

# Review on the dimensions of business-university alliances

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**Abstract.** *The present paper is concerned with identifying and synthesizing the directions of development of the partnerships between the academic environment and the business environment found in main research dedicated articles in the last five years in three relevant databases: Thomson Reuters Web of Knowledge, Science Direct and PROQUEST Central. The method we employed consists in tertiary data selection, processing and filtering by means of adequate software. The thorough literature review on partnerships between the academic and business environments revealed eight main directions of development: sponsoring activities, collaborative research (research partnerships and research services), curriculum development and delivery, academic entrepreneurship, human resource transfer (mobility of academics, mobility of students), informal interaction, commercialization of property right, and scientific publications. In order to qualify the directions of the partnerships we analysed their definitions, identified their goals and the economic and social impacts that they had.*

**Keywords:** business university transfer, academia-business partnership, knowledge transfer, university-business alliance.

## Introduction

Many industries report a high disconnect between the business environment and the academia which translates in less correlated student specialization with the requirements of the labour market. Building specific partnerships between the two is claimed to increase this said correlation. Since we are also taking about a potential gap between the research done in academia and its actual conversion into marketable products, we also need to admit that there are different endeavours conducted in order to bridge this gap (Larkin, 2014). In general, there are many avenues of collaboration between companies and academics to solve different specific technical or design problems (Marcu and Meghisan, 2013), to create new products (services or processes), to undertake research aimed to the attribution of patents, to enhance product and service quality, to remodel the research and development agenda, to provide access to new research by means seminars and workshops, to create a sustainable framework for collaboration between the academia and business, to improve the relevance on the labour market of the study programmes (Marcu and Meghisan, 2014), to sustain a continuous relationship and network with the university, to conduct “blue sky” research (curiosity driven science) by seeking to discover new technology, to conduct fundamental research (Beath et al., 2000) that does not have an actual application but it seeks to explore, to recruit university graduates, and the list may continue (Yong, 2000).

## Research methodology

In order to conduct the present research, we resorted to content analysis by gathering and reviewing scientific articles published between 2012 and 2017 found in three relevant international databases: Thomson Reuters Web of Knowledge, Science Direct

and PROQUEST Central using as keywords business-academia partnerships, business-university partnerships and business-university alliances since they do not describe unrelated concepts, they are suited as initial keywords, and they are used interchangeably throughout the literature. We searched for the keyword in the title, abstract keywords and content: books, conference papers and research articles. We reviewed the articles and selected the ones that were relevant for our research. In doing so, we also used inductive reasoning, analysis and synthesis. The research results were grouped as to entail the dimension of business-university alliance, definitions of such partnerships, goals and both economic and social impacts. While conducting the analysis, we applied the following restrictions: the articles had to be peer-reviewed and had to be written in English. The Appendix presents a synthesis of the business-university alliances dimension/directions.

**Table1.** *Dimensions of business-university alliances*

No.	<i>The directions of development</i>	Science Direct	PROQUEST Central	Thomson Reuters Web of Knowledge	TOTAL	Percentage
1	Sponsoring activities	3	10	0	13	8.4%
2	Collaborative researches	6	15	0	21	13.63%
2a	<i>Research partnerships</i>	6	15	5	26	16.88%
2b	<i>Research services</i>	2	4	3	9	5.8%
3	Curriculum development & delivery	2	2	0	4	2.5%
4	Academic entrepreneurship	8	25	0	33	21.42%
5	Human resource transfer	2	5	0	7	4.5%
5a	<i>Mobility of academics</i>	3	0	0	3	1.9%
5b	<i>Mobility of students</i>	1	5	0	6	3.8%
6	Informal interaction	4	5	0	9	5.8%
7	Commercialization of property rights	1	3	0	4	2.5%
8	Scientific publications	6	13	0	19	12.33%
				Total	154	100%

Source: Authors' own research.

## Research results

**Sponsoring activities.** One of the pillars of the partnership between the business environment and the academic area is represented by the sponsoring activities. They are defined as projects developed by universities supported either fully or partially by sponsoring organizations (Yong, 2000). For companies, the main goals of these activities are gaining access to new researches and development of products (Yong, 2000). On the other hand, for universities this is an important source of indirect revenues through all the sponsored research, the donations or the in-kind support (Poyago-Theotoky et al., 2002), as well as the sponsorship of student fees or for university posts (European Commission, 2014).

**Collaborative researches** are the result of the engagement in research of multiple parties that have a common goal which is achieved through the complementation of the partners in terms of individual backgrounds in search of initiating new foreground knowledge (Borell et al., 2014). Usually, collaborative research is supported by public programmes though this could severely interfere with the free market concept. In Europe, the ‘framework programmes’ of the European Commission provide resources for collaborative projects involving universities and firms (Caloghirou et al., 2001). Collaborative researches aim at increasing the competitive advantage and value, improving or developing innovative products and services that contribute to both firms’ (Howells et al., 2012) and universities’ performance, addressing social needs and seeking to solve social problems, improving the management structures and the degree of professionalization of the alliance staff (Borell et al., 2014). These types of collaborations may either result in scientific publications, new technologies, pilot products or services and even final products that can pass the market test. Therefore, this dimension is split into two subdimensions: product partnerships and service partnerships.

**Curriculum development and delivery** – in this type of partnerships the creation of a new programme is done by incorporating the needs of the local businesses and of the local authorities at times aiming to leverage the strengths of the university (Dima et al., 2016). Additionally, companies are motivated to engage in such partnerships because of the high challenges that they face in recruiting their personnel. These partnerships also ensure that employees engage in lifelong learning experiences in order to be kept up-to-date and for developing employees’ resilience and high adaptability in case of new market conditions that can result in the vanquishing of particular jobs.

**Academic entrepreneurship** represents the action process through which inventors belonging to the academic community seek to develop and commercially exploit technologies through a company they (partly) own (Paunescu, 2014), and additionally academic entrepreneurship activities can represent an excellent environment for engaging the student and eliciting the validation of their theoretical knowledge (Cantaragiu, 2012). The aim of academic entrepreneurship is the transfer of research results to the practical environment (European Commission, 2014) and the stimulation of regional growth and development (Link and Siegel, 2005). One of the effects of academic entrepreneurship is the technology transfer via licensing agreements, research joint ventures and startups (idem). Academic entrepreneurship is a means of commercialization, which is the transformation of knowledge into products, processes, and organization and their contribution to economic growth and innovation.

**Human resource transfer** is “about multi-context learning mechanisms such as training of industry employees, postgraduate training in industry, graduate trainees and secondments to industry, adjunct faculty” (Mitra and Edmondson, 2015, p.115). According to the European Commission (2014), human resource transfers aim at sustainable development of the human capital. Training and development are part of the educational process and they target increasing the agility of the students, professors and employees by improving their competences and sharpening their skills, shifting their attitudes and perceptions, and laying the ground for knowledge absorption to enhance their performance. The human resource transfer direction is divided into two

sub-directions: mobility of academics and the mobility of students. The first type of mobility aims at ensuring the transfer of knowledge, experience and expertise of employees in an international academic environment (MBA courses), while the second one tackles the placement of students as interns in different types of companies under a well-defined structure. In this type of partnerships, students are assigned a tutor from the business environment and a supervisor from the academic environment and are evaluated by both the business and academia. A great correlation between what happens in the business environment and the university environment is ensured by placing guest speakers from the industry in the classroom.

**Commercialization of property rights** represents another pillar of the collaboration between universities and companies. This concept is defined as the transfer of university-generated IP (intellectual property), such as patents to firms, e.g. via licensing (Perkmann and Walsh, 2007). Commercialization of property rights is consolidated through the collaboration experience, breadth of interaction, and inter-organizational trust (Bruneel et al., 2010). The benefits of such a partnership are on both sides. For firms, this relationship generates two advantages: firstly, the acquisition of knowledge that can ultimately generate additional profit and secondly, skill/knowledge enhancement of its own scientific workforce. For the university, the advantages rely on the additional revenue that can be used to enhance fundamental research (e.g., through the purchase of additional equipment or postdoctoral researchers to conduct experiments) and to attract scientists with international reputation (Poyago-Theotoky et al., 2002). In the event the university and business environments do not capitalize the intellectual property right will have negative consequences on the future economic development of a specific country. From this direction we propose university and business partnerships should be conducted under a rigorous framework concerning the IP since it was found to be one of the key factors in ensuring the long-term economic growth of a country.

**The scientific publications direction** refers to the dimension of alliances when companies and universities pool their efforts to break the frontiers of knowledge in seeking to become powerful engines for innovation and economic growth, and in outstanding example in this respect is provided by Silicon Valley. In this region, there have been initiated strong and long-lasting alliances that resulted in the rampant creation of new technologies closely connected with the transformation of industries and the reinventing and modernising of the university in this process. A cornerstone in these collaborations is that scientific publications make use of codified scientific knowledge within industry (Perkmann and Walsh, 2007), that further leads to enriching the intellectual capital of both the academia and the business environment. Other studies have shown that besides the innovative output and the increased financial performance that they deliver (George et al., 2002), these alliances are highly dependent on the proximity between the parties and they can also lead to knowledge spillovers (Audretsch and Stephan, 1996). At the same time, SMEs have been found to be more prone to concluding such type of strategic partnerships in order to compensate for the potential disadvantages brought about by the size of the company (Audretsch and Feldman, 2010). For elite group of world-class research universities, this kind of strategic collaboration is top priority. Among the benefits of such alliances we insist on the substantial streams of external funding, enhanced opportunities for professors and

graduates to work on groundbreaking research, vital inputs to keep teaching and learning on the cutting edge of a discipline, and the impact of delivering solutions for pressing global challenges. The most productive collaborations are strategic and long-term; they are built around a shared research vision and may continue for a decade or beyond, establishing deep professional ties, trust and shared benefits that work to bridge the sharp cultural divide between academia and industry. This type of collaboration is closely connected to collaborative research and commercialisation of intellectual property rights.

## Conclusion

While conducting our research we managed to point out that the partnerships concluded between the university and academy follow eight large directions and at times they might display overlapping characteristics: sponsoring activities, collaborative research (research partnerships and research services), curriculum development and delivery, academic entrepreneurship, human resource transfer (mobility of academics, mobility of students), informal interaction, commercialization of property right, and scientific publications. It is difficult to provide a clear delimitation between the directions of the identified partnerships and to estimate each one' impact, but they all converge towards a main goal which is to create collaborations meant to enhance economic and social impact. These partnerships are beneficial for the both concluding parties aiming to leverage on their complementary strengths, and additionally they may have spillover impacts in the sense that also the local authorities or governments can benefit from the creation of such alliances directly or indirectly.

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## Appendix - Synthesis of research results

<i>The directions of development</i>	<i>Definition(s)</i>	<i>Goals</i>	<i>Economic and social impact</i>
1. Sponsoring activities	Projects developed by universities supported fully or partially by sponsoring companies (Lee, 2000)	<p>Indirect type of income for colleges through the supported research, gifts, and in-kind support from organizations. (Poyago-Theotoky, Beath, Siegel, 2002)</p> <p>Access to new research and product development (Lee, 2000)</p>	<p>Reasons for firms to collaborate with academics and to sponsor activities</p> <ul style="list-style-type: none"> <li>-To solve specific technical or design problems</li> <li>-To develop new products and processes</li> <li>-To conduct research leading to new patents (Bercovitz et al., 2001)</li> <li>-To improve product quality</li> <li>-To reorient R&amp;D agenda</li> <li>-To have access to new research via seminars and workshops</li> <li>-To maintain an ongoing relationship and network with the university</li> <li>-To conduct “blue sky” research</li> <li>-Contribute to fundamental research with no specific targeted applications</li> <li>-To recruit university graduates (Yong, 2000)</li> <li>-Graduate fellowships</li> <li>-Support for proposals for education</li> <li>-Outreach programs</li> <li>-Donation of equipment</li> <li>-Access to on-site facilities</li> <li>-Sponsorship of student fees</li> <li>-Sponsorship of university posts (European Commission, 2014)</li> </ul>

<b><i>The directions of development</i></b>	<b><i>Definition(s)</i></b>	<b><i>Goals</i></b>	<b><i>Economic and social impact</i></b>
2. Collaborative researches	Activities where several parties are engaged in research towards shared objectives, collectively building on their individual background and side ground in the creation of new foreground knowledge (Frison, 2017; Borell, Morais, Smith, 2014)	-Enhance competitive advantage, -Improve/develop innovative products/services or combination -Find solutions to solve social challenges - Improve and develop management structures and the degree of professionalization of the staff involved (Borell, Morais, Smith, 2014)	Impact more the science based sectors such as pharmacy, biotechnology, chemicals. (Perkmann, Walsh, 2007)
<i>2a. Research partnerships</i>	Inter-organizational understandings compatible with R&D (Perkmann, Walsh, 2007)	Co-operate on research and development activities (Perkmann, Walsh, 2007)	Include collaborative research activities (sponsored research and university-industry research centers) (Perkmann, Walsh, 2007)
<i>2b. Research services</i>	University based research and consulting commissioned by the business sector (Perkmann, Walsh, 2007)	Investigate unresearched aspects of a matter. (Perkmann, Walsh, 2007)	Two major fields are mostly prone to outsourcing researches or consultancy coming from universities: software development and engineering. In this type of alliance, the companies direct the research and, as a downside, the university may face the fact of encountering un-exploitable research in terms of scientific publications material. (Perkmann, Walsh, 2007)
3. Curriculum development & delivery	The process of collaboratively creating a learning environment with members of business community including creation of a fixed programme of courses or planned	Develop research related projects (European Commission, 2014)	1. Curriculum Design, development and delivery 2. Bespoke course development 3. Continuing Education and Lifelong learning (European



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	experiences (European Commission, 2014)		Commission, 2014)
4. Academic entrepreneurship	Academic inventors capitalise on technologies by means of wholly or partly-owned companies (Perkmann, Walsh, 2007; Paunescu, 2014)	Materialise research results by transferring them to the practical environment (European Commission, 2014)  Stimulate local, regional and national growth and development (Link, Siegel, 2005)	- Technology transfer via licensing agreements, research joint ventures and startups (Link, Siegel, 2005)
5. Human resource transfer	"Multi-context learning mechanisms such as training of industry employees, postgraduate training in industry, graduate trainees and secondments to industry, adjunct faculty" (Mitra and Edmondson, 2015, p.115)	Contribute to ensuring sustainable development of human capital (European Commission, 2014)	1. Research partnerships 2. Research services (Perkmann, Walsh, 2007)  -A process characterised by bipartite cooperation (European Commission, 2014)
<i>5a. Mobility of academics</i> <i>*Mobility of business persons</i>	<i>"Temporary or permanent movement of professors or researchers from higher education institutions (HEI) to businesses and employees, managers and researchers from businesses to HEIs"</i> (European Commission, 2014)	Create the liaison between businesses with a strategic need and university expertise and knowledge to enhance both parties competitiveness and performance indicators (European Commission, 2014)	Knowledge Transfer Partnerships - in which academic supervisors provide guidance for people working in companies (European Commission, 2014)
<i>5b. Mobility of students</i>		-Increase employability -Promote knowledge transfer, and unravel some of the intellectual assets of the university in the advantage of the host organization (European Commission, 2014)	-Placement of students into the business world under the supervision of an expert - Placement of undergraduates into small and medium sized companies to undertake specific business or technology projects driven by the needs of the host business (European Commission, 2014)

<i><b>The directions of development</b></i>	<i><b>Definition(s)</b></i>	<i><b>Goals</b></i>	<i><b>Economic and social impact</b></i>
6. Informal interaction	Formation of social relationships and networks at conferences, etc. (Perkmann, Walsh, 2007)	Enhances collaboration at local level (European Commission, 2014)	Business-academia conference organisation Participation in business sponsored meetings (D'Este, Patel, 2005) -Developing student knowledge and skills by placing them in different jobs as intrinsic part of their academic studies -Involvement of external experts in lectures, based on the personal contacts of individual academics rather than more formalized arrangements (European Commission, 2014)
7. Commercialization of property rights	Targets enabling the transfer of intellectual property created by universities to companies through licensing contracts (Perkmann, Walsh, 2007)	Provide access to business expertise and facilitate commercialization product or process innovation (Poyago-Theotoky, Beath, Siegel, 2002)	Increasing the impact of the collaboration by enhancing and the breadth of interaction, and inter-organizational trust (Bruneel et al., 2010)
8. Scientific publications	Use of codified scientific knowledge within industry (Perkmann, Walsh, 2007)	Anticipate the future alliances between firms and universities (Perkmann, Walsh, 2007)	Companies have the chance to be involved in changing the public policies by screening scientific publications (Perkmann, Walsh, 2007)

Source: Authors' own processing based on literature.