Specific examples on fostering open innovation at the industry level

University-industry collaboration

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SPECIFIC EXAMPLES ON FOSTERING OPEN INNOVATION AT THE INDUSTRY LEVEL: UNIVERSITY-INDUSTRY COLLABORATION

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Abstract

This chapter highlights the role of university-industry collaboration in generating innovation. It provides an overview of the actors' motives for collaboration, the most common barriers and drivers of this type of inter-organizational relationships, and reviews the types of collaborative links. Moreover, this chapter introduces various online tools for bridging the academia and the industry and presents some real cases of university-business collaboration. The chapter is supplemented by pedagogical guidelines, evaluation questions, teaching tips and suggestions for reading.

Prerequisite	Open innovation ecosystems. Triple helix / quadruple helix collaboration.
Objectives of the lecture	This lecture aims at providing practical examples of open innovation ecosystems involving universities and/or public research organizations.
Workload	2h teaching; 8h homework.
Learning outcomes	**LO #2:** To explore concepts of collaborative innovation and make them actionable. **LO #52:** To identify opportunities for the exploitation of new digital technology and related platforms for sourcing new ideas as part of the organisation's open innovation strategy. **LO #120:** To assess critically the motives for OI and mechanisms through which OI create value for an organisation **LO #128:** To assess innovative ideas and define a roadmap for commercialization. **Knowledge** Basics of OI. **Skills** Analytical thinking and opportunity generation. **Competences** Case evaluation.
Reading List	Effective University–Industry Interaction: A Multi-case Evaluation of Collaborative R&D Projects (Barnes, Pashby & Gibbons, 2002). University–industry interactions in applied research: The case of microelectronics (Banconi & Laboranti, 2006). A typology of research training in university–industry collaboration: The case of life sciences in Finland (Chiang, 2011). Companies on campus (Chiang, 2011). University-industry collaboration: Grafting the entrepreneurial paradigm onto academic structures (Dooley & Kirk, 2007). Best Practices for Industry-University Collaboration (Greitzer, Pertuze, Calder & Lucas, 2010).

	What drives and inhibits university-business cooperation in Europe? A comprehensive assessment. (Galán-Muros & Plewa, 2016).
European Qualifications Framework (EQF) Level	Level 5.

Lecture Content

The aim of this lecture is to provide evidence of university-industry collaboration (UIC) in practice by identifying different modes of collaboration with universities: coordinated efforts, parallel projects and symbolic collaboration (Thune & Gulbrandsen, 2014). The perspective of the university as a key contributor to economic development (Mansfield and Lee, 1996) has increased in recent decades. Within the current knowledge-based economy, the university acts as both a "knowledge educator and a seed-bed for new firms" and for innovation (Etzkowitz & Leydesdorff, 2000). Viewed simply, a nation that can achieve a most effective inter-linkage between the three actors of university-industry-government, can achieve faster transition of discoveries from the lab bench to the marketplace. Empirical research on university-industry relationships has typically focused on the types of interaction (Thune & Gulbrandsen, 2014), the volume of interaction, initiatives, and motivators (D'Este & Perkmann, 2011), firm size and R&D budget, the individual characteristics of academy members, and accordingly the consequences and results of these collaborations (Bruneel, d'Este, & Salter, 2010, Perkmann et al. 2013, Bonaccorsi & Piccaluga 1994). All these factors vary in each type of collaboration.

When understanding why collaboration with universities is beneficial for the industry, the following key drivers emerge:

1. Access to basic scientific competence built up within the university within a niche area of science where the industry partner may be weak. (See the example by Rohrbeck & Arnold, 2006).

2. Access to knowledge (both codified and tacit) that has been developed within the research centre through decades of publicly funded research. (See the example by Felsenstein, 1994).

3. Access to world-class academics who are both scientifically and industrially aware of the state of the art. (See the example by Dooley and Kirk, 2007).

4. Acquiring competitive advantage by gaining access to better leads through faster channels than the competitors, thereby enhancing the product development process. (See the example by Rohrbeck, Hölzle, & Gemünden, 2009).

5. Access to rich sources of highly skilled researchers. (See the example by Thune, 2011).

Motives, drivers and barriers in university-industry collaboration

The principle difference between firm-to-firm and firm-to-university relationships arises from the difference in the primary objectives and motives of these two types of partners. University as an academic partner is more oriented towards searching for new ideas and discoveries, creating fundamental knowledge. Companies, in turn, are more oriented towards profit and practical applications of knowledge (Parker, 1992). That is, in part, why collaboration between academia and business can be difficult to establish and manage. This is illustrated by differing motivation (Siegel, Waldman, Atwater & Link, 2003b), the level of internal bureaucracy (Bruneel, d'Este, & Salter, 2010), the languages the parties speak, and the time horizons and day-to-day practices undertaken (Barnes, Pashby & Gibbons, 2002; Muscio & Pozzali, 2012). Table 1 summarises the motives and rationale of two collaborating actors.

Table 1. Motives for university-industry collaboration

Stakeholder	University	Industry
Actions	Discovery of new knowledge	Commercializes new technology
Primary motive	Recognition within the scientific community	Financial gain
Secondary motives	✔ Access to resources and equipment ✔ Support for students ✔ Getting additional funds from the industry ✔ Access to learning opportunities ✔ Getting a reference of partnership with industrial companies	✔ Access to scientific competence ✔ Access to knowledge (both codified and tacit) ✔ Access to skilled personnel ✔ Taking part in curriculum development
Perspective	Scientific	Organic/entrepreneurial

Source: based on Siegel, Waldman, Atwater & Link, 2003; Perkmann, et al., 2013; Meyer-Krahmer & Schmoch, 1998; Rohrbeck & Arnold, 2006; Dooley & Kirk, 2007.

The fact that collaboration with a university is different compared to interaction with other types of partners is well illustrated by the specific challenges emerging in university-industry collaboration. Among the most recent studies, the one by Galan-Muros and Plewa (2016) defines four groups of barriers and two groups of drivers in university-business cooperation. The first group of barriers is related to the 'connection problem' – the lack of collaborating parties' awareness about the

capabilities of external organizations, and lack of contacts and difficulties in finding the right partner (Muscio & Pozzali, 2013). The second type of barriers is related to lack of funding on both sides and at the various stages of collaboration – from searching for a new partner and investments into stimulating new partnerships (Etzkowitz, 1998) to the resources allocated for maintaining the existing collaborative links (Howells, Ramlogan, & Cheng, 2012). The third group of barriers defined by Galan-Muros and Plewa (2016) combines a wide range of problems caused by the differences in organizational cultures existing between the business and academia and arising no matter what type of collaboration is it – education, research or something else. Particularly, it includes differing motivation (Bruneel, d'Este, & Salter, 2010), different modes of communication and different languages (academic vs. business) (Lambooy, 2004; Muscio & Pozzali, 2013), the time-horizons of universities being normally more long-term oriented (Meyer-Krahmer & Schmoch, 1998), and the levels of bureaucracy at university administration being often less flexible than the business would desire it to be (Siegel, Waldman, Atwater & Link, 2003). Finally, the fourth group of barriers very closely linked with cultural issues is relate to differences in the internal characteristics of both types of organization – disagreements on IPR and disclosure research results (Hall, Link & Scott, 2001), as well as the limited absorption capacity of business (Khamseh & Jolly, 2008; Galan-Muros & Plewa, 2016). The core drivers of UIC include the availability of complimentary resources (funding, human resources, knowledge, etc.) and relationship type of drivers (trust, commitment, shared goals and balancing differing expectations, as well as prior experiences of collaboration) (Galan-Muros & Plewa, 2016).

Types of university-industry collaborative links

To characterize university-industry collaboration, it is necessary to highlight the known types of collaboration links. A number of authors have proposed typologies of collaborative links (Perkmann & Walsh, 2007, Perkmann et al., 2013; Boronowsky, Mention & Woronowicz, 2012; Alexander & Childe, 2013). Discussing the types of interaction, it is important to define the actual direction of knowledge transfer happening during collaboration. Figure 1 shows a three-group classification of collaborative 'links' by the direction of knowledge transfer, particularly: university-industry activities (in the figure they are shifted more towards the block University); bi-directional interaction (blue and placed in the center); industry-university directed activities (in the figure they are shifted more towards the block Industry) (Albats, 2013).

Online tools for collaborating with universities

As mentioned above, the lack of resources inhibits university-industry interaction, but it also hampers the partner search (Muscio & Pozzali, 2012,) contributing to a 'connection' barrier to university-industry collaboration (Galán-Muros, & Plewa, 2016). Browsing through potential partners' websites

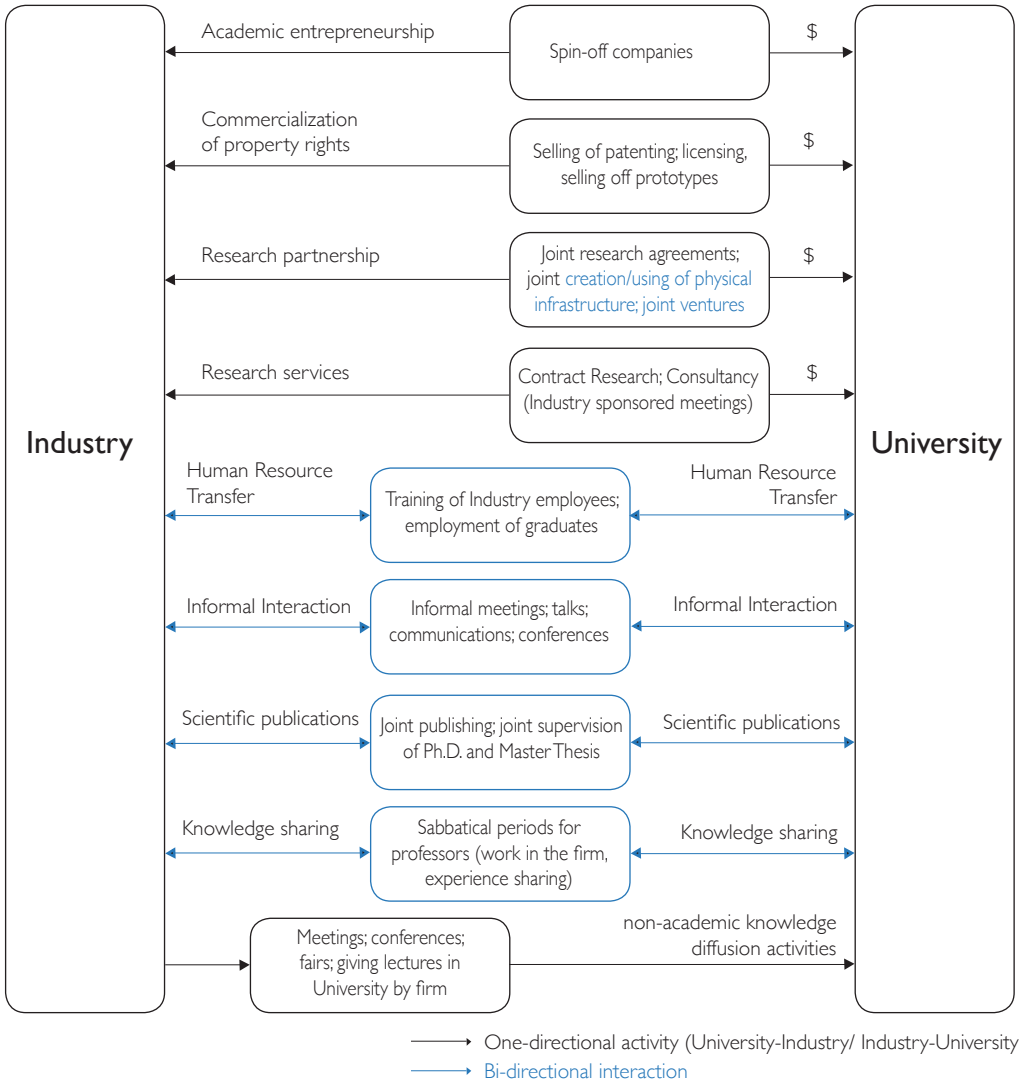

Figure 1. Typology of university-industry collaborative links (Albats, 2013)

is extremely time consuming process, and therefore, electronic tools which assist in partner search are needed for solving the connection problem. A number of online tools or platforms designed specifically for bridging and facilitating university-industry collaboration already exist and develop rapidly, while new ones emerge continuously. Albats, Fiegenbaum and Alexander (2016) provide an overview of such tools and classify them according to their functions or collaborative links to be supported. Sources like Coursera (www.coursera.org) support digital, project-based learning, platforms like in-part (www.in-part.com) support search for complimentary knowledge or IPR. A

number of crowdsourcing platforms (as www.nimblebee.eu and www.marblar.com) are rapidly developing to facilitate generation of ideas from university for solving industry' challenges. Tools for marketing university innovations (as www.leadingedgeonly.com) increase awareness of the academic knowledge, while tools for building networks (as www.uiin.org and www.bridgelight.co.uk) facilitate networks development with digital infrastructure (Albats, Fiegenbaum & Alexander, 2016).

Examples of famous large industries that are leaders in the collaboration with universities:

1. Philips: Philips has and had in the past a number of types of collaboration with universities. Philips was founded in Eindhoven, and that led to the establishment of the University of Technology there in 1956 and supported a continuous flow of human resources between the company and the academia. The region of Eindhoven per se is recognised as one of the top technology centres in Europe, and Philips has definitely played its role in it. Among the studies on the collaboration of Philips with the academia, see Salimi, Bekkers and Frenken, (2015) and Philips website: http://www.philips.com/a-w/research/about-philips-research.html.

2. IBM (see e.g. the case of ETH Zurich and IBM establishing Binnig and Rohrer Nanotechnology Center in Zurich - Edmondson et al., 2012: http://www.sciencebusiness.net/Assets/94fe6d15-5432-4cf9-a656-633248e63541.pdf).

Example of an SME collaborating with a university:

1. IBSENtelecom and Fraunhofer (see Di Minin et al., 2016: http://publications.jrc.ec.europa.eu/repository/bitstream/JRC100823/jrc100823_case%20studies%20on%20open%20innovation%20in%20ict.pdf).

KEY TAKE-AWAYS

- Understanding the rationale for university-industry collaboration: motives, drivers and barriers.
- Understanding the collaborative modes and awareness of the online tools for matching companies and universities.
- In-depth understanding of how university-industry collaboration works, through case studies.

Pedagogical guidelines

The lecture leverages on both a frontal lecture and interactive activities. After 2 hours of frontal teaching, the participants will be divided into groups in order to find examples of university-industry collaboration in their network. They should analyse and evaluate the collaboration and find probable solutions in case of problem recognition. The groups will present their cases and analysis to the other groups.

Evaluation questions

Individual work examples: Could you find examples of university-industry collaboration at your university? How do they work together? What possible problems did you observe? What could be done better? Do you know any famous collaboration cases? Why are they famous in your opinion?

Group work examples: Why did you choose this case? Can you present a summary of the evaluation? Do you think this is a success story? How can the partners make it better?

Teaching tips

Supporting case materials:

http://www.sciencebusiness.net/Assets/94fe6d15-5432-4cf9-a656-633248e63541.pdf

http://www.theguardian.com/higher-education-network/blog/2012/aug/02/the-value-of-research-collaborations

http://www.nsf.gov/eng/iip/iucrc/home.jsp

https://www.uschamberfoundation.org/bhq/industry-academia-and-government-collaboration-game-changer-us-economic-future

http://publications.jrc.ec.europa.eu/repository/bitstream/JRC100823/jrc100823_case%20studies%20on%20open%20innovation%20in%20ict.pdf

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