
Editorial: Introducing the implementation of open innovation approaches by academic entrepreneurship as a viable solution to tackle the lack of resources

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In the last decades, a large stream of literature has recognised the entrepreneurial activity as a critical driving force of the socio-economic development, industrial renewal and societal wealth (e.g., Audretsch, 2007; Chatterjee et al., 2019; Giraudo et al., 2019). In such a context, universities and other public research organisations are increasingly considered key sources of innovation as well as favourable environments for the development of new entrepreneurship (Tidd and Bessant, 2011). This has progressively resulted in the involvement of universities in the promotion of multiple initiatives aimed to foster entrepreneurial culture as part of the third mission (henceforth TM) (Bigliardi et al., 2015; Galati et al., 2020; Marzocchi et al., 2017; Passaro et al., 2018; Phan and Siegel, 2006; Rae et al., 2010). Universities engaged in TM actions are critical actors of the entrepreneurial ecosystem able to contribute to the social, economic and cultural development of the territory in which they operate, by delivering knowledge and technologies to industry and society, training skilled workers and entrepreneurs, and supporting and stimulating innovation processes (Agasisti et al., 2019; Audretsch et al., 2016; Bischoff et al., 2018; Civera et al., 2019; Compagnucci and Spigarelli, 2020; Rippa and Secundo, 2019). The TM can be realised through a wide range of technology and knowledge transfer mechanisms, ranging from patenting to business incubator actions, from entrepreneurship education to the engagement in public initiatives, from technology transfer offices to the ASOs creation (Compagnucci and Spigarelli, 2020; Culkin, 2016; Kakouris, 2016; Phan and Siegel, 2006).

Among the various forms of academic entrepreneurship, the creation of ASOs represents an effective commercial mechanism to transfer the results of research to the industrial and socio-economic system (Wright et al., 2008; Siegel et al., 2007; Van Looy et al., 2011; Festel, 2013; Rizzo and Ramaciotti, 2014; Meoli et al., 2019). An academic spin-off (henceforth ASO) can be defined as a new company founded by university staff (e.g., professors, researchers, technical personnel, etc.) aiming to exploit a novel technology or knowledge originated within a university in order to develop marketable products or services (Bigliardi et al., 2013; Galati et al., 2020; Marzocchi et al., 2017; Sansone et al., 2021).

It is widely recognised that ASOs promote the local socio-economic development and competitiveness by creating new employment opportunities, favouring economic

stability, stimulating innovation processes and feeding up entrepreneurial ecosystems thanks to the generation of knowledge spillovers (e.g., Audretsch et al., 2016; Block et al., 2017; Civera et al., 2020; Guerrero et al., 2015). According to this, ASOs are receiving great attention from both scholars and policy-makers and their relevance has been confirmed by the large proliferation of studies on this research stream.

In particular, the greatest part of the extant literature focuses on:

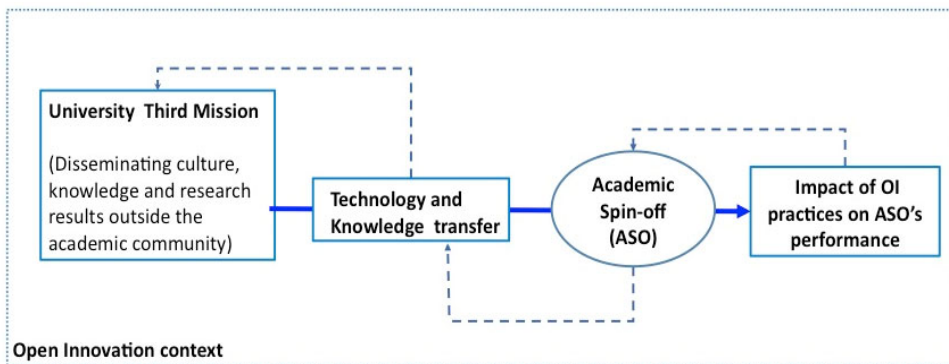
- 1 motivations and personal characteristics of the founders (Prodan and Drnovsek, 2010; Galati et al., 2017)
- 2 the impact of ASOs on the local economic system (Civera et al., 2020; Goldstein, 2010)
- 3 their performances (Bigliardi et al., 2013; Bigliardi and Galati, 2016; François and Philippart, 2019; Jung and Kim, 2018; Mathisen and Rasmussen, 2019; Vohara et al., 2004)
- 4 ASOs' life-cycle processes (Helm and Mauroner, 2007; Vanaelst et al., 2006; Vohara et al., 2004)
- 5 the role of entrepreneurial education (Marzocchi et al., 2017; Sansone et al., 2021)
- 6 their internationalisation (Civera et al., 2019).

Notwithstanding, the topic of ASOs has still to be fully explored. In fact, more in-depth analyses appear to be critical if we consider their performance and success rate. In fact, several empirical results highlight that the majority of ASOs are very small-sized enterprises and the majority of them never grow any further (e.g., Mustar et al., 2008). Scientific evidence suggests that on average ASOs do not perform better than their non-academic counterparts and only few are really successful (Civera et al., 2019). According to this, it is worth to identify the reasons that limit the performance of this type of technology – and/or knowledge-based start-up and the ways to overcome them. As underlined by Rasmussen et al. (2014), this situation depends on the fact that the launch of ASOs requires not only the existence of strong individual motivations, but also the engagement of various actors from society. Creating relationships with external partners is a priority for the success of ASOs and represents a pathway to gain competitive advantage (Perkmann and Walsh, 2007; Soetanto and van Geenhuizen, 2010; Walter et al., 2006; Vincett, 2010; Clarysse et al., 2011; Rodríguez-Gulías et al., 2017; Shutyak, 2016). In this context, the OI paradigm (Chesbrough, 2003) provides a theoretical and practical context to understand how ASOs develop (internally) and contribute (externally) to innovation processes and how the openness of ASOs can support them in tackling the lack of critical resources (e.g., managerial, financial and economic, technical resources, etc.).

Therefore, despite the relevance of the adoption of OI practices for the success of ASOs, very few researches exist on such topic (Shutyak, 2016). For example, Walter et al. (2011) focus more on innovation success of university spin-offs (USOs) rather than precisely on OI. Other contributions deal mainly with the performance issues of innovative activity of ASOs, ignoring other important aspects. Perkmann and Walsh (2007) underline the need to investigate specific aspects of OI practices in ASOs such as incentives and motivation, OI strategies and types of innovative activities.

These relationships are schematised in Figure 1, which shows how the concepts of TM, technology and knowledge transfer, and ASO creation are interconnected and embedded in a broader context of OI. As previously mentioned, OI theorised by Chesbrough (2003) fosters the creation of ASOs through the dissemination and transfer of knowledge and technology. At the same time, however, the ability of an ASO to develop OI activities not only impacts on its performance, but also allows for the strengthening of the technology and knowledge transfer process that occurs upstream. Therefore, we cannot speak about a linear process, but rather of a virtuous circle, shown in Figure 1, in which OI boosts the ASO and vice versa, and together they strengthen the process of technology and knowledge transfer, which in turn will stimulate the TM activities.

Figure 1 Reference framework (see online version for colours)



According to this, this special issue aims to contribute to the debate around the implementation of OI approaches by ASOs and support the collection of theoretical and empirical studies on these topics in order to fill the existing gap.

The scheme proposed in Figure 1 depicts the reference framework on which this special issue is based and that will be used in the following to map the contribution of the papers included in this special issue.

The basic premise of this special issue is that ASOs can overcome their shortage of tangible and intangible resources, as well as their unfamiliarity with the market environment, by opening their boundaries and collaborating with external third parties. Even if growing attention has been paid to the adoption of OI in the SMEs' and startups' context (Rippa et al., 2016), to our knowledge the openness of ASOs is still underexplored. Moreover, while the extant research has explored some of the implied benefits (and costs) of OI in general and for entrepreneurship in particular, the exact entrepreneurial mechanisms by which openness supports academic entrepreneurs are not yet fully understood.

In particular, this introductory article focuses on the intersection of academic spin-offs and OI practices. The general aim is to provide a brief overview of each contribution in this special issue also by positioning them on the reference framework shown in Figure 1.

The papers selected for this special issue contribute to fill this gap, by presenting multidisciplinary, theoretical and empirical studies focusing on the analysis of how ASOs could overcome the lack of critical resources for their survival.

The first paper included in the special issue aims to conceptualise a paradigmatic model of the OI ecosystem in the field of such start-ups. Specifically, Fallah first identified the main actors operating in this ecosystem and explained the relationships between them, after which he proposed a model for the creation of an effective OI ecosystem based on Glaser's (2007) grounded theory analysis. The study is based on a meta-synthesis conducted through a systematic review of 86 articles thanks to which the author has identified four main concepts that facilitate the creation of an OI ecosystem: dynamic facilitators, innovative empowerment, multiple absorption capacity and shared synergy. Dynamic facilitators are tools that facilitate the creation of an OI ecosystem by leveraging the importance of creating an infrastructure to support the internalisation and commercialisation of ideas. Innovative empowerment is a vertical strategy that reinforces the OI process by promoting integration between the company and external partners. Dynamic facilitators together with innovative empowerment stimulate multiple absorption capacity. Finally, the last step to create an effective ecosystem of OI is represented by shared synergy, which allows creating a platform of shared understanding in which internal and external knowledge are effectively integrated.

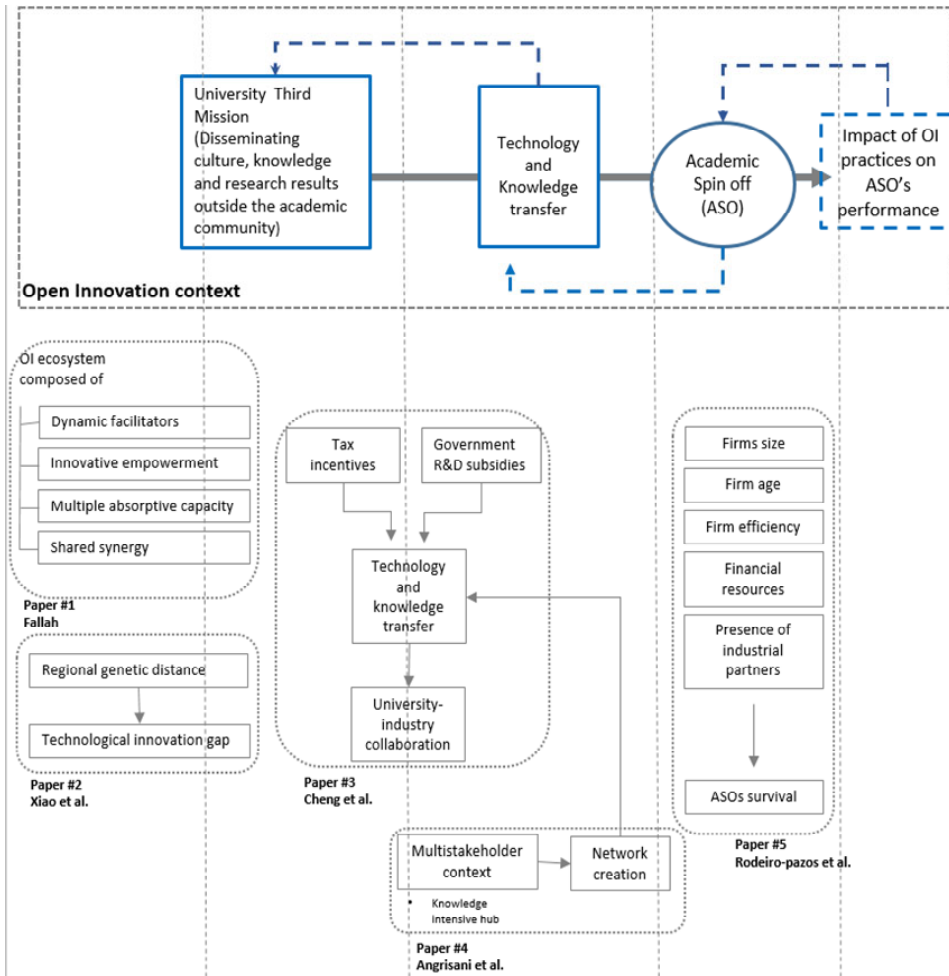
In the second paper included in the special issue, Xiao et al. try to explain the differences in terms of technological innovations in different countries with genetic considerations. According to the authors, in fact, genetic differences between regions produce different levels of innovation in those regions. This study contributes to better define the OI context within which the relationships between universities and industry are framed. In fact, the aim of the study is to assess the impact and mechanisms of genetic distance on the technological innovation gap. The genetic distance measures the heterogeneity of the genetic structure in different regions and affects their absorptive capacity. After analysing a panel data of the number of patent grants obtained in the period 2008–2017, the results show that genetic distance has a positive impact on the technological innovation gap.

The third paper, authored by Cheng et al., is set in the context of the TM, aiming to investigate the relationship between universities and industry. Specifically, the authors study the effect of government subsidies and tax incentives on the interaction between universities or research institutions and the business environment. They conduct an empirical investigation using a panel data from China from 2009 to 2015 of patents joint applied by firms with universities or research institutes. Their initial assumptions are that government-provided R&D subsidies are as likely to foster university-industry collaboration as tax incentives. They found that government subsidies and tax incentives effectively promote such collaboration by enabling technology and knowledge transfer between universities, research institutes, and industry. According to the authors, the role of government is critical in the early stages of industry-university interaction, and specifically the subsidies it provides to universities are those that contribute most to the TM. In fact, government-funded university R&D plays a decisive role in technology and knowledge transfer.

The fourth paper included in the special issue aims to study the dynamics of academic entrepreneurship within an OI context. In particular, Angrisani et al. aim to investigate the OI practices adopted by a knowledge-intensive hub by performing a multiple case study. Their study is based on the idea that the concept of innovation community can explain the successful performance of OI in promoting knowledge and technology transfer within the hub. Results show that the knowledge-intensive hub, in fact, by hosting a plurality of different stakeholders, including ASOs, promotes the development

of relationships among them, boosting the transfer of technology and knowledge in the local territory, as well as the its socio-economic growth.

Figure 2 Map of the selected papers (see online version for colours)



The fifth paper investigates the factors that determine the survival of USOs, also referred to as ASOs. Based on the resource-based view and perspectives from population and organisational ecology, Rodeiro-Pazos et al. derived the mechanisms that lead to different survival expectations. Specifically, the authors investigate nine firm-level characteristics in order to assess whether they can be considered drivers of USOs survival. Their study was conducted through an empirical analysis carried out on a sample of 955 Italian USOs and 531 Spanish USOs. The empirical findings show that firm size, firm age, firm efficiency, financial resources and, in particular, presence of industrial partners favour the survival of USOs.

Table 1 Overview of the selected paper

<i>Authors</i>	<i>Objective(s)</i>	<i>Unit of analysis</i>	<i>Methodology</i>	<i>Results</i>	<i>Future research</i>
Fallah	Conceptualise the open innovation ecosystem for start-ups	86 papers	Literature review based on seven-step meta-synthesis analysis	The factors that constitute the ecosystem of open innovation can be summarised by four main concepts: dynamic facilitators, innovative empowerment, multiple absorption capacity and shared synergy. These constructs are linked together by causal relationships.	Investigating the role of society to create a shared value culture. Studying ways to implement knowledge management within organisation to better deal with knowledge dissemination issues, such as potential leakage of confidential information.
Xiao et al.	Assess the impact and mechanisms of genetic distance on the technological innovation gap	Regional per capita patent grants obtained in the period 2008–2017	Ordinary least square regression analysis	Genetic distance between different regions has a positive impact on the technological innovation gap, that is the greater is the genetic distance, the greater the gap in technological innovation.	Exploring the relationship between regional genetic distance and technology absorption to determine regional absorptive capacity.
Cheng et al.	Understanding the effect of tax incentives and government subsidies on university-industry collaboration	Patents joint applied by firms with universities in China from 2009 to 2015	Econometrics models	Government subsidies and tax incentives to universities, research institutes and industries foster the collaboration between university and industry.	Assessing the direct impact of government subsidies and tax incentives on technology and knowledge transfer. Assessing the impact of non-financial support policy instruments on university-research institutes-industry collaboration.
Angrisani et al.	Investigate the practices of open innovation that take place within a knowledge-intensive hub	An Italian knowledge-intensive hub	Multiple case study	A knowledge-intensive hub can be described by the concept of innovation community (IC), as it involves institutional, academic and industrial players. As a consequence, the rules of IC can be applied to govern the dynamics of knowledge and technology transfer.	Definition of indicators to understand the functioning and assess performances of an open innovation community.
Rodero-Pazos et al.	Investigate the survival determinants of USOs	1,275 Italian and Spanish USOs over the period 2005–2013	Event analysis technique	The variables that positively influence the survival potential of USOs are: firm size, firm age, industrial partners and firm efficiency. On the contrary, patent activity decreases the USOs' chances to survive.	Considering the potential effects of the entrepreneurial team's characteristics on the USO's survival. Considering external factors related to parent universities and the macroeconomic settings in determining the USOs' survival prospects.

To summarise, Figure 2 maps the papers included in this special issue.

Table 1 provides an overview of the accepted papers, together with the avenues for future research proposed by the authors of the included papers.

This special issue is a first step toward filling the existing research gaps on how ASOs can overcome their shortage of tangible and intangible resources, thus we believe that it provides the scientific community with valuable information and knowledge in this field.

To synthesise, the main results that emerge from the selected papers regard:

- 1 the role of governmental measures and incentives in supporting university TM and the relationships between university and industry
- 2 the identification of the main actors and building blocks of OI ecosystems able to support ASOs creation
- 3 the determinant of the ASOs survival.

These results bring out a number of further considerations for researchers that may represent avenues for future studies.

Firstly, the key role played by the different actors of the OI ecosystem, characterised by different qualities (e.g., public and private actors, small and large sized, profit and no-profit actors, innovation/collaboration abilities, etc.) highlight the importance of adopting a systemic approach when dealing with OI and ASO (Maula et al., 2006). Secondly, in a context characterised by numerous and different actors, sometimes with conflicting purposes, the role of policy measures in sustaining the collaboration among OI actors, especially with regard to the collaboration between industry and university, appear to be increasingly an essential factor. Thirdly, for these measures to be effective, it is crucial to investigate both their functioning in different contexts (industries, regions, labour markets, etc.) and their different nature (financial and non-financial, actor/purpose/innovation/industry specific aim, general purpose, etc.) (De Jong et al., 2008). This last aspect seems to be very important as various variables influence the chances of ASOs to survive, thus highlighting the complexity of the innovation context in which operate both ASOs and OI actors and the necessity to define effective policies. Finally, the concept of Innovation community can provide a useful conceptual framework for gaining more knowledge about the role of ASOs in the OI context as actors of social innovation (Toivonen, 2016) and of social OI processes.

Nevertheless, we recognise that much empirical and theoretical work still need to be done to further develop our understanding of this interesting and critical issue. In particular, additional researches are necessary to better investigate the impact of OI practices and approaches, the role of different actors of the OI ecosystems on different types of ASOs' performances and the effect of different policy measures on university TM and ASOs creation and performances.

More in general, it is our hope that the framework presented in this editorial and the papers collected in the special issue will stimulate and inspire future studies in this relevant research area. Moreover, we believe that the papers selected are worth for spin-off entrepreneurs and managers, policy-makers and universities. Spin-off entrepreneurs and managers could greatly benefit from knowledge developed by research to improve their management practices and to strengthen their entrepreneurial commitment and motivations. Policy-makers could gain new insight into a topic of crucial importance for fostering innovation and economic development through measures

aimed to support new innovative entrepreneurship, collaboration among different actors of innovative ecosystems, and the creation of a social innovation community. Universities could improve their TM activities by adopting a systemic approach that should create effective synergies among the three university missions. In particular, the university should define different educational activities (i.e., entrepreneurial courses, technological transfer, incubators facilities, etc.) to support innovation and new entrepreneurship, and play a pivotal role in triggering a virtuous circle able to feed up OI processes and the creation of an open and supportive innovation environment.

The value-added by a special issue is only as good as the contributions of the papers it receives, and the quality of the feedback provided by its reviewers. We are very grateful to all the authors, who supported this special issue through their contributions. We are obliged with the reviewers, who helped us in managing the papers received in a timely manner and provided useful and professional reports about the papers. Finally, we would like to thank the Editor-in-Chief of *International Journal of Technology Management*, who gave us the opportunity to organise the special issue and helped us in its successful completion.

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References

- Agasisti, T., Barra, C. and Zotti, R. (2019) 'Research, knowledge transfer, and innovation: the effect of Italian universities' efficiency on local economic development 2006–2012', *Journal of Regional Science*, Vol. 59, No. 5, pp.819–849.
- Audretsch, D., Lehmann, E., Meoli, M. and Vismara, S. (2016) *University Evolution, Entrepreneurial Activity and Regional Competitiveness*, Springer international Publishing, Basel.
- Audretsch, D.B. (2007) 'Entrepreneurship capital and economic growth', *Oxford Review of Economic Policy*, Vol. 23, No. 1, pp.63–78.
- Bigliardi, B. and Galati, F. (2016) 'Which factors hinder the adoption of open innovation in SMEs?', *Technology Analysis & Strategic Management*, Vol. 28, No. 8, pp.869–885.
- Bigliardi, B., Galati, F. and Verbano, C. (2013) 'Evaluating performance of university spin-off companies: lessons from Italy', *Journal of Technology Management & Innovation*, Vol. 8, No. 2, pp.178–188.
- Bigliardi, B., Galati, F., Marolla, G. and Verbano, C. (2015) 'Factors affecting technology transfer offices' performance in the Italian food context', *Technology Analysis & Strategic Management*, Vol. 27, No. 4, pp.361–384.
- Bischoff, K., Volkmann, C.K. and Audretsch, D.B. (2018) 'Stakeholder collaboration in entrepreneurship education: an analysis of the entrepreneurial ecosystems of European higher educational institutions', *The Journal of Technology Transfer*, Vol. 43, No. 1, pp.20–46.
- Block, J.H., Fisch, C.O. and Van Praag, M. (2017) 'The Schumpeterian entrepreneur: a review of the empirical evidence on the antecedents, behaviour and consequences of innovative entrepreneurship', *Industry and Innovation*, Vol. 24, No. 1, pp.61–95.

- Chatterjee, N., Das, N. and Srivastava, N.K. (2019) 'A structural model assessing key factors affecting women's entrepreneurial success: evidence from India', *Journal of Entrepreneurship in Emerging Economies*, Vol. 11, No. 1, pp.122–151.
- Chesbrough, H. (2003) *Open Innovation: The New Imperative for Creating and Profiting from Technology*, Harvard Business School Press, Boston.
- Civera, A., Meoli, M. and Vismara, S. (2019) 'Do academic spinoffs internationalize?', *The Journal of Technology Transfer*, Vol. 44, No. 2, pp.381–403.
- Civera, A., Meoli, M. and Vismara, S. (2020) 'Engagement of academics in university technology transfer: opportunity and necessity academic entrepreneurship', *European Economic Review*, Vol. 123, p.103376, <https://doi.org/10.1016/j.euroecorev.2020.103376>.
- Clarysse, B., Wright, M. and Van de Velde, E. (2011) 'Entrepreneurial origin, technological knowledge, and the growth of spin-off companies', *Journal of Management Studies*, Vol. 48, No. 6, pp.1420–1442.
- Compagnucci, L. and Spigarelli, F. (2020) 'The third mission of the university: a systematic literature review on potentials and constraints', *Technological Forecasting and Social Change*, Vol. 161, p.120284, <https://doi.org/10.1016/j.techfore.2020.120284>.
- Culkin, N. (2016) 'Entrepreneurial universities in the region: the force awakens?', *International Journal of Entrepreneurial Behavior & Research*, Vol. 22, No. 1, pp.4–16.
- De Jong, J.P.J., Vanhaverbeke, W., Kalvet, T. and Chesbrough, H. (2008) *Policies for Open Innovation: Theory, Framework and Cases*, Research project funded by VISION Era-Net, Helsinki, Finland.
- Festel, G. (2013) 'Academic spin-offs, corporate spin-outs and company internal start-ups as technology transfer approach', *The Journal of Technology Transfer*, Vol. 38, No. 4, pp.454–470.
- François, V. and Philippart, P. (2019) 'A university spin-off launch failure: explanation by the legitimation process', *The Journal of Technology Transfer*, Vol. 44, No. 4, pp.1188–1215.
- Galati, F., Bigliardi, B., Passaro, R. and Quinto, I. (2020) 'Why do academics become entrepreneurs? How do their motivations evolve? Results from an empirical study', *International Journal of Entrepreneurial Behavior & Research*, Vol. 26, No. 7, pp.1477–1503.
- Galati, F., Bigliardi, B., Petroni, A. and Marolla, G. (2017) 'Which factors are perceived as obstacles for the growth of Italian academic spin-offs?', *Technology Analysis & Strategic Management*, Vol. 29, No. 1, pp.84–104.
- Giraud, E., Giudici, G. and Grilli, L. (2019) 'Entrepreneurship policy and the financing of young innovative companies: evidence from the Italian Startup Act', *Research Policy*, Vol. 48, No. 9, p.103801.
- Glaser, B.G. (2007) 'Constructivist grounded theory?', *Historical Social Research/Historische Sozialforschung*, Supplement, Vol. 19, pp.93–105.
- Goldstein, H. (2010) 'The 'entrepreneurial turn' and regional economic development mission of universities', *Annals of Regional Science*, Vol. 44, pp.83–109, doi: 10.1007/s00168-008-0241-z.
- Guerrero, M., Cunningham, J.A. and Urbano, D. (2015) 'Economic impact of entrepreneurial universities' activities: an exploratory study of the United Kingdom', *Research Policy*, Vol. 44, No. 3, pp.748–764.
- Helm, R. and Mauroner, O. (2007) 'Success of research-based spin-offs. State-of-the-art and guidelines for further research', *Review of Managerial Science*, Vol. 1, No. 3, pp.237–270.
- Jung, H. and Kim, B.K. (2018) 'Determinant factors of university spin-off: the case of Korea', *The Journal of Technology Transfer*, Vol. 43, No. 6, pp.1631–1646.
- Kakouris, A. (2016) 'Exploring entrepreneurial conceptions, beliefs and intentions of Greek graduates', *International Journal of Entrepreneurial Behavior & Research*, Vol. 22, No. 1, pp.109–132.

- Marzocchi, C., Kitagawa, F. and Sánchez-Barrioluengo, M. (2017) 'Evolving missions and university entrepreneurship: academic spin-offs and graduate start-ups in the entrepreneurial society', *The Journal of Technology Transfer*, Vol. 44, pp.167–188, <https://doi.org/10.1007/s10961-017-9619-3>.
- Mathisen, M.T. and Rasmussen, E. (2019) 'The development, growth, and performance of university spin-offs: a critical review', *The Journal of Technology Transfer*, Vol. 44, No. 6, pp.1891–1938.
- Maula, M.V.J., Keil, T. and Salmenkaita, J. (2006) 'Open innovation in systemic innovation contexts', in Chesbrough, H., Vanhaverbeke, V. and West, J., (Eds.): *Open Innovation: Researching a New Paradigm*, pp.241–257, Oxford University Press, Oxford.
- Meoli, M., Paleari, S. and Vismara, S. (2019) 'The governance of universities and the establishment of academic spin-offs', *Small Business Economics*, Vol. 52, No. 2, pp.485–504.
- Mustar, P., Wright, M. and Clarysse, B. (2008) 'University spin-off firms: lessons from ten years of experience in Europe', *Science and Public Policy*, Vol. 35, No. 2, pp.67–80.
- Passaro, R., Quinto, I. and Thomas, A. (2018) 'The impact of higher education on entrepreneurial intention and human capital', *Journal of Intellectual Capital*, Vol. 19, No. 1, pp.135–156.
- Perkmann, M. and Walsh, K. (2007) 'University-industry relationships and open innovation: towards a research agenda', *International Journal of Management Reviews*, Vol. 9, No. 4, pp.259–280.
- Phan, P.H. and Siegel, D.S. (2006) 'The effectiveness of university technology transfer', *Foundation Trends Entrepreneurship*, Vol. 2, pp.77–144.
- Prodan, I. and Drnovsek, M. (2010) 'Conceptualizing academic-entrepreneurial intentions: an empirical test', *Technovation*, Vol. 30, No. 5, pp.332–347.
- Rae, D., Martin, L., Antcliff, V. and Hannon, P. (2010) 'The 2010 survey of enterprise and entrepreneurship in higher education', in *33rd ISBE Conference*, pp.3–4.
- Rasmussen, E., Mosey, S. and Wright, M. (2014) 'The influence of university departments on the evolution of entrepreneurial competencies in spin-off ventures', *Research Policy*, Vol. 43, No. 1, pp.92–106.
- Rippa, P. and Secundo, G. (2019) 'Digital academic entrepreneurship: the potential of digital technologies on academic entrepreneurship', *Technological Forecasting and Social Change*, Vol. 146, pp.900–911, <https://doi.org/10.1016/j.techfore.2018.07.013>.
- Rippa, P., Quinto, I., Lazzarotti, V. and Pellegrini, L. (2016) 'Role of innovation intermediaries in open innovation practices: differences between micro-small and medium-large firms', *International Journal of Business Innovation and Research*, Vol. 11, No. 3, pp.377–396.
- Rizzo, U. and Ramaciotti, L. (2014) 'The determinants of academic patenting by Italian universities', *Technology Analysis & Strategic Management*, Vol. 26, No. 4, pp.469–483.
- Rodríguez-Gulías, M.J., Rodeiro-Pazos, D. and Fernández-López, S. (2017) 'The growth of university spin-offs: a dynamic panel data approach', *Technology Analysis & Strategic Management*, Vol. 29, No. 10, pp.1–15.
- Sansone, G., Battaglia, D., Landoni, P. and Paolucci, E. (2021) 'Academic spinoffs: the role of entrepreneurship education', *International Entrepreneurship and Management Journal*, Vol. 17, No. 1, pp.369–399.
- Shutyak, Y. (2016) 'Open innovation practice: a case study of university spin-offs', *Journal of Entrepreneurship, Management and Innovation*, Vol. 12, No. 1, pp.75–90.
- Siegel, D., Veugelers, R. and Wright, M. (2007) 'Technology transfer offices and commercialization of university intellectual property: performance and policy implications', *Oxford Review of Economic Policy*, Vol. 23, No. 4, pp.640–660.
- Soetanto, D.P. and van Geenhuizen, M.S. (2010) 'Social capital through networks: the case of university spin-offs firms in different stages', *Tijdschrift Voor Economische En Sociale Geografie*, Vol. 101, No. 5, pp.509–520.
- Tidd, J. and Bessant, J. (2011) *Managing Innovation: Integrating Technological, Market and Organisational Change*, 4th ed., Wiley, Chichester.

- Toivonen, T. (2016) 'What is the social innovation community? Conceptualizing an emergent collaborative organization', *Journal of Social Entrepreneurship*, Vol. 7, No. 1, pp.49–73.
- Van Looy, B., Landoni, P., Callaert, J., van Pottelsberghe, B., Sapsalis, E. and Debackere, K. (2011) 'Entrepreneurial effectiveness of European universities: an empirical assessment of antecedents and trade-offs', *Research Policy*, Vol. 40, No. 4, pp.553–564.
- Vanaelst, I., Clarysse, B., Wright, M., Lockett, A., Moray, N. and S'Jegers, R. (2006) 'Entrepreneurial team development in academic spinouts: an examination of team heterogeneity', *Entrepreneurship Theory and Practice*, Vol. 30, No. 2, pp.249–271.
- Vincett, P.S. (2010) 'The economic impacts of academic spin-off companies, and their implications for public policy', *Research Policy*, Vol. 39, No. 6, pp.736–747.
- Vohara, A., Wright, M. and Lockett, A. (2004) 'Critical junctures in the development of university high-tech spinout companies', *Research Policy*, Vol. 33, No. 1, pp.147–175.
- Walter, A., Auer, M. and Ritter, T. (2006) 'The impact of network capabilities and entrepreneurial orientation on university spin-off performance', *Journal of Business Venturing*, Vol. 21, No. 4, pp.541–567.
- Walter, A., Parboteeah, K.P., Riesenhuber, F. and Hoegl, M. (2011) 'Championship behaviors and innovations success: an empirical investigation of university spin-offs', *Journal of Product Innovation Management*, Vol. 28, No. 4, pp.586–598.
- Wright, M., Clarysse, B., Lockett, A. and Knockaert, M. (2008) 'Mid-range universities' linkages with industry: knowledge types and the role of intermediaries', *Research Policy*, Vol. 37, No. 8, pp.1205–1223.