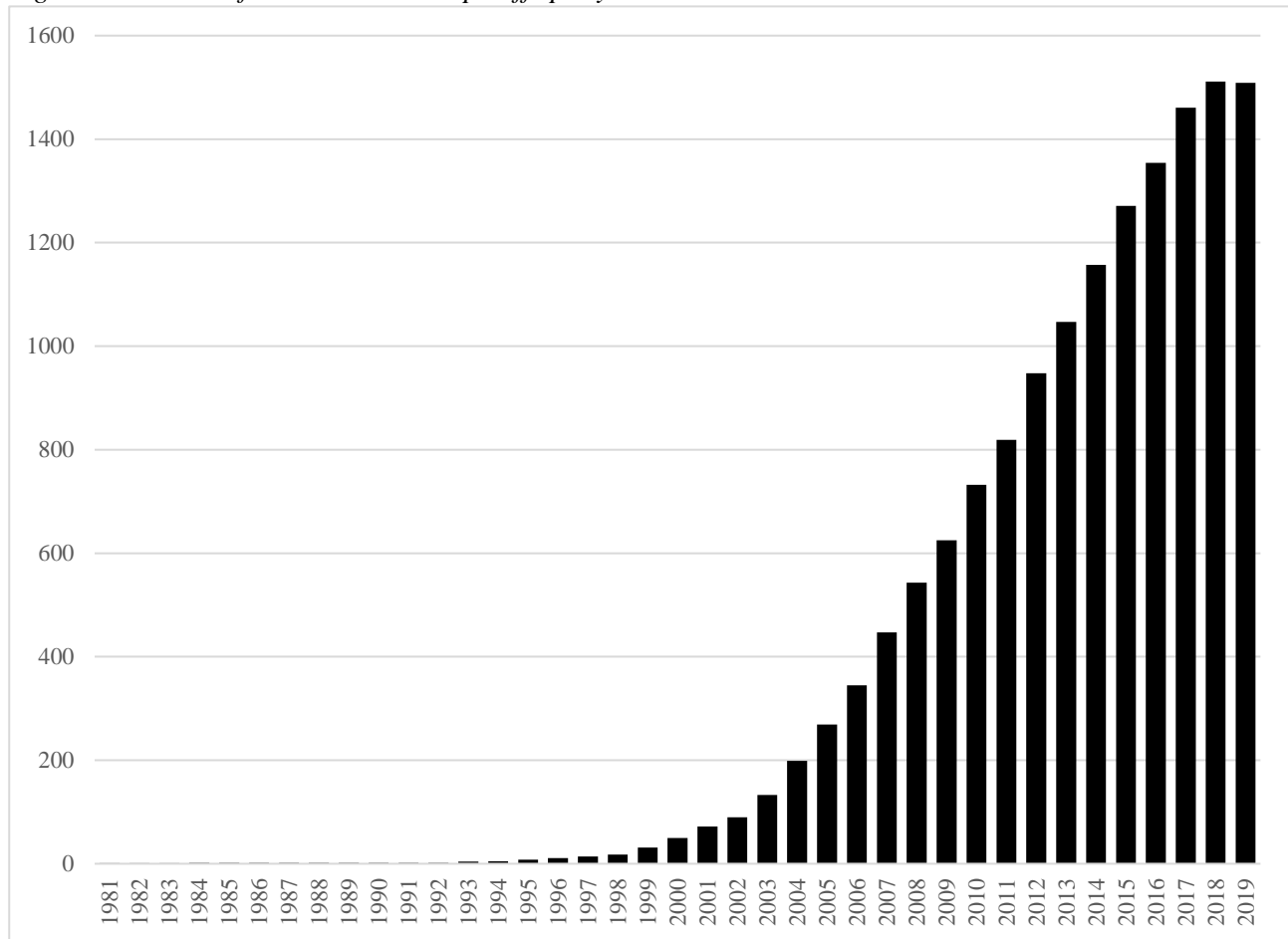
By focusing on the output, the academic spinoffs offer both products and services. Almost half of the academic spinoffs (46%) are exclusively service-oriented, 38% are product-oriented while the remaining 16% are involved in both service and products. An example of the latter is those spinoffs offering consulting activity together with their products (for the vast majority software and platforms). The distinction reveals to be interesting when considering the governance of universities in relation to their engagement within the entrepreneurial ecosystem. Thus, when local stakeholders are appointed as lay members in the university's board of directors, they are associated with increased establishments of service-oriented spin-offs (Meoli et al., 2019).

Despite more than half of the Italian academic spinoffs are hi-tech spinoffs, only 2% of academic spinoffs are created out of a patent. This may be due to the Italian regulation, according to which being an academic spinoff does not require the possession of a patent since not all the innovations which were the result of business projects have already been patented (they may never be). In any case, the timeframe for patents is often too long and is not compatible with establishing a startup. Moreover, the goals of academic spinoffs are different, and commercializing innovation is only one of them. Academic spinoffs can be established either to exploit an opportunity, based on an economic rationale or out of necessity in order to provide a social service to the community, especially at a time when the State finds it increasingly difficult to respond to all of the citizens' needs (Civera, Meoli, et al., 2020). In the same way, necessity-oriented academic spinoffs created to protect academics from eventual unemployment are becoming a diffused reality (Roach & Sauermann, 2010). Opportunity spinoffs are expected to contribute to the added value generated by the regional industrial fabric, whereas necessity spinoffs to be beneficial in avoiding unemployment.

Opportunity academic spinoffs have economic rationales behind so that, according to the neoclassical economic theory they are expected that growth is their primary post-establishment focus (Gundry & Welsch, 2001; Hessels et al., 2008). Nonetheless, many entrepreneurs, also academic ones, choose not to grow their business (Gundry & Welsch, 2001; Kolvereid, 1992; Wiklund et al., 2003). Individuals pushed into entrepreneurship looking for an alternative job to make a life out of it (Horta et al., 2016; Rizzo, 2015; Roberts, 1991) are expected to be invested in the necessity academic spinoffs they generate and they are focused on their survivability.

By relying on a sample of 613 Italian academic spinoffs established over the period 2006–2012, Civera et al. (2020) find that necessity-oriented academic spinoffs are associated with higher survival profiles, while opportunity-oriented spinoffs exhibit higher post-entry growth rates. Focusing on the performance of academic spinoffs, the survival rate of academic spinoffs is extremely high as exhibited in Figure 4.

Figure 3. Number of active academic spinoffs per year



## Conclusion

The academic spinoffs phenomenon has been extensively studied in several contexts. In Italy, they represent an important share of innovative companies. The technological level and the output they produce as well as their performance in terms of survival rate are extremely correlated to the motivation of their establishment, which in turn is inextricably related to the national regulation. Italian scientists may decide to start a new company out of necessity, overall to avoid unemployment. In academia, the case of academic spinoffs as a second-best solution is a frequent phenomenon (Horta et al., 2016). Indeed, it is likely that graduates or PhD students create a necessity spinoffs by considering the foundation of a new company as a "pushed alternative" considering the lack of stable jobs that promise or entail the possibilities of decent earning and career progress (Hahn et al., 2017). The academic career is a highly selective job path and who cannot remain in the system may be interested in spinning out a company to exploit to some extent the knowledge previously developed (D'Este & Perkmann, 2011; Perkmann et al., 2013). Necessity-oriented companies result to be important to the creators because they need to make a life out of them. Necessity-oriented entrepreneurs may be more invested by them in terms of survivability (Hessels et al., 2008). They intend the creation of a spinoff not as a transitory activity but rather as a "for life" option.

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