PART 2

Effects of technology policies: regional situations and how they form innovative networks
Introduction

While universities are important actors in local economic development, their impact on the design and implementation of innovation policy is shaped by national and regional administrative structures. By focusing on the role of universities in regional innovation policies in different countries, this chapter examines the underlying logic and the intended outcomes of science and technologically focused policies, and addresses issues both about the relationship between the national and regional level in policy formation and implementation, as well as the extent to which different levels reinforce existing Islands of Innovation (Hilpert 1992, 2003) or enable the formation of an Island of Innovation in its field of techno-specific expertise effects.

Whether universities are actively or passively engaged in science policy at the regional level is examined within a regional innovation systems (RIS) framework (Asheim et al. 2011). Illustrative case study countries are two centralist countries (the UK and France) and a federalist country (Germany), and a region in each: Oxfordshire in the UK, Bremen in Germany and Grenoble in France.

The UK and France have recently undergone revolutions in policy and administrative systems while Germany provides an example of continuity. We show, while historically there are important differences in the role of universities within each national system, there is some convergence in the direction of policy towards a more active regional role. In France and in Germany in a few places universities are regional stakeholders and part of the decision making process in the design of regional science and innovation policies (Crespy et al. 2007). In the UK, incentives had been put in place to create such regional connections, but following the change of national government in 2010, regional structures were removed with policy delivery instead at the local level, albeit with some local structures being larger than the regional ones they replaced.

The context to these discussions are major changes enacted by the EU towards regional policies in 2011, following a general shift in the 1990s towards entrepreneurship, innovative regions
and milieux with a focus on the role of science and technology in providing the raw material for innovation (Toedtling and Trippl 2005). Underpinning regional policy has been the RIS approach reflected in the shift in focus of EU regional policy (Landabaso et al. 2003). This has included an increasing proportion of structural funds under the European Regional Development Fund (ERDF) assigned to regional innovation measures, and more recently within Europe 2020 the EU’s growth strategy for the coming decade brings the aims of the EDRF alongside other innovation-based strategies. Within Europe 2020 are the goals of ‘smart specialisation’, which emphasises good institutions and strong policy capabilities at the regional level (Foray and Goenega 2013). Universities are seen as having a pivotal role in the social and economic development of their regions and in developing smart specialisation strategies. Access to European funding works within country specific administrative structures, those related to both regional policy and research institutions (universities, research laboratories) that apply for research funding independently of bodies responsible for regional policy.

We begin by discussing why universities might be expected to play important roles in regional economic development and then position them within how regional innovation policies operate in theory and then in practice. We differentiate between different types of policy, and where universities are positioned within them. These themes are then illustrated by the case study countries and regions.

Universities and regional innovation policies in theory

Policy towards universities as actors in regional policy has taken an ‘instrumentalist position’ – of getting things done (Charles 2003) – since at least the 1980s. The extended role which goes beyond teaching and research encompasses an entrepreneurial and innovation role (universities as knowledge exploiters (Asheim and Gertler 2005)), as well as a role in the local community that relates to social equity, sustainability and culture. Universities are expected to plan strategically for their regional role in contributing to improving the local economy, for example through cluster development and responsiveness to the needs of industry (Glasson 2003).

Conceptually, this role is developed in the RIS approach which offers a heuristic for examining the kinds of possibilities of the ways in which universities are positioned with systems of governance, as well as identifying possible systems of governance per se. Perry and May (2007) take this line of analysis further by providing a typology of regional dimensions to science policy with universities as potential regional actors. Together the RIS approach and Perry and May’s typology form the framework used here for examining polity structures in the UK, Germany and France, and the extent to which they reinforce existing Islands of Innovation.

The RIS approach (Cooke 1992) comprises three dimensions: regional structure – administrative, legal, constitutional and institutional arrangements; the long-term evolution and development of regional industry specialisation; and additional core/periphery differences in industrial structure and innovative performance (Howells 1999). In each dimension universities are regional change agents through their position in local policy institutional arrangements and through knowledge exchange with business as the principal actors in the regional learning process (Asheim et al. 2011). This takes into account a wide set of knowledge transfer mechanisms including contract research, consulting, and formal R&D cooperations as well as forms of knowledge transmission that do not involve financial compensations for universities such as knowledge spillovers (through the provision of graduates to the local labour market) and informal collaboration with industry. The third concerns the match of universities with their regional industrial structures, hence their potential contribution to innovation performance.
Many factors mediate possible relationships. They include the strength of the science base (nationally and locally), the institutional setting; the financial system; education and training; the availability and mobility of skilled labour; and public policy measures designed to promote innovation and growth. The situation is further complicated because of different context specific types of RIS structures where universities play a role (Asheim 1998). These indicate the degree of embeddedness of universities into local or national and international networks: whether a ‘territorially embedded RIS’ characterised by localised learning processes and local university–industry interactions, a ‘networked RIS’ that relies on a specific network of universities, firms and supporting institutions that underpin learning, or a ‘regionalised RIS’, universities are more important in sustaining regional specialisation and global–local links. How policy intervention as suggested by ‘smart specialisation’ could in practice help improve the functioning of RIS is contingent on regionally specific RIS structures, resources and dynamics (Cooke et al. 2004; Tödtling and Trippl 2005) and their relationship with national policymaking processes, particularly with respect to science policy.

Defining science policy ‘as the justification, management, prioritisation and funding of basic research and development’, Perry and May (2007: 1040) offer the framework for analysing the regional dimensions to science policy. This distinguishes between those regions that are passive as actors, with either ‘regions as stages’ or as ‘implementers’, or as active players.

As passive actors, regions are appropriate scales of action but regional authorities and agencies are not part of the decision making process. Regional authorities and agencies can also have a role in the implementation of nationally defined and funded policy initiatives.

As active players regions can be either partners with an agency for shaping national priorities or are participants in national policy processes. They can also be independent policy makers. This is where regional authorities and bodies increasingly devote own finance and resources to funding regionally significant scientific investments and projects. As a consequence regional science policies emerge.

Similarly, Crespy et al. (2007) identify three prerequisites for the development of a multilevel polity: a national framework that envisages, or even depends on, regional action for the successful implementation of its policies; arenas for negotiation of national and regional ‘priorities’ and the capacities and capabilities of regional actors to develop clear strategies from the bottom up.

Beyond a multilevel polity within countries, the ability of the EU to influence what happens at the regional level is not clear. In the early 1990s, Hooghe and Keating (1994) found that there had been a great deal of regional mobilization but that its effectiveness was questionable. Member states had been able to maintain and recently reinforce their primacy in defining the modalities of intervention. Moreover, within Perry and May’s (2007) framework, EU spend on innovation goes directly to institutions such as universities, creating additional dimensions to autonomy within regions. These include the circumvention of all of those possibilities by the reinforcement of national patterns of regionalisation or support for emerging strengths as in the vertical logic of smart specialisation (Foray and Goenega 2013). Next we examine major national and sub-national level policies in the case study countries.

**Universities and regional policies in the UK, Germany and France**

**UK regional innovation policy**

In the UK 1979 is the date from which both entrepreneurship and universities’ contribution to economic development entered mainstream regional policy formulation. Under the
Conservative Governments 1979–1997 the underlying policy had shifted from Keynesianism intervention to Friedman free market economics. For the universities and other parts of the science base such as the national laboratories this meant cuts in funding and other ‘incentives’ to become more entrepreneurial and commercial in their dealings with industry adopting a more market approach to commercialising their intellectual property. Indeed, the UK was the first country to develop a national university commercialisation policy (Geuna and Muscio 2009). In 1985, the British Technology Board lost its monopoly access to intellectual property arising from universities and public sector research institutions from Research Council-funded projects. Responsibility was transferred to those institutions giving them autonomy to decide on their commercialisation strategies.

Following the election of successive Labour Governments (1997–2010), the regional scale through the formation of regional development agencies (RDAs) in 1999 was introduced which included active roles for universities and various funding streams for ‘third leg’ activities (i.e. civic responsibilities as well as active economic activities many of which have a regional focus or have a local impact). In effect this saw the introduction of regional innovation policies that included national priorities of cluster creation. Within the government’s policy framework, Perry and May (2007: 1041) noted a ‘policy blurring between science, innovation, higher education and regional policy’. The spatial dimension to regional policy was couched as either passive (regions as stages and regions as implementers) or as active (regions as partners and regions as independent policymakers), with an increasing role for the RDAs (Perry 2007) as well as Regional Science and Industry Councils, which were given a role of ‘encouraging universities to develop their ‘third mission or third leg’ role.

Perry (2007) argued that the centralised policy process in the UK thus had been subtly transformed in the generation of linkages between the research base and industry. She suggests that the novelty of the English case (Scotland and Wales having their own regional (national) development agencies) is not the changing dynamics of national science policy but extensive sub-national mobilisation and institutional creation.

During that period, sub-national university engagement with central government funding was also introduced at the level of the city. In 2005, the ‘science city’ initiative was launched. Six cities (Newcastle, Birmingham, Bristol, Manchester, Nottingham and York) were designated as ‘Science Cities’. Their objectives are to harness ‘the research power of academic institutions, the world-class quality of their scientists, engineers and technologists and the entrepreneurial skills of the business sector, as well as promoting public engagement in science’. However, as Perry (2007) points out, what actually occurred was a greater concentration of scientific resources. By the late 1990s over 40 per cent of GERD was concentrated in the Golden Triangle (London, Oxford and Cambridge).

The RDAs were abolished by the Coalition government (Conservatives and Liberal Democrats) in 2010. Their abolition removed a layer of sub-national mobilisation, and an incentive for universities to be active local players. They were replaced by Local Enterprise Partnerships (LEPs), led by business, that were established to oversee coordination of local growth strategies that emphasise entrepreneurship and innovation as well as infrastructure as key components. LEPs, which have much less funding and leverage than the RDAs, are incentivised to develop more integrated strategies with the introduction of such funding streams as the Growing Places Fund, the Regional Growth Fund, Enterprise Zones and City Deals – many of which explicitly involve universities in policy formulation.

Alongside those measures include third-leg funding streams for which universities compete in for third-leg activities (Table 4.1). These comprise (i) non-spatial research grants with conditions relating to projections of impact, for example those funded under the seven UK research councils,
(ii) funding programmes specifically designed to have commercial outcomes (e.g. spin-offs), for example those of the Higher Education Funding Council for England (HEFCE), and (iii) funding that has regional/local engagement or governance built in. In 2009, the Labour government launched the framework for the future success of higher education, setting out the important role universities will play in securing the country’s economic recovery and long term prosperity, in *Higher Ambitions: the Future of Universities in a Knowledge Economy*. This emphasized the importance of research, high level skills and widening access in economic development.

HEFCE covers 130 HEIs. Its HEIF programme provides funding for universities to support them in developing third function activities such as knowledge transfer to firms and interactions with the wider community. The SEC and the UCF were set up as separate funds under HEIF.

### Table 6.1 HEI innovation programmes in the UK

<table>
<thead>
<tr>
<th>Department</th>
<th>Initiative</th>
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<tr>
<td>OST/HEFCE</td>
<td>Joint Infrastructure Fund (JIF) (1998)</td>
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<tr>
<td>DTI, DTI, HefCE</td>
<td>Science Research Investment Fund (SRIF) (2001)</td>
</tr>
<tr>
<td>DTI/OST/ Engineering and the Engineering</td>
<td>1999 Higher Education Reach-Out to Business and the Community (HEROBC)</td>
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<tr>
<td>Physical Sciences Council (EPSRC)</td>
<td>• special funding for activities to increase universities’ capability to respond to the needs of business and the wider community, where this will lead to wealth creation</td>
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<tr>
<td></td>
<td>• includes the promotion of spin-out companies</td>
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<tr>
<td>DTI/OST/ Engineering and the Engineering</td>
<td>1999 Science Enterprise Challenge (SEC) Fund</td>
</tr>
<tr>
<td>Physical Sciences Council (EPSRC)</td>
<td>• financed Science Enterprise Centres and the Foresight Directorate</td>
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<tr>
<td>Physical Sciences Council (EPSRC)</td>
<td>• encourages regional-level activity</td>
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<td></td>
<td>• Faraday Partnerships</td>
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<td></td>
<td>• joint university–industry initiatives</td>
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<td></td>
<td>• Biotechnology Challenge Fund</td>
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<td>DTI/OST/ Engineering and the Engineering</td>
<td>1999 University Challenge Fund (UCF)</td>
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<tr>
<td>DTI/OST/ Engineering and the Engineering</td>
<td>• seed funding to help selected universities make the most of research funding through support for early stages of commercial exploitation of new products and processes</td>
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<tr>
<td>DTI/OST/ Engineering and the Engineering</td>
<td>• £140 million to knowledge transfer</td>
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<td>DTI/OST/ Engineering and the Engineering</td>
<td>• 2004–6 HEIF 2</td>
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<tr>
<td>DTI/OST/ Engineering and the Engineering</td>
<td>• £187m</td>
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<td>DTI/OST/ Engineering and the Engineering</td>
<td>2006–2008 HEIF 3 £238 million</td>
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<td>DTI/OST/ Engineering and the Engineering</td>
<td>HEIF 4 2009–2011</td>
</tr>
<tr>
<td>Innovate UK (formerly Technology Strategy Board) (focus on innovative businesses)</td>
<td>Knowledge Transfer Networks</td>
</tr>
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<td>Innovate UK (formerly Technology Strategy Board) (focus on innovative businesses)</td>
<td>• Collaborative research and development</td>
</tr>
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<td>Innovate UK (formerly Technology Strategy Board) (focus on innovative businesses)</td>
<td>• Knowledge Transfer Partnerships</td>
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<td>Innovate UK (formerly Technology Strategy Board) (focus on innovative businesses)</td>
<td>• Micro and Nanotechnology Centres</td>
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<tr>
<td>Innovate UK (formerly Technology Strategy Board) (focus on innovative businesses)</td>
<td>• Small Business Research Initiative</td>
</tr>
<tr>
<td>Innovate UK (formerly Technology Strategy Board) (focus on innovative businesses)</td>
<td>• International programmes</td>
</tr>
<tr>
<td>Innovate UK (formerly Technology Strategy Board) (focus on innovative businesses)</td>
<td>• Technology specific programmes</td>
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aimed at both staff and students. In 2001 University Innovation Centres were launched – large, regionally based research and innovation centres often focused on a collaboration between HEIs (Charles 2003). As the HEIF programme has expanded, it has become more commercially orientated and has sought to be more inclusive. In line with the Sainsbury Review recommendations that more funding be directed towards business-facing institutions, HEIF 4 rose to £150 million in 2010–11 with the intention of redistributing funding from the richer to poorer universities. Its approach to the regions recognises the diversity of HEIs and of regions, and supports the relationships that are already being developed between regional and local bodies and HEIs.

Recently the emphasis has shifted back towards science policy in regions rather than regional innovation policy per se. In January 2013 £600 million funding for science and research in ‘eight great technologies’ identified as strategic by the national government was announced. The eight are big data, space, robotics and autonomous systems, synthetic biology, regenerative medicine, agri-science, advanced materials and energy. The funding is for research into cutting-edge technology and designed to help make the UK one of the best places in the world to do science. It is likely that these will reinforce existing ‘science regions’ (Perry and May 2007). This policy sits alongside the Witty Review (2013) which explored how universities can support growth by working with organisations such as LEPs in building on sectoral strengths and clusters. Moreover, the key sectors agreed at national level will also have an impact on policy choices at the local level with respect to ‘smart specialisation’.

**Regional level – the Oxfordshire example**

In the late 1990s, Oxfordshire had made a transition from a traditional economy to a dynamic high tech economy, one with a very strong research base in the form of Oxford University, Oxford Brookes and some ten research laboratories (for example in nuclear energy, space, biomedical science). Alongside its high tech firms was a network of support activities including science parks and incubators, networks and specialist financial support organisations. Recognition of the strength of the county’s high tech economy and its innovation support system came when in 2002 Oxfordshire received its second Award of Excellence as one of Europe’s most innovative regions.

Oxford University is a major component of the regional science infrastructure. It was ranked fourth in the world on the 2012 THES rankings and has engaged in an extensive range of technology transfer activities through its technology transfer organisation Isis Innovation, established in 1988. The local, national and international impact of Isis Innovation, Oxford University’s commercialisation organisation has grown broader and stronger as it has captured more of the wealth creating and outreach roles within the university. It successfully commercialises its research through robust spin-offs, patents and licenses, thereby increasing the value realised to the university of its intellectual property (IP) (Lawton Smith and Bagchi-Sen 2012). With respect to reinforcing regional specialisations, in 2010 the University was ranked seventh participant organisation in the EU Framework 7 programmes.

The Oxford and Oxfordshire LEP was set up in 2011 with in principle an active regional role for Oxford’s two universities: the University of Oxford and Oxford Brookes. Both are members of the LEP board at vice-chancellor level, ‘reflecting their role in supporting and promoting enterprise in the local economy’. The Business Plan for Growth in 2013 prioritises seven key issues: improving access to finance, improving access to business support services, investment for infrastructure, improved broadband, skills, inward investment and lastly innovation. In its ‘smart specialisation’ agenda it highlights four of the national eight great sectors...
as having the greatest potential for growth: life sciences, high performance technologies, space, energy, all of which reflect the strengths of the universities and research laboratories, plus digital, publishing and media.

The Oxford and Oxfordshire City Deal bid, awarded in January 2013:

has brought together all six Oxfordshire councils, the two universities, the big science facilities at Culham and Harwell to the south of the county, and the Oxfordshire Local Enterprise Partnership in a unique joint proposal that seeks to boost the knowledge economy and create a new partnership for growth.\(^9\)

The Science Vale Enterprise Zone\(^{10}\) which covers two district councils encompasses sites at Harwell Oxford (the location of the county’s big science laboratories) and MEPC Milton Park, a large scale business park, is an example of a region as implementers, but at the same time being active as independent policy makers (Perry and May 2007).

While Oxford University and the Rutherford Appleton Laboratory (space research) have long been in receipt of major EU funding, there is some evidence that the local authorities have begun to be more active in innovation policy building on those strengths. In 2012, Oxford City Council led a bid for funding in partnership with Oxfordshire County Council and was awarded a £930,000 European grant funding towards a £1.24m programme to develop local renewable energy and energy efficiency projects.\(^11\)

In sum, Oxfordshire is a regionalised RIS in that Oxford University is important in sustaining regional specialisations (and diversification), through its international research and industrial contacts and the mobility of its staff (Waters and Lawton Smith 2012). Its technology system, characterised as a passive regional system (Perry and May 2007) is underpinned by the dirigiste national government and to some extent by the EU. The science base is reinforced by national and EU research awards to Oxford University and to the county’s research laboratories.

### Germany

In Germany the division between the national government and the federal states (\textit{Länder}) for example on science and technology policy is enshrined in Germany’s basic law (\textit{Grundgesetz}) in Article 30 (Koschatsky and Kroll 2007). This means that the national government should not interfere with policies in the sixteen federal states, a very different situation to that which exists in the UK. Each federal state has its own school and higher education laws, as well as ministries for cultural affairs or science. A crucial element of the science policy of the Länder is the financing and organisation of higher education (Heraud and Koschatzky 2006). In 2003, around 60 per cent of total German expenditures for science were borne by the Länder with a third from the federal government and 5.2 per cent by scientific non-profit organizations (Koschatsky and Kroll 2007). Universities are public corporations funded from Länder budgets (Hartwig 2006). Overall, Germany has various types of research locations: universities, universities of applied sciences, non-university institutes, companies and federal as well as Länder institutions, some 750 in all.\(^12\)

The standing conference of the ministers of education and cultural affairs (KMK) is an important coordination, rather than a dirigiste, body with regard to education, science and research policy.\(^13\) Its responsibilities include universities and promotion of cooperation between education and scientific organisations. Although the federal states are involved in science, technology and innovation policy, drivers also come from the federal government level, especially from the ministries of education and research (BMBF), of economics and technology (BMWI) and defence.
The BMBF and BMWI budgets for institutional promotion and promotional programmes are much greater than those of the single Länder (Koschatzky and Kroll 2007).

Some national programmes are designed to strengthen the science base. For example the national Excellence Initiative potentially has regional outcomes. The objective is to promote top-level research and to improve the quality of German universities and research institutions in general. The idea is that this will make Germany a more attractive research location and internationally competitive. After the Excellence Initiative was passed by the German federal and state governments in 2005, the DFG was given responsibility for running the initiative together with the German Science Council.¹⁴

Science policy should be seen within the core problem in Germany of ongoing structural socio-economic disparities between old and new Länder (OECD 2012).¹⁵ This is despite some positive developments in recent years that have facilitated closing the gap in major urban areas in the east. The new Länder not only continue to lag behind the rest of the country on key indicators such as GDP per capita and unemployment, but have also experienced significant demographic decline in recent years, partially due to the out-migration of younger, educated people. Some areas in the old Länder also face specific structural problems, for example, due to long term industrial or agricultural restructuring. Convergence in economic conditions operates through the Finanzausgleich or fiscal equalization payment, which is an instrument to redistribute financial means from financially strong to financially weak federal states in order to achieve the balance objective (Doring 2005 in Koschatzky and Kroll 2007).

The influence of the EU on German policy was noted by Audretsch (2005) and later by Grimm (2011) who argues that EU entrepreneurship policymaking has contributed to a shift from hierarchical government to a more horizontal and interactive form of governance in the new German Länder which were highly exposed to Structural Funds and the Lisbon Agenda of 2000. The new approach which involves universities as in the UK is illustrated by Koschatzky and Kroll (2007). They identify two aspects between science policy and regional development relating to two interfaces between the federal and Länder governments. The first is joint task university building – extension and new university building. The second is the joint task of the regional economic structure. Both are active roles as regions as partners with the national government. We next explore how this works in the case of Bremen.

**Bremen**

Bremen is the smallest Land in Germany. It lacks the resources of the four big Länder: NRW, Baden-Württemberg, Bavaria and Lower Saxony, especially those of Baden-Württemberg and Bavaria which also have greater concentrations of research institutions and research funding. For example, Baden-Württemberg is home to eighty HEIs including nine research universities and has a strong record of research commercialisation.¹⁶ Bremen has a much smaller science base and does not have a leading university, and therefore lacks the associated international networks as are found in the bigger Länder.

However, like all Länder, it is an autonomous federal state and has a high level of autonomy in policy design and responsibility for research and education. Although Bremen possesses its own research budget, crucial cash flow stems from the federal government (Koschatzky and Kroll 2007). Its history of policymaking makes an interesting comparator to Oxfordshire and Grenoble which are much larger and have stronger universities, but which also rely on national funding. However, major R&D and innovation policies are decided at Länder level, rather than nationally as in the UK and France, with the Land’s Ministry of Education and science and ministry of economic affairs being key actors.
Research and education are the responsibility of the Bremen state government: the University of Bremen (UoB), the Private International University of Bremen (IUB) (now state run following bankruptcy), University of the Arts and universities of applied science in Bremen and Bremenhaven. Other national public research organisations such as Max-Planck, Fraunhofer Institutes as well as other regional research institutes are also located in Bremen.

UoB, founded in 1971, although not a leading university, being ranked 367 by QS World University Rankings (2011), has been selected as an Excellence University and has recently been attracting considerable research funding. In 2010 the University’s scholars and scientists acquired some 91 million euros of research funding. These included the award in 2009 of funding under the Excellence programme which was extended for three years for the Ocean in the Earth System. Since June 2012, the University of Bremen has been entitled ‘University of Excellence’. Some of the ground-breaking educational concepts implemented in those early days, which became known as the ‘Bremer Modell’, have since become established features of modern university education all over Germany; for example, interdisciplinary study and research, research-based teaching projects, orientation to practice, and responsibility towards society. This infrastructure is attracting more and more enterprises to the adjacent Technology Park, making it one of the leading high-tech locations in Germany, hosting close to 320 companies.17

Science and technology policies reflect transformations in the economy. Although it has less R&D intensive manufacturing than the German average, it has specialisations in science and engineering, particularly in aerospace and aeronautics as well as high-end car manufacture. As in other countries, the local economy has been transformed; from one dominated by traditional industries including ship building and car manufacturing, it has become ‘a pronounced service economy’ (Koschatzky and Kroll 2007: 1121).

One of the most important examples of an active independent regional dimension to science policy was InnoVision 2010. The objective was to make Bremen one of the top ten German technology regions by 2010. To do this it invested in science infrastructure, focusing on selected technology fields and regional networking. However, Koschatzky and Kroll (2007) found that the Bremen STI policy has had a tendency towards setting overambitious and unfocused goals due to independent policy agenda-setting, oriented towards regional development. One of the problems seemed to be that the chosen sectors were not likely to become internationally successful. The InnoVision 2010 policy has since been revised to build on state excellence in areas of science and technology.

EU as well as national funding is important for reinforcing areas of excellence in the science base.18 Researchers at the University of Bremen in 2013 were involved in fifty projects within the European Commission’s Seventh Framework Programme for Research and Technological Development, for example in health, food, ICT, nanosciences and the environment. This may reflect a shift towards concentrating resources in a small number of scientific and technological areas rather than a broader regional development strategy as was the case in the past (Koschatzky and Kroll 2007). The co-ordination of scientific and economic interests in Bremen provides good practice for regions as implementers, partners and independent policy makers (Perry and May 2007). Mistakes have been made but the Land is using its science base to help transform its economic base.

France

The key to understanding France’s new forms of state intervention in science policy at the regional level is the country’s productivity gap in research and innovation (Crespy et al. 2007). The blame for inefficiencies has been attached to a ‘vast and ossified public science and research system’, matched by an absence of a culture of exploitation.
Budgetary constraints on funding for science and the European Research Area project have led to the incorporation of sub-national actors by both accident and design (Perry and May 2007). Crespy et al. (2007) find evidence of a more ‘regionalised’ national science policy emerging and creation of spaces for the negotiation of science policy. Regions are now allowed to play a role, which in effect means a ‘dirigiste’ regionalised innovation system with some elements of a bottom up approach. Moreover, regionalisation is seen as a corollary to European developments and as ‘a stepping stone to international visibility’ (Crespy et al. 2007: 1074). Consequently, new forms of state intervention have emerged to manage a more spatially distributed science policy in which, ‘decentralisation actors . . . must respond to proposals and initiatives within a centrally defined framework’ (1073 in Perry and May 2007: 1043). While policy is formulated between top-down and bottom-up procedures, albeit with diluted capacity for central control over science, research and higher education with regional actors such as regional authorities having to respond to proposals and initiatives with a centrally designed framework – regional co-financing is necessary. Recent examples of policy are shown in Table 6.2.

Crespy et al. (2007: 1073) note that these and a raft of other measures, ‘represent varying attempts to bring combinations of academic, industry and local economic actors together within geographically proximate spaces. The emphasis on clusters and networks as tools for economic and scientific development builds on existing regional science and innovation infrastructures.’ Regions are also now welcomed as partners in basic science and research as much as exploitation and universities are seen as key actors in regional policy with regional authorities as active partners and actors (territorially embedded RIS combined with networked RIS, Asheim 1998). Crespy et al. (2007) find that financing higher education has been a key area in which regional authorities have developed substantial roles, despite having no official competence in this area. Through the programme Université 2000 (U2000), the state put in place a negotiation procedure in order to involve regions in addressing the huge and rapid investment necessary in university infrastructures. In exchange for regional money, the state conceded a role to sub-national authorities as partners in the policymaking process. Cities and other sub-national authorities, as well as regional councils, have taken a lead in science and technology policy, driven by the desire to host university or higher education training on their territory. Université du Troisième Millénaire (U3M) was the second large planning operation involving national and sub-national authorities in higher education.

Table 6.2 Recent French entrepreneurship and innovation initiatives

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Description</th>
<th>Funding</th>
<th>Initial Approval</th>
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<tr>
<td>Poles de Competitivité (Competitiveness Clusters) 2005</td>
<td>to promote the development of world class high technology clusters across France.</td>
<td>3 year budget of E1.5 billion committed with Ministries encouraged to allocate around 25 per cent of their funds to collaborative projects. 66 clusters initially approved.</td>
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<tr>
<td>Reseaux Thématique de Recherche Avancée – RTRA (Thematic Advanced Research Networks) 2005</td>
<td>designed to carry out research projects in order to create clusters of internationally excellent science, networks will receive substantial funding for new infrastructures and to attract top scientists.</td>
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<tr>
<td>Poles de Recherche et d’Enseignement Supérieur – PRES (Research and Higher Education Poles)</td>
<td>Mechanism for the coordination of research and HE activities within a particular geographic area, to increase efficiency, visibility and the attractiveness of French HE.</td>
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Source: adapted from Crespy et al. 2007: 1073.
However, universities remain relatively autonomous and while they have the capacity to engage with regional actors, they do not always have the willingness to do so. Moreover, sub-national authorities have no constitutional rights to intervene in research and higher education (Crespy et al. 2007). While the potential exists for regional authorities to adopt greater roles in relation to French science and higher education policy, not all regions are currently in a position to fulfil these functions. Differences exist in regional capacities in relation to science-based economic development, hence in the capacity and intent to engage in RIS. In absolute value, the most important regions are Ile-de-France and Rhône-Alpes (which includes Grenoble), together accounting for 55 per cent of French R&D, which also have the largest regional budgets devoted to Science and Technology. Both have emerged in terms of participation within a multilevel science polity.

Crespy et al. (2007) identifies a shift in policy with (at least partial) bottom-up and competitive procedures being encouraged at the national level. New instruments such as ‘competitiveness clusters’ or PRES are designed at the initiative of decentralized actors (universities, territorial communities, firms) and only subsequently ‘labelled’ by the central administration. In so doing, the French government is creating frameworks that have to be shaped by territorial configurations, leading to more selective action and resource concentration. Within the new national frameworks, regions are emerging as intermediate actors within complex governance structures. However, the authors argue that as a result of such changes, relations between the national and the sub-national level are becoming less hierarchical and more interdependent but it remains the case that central government remains the key driver of policy. We next turn to examining how these changes operate in Grenoble.

**Grenoble**

Grenoble is the first pole of innovation after Paris, and is a major ‘science region’. This in part is possible because of the local share of the national budget devoted to science (Crespy et al. 2007). The city-region has more than 62,000 students, with 9,000 coming from abroad. It has six engineering schools, important universities, a business school, more than 20,000 researchers both in the public and private sector, four international laboratories, European exceptional facilities (European Synchrotron Radiation Facility, Laüe Langevin Institute, European Molecular Biology Laboratory and so on). Its expertise in innovative technologies is mainly organised around three poles: the Information technology pole (microelectronics, telecommunications and software development), biotechnology pole and new technologies of energy.

It also implicitly identifies itself as having a strong active regional innovation system (regions as partners and as independent policymakers) engaging in a multilevel science polity with much of the leverage from within relationships between key local research organisations and the regional authorities.

Anchored in a strong regional dynamic of technological innovation, the Grenoble research centre relies on the regional development and technology transfer structures to support its technology transfer actions and has developed strategic partnerships with large regional companies, such as Schneider, ST Microelectronics and CEA, in particular.19

The competitiveness pole TENERRDIS cluster (industrial and research cluster for renewable energies in the Rhône-Alpes region and for the development of new energy technologies) is designed to promote research and business spin-offs in new energy technology.20 The cluster
includes the CEA, Grenoble Institute of Technology, the University of Savoy and many other public sector research and teaching bodies.

A strength of Grenoble’s science policy is its focus on clustering involving local authorities, universities and research institutes. Several initiatives date back to the late 1990s, including the creation of the incubator GRAIN (Grenoble Alpes Incubator) at the end of 1999 and the first French seed-fund: EMERTEC. Grenoble is one of eighteen regions that have received a label of excellence for its innovation support policy by the EU. Its research strengths underpinned by the French state have enabled the city region to win major EU research and innovation grants, such as in 2013 under the SEMI (semiconductor) Europe programme, strengthening national patterns of regional specialisation and as a regional partner with national government. It is also a member of the five country European Molecular Biology Laboratory, Europe’s flagship laboratory for the life sciences.21

In sum the Grenoble experience matches the account of regional development told by Crespy et al. (2007) about the location of research spending and changes in the French Innovation system, and a multilevel science polity. EU monies have also been important in the design of and support for innovation policies. Grenoble should, however, be seen as a special case comparable only to other regions where innovation is linked to big spending, for example Toulouse (Aerospace). In the Perry and May (2007) quadrant it is both a passive and active independent policymaker and an implementer of nationally defined science policy initiatives.

Conclusions

This chapter asks, what impact do national and regional administrative structures have on the design and implementation of innovation policies involving universities operating at the regional level? In answer, the chapter shows that administrative structures operate in a variety of ways. Taking the national level first, a major feature is the extent to which science funding is concentrated in particular disciplines, which inevitably means that some regions have disproportionate shares of the budget. The consequence is that these ‘Islands of Innovation’ accumulate further assets such as skills and have leverage to acquire further funding on the basis of excellence. This process coexists with regional policies designed to overcome regional economic and social disparities. Possible outcomes are regionalised RIS in which universities play a key role in sustaining regional specialisations. With an increasing investment in science comes the likelihood of a globalised RIS coexisting with a region actively working as a partner with the national government as in France and Germany.

At the regional level, it is also possible for universities to be part of regionalised RIS but not to be engaged as in the UK. Thus, Oxfordshire might be characterised as not even being a ‘region as stages’ because neither Oxford University nor the local authorities play more than a token part in decision making processes (Perry and May 2007). Local outcomes arise from the attraction of national and international funding that underpins commercialisation activities in the science base. Bremen is shown to be an active partner in regional science policy formulation and practice, but has also received national funding and EU funding for research. Although it is a much smaller German example than the big four Länder it is an interesting case study of a region in transition working towards being a more fully developed ‘Island of Innovation’.

France has moved more closely to the German model, whereby regions are welcomed as partners in basic science and research as much as exploitation (Crespy et al. 2007), as for example Grenoble. Grenoble is also a striking example of multilevel governance with EU funding and policy a very strong component of policy formulation and practice. Thus, the state as an enabler
of Islands of Innovation or science regions, through high levels of national spend can be seen in France and the UK. Germany is increasingly going that way.

The chapter also shows that RIS structures and regional dimensions to science policy change over time. Revolution has taken place at the level of the EU, in France and the UK, but with continuity in Germany. The EU Smart Specialisation agenda firmly places universities at the heart of science-innovation regional policy. However, despite theoretically informed policy advances, universities are powerful institutions, especially in the UK, and may frustrate the practical realisation of regional policies – except where it is in their interests to become involved.

Notes

4 www.rcuk.ac.uk/Pages/Home.aspx (accessed 21 February 2011).
17 www.bw-studyguide.de/en/home.html

References


