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Regional Innovation Monitor

Thematic Paper 4

The Role of Universities for Regional Innovation Strategies

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In association with:

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Preface

The research for this report was undertaken by UNU-MERIT for Directorate-General for Enterprise and Industry within the framework of the project 'Regional Innovation Monitor' (Contract No. ENTR/09/32).

This RIM thematic paper is the product of desktop research carried out between mid-October and mid-December 2011. It takes into account material from the RIM baseline regional profiles, innovation measures repository as well as the regional governance and policy survey which were all developed within the framework of the RIM project. This report was written by Henning Kroll, Elisabeth Baier, and Thomas Stahlecker (Fraunhofer ISI).

The authors wish to thank all those who have provided their comments on the draft of this paper.

RIM provides detailed information on regional innovation policies for 20 EU Member States: Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Poland, Portugal, Romania, Slovakia, Spain, Sweden and the United Kingdom. The core of the RIM service is a knowledge base of information on some 200 regions.

The European Commission official responsible for the project is Alberto Licciardello (Alberto.LICCIARDELLO@ec.europa.eu).

For further information about the Regional Innovation Monitor and access to the full range of information on regional innovation policies, please visit the RIM website at: <http://www.rim-europa.eu>

Disclaimer

It should be noted that the content and conclusions of this report do not necessarily represent the views of the European Commission. The report is the sole responsibility of the authors.

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Executive Summary

This paper discusses the potential of universities for regional innovation policy.

In a conceptual section it illustrates that universities are gradually gaining managerial and budgetary autonomy so that the process of engaging them in regional innovation policy is about consensus building and convincing their managers rather than about direct regulation. We argue, however, that this increases rather than decreases the potential of building a strong basis for joint undertakings – as all attempts to micro-manage the regional activities of independent scientists would not constitute a convincing alternative.

Second, it emphasizes that in many regions a large array of locally oriented activities is already being performed by individual scientists – although internal incentive systems at universities often do not yet provide strong support for these activities. Beyond intrinsic motivations, a key reason for such activities is that they provide an opportunity for external funding. The individual motivation to acquire such funding provides a second point of political leverage.

Third, it is illustrated that no two universities are alike, neither with respect to their manager's priorities, nor with a view to the composition of their research fields and courses. Additionally, much depends on the national system of research and higher education and the organisational history that comes with it. Finally, the regional environment plays a major role. An important finding in this regard is that in many regions, the main potential is to a larger extent present in mid-range colleges than in “national stars” located but not embedded in the region.

With respect to policy conclusions, the report,, based on a number of case studies, demonstrates that the options to intervene are manifold but can nonetheless be structured within a certain system. Arguably, attempts to leverage the potential of universities for regional innovation policy should be based on a double strategy: First, to involve university managers in the process of regional strategy development in order to enable them to establish consensus on a number of high-level endeavours aiming for change. Several important issues can only be addressed in this way. Second, to provide a tailor made array of external funding opportunities to facilitate regionally-oriented activities of individual researchers – as high-level agreements will not immediately translate into novel internal incentive systems for everyone.

Arguably, both of these approaches have to be strengthened, and become more focused to successfully implement future regional innovation strategies.

Introduction

The general empirical finding that the presence of a university in a region results in some sort of, often beneficial, impact on its environment is a well-known and broadly accepted fact – although the extent and nature of these effects remain disputed. Less is known, however, about the actual nature and prevalence of interrelations between universities and their regional environment – both on the level of the individual researcher as well as on the level of the universities’ central management.

For that reason, this paper has to start with a documentation of broadly accepted conceptual considerations and the available empirical knowledge about the nature and patterns of interactions between universities and their regional environment. In particular, this first section will aim to illustrate which motivations drive individual researchers and universities to conduct such activities, and how the overall framework conditions relevant to them may have changed in recent years. Additionally, it will deal with the issue whether there is such thing as “a university” in Europe, i.e. to what extent different universities are alike, and, if not, what the implications are for their supposed dormant potential for the development of regional innovation capabilities.

It is important to point out, however, that this paper will not focus on these issues from the perspective of the state administering the universities or the universities themselves aiming to develop suitable overall strategies. Instead, it will take on the perspective of the regional innovation policy maker who, generally aware of the fact that universities harbour a latent potential, wants to learn more about the ways in which regions can aim to leverage this potential – in a situation where many of them are not, or no longer, in the position to determine the institutional strategies of the universities in detail.

In brief, the following thematic paper is aimed at exploring the potentials that the presence of universities provides for regional innovation policy. In line with that, the examples and good-practice cases that will be presented and analysed will, as far as possible, focus on policy actions, rather than on individual universities’ strategies for regional engagement. Thus, the study is developed as a reference for policy makers by combining a conceptual review with concrete evidence from the Regional Innovation Monitor repository.

At a time when new European guidelines require policy makers to determine how regionally specific potentials can be strengthened in a practically feasible way, the latent potential of universities for the development of regional innovation capacity will be an important dimension to consider.

1. The Potential ‘Third Role’ of Universities for Developing Regional Innovation Capabilities

1.1 The Third Role, a Multilayered Concept

Introduction

In addition to their two main roles of research and teaching, universities are said to make a contribution to regional development, which has become broadly known as their “third role” and in different ways been the subject of extensive research (e.g. Cooke 2002; Gunasekara 2004; Kitagawa 2004; Nilsson 2006; Coenen 2007). In certain countries, inside and outside the European Union, it is not a particularly new phenomenon that (some) universities attempt to actively play this role (Abramson et al. 1997; Keane/Allison 1999; Charles 2003; Gunasekara 2004; Gunasekara 2006a; Premus et al. 2003). In others, on the contrary, the notion has, at least among research universities, only become prevalent in recent years (Koschatzky et al., 2011; Kitagawa 2007).

On the one hand, higher education research emphasises that the degree of budgetary and managerial independence of higher education institutions has in recent years increased in a number of European countries (de Boer et al., 2008; Kehm/Lanzendorf, 2006; Kwiek 2008), although the starting point and momentum of this trend differs substantially between individual states (Schimank/Lange, 2009). This increasing freedom of action, prompted for example by changes in the funding and evaluation systems, has lead to reconsideration and possible adaptation of universities’ processes of strategic planning (Krücken et al. 2009; Kwiek 2008; Krücken/Meier 2006; Nickel 2004). In many cases, this reconsideration has, for the first time, put them in a position to actively consider the strategic benefits that they, as an organisation, can draw from regional engagement (Koschatzky et al., 2011).

These processes, often initiated in the 1990s and early 2000s, are now increasingly starting to succeed. Arguably, a much larger number of universities than before have started to act ‘entrepreneurially’ (Clark 1998; Gibbs 2001) i.e. to develop targeted strategies to pursue their own specific interests. As a result, for example, we are witnessing the set up of more and more specific units with “boundary spanning roles” (Youtie und Shapira 2008), ranging from traditional transfer offices to specific internal departments with the sole and explicit task of acquiring third party funding. Importantly, this trend has not only emerged at leading universities but, even more dynamically, at mid-range institutions and colleges (Perry/May 2007; Nilsson 2006).

On the other hand, many governments at both national and regional levels are increasingly stressing the ‘regional component’ when setting up programmes aimed at motivating the now independent universities to integrate into the national innovation system (cf. Crespy et al., 2007; Kiese 2008; Salazar/Holbrook, 2007; Sotarauta/Kautonen 2007). Be it for the sake of the own constituency or due to the realization that certain innovation policies work best at the regional level – policy makers have developed an interest in setting up incentives in such a way that regional engagement becomes more attractive to universities (Asheim et al. 2007; Benneworth/Hospers 2008). Again, these attempts have long moved beyond the illusionist objective of emulating Silicon Valley elsewhere (Perry/May 2007). Often, leverage is not exerted by designing the evaluation or internal governance systems of universities accordingly, as those tend to be drafted at national level, with national objectives in mind. Instead, many relevant policy actions take indirect forms and do not even explicitly target the regional integration of universities (Charles 2003; Gunasekara 2006b; Nauwelaers und Wintjes 2002; Kiese 2008). Co-operative research projects between universities and private firms, for example, have for years been supported in a number of member states – which has substantially benefitted the regional integration of universities without necessarily stating that as the main intention. More recently, however, universities have intentionally become involved as

key partners in large-scale public private partnerships such as the leading-edge cluster competition in Germany or the pôles de compétitivité in France. Such initiatives have moved into the focus of even national policy makers who start acknowledging the increase of efficiency that comes with regional co-operation and that is also relevant from a national perspective (Koschatzky/Stahlecker, 2010).

Support for regionalised science-industry interaction as such is thus anything but new. Nonetheless, the boundaries of conceiving novel ways to motivate ‘accountably independent’ universities to engage on a regional level for the benefit of regional innovation potential have not yet been defined.

To understand them and put them to work will be a central challenge in the development of future, place-based regional innovation strategies.

A Multilayer Approach to Differentiate the “Third Role” of Universities

The manifold socio-economic effects of universities’ and colleges’ engagement in their region have been extensively discussed in the academic literature, at times sceptically and critically (e.g. Benneworth et al. 2009; Huggins et al. 2008; Power/Malmberg 2008).

To understand the extent of the potential for the development of regional innovative capacities that comes with the establishment of universities or the extension of their activities it is necessary to realise that their “third role” is not homogeneous but based on **different functions** that universities (can) fulfil. While these can be fulfilled in parallel, they constitute **different layers of opportunities for action** ordered around a self-evident core. In a stepwise manner, each of the layers offers specific, additional potentials to enhance regional innovative capacities (cf. Goldstein et al., 1995; Uyarra et al., 2010).

First, some **economic effects** are in all cases passively caused by universities, even without any corresponding strategy. These “core” effects, based on employment, demand and procurement are by now common sense and empirically well documented (e.g. Bleaney et al. 1992; Niermann 1996; Harris 1997; Drucker/Goldstein, 2007). In a sense, the main message of many studies is that it is better to have one or more universities in the region than to have none. These passive effects, however, do not necessarily cause any innovation-relevant impacts and will therefore not be in the focus of this paper. Clearly, they play a minor role regarding the development of new options to integrate universities into strategies aimed at boosting regional innovation.

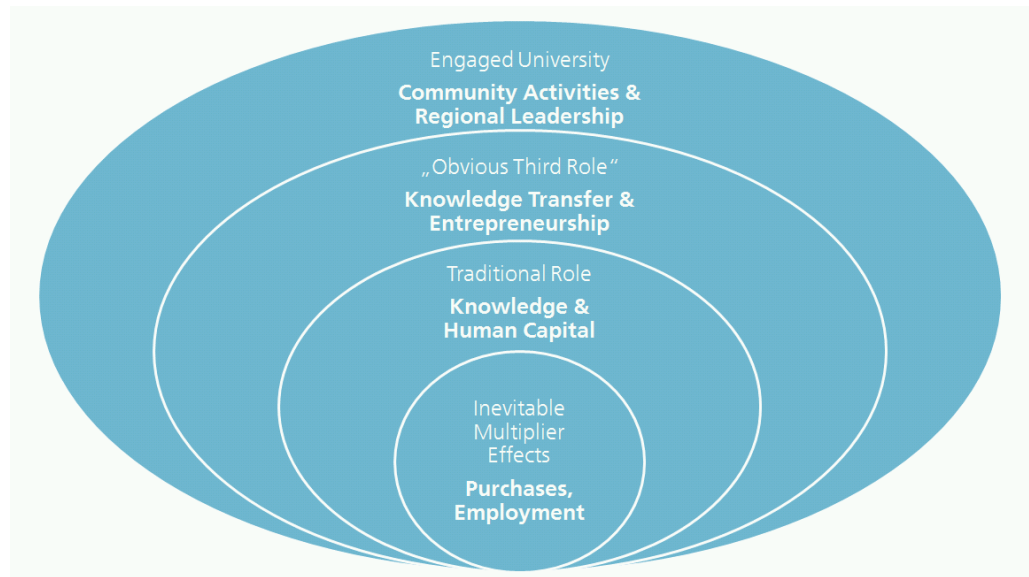
Second, universities fulfil their **traditional roles** as generators of knowledge (research) and providers of human capital (teaching). Inevitably, innovators in the region will profit from the positive image of the university as a ‘knowledge factory’ even if that knowledge does in practice not (yet) benefit many regional actors. Arguably, moreover, some undefined knowledge-spill overs may occur, as a long line of research starting with Jaffe (1989) has argued. Additionally, the region will benefit from graduates that are attracted into the region to study (Goldstein/Luger, 1992) and will, at least to an extent, remain there after they have completed their studies. While these effects come just as naturally with the establishment of a university as the aforementioned economic effects, they are, from a policy point of view, more interesting. Contrary to employment and procurement effects, they result from tasks that are specific to universities. Moreover, they harbour a higher potential: A university’s image can be changed from ‘ivory tower’ to ‘source of knowledge’ and the regional suitability of curricula can be expanded (cf. Gunasekara, 2004). In any case they will have an indirect effect on the innovative capabilities of the region. It is important to note that this effect is not necessarily minor or even less relevant than the more direct effects to be discussed below. For that reason, the effects of these traditional activities should be considered in strategies for innovation policy and will be included in the following analysis and discussion.

Third, since the 1990s, a number of researchers have first postulated and later documented that an increasing number of universities not only act entrepreneurially (Clark 1998; Gibbs 2001) but also directly support **entrepreneurialism** among their faculty and graduates (Franzoni/Lissoni 2009; Koschatzky/Hemer 2009; Stahlecker 2006; Pirnay et al., 2003). A number of them also nurture a culture of innovation by adapting their graduate courses accordingly (cf. Gunasekara, 2004). Additionally, many universities have substantially invested in **technology transfer agencies** that do not only to transfer existing results, but also to bring together partners from science and industry to set up application oriented projects. Arguably, the structure of some disciplines and many degree courses have been adapted to the needs of industry – as predicted by Gibbons et al. (1994). Other than the effects mentioned above, such activities require a clear strategic commitment of universities, professors and other faculty willing to invest time in such endeavours. Quite often, therefore, these strategies tend to be considered as “the basis” of the third role of university – of which they undoubtedly form an important part. While the decision about doing so increasingly rests with the university management directly, governments can seek to reward universities to develop such strategies – either by coupling evaluation schemes relevant for their basic funding (new public management) to licensing income (Etzkowitz et al. 2008), or by designing programmes that explicitly offer additional third party funding for either the development of such strategies or the participation in projects implicitly assuming their existence. Thus it is this “**obvious third role**” that has so far attracted most attention from both academics and policy makers – many of which have sought to publicly support technology transfer wherever possible.

Finally, regional governments can try to **engage universities in joint strategic undertakings** of the industry, the science and the public sectors in a region – activities that have by a large strand of research been baptised Triple-Helix-Models (Etzkowitz/Leydesdorff 1995, Abramson et al. 1997). Some authors have argued that this step from an adaptive ‘developmental focus’ to a transformative ‘generative role’ would be crucial (Gunasekara, 2004). In practice, such initiatives can relate to the initiation of large-scale cluster projects as much as to addressing pressing needs of urban development. As long as issues of economic development are concerned, in market economies the main momentum of such initiatives will have to be generated by private enterprise. Nonetheless, an entrepreneurial university can be an important catalyst or even play an initiating role. Additionally, there are a number of possible joint activities in the social field, such as studies on regional issues of social security or education (Benneworth et al. 2009). In such initiatives, the lead role will more likely be played by the public sector with the private sector providing complementary assistance. In any case, the term ‘regional leadership’ (which will occasionally be used hereafter) does not imply that universities should or could take on a position as ‘paramount leaders’ of economic development in their region. What it does imply, however, is that university representatives can and should be part of those circles and fora of decision making that decide about the development of regional strategies and the launching of large scale projects relevant to the region’s economic future. For regional innovation strategies those truly strategic endeavours have a central function as discussed below.

Figure 1 below illustrates the different possible regional roles of universities in a multilayer model as indicated above. The model is intended to underline different degrees of strategic commitment needed for a university to develop from being passive and traditional to becoming an engaged, triple-helix university in a stepwise manner. On the contrary, it does not aim to make a statement with respect to the relative size or relevance of the respective potentials. Instead, it emphasizes that the role of universities can be extended through targeted action, and that all considerations of the “obvious third role” of universities should at least be complemented by at least two others when it comes to assessing the potential relevance of universities for the targeted development of surrounding region’s innovation potential.

Figure 1 A Multilayer Approach to Universities' Potential Roles in Supporting Regional Innovation



Note: Figure is not supposed to make a statement with respect to the relative or absolute strength/extent of the respective effects, but how they complement each other.

Source: Own Summary, based on Goldstein/Mayer/Luger, 1995, Uyarra, 2010 and others.

1.2 Existing Potentials Waiting to be leveraged

Some authors have raised the objection that the perception of the potential harboured by universities may be overstated. Common criticisms focus on the general understanding that academic knowledge generation was by definition global rather than local as well as on the objection that even under circumstances when that is not necessarily the case, universities' capabilities would often not match those needed in their environment or, in less developed regions, simply be too complex to be relevant for industry sectors based on very practically minded business models (Power/Malmberg 2008).

The answer to these objections is that they are in principle warranted but as a caveat rather than a finding that puts an end to the line of argument.

First, a number of academic fields, such as theoretical physics, are indeed very abstract, highly codified, and footloose so that it is difficult to connect them to the local needs of smaller regional firms. Asheim and Gertler (2005) as well as Asheim and Vang (2007), however, have clearly demonstrated that there are different types and contexts of knowledge generation and that for the interactive learning processes needed for product development general objection of looseness does not hold – quoting and elaborating on Leastadius (1998) notion of 'synthetic knowledge'. While their argument is quite extensive and cannot be quoted in full detail, the most compelling point is that a process of development in which the object of research itself is constantly evolving, resists the codification of knowledge (or at least raises its cost) so that working over distance becomes quite difficult. Consequently, it is not difficult to illustrate that for a number of undertakings in diverse fields, the regional level is the natural area of co-operation.

Second, it is certainly the case that some regions are less developed than others and that the potential scope of science-industry co-operation in those is more limited than elsewhere. This, however, need not preclude the leveraging of those potentials, which are present in these regions. On the one hand, it would be wrong to understand regionally oriented activities as limited to high-level research co-operations (Benneworth/Jongbloed, 2009). A lot of regional integration can take place with a view to teaching and general consultancy – which does not presuppose a booming enterprise sector. On the other hand, a poor match between the disciplinary orientation of universities and the sectoral profile of their industrial environment does not need to be taken as a given. On the contrary, university management aiming at relevance in teaching and research may well consider regional needs when deciding about the future of institutes and graduate courses – a process for which there is ample anecdotal evidence from for example Austria and Spain.

Finally, the most evident proof of the potential that additional support for regional involvement is able to leverage is the fact that many academics¹ have for years if not decades been pursuing activities with partners in their region – in large parts before their deans, rectors and presidents discovered the issue. Apparently, activities co-operation with regional partners are nothing new for academics but something that has to a certain extent already developed on an independent, self-motivated basis before any higher-level support policy was put in place. Now, as in the past, academics have been happy to benefit from the opportunities for external funding that such activities provide, not least based on public funding programmes.

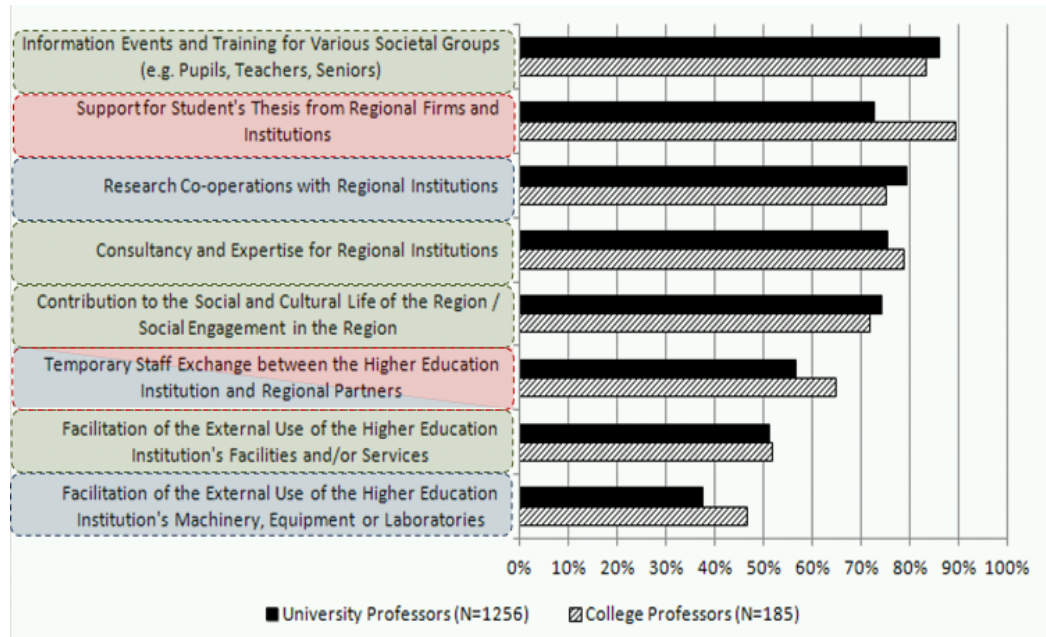
A recent study financed by the German Ministry of Education and Research underlines this general finding from the empirical literature, in that it confirms that regional activities are prevalent among researchers at both research universities and colleges². As illustrated in Figure 2, the activities are diverse and stretch across the fields of research, training, consultancy and broader local engagement (e.g. information events, social engagement).

While the study corroborates that a process of strategy development is developing in parallel at the management level (deans and rectors) there are a number of personal motivations at the level of the individual researcher that drive these activities – which can be politically addressed without taking recourse to the centralised incentive systems *within* the universities.

¹ In the following, the empirical basis of our argument will draw on a German study, which has exclusively surveyed professors. There is, however, however, no compelling reason why the findings should not hold true for assistant professors or lecturers given that they have certain experience in their field, particularly in tenure track systems that allow lecturers to acquire that experience.

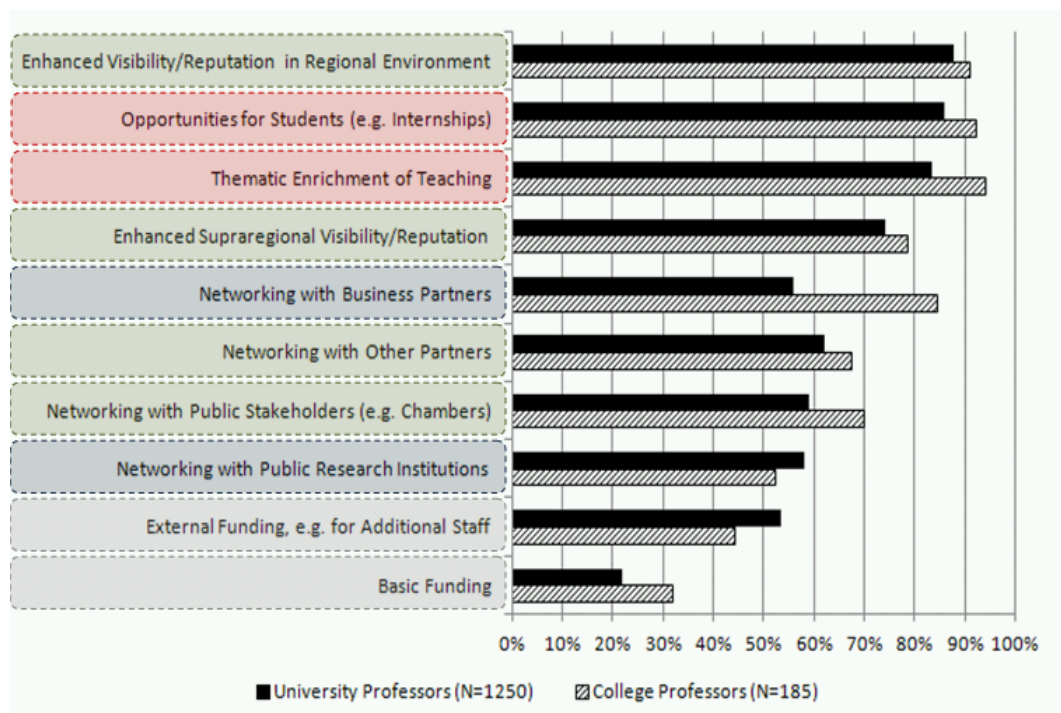
² The study has been performed by a larger working group within Fraunhofer ISI headed by Prof. Knut Koschatzky assisted by Miriam Hufnagl, Henning Kroll, Nicole Schulze and Stephanie Daimer. The term ‘college’ is used to refer to ‘universities of applied sciences’ or ‘Fachhochschulen’, particular to the German and Austrian system, but to a degree comparable to U.S. teaching colleges.

Figure 2 Empirical Evidence on Regional Activities of Universities



Green: Broad Engagement; Blue: Research Co-operation; Red: Teaching Related Co-operation.
 Note: Figure illustrates prevalence of activity types during the last five years among academics with at least one activity during that period of time.
 Source: Koschätzky et al. (2011), adapted; n= 1586 German professors.

Figure 3 Empirical Evidence on the Motivation of Regional Activities



Grey: Funding Related; Green: Visibility; Blue: Research Related; Red: Teaching Related.
 Note: Figure illustrates prevalence of activity types among academics with at least one activity.
 Source: Koschätzky et al. (2011), adapted; n=1586 German professors.

On the other hand, as Figure 3 illustrates, academics are somewhat sceptical about the additional funding that they can acquire on the basis of regionally oriented activities. Only about 50% of those performing such activities state that they are motivated by the prospect of additional external funding and less than 25% hope for an increase in basic funding on the basis of their engagement. In contrast to that, many academics are motivated by opportunities that regional activities provide with respect to rendering curricula and graduate theses more relevant to their students. While these objectives are naturally more prevalent in colleges, the lag of universities is not too big. Additionally, a substantial number of academics maintain that regional activities improve their networks with potential research partners from public research and industry in the region, even though no direct funding may immediately result. Finally, there is strong evidence that an increased regional and interregional visibility as well as an improved network to different stakeholders in the region is considered as motivating by many. For policy makers, this implies that support measures aimed at boosting such activities do not necessarily have to be based on financial incentives alone.

While such broad based evidence has to our knowledge been collected in one member state only, it nonetheless strongly suggests that many academics are in fact quite open minded with respect to regional engagement – which they consider conducive to their main task of research and teaching. Anecdotal evidence from a number of Western European Countries (e.g. Austria, France and the UK) supports the notion that this holds true if not in general so at least in a number of relevant cases. A caveat that has to be placed at this point, however, is that next to all of these cases relate to universities with a history of at least two decades. The regional embedding of many universities in Germany as well as in the UK, the Netherlands or Austria is a phenomenon that has grown. Consequently, the conclusion drawn from the data is that the phenomenon of regional engagement can grow over time at a grassroots level – not that it immediately emerges once a university or a new department is set up. Even in Austria, where the Universities of Applied Sciences were called into being in the mid 1990s, it took about a decade of dedicated and targeted work before their regional integration was fully developed.

The second interesting finding from the study was that, although many deans and rectors publicly commit to the objective of regional engagement, the actual incentive structures felt at the level of the individual researcher remains rather weak. Apparently, regional co-operation or engagement does not as such rank very highly in the universities' internal new public management systems – even in Germany where they are agreed on at the regional level. Evidently, there are some exceptions of this rule, with respect for example to the German and Austrian universities of applied science, which are mainly locally oriented. In general, however, it appears that experienced academics constitute an already quite active target group, which in principle is interested placed in an incentive system that leaves ample room for improvement both with a view to internal governance and external funding opportunities.

From a policy perspective, therefore, it becomes clear that the level of intervention can not only be that of the strategic university management which quite often has no control of or even insights into the full breadth of regional activities taking place at its institution.

Nonetheless, it is evident that all strategic levels within universities across Europe are becoming more interested in raising their regional relevance through regional engagement. In the context of the widespread restructuring of different countries' science sectors such interest is arguably driven by the quite pragmatic hope that a regionally more relevant university may face a lower risk of closure or even a better chance of attracting additional funding. Arguably, the persistent absence of internal incentives may be traced back to the fact that the science policies to which they have to respond are in most Member States developed at the national level. For university management, regional engagement is thus in many cases not yet directly connected to concrete financial benefit. Experience in regions with local science foundations, however, has shown that this point of view can be influenced (e.g. Tyrolean Science Foundation, Baden-Württemberg Foundation).

Both of these perspectives, however, raise an important point to be elaborated later: Possibly, the largest potential for the overall improvement of innovation potential in European regions does not necessarily rest with the limited number of internationally renowned leading-edge universities. While those 'stars' certainly implement the most visible and, on an international scale, most relevant co-operation projects, smaller colleges may face a stronger incentive to engage with their regional environment. Evidently, they cannot display outstanding scientific performance and international visibility to legitimate their requests for (additional) funding from their regulators – as much as some scientists working at them may encounter difficulties to access high-level funding from national research councils. As a result, regional relevance may become a more important asset for both the management and the individual researcher. In particular, this is the case for those that are financed from the regional level or tasked with a regionally oriented mission.

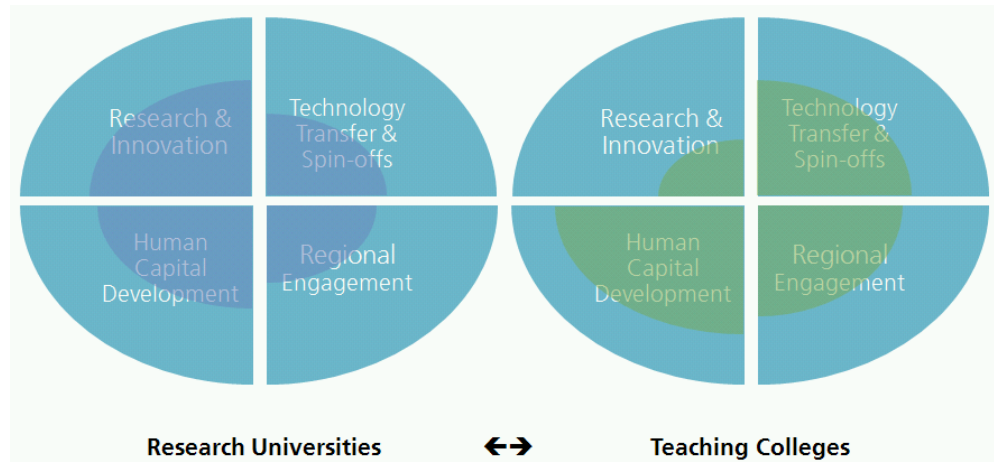
1.3 Different Potentials of Different Universities

The preceding empirical section has thus made the point that regionally oriented activities are an existing phenomenon that regional innovation policy makers can build on – rather than something that has to be created anew.

With a view to the aforementioned, however, it is central to point out that the potentials, which can be leveraged from different universities are not at all alike. As already postulated by Gibbons et al. (1994) in the mid 1990s, the higher education systems of a number of European countries have diversified. Some leading universities strive for global excellence in basic research while others strengthen their application orientation in selected fields and yet others try to unite both ambitions as different facets of one organisation.

As Figure 4 illustrates, the potential of research universities will in most cases be higher when it comes to complex pre-competitive research. Many colleges, on the contrary, tend to be oriented much closer to the needs of local firms, even SME, and are thus often better able to provide on-demand knowledge-transfer and consulting. With regard to human capital development and regional engagement both research and teaching oriented universities have specific potentials to offer so that no general statement can be made.

Figure 4 Different Potentials, depending on University Strategy



Source: own figure.

With a view to this range of possible profiles, it is important to understand that the role and strategic orientation of universities do not only depend on the internal structure of the organisation alone but are highly context specific (Tödtling/Trippl, 2005).

First, different countries' education and research systems pose different challenges to universities. For example, the challenges faced by universities in transitional regions in Central Eastern Europe are distinct from other requirements due to the persistent legacy of the pre-1990 regimes (Gál 2005, Gál 2010, Gál/Ptacek 2011). Formerly quite homogeneous higher education systems, such as the German one, have in recent years been diversifying while, in parallel, their strict internal differentiation between colleges and research universities is at least formally weakened in the course of the Bologna process. As a result, a specific shift of capabilities has occurred.

Second, the role that a university takes and can take depends on the regional environment (Tödtling/Trippl, 2005). For example, universities in non-metropolitan regions have other options to develop a portfolio of regional activities and university-industry linkages than those in large agglomerations (Gál/Ptacek 2011, Wright et al. 2008). For example, high-level research co-operations with larger firms will only be possible close to the headquarters of large corporations, whereas the continuous co-operations of colleges can be realised in a much larger number of regions – with less outstanding levels of development. Additionally, even at this low level, the level of development and the business models prevalent in for example the SME sector will to a large extent determine whether those firms have a general interest to co-operate with local universities or not.

Consequently, both university management and regional policy makers have to be aware of not only the local institutions' specific strengths and weaknesses, but also the national framework conditions and the region's level of development (Reid, 2011) – as the potentials for leveraging the regional potential of universities and to engage them in regional projects will differ accordingly (Boucher et al., 2003).

1.4 The Role of Policy

Overall Framework

In the following section this paper elaborates the above-mentioned finding that the potentials of universities are inevitably quite idiosyncratic and place-specific. That being so, the main question which remains is if and how policies can be tailored in such a way that they are best adapted to a university's specific strengths and the surrounding region's specific needs.

As already argued above, the scope of options for direct policy intervention in higher education institutions has anything but risen in recent years. In many member states, universities have assumed budgetary and strategic autonomy and remain accountable only to a previously agreed system of evaluation and incentives that cannot easily be changed at short notice. As a result, the ministries responsible for funding universities do no longer have the authority to directly 'command' the launch of any regional endeavours.

Paradoxically, however, this apparent loss of control can in fact become a strong asset when it comes to truly engaging universities in regional projects. While, on the one hand, universities have now theoretically acquired the right not to care about their environment at all, they have on the other hand become free to react to the needs expressed by both public and private regional stakeholders – as they are no longer trapped in a (often nationally oriented) bureaucratic steering system. If they engage, they will now do so out of own considerations, with higher commitment and determination. The (often national) ministries in charge of university governance, in contrast, would have rarely been interested in promoting regional initiatives anyway.

Nonetheless in market economies, universities cannot sensibly be considered as 'developers' of regional innovation systems or leading agents of regional change on their own. Inevitably, the development of any regional innovation system will have to depend on private sector participation and private sector initiative. Against this background, the role of universities should neither be overstated nor misunderstood. There are also a number of prominent examples where universities and their strategically adapted behaviour have helped to establish a region as a focal area for private investment in a period where industrial decision makers were still weighing their options. Examples for such roles can be found from Cambridge to Munich, from Dresden to Lund. In a sense, the role of the university and the point of leverage that it thus offers to policy makers is that of a catalyst. With all else equal, a region with a qualified labour force and a number of at least related research activities is more likely to attract private investment than one without. Additionally, a culture of collaboration between the private and the public research sector is needed to turn potential into factual relevance.

Consequently, a central aim of any political strategy must be to convince the university management to make their organisation more relevant for its regional environment and to engage with regional partners.

In practice, this implies that public policy makers, industrial stakeholders and university managers will have to establish common ground in areas of joint interest. The development of relevant courses for and the retention of graduates in the region, for example, may become such a joint undertaking. It is in the interest of the university to demonstrate to potential students how easily its courses enable them to find jobs, while the local industry is interested in access to well-trained graduates. In a situation, where they depend on both industrial and scientific stakeholders' goodwill and intrinsic motivation, it must be the strategic objective of policy makers to identify as many areas as possible in which such common ground can be found.

Dimension 1: Different Points of Leverage

In the following, this paper will provide a brief overview of the different points of political leverage that the presence of a university in a region may provide.

First, even though universities do not produce many ready-to-use solutions research projects may at times yield interesting unintended outcomes. If entrepreneurs can move beyond their sometimes cherished illusionary hope that universities could pull solutions “out of the drawer” on demand while, in parallel, academics carry their commitment to application-orientation beyond lip-service; a significant potential for policies supporting **technology transfer, spin-offs and licensing agreements** can in most cases be found.

Second, however, this thought can be carried somewhat further. Universities have an interest in third party funding while private firms have an interest in pre-competitive research which at times they cannot perform themselves due to lack of both financial and human resources. So if, as in most cases, a ready made solution is not yet available, there will be a large potential for policies supporting **co-operations with a mid- to long- term perspective**. Depending on the field of research and the nature of the firms involved, such co-operations can in some cases assume the character of outright outsourcing.

Thirdly, universities want to attract students: either out of professional ethic or because the number of students is in most cases a direct or indirect basis of reference for their budget. It will be to their benefit if they know beforehand whether a certain curriculum will meet a regional need. Firms on the contrary will be more inclined to remain in a location where they can count on the availability of qualified graduates than to re-locate elsewhere – so that they have to invest more extensively in internal training. Consequently, there is a joint interest in policies supporting the **adaptation of curricula and internship programmes** to the needs of the regional environment.

Fourth, moreover, universities can become involved in regional communities and/or strategy circles. If this engagement is not as such pro bono, it can be a substantial element of co-ordination of public, private and scientific interests. In fact, many of the above-mentioned objective can be best realised when all affected stakeholders manage to form a joint task force. Thus, political efforts can be made to involve universities **in the process and the circles of regional leadership** – even without trying to make them a paramount driver. In such contexts, alumni networks can play a supportive role.

Figure 5 Different Points of Leverage



Source: own figure.

In practice, naturally, few activities can be unanimously assigned to one area. Research and development co-operations, technology transfer and spin-off support, for example, are based on a broad array of often quite similar interactions between science and industry rather than constituting clearly delineated fields of activity. Human capital development is often connected to internships performed in the context of exactly such projects. At times, when the placement involves Ph.D. students working on projects in business firms, the differentiation between human capital development and S&T co-operation becomes academic. Finally, the involvement of universities as regional stakeholders will in the majority of cases focus on at least some issues relating to their main tasks (and interests) in the field of research, human capital development and technology transfer.

Because of these evident overlaps, it is important not to consider these points of leverage as clearly delineated areas of activity. Instead, they are strategic target areas, which university managers will seek to address by the initiation and performance of regional activities in such a way that a balance between the different target areas is achieved. As potentials and missions of universities may differ substantially, the notion of balance does not imply equality in all four fields. Instead, the four dimensions can serve as a framework of reference in which the strategic aims of a specific university's management can be expressed.

Dimension 2: Different Political Ambitions

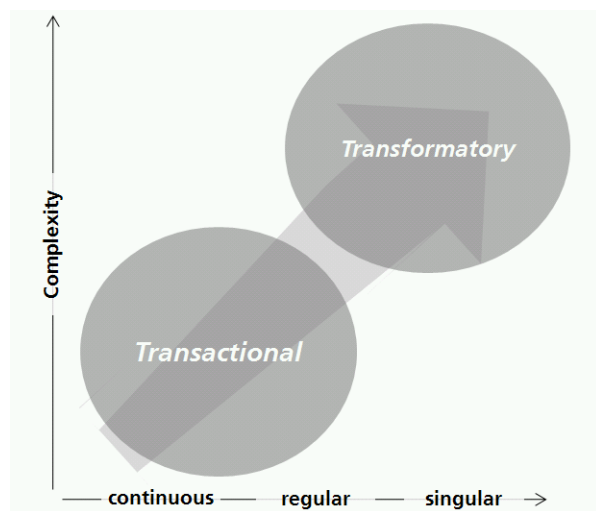
Beyond the suitable points of leverage in a specific regional context, individual policy makers have to decide about the suitable ambition of the planned strategy in order to align it with the needs of the regional environment.

On the one hand earlier sections have illustrated that **individual academics** tend to perform some regionally oriented activities, irrespective of whether those are directly encouraged or asked for by their university's management. As already mentioned, this potential is a major point of leverage which regional policy makers can tap into directly, for example through offering additional external funding for certain types of activities. In cases where internal incentive systems at universities are underdeveloped or the regional environment does not as such provide very good opportunities, such support measures may play a valuable role for improving science-industry interactions at the working level. Overall, the potential of such approaches to facilitate any regional innovation systems workings on a **transactional** level should not be underestimated. On the other hand they are likely to be of limited value when the level of regional development is far below average so that there is a lack of potential partners.

On the one hand, therefore, this first approach is somewhat limited in that it does not directly engage the **university's management**. Rather than taking a poor internal incentive systems at universities or the poor match of their scientific orientation with the region's needs as a given and trying to counteract them by policy measures – a dialogue between science, policy and industry can be established to identify possible areas of joint interest (Tödtling/Trippl, 2005) and to prompt an actual transformation of the overall environment. If the university's management is or can be convinced that changes in the internal governance structures or the adaptation of the university's scientific profile could prove to be in its own interest, then this can be integrated in joint efforts with a view to the development of regional innovation capabilities – regardless if that is aimed at strengthening existing strengths or at building some potential in the first place. In practice, joint initiatives may for example relate to the creation of new institutes or the creation of endowment chairs in co-operation with local industry. Arguably, such management level co-operations can have a much more **transformative** effect on the regional innovation system.

As Figure 6 illustrates, however, *transformative* activities are much more complex to realise than *transactional* ones – not least because they cannot be implemented by policy makers alone. As pointed out above, transformative endeavours have above all to be driven by either local industry or strong public procurers. Should no such involvement exist, the transformative effect will at best be limited. Hence, idiosyncratic one-time approaches are needed to address regional specificities with regard to the actual local needs but also with regard to the local stakeholders' readiness to co-operate. Policies aimed at facilitating the day-to-day transactions between science-industry, on the contrary, can be implemented and adapted on a regular basis – and the German survey strongly suggests that they generate an added value that should not be underestimated. As not all issues will possibly be agreed on at the management level, they constitute the indispensable basis of leveraging the potential of universities for regional development.

Figure 6 Different Ambitions in Engaging Regional Universities



Source: own figure, based on European Commission (2011).

Summary

In summary, university management will seek to develop a profile of regional engagement that matches with the self-perception of the university's mission or, at times, external limitations imposed on the definition of such missions (e.g. in the case of colleges).

If the aim is to engage universities in transformative undertakings it is therefore indispensable to take their management on board, as only these decision makers can, of their own accord, decide to adapt the university's profile or its internal incentive system in a way that structurally benefits the region. As in most cases regulation is no longer available, their process of decision-making can still be influenced by external funds and appeals to image and reputation. Such influence, however, can most convincingly be exerted by regional, yet non-political actors. In that sense, policy must act as a moderator.

Nonetheless it would be a mistake to believe that the whole potential of universities can be leveraged by moderation alone. Just as important as counting on private sector engagement on the management level, is a reliance on bottom-up initiative. An overt focus on university management alone would forfeit an arguably just as large potential at the level of the individual researchers. Consequently, the regional activities of those have to be addressed directly and with monetary means, be they focused on research or teaching. Ideally, success stories thus created may in future even serve as bottom-up inspiration for management level agreements.

1.5 Policy Evidence from the RIM Repository

Subsequent to this conceptual reasoning, the final sub-section of chapter 1 intends to substantiate some of the above-mentioned statements by compiling general evidence on university related policy measures from the Regional Innovation Monitor (RIM) repository. The main issues that will be addressed in detail are the following:

- Is it correct that there is a remaining imbalance with respect to policy measures addressing the development of the “obvious third role”, i.e. technology transfer, spin-offs and R&D co-operations while other aspects related to human capital and other issues are less well addressed?
- Is it correct that the potentials, which can be targeted, are context specific (in as far as evident from regional policy responses documented in the repository)? In particular: do national and regional characteristics influence the way in which the potential of universities is addressed?

In late 2011, the Regional Innovation Monitor repository contained detailed descriptions and classifications of about 1,100 policy measures which could be sorted and examined for relevance from two different perspectives: First, the regional correspondents had to assign key words from a defined list to each policy measure that they described. One of them was “universities”, which could be used to qualify any programme with reference to universities, be it in the field of human capital development, technology transfer or targeted investment in research. Second, the regional correspondents had to classify each measure according to the common systematic employed by the European TrendChart on Innovation. Based on the preceding conceptual section the RIM repository provides the following potentially relevant categories of measures:

- ‘universities’ [relating mostly to measures supporting research];
- ‘TT support infrastructure’;
- ‘knowledge transfer’ [from science to industry];
- ‘R&D co-operation’ [between science and industry];
- ‘awareness creation and science education’;
- ‘improve relation between teaching and research’;
- ‘stimulation of PhDs’;
- ‘recruitment of researchers (e.g. fiscal incentives)’;
- ‘career development (contracts for university researchers)’;
- ‘mobility of researchers (brain-gain)’;
- ‘job training for researchers (LLL)’;
- ‘support to innovative start-ups’; and
- ‘support to start-ups by means of risk capital’.

While the disadvantage of this approach is that it is so broad that it may cover unrelated measures (e.g. in the field of start-up support), its advantage is that it also covers those measures which are not predominantly focused on universities (and may thus not have received a respective keyword) – but nonetheless involve them and/or build on their potential to a large extent.

The overall perspective

The first part of this report summarises the entries in the RIM repository as a whole. National and regional differentiations are presented in the later sections of this sub-chapter. The keyword search for “universities” in the RIM repository delivered 96 results altogether as the last row in Table 1 shows. Thus, it can be assumed that at least 96 measures documented in the RIM repository are aimed at supporting universities – although with large variant as regards their content and goals. In order to refine these rather broad findings, the measures in the RIM repository were extracted by TrendChart categories in a second step, focusing on categories potentially addressing universities. As Table 1 illustrates, the outcomes are very heterogeneous. While measures targeting the knowledge transfer between universities and industry seem to be widely implemented, measures, targeting education and research are less commonly used in the regional innovation policy mix among the RIM regions.

Table 1 Overall Number of University Related Policies in the RIM Repository

	Overall Number
Measures supporting R&D Cooperation	276
Measures supporting Knowledge Transfer	200
Measures supporting Start-ups directly	134
Measures supporting Research at Universities	82
Measures supporting Start-ups by means of Risk Capital	46
Measures supporting Job Training of Researchers	33
Measures supporting the Mobility of Researchers	24
Measures supporting PhD Support	23
Measures supporting Aware Science	22
Measures supporting the Recruitment of Researchers	21
Measures supporting the Career Development of Researchers	15
Measures improving the Link between Teaching and Research	9
Measures with KEYWORD “University”	96

Source: Own analysis, based on RIM repository of policy measures.

Altogether 276 measures of the category “supporting R&D cooperation” (among science and industry) are found in the RIM repository. This category thus receives the broadest attention among the RIM regions. It is followed by the measures classified as “supporting knowledge transfer” (200) and the category covering measures that “support start-ups directly” (134). These figures have to be interpreted with caution, since up to four categories could be assigned to a single measure. In any case, those measures that appear in the lower part of Table 1 seem to be of minor importance, such as measures “improving the link between teaching and research” (9), “career development of researchers” (15) or the “recruitment of researchers” (21).

The national perspective

In this section the authors concentrate on the differentiated analyses of the results on the national level and discuss commonalities and differences between the prevalence of the use of “university related” policy measures in the different countries covered by the RIM.

Judged by the use of the keyword “universities” in the RIM repository in particular three groups of countries seem to be rather active concerning the implementation of university related policy measures (cf. Table 2): First, the group of Anglo-Saxon countries, namely the UK and Ireland, second a small group of Eastern European countries including Slovakia, Romania and Hungary and third Italy and Belgium.

Looking into single TrendChart categories in greater detail, it can be stated that most of the measures do not necessarily address “universities” directly and exclusively but are rather found at the intersection between university and industry and thus indeed reflect the above-mentioned focus on the “obvious third role”. This focus is found with an outstanding continuity across next to all member states covered by the RIM.

Measures classified by the TrendChart category “universities”, in contrast, are not widely used in most countries. Apparently, the category was assigned to even fewer measures than the respective keyword. In general, less than 7% of each country’s policy measures fall into this category. Exceptions to this are the UK, Romania, Austria, Hungary and Slovakia where between 16% and 45% of all measures are classified with a priority on universities.

The opposite holds true for the categories “knowledge transfer” and “R&D cooperation”. The use of measures falling under these two categories is widely spread among European countries so that hardly any country ranges in single figures. Only Belgium, Portugal and the Netherlands have very few policy measures in the category “knowledge transfer”, whereas Germany leads in this field with a remarkable 42%. Similarly common is the category of “R&D co-operation” which in most of the countries covered has been assigned to between 15% and 32% of the policy measures. While Denmark, Romania and Poland remain outliers at the bottom (below 14%), Sweden, the Netherlands, Ireland and Greece lead the field by between 42% and 60%.

In contrast, those policy measures that falls into the general TrendChart category of “Human Resource and Education” (measures five to eleven) seem to be of minor importance in the majority of countries covered by the RIM. As Table 2 underlines, measures assigned to this category are only implemented in single cases, and not systematically developed in many countries. Exceptions are Ireland and Spain where examples of such policies can be found on an at least somewhat broader basis.

Although the support of start-ups is not necessarily always directly connected to universities, many measures assigned to this category have been assessed as relevant elements of regional innovation policy in many regions – else they would not be listed in the RIM repository. Against this background, it seems that a substantial number of them aims to tap into the local potential of graduates or academics and it is worth mentioning that they are the third most prevalent measures across the nations covered – following those labelled “technology transfer” or “R&D co-operation”, as Table 2 shows.

Methodological remarks (concerning this and the following subsection):

To allow for a meaningful interpretation, the number of policy measures included in the RIM repository (1,093) serves as a key reference to the percentages in Table 2. The last row in Table 2 shows how the total number of policy measures covered by the RIM is distributed over all countries. The percentages in the country columns in Table 2 refer to the number of measures with a specific attribute, which are available in the respective country.

For example 5% of all the policy measures that are included in the RIM repository for Austria have been classified by the TrendChart category “universities”. Since multiple categories could be assigned to a single measure (up to four) and the RIM repository contains more categories than included in the present analyses, the sum of the percentages per column can be either smaller or greater than 100%.

Table 2 University Related Policies in the RIM Repository by Member State (RIM coverage)

		AT	BE	BG	CZ	DE	DK	ES	FI	FR	GR	HU	IE	IT	NL	PL	PT	RO	SE	SK	UK
	Keyword "University"	6%	21%	2%	5%	8%	0%	7%	6%	7%	3%	19%	17%	16%	0%	7%	2%	10%	6%	13%	16%
1	'universities'	5%	21%	5%	5%	5%	3%	6%	6%	3%	3%	25%	0%	4%	0%	7%	7%	20%	1%	45%	16%
2	'TT support infrastructure'	0%	0%	0%	0%	5%	0%	5%	6%	3%	0%	6%	8%	12%	8%	7%	11%	0%	3%	0%	0%
3	'knowledge transfer'	29%	5%	27%	21%	42%	20%	9%	12%	12%	35%	13%	25%	14%	0%	20%	2%	20%	14%	16%	23%
4	'R&D co-operation'	19%	32%	17%	26%	24%	0%	24%	12%	20%	62%	25%	42%	30%	60%	15%	14%	10%	42%	23%	16%
5	'awareness/science education'	3%	0%	12%	5%	0%	3%	1%	0%	2%	0%	6%	0%	1%	3%	3%	2%	0%	3%	0%	0%
6	'relation of teaching/research'	3%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	17%	0%	0%	0%	0%	0%	0%	13%	0%
7	'stimulation of PhDs'	3%	0%	0%	5%	0%	0%	2%	0%	6%	0%	0%	17%	3%	0%	8%	0%	0%	0%	0%	0%
8	'recruitment of researchers'	2%	0%	0%	0%	8%	0%	7%	0%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
9	'career development'	3%	0%	2%	0%	1%	0%	4%	0%	0%	0%	0%	8%	4%	0%	0%	0%	0%	0%	3%	0%
10	'mobility of researchers'	0%	11%	0%	5%	4%	3%	5%	6%	0%	0%	0%	0%	4%	10%	0%	0%	0%	1%	0%	0%
11	'job training for researchers'	0%	0%	7%	5%	1%	0%	10%	0%	3%	0%	2%	0%	4%	10%	0%	0%	0%	0%	10%	0%
	Support for Start-ups*	8%	21%	0%	0%	22%	17%	8%	6%	14%	18%	2%	42%	17%	23%	10%	36%	10%	25%	3%	7%
	Total	62	19	41	19	104	30	106	17	125	34	48	12	137	40	59	44	10	72	31	83

* 'support for start-up' covers all measures classified as either supporting start-ups "directly", "by means of risk capital" or both.

Source: Own analysis, Based on RIM repository of policy measures.

The regional perspective

In addition to the national specificities, the authors aim to analyse the differences which result not so much from an institutional perspective (national states) but to a higher degree from a factual level (the different region's endowment). For that purpose the following sub-section will draw on the classification of regions that was developed in the first Annual Report of the Regional Innovation Monitor project. In detail, the classification distinguishes between seven types of regions:

1. Balanced innovating regions;
2. Knowledge-absorbing regions;
3. Public knowledge regions;
4. Knowledge-absorbing innovating regions;
5. Industrialised innovating regions;
6. High-tech business innovating regions; and
7. Business innovating regions.

Other than in the Regional Innovation Scoreboard, this regional classification is based more on the structure of the regional innovation systems than on their overall level of innovative capability. For example, among the public knowledge regions, we find Bucharest as well as London or Berlin. Among the industrialised innovation regions, we find Extremadura as well as the Île-de-France. Hence, the regional perspective will be the one that investigates the relationship between the *innovative profile* of a region and the extent to which its policy makers deploy a specific type of measure to leverage the regional potential of universities.

The prevalence of measures classified by the keyword “university” reaches double digits in four types of regions: balanced innovating regions (type 1), knowledge-absorbing regions (type 2), industrialised innovating regions (type 5) and business innovating regions (type 7). Adequately, such capacity building measures thus appear to be most commonly found in regions in which the public sector is not yet very dominant.

Knowledge transfer measures, in contrast, are most often found in type 3 regions (public knowledge regions) and in type 6 and type 7 regions (high-tech business innovating and business innovating regions). Thus, this type of policy measure seems to be used predominantly in either those cases where a dominant public knowledge sector has yet to realise its full potential, or in those where an already quite dynamic industrial innovation sector seeks to profit from additional input of public science.

Table 3 University Related Policies in the RIM Repository by Regional Types

	1	2	3	4	5	6	7	n/a
Keyword "University"	10%	11%	8%	3%	10%	2%	13%	5%
'universities'	7%	12%	10%	4%	6%	2%	4%	10%
'TT support infrastructure'	6%	6%	3%	9%	4%	4%	3%	0%
'knowledge transfer'	19%	15%	22%	12%	16%	23%	24%	19%
'R&D co-operation'	32%	21%	12%	31%	30%	32%	22%	9%
'awareness/sci. education'	1%	4%	2%	0%	2%	2%	1%	5%
'rel. of teaching & research'	0%	2%	0%	0%	1%	0%	1%	0%
'stimulation of PhDs'	1%	4%	3%	0%	3%	0%	3%	0%
'recruitment of researchers'	2%	1%	2%	0%	3%	2%	5%	0%
'career development'	0%	1%	1%	1%	1%	0%	6%	2%
'mobility of researchers'	3%	1%	1%	1%	2%	5%	4%	3%
'job training for researchers'	2%	4%	3%	0%	5%	1%	1%	2%
support for start-ups*	14%	7%	17%	29%	11%	25%	18%	7%
Total	217	194	116	68	280	81	79	58

* 'support for start-up' covers all measures classified as either supporting start-ups "directly", "by means of risk capital" or both.

Source: Own analysis, Based on RIM repository, First RIM Annual Report.

Interestingly, measures targeting R&D co-operation are very common tools in almost all types of regions with the only exception of type 3 (public knowledge) regions, where the industrial basis may be somewhat too small for a meaningful implementation of such measures.

In type 2 (knowledge-absorbing) regions and in type 7 (business innovating) regions measures concerning human resource development especially education seem to be more systematically implemented than in other types of regions, albeit on a very low level. While in the former case, the activities focus on basic capacity building ('awareness creation', 'PhD programmes', etc.), in the latter case they tend to focus on the strengthening of an existing potential ('career development', 'recruitment of additional researchers', 'mobility of researchers', etc.).

Finally, the implementation of support measures for start-ups is most commonly found in type 3 (public knowledge), type 4 (knowledge-absorbing innovating), type 6 (high-tech business innovating), and type 7 (business innovating regions). Nonetheless, they are fairly commonly applied across all types of regions and even in knowledge absorbing regions, their prevalence exceeds that of all human capital related measures.

Conclusions

In summary, the analysis of the RIM repository provides ample evidence for the first assumption that the potential of universities to raise regional innovation capabilities is still very strongly perceived in terms of the “obvious third role” outlined above. A strong focus lies on policies related to “R&D co-operation”, “knowledge transfer” and the support for academic spin-offs while other issues such as targeted human capital development at or by universities as well as programmes to increase the mobility of researchers receive far less attention. Likewise, programmes focused on capacity building at universities themselves are less common than could be expected, possibly due to the fact that in most cases such responsibilities continue to lie at the national level.

Additionally, we find strong evidence of country specific profiles of policy making with respect to for example the question to what extent human capital related or capacity building issues (‘universities’) are at all addressed. While some countries display a very clear tendency to focus on policies related to the “obvious third role” the activities in others are a bit more broad-based – but in different ways.

Furthermore, there appears to be a certain level of evidence that the profile of regional innovation policy is adapted to the main challenges that characterise the region. While regions with a strong public science or a demanding private sector focus on knowledge transfer, capacity building measures are most often deployed in those regions where the industrial sector is strong, but not necessarily always very innovative.

To an extent, these results should be read and interpreted with care as they reflect the sum of a number of individual country correspondents’ judgements. For each region, these correspondents had to decide which policy measures constitute the core of the region’s innovation policy – and which minor ones could be omitted. Factually, therefore, the situation may be somewhat less clear cut than suggested, as will be demonstrated in the following section.

Nonetheless, this overarching analysis of the RIM repository has provided us with valuable insights into exactly this: How the relevance of policies addressing regional potential of universities is perceived today – and which relevant gaps may continue to exist in this somewhat traditional perception.

2. Universities' Roles in Developing Regional Innovation Capabilities

In the following, this section will present a number of case study examples for ways in which regional governments have attempted to leverage the regional potential of universities in support of regional innovation.

Depending on whether these attempts have been of a complementary nature, aimed at facilitating transactions or, more ambitiously, aimed at transforming the local innovation system, the degree and form of involvement on the side of universities may vary. Consequently, we will focus on cases of support activities or initiatives rather than on universities. This is not only the case because many universities are invariably active in many different domains but also because the level of strongest engagement may be found at a level below that of the rectors and presidents.

To qualify as a good practice example, it is not necessary that a measure has made major changes to a university's strategy. As illustrated in section 1.3, this is not, and need not, always be the case. Large potentials can be leveraged from a local research university, even if this institution's overall strategy remains firmly international. Consequently, it is the suitability of the measures initiated by the regional government that has been assessed, rather than their impact on the internal management and the strategic planning of regional universities – as it is the key objective of this thematic paper to derive conclusions for regional, rather than for higher education policy.

At the end of each set of case studies, an attempt will be made to generalise the findings along the above-mentioned range of intervention logics, ranging from transactional to transformative.

In general, the authors have attempted to cover this range with their selection of examples. It should, however, not be mistakenly assumed that individual cases can be understood as representing one and no other conceptual category. It should be remembered that even the highest-level categorisations refer to points of leverage, rather than to clearly delimited fields of action. For example, it will be next to impossible to find a measure or initiative aimed at increasing R&D co-operation that does not in some way also touch on issues of technology transfer and human capital deployment and development.

Nonetheless, it seems possible and instructive to sort different policy measures according to their main priorities and, in the following attempt, to conceptually distinguish between degrees of intervention – which will be done in the following sub-sections.

While making conscious and extensive reference to the recently published Commission Guide "Connecting Universities to Regional Growth", the paper aims to be consistent with respect to the inductive approach outlined above. While the overall notion of classifying measures on a scale from transactional to transformative is closely adopted, the different sub-categories used to make that point will only in those cases reflect those of the Commission Guide where this is consistent with the empirical evidence from the Regional Innovation Monitor repository and complementary sources.

In summary, this second section of the paper aims to put the statements of the Commission Guide on a much broader and fully independent empirical basis. In that sense, it adds value not by coming up with yet another autonomous classification of measures but by putting existing ones into perspective with the aim of helping to make them more robust and, where needed, refine them.

2.1 Research & Development Co-operation

Box 2.1-A Innovation Vouchers

The objective of Innovation Voucher initiatives is to improve the links between public knowledge providers and small businesses and, in the long run, to create a cultural shift in the small business community's approach to innovation.

Typically, innovation vouchers are small-scale grants worth around € 5,000, which have to be invested into the acquisition of knowledge and/or consultancy from a regional research institute or a regional university. The main objective of such initiatives is to help overcome the traditional differences in mentality between the universities and the SME sector that prevail in many regions. Many SME tend to subscribe to a general perception that public research is too abstract and unsuitable for their needs. Consequently, they are very hesitant to invest in such co-operations. The idea of the innovation voucher programme is to enable first encounters on a concrete basis, but at no extra cost. Together with promotion campaigns, it is hoped that regional firms can be convinced to give co-operations a try if they are associated with no or little additional risk.

Innovation Voucher initiatives have been launched in a number of countries, ranging from Germany, France and the United Kingdom via Ireland, Spain and Italy to the Czech Republic and Italy, in very many cases based on EU Structural Funding.

In general, they have been found to develop a relevant facilitating effect in regions in which the general propensity to co-operate is already high. However, they have the major weakness that they are of no use if the perception of the local SMEs is actually right. From that perspective, the measure must be assessed very critically in regions in which the strategic orientation of research institutes is not yet focused on applied issues. Moreover, it will not be able to unfold any effects in regions where the business models within the SME sector do not tend to be innovation oriented. Although a number of innovation vouchers could be assigned even in peripheral Convergence Regions, it cannot be said that they had developed a transformative effect on the overall nature of the relations between public research and the private SME sector.

In summary, innovation vouchers are a suitable measure to add momentum to a latent interest or existing ideas for co-operation and to energise the innovation system of somewhat but not highly developed regions. To the contrary, experience with them has shown that they have a very limited transformative effect.

Link: <http://www.innovationvouchers.ie/>; www.jic.cz/innovation-vouchers.

Box 2.1-B Knowledge Transfer Partnership – UK wide program

The Knowledge Transfer Partnerships Programme aims at helping firms to improve their competitiveness through the better use of knowledge, technology and skills that reside within the UK Knowledge Base, ideally in their vicinity.

Knowledge Transfer Partnerships aim at serving strategic needs and identifying innovative solutions to help businesses grow through improved quality and operations, increased sales and access to new markets.

There are three principle players within a partnership:

- Company partner - this is usually a profit-making firm but it can also be a health or education organisation or Local Authority. KTP supports firms regardless of size,
- Knowledge-base partner - this is a higher education institution (e.g. university), college or research organisation (public or privately funded),
- KTP Associates – Each partnership employs one or more “associates” (recent graduates), transferring knowledge into the company via a strategic project.

The total funding amount to up to £60,000 per year, of which one to two thirds is contributed by the company’s partner (depending on whether it is an SME or not). Most projects have a duration of approximately two years.

While not human capital measures as such, the KTP Programme is based on the recognition that knowledge developed or improved in academic institutions may need extensively or intensively adapted to particular business applications. Consequently, it is argued that the basis of concrete project co-operations can best be realised based on the employment of an associate – which is considered a more credible and sustainable incentive for interaction than for example the one-time grant of € 5,000 typically offered by Innovation Vouchers. In that sense, the local retention of human capital can be considered a side-effect but not its main objective.

Currently, there are over 1,000 Partnerships running at any one time and over 1,100 Associate projects. For the knowledge base partner (higher education institution mainly), on average, each KTP Associate project produces 3.6 new research projects and 2 research papers – thus creating a substantial incentive for the universities to engage. On the company side, 60% of the associates are offered and accept a post in their host company on completion of their KTP project. According to official statements, for every £1m of government spent the average benefits to the company amounted to an £4.25m annual increase in profit before tax, £3.25m investment with 112 new jobs created and 214 company staff trained as a direct result of the project.

Link: <http://www.ktponline.org.uk/strategy>

Box 2.1-C Public-private collaborative research projects in the field of environment, transport, logistics, info-mobility and energy

The measure aims at strengthening the competitiveness of regional production system by promoting research, technology transfer, including the creation and reinforcement of effective innovation systems and systemic relations between research institutions and enterprises in areas and strategic systems identified by means of regional planning. To this end, the measure provides support for research projects in cooperation between at least two enterprises and at least one research organisation.

It is implemented under Axis 1 "Research, development and technology transfer, innovation and entrepreneurship" of the ROP ERDF 2007-2013 for Tuscany, starting from 2009. It receives substantial national funding of nearly € 6 million as well as ERDF allocation of close to € 3 million (annually).

The measure provides two lines of action:

- the financing of projects of industrial research and experimental development on the environment, transport, logistics and mobile information,
- the financing of development projects in the energy field aimed at improving energy efficiency, promoting renewable energy and promoting initiatives concerning the energy aspects of transport.

Projects may last up to 18 months and should have an overall volume of at least € 1 million and not exceed € 5 million. Large firms are supported with up to 40%, large firms with up to 80%. As of mid-2011, a total of 10 projects had been supported, 4 of which in the fields of transport, logistics and mobile information. Compared to for example. KTP, this programme is technically of a much more classical grant-based nature.

Nonetheless, the programme is interesting in that the regional government aims at guiding the local activities by defining a clear technological focus. It is thus aimed at addressing "grand challenges" through engaging regional universities in co-operation with local enterprises. The regional government does thus on the one hand seek to make its own contribution to addressing those challenges by promoting the development of solutions for applications relevant in the region (logistics, transport) while on the other hand leaving room for more generalist development projects (energy efficiency, mobile information). As a tendency, however, the focus is on leveraging the potential of regional universities in addressing local needs – rather than becoming a hub for general-purpose solutions.

Link: <http://www.rim-europa.eu/index.cfm?q=p.support&n=13992>

Box 2.1-D Stockholm Science City Foundation

In 1990, the Stockholm Science City Foundation (SSCI) was founded and commissioned by the three leading universities Karolinska Institutet, KTH Royal Institute of Technology and Stockholm University, the two cities Stockholm and Solna as well as the county and the business sector. Its mission is to attract academia and business within life science to Stockholm and neighbouring Solna and to develop the life science sector in the new city area developing around Karolinska Institute (Hagastaden) by attracting academia and businesses. The aim of the region, Vision 2025, is to become the world's most attractive centre for life sciences.

The organisation is a tool for its stakeholders in order to facilitate the implementation of joint projects and marketing of Stockholm Life (www.stockholm-life.se), to create attractiveness for academic and industrial life science, in a regional, national and international context. According to its self-stated mission, it is a Triple Helix initiative aimed at the exchange of knowledge between academia, local policy makers and the private sector and at leveraging the critical mass of life science competences in the three leading universities. It had 12 employees in 2011, many with a doctoral degree. Its concrete activities involve facilitating preparation of joint projects, for example by helping interested researchers and managers to gather all necessary information and to access all available sources of funding. Additionally, it supports the universities in the set-up of interdisciplinary research programmes.

Additionally, it strives to maintain active network relations with wither other life science initiatives outside the region or local initiatives with another focus of activity – to be able to provide access to the right networks for all possible queries. Examples are, Sweden Bio, Uppsala Bio, Biotechvalley.nu, Stockholm-Uppsala Life Science, KI, Vinnova, MaRS Discovery District, Canada, Stockholm Chamber of Commerce, Invest in Sweden Agency, Stockholm Business Region.

So far, a number of development projects have been successfully initiated and are administered by SSCI, including ABC Europe, Albano area, EU Bridge, Powerhouse Stockholm Life, North Station development, Stockholm Brain Institute, Sweden Science Net, and Tools of Science. A number of them are ERDF co-financed, some have an inter-regional and/or international scope.

In summary, the Stockholm Science City Foundation is a good example for local universities' active engagement in a local Triple-Helix initiative, or, in other words cluster and network activities, aiming at initiated concrete co-operation projects.

Links: www.rim-europa.eu/index.cfm?q=p.organisation&n=12800;
www.stockholmsciencecity.com/en

Box 2.1-E Medicon Valley Alliance

The Medicon Valley Alliance is an initiative within the framework of the umbrella organisation Øresund Org, which focused on the Øresund Region, but with an international outlook, aims to create cross-border networks and projects. Øresund Org intends to remove barriers to mobility and facilitate competitive clusters within knowledge-intensive areas. Øresund Org is financed by the participating universities, the Capital region of Denmark, Region Skåne, Region Zealand, Øresund Org's member companies and the EU.

Medicon Valley Academy started in 1997 as an EU Interreg II project. The primary initiators behind the life-science cluster organisation Medicon Valley Academy were the Universities in Lund and Copenhagen, from the beginning strongly supported by the major pharmaceutical companies in the region. Later on, the industrial sector's activities in supporting this Danish-Swedish cluster organisation become such that the name "Academy" was changed to the more balanced "Alliance".

The activities of today's Medicon Valley Alliance (MVA) focus on four main activities:

- building local and global platforms for networking for academia and business;
- organising events and seminars with the objective of improving knowledge and competences among stakeholders;
- creating an overview of the on-going development of the Medicon Valley for the benefit of international and local stakeholders; and
- analysing and proposing solutions for the improvement of the life science environment.

The members of MVA include university faculties, the regions of Skåne and København, biotech, pharma, and medtech companies, science parks (e.g. Ideon Science Park Lund), investors, business service providers etc. in the "Medicon Valley".

In that sense, the regional activities around the "Medicon Valley Alliance" are a good example for an agreement on a comprehensive, joint initiative of regional stakeholders who share a certain interest in a certain initiative, although their individual motivations may differ. Additionally, it underlines that universities can play a central role in early stages of cluster development – as long as their initiative is supported by regional industry as well as local policy makers. Consequently, the Medicon Valley can be regarded a success story with respect to building regional consensus on a transformative development project.

Link: <http://www.rim-europa.eu/index.cfm?q=p.organisation&n=15339>,
www.mva.org

Box 2.1-F Umeå Plant Science Centre – Berzelli Centre

The Umeå Plant Science Centre for Forest Biotechnology is an example for a public-private research partnership that has been publicly supported, even though in this case from national sources (the Swedish Berzelli Programme).

Initially, the project started off as a collaboration of two regional universities, the Swedish University of Agricultural Sciences and Umeå University, which were both active in similar fields but had not collaborated beforehand. It began as a virtual project in 1999, which was put on a factual basis with shared laboratories in 2001. Today, it has become a big initiative with 24 working groups in 3 main task forces constituted by 53 professors, 46 Post-Docs, 46 PhD students and 45 other personnel. Its main foci of research are “Tree Growth and Productivity”, “Wood Development and Wood Quality”, as well as “Seasonal and Age Control of Perennial Growth”.

Although no separate legal entity has been formed, the project was put on a new basis when it gained support as a Berzelli Centre. The Berzelli Programme is a Swedish national initiative that aims at the establishment of pre-competitive research centres the strategic orientation of which, however, is strongly oriented towards possible fields of application – and co-ordinated with industry. Despite their basic research orientation, Berzelli Centres are encouraged and after a certain time required to acquire up to two thirds of their budget from non-public sources. In the case of the Umeå Plant Science Centre, this implied that € 5.6 million of additional research funding were allocated for a period of ten years. Moreover, it has led to the involvement of five large industrial stakeholders from the forestry sector and the plant industry. While they do not usually interfere with everyday research activities, they are represented on the management board that determines the strategic orientation of the three task forces. Additionally, there are a number of applied, proprietary projects that the centre performs for industry directly. For this and other purposes, a specific technology transfer company “SweTree Technology” has been set up.

The Umeå Plant Science Centre is interesting. It was initiated by universities but further developed by means of public funds and a publicly developed strategy. Evaluations show that at the beginning researchers remained hesitant to work with business sector representatives. The Berzelli requirements, however, have prompted them to intensify these interactions and in the course of that sustainably lowered the threshold so co-operation now occurs more naturally. Moreover, it is an illustrative example of how public-private partnerships can be build upon the resources and interests available in a particular region – in this case tree-covered Northern Sweden.

Link: <http://www.upsc.se/Contact/UPSC-Berzelli-Centre.html>

On a scale from transactional to transformative, the surveyed policy initiatives to support **R&D co-operations** can be systematised as follows:

First, government can offer small scale support for R&D consultancy services provided by faculty to business firms, e.g. in the form of ‘innovation vouchers’. Such measures mainly help to lessen the emotional boundary line and to facilitate already considered co-operations between the science and, in particular, the SME sector. In contrast, it remains a subject of debate whether they have any form of transformative effect.

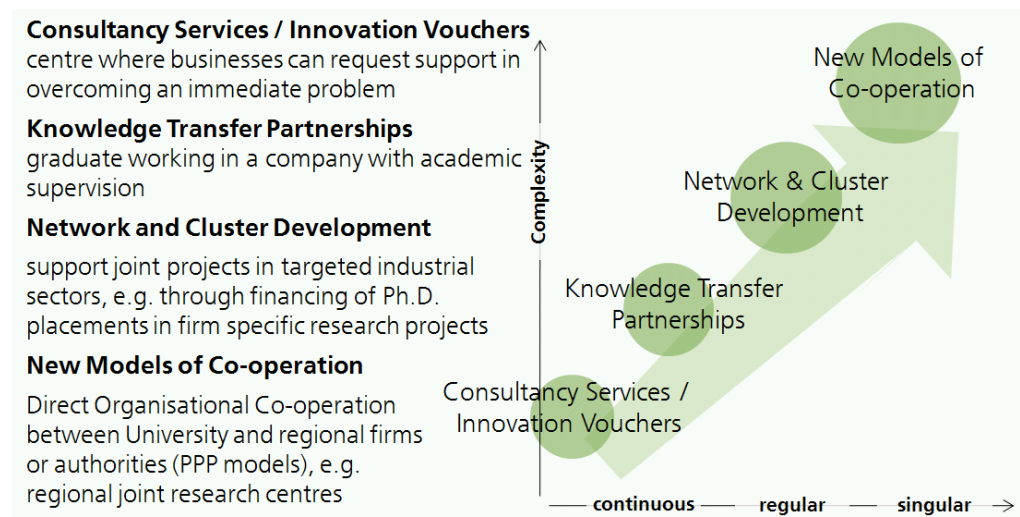
Second, government can offer support for somewhat more large-scale and mid-term R&D co-operations between universities and firms, for example by financing the placement of graduates in business R&D projects with the background support of faculty, for example in the context of ‘knowledge transfer partnerships’. Experience shows that these projects tend to result in continued working contracts and sustainable working relations.

Third, universities can engage actively in clusters and networks of firms in their environment to internalise an awareness of the local firms' needs and potentials. Regular events with industrial decision makers can help to maintain a mutual exchange of experiences and attractive in-service training can help to swiftly spread the universities' image among the region's high potentials. Likewise, universities can seek to establish a sustainable basis for on-going co-operation, e.g. through the regular placement of Ph.D. students.

Fourth, universities and larger firms can seek to engage in novel forms of public-private partnerships (PPP). Often, those are set up between large corporations and leading universities and not focused on immediate application – although that is not by definition required. They undoubtedly count among the long-term, large-scale endeavours with a transformative ambition.

In summary, most transactional approaches in the field of research and development co-operation try to remove obstacles to co-operations in which the existing stakeholder would have been interested anyway, while the more ambitious approaches aim to create an attractive environment to attract firms that are not already there. Alternatively, they seek to adopt the profiles of universities in such a way that they can – in the mid- to long term – better serve the needs of regional industrial firms.

Figure 7 Different Ambitions in Research & Development Co-operation



Source: own figure, based on European Commission (2011).

2.2 Entrepreneurship and Technology Transfer

Box 2.2-A Créa'Campus

The main objective of Créa'Campus is to facilitate the creation of an entrepreneurship culture among the young population in the region of Centre, in particular among its higher education students. In order to do so, the François Rabelais University and the Business and Management School of Tours and Poitiers organise the business creation project competition “Créa'Campus” on a yearly basis.

Students belonging to all university departments are eligible to present a real or fictitious business creation project, carried out with the support of different types of entrepreneurship practitioners: experts, businessmen and women and university professors. The competition offers students the possibility to acquire core skills, through theoretical and practical exercises, on entrepreneurship and innovation.

In the fifth round of the competition, 228 registered students, are distributed among 85 different teams. Projects are presented before a jury responsible for selecting the three winners. Each of the winners is awarded € 1,000. The competition is organised with the support of the regional innovation agency (ARITT).

No formal evaluation of the Créa'Campus competition has yet been carried out. Nonetheless, university and regional authorities are strongly convinced that this type of activity contributes to the development of entrepreneurial and innovation skills among the region's youth. In 2010, a total of 50 students from different academic disciplines participated in the 15 final round-projects in the competition.

While as such a fairly commonplace measure, the entrepreneurship competition is well organised in that it “pools resources” from several universities and thus creates better opportunities for interaction, exchange and broadens the context of ideas.

Nonetheless, it remains a stand-alone, if regular, measure that does not carry the idea of entrepreneurship into the students' curricula themselves and does not educate them in the managerial skills required to start up a firm. In that sense, the comprehensiveness of business-plan competitions is arguably quite limited.

Link: <http://www.rim-europa.eu/index.cfm?q=p.support&n=13791>

Box 2.2-B EXIST-Gründerstipendium/EXIST-Forschungstransfer

The *EXIST-Gründerstipendium* is a grant to support new entrepreneurs from universities and non-university research institutions who want to turn their idea for a start-up into a business plan. These should involve technologically-innovative start-up enterprises with good prospects of economic success. The EXIST-Gründerstipendium scheme supports start-up teams of up to 3 people for one year. The funding covers personal living costs (with between € 800 and € 2,500 a month depending on the level of qualification), expenditure on materials (up to € 10,000) and coaching services (up to € 5,000). Additionally, entrepreneurs will be required to take part in a number of standardised EXIST seminars. For grants to be allocated, the university has to be part of an EXIST network and commit to support the single entrepreneur or team by means of mentoring and cost-free access to its infrastructure throughout the support period. Applications for funding may be submitted at any time, by the university rather than the entrepreneur.

The sub-programme *EXIST research transfer* supports outstanding, research-based start-up projects involving complex and risky development work. Funding is provided both for development work to prove the technical feasibility of the research-based start-up concept, and for the necessary preparations to start up the company. Research teams at universities and research institutions and their start-up companies are supported in 2 phases for a maximum of 3 years. In the first phase it covers personnel cost for up to 4 employees as well as up to € 60,000 of expenditure on materials. After the viability of the project has been documented during the first phase, additional funding of up to € 150,000 can be awarded in the second phase, subject to a number of criteria. Project outlines may be submitted by the cut-off dates of 30 June and 31 December each calendar year.

EXIST is a programme of the Federal Ministry of Economics and Technology with a long history dating back to the mid-1990s. In the course of the years it has continuously been adapted and gradually improved. EXIST III and the EXIST-Gründerstipendium programme are co-financed by the European Social Fund (ESF). The key advantage of this project line is the long learning curve so that by now most of the support packages and seminars offered under this framework have been proven to work and generate additionality in practice – while a number of others have been discarded. The overall programme has been closely monitored through accompanying research as well as regular evaluation from its onset which has added momentum to the gradual process of improvement. While it is not itself a regional programme, it is aimed at leveraging the regional potential of universities

Link: exist.de/exist-gruenderstipendium/index.php; exist-forschungstransfer/index.php

Box 2.2-C Spin-off in Brussels

Launched in 2006, this programme aims to encourage the transfer of basic research results into concrete applications with a view to creating new companies (spin-offs) in the Brussels-Capital region and thereby develop the regional economy. It addresses both academic spin-offs (universities and colleges of higher education) and industrial spin-offs (companies and collective research centres). More than € 1.3 million of regional funding have been allocated for the financial year 2009, up from around € 600.000 in 2006.

The measure is part of an overall effort by the region to stimulate the number of new 'high-tech' or knowledge intensive firms created in the region. In 2006, the Brussels 'Regional Innovation Plan' highlighted the low share of employment in medium to high tech manufacturing and the very low level of R&D expenditure in enterprises as a weakness despite the fact that the region is home to a significant research potential, notably academic potential, around the Free University of Brussels. As a complement to the measure, which was inspired by the Walloon measure 'FIRST Spin-off', the region has recently launched three new incubator structures, which have been in operation since 2009.

Funding is granted for a two-year period, which may be extended by two years for an academic spin-off and by one year for an industrial spin-off. The funding covers, in addition to the salary for an 'enterprising researcher', the operating and training costs as well as support costs (e.g. preparation of the business plan). The 'enterprising researcher' is expected to receive training and coaching by a promoter, an industrial sponsor and a liaison officer from INNOVIRIS.

So far no independent evaluation has taken place yet. Since its inception in 2006, an average project funding of € 200,000 has been awarded to between four and seven proposals, resulting in an overall support volume of up to € 1.3 million. In most years the approval rates have been around 50% suggesting that a critical appraisal of the submitted proposals has indeed taken place before the allocation of funding.

The measure is a classic case of subsidy based spin-off support. The monitoring figures suggest that there is a continuous entrepreneurial demand for support of this nature although the actual number of projects supported remains fairly limited. In a general sense this type programme can be regarded as a suitable continuous effort to support and add momentum to the latent entrepreneurial potential in the region and to leverage the universities potential as sources of novel and technologically creative applications which may not be easily be adopted by existing firms.

Link: <http://www.rim-europa.eu/index.cfm?q=p.support&n=14165>

Box 2.2-D Wielkopolska Innovation Platform

Wielkopolska is a region in the centre of the western part of Poland, with a well-developed capital – Poznań. In order to take advantage of the scientific potential of universities and to increase the innovativeness of the region, the “Wielkopolska Innovation Platform” was launched in 2005. The objective of this initiative was to enhance cooperation between universities and companies located in Wielkopolska through the promotion of universities as a source of new solutions for companies.

A Web site was created to improve the communication between universities and companies. It includes a database of offers addressed to companies. Seven public universities take part in the project, offering their analytical and research services and the possibility of using the outcomes of theses and other scientific work. Each of these universities has a representative called an academic entrepreneurship promoter, who is responsible for searching and collecting information regarding potential business partners and coordinating existing partnerships mainly with regard to commercialisation of projects. Exemplary outcomes of the initiative are as follows:

- The cooperation between the Faculty of Commodity Science of Poznań University of Economics and the company PPU BELiN, which offers a wide selection of teas. It involved the research on improving the products, recipes, the techniques of their development and quality assurance.
- The cooperation between the Department of Biotechnology and Food Microbiology of the Faculty of Food Science and Nutrition of Poznań University of Life Sciences and the company FPH PAULA, which resulted in the development and implementation of a new technology leading to the introduction of a new, fat-free food product.
- The cooperation between the Department of Toxicology of the Faculty of Pharmacy of Poznań University of Medical Sciences and the firms Agro-Trade, where scientists conducted research on the efficiency of substances used to exterminate rats.

Aside from the platform, almost all of the universities have units dedicated to initiating contacts with entrepreneurs. One of such units is the Centre of Innovation and Technology Transfer of Adam Mickiewicz University, another the Centre of Innovation, Development and Technology Transfer of Poznań University of Technology.

In conclusion, the platform is a tool that may remove the obstacles to the cooperation between science and business, contribute to taking advantage of the scientific potential of universities and increase the competitiveness of the region.

Link: <http://www.wpi.poznan.pl/en/>

Box 2.2-E EXIST III – Entrepreneurial Culture

EXIST III – Entrepreneurial Culture supports projects in universities and non-university public-sector research institutions that contribute to the establishment of an entrepreneurial culture to boost the creation of new spin-offs from universities and non-university research institutions. Consequently, the recipients of funding are the universities rather than the potential entrepreneurs themselves. Between 2006 and 2008, 48 projects were selected for support in three rounds of funding applications.

In the new competition “University for Entrepreneurs” (“Die Gründerhochschule”), they have to submit clearly defined individual project proposals implemented in cooperation with partners that focus on special courses, adaptations of the overall curriculum and other complementary activities. In the first round of this new competition, started in 2010, proposals were submitted by 84 universities, ten of which were selected for funding and three given additional distinction. Currently the following universities receive support: C-v-O Universität Oldenburg, TU Berlin, Universität Potsdam, MLU Halle-Wittenberg, Ostfalia Hochschule für angewandte Wissenschaften, TU Dortmund, HHU Düsseldorf, FSU Jena, TU Munich and FH Munich.. Projects start off with a “conceptual phase” of six months during which their proposal has to be further developed and its viability convincingly demonstrated. The maximum amount of funding allocated for that purposes amounts to € 70,000. If the project itself is approved, it will be supported with annual funding of up to € 1 million for a period of up to five years. Thus, *EXIST III – Entrepreneurial Culture* allows the universities to implement initiatives of substantial scope and ambition.

EXIST is a programme of the Federal Ministry of Economics and Technology with a long history dating back to the mid-1990s. Over the years it has continuously been adapted and gradually improved. *EXIST III* and the *EXIST-Gründerstipendium* programme are co-financed by the European Social Fund (ESF). The key advantage of this line of projects is the long learning curve so that by now most of the support packages and seminars offered under this framework have been proven to work and generate additionality in practice – while a number of others have been discarded. The overall programme has been closely monitored through accompanying research as well as regular evaluation from its onset, which has added momentum to the gradual process of improvement.

While it is not a regional programme in itself, it is aimed at leveraging the regional potential of universities. Moreover, regional governments are expected to contribute follow-up financing after the five years of project financing have ended.

Link: <http://www.exist.de/exist-gruendungskultur/index.php>

Box 2.2-F CAST - Centre for Academic Spin-offs Tyrol, Gründungszentrum GmbH

CAST is the business start-up centre of the universities, technical colleges and non-academic research institutes of Tyrol. CAST's shareholders are select institutions with considerable resources for a successful increase in technology-oriented business start-ups based on the Tyrolean academic environment. Among them are Innsbruck's universities, the province of Tyrol through the Standortagentur Tirol and the Management Center Innsbruck (MCI). Furthermore, CAST is one of eight AplusB (Academia plus Business) centres, commissioned by the Federal Ministry of Transport, Innovation and Technology (BMVIT).

CAST's main task is to stimulate technology-oriented business start-ups from the above-mentioned facilities, providing intensive consultancy, coaching and backing along the way. Further tasks are related to the commercial exploitation of university research results and the networking of all initiatives, which promote technology transfer from science to industry. The goal is to strengthen the business location of Tyrol and to increase its international competitiveness. In order to stimulate technology-oriented business start-ups from academic and research institutes, CAST's main activities are

- to provide consultancy, coaching and backing;
- to advise on IPR issues to support the exploitation of research results; and
- to promote the transfer of technology from academia to the world of business.

These tasks include start-up consultancy and promotion, patent consultancy, qualification measures, business plan support, idea (CAST awards) and business plan competitions (adventure X). CAST's service portfolio is directed at professors, other members of the teaching staff, research assistants, graduates and researchers funded by third parties at Tyrol's academic institutions. At its premises CAST provides a supportive environment to prepare and initiate technology-oriented start-ups based on academic research, through its proximity to academic facilities, the provision of office and laboratory space, technical infrastructure, central administration and consultancy services, communal facilities as well as contact and possibilities for collaboration with companies or research institutes that belong to the same industry.

In summary, CAST constitutes an example of a classic incubator, which can be found at many universities across Europe. Positive features are the joining of forces of the local universities and the additional support from the Austrian federal government that promotes exactly this joining of forces in one incubator per federal state.

Link: <http://www.cast-tyrol.com/>

Box 2.2-G Science and Technology Park of Sicily

The Science and Technology Park of Sicily (PSTS) is a consortium, which was established in 1991 with capital provided by the Region of Sicily and continues to be maintained on that basis. It is supported by the universities of Palermo, Catania and Messina as well as a number of other local research institutes.

Currently, about 75 people are working in the park, and around 25 enterprises are located on its premises, which are made up of 1,000 m² of office space, 1,500 m² of laboratories and are spread across four locations. The activities of the firms active in the park are focused on the areas of ICT and biotechnology but also on agriculture.

The park aims to foster a system of relationships between Sicilian universities, research centres and companies that share the objective of enhancing the competitiveness of the region through research, innovation, technology transfer and dissemination of a culture of quality and specialized training. Hence, the stated mission of the PSTS is to bring research and specific training together in one location in order to transfer applied knowledge and concrete research results. It aims to make use of its constant interaction with the entrepreneurial and institutional reality in the region, to spread a better understanding of the region's development needs within in the local environment – thus facilitating the implementation of new technologies and innovative organization models in the regional economy of Southern Italy. Since 2001 a specific focus has been put on training, based on structural funding. So far, 13 courses have been organized for a total of 180 people in the fields of: food farming quality, environmental certification, materials, cultural heritage and entrepreneurship. Over 40 on-the-job trainees, coming from Sicilian and national universities and companies, have taken part in periods of professional training. A number of them are Ph.D.-students who work on their theses on the park's premises.

In a sense, the Science Park can be regarded as a typical project in the periphery, trying to either develop those competences, which are partially present at regional universities or to focus on those needed in the region. Arguably, however, it is also a case of following “trends”. If the competences of the universities of Palermo, Catania and Messina are really best leveraged in the fields of ICT and biotechnology remains open to debate. On the other hand, promising approaches are visible with a view to the focus on agricultural and other regionally relevant applications.

Finally, the park has a number of international agreements with other science parks and research institutes in the periphery: Greece, Romania, Russia and Tunisia but none of the leading ones in Europe.

Link: <http://www.pstsicilia.it/pages/about-us.php>

Box 2.2-H “Minalogic” – Pôles de Compétitivité (Mondial)

The Pôle de Compétitivité Mondial “Minalogic” in Grenoble fosters research-led innovation in intelligent miniaturized products and solutions from the fields of micro- and nano-technologies as well as embedded software intelligence. The cluster aims at supporting the development of multi-purpose technologies applicable to all business sectors, including traditional industries. Minalogic brings together major corporations, small and mid-sized businesses, and government agencies. It leverages the strengths of Grenoble's innovation ecosystem, which offers a convergence of world-class public technological research and industrial applications. With a view to multi-purpose technologies, it establishes contacts between developers and potential users.

The governance structure at Minalogic is organized around a board of directors, which manages the strategy at the cluster. The board oversees the coordination and technological units and reports to the members of the cluster at regular meetings. All categories of Minalogic members-corporate partners, local government, small and mid-sized enterprises and industries, training and education organizations, and research laboratories are represented on the board. The Minalogic Coordination Unit implements the board's decisions and runs the daily cluster activities. It has four permanent members. Its mission is to help cluster partners to identify potential projects in a monthly meeting, help to put together project financing packages, ensure that project output is transferred to industrial and services businesses as well as to create ties with other clusters working in related fields etc. Since the creation of Minalogic in 2005 185 projects have been certified and co-financed with a total of € 575.3 million. Beyond a small amount of support for the coordination unit itself, main sources of funding have been the Fonds Unique Interministériel (125 projects, € 203 million), the National Research Agency (184 projects, € 76.3 million), the Programme d'Innovation Stratégique Industrielle (5 projects, € 220 million), Oséo (21 projects, € 26 million) and CATRENE (4 projects, € 50million).

Of the clusters 204 members, 15 are research centres and universities while 154 are companies, 82 % of them SMEs. The universities' role in this regional initiative can thus be understood as one of co-operation hubs and sources of knowledge for a broad-based SME population. Evidently, however, they do not dominate the pattern of regional interaction. Nonetheless, they play an antenna function with respect to the newest global scientific trends as not all SME have the resources to conduct world-wide technology scouting, or, in the case of traditional industries can be aware of the latest multi-purpose technologies that might improve their products and processes.

Link: <http://competitivite.gouv.fr>; www.minalogic.org

Box 2.2-I MicroTEC Südwest – Leading-Edge Cluster Competition

The cluster is located in one of the EU's high-performance areas of science and industry is focused on the four regions Karlsruhe, Stuttgart, Villingen-Schwenningen and Freiburg . Roughly one in seven patents in the field of microtechnology granted worldwide comes from this region. There is a unique accumulation of competences along the entire value chain with reference to four main economic sectors:

- Automotive,
- Life science / Medical technology,
- Mechanical engineering / Production engineering,
- Automation engineering / Sensor technology.

The aim of the stakeholders involved is to further develop the leading international position that the state of Baden-Württemberg already enjoys in the field of microtechnology into one of true global leadership. With major global players as well as many innovative small- and medium-sized enterprises the leading-edge cluster MicroTEC Südwest provides services to a cross-sector foundation for innovation and growth in the region. Activities within the cluster are coordinated by MST BW. Charged by the regional Ministry of Economic Affairs with the cluster's management, MST BW provides a central point of contact and represents the interests of its members in dealings with government and other institutions.

The cluster brings together over 1,200 researchers from more than 350 firms, organizations, universities, and research institutes, making MicroTEC Südwest one of the largest technology networks in Europe. In that sense, it is the key objective of the cluster to serve as an interface between science and industry. Of these 350 members only 11% are higher education institutions, which at first sight seems to suggest a rather limited role. In many cases, however, those constitute the common and connective elements for many production and service firms with diverging agendas.

Like Minalogic, the MicroTEC Südwest Cluster is an illustration of how the regional potential of universities and research institutions precisely by engaging them in large-scale regional initiatives which are at their core driven by industry. In the framework of those initiatives they can play a central role both as hubs in co-operative networks and as antennas, which channel information on the latest scientific technological trends into the region. While many of the potential industrial users of multi-purpose technologies have a far clearer understanding of their potential, the latest developments with regard to the technologies themselves still fall mainly into the domain of the pre-competitive research, which only larger firms can employ in-house.

Link: http://microtec-suedwest.de/cms/front_content.php?changelang=2

Box 2.2-J The Centre of Advanced Technologies 'AERONET - The Aviation Valley'

The southeastern part of Poland is characterised by a high concentration of aerospace industry (encompassing approximately 90% of aerospace manufacturers), as well as being the site of aviation training centres. A group of leading aeronautic companies founded the Association of the Group of Companies of the Aerospace Industry "The Aviation Valley" (Stowarzyszenie Grupy Przedsiębiorców Przemysłu Lotniczego "Dolina Lotnicza") in April 2003 in order to continue the development in the region, to integrate the aerospace industry and to keep businesses in this part of Poland. The main objective of the association is to transform the region into one of leading European aerospace regions. From its very beginning the association focused on close cooperation between the aerospace industry and the scientific world. This led to the foundation of the Centre of Advanced Technologies "AERONET – The Aviation Valley" the aegis of Rzeszow University of Technology.

The centre consists of eleven entities, i.e. one all-round university, six technically-oriented universities and four research and development institutes. Its principal objective is the implementation and commercialisation of new technologies for the aerospace industry through research and training activities. The Laboratory of Materials Research for the Aerospace Industry was established at Rzeszow University of Technology for this reason. During the foundation and the development of the centre, international cooperation was established with research centres located in Austria, Canada, France, Germany, Hungary, Israel, the Netherlands, Slovakia, Spain and others. The project entitled "New Material Technologies Applied in the Aerospace Industry", undertaken by AERONET, is one of the biggest research projects in Poland. Its authors hope that it will result in innovative materials and technologies applicable in the aerospace industry, patents and research papers in leading journals. One of the objectives of the project is to increase the application of the results of Polish research and development efforts.

One of the results of the cooperation between the companies of the aerospace industry is increased human development with regard to technical and scientific skills. For example, students and scientific staff benefit from traineeships at WSK „PZL-Rzeszów” S.A. (manufacturer of aerospace engines and components). An ever-increasing activity in the field of research and its application in the aerospace industry within the Centre of Advanced Technologies "AERONET – The Aviation Valley" can lead to the incubation of spin-off companies based on the technical facilities and the human capital of the centre.

Link: <http://www.pracodawcy.uni.lodz.pl/>; <http://www.aeronet.pl/en/>

On a scale from transactional to transformative, the surveyed policy initiatives to support **entrepreneurship and technology transfer** can be systematised as follows:

First, support programmes can either provide subsidies to firms spin-off by faculty or set up by graduates through universities or directly. Alternatively, stakes in such firms can be taken or a specific venture capital fund can be launched. While at first sight, these programmes may impress with their large financial volume, they do not necessarily imply a concept to raise the entrepreneurial ambitions of people in the first place.

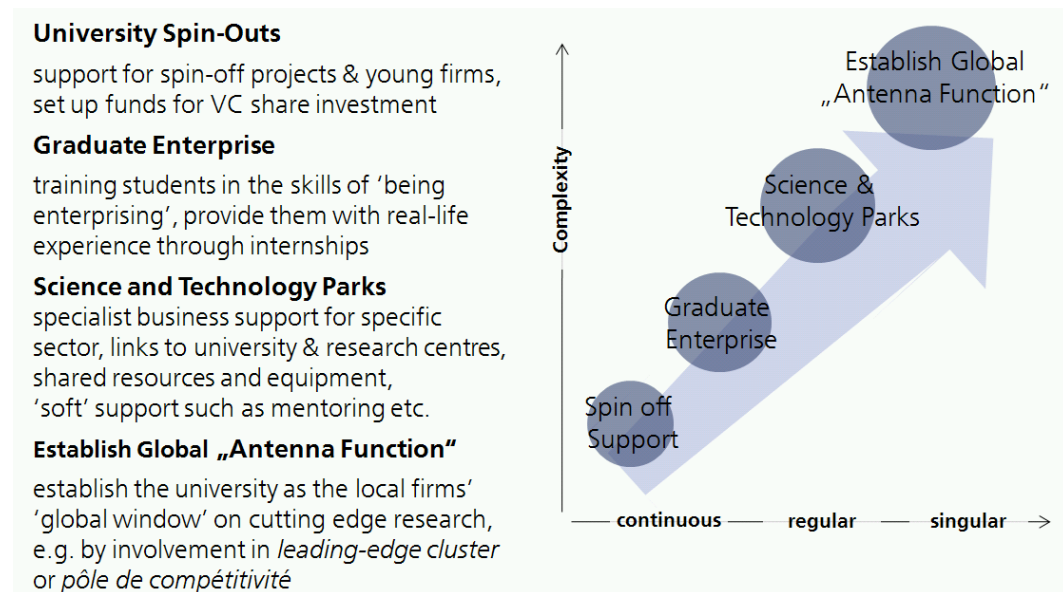
Second, the curricula can be adapted in such a way that students become interested in entrepreneurship. Beyond general skills like accounting, courses can address competences like field specific project management. While from the point of view of the decided entrepreneur, this support may appear less substantial; its overall ambition is more transformative in that it aims to raise the entrepreneurial spirit in the region – in co-operation with the universities.

Third, universities can invest more substantially e.g. in science and technology parks and with cheap office space and the 'just-in-case' provision of consultancy services. While such investment bets on the future and is more risky, it may also be the only option in weaker regions. Depending on how the obstacles to science-industry interaction manifest themselves, incubators can be anything from facilitators to the only option of a start-up.

Fourth, the university can aspire to proactively seek inspirations and develop novel general-purpose technologies in its international scientific networks and present these to firms, in particular to those without continuous access to the global R&D community. One typical example of such a role is the participation of universities in cluster initiatives that are mainly driven by industry but nonetheless substantially benefit from the specific role of public research.

In summary, most transactional approaches in the field of entrepreneurship and technology transfer aim to ease the transfer of the latent potential that is already available at universities to the business sector, through subsidies, targeted education modules, or incubator facilities. Experience shows, however, that entrepreneurship harbours a limited transformative potential for the region as such. Consequently, approaches with a more transformative ambition try to integrate universities in larger cluster initiatives, so that they are able to better understand the needs of present regional industrial sectors and that the transfer of knowledge and technology out of the universities can be developed beyond specific spin-off projects.

Figure 8 Different Ambitions in Entrepreneurship and Technology Transfer



Source: own figure, based on European Commission (2011).

2.3 Human Capital Development

Box 2.3-A StagInno – Université François Rabelais Tours

The University of Tours has developed the StagInno programme to simultaneously facilitate the labour market entry of its graduates and support regional economic development. Every year the university's partnership, promotion and contracts service publishes a call for projects for this specific mechanism. StagInno chooses one regional SME, one university student and one university organisation (laboratory, professor, research centre) in order to develop an innovation-oriented project. StagInno aims at developing innovation by providing expertise, equipment and trained personnel to enterprises during a one-year period. This type of public/private collaboration gives enterprises the opportunity of acquiring the necessary capacities to carry out their projects at a very low cost. The selection process is carried out by a panel of experts selected by the university. Projects must display high levels of creativity, provide a solution to a particular enterprise need, and produce concrete scientific, technical or economic outputs in order to be selected. The programme's budget amounts to € 300,000 annually, thereof € 100,000 of EU structural funding.

Enterprises have displayed high levels of interest in this mechanism due to their constant need to integrate new capacities in order to develop their innovation projects. The answers this mechanism provides include technical know-how, as well as new techniques for project management. The large variety of study programmes offered by the François Rabelais University allows them to provide support on technical, commercial or marketing-related issues. So far, most projects have led to an extended collaboration between the enterprise and the university organisation involved in the projects. Most students involved in the projects have been hired by the enterprises after the completion of the projects.

Consequently, the StagInno programme is a good example of how external incentives can be set to retain human capital in the region. While it would probably be futile to attempt to pay the enterprises for hiring graduates from a defined university, the combination of a convincing project proposal has proven to be a suitable approach to lay the foundation for sustainable employment.

This example illustrates that in particular policies to support R&D co-operation and policies to support human capital retention cannot be delineated clearly, although a main emphasis can of course often be identified. Nonetheless, experience has shown that each can be the means to the other's end and that this mutual inter-connection should be regarded as something positive.

Link: <http://www.univ-tours.fr>, www.rim-europa.eu/index.cfm?q=p.support&n=13789

Box 2.3-B Practice for Science and Science for Practice

Taking into account the future career path of its students, the University of Lodz (Uniwersytet Łódzki) inaugurated the project entitled “Practice for Science and Science for Practice” (“Praktyka dla nauki, nauka dla praktyki”) in 2010, set out to link the subject matter of diploma theses with the needs of the regional companies. It takes an average student approximately five hundred hours to write a diploma thesis. The time is usually not spent on gaining practical skills, but mostly on the theoretical study of literature. This is why the university has come up with the said initiative, so that the time spent on writing a thesis would become an opportunity for students to acquire new knowledge and skills, which in turn would become a competitive advantage once they start looking for a job.

A detailed, multistage process was developed in order for the cooperation to yield expected results. The first stage consists of identifying the internal needs of a company, so that those topics related to the operation of a company, which a student – an inexperienced outsider – could handle are found. Afterwards, the company submits a topic to an electronic database. Within two weeks the coordinator responsible for the cooperation with companies establishes contact with a suitable academic supervisor who conducts a diploma seminar relevant to the task put forward by the company. The supervisor and a student, whose interests match the matters outlined in the topic, develop a detailed plan of solving the problem outlined by the company. In the next stage, a contract is signed between the student and the company in order for the former to undergo relevant training. Finally, the diploma thesis is defended. Between April and June 2011 students cooperated with twenty-four companies from different sectors (such as banking, media, pharmaceutical, ICT). This diversity allowed students of physical, life and social sciences to gain experience and prepare diploma theses focused on practical problems.

The university tries to match the development of its academic staff with the needs of the regional market in many different ways. It introduces new courses relevant to the job market, mandates internships in most courses and entrusts lecturers from outside of academia, with practical experience of teaching some classes. All of these efforts help young people to find a better job more quickly after they graduate.

Link: <http://www.wpi.poznan.pl/>

Box 2.3-C Assistant for Innovation (e.g. Upper Austria, Tyrol)

The objective of the Assistant for Innovation programme is to increase the innovativeness and competitiveness of SMEs in the region by offering them grants to hire highly qualified personnel from the higher education sector in the area of project administration and innovation management. Beyond the immediate job opportunities generated by the programme aims to mitigate the risk connected to research and development by providing small firms with professional management skills.

The rationale behind this approach is that in the well-developed regions of for example Austria, many small and medium-sized firms do in fact already possess the technological competences to conduct innovation-oriented projects. On the contrary, they are often lacking the necessary managerial competence or experience to efficiently perform the organisational tasks specific to such undertakings. On the other hand many SME would tend to hesitate to employ such personnel – afraid of the cost and sceptical of the benefit. In regions with a particularly large share of SMEs in the local firm population, this situation may actually grow into a deterrent for local students to choose such field of study so that a vicious circle could ensue. To prevent this from happening, it is at least one of the central objectives of the programme to improve the regional employment perspective to graduates R&D management, which are certainly needed but hardly invested in without additional incentives.

In their application, the participating firms define a central innovation oriented project for a period of two years. If the application is granted the firm chooses a graduate (innovation assistant) from either a technical or a management science or economics related subject to act as project manager. The recipient firm will in turn assign an external coach to instruct the graduate with regard to project or firm specific information. The support measure covers part of the innovation assistants personnel cost in the form of a grant (50% in the 1st, 25% in the 2nd year), the cost for external coaches (up to 13 days) and the additional specialist training. Moreover, the graduate will in some cases receive free additional training at a regional college so that employing them becomes more attractive and profitable to the firm (Tyrolian Case).

According to the project's website, this scheme has resulted in at least 30 'success stories' in Upper Austria alone. In any case, it is an illustrative example how human capital retention measures can be adapted to the regional situation. Arguably, measures of the StagInno type would have a lesser effect in those regions where many SMEs already employ a number of excellent engineers.

Link: <http://www.rim-europa.eu/index.cfm?q=p.support&n=13591&r=AT31>;
<http://www.rim-europa.eu/index.cfm?q=p.support&n=14544&r=AT33>

Box 2.3-D Stockholm's Akademiska Forum

The Stockholm Academic Forum (StAF) is a co-operative organisation of 19 of Stockholm's colleges and universities in which the City of Stockholm is involved as an additional partner. The Stockholm Academic Forum intends to develop Stockholm as an international and national centre for students, international actors and the business world. StAF's work should generate awareness of Stockholm as an attractive and stimulating region. One important mission is also to increase awareness among regional stakeholders concerning the importance of higher education for skills supply. The organisation was founded in 1998 and is financed by the universities and university colleges in Stockholm, as well as the City of Stockholm.

The Stockholm Academic Forum (StAF) approach is based on the analysis of the region's potential and the co-ordination of projects between universities, colleges and the business world. StAF distributes knowledge of universities and their importance for the development of the region of Stockholm. StAF also strives to influence public opinion and to develop relations with actors in the region.

The main activities are organised in three working fields:

- Analyse. StAF initiate, analysing and spreading analysis and investigations concerning Stockholm as a knowledge region;
- Influence. StAF has an influence by participating or creating meeting places where they elucidate Universities' significance for an attractive knowledge region: and
- Co-ordinate. StAF is a cohesive link between centres of learning and between other actors in the region.

In particular, it attempts to promote Stockholm as a place to study by means of events and the well-developed website www.studyinstockholm.se which provides information on the region's universities, available courses, tuition fees and many other issues related to the reader's future student life.

The Stockholm Academic Forum is an interesting initiative in that it attempts to attract people to the region, before they can actually be "developed into human capital". Arguably, this is an ambitious and self-conscious approach built on the assumption that the region will be able to retain the students once they graduate. On the other hand it can be argued that such a pre-graduation campaign is both cheaper and more efficient than post-graduation approaches. This is not least because the prospective students can be attracted straight into the courses relevant for regional demand, whereas after graduation, policy makers have to live with the mix of graduates available.

Links: www.rim-europa.eu/index.cfm?q=p.organisation&n=15089;
www.staforum.se/Hem.aspx

Box 2.3-E Contracting and mobility of Engineers and Ph.D.s for R&D activities

The lack of qualified personnel devoted to R&D in companies is a limiting factor for the innovative activity in enterprises in the Comunidad Foral de Navarra. In addition, companies with a certain level of R&D activity often find it difficult to train their staff in R&D. Hence, the programmes main objectives are:

- Attract, retain and manage talent in terms of sectoral and technological needs;
- Promote the hiring of technical personnel and researchers by companies;
- Increase the length of stay of company R&D staff in R&D centres and universities;
- Increase the training of company staff in R&D activities;
- Encourage sojourns of technicians of R&D centres and universities in companies.

The beneficiaries of the measure are companies, research centres and universities. In particular, the programme is aimed at small and medium-sized firms although support is also available for larger enterprises. The programmes budget in the year 2011 amounted or amounts to about € 1.9 million, up from € 780,000 in 2008.

In detail, the supported activities were:

- Contracting by companies of technical personnel and researchers work in R&D, (a total of 200 posts during 2008-2011).
- Stay of enterprises' staff in technological centres and universities. (a total of 40 stays during 2008-2011).
- Stay of university faculty and R&D centre staff in companies. (a total of 40 stays during 2008-2011).

Attendance of company R&D staff at training courses (tuition and travel), (a total of 150 attendances during 2008-2011).

In general, the programme seems noteworthy as although it is rather broad in focus, it nonetheless has a clearly stated objective: to increase the exchange of human capital between firms and public research institutions. Given the overall budget of the programme, the individual stays can only be supported with up to around 1-2 monthly wages. Given that the programme already builds on a latent interest to exchange personnel – as it does not connect the exchange to particular activities – it appears uncertain whether it can by itself prompt structural change. Certainly, however, it can help to overcome structural obstacles and lower the uncertainty involved in personnel exchange. Measures like this are well designed to help to facilitate transactions and knowledge exchange in the regional innovation system that had already been considered. In that sense, it can be seen as positive that the programme is not focused on a particular sector – as such facilitation should benefit all regional businesses equally.

Link: <http://www.rim-europa.eu/index.cfm?q=p.support&n=13132>

Box 2.3-F Aalborg Universiteit

The *Aalborg Model's* project-oriented way of studying was developed in the 1970s. The main characteristic of this model is that up to 50% of the study work is problem-oriented project work.

Since Aalborg University was first established in 1974, all university programmes have been based on a unique model of teaching and learning: the problem-based, project-organized model is also referred to as “PBL - The Aalborg model”. The PBL - Aalborg Model, has become both nationally and internationally recognised as an advanced and efficient learning model and a trademark of Aalborg University. Thus, UNESCO has placed its only Danish Chair in PBL at Aalborg University.

The PBL-Aalborg Model gives students the possibility for independent learning to achieve knowledge and skills at a high academic level. Projects in co-operation with local industry form a central element of this project-based approach. In Aalborg, many students have the possibility of working with the business community to solve real-life problems. Beyond providing them with practical experience, the Aalborg learning model also helps students to learn how to analyse problems, how to work result-oriented and finally how to do successfully work in a team.

Consequently, the Aalborg approach seems noteworthy in that it naturally brings together the university and the regional firms and effectively makes the local firm's needs and practices part of the students' curriculum. Having studied a number of courses on that basis, the propensity of students to take up work locally appears more likely and will increase significantly.

The adaptation of the curriculum to the regional industry's fields of interest is thus not negotiated at the organisational level in some circles of industrial and university managers but rather in a bottom-up manner based on regular interaction that has become part of the university's mission and self-image. In that respect, Aalborg University operates in a way that is comparable to Austria's and Germany's Universities of Applied Sciences, many of which were established at a similar time.

Nonetheless, internationalisation has always been and continues to be a very important part of the university's trademark. It is a member of the “European Consortium of Innovative Universities”, which consists of 10 European universities whose purpose is the exchange of experience and the development of new projects within education, research and regional development. In that sense the university, as an organisation, also strongly emphasises, improving its integration in the regional environment – for the purpose of regional development.

Link: <http://www.rim-europa.eu/index.cfm?q=p.organisation&n=13223>, www.aau.dk

Box 2.3-G Human Resources Programme for Training, Recruitment and Mobility

This programme “Human Resources Programme for Training, Recruitment and Mobility” belongs to the Fourth Regional R&D&I Plan of Extremadura 2010-2013, which was launched in 2010. It aims at fostering improvements in human resources, combining criteria to facilitate the continuous process of training, increasing its stability and workforce development while maintaining the quality standards established for researchers and technologists working in the region. The objectives of the programme are: to improve career options and increase job security for researchers and technical personnel, to raise the amount of human resources devoted to R&D in strategic areas, to attract trained researchers and technical personnel to the region, to attract renowned researchers to knowledge centres, and to facilitate the mobility of researchers between institutions, research groups and companies.

To achieve these rather broadly stated objectives the programme counts with seven different instrumental lines providing incentives for:

- doctoral training of researchers;
- the training of technical personnel / research and innovation managers;
- postdoctoral specialization;
- the recruitment of Ph.D.s from the University of Extremadura and R&D centres;
- the employment of researchers, and R&D managers in private companies.

The budget of the Programme for Training, Recruitment and Mobility of Human Resource for the period 2010-2013 is € 90m, a substantial sum. In general, it is thus interesting to see that the Region of Extremadura, one of Spain’s economically least developed regions directs such a substantial effort to the development of human capital in the region. It is an illustrative example of the effort and resources needed in a peripheral region to develop an attractive higher education system.

Only by offering attractive courses and other opportunities for further education will policy maker be able to raise the propensity of the qualified workforce to remain in a region that otherwise provides less than optimal conditions. Interestingly, most of the measures address the regional higher education landscape directly without, however, making any further provisions. It could thus be considered a weakness of the approach that even at this low level of subsidiarity, policy makers have apparently not been able to identify and address specific regional areas of strength more directly. In particular in a region with limited strength, it remains an open question whether a more targeted approach could be more efficient and more convincingly address researchers’ needs.

Link: <http://www.rim-europa.eu/index.cfm?q=p.support&n=13364>;
<http://doe.juntaex.es/pdfs/doe/2010/1300O/10040164.pdf>

Box 2.3-H Call for Recruitment of Researchers - ARAID

The objective of the “Call for Recruitment of Researchers” is to increase the level of excellence and practical relevance of the research carried out by technological institutes and universities in the Region of Aragón. In an indirect manner, it is thus aimed at improving the future basis for science-industry linkage and knowledge transfer. It is funded by the regional development agency ARAID.

Funding for an average of eight full-time positions will be awarded each year. The selection of applicants will take into consideration the priority areas of the Region of Aragón’s Research and Innovation Plan. Nonetheless, applications from outstanding researchers in other areas may be considered. The candidates are expected to have a minimum of six years of post-doctoral experience, with at least two years spent in a different centre to the one that advertised the position. The applications are assessed by an independent evaluation commission, whose responsibility is to rank the different candidates for a given position. The final choice is made based on this ranking and on interviews conducted with the best candidates.

The successful candidates will become permanent staff of ARAID, and will work with teams from universities or other research centres on the institutions’ premises.. ARAID researchers are expected to make a substantial contribution to their own areas of research while at the same time actively strive to become members of the regional science and technology networks. Salaries are paid in line with those at the universities, but adjusted to the experience and potential of the candidates and negotiated individually. Permanent contracts can be offered to the candidates, subject to periodical quality evaluations. Foreign nationals will be given assistance with obtaining a Spanish visa and working permit. The programme’s budget amounted to € 500,000 in 2009 up from € 425,000 in 2006.

The main positive factor is the repetition of the calls year by year, which has made the availability of these support funds a known and continuous characteristic of the regional innovation system. The overall number of researchers recruited in this manner has risen to more than forty. It can be criticised, however, that the quality evaluation of the individual positions is not carried out in a transparent manner. In general, the measure is noteworthy in that explicitly ties the publicly funded capacity building at universities to a regional development strategy. Its budget, however, does not allow to pay the researchers particularly attractive wages and must be understood as complementary to the structural development of the regional universities. It is not known whether the management of these universities was involved in designing this measure.

Link: <http://www.araid.es>, www.rim-europa.eu/index.cfm?q=p.support&n=13203

On a scale from transactional to transformative, the surveyed policy initiatives to support **human capital development** can be systematised as follows:

First, measures can be aimed at lowering the threshold of regional firms, in particular SMEs, to employ regional graduates and to thus increasing the regional graduate retention rate. While universities will rarely invest monetarily in such efforts, they may support policy efforts, e.g. through job-search events. Alternatively, regions can, in co-operation with universities, attempt to attract potential students to the region even before they commence their studies.

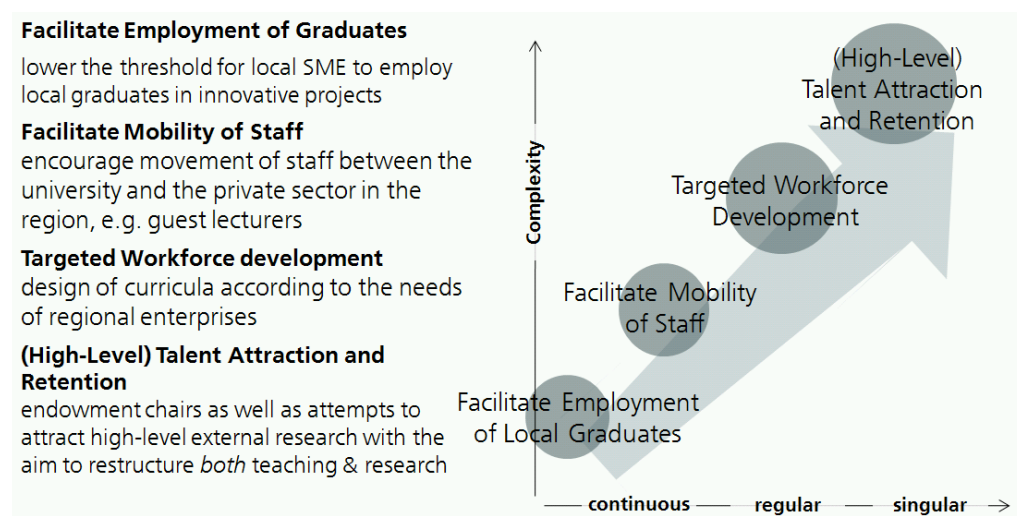
Second, measures can be aimed at increasing the mobility of staff between science and industry. However, university management has to at least approved these measures, even if they do not offer incentives, – for which many colleges have set positive examples. Most often, this relates to either short-term placements at a partner institution, or part-time teaching arrangements of industrial practitioners at universities.

Third, universities can adopt their teaching curricula in such a way that they directly address the needs of the local environment. Endowment chairs as well as the targeted selection of new professors are possible activities in this field. Moreover, the process of accreditation of new courses can be made subject to prove the regional relevance by independent studies. Alternatively, the curricula can be structured in such a way that the needs of the regional environment are taken up naturally, as in the case of the Aalborg model or the German and Austrian Universities of Applied Sciences.

Fourth, the ambition please specify can be set even higher by investing substantial funding in attracting external high level scientists. New human capital is thus not developed for the labour market but within the universities. Whether this is done based on individual needs or in key institutions, such processes can be both promising and complex. It should be noted that while such a transformative ambition can be a sign of strength, it can also be a sign of need or evident current mismatch.

In summary, transactional approaches in the field of human capital development mostly seek to supply the regional labour market with local universities' graduates so that their natural potential in this regard will not be lost. More transformative approaches aim to adapt curricula or to employ new staff in such a way that in the mid-term the curricula themselves will increase the graduates' options on the labour market. Moreover, they can aspire to improve the human capital basis within the university itself to improve its focus and capacities in a way relevant to its regional economic environment.

Figure 9 Different Ambitions in Human Capital Development



Source: own figure, based on European Commission (2011).

2.4 Regional Engagement and Regional Leadership

Box 2.4-A Valencia Region, Spain

Universities in the Valencia region actively develop and maintain their links with the region through a range of centres, services and activities. This is not only done by means of education and research, but also by contributing to social development. In general, the universities are open and well integrated in the region and they provide various different social services, which can be classified as follows.

- Sports facilities: in general, the universities provide the entire university community with a considerable number of sporting opportunities, most of which are free of charge. Many of these services are open to the general public,
- Library Service: access is free to everyone, although certain services are restricted to members of the university community,
- Summer courses, spring workshops, summer school for pupils: All these activities are available to everyone even if they do not belong to the university community.
- University social volunteer programme: some of the aims of this programme are:
 - raise awareness in order to bring young people into contact with social reality, making them aware of social inequalities and exclusion;
 - recruit volunteers, since universities are a good place for recruitment campaigns and the volunteers themselves act as multipliers when inviting other students,
 - train university volunteers in order to optimise the quality of voluntary work, e.g. in collaboration with Valencia Prison with regard to theatre and literary courses etc.
- Local development programmes: the University organises two programmes: one aimed at strengthening the social fabric of poor and underprivileged neighbourhoods; the other one to develop programmes for inland areas.

Additionally, promoting and spreading culture is a fundamental part of the mission of universities in the Valencia region. All the universities have expressed their commitment to encouraging cultural development, mainly by means of direct action but also through their support of cultural activities promoted by external agents.

In summary, the Valencia region is a good example of the substantial cultural and social effects that emerge from all universities. On the other hand, it also illustrates that in many cases, these activities are not communicated as a central strategy. A summary of these activities would have not been compiled without an OECD study

Link: <http://www.oecd.org/dataoecd/17/52/36295540.pdf>

Box 2.4-B Canary Islands, Spain

The two Canarian universities provide the community with a range of services linked to health, wellbeing and support of social groups, as follows.

- **Health.** Both universities have Faculties of Medicine and offer Diploma qualifications in Nursing and Physiotherapy. Degrees are delivered as part of agreements with the Canarian Health Service governing the joint use of hospitals and other health centres for teaching purposes. Under these agreements, faculty staff and researchers work in teaching hospitals, (which are used for training students.)
- **Culture.** Both universities offer courses in the humanities and the contributions of university researchers to knowledge/science/research in the Canary Islands have been crucial throughout the history of university activity in the region. Over and above the qualifications offered and the contribution of research to the generation of knowledge, both universities provide outreach in scientific and humanist disciplines through their respective Extra-Mural Departments and numerous cultural groups and associations.

In particular, it seems important to mention the extra-mural activities at the University of Las Palmas de Gran Canaria. These activities take place from October to June and are open to the general public. They are offered in the form of courses, seminars, symposiums, or workshops and cover a broad range of subject areas including informatics, administration, internet, health, psychology, intolerance, sexuality, environment, training in technology, languages, public speaking and others. The courses contribute to social development in that they provide training in fields of personal interest and also enhance individuals' labour market prospects.

Likewise, the University of La Laguna on Tenerife organised 129 extra-mural courses, during the 2004-05 academic year, attended by a total of 4,065 students. The courses were held on Tenerife (57 courses), Lanzarote (31 courses); La Gomera (4 seminars) and La Palma (4 courses). Additionally, regarding health, the University of La Laguna (ULL) provides valuable support to the University Hospital of the Canary Islands, which is situated in Tenerife. Finally, the regional Ministry of Health and the University of La Laguna have concluded a framework agreement covering cooperation in the area of new technologies for telemedicine. Specific agreements will be also drawn up to cover systems techniques, software operations and broadband for the development of specific applications for the Canarian Health Service (SCS).

Therefore, the regional engagement strategies of the two universities in the Canarias region are to an extent more developed than those in the Valencia region. However, an explicitly formulated strategy remains absent.

Link: <http://www.oecd.org/dataoecd/25/26/36791509.pdf>

Box 2.4-C Pécs University

The University of Pécs was founded on 1 January 2000 by merging three local universities. It is one out of two outstanding regional knowledge bases in South Transdanubia and its goal is to develop the regional economy in an innovation- and knowledge-oriented way. It helps to create an environment that allows the optimal flow of knowledge between local knowledge bases and innovative entrepreneurs. Additionally, it promotes innovative activities. It is the University of Pécs' main goal to build a bridge between industry and science and initiate and promote the utilization of new research findings at the university and the academic institutes.

This goal can be perceived as particularly important for further regional development since the innovation activity in the region is quite low in comparison to national and European standards. Technology transfer is still in its infancy. The higher education sector plays a dominant role in R&D performance and is the largest employer of R&D personnel. Additionally, to meet the demands and the needs of the region for continuing education, the University of Pécs has started to develop a programme within the area of life-long learning and attaches great importance to advanced training, organised in the colleges for advanced studies.

The regional innovation strategy concentrates on ways to enhance regional SMEs' innovative activity. This necessitates the establishment of a developed IT base, investment into the upgrading of SMEs' technology, and trademarks. The improvement of access to finance for innovative SMEs is an indispensable condition to enhance the regional innovation potential as well. Therefore, the strategy calls for the elaboration of new financing instruments (e.g. a regional venture capital fund). In 2004 the Hungarian government established a programme, which particularly addressed these shortcomings as regards research collaboration and knowledge transfer: the Regional University Knowledge Centre programme.

The University of Pécs nowadays is a key actor in the economic and cultural development of the region. Pécs was the European Capital of Culture in 2010 and the city operated closely with the University of Pécs and other knowledge-based organizations located in the region in order to promote regional development. A good example for such activities is the newly founded South Transdanubian Regional Library and Knowledge Centre, which integrates the three major libraries of the city and provides information and documents for the people of the region and the city by European standards and hosts community, cultural and leisure programmes.

Links: <http://english.ptt.hu/>;
<http://www.rim-europa.eu/index.cfm?q=p.policy&n=12671&r=HU23>

Box 2.4-D Jyväskylä region, Finland

In the Jyväskylä region, issues of ecology, economy, and society are comprehensively reflected in the Jyväskylä Agenda 21, an operational programme for sustainable development that has been prepared in cooperation with regional actors. Due to this policy consensus, the University of Jyväskylä (UoJ) and Jyväskylä Polytechnic (JP) have not prepared separate strategies for sustainable development but sustainable development is horizontally integrated in their operations.

In Finland, it is a shared belief among policy makers and university managers that constant input into the utilization of knowledge is needed to safeguard the socio-economic development opportunities of the country's regions. Hence, polytechnics and universities are seen as important generators of societal effects, albeit on the basis of different operation modes and foci. The most promising fields of JP and UoJ activity in this respect can be identified in the areas of social studies, healthcare, environment and culture, but also their horizontal integration of other fields. The mechanisms for the transfer of social service innovations for general use include diverse activities and development programmes. Some examples are given below:

- *Central Finland's Centre of Expertise in the Social Field* forms a network of actors that aims at developing effectively organized social services and the renewal of the social service structure. The UoJ and JP form an integral part of this network. The hospital district of Central Finland and the social and health services of the city of Jyväskylä as well as other municipalities are other important partners.
- The *WIRE projects* have focused on the development of new kinds of services for the long-term unemployed in Central Finland. The model – developed in cooperation with the JP (co-ordinator), the Jyväskylä Development Organization, and the Jyväskylä Employment Office integrates various disadvantaged groups into working life through diverse measures of physical and social rehabilitation.
- The idea of *Peurunka Medical Rehabilitation Centre* was created by war veterans almost thirty years ago. UoJ staff, students and alumni helped to develop the original philosophy and programme. Moreover, the UoJ has continuously been represented in the governing bodies. Physical education professionals working at the UoJ have had a major impact on the centre's operations and activities.

In summary, Jyväskylä is a good example of regional universities merging into a general regional consensus on sustainable development. Arguably, they have even contributed to or provided the basis for such a consensus as many of their outreach activities predate the Jyväskylä Agenda 21 by many years.

Link: <http://www.oecd.org/dataoecd/16/9/36175211.pdf>

Box 2.4-E Twente, The Netherlands

The Universities in the Region of Twente offer a number of facilities to the regional community by sharing not only their 'physical capital' (e.g. buildings, leisure infrastructure), but also their 'human capital'. In different stages of their bachelor and master courses, students carry out commissioned research on social issues in the region, thus providing paid or unpaid services to the community.

A number of examples are given below:

- The *Kennis Expertise Centre for Urban Society and Development* is an association bringing together public and private interests around specific urban issues. The centre mainly focuses on the topics of social integration/safety/regional cooperation and urban development. Its output is symposia and workshops in which academics and practitioners share their know-how and experience. The member organisations of the centre include the major cities of the region of Overijssel, the provincial government, housing corporations, the local police force, universities and private firms.
- The *Henk Pronk Identity Centre*, a co-operative service unit dealing with questions of identity and views of life at the Edith Stein University for Teacher Training. It offers advisory services on religious and philosophical issues.
- The *Science Shop at the University of Twente* is a customer-oriented organisation that mediates between the demand for scientific knowledge in the local community and the expertise available at the University of Twente. Among the shop's customers are non-profit organisations, private citizens, action/interest groups and, under certain conditions, small and medium-sized businesses.

Besides these structural facilities for expertise support, the higher education institutions in Twente provide community services on a more casual basis such as public debates when controversial issues in the region emerge. In addition, on a seasonal basis, students e.g. help elderly people in completing their tax declarations. Moreover, at the annual Twente Summer Campus in May secondary school students from the region can receive coaching on how to prepare themselves for their final exams. Additionally, the AKI art college provides BA training in visual arts and MA training in other arts courses. In collaboration with the University of Twente, it has set up the *tART Foundation* to explore the interface between art and technology. Finally, it provides the usual services: sports facilities and cultural events.

In summary, the University of Twente displays a particularly well-developed strategy of regional engagement, which, is based and built on many individual strands rather than one large-scale, transformative undertaking.

Link: <http://www.oecd.org/dataoecd/15/60/35883426.pdf>

Box 2.4-F The Brno universities

Brno is the second largest city in the Czech Republic and the centre of South Moravia. It is also an important cultural, higher education and an emerging high-tech centre. It hosts six universities with around 85,000 students. In general, the region of South Moravia is regarded as a successful example of the “systematic elaboration and implementation of innovation policy measures and pro-active innovation strategies” with universities being one of the key actors for regional development alongside MNEs. Due to the decline of traditional industries in the region at the beginning of the 1990s the city council of Brno as well as several regional actors were looking for a new economic model. They started linking actors on different levels and from different sectors. As a result, the city of Brno and the universities developed a cooperation strategy assigning a key role to the universities in the regional development strategy. Additionally, negotiation mechanisms between the universities and the private sector were cultivated. The foundation of the Brno Centre for European Studies, which comprises the six universities of the city and coordinates administration and funding (from different sources and different levels), achieved the formalisation of the relationship between the city of Brno and the universities.

The Brno Universities cooperation involves the inclusion of university representatives in internationalisation activities of the city, the attraction of international students, joint organisation of events, preparation of marketing materials and participation in events as well as the organisation of different projects such as the foundation of the South Moravian Centre for Innovation, the South Moravian Centre for International Mobility and the Central European Institute of Technology. The Brno Universities initiative aims at the creation of a cooperative spirit among the partners, achieve an increasing integration of research, increase the funding opportunities and to become a key player in regional development.

The third and most recent South Moravian innovation strategy reflects the economic development during the last few years and prepares the region to effectively exploit the structural funds. It envisages South Moravia as the most innovative region in the Czech Republic. In order to achieve this, regional competitiveness must be strengthened through the co-operation of research organisations and enterprises, and by use of the potential of the large R&D projects like the International Clinical Research Centre and the Central European Institute of Technology. This strategy corresponds with the Development Programme of the South Moravia Region and the Strategy for the City of Brno and thus assigns an important role to the universities.

Links: www.kr-jihomoravsky.cz/Default.aspx?pubid=6234&TypeID=7&foldid=2928&foldtype=7; www.jic.cz; www.rim-europa.eu/index.cfm?q=p.policy&n=13659&r=CZ06

Box 2.4-G Université de Strasbourg

The *University of Strasbourg* (UdS) is among the largest universities in France and in 2009 resulted from a merger between three separate universities located in Strasbourg. The merger of universities is perceived as unique and pioneering in France. The university has for many centuries been the intellectual centre of Alsace and is solidly anchored in European Higher Education as well as the region of Alsace. The university is an important actor in regional innovation networks and a centre of knowledge production, as previous analyses show. In addition, the university is one of the largest employers in the region of Alsace and the region perceives the Alsatian universities as important partners in research, innovation and technology transfer in particular.

During the organisational restructuring of the university the areas of creativity, innovation and technology transfer were reinforced in various dimensions. Besides the enlargement of ongoing technology transfer activities, which have been of particular importance in Alsatian universities for a long time, (scientific) creativity and its territorial implications became central (research) concerns. Concrete implications of this were for instance the foundation of the *Académie du Management de la Créativité et de l'Innovation*, which can serve as an example of regional engagement of universities in cultural development and place making, especially, since these activities are an integral part of the regional innovation strategy (http://www.region-alsace.eu/medias/publications/recherche/sri_def.pdf) concerning the regional development in terms of regional innovation capacities.

Finally, the academy was founded in October 2011 and has three key missions: First, to organize, coordinate and develop training and research in several faculties as regards the management of creativity and innovation, second, to develop (research) collaborations with businesses and local institutions and third to provide physical and virtual spaces. It is characterised by a cross-disciplinary approach, an international orientation and the provision of an interface between enterprises.

Through its engagement with other local institutions, enterprises and individuals it helps Strasbourg and Alsace to develop into a renowned place for creativity and innovation. Especially the provision of physical and virtual meeting spaces as well as the cooperation of the new academy with other laboratories such as the *School for Engineers and Architects* and the *National Institute for Applied Sciences* (INSA) documents this crosscutting character.

Links: <http://academie-creativite.unistra.fr/> and <http://www.unistra.fr/>

Box 2.4-H Øresund Region

The Øresund Region comprises two regions, which belong to different states. Nonetheless, the national government bodies of both Denmark and Sweden aim to make political initiatives and support programmes in the region available to as many of its inhabitants as possible. The best example for this is the ‘The Øresund Committee’, a regional community created in 1993 to improve political cooperation and overcome administrative boundaries. In short, the region is well integrated and well managed.

The regional universities, moreover, share the belief that their mission goes further than higher education and research alone. In their mission statements they consider themselves proponents of education in a wider sense and “good citizens” – contributing to the common good and to the development of society at large.

Beyond the political domain, therefore, the Øresund Institute has been set up to encourage integration within the Øresund region. This is done through qualified analysis, objective fact-finding and boundary-crossing debate regarding different issues. The institute binds together the region’s fourteen universities to public life, where information, analysis and ideas are created and spread in order to support the integration process and the development of the region. The members of the Institute are public authorities, corporations, organisations and universities. It is financed primarily through membership fees and is independent of special interest organisations, political parties, public authorities, companies and nations.

Local universities offer a wide range of programmes and courses related to the so-called “creative” areas. They are “sources” of innovative and creative students and researchers in the international top league of design, architecture, film and the arts., Therefore, they naturally promote the work of these skilful students and researchers by holding exhibitions, concerts and conferences. Additionally, many universities are focused specifically on the area of fine arts and the performing arts. This is not least because Copenhagen as a capital is home to several one-of-a-kind HEIs such as the National Film School and the Royal Danish Academy of Music.

In this context,, local initiatives argue that universities are among the most important providers of cultural ‘products’ consumed locally and globally. Given the Danish and Swedish reputation for design and arts, cultural products from the universities have a great impact on the development of new businesses in many fields. By all of the regional initiatives, therefore, “cultural products” in the field of art and design are seen as a central component of potential provided by universities and as an indispensable basis for entrepreneurial projects and successful innovation.

Link: www.oresundskomiteen.org/en, www.oecd.org/dataoecd/28/51/35996176.pdf

Box 2.4-I Dresden Concept

The Technische Universität Dresden (TUD) is well equipped to become one of Germany's new elite universities. It has a long tradition of being a university of academic excellence and is rooted in a region that as a whole aims to continuously improve. In the second round of the German Universities Excellence Initiative, the TUD wants to build on that solid basis.

In order to be successful, the TUD builds on quality as well as its potential as a hub of regional interaction and integration: Explicitly, this potential is seen with respect to the broad range of fields covered by the university: Engineering, Mathematics and Sciences, but also Humanities and Social Sciences.

The idea underlying the initiative DRESDEN-concept reflects this interactive and vivid network – proposing to understand 'DRESDEN' as an acronym for "Dresden Research and Education Synergies for the Development of Excellence and Novelty".

At its core, the initiative envisages a research alliance of the TUD together with the strong partnership of regional stakeholders in research but also in cultural areas. In particular, the co-operation of all DRESDEN-concept partners is aimed at the development and leveraging of synergies in research, education, infrastructure, and administration, to muster support for local competences, and to identify new emerging scientific areas. Additionally, the DRESDEN-concept alliance also works on a joint initiative to attract top talents and to convince the best ones to come to Dresden – taking full advantage of the cultural assets of the region.

Consequently, the alliance centred around the TUD is made up of eleven public research institutes (Fraunhofer, Max Planck, Leibniz, and Helmholtz) but also of two large local museums and the Saxon State Library.

Against this background, Dresden Concept can be seen as an interesting example of a university attempting to take the regional lead in, on the one hand, leveraging the potential of its own competences in the field of Humanities and Social Sciences but also to actively improve the region's image and promoting it as an attractive location for science and scientists. While in this case, the regional government is not obviously involved as a continuous partner, it has taken a supportive and approving role when the university embarked on the initiative. On the other hand, it seems remarkable to what extent comprehensive and ambitious activities at universities can be triggered by the availability of public funding – subject to the development of such strategies.

Link: <http://www.dresden-concept.de/en/alliance/mission.html>

On a scale from transactional to transformative, the surveyed cases studies of **regional engagement or leadership** can be systematised as follows:

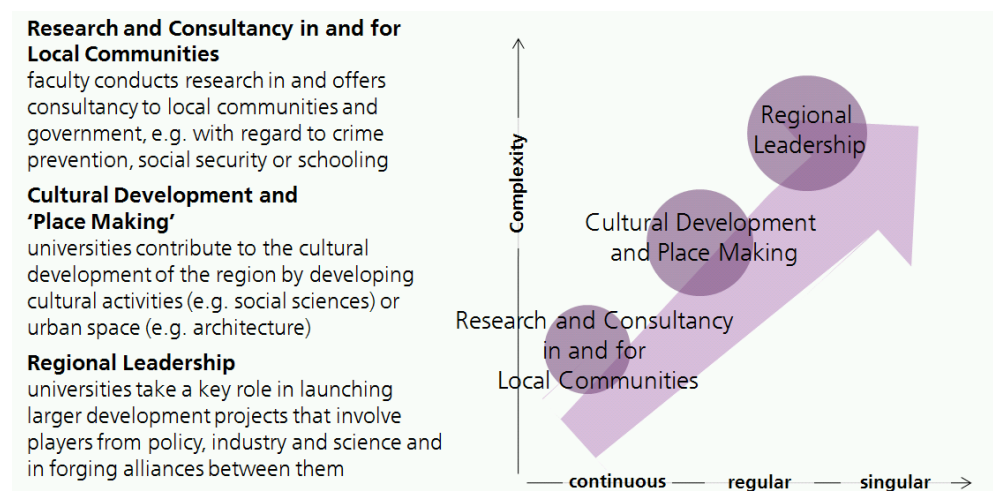
First, activities can aim at the promotion of research and provide advice to local communities. In some fields, such as sociology, education, or social work, such activities constitute a natural field of interest of individual researchers – that can be supported. In particular, this relates to scientific work that is not commissioned by industry but by local public and semi-public stakeholders, e.g. local chambers of commerce or local government directly. In many of the surveyed cases, however, these activities are organised in a decentralised fashion without being elements of a targeted overall strategy.

Second, universities can strive to actively contribute to processes of cultural development and place making. Again, such activities will often be driven by social science and the humanities as well as e.g. architecture. As such larger scale initiatives often come with a higher degree of public visibility. University management will have to be involved, at least at the level of the faculty. Likewise, however, their potential effect on the university's image is greater. While such activities typically involve an - at least partially - strategic approach and are stated in the university's overall mission, they do not always take the form of a comprehensive approach co-ordinated with regional policy makers.

Third, universities, i.e. their central management at the level of rectors, presidents or chancellors can actively engage or be involved in processes and circles of regional leadership. Rather than simply participating in regional socio-economic development projects and strategies, they can play a central role in their conception and launch – by expressing their interests and seeking to, at an early stage, align the priorities of the government with their own. While this is not to say that such endeavours will have a more transformative effect than the sum of those of individual scientists, they are of a more policy-oriented nature and have a more clearly stated transformative ambition.

In summary, as already pointed out in the more general sections, the situation in which the university will assume a role of the paramount driver of regional activities will remain the exception. Arguably, it cannot even be considered desirable, as the absence of the much needed engagement of actors from both public policy and local industry would imply. Nonetheless, a number of regional activities can be identified through which the different levels of a university, from the Ph.D. student to its president, can contribute to regional communities and socio-economic development. As this is the main outlet of the application oriented potentials dormant in social science, the humanities and urban planning, its potential should not be underestimated.

Figure 10 Different Ambitions in Regional Engagement and Leadership



Source: own figure, based on European Commission (2011).

3. Conclusions and Future Challenges

As the regulatory environment is changing to one that is giving universities more and more strategic and budgetary freedom, regional governments cannot direct regional engagement in a straightforward manner. Even the internal incentive systems of universities that may provide strong incentives for such activities are in most cases either determined by national framework regulations or developed by the increasingly independent universities themselves.

Nonetheless, both the conceptual considerations and the empirical evidence presented in this study have demonstrated that, indeed, the regional engagement of universities is in many places a well-established fact – and can be leveraged by regional innovation strategies. It was illustrated that there are a number of strong motivations that prompt individual researchers to engage and co-operate with partners in their regional environment irrespective of whether the universities' management sets incentives for them to do so or not. As it is rare that university managers try to prevent such activities, these personal motivations constitute a not-to-be-neglected potential complement to university and regional policy level considerations – one that can and should be taken into account in regional innovation policy.

The conceptual chapter has demonstrated that the interaction between universities and their regional environment can take manifold forms – from mere multiplier effects to a regional leadership role, which reaches beyond our common understanding of their “third role”. These, however, depend on the overall nature of the specific university as well as its regional environment. Following a recent practical guide authored by the EU this paper argues that potential contributions of universities to enhancing regional innovation capabilities should be understood as based on diverse activities in the fields of:

- R&D co-operation,
- Entrepreneurship and technology transfer,
- Human capital development,
- Regional engagement and regional leadership.

For policy makers, the main challenge thus is to understand the potential in hand, both on the side of the university and with respect to their own region's needs. Additionally, they have to consider at which level they want to address this potential and aim to leverage it for the benefit of the regional economy and regional communities. In any case, therefore, networking is central to a successful regional engagement – be it on the part of the university managers directly or on the part of individual professors to whom the university gives room and opportunity to do so.

By drawing on both the RIM repository of policy measures and a number of case studies from this and other sources, this paper has demonstrated empirically that the nature and ambition of policy initiatives to leverage regional engagement to improve regional innovative capabilities can differ, depending on the objective that policy makers aim to achieve.

In some cases, they seek to improve the interaction between the existing actors in order to facilitate existing or latent interactions and transaction between stakeholders of the regional innovation system. In others, they pursue a more transformative ambition in that they try to prepare the basis for and initiate interactions that are not currently considered. Some even set up new organisational units or joint initiatives to create new partners in the regional network of co-operation and knowledge exchange. Naturally, more ambitious measures will tend to be more complex and long-term oriented and not too many of them can credibly be pursued at one time.

Consequently, the main conclusion of this paper is that policy makers have to pursue a double strategy to regionally embed universities in the most suitable way to leverage their potential to raise regional innovation capacities:

On the one hand, they will have to address university managers and explore which transformative joint projects the university managers can be convinced to join. In the ideal case, the universities will be able to establish their own interest in an initiative based on regional consensus and become major drivers of such an endeavour. Even if this is not the case, such as in cluster initiatives driven by industry, the active participation of the region's universities will make a major difference. Moreover, the universities teaching profile can be adapted in a way that increases their regional embeddedness and produces regional alumni networks. Bringing university managers to the table of regional governance and to ensure their high-level commitment to strategic regional development projects is thus one central element.

On the other hand, not all potential assets of the universities may be addressed in this way – either because university managers are unwilling to acknowledge a factually given potential or because a certain potential is so specific that it cannot sensibly be made the subject of a university's main strategy. In this case, regional policy makers need to consider the set-up or extension of support programmes for which academics can apply individually. Precisely when a university strategy on, or example co-operation with regional SME or regional communities is absent, external support may be the incentive needed to prompt academics to realise latent ideas – based on third party funding. Nonetheless, these approaches should also at least be discussed and receive the approval of regional university managers.

Practically, however, the analysis of those policy measures aiming to leverage the potential of universities for raising regional innovation capability, that are covered in the RIM repository, delivers a somewhat sobering account. Even though methods of identification are always open to reconsideration, the focus on a fairly traditional understanding focused on technology transfer, spin-offs and 'hard' R&D co-operations is so strong that it could hardly be denied. Apparently, broader policy approaches with the aim to actively align the universities' core missions of teaching and research to regional needs remain less common than could have been expected.

With a view to the future, it thus becomes evident that the involvement of university managers in processes of regional consensus building will become even more crucial in the context of Horizon 2020 and the next structural funds support period. Additionally, models which, like in Austria, make the launch of new courses in colleges subject to external studies documenting the regional demand for graduates will and should become more prevalent. Furthermore, universities can, by means of regional network events and alumni networks provide arenas in which the process of "entrepreneurial discovery" of suitable regional specialisations takes place.

Nonetheless, it will also require policy makers to look further. Evidence undoubtedly demonstrates that much of the potential of regional universities lies as well at the level of the individual researchers. It has to be borne in mind that not all high-level agreements with university managers result in direct corresponding changes of internal incentive systems – if only because many universities exhibit a strong organisational inertia. Hence, a regionally specific array of targeted programmes (or regional science foundations) that offer external funding in priority areas to university researchers directly will have to remain a central ingredient of place-based, adapted innovation strategies at the regional level.

Finally, it should be highlighted that all newly developed paradigms of European innovation policy add emphasis to the finding that political strategies to leverage the potential of universities to develop regional innovation capabilities should not stop at the "stars" of the national research community. Very likely, many regional colleges, universities of applied sciences and polytechnics will have an important role to play when it comes to the adaptation of multi-purpose technologies to the needs of regionally specific industries – in well-developed as much as in peripheral regions.

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