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Academic institutions and the changing entrepreneurial finance landscape

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ABSTRACT

Universities have emerged as central players in the fast-changing entrepreneurial finance landscape. This editorial introduces and describes the recent changes in academia and the entrepreneurial finance landscape. It then investigates the particular role of universities in supporting start-ups, as investors or facilitators of investments. Following this, it discusses the role of universities in democratising venture capital investments, the different archetypes of university investment vehicles, the importance of institutional context and entrepreneurship learning and finally the patterns of internationalisation and funding in academic spin-offs. The editorial also provides some practical recommendations for practitioners and gives food for thought for future research.

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Introduction

In recent years, the digital transformation and the development of fintech technologies has led to the emergence of alternative sources of early-stage finance, which are radically changing and reshaping the start-up ecosystem (Bertoni et al. 2022). At the same time, universities around the world have taken measures to support access to early-stage finance of the start-ups created by their research personnel, students and alumni (thereafter, university-based startups) by either directly providing funding or by creating a favourable environment and frameworks that effectively stimulate private investments and channel high-risk financial resources to these start-ups.

This growing trend reflects both changes in the supply of start-up finance, as new funding providers (e.g., accelerators, crowdfunding platforms, university venture capital [VC] funds) enter the market, and changes in the demand for such finance from university-based start-ups, which face important challenges in raising capital from traditional sources. Debt financing is not an option for seed and early-stage companies, as they lack assets that may serve as collateral (Cassar 2004; Revest and Sapio 2012). VC funds are often hesitant to invest at a very early stage due to high transaction costs, information asymmetries, and uncertainties concerning the successful transfer of highly innovative

technologies to a marketable product or service (Bonini and Capizzi 2019; Colombo, Grilli, and Verga 2007; Knockaert et al. 2010; Lockett, Murray, and Wright 2002; Munari, Sobrero, and Toschi 2017).

These challenges are further exacerbated within the academic sector, as the organisational culture, motivations and personal characteristics of different players involved in academia are unique. Namely, university scientists are driven firstly by promotion incentives (Berbegal-Mirabent and Sabate 2015; Ryan and Berbegal-Mirabent 2016) and secondarily by financial gains; whereas university technology transfer offices have as their primary motivation the protection and marketing of the intellectual property of the university, with financial gain also playing a role in this process (Cartaxo and Godinho 2017). Lastly, university students and recent graduates lack a track record that signals their ability as “jokers”, an aspect that plays a key role in VCs’ investment decisions (Gompers et al. 2020; Kaplan, Sensoy, and Strömberg 2009).

Accordingly, the potential importance of university-established or university-led funding mechanisms in supporting start-ups is four-fold. First, they increase the supply of finance through direct subsidies, equity investments, university-affiliated fund investments (Atkinson 1994; Corsi and Prencipe 2018; Herber et al. 2017; Widding, Mathisen, and Madsen 2009), and proof-of-concept programs (Munari et al. 2016). Second, university funding is often seen as a positive signal to attract external funding, as a financial investment from the parent research organisation has a positive effect on the growth of the company (Bock, Huber, and Jarchow 2018; Gubitta, Tognazzo, and Destro 2016; Munari, Pasquini, and Toschi 2015).¹ Third, university funding supports the overall entrepreneurial ecosystem, as university-led seed funds are recognised as a critical entrepreneurship ecosystem element and have a positive impact on regional competitiveness (Algieri, Aquino, and Succurro 2013; Brown 2016; Degroof and Roberts 2004; Guerrero et al. 2014; Jacob, Lundqvist, and Hellsmark 2003; Jefferson et al. 2017; Mustar and Wright 2010; O’Shea et al. 2005; Pierrakis and Saridakis 2019; Pique, Berbegal-Mirabent, and Etzkowitz 2018; Swamidass 2013). In this respect, Wright et al. (2006) posited that these funds are needed because venture capitalists do not invest in early-stage companies. Finally, such funding mechanisms increase research productivity (Cattaneo, Meoli, and Signori 2016), support intangible goals of the university (e.g., building an entrepreneurial culture), help strengthen networks with regional stakeholders (Gubitta, Tognazzo, and Destro 2016; Hayter et al. 2018), and also improve founder’s social networks and capabilities to get external funding (Huynh 2016; Soetanto and Van Geenhuizen 2015).

Although several universities have established such funds, their study has received limited attention. For several years now, Wright et al. (2006) pointed out that further investigation was needed to explore alternative financing mechanisms to support the commercialisation of research results in the form of start-ups and spinoffs, as well as to examine how such financing can complement or substitute institutional venture capital. Since then, not much progress has been made in these lines, as Croce, Grilli, and Murtinu (2014) and Kremer, Achleitner, and Braun (2022) explain. This special issue addresses these research gaps by elucidating the distinct options and associated challenges that universities face when assessing the various funding options available.

Universities and third mission

In today’s knowledge-driven society, knowledge has become a commodity (Nico 2020) and science has become central to generating growth and welfare (Klofsten et al.

2019), with research outcomes required in various social and economic activities. Companies, regardless of their size, are increasingly dependent on new scientific discoveries. The contemporary society speaks back to science, putting into manifest the transformation from an industrial society to a knowledge-based one. Not surprisingly, studies in the field of regional development have highlighted the significance of promoting knowledge flows among the different actors that are part of an innovation ecosystem (Carayannis and Campbell 2009; Oh et al. 2016) as a strategy to help regions revitalise their industry and maximise the economic benefits (Etzkowitz and Zhou 2018).

In this process, universities, as knowledge-creating institutions, play a paramount role, becoming anchor institutions. Specifically, universities can be viewed as resource endowments in the region for its development. They support sustainable development and stimulate wealth creation, becoming contributors to foster regional prosperity and competitive advantage (Brundenius, Göransson, and de Mello 2016; Orecchini, Valitutti, and Vitali 2012). Yet, this new role has come at a cost: universities have had to significantly shift their agendas moving their traditional teaching and research activities, towards the adoption of a stronger commitment with the region for community development (Goddard et al. 2016; Pique, Berbegal-Mirabent, and Etzkowitz 2018). By doing so, they have incorporated the so called “third mission” within their objective function. Yet this commitment should not only materialise locally, but globally. In an era of high uncertainty and volatility, universities are expected to commit to the global societal challenges and contribute to make our planet a better world (Berbegal-Mirabent, Rizzo, and Rossi 2022; Zamora-Polo and Sánchez-Martín 2019). The idea that universities can significantly help mitigate local and global challenges has prompted national and regional governments worldwide to endorse their universities and introduce new policies and mechanisms to facilitate their operations.

Literature on the regional engagement of universities reveals that better performance rates are achieved through trilateral interactions which can be conceptualized by means of the Triple Helix model of university, industry, and government relations (Ranga and Etzkowitz 2013).

The contemporary university is entrepreneurial (Etzkowitz 2017), that is, one that embraces an entrepreneurial mind-set and culture, seeking to create and transfer knowledge through research and innovation, as well as through the commercialisation of intellectual property, technology transfer, and the creation of spin-off companies. Under the remit of the third mission, entrepreneurial universities emphasise collaboration with industry, government, and other organisations to promote economic development and social impact, as well as to generate revenue and enhance their own sustainability. These objectives materialise in a wide range of activities aimed at generating, exploiting and transferring new knowledge beyond the confines of academia. As Etzkowitz et al. discuss in this special issue, university venture capital funds play an important role in promoting innovation by financing university linked start-ups.

Because universities are heterogeneous and there is no size that fits all (Lepori 2022), each institution has adopted this mandate at a different pace, being constrained by the context in which it operates – including the legal framework of the region but also the corporate structures as well as the interests of the individuals that oversee and manage the institution.

What follows from the above is that the third mission has given rise to different institutional forms. By offering courses, workshops, and other programs that teach entrepreneurship and innovation skills, universities provide valuable learning opportunities for students, faculty, and staff, and lay the foundations for new start-ups to develop (Nicotra, Del Giudice, and Romano 2021). Colombo and Piva (2020) show that the design of the university curricula crucially influences the entrepreneurial rates of university students and recent graduates. As Leiva et al. (2023) argue in this special issue, the university context positively influences the start-up activities of students involved in nascent entrepreneurship. More specifically, Leiva et al. analyse how university-specific entrepreneurship learning affects the entrepreneurial activity of students in different contexts while acknowledging that contextual factors may affect this process. They found that a university context that is conducive to offering entrepreneurial learning positively influences the start-up activities of students involved in nascent entrepreneurship.

Universities and the entrepreneurial finance landscape

Another strategy universities are following to accomplish the third mission is to offer support services for start-ups (Breznitz et al. 2018) and seed funding. For example, incubators and accelerators provide start-ups with mentorship, access to networks, seed funding and other resources that can help them to grow and scale their businesses (Colombo and Delmastro 2002; Hallen, Cohen, and Bingham 2020). Many academic institutions have also developed partnerships with industry and other stakeholders, creating new opportunities for start-ups to access markets, customers, other resources and funding. The literature has widely discussed the financial constraints and asymmetric information experienced by young ventures seeking to raise external finance. The providers of such finance and the landscape for entrepreneurial finance in general, have changed over the last years (Hockaday 2020). New players such as business accelerators and crowdfunding platforms now co-exist with more established equity finance providers such as venture capital funds and business angels. Universities have established a close relationship with these different actors and in recent years have emerged as an integral part of the entrepreneurial finance landscape.

Accelerators have become a popular and distinct new form of intermediary organisation, playing a key role in supporting entrepreneurial and innovation activities (Crişan et al. 2021), even though the evidence is not unanimous in highlighting positive effects on accelerated start-ups (Hallen, Cohen, and Park 2023). Accelerators that operate within a university context aim either to create a valuable learning experience (Adomdza 2016; Mansoori 2017) to foster innovation (Wise and Valliere 2014), or to support technology transfer. However, as Metcalf, Katona, and York (2021, 667) put it, it is still unclear whether “*university start-up accelerators intend to educate or are they created to facilitate business starts and to contribute to regional economic development?*” Crowdfunding platforms have also become an integral part of the start-up ecosystem. Crowdfunding platforms act as intermediaries between potential investors/backers, who in addition to finance, may provide start-ups with ideas, feedback and solutions that help them develop their activities (Belleflamme, Lambert, and Schwienbacher 2014). In the context of higher education, crowdfunding platforms

offer the opportunity to students and academics to raise money from the crowd for innovative projects, research and programs. Troise et al. (2023) investigated the motivation, benefits and risks of equity crowdfunding for university spinoffs and found that equity crowdfunding can serve as a model for helping university spinoffs overcome some typical resource constraints by providing funding but also other crucial non-financial resources such as networking, partnerships, feedback etc.

Universities often enter the venture capital markets mainly through their existing technology transfer offices (TTOs) that manage the funds and their investment focus is usually internal through the financing of business projects and technologies developed inside the parent university (potentially in conjunction with other research organizations) (Croce, Grilli, and Murtinu 2014). Notwithstanding, it has not been until recently that we have witnessed the emergence of a very large number of investment funds of different scale and with different investment objectives, directed at transferring technologies from university to market one way or another (Belitski, Aginskaja, and Marozau 2019). These initiatives have had a significant impact on the entrepreneurial finance landscape, creating new sources of funding and expertise for start-ups and expanding the opportunities for academic research to be translated into new products and services.

Although university-affiliated venture funds (UVF) are now in the spotlight in current academic and practitioner debates, they are not an entirely novel idea, having been employed, albeit at a small scale, as a mechanism to foster technology transfer since the 1980s (Kremer, Achleitner, and Braun 2022). The increased establishment of UVF is driven by several factors, including the desire to support entrepreneurship, increase industry partnerships, and generate revenue. As Magomedova et al. (2023) explain in this special issue, university venture capital funds differ in terms of governance system, fundraising, industry and stage focus. Of particular interest is also the role of government as a limited partner in such a context, as governments around the world have increased the availability of the supply of finance for innovative ventures and in many cases they have supported venture capital schemes that have an explicit focus on universities (e.g., University Challenge Scheme in the UK).

Universities are often the source of ground-breaking research and the development of emerging technologies (Belitski, Aginskaja, and Marozau 2019), yet many of these discoveries may not be commercially viable given that the early-stage nature of these projects makes it more challenging to build a persuasive case for investment. Additional funding and expertise is needed for further additional market analysis, proofs-of-concept and pivots before bringing these projects to the market. However, external financing for new and smaller businesses may be particularly challenging when dealing with untested technology, as marketability and profitability are uncertain. This creates an “equity gap” as traditional venture capital is not available for smaller projects (Lerner and Nanda 2020). By creating venture funds, universities can provide seed funding and resources to support their students, faculty, and staff who are interested in starting their own companies. This can help to cultivate a culture of entrepreneurship on campus and is a viable alternative that can effectively enhance the performance and frequency of spin-off organisations. According to Moray and Clarysse (2005), UVFs provide the financial resources required to transform uncertainty into manageable levels of risk.

Another motivation for the creation of UVF is that they demonstrate a commitment to innovation and entrepreneurship which may help attracting top talent to the university (Croce, Grilli, and Murtinu 2014; Wright, Vohora, and Lockett 2004). It is most likely that in

the upcoming years, those universities that have not yet created venture funds may feel the pressure to do so to remain competitive.

UVF are also a valuable tool for engaging with industry, government, and other external partners to transfer knowledge and expertise to the broader community, embarking on a win-win relationship (Croce, Grilli, and Murtinu 2014). For instance, conducting research further downstream – close to the market – knowledge flows between academia and the industry are accelerated, which in turn, allows universities to partner with companies that might be interested in licensing their intellectual property or collaborating on new projects. These partnerships might later lead to increased funding opportunities, access to new markets, and expanded research capabilities. However, despite such efforts, the links and networking opportunities between university VC funds and their private counterparts often remain weak (Pierrakis and Saridakis 2013), which is often attributed to the different institutional objectives or the level of expertise of the investment managers.

Papers in the special issue

The first study in this collection of articles (*“University Venture Capital in Big Data, Regional and Historical Perspective: Where and Why Has It Arisen?”*) (Etzkowitz et al. 2023) is a collaborative work led by Prof. Henry Etzkowitz (International Triple Helix Institute, Silicon Valley) that offers a comprehensive picture of university-based funds, an emerging type of venture capital that has been overlooked by both academics and practitioners. A selected number of contributors from different universities and industry sectors are co-authoring this study: Miranda Weston-Smith (MWS Consulting, UK), Jim Beddows (TDP Data Systems), Ekaterina Albats (LUT University, Finland), Helen Lawton-Smith (Centre for Innovation Management Research, Birkbeck, University of London), Jim Wilkinson (Oxford Science Enterprises), Jialei Yang (University of Oulu, University of Helsinki and Stanford University), Joe Miller (TDP Data Systems), Cannon Gardner (TDP Data Systems), Emma Foster-Palmer (Palmer Consulting) and Chunyan Zhou (Triple Helix Association). The result is a well-crafted and documented article that elucidates on the development of university venture capital, its role in innovation, and the broader venture capital phenomenon.

This work starts by contributing to the existing discourses on the rise and emergence of the entrepreneurial university as a key element of the knowledge economy. Within this context, one way to enhance the entrepreneurial capacity of universities is through venture capital entities, which can speed up the innovation processes by financing and supporting the emergence of new economic activity generated within academia. The authors then propose a reflection on the variety of VCs that have proliferated, originating from different university-industry-government institutional sources at various levels of capitalisation, and extending their reach globally. Next, using a multi-method/multi sample comparative regional innovation case study and big data analytic techniques the authors illustrate the developmental inequalities of a widespread yet highly concentrated phenomenon. Different contexts are analysed and mapped in order to understand the link between VC funding with spatial issues like the location of the headquarters of the firms that are funded (with heat points in California and the East Coast (Boston, New York) of the United States, in the UK, Tel Aviv, and Tokyo), the

concentration of start-up incubators/accelerators (which tend to be close to the main “innovation hubs” and major research institutions and universities), or the university investment vehicles that are in the VC space. The overarching conclusion is that UVC is becoming increasingly a part of university technology transfer and that it takes various forms, depending upon the location of the university and its ability to generate start-ups with sufficient growth potential, appropriate for venture funding. Therefore it is necessary to avoid falling into the one size fits all specific mechanism, and instead take into account the varying conditions of the local entrepreneurship ecosystems.

The second paper, *“Nascent entrepreneurship in university students: the role of the context”*, is written by Juan C. Leiva, Ronald Mora-Esquivel, and Martín Solís, and it explores the role of contextual factors in the business creation process of nascent entrepreneurs coming from the university context. Specifically, it investigates the influence of university and national level environments on students’ start-up processes while considering the different categories of those processes. Their empirical method relies on a perspective of the start-up process not as linear but as a sequence of interconnected actions. The general findings of this paper suggest that the context may influence the start-up process in different ways, depending on the category of activities and regions. Their results indicate that a university context that is conducive to offering entrepreneurial learning positively influences the start-up activities of students involved in nascent entrepreneurship. If all other variables are equal, the extent to which entrepreneurial courses and offerings at university equip students with understanding, practical management skills, and abilities for business -Program learning-, increases the likelihood of business start-up activities in terms of “Business Planning” and “Interaction with the external environment”. Such offerings also increase the likelihood of attempting to finance a venture (“Financing the firm”).

The third paper, by Mariluz Fernández-Alles, Carmen Camelo-Ordaz, Juan Pablo Diáñez-González, and Evaristo del Castillo-Rodríguez (*“Linear and non-linear patterns of internationalisation and funding in academic spin-offs”*) pursues two main objectives. First, it analyses whether internationalised and domestic academic spin-offs (ASOs) use different financial agents, thus answering the question of which agents providing financial resources are relevant for the internationalisation of ASOs. Second, it explores the patterns of internationalisation of ASOs and investigate whether there are differences between the agents financing the diverse internationalisation patterns. In order to achieve these objectives, a sample of 173 Spanish ASOs is examined through cluster analysis, ANOVA analysis of variance and post-hoc tests. Regarding the first objective, results indicate that internationalised ASOs rely on financial agents which are indeed different to those funding domestic ASOs. Significant differences are showed in three agents – governmental institutions, venture capital firms, and other financial investors – so that these are the most relevant agents for the internationalisation of ASOs. With respect to the second objective, the study finds different patterns of internationalisation in the ASOs, and differences between the agents that finance them. More specifically, the results reveal the existence of four internationalisation patterns of ASOs, among which the most representative is Born Global, through the True Born Global and Sporadic Born Global sub-patterns. The study also confirms that different internationalisation patterns are supported by different financial agents, although governmental institutions and venture capital firms constitute the most relevant agents.

Finally, the forth paper, authored by Nina Magomedova, Núria Villaescusa and Alba Manresa (with the title “*Exploring the landscape of University-affiliated Venture funds: an archetype approach*”) aims at exploring the diversity of university-affiliated venture capital funds. To do so, the authors analyse 11 European UVC funds through the lens of an archetype approach of institutional theory, which allows identifying relevant structures and schemes for UVC. Specifically, results point to three different archetypes of UVC funding that, despite some similarities, differ in their governance structure, the investment rationale and the stage of a venture development: (i) seed spreaders that are mainly focused on pre-seed-stage university spin-offs and that in their governance structure combine external and internal stakeholders; (ii) externally managed seed sprouters supported by multiple universities to finance seed-stage university spin-offs; and (iii) seed boosters targeting potential unicorns with a clear marketplace. The study demonstrates the uniqueness of UVC funds in terms of institutional hybridity, and dual organisational schemes and structures. As these organisations combine two different institutional logics – the commercial and business-oriented one with the academic logic of an educational institution and a research centre – they have the arduous task of balancing their contradicting objectives. The unique role of UVC funds in the financial sector is therefore elucidated in this study as well as the place that such funds occupy in the entrepreneurial university ecosystem, suggesting that they should not be seen as competitors to the existing financing mechanisms but rather as additional players that complement the others. The study concludes arguing that UVC archetypes are neither static nor isolated from each other. Instead, they have blurred boundaries that enable them to borrow elements from each other to better meet the specific needs of universities. This, in turn can contribute to the creation of a more flexible, dynamic and fluid entrepreneurial university ecosystem.

Conclusions

To summarise, the entrepreneurial finance landscape has changed enormously over the last years and universities have emerged as key players that either provide or facilitate investments in innovative start-ups. The relevant literature highlights the efforts and challenges faced by the universities to comply with their “third mission”, coupled with the need to adopt a more corporate approach, quite often fuelled by government demands or aspirations. Institutional logic that promotes a more “corporate university”, determines performance measurement systems in academia which are often ambiguous. Is the main objective of the university to create entrepreneurs, or to make financial returns from its investments?

Although anecdotal evidence from universities such as Stanford or Yale suggests that financial returns are a factor in universities’ investment decisions (Lerner 2005), it is not necessarily true for all investments and investors (Kremer, Achleitner, and Braun 2022). Many UVC funds are, to some extent, subsidised by the government, therefore, the potential returns on investment are not always a reliable source. In addition, investing in start-ups at seed and pre-seed stage is inherently risky – due to the novelty of the emerging technologies or the disruptive business models – and often, UVF must navigate potential conflicts of interest – if a UVF invests in a start-up that is based on research conducted at

the university, there may be concerns about the objectivity of the investment decision. Therefore, careful management and oversight of the investments are critical to ensure an alignment with the university's mission and values without compromising their integrity. Addressing these challenges requires a combination of strong leadership, strategic planning, effective management practices, and a deep understanding of the start-up ecosystem. Balancing universities' financial and strategic objectives is not an easy task, particularly when resources are limited. A careful prioritisation of the investments and efficient use of resources are imperative to maximise the impact of the funds.

Future work should further investigate the organization and governance of UVCs. What are the specific mechanisms used by university-led funding schemes, in terms of the investment process, screening, due diligence, etc., and how effective/ineffective are these by comparison with the traditional VC funding sources? Should UVCs syndicate their investments and with whom (e.g., business angels, local VCs, highly reputable international VCs, governmental agencies)? How could UVCs assure the participation of other investors in follow-on rounds? What should be the balance between establishing universities' internal funding vehicles and facilitating access to external funding sources? In order to answer these questions and assess the effectiveness of university funding schemes, progress should be made on how the impact of these schemes should be measured. We hope that this special issue will open the way for further work on these important and under-researched issues.

Note

1. Nevertheless, Munari, Pasquini, and Toschi (2015) found that spinoffs receiving university seed funds have a lower likelihood of IPO, and Croce, Grilli, and Murtinu (2014) observed that university funds in the U.S. seem to be outperforming those in Europe, perhaps due to their disciplinary and later-stage spinoff focus.

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