

Chapter 7

Diversified Channels of Knowledge Exchange in European Universities: Major Parameters of University-Enterprise Partnerships

7.1. Introduction

The present chapter focuses on knowledge exchange in European universities as viewed through the lenses of university-enterprise partnerships.²³² It presents research findings of a large-scale comparative European research project funded by the European Commission which focused on university-enterprise partnerships (called hereafter partnerships) in six European countries: Germany, Italy, Spain, the United Kingdom, the Netherlands, and Poland. The analysis of empirical material on partnerships is performed at three distinct levels: six national case studies, eighteen institutional case studies, and ten partnership case studies, with different units of analysis: countries, individual academic institutions, and individual institutional partnerships. (a full list is given at the end of the Chapter).

The structure of the chapter

The structure of the chapter is as follows. Following this introductory section, the analytical framework is presented in section two. Then the

232 This chapter is based on both theoretical and empirical work done within an EU-funded comparative research project GOODUEP, *Good Practices in University-Enterprise Partnerships* (2007-2009), coordinated by José-Ginés Mora of CEGES (Technical University of Valencia). The partners in the project included: José-Ginés Mora, Jose-Miguel Carot, Andrea Detmer, Maria José Vieira, Debra Payne Chaparro (Spain), Ulrich Teichler and Christian Schneijderberg (Germany), Stefano Boffo, Libera Picchianti, and Frank Heins (Italy), Paul Temple and Michael Shattock (the United Kingdom), Ben Jongbloed and Maarja Beerkens (the Netherlands) and Marek Kwiek (Poland), as well as Guy Haug as an external expert. I wish to express my gratitude to all colleagues involved in this project; all mistakes and limitations are my sole responsibility.

chapter explores the following three major partnership parameters: in section three, the role of individuals (academics/administrators) in establishing and running successful partnerships; in section four, the role of public authorities, public subsidies and private donations in operations of successful partnerships; and in section five, the staff mobility between public and private sectors as part of established partnerships. In section six, the chapter presents its research findings in a wider context of academic norms, values and attitudes towards the commercialization of research and technology transfer analyzed on the basis of a recent (2011) large-scale quantitative comparative European research on the academic profession in eleven countries (ESF-funded EUROAC, “Academic Profession in Europe: Responses to Societal Challenges”). Section seven presents tentative conclusions. In general, research findings are linked to current discussions in the knowledge transfer and science policy literatures on the growing role of knowledge exchange and university-industry linkages in the knowledge economy, with particular emphasis on the role of individual vs. institutional characteristics in successful university-industry collaborations, the role of the public/private mix in funding and governance modes in partnerships, and the relative separation of university and business cultures in European universities as factors inhibiting the inter-sectoral mobility.

Reconfigurations of knowledge production: a larger context

Knowledge production in European universities is undergoing a significant reconfiguration, both in its governance and authority relationships (Whitley, Gläser and Engwall 2010, Whitley 2010, Whitley and Gläser 2007) and in its funding modes (Geuna and Martin 2003, Martin and Etzkowitz 2000). The combination of ever-increasing costs of academic research and the decreasing willingness and/or ability of European governments to finance academic research from the public purse (Aghion *et al.* 2008, Geuna 1999a, Geuna and Muscio 2009, Etzkowitz, Webster, Gebhardt *et al.* 2000) leads to growing emphasis in both national and European-level policy thinking on seeking new revenue sources for research universities (Mazza *et al.* 2008, Alexander and Ehrenberg 2003, Herlitschka 2008, Hearn 2006, EC 2008, EC 2009, EC 2011a, EC 2011b). New sources may include increased fees for the teaching mission and increasing reliance on various forms of third stream activities leading to more non-core non-state income for the research mission (see Geuna 1999a, Geuna 2001, Geuna and Martin 2003, Shattock

2009a, Temple 2012a), as we have shown in Chapter 5. The inter-sectoral national competition for tax-based public funding has been on the rise in the last two decades, following the rising costs of all major public services, especially health care and pensions (Powell and Hendricks 2009, Salter and Martin 2001, Kwiek 2006a), as we have shown in Chapter 1 and Chapter 3. At the same time, both the ability and the willingness of national governments to fund growing costs of academic research may be still reduced, for reasons as diverse as a shrinking tax base (Tanzi 2011), escalating costs of maintaining the traditional European welfare state model and economic challenges resulting from global economic integration and the passage to knowledge-based capitalism (Florida and Cohen 1999), as well as the overall social climate in which the promises of science may not be thought by both the population at large and policy makers to be kept by public universities and research organizations (see Martin and Etzkowitz 2000: 6-8 on the “changing social contract” between science and the university, and between society and the state; Guston 2000 and Guston and Keniston 1994b on the emergent “fragile contract” with science in the context of Bush 1945; Ziman 1994 on science under “steady state conditions”, and Kwiek 2005 and 2006a on the changing social contract linking universities, nation-states and welfare states).²³³ In this wider context of the reconfiguration of governance modes and funding modes of university research, knowledge transfer has become “a strategic issue: as a source of funding for university research and (rightly or wrongly) as a policy tool for economic development” (Geuna and Muscio 2009: 93, Etzkowitz *et al.* 1998). There are increasing social and political expectations from universities, as discussed throughout the book, to show “more direct interaction with society and the economy” (Bonaccorsi *et al.* 2010: 1) to

233 The traditional social contract between states and societies is under renegotiations together with a traditional contract between states and universities, as discussed in Chapter 2. From a historical perspective, “beginning some time around the end of the 1980s (but perhaps slightly earlier in certain countries like the UK and the US), we have seen the emergence of a revised social contract ... under the revised social contract there is a clear expectation that, in return for public funds, scientists and universities must address the needs of ‘users’ in the economy and society. Furthermore, they are subject to much more explicit accountability for the money they receive. In addition, implicit in the new contract is a much more complex model of innovation than the previous linear model, unfortunately making it much harder to persuade politicians of the merits of increasing public spending on research!” (Martin and Etzkowitz 2000: 7).

which both academic knowledge production and various knowledge exchange channels need to respond, following transformations in universities' environments. As Geiger and Sá (2008: 210) point out,

in sum, although it has often been a contested mission for research universities, economic relevance should instead be seen as a complementary mission. ... virtually all research universities have pursued at least some portion of the economic relevance agenda. But it has essentially been an addition, like previous external missions, rather than a displacement of any other university commitments. In fact, dedication to economic relevance falls unevenly across the field of research universities and within individual universities.

The policy focus at national, European, and global levels on universities functioning in a closer symbiosis with enterprises has never been so dramatic in the last four decades (for early reports, see Stankiewicz 1986, Fairweather 1988, Gibbons 1992, and Ziman 1994).²³⁴ Linking universities to the world of business may take a variety of forms but each of them, over a period of time, is able to influence the core institutional culture of academic institutions (Maassen and Olsen 2007, Olsen 2007b). Certain patterns of university-business relationships may gradually become institutionalized; but the process of recognition of new institutional norms and values, institutional behaviors, routines and procedures (Braunerhjelm 2007: 621) takes time in such institutions as culture-embedded and history-attached European universities (see in particular Bruneel, D'Este and Salter 2010: 859, Etzkowitz 2003: 116, Etzkowitz, Webster *et al.* 2000: 326, Ranga *et al.* 2003: 302, David and Metcalfe 2010: 90). Transformative rather than incremental changes are possible but, as aptly remarked, "the university is a very adaptable organism. Throughout its history, it has proved able to evolve in a changing environment" (Martin and Etzkowitz 2000: 17, see Kwiek 2012a). Universities do evolve, following transformations in their

234 For the European Commission, for instance, the concept of the "knowledge triangle" (education, research, and innovation) is crucial in rethinking the role of higher education institutions and their environments. As it stresses (EC 2011b), "to optimise skills, innovation and research outcomes, it is important for these three domains to work closely together. This in many cases requires changes in the traditional approaches to designing and delivering education programmes. ... Turning the theoretical concept of a strengthened knowledge triangle into reality in teaching, research and innovation is a complex task, but an area where progress is being made. Public authorities can play an important role in supporting higher education institutions to form closer links with employers and employer's organisations, external research organisations and innovative businesses to enhance their educational offer".

environments, do redefine their norms and values, and in the last two or three decades, depending on a national context, they have been following new, highly economic (rather than culture-related) legitimation for scientific research (Ziman 1994, Etzkowitz and Leydesdorff 2000: 117, Aghion *et al.* 2008) as the link between universities and “the promise of economic growth” becomes ever closer (Geiger and Sá 2008: 186-210). The emphasis in national and European policy thinking on the redefinition of academic cultures, norms and values towards accepting ever closer relationships between universities and their economic surrounding has been stronger than ever before in the post-war period. University-enterprise partnerships studied in this chapter are clearly linked to these more widespread processes of universities’ institutional adaptations resulting from powerful global and European policy trends (see Florida and Cohen 1999: 589-610 on “knowledge-based capitalism” and Slaughter and Rhoades 2004: 305-338 on the “academic capitalist knowledge/learning regime”).

The role of different types of collaboration between European universities and their environments has been increasingly discussed in both scholarly and policy literature throughout the 2000s. In particular, current national and EU-level policies stress the role of universities’ collaboration with enterprises (EC 2009, EC 2011a, EC 2011b). In this chapter, we shall discuss several parameters relevant to the successful development of university-enterprise partnerships in European universities. Efforts to build business-university collaborations are “gathering momentum throughout the developed world” (Lambert 2006: 161).

The chapter explores uneasy relationships between the world of academia and the world of business, as they appear in joint undertakings between academics and business people, most often with the support of public officials and public funding. Differences between the three groups of partnership stakeholders can clearly be shown; indeed their languages and timetables, their incentives for collaboration and their institutional cultures, are often radically different (and therefore university-industry research relationships have to overcome what Robert L. Geiger (2004: 182-186) termed the “cultural divide”). And these different institutional cultures clash in partnerships and in their governance modes, which leads to clashes of values and attitudes, procedures and behaviors, and to ad hoc idiosyncratic governance solutions. At the same time, as Braunerhjelm points out in his study linking social norms, university culture and policies (2007: 621), “altering existing routines and norms that have prevailed for a long time is a

difficult and time-consuming task”. Novel trial-and-error governance and management modes gradually become institutionalized as partnerships grow and mature. Some partnerships are short in duration and others are long-term, sustained, but all operate at the intersection of mostly incommensurable institutional cultures (Metcalf 2010: 30). Academia and industry, due to their different missions and modes of operation, are subject to what Müller (2006: 178) called “intrinsically different agendas” and the cultures of industrial and academic research are “fundamentally different”:²³⁵ while research in industry possesses “an inherent inclination toward applied research and nondisclosure”, faculty research is “inherently inclined toward theoretical topics and open publications” (Geiger 2004a: 183). Private industry’s support of university research certainly raises the question of “what businesses expect to receive in return for their investments. After all ... industry funding is presumably based on a profit calculation” (Weisbrod *et al.* 2008: 151). The present chapter explores these issues in European universities across six countries.²³⁶

7.2. The analytical framework

Definitions

The chapter is focused on diversified channels of knowledge transfer in universities rather than on (more restricted) technology transfer.

235 The key differences between the academic agenda and the business agenda in the context of (for instance) pharmaceutical companies and universities are the following: novelty/curiosity driven vs. goal/target driven; novelty, publication vs. impact in drug discovery; satisfaction of curiosity vs. decision-critical data; education on projects vs. experts in charge; volatile expertise vs. continuity in expertise; struggling for funds vs. struggling of approval; long project approval times vs. prompt start on needs; continuity/project life cycle vs. flexibility to change or stop; research alone vs. research in teams; and teaching to next generation vs. peer knowledge exchange (Müller 2006: 178).

236 The list of the eighteen European universities for which institutional case studies were produced and the ten institutional partnerships for which case studies were produced is given at the end of the chapter. I would like to thank interviewees throughout Europe who were willing to spend time with the GOODUEP project international team members, and in particular my own interlocutors in Poland, Germany, and the Netherlands.

Consequently, in its analytical framework and empirical background, it goes beyond what Abreu *et al.* (2008: 45) called “a prescriptive view of university-business interactions with a narrow focus on technology transfer”. As they pointed out in their study on *Universities, Business and Knowledge Exchange*, “although technology transfer may be important, it is also necessary to focus on the more diverse and varied impacts of business-university knowledge exchange relations” (Abreu *et al.* 2008: 45).

In the course of research performed within the GOODUEP project, two definitions of university-enterprise partnerships have been adopted: a more open one was adopted in the mapping of partnerships in eighteen European universities selected in six countries (university-enterprise partnership as “any joint activity involving university and enterprises”) and a more restrictive one was adopted in the selection of case studies of good practices of specific partnerships. Thus a university-enterprise partnership in the second, more restrictive account, is:

a partnership between the university (or a university unit such as a particular department or research institute), an industrial partner (or some other private entity such as a foundation), and, in most cases, a government partner (national, regional, municipal). The partnership is based on a formal agreement between the partners about the goals, funding, management and governance of the partnership in terms of each partner’s responsibilities and contributions. The activities of the university-enterprise partnerships focus on the manipulation (co-production, sharing, dissemination, valorization, and commercialization) of academic knowledge (see a final report from the GOODUEP project: Mora, Detmer and Vieira 2010: 126).

A three-level analysis

The analysis of partnerships was thus performed at three distinct levels: national case studies, institutional case studies, and partnership case studies (on the role of case studies in theory development in the social sciences, see George and Bennett 2005: 3-36, 263-266, and on case study research, see Gerring 2007: 65-2010 and Gerring 2008). At the first level, national case studies evaluated general conditions for developing partnerships in six countries. At the second level, institutional case studies reported currently developed partnerships in eighteen European universities in terms of their types, institutional policies to promote them and governance structures used to develop them. Institutional case studies, in particular, referred to the following variables: types of universities in the country, size of universities,

geographical aspects, teaching/research orientation, originality of content/structure of possible partnerships, and originality of governance structures. Finally, at the third level, partnership case studies included science parks, research institutes, joint teaching programs and joint support structures for promoting entrepreneurialism and were based on both documentary analysis and semi-focused interviews with key stakeholders.

The partnership-level case studies provide an empirical basis for the present analysis. The variables included in the analytical framework were analyzed transversally for the ten cases. The analytical framework referred to two dimensions: the institutional context of partnerships and the governance of partnerships (see Mora, Detmer and Vieira 2010: 175-176). The institutional context section included key elements of the regional and institutional settings (including institutional support structures) which directly affected the development of a partnership.²³⁷ And the governance section focused on partnership-level structures, mechanisms and instruments used in governing the partnership. The unit of analysis in partnership case studies was a specific partnership at a given university. The institutional context of partnerships studied focused on the level of institutional governance structures, institutional human resources management, incentives to academics and academic cultures, and the degree of

237 The analysis was therefore focused on the following issues (see Annexes to Mora, Detmer and Vieira 2010: 171-184): (1) The extent to which the university has put support structures for partnerships in place; (2) The extent to which the university includes the collaboration with enterprises as relevant components of its teaching and research activities (e.g. regular collaboration in curricula design); (3) The extent to which external funding (non-core public funding and, in particular, funding from enterprises) is relevant in the institutional budget; (4) The extent to which enterprises, industrial organizations and chambers of commerce are represented in university governance boards; (5) The extent to which the collaboration with the industry is considered in research and teaching assessments/evaluations; (6) The extent to which the collaboration with the industry is considered in promotion, salary and employment decisions; (7) The extent to which university intellectual property (IP) policy financially rewards researchers; (8) The extent to which university policy to encourage commercialization and spin-offs brings any financial rewards to individual researchers and research groups; (9) The extent to which the university encourages/tolerates mobility between the university and enterprises; (10) The degree of autonomy at the institute/department level to create new research and staff positions; (11) The degree of autonomy experienced by university departments in setting salaries; and (12) The degree of autonomy in budget allocation and generation of external revenues by departments and research groups in the university.

decentralization. The partnership's governance was the focus of interviews and it assessed specific aspects of partnerships rather than aspects of institutions, in particular various roles and responsibilities of partnerships' stakeholders and the role of institutional support structures in developing particular partnerships, the role of governmental actions, policies taken by enterprises and their associations, and potential conflicts of interest. The first question explored was the degree to which responsibilities were shared between institutional, enterprise and other types of partners in a partnership in developing, by each stakeholder, different functions (funding, programming/research agenda, facilities, execution of core activities, supervision and other). The second question explored was the degree to which different benefits from partnerships were shared between the university, the enterprise and other actors (such as governmental agencies): financial benefits, intellectual property, training and education, knowledge and acknowledgement of partners' needs and capacities (including on-site training for students and academic staff and continuous education for enterprises' employees and the acknowledgement of labor market conditions and enterprises' needs, as well as university research results, facilities, and capacities).

Both “numbers” and “words”

The chapter uses a mixed-method approach (that is, in its simplest form, at least one quantitative method and at least one qualitative method, see Greene 2007: 95-137, Nagel, Bieber, Jakobi *et al.* 2010: 28-50, Greene *et al.* 2009). While quantitative methods in this chapter collect “numbers”, qualitative methods collect “words” (Caracelli and Greene 1993: 195). Following Nagel, Bieber, Jakobi *et al.* (2010), it uses different methodological strategies: an (expert) interviews and documentary analysis and a policy network analysis (for GOODUEP data) and a time-series cross-section regression analysis (for EUROAC data only). Each of the three methods uses specific research logic: explorative logic (interviews), descriptive logic (documentary analysis) and explanatory logic (regression analysis) and each is used here to different degrees. The chapter supports its theoretical propositions with two-level case studies, statistical analyses, financial statements analyses, analysis of transcribed semi-focused interviews and (in its contextual part in section six) analyses of large-scale European surveys. In its research design, it follows the logic of case-

oriented research, with its emphasis on understanding through differences, exploring diversity, keeping the number of cases low and focus on processes and temporal sequences (rather than periodization) (see della Porta 2008: 198-222), as well as with its emphasis on “policy relevance” (George and Bennett 2005: 263-286).

The three parameters to explore partnerships in the present chapter are the following: the leadership and the role of individual academics /administrators in establishing and running successful partnerships; the role of public authorities (from the EU, national, regional and local levels), public subsidies and private donations; and the staff mobility between public and private sectors as part of partnerships.

7.3. The leadership and the individual/institutional characteristics

Individual research motivations vs. the academic culture and institutional arrangements

Recent literature on different factors underlying the development of university-industry links draws an important distinction between (often overlooked) individual characteristics and institutional characteristics. For instance, D’Este and Patel (2007: 1309) conclude that “in explaining the variety and frequency of interactions with industry among academic researchers, individual characteristics have a stronger impact than the characteristics of their departments or universities”. The present research indicates that individual research motivations, drives and interests of particular researchers or administrators count at least as much as (and often more than) the academic culture and institutional arrangements in which their activities are embedded (which is consistent with findings by Este and Patel (2007) about individual vs. department vs. university characteristics underlying various interactions with industry). Individual academic norms, behaviors and routines seem to count as much as (and often more than) institutional academic norms, rules, behaviors and routines (to which we shall return in a contextual survey-based sixth section about the academic profession).

University-enterprise partnerships studied in this chapter are clearly bottom-up driven; they succeed because individual researchers’ motivations

are followed, often despite a weak or missing entrepreneurial culture across their institutions; in contrast, top-down approaches to creating partnerships where individual motivations are weak or missing seem to be bound to fail (just as top-down pushes towards more third mission or more entrepreneurial activities in European universities may be detrimental or ineffective: as Philpott *et al.* observed, “the research indicates that a bottom-up approach is more conducive to fostering academic entrepreneurialism in a comprehensive university setting and thus university management need to be cognisant of the underlying culture within their institution before engaging in interventionist policies”, 2011: 169). Partnerships studied, from the perspective of the individual/institutional distinction, are all clearly individual-driven rather than institution-driven. They seem to be more successful, though, when the norms, rules, behaviors and routines shared across the institution are similar to those shared by entrepreneurial researchers or administrators involved in running partnerships. The role of institutional academic norms was viewed as key already when first studies of university-industry liaisons were published (see, for instance, early studies by Stankiewicz 1986: 27, Fairweather 1988).

The role of individuals, powerful and visionary leaders in partnerships studied, is critical. Leaders, both researchers, administrators and researchers-turned-administrators (as often in the case of research groups as “quasi-firms”, Etzkowitz 2003: 111), make every effort to sustain expanding partnerships and research groups they created. The “human factor” in partnerships, or individual-level characteristics accompanying institutional-level characteristics, represented by academics and administrators alike (located in universities or in its close surroundings, most often both physically and organizationally), is at least as important as other factors. Which is consistent with what Abreu *et al.* (2008: 45) observed recently on the basis of their study of knowledge exchange in the United Kingdom: “There are multiple knowledge exchange mechanisms; the most important of these involve people”. Other factors include the legal ambience in which partnerships appear, the availability of infrastructure and university support structures for entrepreneurialism, public and private funding available, and the overall positive attitude of universities towards partnerships with enterprises (or the appropriate “institutional culture”, see Braunerhjelm 2007, and the “entrepreneurial belief” or the “integrated entrepreneurial culture”, see Clark 1998a). And often, as our research shows, the “human factor” seems more important than other factors for the partnership’s lasting success.

In several cases studied, the role of individuals involved in creating and maintaining partnerships is overwhelming. Their determination, persistent acting against institutional and administrative obstacles, but also persistent opportunism, or acting when opportunities arise, make partnerships financially sustainable. Also recent studies of academic entrepreneurialism in European universities show that the bottom-up approach is of critical importance in establishing and running partnerships, even though the top-down arrangements (e.g. national, regional and institutional policies accompanied by various national and regional forms of supporting entrepreneurialism, or national or regional funding schemes to support university-enterprises partnerships) are important as well (on specific conditions for academic entrepreneurialism to appear more widely in European universities, see Shattock 2009a, Temple 2009, Kwiek 2008a, Kwiek 2009a, Williams 2009, Temple 2011, and Mora, Vieira and Detmer 2011).

Top-down vs. bottom-up initiatives

The pattern of the emergence, growth and evolution of successful partnerships is structurally similar in several cases studied: there are powerful, charismatic individuals (rectors, former rectors, or university professors with internationally recognized research achievements). Without much influence of top-down national policies supporting university-industry links, these individuals become heavily involved in establishing a viable support structure of university-industry cooperation. The structure often involves a network of local and regional private businesses (mostly, although not exclusively, small and medium-sized enterprises). These individuals use both their academic powers at the university (to make a public institution enter smoothly the partnership) and their excellent relations with local and regional authorities (to make them enter the partnership and possibly invest municipal land and/or municipal and regional public funding). At the same time, powerful university leaders ensure good working relationships with local and regional businesses, sometimes with core business funders in the region, and based on their networking abilities and past experiences of collaboration, ensure a necessary level of trust between all stakeholders involved in the emergent partnership. Partnerships to be sustainable need long-term trust between their major stakeholders, first of all between universities and enterprises. The initial trust is often based on previous good personal relationships. What

also seems useful is high social and institutional visibility (and resulting social and institutional respect) in the region of the major stakeholders in a partnership.

Examples of powerful academic leaders involved in the creation and maintenance of successful partnerships in the current research include a former rector of the University of Poznań, Poland, who in the 1990s founded the first Polish science and technology park with the aid of Poznań municipalities and their land donation, with the aid of European Union structural funds and municipal and regional funding. After two decades, he is still running the park, the university foundation, and coordinating its recent multi-million-euro expansion. Other examples include a former rector of Politecnico di Torino, Italy, who founded the Istituto Superiore Marion Boella (ISMB) and combined several factors: regional needs of university-industry cooperation, the availability of funding from a private foundation, and the presence of a prestigious Italian university of technology. As the Italian institutional case study (GOODUEP case studies 2009, Politecnico di Torino, Italy)²³⁸ explains, “with the support of the Compagnia di San Paolo, he gave the initial boost for creating the ISMB and he was the Chairman of its Governing body from the beginning. The leadership of one person able to connect different elements in a big project is in this case the spark which explains to a great extent the success of the ISMB”. These findings are consistent with research results from other countries: as stressed recently, in Spain “relationships between universities and firms are linked to personal interactions between individuals. They are born from common and overlapping interests from both sectors and often take place through exchanges which are negotiated informally” (Ramos-Vielba *et al.* 2010: 652).²³⁹

238 References to the GOODUEP empirical material in this chapter will be given in the following format: GOODUEP case studies 2009/GOODUEP national reports 2009, the name of the institution, country.

239 It is different in the case of transformation of universities into entrepreneurial or adaptive organizations. As Clark (2004a: 5-6) summarizes his empirical findings from European universities, “sustainable adaptive universities do not depend on ephemeral personal leadership. Charismatic leaders can serve for a time but in the lifeline of universities they are here today and gone tomorrow. Lasting transformation also does not depend on a one-time burst of collective effort occasioned by a dire environmental threat ... Rather, whatever the initial stimulus, it depends on those collective responses that build new sets of structures and processes – accompanied by allied beliefs – that steadily express a determined institutional will”.

Powerful leaders in partnerships studied come from both managerial and academic university ranks. Examples in the current research include the visionary leadership of an eminent professor from the University of Santiago de Compostela, Spain, who stood behind the creation of the UNIEMPRENDE, a support structure dedicated to increasing the entrepreneurial culture at the university; its financial structure, the UNIRISCO, was already “exported” at the national level throughout Spain and then was used as a model in Colombia and Chile. As the Spanish institutional case study stresses,

The success of the UNIRISCO is certainly also due to the visionary leadership of its inventor: the professor who created the UNIEMPRENDE is completely dedicated to the development and improvement of the complex system of supporting structures he has set up over the years. ... With his networking skills and his strong will to realize the vision, the inventor of the UNIEMPRENDE presents a strong pull factor driving the university-enterprise partnership towards success by connecting university to entrepreneurial culture (GOODUEP case studies 2009, Santiago de Compostela, Spain).

Another example of the crucial role of individuals in the emergence of knowledge transfer and knowledge exchange structures comes from Valencia, Spain. The Institute of Biomechanics (IBV) was started over 30 years ago by a small group of people, including its current director, and the role of visionary leadership was key to its success. At Twente University in the Netherlands, the key role in promoting the initiative of the Kennispark was played by its former rector who was heavily involved in turning the university into an entrepreneurial organization (the institutional change process at Twente was reported for the first time in Burton Clark’s seminal discussion of a set of empirical case studies of European universities in *Creating Entrepreneurial Universities*, Clark 1998a: 39-60, and then in his *Sustaining Change in Universities*, Clark 2004a: 38-49). In smaller-scale partnerships, as in the case of the University of Kassel, Germany, the role of a strong, visionary academic leader was critical. The Kassel partnership studied represented a pyramid of twenty five researchers in the area of mechanical engineering, with a highly successful professor at its top. The role of the ability to combine the two university missions (the traditional research mission and various types of “third mission activities”, see especially Gulbrandsen and Slipsaeter 2007: 112ff, Laredo 2007: 441-456, Molas-Gallart *et al.* 2002, and Molas-Gallart 2004: 74-89, Zomer and Benneworth 2011) seems crucial to the success of the partnership. While

highly competitive, nationally and internationally relevant research output of the research team paved the way to get competitive national German research funding and research-based academic respect, diversified third mission activities provided additional funding based on hundreds of smaller-scale practical interventions performed at the level of companies, mostly located in the region. The vision of combining internationally competitive research on the one hand, and the provision of research-derived practical solutions to daily technical problems of regional small- and medium-size companies, often at an ad hoc basis, on the other hand, lies at the core of the long-term success of this partnership.

This University of Kassel partnership shows also the role of academic leadership combined with the ability to work according to two substantially different modes of operation: the academic mode and the business mode. It is a good example of Etzkowitz' findings about a research group functioning as a "quasi-firm" and about the stages of development of a research group:

Research groups operate as firm-like entities, lacking only a direct profit motive to make them a company. In the sciences, especially, professors are expected to be team leaders and team members, with the exception of technicians, are scientists in training. As group size increases to about seven or eight members, professors who formerly were doing research are typically compelled to remove themselves from the bench to devote virtually full time to organizational tasks. Often persons in this situation describe themselves as "running a small business" (Etzkowitz 2003: 111).

Leaders in partnerships studied are highly ambitious, being clearly in line with what Shattock noted about *Managing Successful Universities*, "ambition fuels success in universities as in other organizations. ... No organization can achieve success without being ambitious and competitive; success does not just happen, it is achieved" (Shattock 2003: 137). Both enterprises and universities, as well as their units involved in partnerships, are highly prestige-driven and competitive. Their logic of operation differs considerably, though (David and Metcalfe 2010: 90). As Lambert 2006: 161 summarizes the difference, "academics and business people are not natural bedfellows. They talk in different languages. They work to different timetables, and are driven by different incentives". Their time-scales seem to be different, and bureaucratic hurdles encountered in universities are sometimes hard to explain to enterprise partners. Our findings are consistent with what Ternouth *et al.* (2010) included among limiting factors influencing university-business cooperation: "the natural pace of activity

tends to be slower for universities. Lack of true commercial experience leads to protracted and bureaucratic processes. These tendencies reinforce each other to increase transaction costs which are a deterrent especially to smaller companies which are unused to such dealings”. Also Abreu *et al.* (2008: 13) enlist “a mismatch in time lines, with universities often operating on longer time scales” among barriers to cooperation. As reported, in a similar vein, in the Kassel partnership case study,

The logic of the company is different from the logic of the university in e.g. time-lapse: the university is naturally inclined to be involved in longer projects while companies usually want as short projects as possible. What does success mean for the staff involved in contract research? Successful projects mean that “the company will call us again”. The institute views itself, and its staff views themselves, as a helping partner to companies – and acts itself “almost like a company”. After years of experience, there is no major clash between the academic culture and the company culture in contracted work performed (GOODUEP case studies 2009, University of Kassel, Germany).

Not surprisingly, the majority of employees in university support structures studied (located within universities or in a close institutional proximity to them) come from universities but, at the same time, they do not share the same academic culture as their university-based colleagues. They seem more often to rely on a more business-related culture of entrepreneurialism (and often only heads of these structures remain both inside and outside of the academia, combining academic posts in the university and administrative posts in the cooperation support structure). The prestige gained through high research achievements is translated into the trust into academics’ abilities to solve technical problems of their enterprise partners on the part of enterprises seeking partnerships (in a similar manner, the partnership with a medical company studied at Hertfordshire University in the UK would not occur if the department partner did not have academic credibility in the area in which this company sought a solution to its technical problem).

“Inter-organizational trust” and the role of powerful individuals

Most university partnerships with enterprises studied are long-lasting and based on mutual “inter-organizational trust” (Bruneel *et al.* 2010: 861), gained in various types of previous smaller-scale collaborations. Previous small-scale collaborations lead often to higher-level, more institutionalized

and larger-scale collaborations, as various recent studies show (D'Este and Patel 2007: 1309, Ramos-Vielba and Fernández-Esquinas 2012). As Paul Temple (2012b: 14-15) pointed out recently, “partnerships shift over time across various categories of interaction. What might have begun as a relatively informal consultancy may turn into a formal, specially tailored teaching activity which might lead to a research collaboration”. Universities display the ability to manage and to reconfigure knowledge; they are able to “to take knowledge created in one context (consultancy, say) and to apply it in another context (perhaps formal research), with this then feeding into teaching” (see also Jongbloed and Zomer (2012: 99) on mutually feeding relations of “exploration” and “exploitation” between university and industry, Geuna and Muscio 2009 on two-way interactions between the two sectors, and Philpott *et al.* (2011: 162-164) on the impact of earlier “softer” entrepreneurial activities on later, more mature and “harder” activities).

The relationships of universities with enterprises studied are established with strong individuals (rectors, directors or academics), as well as with academic or non-academic (but remaining in an institutional proximity to universities) units or structures at first formed and then headed by those individuals for many years. Also external funding seems guaranteed by high academic prestige of university stakeholders, or their powerful business or political or social connections, as well as their high networking skills at local, regional or national levels. These powerful individuals are founding-fathers of a particular partnership or a particular university support structure for university entrepreneurialism. It is different at the university level and at the level of partnerships studied; Burton Clark in his early studies of the three “distinctive colleges” stresses the limited and controlled role of charisma in university leadership (Clark 1970: 240-245) and points out that, generally,

the occurrence of charisma is controlled and enhanced in systematic ways. It is partially controlled through the deliberate avoidance of charismatic figures. In higher education, men who appear strongly charismatic are not commonly selected by boards of trustees and faculties to be presidents of colleges, not primarily because of a shortage of supply, but because such men are inappropriate for the stability, continuity, and maintenance of the existing power structure. Such men seize and demand, rather than follow rules and respond to others. In normal times, they are judged too disruptive (Clark 1970: 241).

Former rectors involved in partnerships are sitting on boards in companies which are subsidizing their academic units or academic structures involved

in partnerships as they have long-lasting, trustful relationships with the business stakeholders in the partnership. They have trustful working relationships with business funders and their foundations; also charismatic academic professors maintain their endowed chairs in universities funded or co-funded by private local or regional companies, maintain their board memberships in science and technology parks and in university support structures, inside or outside of the academia.

Their role as individuals is critical, and they are not easily replaceable. The success of a lasting partnership is often an individual success much more than an institutional success. The less institutionalized partnerships are, the more susceptible they are to the succession problem, though, as emergent in several case studies. Social networking skills play an important role in partnerships, as shown by the Italian partnership case study of the Politecnico di Torino:

The ISBM was supported from the beginning by the Torino Wireless, a regional foundation of companies, local authorities, and universities which promote innovation in the region. The role of the Torino Wireless is finding out the needs of innovation that, when feasible, are solved by the ISMB. To some extent, the Torino Wireless is a provider of clients to the ISMB. Not too surprisingly, it happens that the Chair of the Torino Wireless is the former rector of Politecnico and Chair of the ISMB. Public authorities are not directly involved in the ISMB (although they are part of the Torino Wireless) but they have important demands of innovation which are tunneled through the ISMB (GOODUEP case studies 2009, Politecnico di Torino, Italy).

Academic linkages with private companies are based on very individual, trustful, and long-lasting relationships. The general rule could be that the more institutionalized a partnership support structure is (as the cases of the Kennispark in Enschede, the Netherlands, the ISMB in Torino, the IBV in Valencia, and the AMU Foundation in Poznań indicate), the more financially and institutionally viable (and the less vulnerable) it is in the future. In the cases of more individual (academics-led research) partnerships such as e.g. partnerships with small and medium enterprises via contracted research (as in the cases of the Kassel and Hertfordshire partnerships studied), there is a danger that they may gradually disappear as the level of their institutionalization is usually very low (and this is exactly what happened to the Kassel partnership in 2011, after the retirement of its academic leader).

7.4. Public subsidies and private donations in partnerships

Universities, business partners, and governments

Partnerships studied involve usually universities, business partners and local, regional or national governments. Public subsidies, private donations, or a combination of both sources of third stream funding, play a fundamental role both in their establishment and in their financial sustainability (which is consistent with the “no margin, no mission” slogan, a reminder that university partnership structures, as other organizations, cannot operate without revenue, as Weisbrod *et al.* point out, 2008: 5). The combination of the support of public authorities and access to public subsidies (especially of municipal and regional authorities and to regional public funding) and the support of private business donors and partners is crucial. Regional and national governments, in general, are as important in partnerships as universities and business even though, following Geiger (2004: 182) who analyzed American universities, it can be stated that “universities are the sellers and commercial firms the buyers”. Governments throughout the industrialized world are helping to build bridges between the higher education sector and the business sector. The link between academic research and the world of business is viewed as central in the knowledge economy discourse, both in academic research and at the national and European policymaking level (EC 2011a, EC 2011b, EC 2009a, and EC 2007a)

Lambert (2006: 162) lists three incentives governments can have in supporting building the bridges: they want to push their economies up the value chain and build a competitive advantage in knowledge-intensive industries; they want to maximize the return on the public funding of research; and they want to attract and retain research-intensive multinational businesses at a time when business research is going global. “Nowhere are these challenges more important than in Europe”, he concludes. Partnerships studied seem to need both public subsidies, especially at the time of their inception, and private donations from their business partners, especially later in their lifecycles. The combination of public and private funding and public and private lobbying and public relations seems especially fruitful. Public funding is most often available to partnerships and university partnership support structures in their initial stages of operation. Then they often become increasingly financially self-reliant and base their operations

increasingly on non-core income. But as literature shows, financial self-reliance of both partnerships and support structures is extremely hard to achieve. Some partnerships studied (e.g. the ISMB in Torino, see <http://www.ismb.it>) have had access to annual multi-million euro business partners donations for running costs from their major private partners for many years. Other partnerships, like the AMU Foundation in Poland and its science and technology park (see <http://www.ppnt.poznan.pl>), or the Kennispark at Twente University (see <http://www.kennispark.nl/>), have received substantial public financial support in the beginning, including the title to the ownership of land on which their infrastructure is being built. The case studies suggest that, in general, successful partnerships with enterprises most often made very good use of public subsidies, especially of regional development funds from regional development agencies or, as in the Polish case, of both regional and European structural funds. Then, with the passage of time, they are increasingly determined to seek new sources, especially non-state or private sources of revenues.

Public funding, private funding, and the governance of partnerships

The availability of public funding is sometimes a decisive factor for a partnership to emerge: it was the case of the Hull University partnership in the UK where regional development funding was made available to meet its start-up costs. In the case of the AMU Foundation and its science and technology park, both regional funding and European structural funds (regionally distributed), as well as the donation of the land belonging to the municipality were of critical importance both in the early 1990s and in the 2000s, its second period of expansion. The Twente University case of its Kennispark (and its predecessor, science and technology park) shows the importance of both public (municipal, regional, and national) funding and the donation of land belonging to the city. As the Kennispark partnership case study explains,

Financial commitment from the city, provincial and central governments for Kennispark started. The initiative was attractive due to its potential economic impact on the Twente region; at the same time, there were funds available for innovation, including those from the 2002-2003 Municipality Master Plan. Important funding from the three levels was received, being crucial for the project's viability (GOODUEP case studies 2009, University of Twente, the Netherlands).

On a smaller scale, public funding was also instrumental in setting up a University Hertfordshire partnership with a medium-sized medical company in which governmental KTP scheme (Knowledge Transfer Partnerships) was used to cover the costs of placing researchers (called KTP Associates) in firms, with specific research and development tasks to perform. Also in the Spanish case of the University of Santiago de Compostela, the UNIEMPRENDE university support structure (see <http://www.uniemprende.es>) has initially received financial and technical support from the regional government.

The regional involvement means in practice not only public funding for partnerships but also the commitment of governmental structures and regional development agencies to the development of the region through the partnership. The will to boost regional economy via various forms of university support structures for partnerships was clear in the cases of Twente University and the Maastricht University where regional authorities have had strong interest in collaborating not only with the university sector but also with the private sector, the other necessary element of partnerships. In the AMU Foundation case in Poland, structural funds invested in both AMU Foundation's science and technology park and the university itself have a clearly regional dimension. In the Cologne partnership studied, where demand-oriented study programs were developed (and whose model of combining studying and working became a German benchmark for other universities of applied sciences), the regional market-led demand to develop fee-based courses in some areas of studies was a determining factor.

Regional funds in the partnerships studied were both public and private. In two cases, the fostering of regional development was strongly supported by regional private big business institutions: in the case of the Torino's ISMB, an important national Torino-based bank (INTESA San Paolo) started a foundation and acted together with the technical university (Politecnico di Torino), accompanied by several other smaller private business partners. In the case of the UNIEMPRENDE support structure at the University of Santiago di Compostela, two big Galician private enterprises (Inditex and Grupo San José) invested their money needed to start the UNIRISCO company (see <http://www.unirisco.org>). The role of local small and medium enterprises was important in the Kassel case of academic entrepreneurialism: the regional entrepreneurs' association was funding at first an endowed chair for the professor in charge of the partnership at the university, and then the enterprises involved were often valuable clients in contracted research activities of the partnership. Ideally, both substantial public and private funding is made

available to a partnership, as in the case of the University of Santiago de Compostela in which both the support from Galician private enterprises and from regional development agencies were of critical importance to establish the partnership.

Both public funders (national and regional authorities, regional development agencies) and private donors (especially big companies) remain heavily involved in the governance of partnerships, and the relationships between public and private stakeholders and the university representatives in partnerships becomes trustful. Joint steering and supervisory bodies that include representatives of both public authorities and private companies are being formed and the three types of stakeholders – that is, representatives of public authorities, private companies, and public universities – often meet on a regular basis. As a Maastricht partnership case study stresses,

Steering bodies with representation of members from Maastricht University and other stakeholders (City of Maastricht, Academic Hospital, LIOF development agency, business sector) are put in place and meet on a regular basis with the management of the respective valorization bodies. The board members discuss the strategy of the Holding, respectively the BioPartner, and the BioMedBooster. There is good communication and trust among the partners. This was built up over the years and partly thanks to the persons sitting on the boards and the management GOODUEP case studies 2009, University of Maastricht, the Netherlands).

The partnerships studied, ideally, need both public subsidies and private donors for their operations. Both public and private funding is valuable, both short-term (for instance, start-up costs) and long-term commitment contributes to the success of partnerships. The scale of public and private commitments to partnerships differs across partnerships and across countries studied; also the role of representatives of public authorities and of private donors in boards of directors, councils or steering bodies of partnerships differs across institutions and countries, often being a reflection of national traditions. Most successful institutions and institutional support structures seem to be able to combine public and private funding from the very beginning. As noted in a study on American research universities and their patrons already three decades ago, “excessive dependence on a single patron produces an unhealthy degree of vulnerability. This is true even when the patron is as internally diverse as is the federal bureaucracy” (Rosenzweig and Turlington 1982: 47; see esp. Shattock 2009a and Williams 2009).

7.5. The university-enterprise inter-sectoral staff mobility

Choosing between the two different worlds?

It is also interesting to explore the extent to which European universities studied encourage (or tolerate) the mobility between public and private sectors, especially between the two nodes of partnerships: enterprises and universities. Not surprisingly, as the AMU partnership case study reports on Poland,

the world of enterprises and the world of academia are different, totally separate worlds. There seems to be no mobility between enterprises and universities possible. Once an academic leaves the university, his/her chances to return are minimal. The institutional culture at the university does not seem to allow such mobility (GOODUEP case studies 2009, University of Poznań, Poland).

It is not much different in other European countries studied, though. The findings are consistent with the strand of literature that shows that “in many European countries, researchers have to choose between academia and business, as any activity in one field will lead to the rejection by the other” (Wink 2004: 2).

Staff mobility from businesses to universities is rare in almost all countries studied. It is infrequent in Germany (as the Cologne partnership case study sums up, “mobility as such, although it is tolerated, it is not frequent” and, as the Kassel partnership case study puts it, “there is no mobility between the university and the academia”), hardly possible in Italy (“the rigidity of Italian university recruitment regulations does not allow easy mobility to and from enterprises”), and rare in the Netherlands (“there is not a lot of mobility between the university and enterprises. It is tolerated, though”). A slightly more positive conclusions are reached in the two UK cases (as the UK national report put it, “in principle, this would be welcome”). Finally, new developments were reported in the two Spanish cases: at a national level, a new law on universities (2007) promotes university-business partnerships and seems to enable academics to participate in, or create, private firms. The law allows them to take so-called “technological leaves of absence” and to retain their university tenure for up to 5 years. The practical consequences of the new law after several years in this area seem uncertain, though; as the Valencia partnership case study stresses, “this new norm represents a strong cultural change that is just starting to be used by academic staff” (GOODUEP case studies 2009, Valencia University of Technology, Spain).

Thus so far, the mobility understood as moving back and forth between universities and enterprises, and especially moving from enterprises to universities, seems marginal in the European countries studied. Researchers running their own spin-off companies in the Netherlands (as reported both in the Maastricht University and the Twente University cases) are requested to reconsider their presence in the company's management bodies within a year, and to make a choice which path of activity (the business path or the academic path) to follow. In Poland, there are no legal restrictions to run spin-off companies and to work full-time at the university at the same time, but the number of such companies is very limited. A new law on higher education (of March 2011) requires academics to seek consent of rectors of their universities to run any company, with no distinctions made between companies in general and spin-off companies. In the Kassel University case in Germany, there is a clear path followed by many researchers involved in research projects (the academic model) and in contracted research (the business model): researchers stay at the university until the completion of either their MA theses or their PhD theses under the supervision of their academic leader, the founder of the partnership studied. Then they immediately leave academia and go to the business sector. This is a classic example of a one-way university-enterprise mobility: as the Kassel partnership case study explains,

The standard career pattern for young researchers is to leave the university for much better paid company jobs. For the university, as in this case for the academic center in mechanical engineering studied, it is of critical importance which German companies are hiring its graduates or its PhDs. One of dimensions of excellence of the center is the prestige of companies which employ its graduates. The better companies, the better students in the future, this is the link (GOODUEP case studies 2009, University of Kassel, Germany).

There are many success factors for partnerships found in current research. They are consistent with what Lambert summarized as the ingredients for success in the case of small and medium-sized companies: "they include a strong and shared sense of purpose, a common strategic vision and detailed planning from the beginning. Each side must feel that the other is making a genuine contribution to the collaboration, and researchers need to get together often enough to discuss problems and establish trust" (Lambert 2006: 169, see Bruneel *et al.* 2010: 861).

Some types of partnerships produce researchers directly for the business sector, with no future chances to return to the academic

community, because of rigid institutional structures inhibiting the university-industry staff mobility. In European universities with more hierarchical institutional settings, with very limited access to career progression for junior researchers, or a very limited number of senior academic posts, the mobility is almost always from universities to enterprises. Although full-time returns from the business world to academia seem difficult, some part-time returns (e.g. sharing practical knowledge derived from company experience) still seem possible. In general, they are reported as rare. There is much more mobility between university support structures for partnerships and enterprises than between universities themselves and enterprises. Support structures differ in their proximity to universities; they can be parts of it, or be close to it in institutional and financial terms. Most support structures studied, no matter how close they are to universities from which they emerged, represent business attitudes and foster business or business-like culture of entrepreneurialism, which is closely related to their strongly felt need of financial self-reliance.

Tensions between different institutional cultures

We can draw a distinction between three separate cultures (and separate worlds) in the organizations studied: the academic world, with its traditional academic norms and values, usually with powerful Mertonian overtones (Martin and Etzkowitz 2000); the in-between world of academic support structures for partnerships (and for academic entrepreneurialism), with its academic norms and values, combined to different degrees with business norms and values; and, finally, the world of enterprises, with purely business norms and values and clear for-profit orientation (Ternouth *et al.* 2010). Changes in attitudes and norms must complement various incentive mechanisms in order to enhance to diffusion of knowledge from universities to the outside world (Braunerhjelm 2007: 622). There is a continuous tension between the two or three institutional cultures in the course of the existence of partnerships; their mix differs in time and is related to the staff composition and their sector origin, the financial condition and major sources of funding, and the organizational maturity of a partnership. More mature partnerships tend to show more business-like attitudes. From the perspective of institutional culture, the tension testifies to the one-way interpenetration of values and norms, though: business attitudes are clearly invading both support structures and university units (rather than traditional

academic attitudes invading enterprises; for an opposite view, see Bastedo (2012b: 4) who argues that nowadays “business is becoming more like higher education”). The differences in attitudes were clearly reported for the Kennispark at Twente University and for the Maastricht University partnership. Academic cultures and business cultures still rarely mix in the cases studied and therefore the mobility between business-oriented partnership support structures to the business world and back tend to be much more conceivable than the mobility between strictly academic structures and enterprises. At both national level and at the EU level, there is a growing interest in the staff mobility (EC 2009), especially at the level of PhDs, as various national and EU programs testify (for instance, there are IPPs, or Industry-Academia Partnerships and Pathways, one of Marie Curie Actions in the 7th Framework Programme, in which research and business sectors have to work hand in hand).

To sum up, the mobility between the world of business and the world of academia in European universities is infrequent; the isolation between the two worlds is reported to be high and university-enterprises partnerships are those rare institutional arrangements in which the two distinct institutional cultures meet on a daily basis. There are different motivations for knowledge production in the two sectors, and there are clashes in values and norms, widely studied in the literature (see especially Bruneel, D’Este and Salter 2010, Abreu *et al.* 2008, Ternouth *et al.* 2010, Philpott *et al.* 2011, David and Metcalfe 2010, Guldbrandsen, Mowery and Feldman 2011, and Braunerhjelm 2007). Our research findings are fully consistent with how David and Metcalfe summarized the differences between universities and companies involved in knowledge exchange activities recently: apart from different “governance systems”, and “different norms for the production and sharing of knowledge within and between the two systems”, they also represent “different cultures, different value systems, different time frames, and different notions of what their principal activities are. Thus the principal output of universities are educated minds and new understandings of the natural and artificial worlds, economy, society and so on. The outputs of business are different” (David and Metcalfe 2010: 90).²⁴⁰

240 The role of close university-business links have been emphasized at the level of the European Commission repeatedly in the last few years. The Commission has launched what it termed “the University-Business Forum”, which is described as (EC 2011b) “a platform on European level for a structured dialogue between the stakeholders. The exchanges and discussions are based on real cases and address university-business

While knowledge produced in universities is more “public”, knowledge produced in firms is “private” (Bruneel, D’Este and Salter 2010: 859): it is

largely closed, remaining hidden within the firm or disclosed in a limited way through patents filed primarily for the purposes of obtaining temporary monopolies. ... the primary motivation of firms’ knowledge creation activities is the appropriation of knowledge for private gain, and openness to external actors is used as a strategic mechanism to gain advantage over competitors. Given these two systems of knowledge production, U-I [university-industry] collaborations are likely to be plagued with conflicts due to a weak attitudinal alignment between partners.

There is a lot of uncertainty and suspicion between the two sectors but especially public (and in some cases private) funding makes the meeting of two institutional cultures fruitful for both academic and business partners.

7.6. A wider empirical context: partnerships and academic norms and values in 2011

Norms and values of European academics in 2011

In exploring the diversification of channels of knowledge exchange in European universities and changing roles of individuals, institutions, public and private funding arrangements and staff mobility in the success of partnerships, a wider empirical context is also useful. A large-scale comparative empirical studies of attitudes to university-enterprises partnerships can either focus on academics or on the business community (for the business perspective, see a study by Ternouth *et al.* 2010). Here, we refer to recent (2011) studies of European academics in eleven countries. Thus research findings presented in this chapter

cooperation related topics from the business and higher education perspectives, including governance, curriculum development and delivery, mobility, lifelong learning, knowledge transfer, entrepreneurship, etc. The Forum has opened a dialogue between the two worlds about how they can work more closely together. It has demonstrated that there is an appetite on both sides for working in partnership focused on education, with the common goal to ensuring that education delivers high-level and highly valued skills, underpinned at all times by high levels of adaptability, entrepreneurship and creative and innovative capacities. ... The overall objective of this action is to ensure stronger societal and economic relevance and outreach of higher education through strengthening the employability, creativity and innovative potential of graduates and professors and the role of higher education institutions as engines of innovation”.

can be viewed in a larger context of general attitudes of European academics to research they perform and how they classify their own research activities. So far, the literature in the area based on empirical data tended to focus on national systems (or if globally, then with only four European systems represented, as in the Carnegie study of the academic profession, as reported in Altbach 1996 and Boyer, Altbach and Whitelaw 1994). The present contextual analysis comes from the EUROAC project dataset (an ESF “Academic Profession in Europe: Responses to Societal Challenges” project which follows the global format of a CAP “Changing Academic Profession” project, based on country data from 11 European countries, with about 20,000 returned surveys and 600 semi-structured in-depth interviews (the present author was coordinating the Polish part of the EUROAC project which includes about 3,500 returned surveys and 60 semi-structured interviews).²⁴¹

The survey data (as well as large qualitative material from interviews in seven countries, not studied in this chapter) tend to indicate a huge heterogeneity in attitudes towards commercialization and technology transfer, based on prevailing academic norms and values, across the European continent. From among self-identifying options studied in the survey (four answers to the question “How would you characterize the emphasis of your primary research this (or the previous) academic year?”: “basic/ theoretical”, “applied/ practically oriented”, “commercially-oriented/ intended for technology transfer” and “socially-oriented/ intended for the betterment of society”), half or more of academics in the countries studied (except for Switzerland and Portugal) chose “basic/theoretical” (50-69 percent) and more than a half of academics chose “applied/practically oriented” (55-73 percent) self-declared identification.

The emphasis of primary research across European systems

The “commercially-oriented/intended for technology transfer” option is indicated by between 14 percent of academics (in such countries as Austria, the Netherlands, and Norway) and 20-22 percent (in such countries as

241 Research in Europe was conducted in 2009-2011, coordinated by Ulrich Teichler of Kassel University, and funded by the European Science Foundation. The dataset used in this chapter was created by René Kooij and Florian Löwenstein for the EUROAC project (date of version: 17.06.2011), E-mail: kooij@incher.uni-kassel.de; loewenstein@incher.uni-kassel.de, International Centre of Higher education Research - INCHER-Kassel, University of Kassel, Germany.

Germany, Finland, and Switzerland). Most innovative economies in Europe in the last half a decade – Germany, Finland, and Switzerland – have systems of higher education which are highly positive towards commercialization activities compared with other countries, which may indicate a more direct link between academic values and norms, and especially positive attitudes towards knowledge exchange between the university sector and the business sector, and innovation and the economic competitiveness of nations. Cross-national variations between European systems in attitudes about the commercialization of research and technology transfer are given below, in the context of overall emphasis in research activities across eleven countries. The scale of answers in Tables 1 and 2 below was from 1 = “Very much” to 5 = “Not at all”. The number of academics surveyed varied but in most countries the number was more than 1.000. The countries in Tables 1 and 2 are shown in a descending order: from those systems in which academics identify most with the commercial orientation in their own research to those systems in which this identification is the lowest; the difference between the highest ranking countries (Switzerland, Finland, and Portugal) and the lowest ranking ones (Austria and Norway) is not substantial, though (3.8 vs. 4.2).

Table 1. *Character of Primary Research (arithmetic mean)*

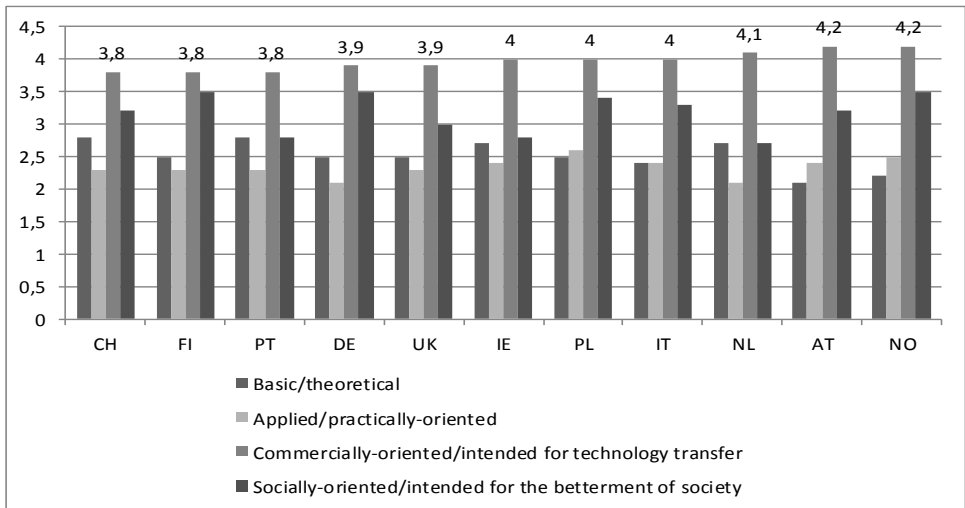
Question D2: **How would you characterize the emphasis of your primary research** this (or the previous) academic year? (Scale of answer from 1 = Very much to 5 = Not at all)

Country	Basic/ theoretical	Applied/ practically- oriented	Commercially- oriented/ intended for technology transfer	Socially-oriented/ intended for the betterment of society	Count (n)
CH	2.8	2.3	3.8	3.2	1234
FI	2.5	2.3	3.8	3.5	1126
PT	2.8	2.3	3.8	2.8	1006
DE	2.5	2.1	3.9	3.5	1053
UK	2.5	2.3	3.9	3	805
IE	2.7	2.4	4	2.8	856
PL	2.5	2.6	4	3.4	3410

IT	2.4	2.4	4	3.3	1684
NL	2.7	2.1	4.1	2.7	578
AT	2.1	2.4	4.2	3.2	1410
NO	2.2	2.5	4.2	3.5	912

Table 2. Character of Primary Research (arithmetic mean)

Question D2: **How would you characterize the emphasis of your primary research** this (or the previous) academic year? (Scale of answer from 1 = Very much to 5 = Not at all)



Count: n(CH)=1234; n(FI)=1126; n(PT)=1006; n(DE)=1053; n(UK)=805; n(IE)=856; n(PL)=3410; n(IT)=1684; n(NL)=578; n(AT)=1410; n(NO)=912.

The differences between European systems become much more marked if we analyze only the answers 1 and 2 (from a scale of 1 to 5), i.e. those closest to the (positive) “Very much” answer. The variation between systems the least identifying with the commercialization and technology transfer in universities is by more than 50 percent: while in Austria, the Netherlands, and Norway, the percentage of answers is 14 percent, in those systems most strongly identifying with third mission activities, commercialization and technology transfer (Germany, Switzerland, and Finland), the percentage of answers is in the 20-22 percent range. The details are given below in Table 3.

Table 3. *Character of Primary Research (percent; responses 1 and 2)*

Question D2: **How would you characterize the emphasis of your primary research** this (or the previous) academic year? (Scale of answer 1 = Very much to 5 = Not at all)

Country	Basic/ theoretical	Applied/ practically- oriented	Commercially- oriented/ intended for technology transfer	Socially-oriented /intended for the betterment of society	Count (n)
AT	69	61	14	39	1490
NL	50	73	14	51	578
NO	67	59	14	30	912
IT	57	61	15	34	1684
IE	50	63	16	48	856
UK	55	66	17	41	805
PL	58	55	18	32	3410
PT	42	64	18	48	1006
DE	58	70	20	30	1053
FI	56	66	21	31	1126
CH	44	65	22	37	1234

Writing academic papers vs. technology transfer activities and patenting

There have been concerns about the impact of changing relationships between universities and industry on basic research performed in universities, as summarized by Ranga *et al.* (2003: 301-302): “the process of reorienting Science to the needs of industry is often seen as coming only at a very heavy price, namely that universities will be deflected from their primary mission of undertaking basic research, in the interests of commercialization”. In the cases studied in the GOODUEP project, similar concerns have not been voiced. Rather, consistently with one line of

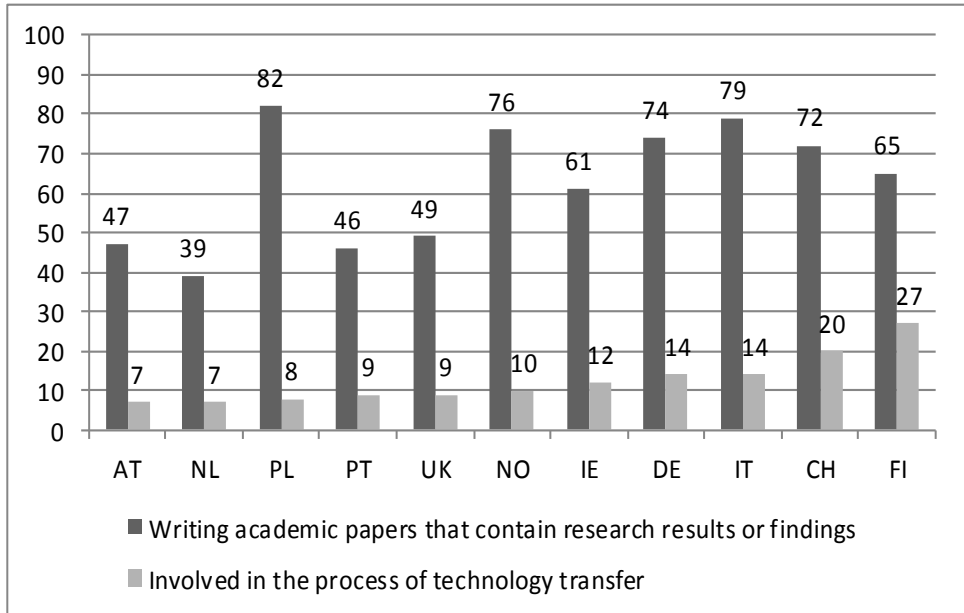
literature (Ranga *et al.* 2003: 318, Siegel *et al.* 2007: 497), mutually reinforcing relationships were observed between various channels of knowledge exchange (as Larsen (2011: 16) pointed out, “publishing, patenting, and various other forms of academic enterprise, appear to be complementary rather than competing activities”). A higher degree of involvement in partnerships, at an individual academic or a research group level, meant usually a higher publication record and more other academic achievements (see a study by Lam (2011) on three different motivations of academic scientists to engage in research commercialization: “gold”, “ribbon” or “puzzle”, Bercovitz and Feldman 2007).

The majority of partnerships studied were “soft” channels of knowledge exchange or entrepreneurial activities (and only several were “hard”, on the distinction, see Philpott *et al.* 2011: 162-163) but the findings were consistent across academic institutions and across countries. They are in turn consistent with research results of the EUROAC project which shows that the large-scale involvement of the academic community in the traditional channel of knowledge exchange (“writing academic papers” as an academic activity; see Godin and Gingras (2000: 277) on the centrality of universities vis-à-vis the government, industry, and the hospital sectors in the knowledge production through scientific papers, and Cohen *et al.* 2003 on published papers as a key channel through which university research impacts industrial R&D) in many systems is combined with technology transfer activities and patenting. One of the questions asked in the survey was the following: “Have you been involved in any of the following research activities during this (or the previous) academic year?” The analysis of the EUROAC dataset shows that in the countries in which the highest share of academics is involved in writing academic papers, also the highest share of academics is involved in technology transfer (they do not have to be the same academics; on the same research groups, see Ranga *et al.* 2003, the same academics, or the level of “forgotten individuals” in the studies of commercialization, see Magnusson *et al.* 2009). This is especially clear in the four countries with the highest level of staff involvement in technology transfer activities: Finland (27 percent), Switzerland (20 percent), Italy (14 percent) and Germany (14 percent); Poland is a special case which combines the highest degree of involvement in writing academic papers and one of the lowest degrees in technology transfer, due to the Polish system being highly inward-looking and academically-driven, see

Kwiek 2012a, Kwiek and Maassen 2012). The details are given below in Tab. 4, and full data in the Data Appendix.

Table 4. *Research Activities (percent of all respondents; multiple responses)*

Question D3: Have you been involved in any of the following research activities during this or the previous academic year? **Writing academic papers that contain research results or findings vs. involved in the process of technology transfer**

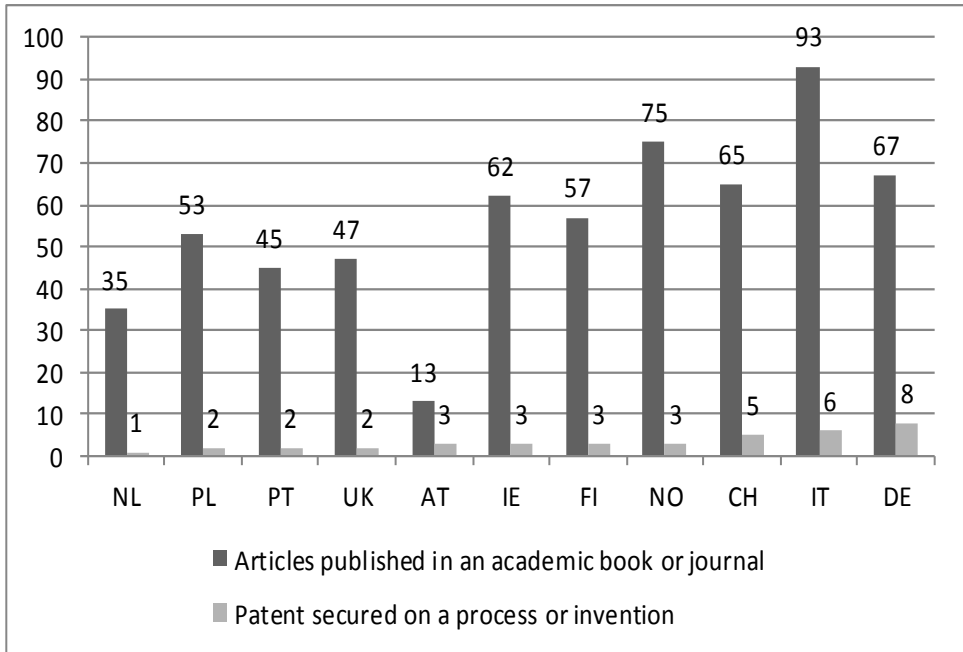


Count: n(AT)=1492; n(NL)=1209; n(PL)=3704; n(PT)=1513; n(UK)=1467; n(NO)=986; n(IE)=1126; n(DE)=1215; n(IT)=1711; n(CH)=1414; n(FI)=1374.

A similar cross-country analysis can be performed with another set of variables referring to different research outputs completed in the past three years: “articles published in an academic book or journal” and “patent secured on a process or invention”. The three countries in which the highest share of academics was involved in patenting (Germany 8 percent, Italy 6 percent, and Switzerland 5 percent) are all countries in which the share of academics publishing academic articles is higher than the average in the sample of European systems. The details are given below in Tab. 5, and full data in the Data Appendix.

Table 5. *Proportion of Respondents Producing Different Research Outputs in the Past Three Years (percent of all respondents; multiple responses)*

Question D4: How many of the following scholarly contributions have you completed in the past three years? **Articles published in an academic book or journal vs. patent secured on a process or invention** (percent of all respondents)



Count: n(NL)=1209; n(PL)=3704; n(PT)=1513; n(UK)=1467; n(AT)=1492; n(IE)=1126; n(FI)=1374; n(NO)=986; n(CH)=1414; n(IT)=1711; n(DE)=1215.

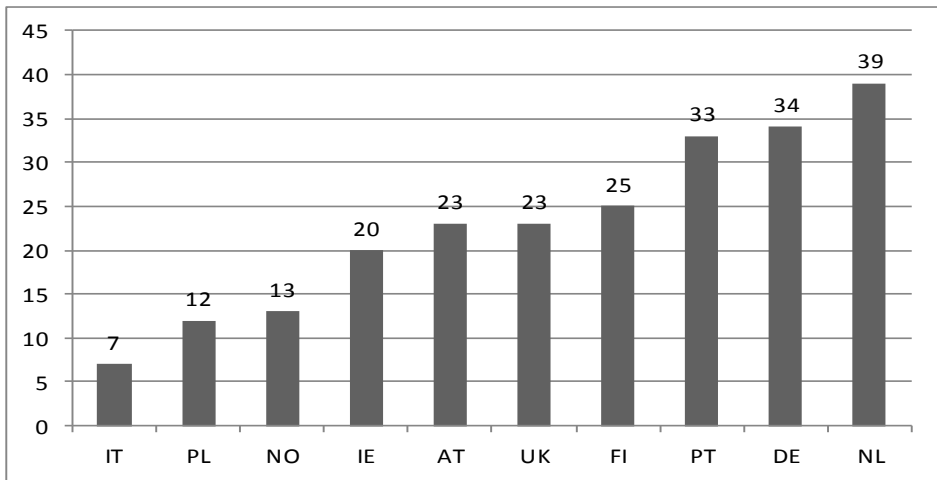
Staff recruitment procedures: work experience outside academia

Also the research findings about the staff mobility presented in this chapter are consistent with the EUROAC survey data which clearly show that most European institutions do not consider work experience outside of academia as important in their staff recruitment procedures. The survey question asked was “to what extent does your institution emphasize the following practices” (Scale of answer 1 = Very much to 5 = Not at all): “recruiting faculty who have work experience outside of academia”. The (most positive) answers 1 and 2 varied substantially across countries, from 7 percent to 39 percent, with the lowest scores in Italy, Poland, and Norway, and the highest scores in Portugal, Germany and the Netherlands. Only in four countries, the

emphasis on the recruitment of faculty who have work experience was reported by a quarter or more of academics (Finland, Portugal, Germany, and the Netherlands). The details of cross-country variations are given below in Table 6, and full data in the Data Appendix.

Table 6. *Strong Perceptions of Teaching and Research Related Institutional Strategies (percent; responses 1 and 2)*

Question E6: To what extent does your institution emphasize the following practices? (Scale of answer 1 = Very much to 5 = Not at all): **“Recruiting faculty who have work experience outside of academia”**.



Count: n(IT)=1622; n(PL)=3424; n(NO)=871; n(IE)=794; n(AT)=1113; n(UK)=796; n(FI)=1173; n(PT)=960; n(DE)=1001; n(NL)=688.

To sum up this contextual brief section: the context provided by large-scale European comparative higher education research is useful in relating various knowledge exchange channels and processes to academic norms and attitudes represented by the European academic profession. The implementation of national and European-level policies of strengthening university-enterprises links is always conditional to, and embedded in, academic institutions and their values and norms. Large-*N* (statistical) research designs are becoming increasingly useful in putting knowledge transfer in the context of the academic profession studies.

7.7. Conclusions

Research findings in this chapter support strongly the argument according to which the role of individuals in knowledge exchange is equal to (and often higher than) that of institutional (both funding- and governance-related) arrangements. Case studies across European universities seem to indicate that individual academic norms and values, as studied in the academic profession research, count at least as much in the development of university-enterprise partnerships as institutional academic norms and values, as studied in institutionalist approaches to the studies of organizations (Maassen and Olsen 2007). Partnerships studied here are bottom-up driven and heavily dependent on their visionary leaders who are often functioning like “quasi-firms”. Policy changes leading to the enhancement of university-business links, to be successful, need to refer to the existing academic norms and values which show strong country-variations across Europe. The most successful partnerships seem to emerge when there is a convergence between individual academic norms, supportive of knowledge exchange with the outside environment, and institutional academic norms, favoring academic entrepreneurialism and third-mission activities.

The pattern of growth of partnerships across Europe seems structurally similar, although the level of public engagement (and public funding) in partnerships varies widely. While the world of academia and the world of business operate like separate universes (with different attitudes and work motives, different institutional cultures, timeframes of operation and conceptions of what their core activities are), at the intersections between them found in partnerships, the two worlds come closer for specific purposes, in specific academic places, and with specific (often publicly-supported) funding arrangements. The inter-sectoral mobility was found to be very low, mostly one-way (from the academia to the business sector) but nevertheless present through various part-time arrangements. The European academic profession, as viewed through the lenses of a large-scale statistical analysis of eleven countries, seems surprisingly highly appreciative of commercially-oriented research, with such countries as Germany, Finland and Switzerland having one fifth or more academics characterizing their research emphasis as strongly commercially-oriented. The most popular soft channel of knowledge transfer, that is “writing academic papers”, does not seem to collide with such hard channels as technology transfer and patenting, at least at the level of national systems (an individual-level cross-country analysis of relationships between

engagement in soft and hard channels goes beyond the scope of this chapter but is an exciting research direction for the future).

Finally, there are two wider lessons to be drawn: one is in line with what John Ziman suggested almost two decades ago in his study on science in a “dynamic steady state”: we are in a state of flux leading to transformative changes in the university sector across Europe, and various knowledge exchange mechanisms are those university nodes where the changes are experimented with. They are in the eye of the storm:

We are still in the midst of a major historical event, whose contours and outcome we can only guess. ... The new structures that are emerging are not the products of a gentle process of evolution: they are being shaped very roughly by a dynamic balance between external forces exerted by society at large and internal pressures intrinsic to science itself. ... The whole system has become extraordinarily fluid. Nobody is quite sure what arrangements will crystallize out and harden into a regular pattern of principles, procedures, policies and practices for the longer run (Ziman 1994: 25).

And the second lesson is in line with a long-term historical perspective in which universities and businesses are entirely separate social institutions with separate, incongruent social roles and tasks. They increasingly meet and cooperate in such places as partnerships studied in this chapter but their internal cultures remain and should remain different. As J. Stanley Metcalfe (2010: 30) stressed recently,

the division of labour between profit seeking business corporations and universities reflects both the quite distinct roles that these organisations fulfill, and, the complementarity between those roles. We can all understand that it would be as unwise to expect firms to behave like universities as it would be to expect universities to behave like firms. The division of labour is there for a purpose, it should be respected.

Note: the chapter refers specifically to national reports from six countries (Spain, Germany, Italy, the Netherlands, Poland, and the United Kingdom), eighteen institutional case studies (University of Kassel, Technische Universität Darmstadt, and Cologne University of Applied Sciences in Germany; Valencia University of Technology, University of Santiago de Compostela and University of Seville in Spain; Politecnico di Torino, University Commerciale Luigi Bocconi, and University of the Salento at Lecce in Italy; University of Maastricht, University of Twente, and Utrecht University of Applied Sciences in the Netherlands; Adam Mickiewicz University/University of Poznań, Poznań University of Economics and Poznań University of Technology in Poland; and University of Warwick, University of Hull, and University of Hertfordshire in the United Kingdom), and ten

Data Appendix:

Table 7. *Research Activities (percent of all respondents; multiple responses)*

	2010				2007/08							
	AT	CH	IE	PL	NL	DE	FI	IT	NO	PT	UK	
Preparing experiments, inquiries etc.	53	57	55	40	34	60	57	56	51	32	30	
Conducting experiments, inquiries etc.	50	54	66	38	30	58	50	54	41	30	29	
Supervising a research team or graduate research assistants	48	40	36	49	23	39	38	63	31	16	25	
<u>Writing academic papers that contain research results or findings</u>	82	72	61	82	39	74	65	79	76	46	49	
<u>Involved in the process of technology transfer</u>	11	20	12	8	7	14	27	14	10	9	9	
Answering calls for proposals or writing research grants	56	45	45	54	27	50	49	70	70	15	35	
Managing research contracts and budgets	42	34	33	16	10	37	29	44	30	11	21	
Purchasing or selecting equipment and research supplies	34	34	30	46	8	40	39	59	32	23	24	
No answer	11	15	11	12	55	17	18	4	13	42	48	
Total	387	370	349	346	233	389	373	443	354	225	271	
Count (n)	1492	1414	1126	3704	1209	1215	1374	1711	986	1513	1467	

Question D3: Have you been involved in any of the following research activities during this or the previous) academic year?

partnership case studies (Institute of Materials Technology – Polymer and Recycling Technology, University of Kassel; Integrated and Dual Study Programmes, Cologne University of Applied Sciences; Valencia Institute of Biomechanics, Valencia University of Technology; UNIRISCO, University of Santaigo de Compostela; Instituto Superiore Mario Boella, Politecnico di Torino; University of Maastrich Holding BV; Kennispark, University of Twente; Adam Mickiewicz University Foundation’s Science and Technology Park, University of Poznań; Hull Logistics Institute, University of Hull; and University of Hertfordshire and Heales Medical Ltd), publicly available from the GOODUEP (“Good Practices in University-Enterprise Partnerships”) project website: <http://www.gooduep.eu/>.

Table 8. *Proportion of Respondents Producing Different Research Outputs in the Past Three Years (percent of all respondents; multiple responses)*

	2010				2007/08							
	AT	CH	HR	IE	PL	NL	DE	FI	IT	NO	PT	UK
Scholarly books you authored or co-authored	29	22	34	15	9	12	18	19	47	23	16	11
Scholarly books you edited or co-edited	26	12	24	14	7	8	12	14	26	12	13	8
<u>Articles published in an academic book or journal</u>	23	65	82	62	53	35	67	57	93	75	45	47
Research report/monograph written for a funded project	46	45	26	34	12	17	47	30	47	19	28	20
Paper presented at a scholarly conference	76	65	85	65	51	32	64	59	84	70	49	46
Professional article written for a newspaper or magazine	26	32	31	23	19	22	24	26	28	31	20	14
<u>Patent secured on a process or invention</u>	5	5	1	3	2	1	8	3	6	3	2	2
Computer program written for public use	5	7	8	4	1	3	6	5	4	4	4	3
Artistic work performed or exhibited	2	6	4	4	2	1	4	3	1	5	3	2
Video or film produced	4	7	4	6	0	1	6	3	3	4	3	2
Others	5	5	6	5	3	2	4	5	4	9	8	5
No research activity stated	15	18	7	27	39	56	17	24	2	12	39	47
Total	262	289	313	263	199	189	276	247	344	266	231	207
Count (n)	1492	1414	354	1126	3704	1209	1215	1374	1711	986	1513	1467

Question D4: How many of the following scholarly contributions have you completed in the past three years?

Table 9. *Strong Perceptions of Teaching and Research Related Institutional Strategies (percent; responses 1 and 2)*

	2010				2007/08						
	AT	IE	PL	NL	DE	FI	IT	NO	PT	UK	
Performance based allocation of resources to academic units	40	22	38	37	49	55	30	53	16	47	
Evaluation based allocation of resources to academic units	25	13	25	26	26	35	23	23	15	33	
Funding of departments substantially based on numbers of students	29	59	49	75	45	46	54	51	40	70	
Funding of departments substantially based on numbers of graduates	18	30	9	66	25	70	23	55	20	30	
Considering the research quality when making personnel decisions	48	40	32	38	50	39	23	34	22	62	
Considering the teaching quality when making personnel decisions	20	18	23	39	26	28	12	26	17	31	
<u>Considering the practical relevance/applicability of the work of colleagues when making personnel decisions</u>	23	16	16	31	22	31	11	20	15	29	
<u>Recruiting faculty who have work experience outside of academia</u>	22	20	12	39	34	25	7	13	33	23	
<u>Encouraging academics to adopt service activities/entrepreneurial activities outside the institution</u>	11	23	12	27	50	20	15	14	32	30	
<u>Encouraging individuals, businesses, foundations etc. to contribute more to higher education</u>	34	40	21	37	45	19	22	20	29	36	
Count (n)	1138	794	3424	688	1001	1173	1622	871	960	796	

Question E6: To what extent does your institution emphasize the following practices? (Scale of answer 1 = Very much to 5 = Not at all)

Marek Kwiek

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