

# Entrepreneurial University and Business Education: Towards a Network Model

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## Abstract

In this study, we aim to reach a better understanding of the critical issues that affect the achievement of the University third mission. We argue that the third mission is positively linked to the first one. Renewing the teaching way and building a dynamic system of cooperation between university players means obtain positive results that integrate the proposal of an Entrepreneurial University (EU) model into a new network perspective. In order to identify its characteristics, resources and activities, we provide a literature review about the EU. We collect the more frequently shared indicators so as to define the EU model and consider new indicators, such as internships and more highly skilled students. We propose to design the EU ecosystem as a network where it is possible to identify the players involved, the activities performed and the tools used. Particularly, we refer to Italy. Within a network, interaction ways among actors are renewed, reinforced and changed. Each university could build its own network, according to its history, culture and environment. We pinpoint obstacles and incentives only exploring literature review. We do not have empirical data or case studies to support directly the feasibility and applicability of our model. Redesigning University-Business Cooperation to renew entrepreneurial learning environments. Obtaining an applicable perspective starting from the strengths of each university environments. Developing an entrepreneurial mindset inside students. Highlighting a dynamic, released, flexible approach, fit to different contexts.

**Keywords:** EU, university-business cooperation, higher education, internship

## 1. Introduction

The idea of an engagement between universities and society has been growing more than ever when the third mission has been recognised as a powerful driver of innovation within economic development. University third mission is focused on academic knowledge activities aimed to reinforce social, economic and cultural development. According to Howard and Sharma (2006), universities contribute to government and society, supporting not only with economic performance but also enhancing “quality of life and the effectiveness of public service” (p.3). In order to intensify the pressure in favour of university third mission, it is necessary to develop an entrepreneurial orientation so that universities influence innovation process, knowledge and economic growth. Generally, speaking the third mission is only referred to startups, scientific parks, incubators, offices of technological transfer and other structures, which promote innovation and knowledge at an economic level. There are many actors playing different roles in the achievement of the third mission. Therefore, it is not possible to consider as representative only these activities. The cooperation between academia and industries can be efficient only if all actors positively perceive, develop and drive their respective areas of responsibility and parts (Davey et al., 2011). According to Etzkowitz (2013), adopting a more entrepreneurial approach by university should be considered as a conduit of innovation and economic spillover on territorial growth. Therefore, EU offers its contribute in this direction, disseminating knowledge and becoming a driver for economic development. In this perspective, university should play a mediation role but it needs a new mandate and more incentives: only in this way, it is possible to build on collaborative research with all stakeholders for underpinning policies, practices and professional growth. Universities should open the barriers and link with companies, institutions and organizations, so creating a new way to communicate with them.

In our opinion, to reach this goal we should redesign university model starting from teaching. Unfortunately, in many countries, and even in Italy, there are different key barriers to realise this path: Third mission achievement

is often considered a threat to teaching and research. Furthermore, we had the possibility to verify that it is identified as research commercialisation, with a lower interest for education. All this creates a strong resistance to change. A balance could be found by developing different entrepreneurial activities, such as consulting, industry training courses, co-research, supporting a unified culture across the institutions (Philpott et al. 2011). Engaging all stakeholders (higher education institutions, academics, students, businesses, intermediaries and governmental organisations) involved in University-Business Cooperation (UBC) generates value, improves understanding of this cooperation, new solutions, new practises, common culture. Therefore, the aim for universities is to understand the importance of acting in synergy with other organizations, for development and innovation, and to increase performance. Particularly successful cooperation could be realised through relationships with governments and businesses (Triple Helix), recognising that the interaction is the ideal driver of knowledge-based economies (Etzkowitz & Leydesdorff, 1995).

UBC is considered as a connection point between academics, or more generally, higher education, and business, to reach mutual benefits. The lack of public funds, the need for businesses to gain and maintain their competitive advantage within international markets, the concern for university contribute to regional and national economic development, provide more relevant knowledge and skills, also connecting demands and offers of the labour market. UBC creates mutual benefits for all parties involved and, to society as a whole (Davey et al., 2011). Understanding cooperation means to recognise the importance of creating opportunities for people to meet and develop interesting relationships, in the right time and space; mutual trust and commitment; managing expectations when a collaboration begins; communicating with transparency and clearness; creating win-win negotiation; engaging academics through incentives; choosing which are the strategic partners according to one's own aims. Moreover, UBC performances are closely related to the development of an attitude or a mindset. Results are often led by intrinsic and psychological elements rather than predefined rules and schemes. As well, experience and background also represent factors that rely more on relational capabilities. Many academics remain inactive and do not recognize the benefits from UBC: they perceive it as an area outside their responsibility. There are, however, some isolated cases of people with a high degree of activity identifying benefits and seeking drivers to trigger the collaboration processes. In order to highlight the role of cooperation in the academic sphere, it is necessary to create a positive environment, to communicate advantages, to prefer better practices, to define the role of intermediaries and to establish a number of appropriate incentives.

In the second paragraph of this paper, we provide a literature review about EU to identify its characteristics, resources and activities. We aim to reach a better understanding of the critical issues that affect the third mission achievement. On one hand, we collect the indicators most frequently shared to define an EU model, and on the other hand we suggest how to enrich the existing models with a new perspective.

Successively, in the third paragraph, we explore entrepreneurship education, typically associated to the first mission, which influences strongly the development of entrepreneurial intentions (Diaz-Casero et al., 2017); therefore, the first mission is positively linked to third mission results. An entrepreneurial spirit should be stimulated in students as they start their university path. Third mission is often considered in a separate way, not linked to the other missions. Nevertheless, we are absolutely convinced that, as for the third mission, we will have positive results only if we renew the teaching way and build a strategic relationships system

In the fourth paragraph, we discuss how to contribute to the building of an EU. In this sense, starting from redesigning relationships among the players involved, renovating and strengthening them through the network creation are necessary steps to take. The network aims to fill the gap existing in literature about EU models: there are many features and tools identified, but it lacks a structured organization. Singularly, each partner was already existed before, but within a network, players redefine their identity and their role. At the same time, other stakeholders could become new hub or generate new ties. We propose an EU model where those new elements, generally undervalued, enter inside the network concerned, such as entrepreneurship courses for academics, curricular internship, entrepreneurship courses for students, and are supported by new tools, such as online university magazines and web-radios. We conclude pointing out the insights provided by this paper. Therefore, we highlight the importance of a business education prior to the creation of a company, and recognise that triggering a cooperative interaction needs an open mind approach, by both the academics and the stakeholders involved.

## **2. Entrepreneurial University: A Theoretical Background**

EU has not a common definition yet: it is a complex and abstract topic. The knowledge society has challenged the traditional concept of university based on several characteristics, such as: the social mission, traditional principles, independence of investigations and academic community (Olearnik and Pluta-Olearnik, 2015).

Universities progressively have assumed new missions, structures and strategies, giving birth to EU. Indeed, universities become more socially and economically relevant organizations (Nelles and Vorley, 2011), in which core activities and functions have undergone internal transformations and transitions to legitimize their role in the economy (Miller et al., 2014).

Several authors have tried to define EU but without consensus on the use of one specific definition, because in the knowledge economy it occurs at the boundaries of different scientific and professional fields (Urbano and Guerrero, 2013). The concept of the EU has developed in Europe at the end of the 20th century (see table 1). Clark (1996; 1998) underlined the transition of the university from the traditional culture, based on knowledge creation and scientific work, to the entrepreneurial culture. In this perspective, Etzkowitz et al. (2000) described the change of universities as an “evolution of ivory tower to entrepreneurial paradigm” (p.325). Such university has managerial and governance distinctiveness (Subotzky, 1999), and plays a key role in stimulating regional or national economic development, as university’s financial advantage (Etzkowitz et al., 2000; Cohen et al., 2002).

Further elements that characterize the idea of EU are the commercialization of research (Jacob et al., 2003) and the translation of knowledge produced within the university into economic and social utility (Etzkowitz, 2003). In fact, university acts as a provider of knowledge, supporting the transfer of researches’ discoveries to business world through valuable products and services (Mian et al., 2014). The EU plays an active role in fostering the creation of academic knowledge, enhancing the intellectual property resulting from the activities carried out by its faculties. EU has been conceptualized also in terms of an institution able to support new business activities via entrepreneurship education (Guenther and Wagner, 2008), to access to external sources of funding (Kirby et al., 2011), and to provide “entrepreneurship capital” (Audretsch, 2012).

Moreover, the evolution process of universities has gained significant attention in the recent literature that emphasizes the role of universities in capitalizing knowledge, organizing new entities and managing risks (Etzkowitz, 2013). Autio et al. (2014) define EUs as drivers of innovation and entrepreneurship activities. More concretely, university goes beyond the traditional focus on research and teaching and becomes a relevant asset for regional economic and social development, particularly because it generates knowledge as entrepreneurial opportunities (Guerrero et al., 2014). In this sense, governments mobilize university as a part of the strategy to stimulate regional economic performances (Cohen et al., 2002). According to Olearnik and Pluta-Olearnik (2015), universities have to comply with four entrepreneurship attributes of institutions: economic orientation, that refers to financial efficiency of the activities pursued; market orientation, as significant criterion for developmental decisions in market mechanism; innovative orientation, that is a core factor for institutions of higher education; and managerial orientation, related to business rules and management methods applied in enterprises.

Table 1. Definitions and main features of EU

DEFINITIONS AND FEATURES	AUTHORS
University that explores new ways of organizing knowledge and/or more effectively exploiting the fields in which it is already engaged	Clark, 1996
University based on organizational adaptation to environmental changes and new activities oriented to the development of entrepreneurial culture	Clark, 1998
University that undertakes entrepreneurial activities with the objective of improving regional or national economic performance	Etzkowitz, 2000
University characterized by the commercialization of research	Jacob et al., 2003
University that has the ability to generate a focused strategic direction, both in formulating academic goals and in translating knowledge into economic and social utility	Etzkowitz, 2003
University with direct mechanisms to support the transfer of technology from academia to industry as well as indirect mechanisms in support of new business activities via entrepreneurship education	Guenther and Wagner, 2008
University with new managerial ethos in governance, leadership, and planning, including greater faculty responsibility for accessing external sources of funding	Kirby et al., 2011
Universities that contribute both to the generation of knowledge (a traditional function) and to its transfer to the business world (a new function)	Mian, et al., 2012
University that contributes and provides leadership for the creation of entrepreneurial thinking and actions (“entrepreneurship capital”)	Audretsch, 2012

University that involves extension from ideas to practical activity, capitalizing knowledge, organizing new entities and managing risks	Etzkowitz, 2013
Universities that becomes driver of innovation and entrepreneurship activities	Autio et al., 2014
University that tries to provide a supportive environment, in which the university community can explore, evaluate and exploit ideas that could be transformed into social and economic entrepreneurial initiatives	Guerrero et al., 2014
University that pursues economic orientation, market orientation innovative orientation and managerial orientation	Olearnik and Pluta-Olearnik, 2015

Source: adapted by Schmitz et al., 2016.

Some studies (Kirby et al., 2011) have recognized key factors and actions that facilitate the development of the EU mode (see table 2). Universities need to select forms of entrepreneurial activity that can optimize the impact of university on economic development (Philpott et al., 2011). First of all, EU includes partnerships with industry (Etzkowitz, 2003; Kirby et al., 2011) and the creation of new ventures (Jacob et al. 2003; Etzkowitz, 2003; 2013). In fact, one important factor of the EU is related to the development of new spin-offs, which are company based on university research (Shane, 2004; Lockett et al., 2005). They represent a window of socioeconomic contributions to the region (Guerrero et al., 2015; 2016). Some authors point out the role of patenting and licensing, in order to enable the securing of intellectual property rights on discoveries and allow regional prosperity (Grimaldi et al., 2011; Trippel et al., 2014). These activities are generally perceived as tangible outputs of mature entrepreneurial universities (Klofsten and Jones-Evans, 2000; Rasmussen et al., 2006). Moreover, universities have greatly increased their emphasis on technology transfer activities through science parks and business incubators (O'Shea et al., 2005; Grimaldi et al., 2011). These latter are equipped areas with laboratory and office equipment that support spin-offs in their startup phase. Additionally, universities often include industrial liaison offices and technology transfer offices (TTOs), which perform university formal functions in managing the interface between academia and various industries, governments, and other research organizations (Fassin, 2000; Perkmann et al., 2013). Other important sources for the university contributions to the economic growth are knowledge networks industries and training courses, which can include executive education (Huggins and Kitagawa, 2012; Guerrero et al., 2015). Moreover, Cohen et al. (2002) show the relevance of softer channels through which universities can transfer their knowledge to industry, such as publications, contract research with industry and consulting. The latter refers to the selling of academic expertise to external organizations to solve practical problems (Philpott et al., 2011).

Table 2. Main tolls and activities of EU

TOLLS AND ACTIVITIES	AUTHORS
Spin-off and startups	Shane, 2004; O'Shea et al., 2005; Lockett et al., 2005
Patents and licenses	Klofsten and Jones Evans, 2000; Cohen et al., 2002
Science/technology parks and business incubators	O'Shea et al., 2005; Grimaldi et al., 2011
Liaison offices and TTO	Fassin, 2000; Perkmann et al., 2013
Knowledge networks and training	Huggins and Kitagawa, 2012; Guerrero et al., 2015
Publications, contract research and consulting	Klofsten and Jones Evans, 2000; Cohen et al., 2000; Lockett et al., 2005

Source: adapted to Philpott et al., 2011.

The tolls and the activities of EU are crucial in the development of economic and human capital (Mason and Brown, 2014), related to the stock of knowledge, abilities and skills. In this perspective, university becomes a strategic actor in producing and disseminating innovations (Etzkowitz et al., 2000; Etzkowitz, 2003; Autio et al., 2014) that have the potential to be put to commercial use. In fact, universities are usually discussed by policy makers and academics as key elements in innovation systems (Clark, 1996), as they can not only produce good ideas but enable innovations, to be applied by creating an effective exploitation of knowledge.

In this scenario, Etzkowitz and Leydesdorff (1995) proposed that the three major parties in new environment of

innovation are industry (economy), universities (higher education) and public control (government), which collaborate with each other in order to create new technology, products and services. The common objective is to realize tri-lateral initiatives for the economic development: strategic alliances with company in marketing product and process, government laboratories and academic research groups. Thus, the Triple Helix thesis in the “core model” for innovation states that the university can play a leading role in knowledge-based societies (Etzkowitz, 2003; Leydesdorff and Meyer, 2006). In this context, government is an active actor in formulating policies, offering incentives and pressing academic institutions to go beyond the performance of the traditional research functions and make a more direct contribution to “wealth creation”. Since the Triple Helix model is not a sufficient condition for long term growth, Carayannis and Campbell (2009) suggested a Quadruple Helix, related to the “media-based and culture-based public”, as well as to the “civil society” (Colapinto & Porlezza, 2012). This fourth helix, associates with “creative industries”, “culture”, “values”, “life styles” and “art”, underlines the relevant role of public into advanced innovation systems, as it takes part in the knowledge creation process (Carayannis & Campbell, 2009). The interaction between industry, academia, government and civil society is, in fact, a requirement for sustainable growth. Moreover, unlike the Triple Helix, the Quadruple Helix is more explicit in pointing out that the existence of a democracy is necessary for knowledge production and innovation. In fact, the fourth helix is “human-centered”, rather than “institution-oriented”, and represents the perspective of the “dimension of democracy”, emphasizing the contribution of people inside an innovation system. Thus, within the context of knowledge-based society, the EU is seen by scholars and business community as a well-articulated concept (Goldstein, 2010), in which the collaboration between university and external stakeholders is widely emphasized. However, there is a need to continue analyzing theoretically and empirically the relationship also with internal stakeholders, who are key actors to understanding the success of university initiatives.

About Italian literature, Napolitano and Riviezzo (2017) discuss about Entrepreneurial Orientation of departments in the university, comparing Italian and Spanish contexts. They evaluate the relation between departments’ entrepreneurial orientation and performance, strictly linked to the ability to create spin-off and patents. Particularly, their study shows that the context conditions influence the performance by universities. Some indicators are the same used in other countries: they could define an EU in Canada, but they do not correspond to the needs of the legal, economic and policy context of Latin countries, such as Italy and Spain, whose universities present a similar approach. In addition, the authors recognised the need of refining and understanding which elements are fundamental to define EU: particularly, policy-makers should promote a more active role of knowledge transfer to industries. Also, Carbone and Orazi (2017) debate the possibility to encourage the transfer of knowledge between businesses, universities and governments with a particular reference to contexts and environmental conditions. While designing an ideal best way to conduct university towards a more entrepreneurial approach, they list some factors stimulating the third mission development, which are: number of spin-offs, scientific parks, incubators and startup accelerators; universities networks; entrepreneurship workshops for industrial innovation; presence of professional communities and innovative entrepreneurial networks; startups and spin-off with humanistic vocation; investments in R&S; investments dedicated to the third mission. Piazza (2015) focuses on the meaning assigned to entrepreneurship education, trying to define the most important initiatives focused on the acquisition of those skills required by young people to develop creativity and to face the constant change in the work world. This concerns the development of skills not only inside universities, but also in other contexts, such as business schools.

Finally, we can note that EU concept is not yet recognized in the Italian literature, and above all, that no satisfactory solutions have been proposed to the development of entrepreneurial skills. In Italy, there are many initiatives to facilitate startup creation, incentive programs for entrepreneurship and many courses to provide specific skills: unfortunately, universities are not enough competent and organized as for business cooperation, and there is still no awareness of the benefits that could derive from this interaction. Initiatives are disconnected and unrecognized: they are not part of a unique ecosystem.

### **3. Entrepreneurial Orientation: Incentives and Barriers**

Considering factors and activities that facilitate the cooperation between university and industry, we might pay attention to internship. Nowadays, at a theoretical level, curricular internships are undervalued as an indicator of EU, but they are worldwide promoted as part of EU educational programmes. Paying attention to internships, on both levels, could contribute to achieve the third mission. Internship is a bridge between academic and business world: it is the first positive indicator about students’ mobility, catalysing changes within and between university industry collaboration. Internships work as an accelerator when policies and professional growth are too slow to face the needs of a dynamic environment. Unfortunately, data about curricular internships in Italy show a lack of

interest, while European institutions are investing in internships; this work-based learning experience is held even in great consideration all over the world. Undergraduates carry on more than two internships. Moreover, in della Volpe et al. (2016), the literature examined highlighted how students with more internships are placed easier than the others. In addition, practical activities by students can inform policy and professional development quickly, becoming a channel for collaborative change. Students' mobility is a right way to realise knowledge exchange between two different players: when students start their internship, they transfer their knowledge to companies or institutions, together with their innovative point of view in the meanwhile they are learning from the practise. At the opposite, when they finish the internship, they transfer their new knowledge and capabilities to the academic context. In this case, university has to be able to dialogue, listen and receive new inputs from students (della Volpe & Esposito, 2016).

WISE and Gallup (2015) highlighted as education for work is a fundamental issue: "twice as many say that success in the workplace relies more on obtaining job-related knowledge and skills than on earning a well-respected degree, 67% vs. 30%. And, by more than six-to-one - 80% vs. 13% - WISE experts say they would rather hire a B- student with a relevant internship than an A+ student with no such experience" (p.26). Moreover, some students could be managers in the future; this is the very reason why university should attract undergraduate students, so that when graduated and placed, they will come back to university for research, projects, lifelong learning, to share resources with businesses or to support industries with sponsorships. In order to achieve all this, mutual trust, shared goals, flexibility and a common dialogue language are crucial elements, together with the need to overcome all different players' visions: the commercial orientation by university and the scientific orientation by business world. Increasing mobility between university and industries may concern not only students, as it undertakes a fundamental role in the academic and staff training and managers upgrading. Actually, it could be configured as a temporary mobility.

So far, we highlighted some factors, which influence the ability to develop university-business cooperation and a path toward EU. We will go deeper into facilitator factors and barriers, particularly looking at the Italian ecosystem (see table 3). In many countries, there is a great attention to soft skills development. For instance, the report *Managing Skills Challenges in ASEAN-5* (Tan and Tang, 2016) provides insights and recommendations on how the ASEAN-5 countries can respond to skills challenges affecting their economies. As this report shows, workforce is insufficiently skilled, particularly referring to soft skills such as communication, problem solving, and teamwork. For companies, it is not sufficient to address teaching and learning only on the base of prefixed models: without the proper considerations of all important variables, workforce skills would be lacking and fragmented with respect to environmental changes. This is the reason why entrepreneurship education can contribute to develop individuals' appropriate skills, transferring them a mindset suitable to deal with very modern issues, characterized by uncertainty and ambiguity, where the pre-established schemes are not applicable to solve problems.

Table 3. Obstacles and incentives for university industry cooperation

OBSTACLES	INCENTIVES
▪ absence of interdisciplinarity	▪ academic training
▪ absence of a shared culture	▪ future job prospects of students
▪ scientific/commercial orientation	▪ interest in scientific research by industry
▪ resistance to change	▪ interest in commercial activities by university
▪ lack awareness of opportunities from cooperation	▪ shared goals
▪ difficulty in finding the right partner to collaborate	▪ staff, academics and student's mobility
▪ lack of business/university/government funds	▪ to improve a good communication of university/industry
▪ bureaucracy	▪ to enhance reputation of university/industry
▪ conflicts with teaching and research commitment	▪ to improve students' skills
▪ lack of skills and training	▪ national strategic guidelines and policies
	▪ to improve access to technology/know-how/capacity

Source: Author's elaboration

To support university-business interaction, the actions to take are: internship, lifelong learning, commercialization of research results (licencing, patenting, joint funded research, startup, spin-off), insertion of academics on business boards and, on the opposite, insertion of business people in university boards, to train intermediate figures, to promote industries engagement programs. The role of intermediate human resources is

crucial: they have to be not only academics, businesspersons or governors. Every intermediate linked to university should have had experiences in industry from a minimum of two to a maximum of ten years. As for finding places and people to collaborate with, as for intermediate people, we suggest to use Web 2.0 tools, as online platforms and social networks; also, technical meeting with academics, or traditional individual conversations, can be appropriate.

#### 4. Enhancing Interaction with Network Model

As certified by the literature, universities become more socially and economically relevant organizations (Nelles and Vorley, 2011). The third mission considers university as involved in a complex context composed by economic, policy and social dynamics, based on top down macroeconomic models and assumptions. Nowadays, university ecosystem involves institutions and industries, typically recognized in the model of the Triple Helix by Etzkowitz, but our assumption is that it also involves a fourth helix: the civil society, represented by culture, arts, values and life-style in a human-centered perspective. This perspective determines the consideration of a range of activities that can foster interactions between university, business, institution and society. It is not sufficient to confine these activities strictly to the commercialization of research results and to knowledge transfer; they require an active role into social development, institutional policy processing and economic growth, from medium to long term. Each university plays a key role in stimulating regional or national economic development, including university financial advantages. Therefore, thinking about an EU model, we cannot take into account several external and context factors. A contribution in the cultural and social dimension by university implies the involvement of numerous social and economic actors: to facilitate the interaction among them, it is necessary to carry out multiple activities supported by useful tools. The network approach is made up of subjects or organizations that can influence the institution performances, directly or indirectly. In the current social, political and economic scenario, no partaker can do without interacting with all the others. Actually, all organizations are embedded in a system characterized by the presence of relationships based on collaboration and also competition. It needs aggregations: organizations are, more than even, interdependent, and their success, or sometimes even their simple survival, depends heavily on the actions of the other players. (Daft, 2004).

Therefore, relationships represent a constituent element of organizational structures: they have the task of managing complexity and turn it into opportunities for growth and innovation. More than others, entrepreneurship and innovation find space in a free interconnection and in mutual influences. University and businesses should work together to encourage the triggering of these processes. Before doing this, they need to learn how to cooperate, sharing interests, capabilities, resources, and how to realize synergies.

In particular, the opportunities given by social networks offer an economic, ubiquitous and massive tool to university to communicate with its players' ecosystem. Moreover, it generates many chances to support different functions in organizational activities (Sánchez & Sánchez, 2017). Communication possibilities, based on social network, facilitate collaborative work in a wider and complex environment such as EU.

In this paper, we explored the network concept in literature. According to a first general understanding, the concept has been used with reference to very different occurrences, from biology to neuroscience, and from computer science to business theories: for example, in strategic alliances, divergence, productive decentralization of activities, and so on.

As Newman (2003) states, "a network is a set of items, which we will call vertices or sometimes nodes, with connections between them, called edges" (p. 168). Creating and developing good lines of communications, in all directions, is as important as maintaining connections: if they are operating and well-preserved, they become durable. Hubs grow and decrease continuously; according to the needs of individuals, ties are intensified and depopulated. Interconnections should be based on trust and reciprocity, otherwise on interdependency (Van Dijken et al., 2012).

Thus, network is a non-hierarchical social system and constitutes the basic social form that permits an inter-organisational coalition to develop (Carley and Christie, 2000). More than ever, network studies are emergent phenomena in many fields: organisations and institutions begin to embrace a collaborative process, engage in decision making other subjects and begin to act as a unique entity. According to Milward and Provan (2003) when this occurs, a network has built. These authors also discuss an inter-organisational form, referring to that as a coalition, a strategic alliance, a consortium or a partnership. For Ashman (2003), an effective network model is based on creation of mutual trust. Furthermore, it is important to employ methodologies that add value to all members, allowing participants to set goals for themselves, not taking away from the responsibilities given by participation in the social community. The value of leadership is also mentioned: it is necessary both within the network and within the own organization. Ashman (2003) argues that effective networks are managed in

ways that the control is shared and management co-ordinates activities, so that all members are represented and have influence.

Besides, Zee and Engel (2004) identified the three main characteristics among participants of a successful network. Firstly, their ability to share, in terms of attitude and disposition: network members should be open, disposed and able to learn from each other. Second characteristic concerns their ability to contribute, in terms of skills, access to ICT facilities and financial resources, preventing the marginalisation of certain groups. Finally, the third characteristic is the commitment to networking.

In this perspective of mutual gain and trust, of relationships commitment and knowledge sharing, we propose to design the EU ecosystem as a network where we identify the players involved, the activities performed and the tools used.

Taschereau and Bolger (2007), provide a categorization of different network forms: networking, informal networks and networks with some formal elements, institutionalised networks and inter-organizational partnership (p.23). Particularly, the characteristics identified, regarding inter-organizational partnership, are:

*Form of organising.* Contractual relationships, agreements and accountabilities where the main drivers are projects and delivering on results.

*Capacity and benefit.* Capacity to address local, regional and global policies or to integrate service delivery, requiring collaboration among different stakeholder groups and organisations.

*Potential challenges and limitations.* Fostering and maintaining trust, combined ownership and collaboration. Possible competition and conflict among players holding power and players accessing to resources can lead to disengagement of key actors, loss of key capabilities and legitimacy.

We could recognize in inter-organizational partnership form, the one that more than others, fits our ideal EU network model. Foregoing, from our point of view a network model represents the right and flexible approach to enhance UBC, which is a network in which everyone grabs the opportunity to interact with everyone else. Working in a network perspective can produce more innovations and enjoy better performance, providing access to resources and knowledge developed by participants.

Scott (2017), quoting Putnam (2000) considers social networks as particular forms of social capital, in which individuals can interact taking advantages and opportunities (p. 7). Moreover, Latour (2005) intends the social network composed by humans or group of individuals: according with his theory, actors are constituted by their relationships with material objects, other individuals, cultural values and environment. That is just what occurs to EU: to pursue his missions, interacts with numerous actors, through different ways and heterogeneous initiatives or activities. The social ecosystem whose university belongs is very complex and every university has to choose its strategy: players, activities and tools to bet on. For this reason, we try to outline the network created identifying all subjects and objects involved. We identify a set of players, tools, activities within them every university build its strategy: every country, every context, every university has its own network.

Particularly, we refer to Italy: our viewpoint starts from considering Italian universities and their environment. In table 4, we firstly list players, some major activities and some tools. Then, we collect and encase them in different clusters: players cluster, tools and resources cluster, activities cluster. In addition, to achieve a better understanding, we categorized in a sub-cluster players belonging to academic, industry and government area. Every cluster could be further enriched with new entities, if we consider that each university can choose to intertwine suitable relationships to its specific aims.

Within a network, creating ties can renew, reinforce and modify interaction ways between actors. The network redefines actors' identity, on the base of their limits and potential. Each university could build its own network, identifying and involving entities suitable to its history, culture, environment, according to the nature of universities, from those of liberal arts to scientific ones. The network approach and the literature about EU have provided new insights into cooperation between university and industries, case by case based on the creation of concrete values. This model can be iterated and personalised: by means of some adjustments to any and each different context, we may obtain a dynamic, unlocked, and flexible approach.

In a previous study (della Volpe & Esposito, 2017), we verify how relationships between players have a positive impact on UBC. Starting from an innovative tool such as university web-radio, a new communication way to strengthen relationships was experienced useful to improve industries, institutions and academic interaction. It was a case: that kind of strategy allowed to obtain more agreements and partnerships between university and companies for internship students.



Table 4. Players, tools and activities clusters

PLAYERS CLUSTER	TOOLS AND RESOURCES CLUSTER	ACTIVITIES CLUSTER
<b>ACADEMIC</b>		
Academics	Magazine online	Teaching
Undergraduate Students	University web-radio	Research
Graduate students	Info point	Policies processing
Researchers	Traditional media	National strategy
Intermediates	Social networks	Internships
Office of technological transfer	Expert Consultations	Startup
Administrative staff	Public funds	Spin off
Public incubators	Private funds	Patents and licensing
<b>INDUSTRY</b>		
Top Management	National incentive programs	Technological Parks
Entrepreneurs		Communication
SMEs		Reputation Management
R&D department		Training for academics and businesses
Intermediates		Mentorship and coaching programs
Employees		Lifelong learning
Venture capitalists		Company visits
Private incubators		Events and conferences
Business Angels		
<b>GOVERNMENT</b>		
Governors		
European governors		
Policy-makers		
Intermediates		
Association		
No profit organizations		
Culture e social life		
Citizens		
Local and regional administrations		

Source: Author's elaboration.

Academic, industry and government clusters refer to the players involved inside cooperation. These players communicate among them through several traditional or innovative tools and resources. By means of interaction, players complete different activities finalised to achieve the aims engendered by cooperation challenges. These aims are shared culture, skilled students, interdisciplinarity, streamlined bureaucracy, integration among the three university missions, finding out proper partners, student placement, mobility, good reputation, knowledge access and transfer, focus on technology and innovation.

For instance, a student does his/her internship in a company and has the opportunity to discuss about his/her experience at a university web-radio, involving managers whom he is working with. Through internship and other activities typically belonging to web-radio daily programs, students and industry have the great opportunity to collaborate in a creative way. Successively, university and company could take a chance to work together, for example, carrying out a new project, sharing knowledge and practises, creating new ties with other players, sharing their schedules. At this point, they could involve other players, such as some teachers, or another company, to sustain their common aims, using new tools, such as an online magazine, to describe and discuss their project. These tools could enhance new activities among students, as for example the realisation of video interviews, or the collection of scientific papers dealing with analogous topics. Online magazine users would enjoy to be involved in a new path, and they could submit some innovative ideas. In Figure 1, we report the possibility that a network model offers to lower the barriers among different players, by introducing innovative interaction tools and activities.

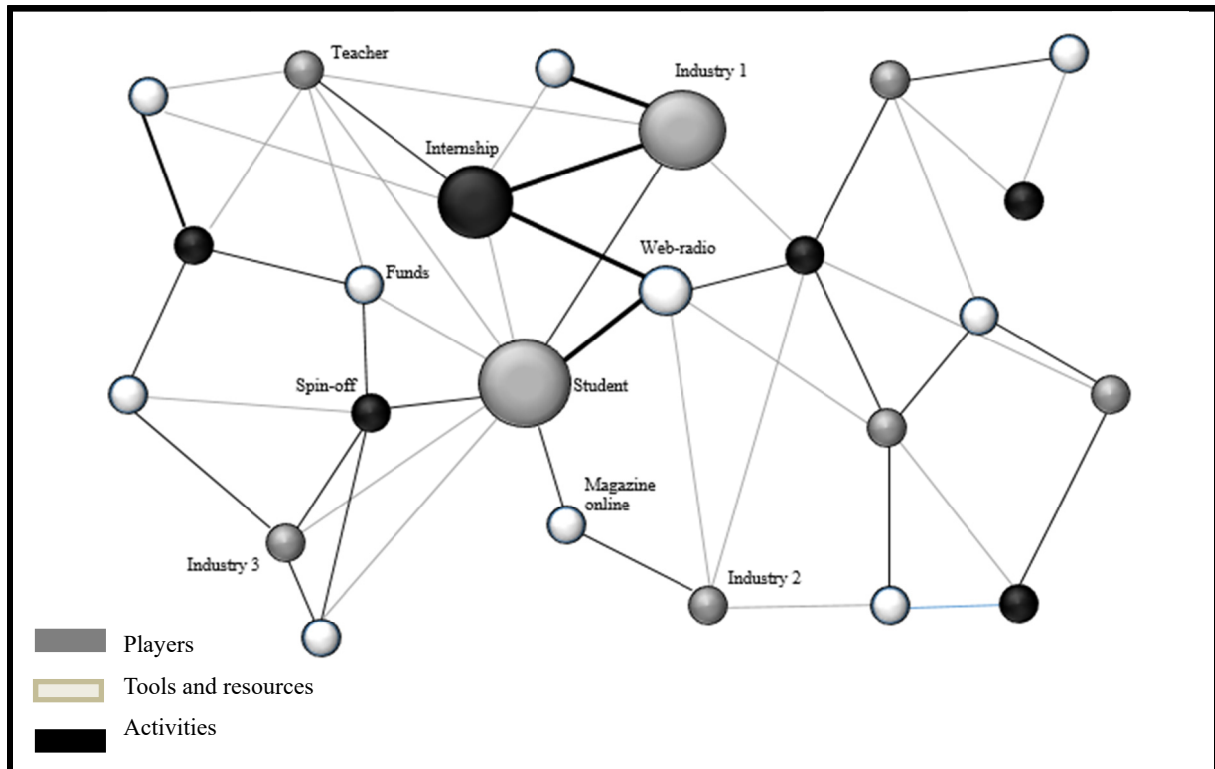


Figure 1. EU Network Model (source: author's elaboration)

## 5. Implications and Conclusions

This study wants to be a contribution to the debate on EU, and to provide a number of valuable insights, which come from a theoretical and managerial point of view. Nowadays, it is no longer possible to imagine university as an isolated subject: it needs to communicate with other organizations and with society in general. Unfortunately, it is not sufficient to break the barriers at the entrance and exit: on the contrary, it is necessary to guide collaborative projects through effective strategies, acting on the mindset of academics, and promoting the development of entrepreneurial skills within students. These skills do not relate to the acquisition of hard knowledge during the course of studies, and are not simply related to business creation. Relational skills, organizational capabilities, problem solving, and teamwork, drive and promote relational processes, helping to strengthen students' personality by making their life projects more confident.

Recognising the importance of intuitive thinking, we need to explore in business education, by means of design thinking, creativity and innovation, using the world of action and experiences, and supporting our action with originality and invention. We should accept to size dimensions in a more indirect way, paying attention to insights and creativity.

For this reason, EU approach should be founded on renewing entrepreneurial learning environments. Education plays a great role in the collaborative process: focusing on students, universities can foster skills and capacities suitable to industry needs, to build innovative, unexpected and creative paths. An ideal model of EU includes the instillation, promotion and practicing of collaboration inside all university activities. Moreover, it is necessary to highlight the role of interdisciplinarity contributes to realize a focus on personal and social skills. Other issues include an integration of an entrepreneurial mindset inside university plans, decision-making structures and evaluative measures, integrating them inside research, and more specifically within university teaching components. There is a need for university members, such as professors, students and administration staff, to create a space for focusing on the value of collaboration with their neighbouring milieu. Triggering a cooperative interaction is possible only with open-minded academics, and using an approach founded on an entrepreneurial mindset, in order to commit to collaborative research or to undertake business experiences, balancing knowledge in a renewed framework. However, nowadays only few academics play a decisive role in this process of renewing, both for a lack of trust, and for the excessive complexity of bureaucracy.

The role of intermediaries in Italian universities is poorly acknowledged, yet they are crucial to the interaction

process, as they are able to identify relationships that can produce positive results at a specific time. The intermediaries needed are those who comprehend both the academic and the business world, at a technical and organizational level and, most of all, at a cultural level, being able to communicate effectively and with full transparency.

Therefore, placing students at the core of cooperation entails taking care of their mobility, internships, work-based programmes, coordinating education and training to lead a quickly employment, and a lifelong learning. This type of education should aim to shape students as entrepreneurs of themselves, developing an entrepreneurial mindset so that they can manage their life project according to their expectations and goals, being aware of the context in which they operate, in order to well identify and grasp opportunities. All kind of students need to have initiative spirit, not only to those who will like to convey ideas into action, starting a business. Every working individuals must be endowed with the ability to plan and organise, in order to achieve their aims; to work in teams and individually; to identify strengths and weaknesses inside processes, people, projects; to manage at best their own goals, with determination and motivation, designing with passion and releasing their own creative energy.

Benefits from collaboration are not experienced in a short timeframe, but in a medium to long term. To overcome barriers against cooperation, it is necessary to train academics to change their culture about companies, building a stable environment where good relationships offer opportunity for strategic partnership. Moreover, it is crucial to reach an institutionalisation of this collaboration within the organisational culture, involving human resources at different levels and in different roles.

In our study, we have proposed a network model for the EU, with the aim to overcome some of the critical issues university is facing today. First, a network does not have a hierarchical structure, and the number of its connections can be unlimited. Not only the scientific nature of the university, but also the culture and historical moment it crosses can help in creating its reference environment, selecting the organizations with which it wants to get in touch, identifying the activities it wants to undertake and the communication ways it will go through.. The network model is flexible and repeatable in different contexts. Each country should recognize and create its ecosystem, in a way to make it compatible with other ecosystems of different countries.

The network model has not yet been proposed and considered in the EU literature, while the value of collaboration and interaction with organizations belonging to its ecosystem is strongly recognized. In practice, some countries, such as the US, Canada, and Singapore, show some flexion to this model and get excellent results. They pay close attention to education and exploit the role of intermediaries to cure relationships with the environment.

Furthermore, UBC cannot be measured only through the increasing of number of patents, licenses, startups and spin-offs: we need also to add some indirect indicators referred to intangible elements, such as the intensity of connections and student skill improvements. We are aware that it is very difficult to measure a process in this way: cooperation is not easy to capture. But if it is the only path to create new value in an area - city, region or country - then we can try to overcome a vision based only on rigorous, quantitative analysis, often sustained by Decision Support Systems, deductive or inductive reasoning, to declare certainties, theoretical and methodological tools.

In future studies, we will explore further EU themes, paying particular attention to teaching and business relationships. It is necessary to better understanding the benefits that may come from the adoption of a more entrepreneurial approach, to increase the awareness of those academics who, as stated elsewhere, do not recognize the advantages and opportunities of an EU model.

This study is only an attempt to explore the complex relationships' system between university and society. To obtain a clearer frame, we should involve in future studies every stakeholder in order to measure common goals within network and knowledge exchanges among players. In the same way, it could be explored relationships' quality. Moreover, we observe that it's easier measure network impact when web 2.0 tools are used: they generate a multitude of data that could help academics and organizations to analyze their environment, and to take decisions thanks to their support. Finally, we like remember that, through Web 2.0, players interact in a freeway, easily, remotely, and perhaps with a creative approach. Surely, Social Network Analysis can contribute to identify and measure network: identifying location, grouping players, monitoring system and evaluating those results, which could support decisions and initiatives, in a future perspective. But we have to remember that every measure is a picture in a specific moment, because every network is dynamic: it changes continuously.

## References

- Ashman, D. (2003). *Towards More Effective Collaboration in NGO Networks for Social Development: Lessons Learned from the NGO Network for Health Project and a framework for Planning, Monitoring and Evaluation*. Unpublished report for NGO Networks for Health.
- Audretsch, D. (2012). Entrepreneurship research. *Management Decision*, 50(5), 755-764. <https://doi.org/10.1108/00251741211227384>
- Autio, E., Kenney, M., Mustar, P., Siegel, D., & Wright, M. (2014). Entrepreneurial innovation: The importance of context. *Research Policy*, 43(7), 1097-1108. <https://doi.org/10.1016/j.respol.2014.01.015>
- Carayannis, E. G., & Campbell, D. F. (2009). 'Mode 3' and 'Quadruple Helix': toward a 21st century fractal innovation ecosystem. *International Journal of Technology Management*, 46(3-4), 201-234. <https://doi.org/10.1504/IJTM.2009.023374>
- Carley, M., & Christie, I. (2000). *Managing sustainable development*. Earthscan: United Kingdom.
- Clark, B. R. (1996). Substantive growth and innovative organization: New categories for higher education research. *Higher Education*, 32(4), 417-430. <https://doi.org/10.1007/BF00133256>
- Clark, B. R. (1998). *Creating entrepreneurial universities: organizational pathways of transformation*. Issues in Higher Education. Elsevier Science Regional Sales, 665 Avenue of the Americas, New York, NY 10010.
- Cohen, W. M., Nelson, R. R., & Walsh, J. P. (2002). Links and impacts: the influence of public research on industrial R&D. *Management Science*, 48(1), 1-23. <https://doi.org/10.1287/mnsc.48.1.1.14273>
- Colapinto, C., & Porlezza, C. (2012). Innovation in creative industries: from the quadruple helix model to the systems theory. *Journal of the Knowledge Economy*, 3(4), 343-353. <https://doi.org/10.1007/s13132-011-0051-x>
- Cubico, S., Bortolani, E., Favretto, G., & Sartori, R. (2010). Describing the entrepreneurial profile: the entrepreneurial aptitude test (TAI). *International Journal of Entrepreneurship and Small Business*, 11(4), 424-435. <https://doi.org/10.1504/IJESB.2010.036295>
- Daft, R. L. (2004). *Organizzazione aziendale*. Apogeo Editore.
- Davey, T., Baaken, T., Galan Muros, V., & Meerman, A. (2011). The State of European University-Business Cooperation. Part of the DG Education and Culture Study on the cooperation between higher education institutions and public and private organisations in Europe.
- della Volpe, M., & Esposito, F. (2016). Curricular Internships as Entrepreneurial University Indicators. Evidence from Italian Courses of Study. *Academic Proceedings of the 2016 University-Industry Interaction Conference: Challenges and Solutions for Fostering Entrepreneurial Universities and Collaborative Innovation*, Amsterdam, The Netherlands June 1-3, 2016, 373-386.
- della Volpe, M., & Esposito, F. (2017). Universities Web-Radio: A Web-Based Tool to Improve Industries, Institutions and Academic Interaction. *Practitioners Proceedings of the 2017 University-Industry Interaction Conference: Challenges and Solutions for Fostering Entrepreneurial Universities and Collaborative Innovation*, Dublin, Ireland June 7-9, 2017, 14-26.
- della Volpe, M., Siano, A., Vollerero, A., & Esposito, F. (2016). Exploring Curricular Internships in Italy: Towards Entrepreneurial Universities. *International Business Research*, 9(9), 150. <https://doi.org/10.5539/ibr.v9n9p150>
- Díaz-Casero, J. C., Fernández-Portillo, A., Sánchez-Escobedo, M. C., & Hernández-Mogollón, R. (2017). The Influence of University Context on Entrepreneurial Intentions. In *Entrepreneurial Universities* (pp. 65-81). Springer International Publishing. [https://doi.org/10.1007/978-3-319-47949-1\\_5](https://doi.org/10.1007/978-3-319-47949-1_5)
- Etzkowitz, H. (2013). *Can a teaching university be an entrepreneurial university? Civic entrepreneurship and the formation of a cultural cluster in Ashland, Oregon*. Published on Birkbeck Centre for Innovation Management Research web site, pp. 1-35.
- Etzkowitz, H., & Leydesdorff, L. (1995). The Triple Helix--University-industry-government relations: A laboratory for knowledge based economic development. In *EASST Review*, 1, 14, 14-19. <https://doi.org/10.1.1.302.3991>
- Etzkowitz, H., Webster, A., Gebhardt, C., & Terra, B. R. C. (2000). The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm. *Research Policy*, 29(2),

- 313-330. [https://doi.org/10.1016/S0048-7333\(99\)00069-4](https://doi.org/10.1016/S0048-7333(99)00069-4)
- Fassin Y. (2000). The strategic role of university-industry liaison offices. *Journal of Research Administration*, 1(2), 31.
- Goldstein, H. A. (2010). The 'entrepreneurial turn' and regional economic development mission of universities. *The Annals of Regional Science*, 44(1), 83-109. <https://doi.org/10.1007/s00168-008-0241-z>
- Grimaldi, R., Kenney, M., Siegel, D. S., & Wright, M. (2011). 30 years after Bayh–Dole: Reassessing academic entrepreneurship. *Research Policy*, 40(8), 1045-1057. <https://doi.org/10.1016/j.respol.2011.04.005>
- Guenther, J., & Wagner, K. (2008). Getting out of the ivory tower—new perspectives on the entrepreneurial university, *European Journal of International Management*, 2(4), 400-417. <https://doi.org/10.1504/EJIM.2008.021245>
- Guerrero, M., Cunningham, J. A., & Urbano, D. (2015). Economic impact of entrepreneurial universities' activities: An exploratory study of the United Kingdom. *Research Policy*, 44(3), 748-764. <https://doi.org/10.1016/j.respol.2014.10.008>
- Guerrero, M., Urbano D., Cunningham J. A. & Organ, D. (2014). Entrepreneurial universities in two European regions: A case study comparison. *The Journal of technology Transfer*, 39(3), 415-434. <https://doi.org/10.1007/s10961-012-9287-2>
- Guerrero, M., Urbano, D., & Fayolle, A. (2016). Entrepreneurial activity and regional competitiveness: evidence from European entrepreneurial universities. *The Journal of Technology Transfer*, 41(1), 105-131. <https://doi.org/10.1007/s10961-014-9377-4>
- Howard, J., & Sharma, A. (2006). Universities' third mission: Communities engagement. *B-Hert Position Paper*, 11. Retrieved from <http://www.bhert.com/publications/position-papers/B-HERTPositionPaper11.pdf>
- Huggins, R., & Kitagawa, F. (2012). Regional policy and university knowledge transfer: perspectives from devolved regions in the UK. *Regional Studies*, 46(6), 817-832. <https://doi.org/10.1080/00343404.2011.583913>
- Jacob, M., Lundqvist, M., & Hellsmark, H. (2003). Entrepreneurial transformations in the Swedish University system: the case of Chalmers University of Technology. *Research Policy*, 32(9), 1555-1568. [https://doi.org/10.1016/S0048-7333\(03\)00024-6](https://doi.org/10.1016/S0048-7333(03)00024-6)
- Kirby, D. A., Guerrero, M., & Urbano, D. (2011). Making universities more entrepreneurial: Development of a model. *Canadian Journal of Administrative Sciences, Revue Canadienne des Sciences de l'Administration*, 28(3), 302-316. <https://doi.org/10.1002/cjas.220>
- Klofsten, M., & Jones-Evans, D. (2000). Comparing academic entrepreneurship in Europe—the case of Sweden and Ireland. *Small Business Economics*, 14(4), 299-309. <https://doi.org/10.1023/A:1008184601282>
- Latour, B. (2005). *Reassembling the social: An introduction to actor-network-theory*. Oxford university press.
- Leydesdorff, L. (2013). Triple Helix of university-industry-government relations. In *Encyclopedia of Creativity, Invention, Innovation and Entrepreneurship* (pp. 1844-1851). Springer New York.
- Leydesdorff, L., & Meyer, M. (2006). Triple Helix indicators of knowledge-based innovation systems: Introduction to the special issue. *Research policy*, 35(10), 1441-1449. <https://doi.org/10.1016/j.respol.2006.09.016>
- Lockett, A., Siegel, D., Wright, M., & Ensley, M. D. (2005). The creation of spin-off firms at public research institutions: Managerial and policy implications. *Research policy*, 34(7), 981-993. <https://doi.org/10.1016/j.respol.2005.05.010>
- Mason, C., & Brown, R. (2014). Entrepreneurial ecosystems and growth oriented entrepreneurship. *Final Report to OECD*, Paris, 30(1), 77-102. Retrieved from <http://www.oecd.org/cfe/leed/entrepreneurial-ecosystems.pdf>
- Miller, K., McAdam, M., & McAdam, R. (2014). The changing university business model: A stakeholder perspective. *R&D Management*, 44(3), 265-287. <https://doi.org/10.1111/radm.12064>
- Nelles, J., & Vorley, T. (2011). Entrepreneurial architecture: A blueprint for entrepreneurial universities. *Canadian Journal of Administrative Sciences, Revue Canadienne des Sciences de l'Administration*, 28(3), 341-353. <https://doi.org/10.1002/cjas.186>
- Newman, M. E. (2003). The structure and function of complex networks. *SIAM review*, 45(2), 167-256.

<https://doi.org/10.1137/S003614450342480>

- Olearnik, J., & Pluta-Olearnik, M. (2015). Entrepreneurial university—from ideas to reality. *Optimum. Studia Ekonomiczne*, 5 (77). <https://doi.org/10.15290/ose.2015.05.77.01>
- O'shea, R. P., Allen, T. J., Chevalier, A., & Roche, F. (2005). Entrepreneurial orientation, technology transfer and spinoff performance of US universities. *Research policy*, 34(7), 994-1009. <https://doi.org/10.1016/j.respol.2005.05.011>
- Perkmann, M., Tartari, V., McKelvey, M., Autio, E., Broström, A., D'Este, P. & Krabel, S. (2013). Academic engagement and commercialisation: A review of the literature on university–industry relations. *Research policy*, 42(2), 423-442.
- Philpott, K., Dooley, L., O'Reilly, C., & Lupton, G. (2011). The entrepreneurial university: Examining the underlying academic tensions. *Technovation*, 31(4), 161-170. <https://doi.org/10.1016/j.respol.2012.09.007>
- Piazza, R. (2015), Entrepreneurship Education, Guidance to be enterprising, *Pedagogia Oggi*, Siped, 1, 73-90.
- Putnam, R. D. (2000). Bowling alone: America's declining social capital. In *Culture and politics* (pp. 223-234). Palgrave Macmillan US. [https://doi.org/10.1007/978-1-349-62397-6\\_12](https://doi.org/10.1007/978-1-349-62397-6_12)
- Rasmussen, E., Moen, Ø., & Gulbrandsen, M. (2006). Initiatives to promote commercialization of university knowledge. *Technovation*, 26(4), 518-533. <https://doi.org/10.1016/j.technovation.2004.11.005>
- Riviezzo, A., Liñán, F., & Napolitano, M. R. (2017). Assessing the Entrepreneurial Orientation of University Departments. A Comparative Study Between Italy and Spain. In *Entrepreneurial Universities* (pp. 35-46). Springer International Publishing. [https://doi.org/10.1007/978-3-319-47949-1\\_3](https://doi.org/10.1007/978-3-319-47949-1_3)
- Sánchez, M. A., & Pinochet Sánchez, G. (2017). El rol de las redes sociales virtuales en la difusión de información y conocimiento: estudio de casos. *Universidad & Empresa*, 19(32), 107-135. <https://doi.org/10.12804>
- Schmitz, A., Urbano, D., Dandolini, G. A., de Souza, J. A., & Guerrero, M. (2017). Innovation and entrepreneurship in the academic setting: A systematic literature review. *International Entrepreneurship and Management Journal*, 13(2), 369-395. <https://doi.org/10.1007/s11365-016-0401-z>
- Scott, J. (2017). *Social Network Analysis*. SAGE Publications: London.
- Shane, S. A. (2004). *Academic entrepreneurship: University spinoffs and wealth creation*. Edward Elgar Publishing.
- Subotzky, G. (1999). Alternatives to the entrepreneurial university: New modes of knowledge production in community service programs. *Higher education*, 38(4), 401-440. <https://doi.org/10.1023/A:1003714528033>
- Tan, K. S., & Tang, T. H. J. (2016). New skills at work: Managing skills challenges in ASEAN-5, *Research Collection School of Economics*, J P Morgan, Singapore. Retrieved from [http://ink.library.smu.edu.sg/soe\\_research/1891](http://ink.library.smu.edu.sg/soe_research/1891)
- Taschereau, S., & Bolger J. (2007). *Networks and capacity. A theme paper prepared for the project "Capacity, Change and Performance"*. Discussion paper N. 58C. Reflection. ECDPM (European Centre for Development Policy Management), February 2007. Retrieved from <http://ecdpm.org/wp-content/uploads/2013/11/DP-58C-Networks-and-Capacity-2007.pdf>
- Trippel, M., Sinozic, T., & Lawton Smith, H. (2015). The role of universities in regional development: conceptual models and policy institutions in the UK, Sweden and Austria. *European Planning Studies*, 23(9), 1722-1740. <https://doi.org/10.1080/09654313.2015.1052782>
- Urbano, D., & Guerrero, M. (2013). Entrepreneurial universities: Socioeconomic impacts of academic entrepreneurship in a european region. *Economic Development Quarterly*, 27(1), 40-55. <https://doi.org/10.1177/0891242412471973>
- Van Dijken K., Prince Y., Wolters T. J., Frey M., Mussati G., Kalff P., & Meredith, S. (2012). *Adoption of environmental innovations: the dynamics of innovation as interplay between business competence, environmental orientation and network involvement* (Vol. 2). Springer Science & Business Media.
- Wise & Gallup. (2015). 2015 Wise Education Survey: Connecting Education to the real world. Retrieved June 2, 2017 from [http://www.wise-qatar.org/sites/default/files/asset/document/wise\\_survey\\_report\\_2015.pdf](http://www.wise-qatar.org/sites/default/files/asset/document/wise_survey_report_2015.pdf)
- Zee, A. Van, & Engel, P. (2004). Networking for learning: What can participants do? Interchurch Organisation for Development Co-operation (ICCO) Zeist, The Netherlands. Retrieved from

<https://www.ircwash.org/sites/default/files/ICCO-2004-Networking.pdf>

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