

# UNIVERSITY AS NEW ENTREPRENEURIAL FINANCE PLAYER: A SEARCH FOR THE NEW ROLE

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## Abstract

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The European strategy is to promote new businesses as a real driver of economic growth, but also to support their growth and resilience. A typical kind of new business is the academic start-up (ASU) that can play a strategic role in their local economy. This paper aims to contribute to the lively debate about the universities policies in entrepreneurial finance. In the first part, it investigates the strengths and weaknesses of academic start-ups and the role that universities have to support them in value creation. The authors tested the research questions on a sample of start-ups of the University of Pisa. The findings show important financial and not-financial goals of academic start-ups. These goals can fuel the dialogue with entrepreneurial finance players. Furthermore, the research shows some ASUs' vulnerabilities. In conclusion, the role of universities as new entrepreneurial players is discussed.

**Keywords:** Academic Start-ups, Enterprise Value, Entrepreneurial Mind-set, Universities Policies

## 1. INTRODUCTION

In this critical moment for the European system, politicians have a common goal for future development: innovative start-ups. As remarked by the European Commission Vice-President, entrepreneurship is also the most powerful driver of economic growth in economic history (2013). Over the past 10 years, academic scholars have also agreed and have emphasized the role of new companies in the development of scientific knowledge. They can promote innovation and create new jobs. They are essentially for the value creation of the European economic system (Acs et al., 2005; Armington & Acs, 2002; Audretsch & Thurik, 2001; Carree et al., 2002; Davidsson & Wiklund, 2001; Johnson, 2004; Minniti et al., 2006; Storey, 1994; Lawton, 2000; Dahlstrand & Jacobsson, 2003; Clarysse et al., 2005; Mustar et al., 2008; Mariani et al., 2018).

A special kind of innovative start-up is the academic start-up (ASU) whose features make it different from other SMEs. In fact, academic start-ups are firms founded by university professors or researchers and they can play a strategic role in the local economy (Benneworth & Charles, 2005; Vincett, 2010; Iacobucci & Micozzi, 2014; Mariani et al., 2018). Academic start-ups can produce direct effects

(Malecki, 1997) quantifiable in new employment and turnover growth in the area (Etzkowitz, 2001). Considering that an academic start-up's core business is research, some of its indirect benefits can contribute to the enterprise value and to regional economy. The production of new technological knowledge, partnerships, consultancy activities and shared assets are some non-quantifiable drivers for growth process (Delmar & Wemberg, 2010).

We can also add relations with public and private partners in social networking, branding of industry training activities, collaborations with international research centres, international exchange of students and international recognition of universities (Leitner, 2004; Ramirez et al., 2007; Cañibano & Sánchez, 2008; Sánchez et al., 2009; Bezhani, 2010; Bodnár et al., 2010).

The academic start-ups have a technological entrepreneurship which is able to develop regional economies (Etzkowitz, 2001). They can promote regional technology clusters (Di Gregorio & Shane, 2003) and help create a favorable environment for the birth and growth of new technology start-ups in the same areas (Lockett et al., 2003). According to Schumpeter (1934), entrepreneurs represent an important source of variation in the economic

system by introducing new types of goods and services and/or new ways of organizing their production.

The creation of new technological knowledge and networks for access to finance (Dahlstrand, 1999) are other important non-financial results. Moreover, academic start-ups can maintain links with the parent institutions through incubators or research collaborations (Heydebreck, 2000; Zomer et al., 2010) and create value.

This is mainly because universities have their main goal the production and the dissemination of knowledge (Sanchez et al., 2006; Guerrero et al., 2015). Therefore, while European policy makers are promoting entrepreneurship, universities are wondering what the role they can play as entrepreneurial finance players.

According to this strategy, universities promote their 3<sup>rd</sup> mission, technology transfer, with a policy of academic start-ups (Secundo et al., 2017)

The belief in literature is that innovative academic start-ups play an important function in Europe for both technical innovation and economic growth (Lawton Smith, 2000; Dahlstrand & Jacobsson, 2003; Clarysse et al., 2005; Mustar et al., 2008; Kennedy & Patton, 2011). The European strategy is so to promote new businesses, but also to support their growth and resilience. Every different start-up surveys celebrate new births but they mourn many defaults also. New businesses have a high mortality, especially in the first years of life. If they survive, they risk being marginalized (COM 795: 2012).

Considering the market-side one main motivation is that, in the light of the recent financial crisis, the limits of the European capital markets have emerged. In fact, the market is fragmented and difficult to access by small and medium-sized enterprises, especially for innovative start-ups. A large part of academic literature has highlighted the growth difficulties (Edelman et al., 2010) that these innovative companies have especially because of their distrust of entrepreneurial financiers and their lack of managerial skills.

The aim of this paper is to analyse the role of universities as entrepreneurial financial players. After introducing the theoretical framework and research questions, we will discuss the findings of an analysis of academic start-ups of the University of Pisa. We first analyse their strengths and weaknesses as drivers of economic growth. The article concludes with a discussion about the role that universities could play to support academic start-ups in a logic of value creation for the regional system.

## 2. THEORETICAL FOUNDATIONS AND RESEARCH QUESTIONS

However, some scholars have addressed the issue of growth difficulties that academic start-ups encounter during the first stages of their life cycle (De Jong et al., 2006; Nicolò, 2017). They have highlighted the weaknesses of these firms such as no interest in planning activities (De Jong et al., 2006; Carlesi et al., 2017) and a low capacity for self-criticism (Colombo et al., 2008; Van Geenhuizen et al., 2009; Galati et al., 2016). In fact, these firms guide their activities with a logic of improvisation because new entrepreneurs, often of scientific and

technical training, have poor managerial culture, especially in financial planning and avoid R&D investments. Because of the low-development of a “financial culture”, they have to survive with modest financial resources (Colombo et al., 2008). They do not consider the strategic and critical role of working capital management, so they live in an unstable financial equilibrium (Carlesi et al., 2017). They finance their activity essentially with short-term bank debts (Bellavitis et al., 2017). Small and medium-sized unlisted companies find it difficult to obtain traditional financing through long-term bank loans and they do not have access to capital through the stock market. Some research has found, in fact, that innovative new businesses, while lively and bearers of value to the economic system, have a high mortality, especially in the first years of life, or they survive under limited conditions. High-tech academic spin-offs tend to remain small for a long time or to grow slowly (Salvador, 2006; Clarysse et al., 2011; Galati et al., 2016). According to this discussion, our first research question is:

*RQ: What weaknesses and strengths of academic start-ups' are important for entrepreneurial finance?*

Some research has highlighted that one on two new businesses fail during the first five years and anyway they remain small. The European strategy is to promote new businesses but also to support their growth and resilience (COM 2012:0795).

To safeguard and enhance the competitiveness of SMEs in the EU economy, the European Commission has already adopted a clear strategy with the Small Business Act for Europe (SBA - June 2008) and communication on Long-Term Financing of the European Economy (March 2014). One of the main objectives of the “Europe 2020 Strategy” (March 2013) is to ensure SMEs have full access to the credit markets and capital in Europe. The Capital Markets Union (CMU) aims to expand the range of financing options for growing businesses, which include academic start-ups, to increase resources for innovation, for innovative start-ups and for non-listed companies. The European Commission explains in the “Action Plan on Building a Capital Markets Union” (2015) how to promote an entrepreneurial finance development. An important aim is to encourage venture capital (through tax incentives) and raise equity capital by reducing listing costs and overcoming information barriers to SMEs investment. Another goal is to reduce barriers for companies which want enter and raise capital in public markets by promoting innovative forms of corporate financing, like crowdfunding, and developing a coordinated approach to loan origination by funds.

This debate includes the role of universities as entrepreneurial finance players. Etzkowitz in his seminal work (1983) fuels the debate on entrepreneurial universities role. Universities now have the important task of fostering innovation and technological transformation, technology has led to many social implications, over the years. University has been given the responsibility function of socio-economic development and, thus, it is a guide for society (Etzkowitz, 2001; Etzkowitz & Klofsten, 2005). Pointing to this new and third role of universities, both scholars and policymakers have begun to refer to an “entrepreneurial university”

model (Etzkowitz, 2003; European Union, 2012) that implies also an active part in term of entrepreneurial finance (Block et al., 2018).

The third mission of universities covers all of the activities through which they contribute to innovation and social change. There exist several contributions in the literature that have identified the activities that compose the third mission and its benefits, in particular, on the local level (Huggins & Johnston, 2009; Trequattrini et al., 2015). According to Seguí-Mas, Mas et al. (2017) specific training in managerial competencies to potential academic entrepreneurs is advised to universities to promote successful knowledge transfer via spin-offs. One of the most important effects is their ability to convert the knowledge that is created through research into a business idea, by creating an industry-university collaboration (Etzkowitz, 2003; Green Paper, 2012). The rate of creation of new firms and their performance are measures of university entrepreneurship (Chiesa & Piccaluga, 2000; Di Gregorio & Shane, 2003; Clarysee et al., 2005; Leitch & Harrison, 2005; Link & Scott, 2005; O'Shea et al., 2005). Given this discussion, the second research question is:

*RQ<sub>2</sub>: What role can universities play in entrepreneurial finance?*

### 3. METHODOLOGY

In the lively debate on what kind of value drivers the innovative start-ups can share with entrepreneurial finance investors, we studied a sample of University of Pisa Academic start-ups. We developed two complementary levels of study to measure financial and non-financial goals. As regards financial goals, we defined two perspectives: performance and value creation<sup>1</sup>. With the analysis of Performance Indexes, via financial documents, the focus was on ex-post results to outline a snapshot of a company's health. The Enterprise Value, instead, via business plans and questionnaires, gave a prospective vision of the value creation, according to the private equity perspective (Damodoran, 1999). The interviews were essential developed to capture non-financial goals, represented by the number of patents and awards, the number of research projects, the place where they made physical investments, the number of partnerships and/or the participation in associations, the presence of managerial skilled staff in the firms, etc. In these value drivers, the social impact plays a strategic role.

The University of Pisa's start-up population is 30 units (in 2016). In order to define enterprise value, we selected only those that presented at least one balance sheet and a three-year business plan. We had to exclude two companies in liquidation, four because they were still unstructured and 3 did not collaborate. The final sample consisted of 21 well-structured companies, whose characteristics were representative of the population, although they differed regarding age, industry, and activity type (Table 1). In any case, they were all innovative start-ups, by Italian law Definire.

<sup>1</sup> According to Damodoran (1999), in the last decade, managers seem to have come around to the view that value maximization should be, if not the only, at least the primary objective for their firms. In a generic model of value, we relate value to expected cash flows in the future and consider all of the potential routes that are available for a firm to create value.

**Table 1.** Descriptive data of the sample

ID	Year of birth	Industry	Sales (year 2016)	n' of employees
A	2007	Engineering	392,446	5
B	2008	Engineering	476,459	10
C	2013	Life	28,150	0
D	2010	Life	36,365	0
E	2012	Life	27,930	1
F	2014	ICT	37,750	1
G	2014	Life	7,867	0
H	2013	ICT	0	0
I	2011	ICT	400,171	3
J	2011	Engineering	100,738	1
K	2003	Advanced Instruments	103,544	7
L	2006	ICT	736,647	7
M	2011	New materials	106,740	1
N	2012	Life	43,000	0
O	2011	Advanced Instruments	102,508	n.d.
P	2011	Engineering	83,896	0
Q	2009	Engineering	16,639	1
R	2011	Advanced Instruments	576,918	11
S	2009	New materials	143,678	1
T	1997	Advanced Instruments	3,965,353	50
U	2009	Energy & Environment	200,728	2

This new entrepreneurial experience of the University of Pisa is relatively young, with an average age of 6 years. We can underline that the oldest start-up was incorporated in 1991, but the majority (17) structured from 2011 (an average of four new companies per year. (Table 2).

In consideration of the fact that our research had a dynamic focus, with the aim to map the growth intentions of entrepreneurial firms, rather than the setting-up, we defined three subsamples, on the basis of age.

- 1) NEW, 12 units, ASOs operating for less than three years;
- 2) JUNIOR, 6 units, operating from 3-7 years;
- 3) SENIOR, 3 units, operating for more than 7 years.

The academic start-ups realized a total turnover of 8 million, with an average of around 400,000 euros per company (2016) and 7,000 euros minimum while the maximum values were, of course, in the Senior group, with a peak of 4 million.

Overall, the University of Pisa's academic start-ups somewhat foreshadows of a research-oriented medium-sized company, with a total of 101 employees (of which 57 new high-tech jobs were created in the last four years). The employee average per firm was 5, but in the group of Seniors, the 3 companies had reached a larger size, and they currently operate with an average of 21 employees.

As mentioned above, the companies of the sample were, as expected, essentially research oriented. Almost all of the entrepreneurs also had an academic activity and, in 2016, they invested about 2 million in R&D for, with only 1 million promoted by the 3 Senior start-ups. During the interviews, the team declared that the principal research activity was for new products and new technological solutions, with the direct involvement of researchers, graduate students and fellows (with a focus on technological aspects).

**Table 2.** The financial goals of Academic start-ups (2016)

	<i>NEW</i>	<i>YOUNG</i>	<i>SENIOR</i>	<i>TOTAL</i>
N° companies	12	6	3	21
<i>Performance indexes</i>				
Turnover	2,270,056	1,333,212	4,527,934	8,131,202
Turnover per company	18,171	222,202	1,509,311	387,200
Employees	21	17	63	101
ROA	14.75	7.17	2.98	
Leverage	2.20	4.70	2.70	
Financial Debts Short Term/ Total Financial Debts	71%	91%	90%	
Interests/Ebit	3%	6%	4%	
Working Capital Cycle	19	71	63	
<i>Value creation</i>				
Enterprise Value	11,149,112	4,157,359	5,876,502	18,430,794
Enterprise Value per company	712,373	617,694	2,342,517	918,199
<i>Other information</i>				
R&D investments	557,534	246,550	1,028,509	1,832,593
R&D investments per company	46,461	41,092	342,836	87,626

Similar considerations were valid in the performance analysis. In ASU's, young age, sectoral specificities and simplified form of the financial statements drafted (in short form) are elements that made the performance study difficult. We obtained expressive values only for ROA and they were quite large values, going from zero to 33%. Within the sample, it is above all the Younger companies that had the highest return on investment (14.75%). It was clear that the high value of the index was above all due to the low capital invested. The Senior companies, on the other hand, while noting a rather contained ROA, required careful reading. The more structured firms had a higher capital invested, both for intangible and tangible assets. In addition, the preparation of the financial statements was more complete and guided by optimizing financial statements to reach positive results.

As regards the second perspective, value creation, we opted for the Enterprise Value (EV) to express the value created by innovation investments. In this typology of the firm, the Enterprises Value captures the essence of the innovativeness value of the team, the real asset of the innovative entrepreneurial firms and the value driver that entrepreneurial finance players appreciate. In order to capture every value drivers, it is necessary to integrate several methodologies. Normally, practitioners adopt at least two methodologies: one is accounting based and the second on market data.

We must bear in mind that the ASUs operate in an industry with high uncertainty and they do not have an operating history on which to project future expectations. In addition, the preponderance of intangible assets are determinant for value estimation (R&D, patents, know-how, etc.). Therefore, we adopted four methodologies that addressed all the value drivers: a discounted cash flow (DCF), the income method from an accounting perspective, the multiples method, and the venture capital approach for company market value. The venture capital approach is one of the most recommended evaluation methods for start-ups (Damodaran, 2007; 2011) because it focuses on the potential value of the company on the exit date foreseen for the Venture Capitalist (Sahlman & Scherlis, 1987), traditionally attracted by innovative start-ups. With the four values, it is possible to obtain the value both for the market and for investors (venture capitalists). We tested our data using the above four methods and ended up with four values for each

firm of the sample. We used these four values to show two averages: the mathematical mean and the weighted mean. It is highly accepted by accounting practitioners that both DCF and income method have an index of 35% each, while 15% for multiples method and for the venture capital approach (Mariani et al., 2018). We took all the data required for the calculation of the cost of capital (to use the discount flows) from the open database of Damodaran's website<sup>2,3</sup>. By following the practice of business evaluation, we adjusted the data to take into account the firms' specific characteristics. By using the four above-mentioned methodologies, we were able to assess the firms' more tangible assets (cash flow, income, etc.), and their intangible ones (industry performance, R&D investments, number of patents, etc.).

The Academic start-ups of the University of Pisa express a weighted value of 18,430,794 euros. The Income Method value is the minimum while the Venture Capital Approach shows the highest. A start-up enterprise value is essentially expressed by future perspectives, so market-based methods are more able to express the value better but more uncertain.

Another element that deserves notice is that the maximum Enterprise values (6 firms earned more than a million in EV) were not only among the Seniors (4) but 2 belonged to the first group. They were in the early stages and operating in ICT: a sector that expressed the best sales trend in the period (Deloitte, 2016).

According to Block et al. (2018), new players in entrepreneurial finance are also interested in non-financial goals that can capture the value of innovative entrepreneurial firms better. These news

<sup>2</sup> In Italian law, innovative start-ups are: companies with shared capital (i.e. limited companies), including cooperatives, the shares or significant registered capital shares of which are not listed on a regulated market nor on a multilateral negotiation system. These companies must also meet the following requirements: - be new or have been operational for less than 5 years; - have their headquarters in Italy or in another EU country, but with at least a production site branch in Italy; - have a yearly turnover lower than 5 million Euros; - do not distribute profits; - produce, develop and commercialize innovative goods or services of high technological value; - are not the result of a merger, split-up or selling-off of a company or branch; - be of innovative character, which can be identified by at least one of the following criteria: 1. at least 15% of the company's expenses can be attributed to R&D activities; 2. at least 1/3 of the total workforce are PhD students, the holders of a PhD or researchers; alternatively, 2/3 of the total workforce must hold a Master's degree; 3. the enterprise is the holder, depositary or licensee of a registered patent (industrial property) or the owner of a program for original registered computers. Support measures apply to newly established companies for the first 5 years of activity, provided that they meet the aforementioned requirements.

<sup>3</sup> <http://pages.stern.nyu.edu/~adamodar/>

innovative companies capitalise their abilities with research grants, patents, international conferences and networks and they have invested in managerial training. They invest both in research activities and in managerial skills (Table 4). This kind of progressive evolution of the two souls of an innovative entrepreneurial firm enabled 4 of the "News" to involve new international partners; while

18 academic start-ups attracted non-academic partners. Enterprise value methods can express these non-financial results and they are the real key of their future value (the value drivers of an academic entrepreneurial firm able to manage a trend of growth). Entrepreneurial finance players seek new companies with high growth opportunities.

**Table 3.** Academic start-ups enterprise value (2016)

	<i>New</i>	<i>Junior</i>	<i>Senior</i>	<i>Total</i>
DCF	8 163 961	4 889 742	5 587 298	18 641 003
Income method	8 175 287	4 778 558	2 712 554	15 666 400
Multiplies method	10 314 389	3 489 864	7 033 035	20 837 288
Venture capital approach	7 540 250	1 666 491	12 777 319	21 984 061
<i>Mathematical mean</i>	<i>11 408 864</i>	<i>3 706 164</i>	<i>7 027 552</i>	<i>19 282 188</i>
<i>Weighted mean</i>	<i>11 149 112</i>	<i>4 157 358</i>	<i>5 876 501</i>	<i>18 430 793</i>

**Table 4.** Non-financial goals of Academic start-ups (2016)

	<i>Research Grants</i>	<i>Patents</i>	<i>Grants</i>	<i>International conference participation</i>	<i>Business associations participation</i>	<i>Foreign investors (1=si; 0=no)</i>	<i>Foreign shareholders (persone fisiche)</i>	<i>Non-university shareholders</i>	<i>Managerial training</i>	<i>Professionals Managers</i>
New	50	18	20	43	21	4	6	10	6	9
Young	15	6	4	13	12	0	0	6	1	5
Senior	2	0	2	0	1	0	0	2	3	3
Total	67	24	26	56	34	4	6	18	10	17

#### 4. SOME ACADEMIC START-UP WEAKNESSES

During the interviews, we noted that top management almost predominantly had figures with scientific know-how and managerial training (Salvador, 2006; Clarysse et al., 2011; Galati et al., 2016; Mariani et al., 2018). The planning activities, in fact, were not structured and they often focused on the drafting of European projects. All the companies had to draw up a business plan for the recognition procedure for spin-off brand, but only about half of them recognized its strategic importance for decision-making purposes and progressively updated the forecasts. In fact, they guided the activities with a logic of improvisation; the new entrepreneurs, often of scientific and technical training, had poor managerial culture, especially in financial planning and did not want delegate or to involve managerial professionals. They decided to avoid new investments, including in R&D. In this view, managerial culture could be considered an element that devises the two perspectives. With a correct managerial, especially for financially government, the firms are able to promote the research activities. We also found that most of them prefer to use their own resources (typical friends and family), or research funding, from EU, which affect their development skills.

In line with Bellavitis et al. (2017), our survey showed that our ASUs prefer traditional debts. In our sample, short-term bank debt prevails in their financial structure, with more than 75%! However, the financial exposure of companies does not have critical effects on economic risk. Financial interests have a limited weight on EBIT, above all because academic start-ups mainly have different forms of concessional financing: European funds, government and regional funding, university financial support and also chambers of commerce equity.

The management of working capital has particular connotations. Our academic start-ups had

a business where a warehouse is not necessary, such as when the product is an app or software. It was possible to calculate the cycle of working capital only for 8 companies that did not present alarming data (Table 1, 2). On the contrary, the values of the working capital cycle were quite limited. It should be noted that this equilibrium is a random situation. However, from the interviews carried out, we found that they did not consider the strategic and critical role of working capital management, so they survived in an unstable financial equilibrium, frequently feeding an insolvent state.

#### 5. DISCUSSION

The innovative academic start-ups of our study achieved interesting innovations, registered patents and earned an active part in international scientific networks, fertilizing opportunities for growth and expansion. Gradually these firms have progressively developed managerial activities and realized interesting results. We found that where researchers promoted and invested in "cultural metamorphosis" and fertilized an entrepreneurial mind-set, did their academic start-ups become real businesses, growing and reducing their rate of bankruptcy. In the first 3-5 years, the NEW entrepreneurs mainly followed "researcher's vision", devoting themselves almost exclusively to refining their research projects. In this phase, they made few investments (mainly R&D) and essentially worked with their "traditional" research team and always within university laboratories. In fact, their business did not change the role of the academic research unit. They only elaborated a business plan to obtain the Academic Spin-off brand (which is often not developed in the economic and financial analysis).

The excitement for new starting is high; there are situations in which the firms have already obtained interesting (but still isolated) awards and market successes.

The Junior group progressively began to show interest in other business strategies, including strategic planning, where scientists/entrepreneurs can practice their high mathematical skills. They feel the need for external personnel with managerial skills, above all to support the management of research projects and partnerships with other companies. This primordial managerial evolution, however, is not yet structured and it delegated to external figures, essentially in staff, or sometimes self-made within the entrepreneurial group, which, in light of the high scientific professionalism, believes that the day by day managerial know-how will develop autonomously within the company.

The Junior start-ups are not yet interested in growth strategies. The scientists/entrepreneurs prefer to maintain their status quo and not expand the company structure and the organization chart, fearing that they will not be able to control. Their link with the University is still very strong and the projects continue to be supported by making use of the various researchers (undergraduates, doctoral students, scholarship holders) without taking responsibility for decision-making. At some point, however, situations are created in which successes and networks "fertilized" for years impose some options. The firms can develop real growth projects becoming a SENIOR company or maintain the same status quo, by living a chronic phase of as sort of "Peter Pan" entrepreneurial syndrome. This second option will degenerate in default or in liquidation of the company. The virtual entrepreneurs are not able to manage in a concerted way something that is no longer just research. They often escape from the growth of complexity and prefer to be only university researchers.

In the more structured, Senior group, we identified the three cases of firms. For two of them (which despite having achieved interesting results, and being in fact in a development phase) the business team has crumbled, failing to find an internal organization and not wanting to insert qualified managerial figures. Then, there are some firms, which continue to devote themselves day by day and to keep the "umbilical cord" strong with the university and they see the company as a way to simplify the management of external research projects.

In some cases, however, they have taken off by structuring their company organization with the entry of managerial figures, dedicated to financial management and planning, thanks also to industrial and equity financiers, even foreign. They proceed to plan investments, introduce governance practices and grow both in terms of turnover and employees (with operational offices also abroad). The value creation aim is metabolized and in this case, the scientist's DNA is perfectly integrated with the managerial gene.

## 6. CONCLUSION

In this evolutionary process the university system, with its third mission, is called to play an important role as an accelerator of entrepreneurial metamorphosis, promoting an entrepreneurial mind-set. In the lively debate on the role that an entrepreneurial university can play on the economic system, some scholars have measured their social enrichment by multiplier logic means. Elliott et al. (1988) have highlighted that regional multipliers usually have a magnitude of about two. Siegfried et al.

(2007) reveal by analysing 21 impact studies, the multiplier ranges from 1.32 to 4.75, with a median of 1.8. Mariani et al. (2018), by defining a multiplier ad hoc, showed the multiplier effects of the University of Pisa investments in innovation in 2.74 in terms of wealth created on the regional area.

Universities can play an important role in entrepreneurial finance and, as underlined above, they could have a high social impact. The question is what kind of players are they? In our survey (and on the basis of other research), we can say that university support of academic start-ups is not so much to promote their birth but to side-line their growth. Academic start-ups need to overcome their difficulties of transforming innovative ideas and knowledge into business opportunities. They must reinforce their capacity to manage uncertainty, to become going beyond the logic of improvisation and overcoming poor managerial culture as new potential entrepreneurs. New enterprises, young entrepreneurs and start-ups need to be empowered in terms of their ability to compete in an evolving market, bringing new ideas that follow technological growth. Hence, future education and training approaches should embrace the emerging paradigms that reinforce resilience, encourage innovation and can stimulate real start-ups development. According to "Europe 2020 Strategy" (March 2013), new companies need to develop the ability to communicate with different type of financiers (venture capitalists, bank systems, financial market players).

In line with Block et al. (2018), universities can be essential partners for academic start-ups with a different role according to firm life cycle. In the seed and early stages, (the New group) universities could maximize their role with managerial and financial support. The first task is to fertilize an entrepreneurial mind-set and to discover and translate research ideas into entrepreneurial initiatives. For this purpose, there have to be entrepreneurial culture programs within higher education institution, in order to stimulate students and researchers to develop the necessary skills and knowledge to industrialize their ideas with a business approach and raise the number of new firms with a long-term success.

In the seed and early stages, universities could also promote their funds for academic start-ups, with the collaboration of banks and equity players, to define different financing models, by mixing revolving funds, traditional equity and debt, according to the specific market and activity of the new firms.

Then the academic support system must evolve towards a coaching role, to reinforce start-up and young company resiliency against economic troubles, by reducing the risk of failures because of insufficient managerial skills and from the inability to manage uncertainty, through a fruitful exchange of knowledge and competencies. The university has to raise the awareness of present and future entrepreneurs towards a growth-oriented managerial culture. In this phase, concessional funds must make way for market financial players because start-ups must evolve managerially.

Excessive financial support, with concessional conditions, can limit growth because new companies avoid more evolved partnerships with new entrepreneurial finance players that want a real market vision. Furthermore, financial support could play a caring role, degenerating in the "therapeutic

obstinacy” towards financial critical situations. In this direction, an essentially university-managed approach could produce some important effects, by raising awareness and guiding present and future managers and entrepreneurs to deal with uncertainty, to assume a long-term perspective, to promote start-ups with a real growth trend and to reinforce a start-up’s “immune system” against economic troubles. By metabolizing a real entrepreneurial mind-set, young entrepreneurs could remove their chronic “information knots” that characterize their relationship with institutional

investors. Academic start-ups must become real ventures.

We are aware of some limitations of this investigation. The considerations that emerged in this research have uncovered more in-depth insights that this research group is now investigating. We are promoting some case studies to investigate intangible value drivers in this kind of companies. On the other hand, our research method could be applied to study the cases of other Italian and European universities in order to compare the different spin-offs universities policies and their results.

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