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UNIREG

Final Report

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Abstract

The main objective of the research was to investigate the ways in which universities are responding to the new demands placed on them to play a leading role in regional economic and social development, assisting employment creation, encouraging individuals to achieve their potential, and developing a culture of flexibility and learning, and contributing to institutional innovation.

Other objectives were to analyse the changing role of the university in the light of the other pressures — fiscal, technological, managerial, political — that are increasingly impinging on them, to examine the interaction between national and regional policy contexts for university engagement, and European policy fields specifically providing support for science and technology, innovation, and structural development, and, to assist policymakers, university managers and practitioners at various spatial scales to better tailor policies and actions through the dissemination of good practice and European comparative experiences of existing actions.

Key questions were:

- How are changes in funding regimes, technologies, 'knowledge production' regimes and academic working practices affecting the role that universities play in the regional development process?
- How are the universities strategically engaging with regional business and economic policy communities?
- To what extent, and how, does the university manage the interface between local business or local interest groups and external actors at an inter-regional, national or European level?
- To what extent does the university play an intellectual and cultural leadership role in setting regional development strategies and how is this organised? What is hindering universities from playing a greater role in regional development?
- How do changes in the role of the university affect the educational and cultural roles of the university?
- How do universities cope with tensions stemming from their different roles as academic knowledge provider and as contributor to regional innovation processes?
- To what extent do universities contribute to the development of new agendas and initiatives in the area of information society, and how does this fit with other university missions?
- How do graduates contribute to regional economic development? To what extent are the career paths of graduates surveyed at the regional scale and are there specific programmes to assist their absorption within the regional labour market? To what extent do universities respond to changes in the regional labour market, such as increasing demands for knowledge workers?
- To what extent do universities, through engaging in economic development, contribute to the wider goals of cohesion, and European integration.?

There are many differences (for example in the status, funding and organisation) of the university sector between different countries in the EU. At the same time, there

are in many cases also major differences between universities with different histories and traditions within each country. Through a strong comparative element the project examined what can be learned by the higher education community generally from the strategies and tactics adopted by particular institutions.

Executive Summary

Universities are increasingly widely recognised as a having a key role to play in the regional development process. The development of an increasingly "knowledge intensive" economy and society — not only in terms of the expansion of the knowledge sector itself but also in terms of the increasingly role of information and knowledge in all sectors and activities — suggests that this role can only increase. As one of the key traditional centres of knowledge production and distribution, universities across Europe have more or less enthusiastically deepened their engagement with regional development issues and the regional development community.

Much of recent thinking on processes of regional development stresses the role of knowledge as a development factor, often raising it to an overwhelming importance relative to more traditional factors such as labour and capital. In such discourses, universities and other knowledge infrastructures also occupy a key role both as resource endowments within the region, but also more interestingly as active participants in the construction of regional competitive advantage. This project develops a conceptual framework for understanding the role that universities may play in processes of regional economic development, not just as an account of exemplary regions, but as a more mundane process that is replicated to some extent in most regions. Indeed our ultimate intention is more to explore the institutional variations in university roles that contribute in some way to differential regional outcomes.

We see the universities as a one element of regional institutional systems, struggling to adapt to the needs of a global process of competition for investment and jobs. The importance of the universities comes from their role in the knowledge generation and transfer process which underpins the success of regions in attracting and retaining high value added activities, whether in the form of mobile capital or endogenous development. Cultures of learning, association and institutional adaptation are both supported by the work of universities, but also themselves shape the extent to which universities can be beneficial to their regions

Ø Knowledge as a commodity

Much of the debate about the role of universities in regional economic development has focused on technology transfer and spin off, as models of endogenous development in the 1980s identified universities as sources of knowledge which could be commodified for use within the local economy either through licensing or the formation of new firms. Knowledge can be appropriated on three different spatial scales: international, national and local. A common concern of policymakers, and the prime reason for the introduction of a regime of appropriation within the university system is the desire to prevent free appropriation on an international level.

Ø Knowledge as human capital

A key element of the role of universities in economic development is in the formation of human capital. One means of understanding this role can be found in the concept of the learning economy which emerges from studies of national systems of innovation The importance of interactive learning is stressed as the basis for innovation and change in modern developed economies.

Ø Knowledge as social capital

Although most research has focused on the direct contribution of universities to the economic success of their localities, a further question concerns the indirect contribution of universities to the social and cultural basis of effective democratic governance and, ultimately, economic success. A key challenge is to enhance the role which universities, and their staff and students, play in the development of networks of civic engagement, and hence in the wider political and cultural leadership of their localities.

The regionalisation of HE: national regulatory frameworks

The regional agenda is not a single process and several different elements can be identified, often co-existing in single university systems. At its most simple, regionalisation can mean both the more equitable distribution of universities and student places, and also the decentralisation of university governance and funding to the sub-national level.

The question of equitable distribution of universities is also linked with the role of universities in regional development. The development role encompasses the question of opportunities for the population of less favoured regions, but is more typically focused on the advantages a university can give a region as a whole.

The endogenous development argument also reflects a greater emphasis on locally specific responses to the rigours of globalised competition.

In most of the countries being studied we have observed a general tendency over the long term from a university system that is elite and nationalist in orientation to one that is more regionalist and caters to diverse needs, with a greater emphasis on relevance to employment. Such trends are often seen as challenging or threatening by traditionalists within the university system, although others may identify these trends with wider changes in the nature of the economy and the organisation of knowledge production as a whole.

All of our case study countries have seen a spatial decentralisation of universities over time, particularly in the period since the 1960s, but for some with greater impetus in the 1980s and 1990s.

Although a number of university systems have been through a process of increasing relevance to regional needs, this is not always associated with regionalisation of funding. The extent to which funding is regionalised in part depends on the existence of regional tier of government with fiscal responsibilities, hence the federal systems of Germany has a long history of regional funding and Spain has been following that line.

Even if universities are funded by regional bodies, this does not guarantee that the orientation of the university culture is to the region rather than the national level, and vice versa, as this depends on the implementation of policy levers to shape the internal agendas of universities, either by directing resource allocation to specific kinds of activities, or by providing additional incentives or special funds for new regional activities.

Employability and graduate labour markets

A key area of regionalisation of higher education concerns the extent to which regional universities orient their teaching activities to the labour market needs of the

regional economy. This begs the question as to whether the regional economy differs in its needs from the national or indeed the international economy, or even whether universities should respond to the needs of their students or regional employers. However higher education policymakers in most countries have recently expressed the need for universities to better reflect employability skills in the curriculum.

A central element in these debates is the extent to which graduates are retained within the home region or the region of study. In trying to understand such migration patterns of graduates we need to take account of the origins of students. The entrance mobility of students is particularly influenced by national higher education systems, which directly control the recruitment practices of universities.

Graduate retention is an important mechanism through which regions retain people with skills, enterprise, innovation and management capabilities. However a region's ability to retain its graduates depends on a variety of factors such as the migratory forces that pull graduates from the periphery towards the core; the evolution of occupations within regions; the embeddedness of employment issues within university agendas; and the origins and socio-economic backgrounds of the student.

The overwhelming impression conveyed by many of our case studies is the strong migratory pull from the periphery to the core and the high percentage of students who stay in the core region once they have been educated there. In many cases this is influenced by better job prospects, a higher salary, uneven growth in service sector economies and established clusters of knowledge intensive activities

There is a sense therefore that universities act as mechanisms to equip graduates both to take up better jobs, but also to take up opportunities involving inter-regional migration, even where students are attending university in their home region. A key issue is therefore what measures are being adopted to encourage local embedding of graduates in order to facilitate local employment.

The social shaping of knowledge workers

One specific form of institutional linkage between universities and the knowledge-based development of their regions is the social shaping process by which some university students become graduate knowledge workers for key professions in their regions. In particular, we compare and contrast the social shaping of two types of knowledge workers: accountancy and computer science graduates.

The research suggests that the curriculum design process for university degree courses varies depending on the type of national higher educational system, the type of university, the faculty or department, the individual staff member as well as the nature of the markets and profession for a particular discipline. These variables also have some bearing on the knowledge basis of university curricula for degree courses which differ largely in terms of the international or global, European and national shape of university curricula.

For example, there tends to be more national state shaping of at least a core university curriculum in state equality systems, while the curricula tends to shaped at the faculty, departmental or individual staff member in state liberal systems in line with 'traditional' university autonomy. Further, the quasi-academic autonomy of state liberal systems allows curricular design space for some external shaping of university courses by, for instance, key external actors in private and public organisations,

particularly for more 'professional' or 'vocational' degree courses like law, accounting, medicine or social work among others.

To a certain extent, the knowledge basis of the university degree courses follows this state equality/state liberal system pattern. Specifically, the greater degree of university autonomy in state liberal systems provides relatively more flexibility in the knowledge mix of the curricula including more space for regional knowledge geared to regional structures and issues.

Finally, with regards to disciplinary markets and professions, the research indicates that the knowledge basis of computing courses across the universities in both the state equality and state liberal systems tends to be more globalised, reflecting the globalisation of the computing industry driven largely by American multinational computer firms. On the other hand, the knowledge basis of accounting courses is predominantly national, reflecting the national structure of the accounting profession. Yet, this national basis of the accountancy profession and university curricula is facing increasing institutional demands for greater European harmonisation at the EU level as well as international standardisation driven again largely by American multinational 'accounting' firms.

What the reports do not indicate, however, is a high degree of regional institutional and key actor involvement in the shaping of university curricula, or of a regional knowledge basis to, the curricula at least with respect to accounting and computing degree courses. In fact, the results show that overall there is little to no regional shaping of, or a regional knowledge basis to, the curricula for degrees in the fields of accounting and computing. What regional influence there is appears mostly in the state liberal systems, yet even in these cases the university's contribution to regional development seems at best an indirect outcome of the production of accounting and computing knowledge workers, particularly for global, European and national core regions with more developed business services and computer industries.

Universities and regional innovation systems

Support for innovation in business is perhaps the least controversial area of university regional engagement from a policy perspective and has been subject to considerable international transfer of policy lessons. Three key questions are addressed here

- Do different national systems of HE encourage and adequately resource these activities, and provide appropriate institutional governance systems?
- Do the national systems support interaction with regional innovation systems as distinct from national orientation, and is there dedicated incentives and funding for such initiative?
- How do universities negotiate with local governance systems to deliver mutually desirable policy outcomes?

National policies are important through a series of mechanisms. The regulation of the appropriation of knowledge affects how universities or their staff appropriate and thereby control the ways in which their knowledge and discoveries can be valorised economically. Universities may be seen as an economic development motors nationally or regionally, and therefore are encouraged through public investment and regulation to collaborate with industry. The distribution of research resources across universities may be spatially uneven leading to significant regional inequalities in the

level of research intensity between universities and regions. Finally the means by which research in the universities is funded can have significant implications depending on whether it is primarily nationally funded or if there is a significant regional element.

Given the national funding of most university systems then engagement in regional innovation systems is invariably underpinned by national funds, whether general university funds or more specific regional programmes. The latter has been a growing element of the university policy framework in recent years as governments have sought to encourage universities to support SMEs, usually within the local region, and to address regional economic disparities through innovation programmes.

National funding for regional innovation has tended to fall into three categories

- National programmes to encourage innovation involving collaborative activities and implementation in each region.
- National strategic developments in selected regions only, to foster centres of excellence, often in disadvantaged areas.
- National funding for regionally-initiated schemes.

National programmes for regional innovation have taken on a wide variety of forms. One dimension is the nature of the support – research infrastructure, technology transfer, graduate placements, consultancy, demonstration sites – the variety is extensive. Another dimension is the institutional orientation – whether project based (often departmental), university level, or based through independent intermediaries or university consortia. A third dimension is whether there is a competitive process or a fixed allocation to each university or region.

Two main trends are shown within the university-industry interface at the regional scale. First, the patterns of interaction depend on a mix of three different scales of policy outlined above. In each region the nature of the specific role of universities in regional innovation systems depends on how they have combined with the strength of regional governance and local institutional thickness.

Second, individual institutions have sought to combine resources and programmes at the different scales to construct integrated innovation support infrastructures. Often this creativity is left to the individual staff of university departments, but increasingly universities are building specialised units to manage the configuration of these external relations.

National and regional IS strategies

There are a number of potential roles for the university in the development of a regional information society.

1. It can be a ***formal adviser to the region***, in a broader strategy, playing in parallel a role in implementation. The effort to play a formal adviser's role when the regional authorities are not mature may constitute a waste of resources, in which case it is better to concentrate on a project-based role.
2. If there is no regional strategy, but financial opportunities are offered at the national/EU level, individual university teams can offer ***ad hoc direct services to society***. While one may argue that in this case the university, as a publicly

funded actor, may alter the rules of competition, the market failure argument applies. Particular examples of this kind identified were

- Create awareness for the general public (diminish the risks of exclusion)
- Train the civil service
- Support companies (access to the Internet to e-commerce)
- Support networks of smaller companies (take advantage of reducing barriers to entry)

3. The university can also offer ***indirect services***, working on ICTs, with specific code, framework and platform developments, ensuring privacy of personal information and making transaction secure. University teams of high quality, participating in national or trans-national networks, have no direct influence to regional development, but skills are maintained for future needs.

In the very different environments studied both ***institutionalised and ad hoc roles of universities*** were found, with different degrees of involvement and efficiency.

All universities studied make extensive use of IS tools. Comparing the regional maturity with the internal facilities of the HEIs there is no doubt that they make well above average use, out-performed only by multinationals and large national businesses.

All universities studied were found to dispose of the necessary infrastructure, have internal tele-education and tele-work facilities and many of them have started offering important value added services, going beyond the offer of simple access to internet and e-mail facilities and a rudimentary web-service. In the UK and Australia in particular there are very ambitious plans for e-learning currently, both at a regional and at the international scale. However, in the majority of the cases reported tele-education exercises were less ambitious. The impression gained is that for enrolled students tele-education is promoted only at individual pilots and as a test of infrastructure rather than as an alternative mode to traditional teaching.

Like with tele-education most universities offer students and staff the possibility to work from home through dial up access to the university centre. The necessary infrastructure exists everywhere, but low and unsystematic use is made, more in the UK and Germany that in other national environments. Compared with big companies (who prefer to save space and where tele-work has been most advanced) universities have no tele-work strategies but tele-work facilities. Universities were not found to play a role in providing tele-work possibilities for the community.

Formal education in ICTs is offered by most of the universities studied. The skill shortages in ICT skills all over Europe are well known and apparently no region, whether rich or poor has a good track record. European universities have as yet failed to produce the necessary skills in sufficient numbers. Universities like Crete and Shannon have been very good in training scientists and engineers, suggesting that in general peripheral universities are good in training but lose their graduates through migratory flows.

Services to companies are often offered by the universities or by individuals. Most of them are profit-oriented activities by the university itself, but charged at lower costs than from private businesses. Scientific excellence (for R&D co-operation with big firms) and market failure arguments (for dissemination work to SMEs) are the major

arguments for these services. In the latter case the role of the regional/local authorities is crucial, since an initial incentive is necessary to introduce the service.

In addition to direct services to the private sector, universities exploit their knowledge for regional actors in specific projects, which are of interest to the community, as in the case of the design of modern transport information systems, air traffic control, port and maritime services etc. This is done on a project basis and exploits regional skills.

Finally universities can play a role for the wider community, not only through the adult education programmes mentioned above, but through their participation in awareness raising and the activation of the society as whole. They can also play a crucial role in tele-medicine.

Universities all over the regions studied are now endowed with a reasonable infrastructure that allows them:

1. To design and implement a good internal and external information system, improving their management.
2. Both tele-education and tele-work facilities exist but their creation and use is more often than not based on individual initiatives for pilot projects, with limited or no institutionalised use and encouragement.
3. The limiting factors for disseminating tele-education and tele-work are human and not technical.
4. Special arrangements on telecommunication costs, can help at least eliminate cost considerations.

Universities can play a very prominent role for regional economic development through their involvement in:

1. Adult education, an increasing activity, where universities are in a position to offer courses exploiting economies of scope.
2. Universities can enhance economic development directly though support to companies and economic restructuring.

For a more co-ordinated approach, going beyond individual projects and teams the national or regional government should give funds to universities, assuring a high quality, systematic offer of services, be it to the productive sector ot for the creation of skills particularly relevant for regional needs.

Universities and regional culture

Culture underpins wider processes of regional development in a number of ways.

- As a sector in its own right the culture industries employ significant numbers of people and are an important element in wider leisure and tourism industries, and even interact with some production activities
- Culture is an important element in the attraction and retention of skilled labour within a region in the form of the contribution to the quality of life. Areas with a pool of highly qualified labour will usually generate cultural activity through demand, but regions seeking to reposition and re-image themselves often choose cultural activities as a way of raising their profile and overcoming traditionally negative images.

- Similarly in the desire to attract investment, regions will play on cultural assets as a means of attracting investments in either cultural activities or mainstream economic activities
- Culture is also seen as an element in the promotion of social capital and regional cohesion

Universities can play a critical role in underpinning and strengthening the cultural resources of region

Cultural provision in universities can aim to gain reputation and attract students, or to improve communication and quality of life on the campus (entertainment), it can be also used strategically as complement of the general regional cultural infrastructure which may be weak or have some absent elements. Universities can (consciously) serve the regional cultural labour market and they can generate cultural life outside of the institutions, both, actively as suppliers of provisions (e.g. cultural events) and passively in the sense that staff and students demand cultural offerings of other providers (e.g. public concerts, nightlife activities).

'Enhancing quality of life' is an objective which has often been mentioned in the context of our regional case studies. In particular, universities located in culturally less attractive regions are anxious to enhance campus life by providing cultural and entertaining opportunities. A further feature is evident: those universities which are comparably young campus universities, located outside of the city centre particularly stress this role.

In many cases university cultural activities are addressed at a broader range of 'clients' and these are often those cases in which universities fulfil a wider mission to supplement the regional culture infrastructure. We examined the extent to which the universities need to compensate for deficits in the regional cultural sector. The result was that nearly all universities offer cultural activities to the wider public although the intention to provide compensation for weaknesses in the public infrastructure is restricted to only some cases.

Nevertheless, universities do have their role. First it should be mentioned that all the cultural activities which universities do provide in addition to the ordinary courses of study can have an effect on graduate employability skills.

In the field of culture, university spin-offs are not very common. Such effects seem to be restricted to core regions of the nations. In general, in cities such as London or Dublin the foundation of a small niche theatre might make more sense than in peripheral regions.

Universities are a strong regional cultural factor as they generate cultural life outside of the institutions, actively and passively.

'Passive cultural enrichment' - the demand side - Universities are not only cultural suppliers, on the other hand they generate cultural demand as well. Here, this kind of effect is named 'passive cultural enrichment' - the universities themselves supply the need by providing own facilities, services and events which often complement the regional cultural landscape.

'Active cultural enrichment' by events - the supply side - Universities also enrich the regional cultural infrastructure by initiating cultural events. This strategy can be characterised as 'active cultural enrichment'.

Universities and regional governance

Historically, universities have played a key role in the process of nation building throughout Europe. Their contribution to the selection of national elites, to the shaping of dominant ideologies, and the development of national innovation systems is generally recognised. Recent years have also seen growing awareness by universities of the significant role they play and can play in their own region. This growing interest must be understood within the broader context of the resurgence of the region as an important arena for political and economic activity, and, at the same time, a shift in emphasis from material to non-material assets such as knowledge, skills, culture and institutions.

Universities are considered to be of crucial importance in building the receiving system in the region. The role of the university is to contribute to the less tangible aspects of the system by building social networks that link key actors in the local community and feed their knowledge and expertise in these networks.

We are witnessing, in regions throughout Europe, a rise of new regional governance structures where more institutions then before engage in regional development. These regional actors have a growing interest to become more active in establishing regional networks in order to stimulate the sharing of knowledge and expertise and to promote co-operative activity. It appears that universities are often sought as one of the partners in these regional networks. At the same time, universities themselves, in times of diminishing state support and growing student numbers, show more and more interest in engaging in their region. The growing number of local and regional actors engaged in regional development and their desire to build networks appear to offer numerous opportunities for universities to engage locally.

There are still large differences between countries with regard to the extent to which universities have structurally engaged in these regional networks. The ability of universities to participate in the regional governance structures depends on the degree of independence of the institutions from regional and national governments, the extent to which regional policy is formulated in the region itself, the nature of the funding relationship and hence of priorities set through that mechanism.

A categorisation of forms of regional involvement can be developed:

- Formal representation - This encompasses regional and local representation on university governance structures as well as university representation on local and regional institutions.
- Partnerships - Partnerships are co-operative agreements between local and regional government and other local/regional public, private, and voluntary parties coming together in order to collectively formulate and carry out certain policies in the region in mutual agreement. The research found examples of five different sorts of partnerships, which can be distinguished on the basis of their central aim. These are: city regeneration, regional promotion, strategic development planning &knowledge transfer, science and technology transfer, and ad-hoc project based partnerships
- Higher education consortia - The situation whereby higher education institutions in one region join together to bring out their common interests and combine their expertise in regional affairs is still quite rare. With the exception of the UK and

Ireland, there are no other countries in this research where such consortia with regional aims have been established.

- Informal engagements tend to be based on structural or ad hoc, not statutorily regulated, contacts between university research groups, individual academics, or transfer departments, and local or regional institutions. They often arise during public calls to conduct specific tasks, or to provide expert-advice for specific purposes, such as the revision of regional strategies. For some universities in this study, it appears that these informal structures are the most important and, in some instances, the only channel to influence regional decision-making.
- Personal appointments - This category concerns the various ways by which university staff participates on the boards of regional and local organisations and activities. In some cases, their appointment is based on their specific expertise in a certain domain. In others, it is based on their general management experience.

An important explanatory factor for regional involvement in governance structures, stretching across all the case studies in this study, is the identity of the region itself and the allied problem of the universities' local commitment to regional engagement.

Conclusions and policy issues

This report has sketched out some of the emerging findings of the multifaceted nature of university-regional engagement. The research has identified a much deeper engagement of universities in their regions than is evident in the conventional literature on innovation activities, but still revealing considerable heterogeneity across Europe on account of structural characteristics of national higher education systems, and the scope for receptivity within regional institutions. Nonetheless, in spite of barriers and difficulties the diversity of practices and mechanisms results in patterns of interaction that find appropriate or possible forms regardless of the regulatory situation. Formal links emerge where the institutions are in place and where the regional problems are acute, whilst informal mechanisms develop in those situations where institutions do not permit formal relations.

The variations of national system of higher education imply that there will be differences in appropriate forms of good practice, although some underlying principles are common across all regions. The kinds of recommendations that emerge from the work are therefore quite generic although still appropriate in many cases where universities could be more effective in promoting a regional role for themselves.

Recommendations fall into two main groupings: those that emerge from the specific themes pursued in the study, and those that are more strategic and address issues of wider institutional policy. The recommendations listed below are quite briefly described and will be further expanded in a longer and more comprehensive version of this report to be published subsequently on the project website.

Recommendations relating to specific themes:

1. There are considerable national differences in policy on the tracking of students through the university system, monitoring social class and geography of origin and ultimate destination. All universities are recommended to invest resources into understanding the regional origins of students and destinations in order to be able to inform policy on curriculum development, placement and recruitment to

regional firms, and to understand the role of the university in the regional labour market. Ideally such tracking should at least in part be managed on a national basis to disentangle the full inter-regional flows.

2. Universities should assess the extent to which they draw upon regional actors in the design of the curriculum and should assess the extent to which curricula should reflect local needs. Such consideration will depend on the localisation of graduates as dependent on adequate destination tracking.
3. Universities should develop a strategic plan for providing local business support, based on their understanding of regional industrial trends and potential links with their own strengths.
4. All universities are investing in the application of new ICTs for their core mission whether in research, teaching or administration. Often these developments are being planned without consideration for the regional implications, but could be implemented in such a way that regional benefits can be achieved. Consideration should be given to the regional consequences.
5. Universities are often considered as key partners in regional information society programmes due to their ICT resources, training role and expertise in application development. They should take a central position in the development of regional information society strategies and examine ways in which their resources can be more widely made available to the local population.
6. Universities should carry out an audit of cultural activities and provision and assess how their activities complements regional provision. Attention should be paid to the potential for enhancing the cultural role where regional collaboration can benefit the university and the region.
7. Each university that has significant provision of cultural education and training should consider the potential for culturally-based spin offs and business interaction alongside any existing strategy for technology-based business interaction.
8. Where universities institutional governance involves regional stakeholders, universities should consider how such relationships could be utilised by the institution to develop deep and productive regional partnerships and better integrate the region into the universities strategic planning.
9. Universities should seek to be active partners in regional governance partnerships, moving beyond the passive involvement of senior staff in committees to seek to shape the strategies of partners with the aid of university expertise. Internal networks within universities are necessary to ensure that those involved in external relations have access to the knowledge of staff within the university.

In addition to these specific recommendations there are a set of general recommendations:

A central concern is the need for each university to review their regional strategies and processes through benchmarking. Benchmarking can identify areas where improvement is needed. Once identified, examples of possible good practice can then be evaluated for potential implementation.

Benchmarking good practice in regional engagement

Benchmarking is becoming a well-established element within the process of continuous improvement for companies.

A benchmarking framework for regional engagement provides a means for stimulating discussion and internal assessment of where to focus effort both for the benefit of the region and for the university.

Ø What mechanisms exist within the univeristy to establish a consensus on what strategic priorities should guide the regional development process?

Ø What mechanisms can be established within the university to link together existing regionally-focused activities and add value to them?

Ø What mechanisms exist within the university to balance its different geographical roles and create synergy between them?

Ø What mechanisms exist within the region to think about issues such as health, culture, the economy, and community regeneration, in a joined-up way?

Ø Finally, what mechanisms can be established to bring together those involved in the regional development process such as universities, regional agencies, community groups and central government, so they can begin to prioritise which regional needs should be addressed?

Monitoring and recording good practice initiatives

There is considerable evidence on good practice initiatives collected in the preparation of this and other projects. Much has only previously been available in a fragmented way through ephemeral publications and websites, and there has been no opportunity to make comparisons across institutions within particular categories of initiative or problem focus.

Several options exist for making such data available, and universities should collectively assess how to collect and disseminate such information, perhaps with national associations facilitating the process.

One option would be for regional associations to provide a forum within which universities could exchange experiences concerning particular forms of initiative.

Embedding regional engagement in the mainstream

The next priority for universities would be to ensure that the lessons learnt are effectively embedded in the mainstream activities. There are three elements to effective regional engagement:

- Institutional level policy frameworks that set priorities, govern partnership arrangements and establish administrative infrastructures,
- External resources that support those activities where there is benefit to the region, but where mainstream funding council support and full cost recovery are not appropriate, and
- Activities that can be tied into mainstream teaching and research, and often require innovative thinking about combining missions rather than new resources.

Whilst the second of these does require external inputs from central government or regional partners, the other two elements are within the powers of the universities

themselves. In some cases it seems that these elements are however almost neglected in the desire to obtain new resources, although greater value added may be obtained by providing a clearer set of signals to staff to encourage more regional engagement through mainstream activities.

Working through regional consortia

Finally, although the key lessons are for individual HEIs to implement good practices internally, there are an increasing number of examples of regional level collaboration, either through regional consortia or through other collaborative partnerships. Many of the problems faced by disadvantaged communities are such that HEIs working together can better assemble the package of knowledge, skills and resources needed.

Background and Objectives to the Project

This project focuses on the role of universities in regional economic development. Taking a step forward from the 'impact' studies which proved the significance of universities in technology transfer, business spin-offs and as a regional income generator, this study highlights the role of universities as one of the key players in systems/regimes of regional governance which underpin regional development strategies. Following a number of network perspectives, the position of seven different European university systems and their environment are analysed and compared. Key questions are:

- How are changes in funding regimes, technologies, 'knowledge production' regimes and academic working practices affecting the role that universities play in the regional development process?
- How are the universities strategically engaging with regional business and economic policy communities? How is this engagement affecting the educational and cultural roles of the university?
- To what extent, and how, does the university manage the interface between local business or local interest groups and external actors at an inter-regional, national or European level (for instance as brokers of information on business and political developments, funding possibilities, and relevant research outcomes)?
- To what extent does the university play an intellectual and cultural leadership role in setting regional development strategies and how is this organised? What is hindering universities from playing a greater role in regional development?
- How do changes in the role of the university affect the educational and cultural roles of the university?
- How do universities cope with tensions stemming from their different roles as academic knowledge provider and as contributor to regional innovation processes?
- To what extent do universities contribute to the development of new agendas and initiatives in the area of information society, and how does this fit with other university missions?
- How do graduates contribute to regional economic development? To what extent are the career paths of graduates surveyed at the regional scale and are there specific programmes to assist their absorption within the regional labour market? To what extent do universities respond to changes in the regional labour market, such as increasing demands for knowledge workers?
- To what extent do universities, through engaging in economic development, contribute to the wider goals of cohesion, and European integration?

Objectives

The main objective of the research was to investigate the ways in which universities are responding to the new demands placed on them to play a leading role in regional economic and social development, assisting employment creation, encouraging individuals to achieve their potential, and developing a culture of flexibility and learning, and contributing to institutional innovation.

Other objectives were:

- To analyse the changing role of the university in the light of the other pressures — fiscal, technological, managerial, political — that are increasingly impinging on them,
- To examine the interaction between national and regional policy contexts for university engagement, and European policy fields specifically providing support for science and technology, innovation, and structural development, and,
- To assist policymakers, university managers and practitioners at various spatial scales to better tailor policies and actions through the dissemination of good practice and European comparative experiences of existing actions.

Methodology

The project methodology combines three fundamental elements:

- National level contextual analysis - as many of the institutions involved, and notably the universities themselves, are regulated at the national level.
- Regional case study analysis - at which level the interactions being studied are observed.
- Comparative analysis for a selection of research themes - in order to ensure the research has a synthetic approach rather than simply a collection of case studies.

These three elements provided the three main empirical modules of the research.

National

Although the study concerns regional development and regional cultures, the regional case studies are set within a national context. The governance of regional economic development is in part a negotiation between the region and the national state, and many of the bodies concerned have substantial funding from central government and operate within some form of nationally regulated environment. Universities in particular tend to operate within a national system, and major policy shifts affecting their orientation towards their locality are usually driven by national policy agendas. There is of course a difference in the importance of the national framework between centralised systems such as the UK, Greece or Ireland, and the federal system in Germany, and to a lesser extent in Spain, but even in those cases where regions have responsibility for higher education there is still a process of regulation centrally. The first empirical module therefore provided a national framework for the research by analysing the evolving policy environment using a common framework for each of the seven countries.

Regional

The primary spatial scale of the research is the regional level, and the second main empirical module focused at this level. The regions selected provide a wide range of different circumstances on various typologies:

- Urbanisation - ranging from a global city (London) through national capitals, provincial cities, to rural regions.
- Industrialisation - from service oriented to high technology, older industries and primary/tourism oriented

- Economic Development - from high income to objective 2, objective 1 and objective 6.

A common framework was used to manage the diversity of cases, and ensure that comparative analysis could be undertaken.

Thematic

The final empirical module combined more detailed investigation with the development of a synthesis across the case studies. Each member of the team took responsibility for one theme emerging from the regional case studies and produced a synthetic report for that theme across the project.

Scientific Report

1 Introduction

Universities are increasingly widely recognised as a having a key role to play in the regional development process. The development of an increasingly "knowledge intensive" economy and society — not only in terms of the expansion of the knowledge sector itself but also in terms of the increasingly role of information and knowledge in all sectors and activities — suggests that this role can only increase. As one of the key traditional centres of knowledge production and distribution, universities across Europe have more or less enthusiastically deepened their engagement with regional development issues and the regional development community.

However, this increasing engagement is taking place in the context of wider set of changes with which universities must contend: changes in the educational role ascribed to universities with the move from elite to mass higher education; changing funding regimes as states seek to control the education budget and increase the "efficiency" of universities; changing uses of technologies in education and research (the "virtual" university); a growing crisis of legitimation around the academic role and identity of the university and its claims to a monopoly of certain types of knowledge and learning; changes in the regime of "knowledge production"; an increasing awareness of universities as having a major economic role (as an employer, through attracting students, as a source of technological know-how, as source of human capital development in promoting a flexible and adaptable workforce).

There is an emerging literature on the role of universities in regional development. To date, much of this literature has been narrowly concerned with two issues: econometric analysis of the multiplier associated with staff and student spending in the local economy; and, the role of universities in technological transfer, e.g., through the creation of spin-off companies or the establishment of science parks

The role of the university in regional development is increasingly being seen as going well beyond this narrowly techno-economic approach. A number of further issues are now being raised, for example:

- the role of universities in human capital formation and questions of graduate retention in some areas;
- the role of universities as political players in formal and informal local governance structures;
- the key role of universities in the development of the "information society"; and
- the role of universities as centres of intellectual and cultural leadership within a region.

This report presents results of an international review of universities in their engagement with their regions, which examines a number of key themes across eight countries: Australia, Finland, Germany, Greece, Ireland, Netherlands, Spain, and the United Kingdom.

2 Knowledge production, localisation and the role of universities in regional development.

Much of recent thinking on processes of regional development stresses the role of knowledge as a development factor, often raising it to an overwhelming importance relative to more traditional factors such as labour and capital. In such discourses, universities and other knowledge infrastructures also occupy a key role both as resource endowments within the region, but also more interestingly as active participants in the construction of regional competitive advantage. This project develops a conceptual framework for understanding the role that universities may play in processes of regional economic development, not just as an account of exemplary regions, but as a more mundane process that is replicated to some extent in most regions. Indeed our ultimate intention is to explore whether there are institutional variations in university roles that contribute in some way to differential regional outcomes.

The review starts by considering the role of knowledge in regional economic development by examining a series of literatures. These range from the agglomeration economy-based approaches of the new industrial spaces, to the more sociological explanations of industrial districts and innovative milieux, and to the 'worlds of production' synthesis. This focus goes beyond a narrow conception of knowledge in the form of commodifiable product knowledge such as patents, to consider various forms of tacit knowledge, and combinations of tacit and explicit, embodied and disembodied, local and global knowledge.

Following this we focus on the role of knowledge institutions, and especially universities in the formation, exchange and application of knowledge in different settings. Here we seek to explore the different roles and contributions that universities can play in the context of this research framework.

Finally we examine the spatiality of the role of such institutions and their involvement in territorially specific innovation systems.

2.1 Knowledge and the economy

All economic life depends on the application of knowledge, but it is increasingly claimed that we are living in a knowledge-based society, with new knowledge based industries emerging. What does this mean?

We can suggest that there has been an expansion in demand for more formal kinds of knowledge of particular kinds. This can be seen in the growth of science-based industries where leading edge scientific knowledge forms the basis for product and process development, but also in the application of formal knowledge such as mathematical modelling to stockbroking or logistics. In parallel the professionalisation and credentialisation of many occupations and activities is creating a new demand for those that can codify management processes and repackage or commodify that knowledge into consultancy or training.

Also the changing pace of the economy, the intensified competition and integration of national economies, abbreviated to globalisation, leads to increasing demands for market information, not just information about marketing but all forms of information that enable companies to react swiftly to address market opportunities and construct new forms of demand and product. This much is routine and needs no real explanation

or justification. We can see the consequences in the growth and integration of multinational firms, in the emergence of network firms and the importance placed on enterprise wide information networks. This thesis of increased demands for knowledge can be expressed as related to a process of codification and commodification of knowledge, of globalisation, of deterritorialisation of knowledge and firms. This idea of hypermobility and the creation of a world economy conceptualised as a space of flows is strongly articulated by Castells (1996) and can be seen as a culmination of at least two centuries of development in communications technologies enabling capital to be ever more flexible in extracting profits across space.

It has become somewhat commonplace to assert that globalisation is being driven by developments in technology, although a more sophisticated reading stresses the need for capital to constantly seek out new opportunities to exploit marginal price differences over space, driven by the need to compete. Thus a ready market is created for new forms of transport and communications technologies, and firms seek to develop spatially differentiated operations that take advantage of both differentiated production costs and differentiated access to embodied knowledge in the form of skills and technical expertise. However in order to take advantage of such spatial differentiation, knowledge must be de-localised so that it can be exploited globally, whether by its encapsulation in mobile products, by its codification as blueprints or software, or through the enhanced mobility of key knowledge workers - physically or via high quality telecommunications.

But whilst the de-localisation of knowledge and knowledge-based products is not new, albeit more intense and immediate than before, knowledge production itself is also changing from its traditional form and the new production of knowledge thesis (Gibbons et al, 1994) suggests that knowledge production is becoming interdisciplinary, reflexive, and more widely networked and distributed. The idea of mode 2 knowledge production, as differentiated from mode 1 or traditional disciplinary knowledge is a popular characterisation of these changes. The mode 2 thesis suggests the reduced relevance of traditional conceptualisations of innovation as basic knowledge breakthroughs emerging from disciplinary-based academic and public research units, being transferred into industrial development labs through codified means. Such linear approaches to innovation may never have been more than a caricature, but that today the need to increase the pace of innovation as product lead-times and life-cycles reduce and competition becomes more global means such leisurely processes are redundant. Instead knowledge discovery processes become more focused in the interstices between disciplines, and in new areas yet to be formally institutionalised, and the links between fundamental research and product development become more interactive and iterative.

Other work within the sociology of knowledge suggest further that knowledge production is a socialised activity drawing on many different kinds of inputs and operating within a social context. Some go further and suggest that knowledge, science, technologies are all configurations of actors in networks – in which the actors include inanimate objects and texts as well as humans and organisations (Latour, 1987). The implications for the spatial distribution of innovative activity and hence economic development is that place specific advantages may be built in a variety of ways on a mix of human and place specific assets.

As such then, socialised processes of knowledge production suggest, rather than seeing a process of convergence, and the free flow of information and knowledge stimulating economic convergence, there remain intense national and regional inequalities with some regions being seen as centres of knowledge production, of symbolic analysts (Reich, 1992) and hence of value added and retained income. This suggests that knowledge is not so transportable and tends to accumulate in specific places, and hence the importance of knowledge and tacit knowledge in particular has become a central element of new theories of regional development, often summarised as 'New Regionalism'.

2.2 Knowledge and new regionalism

The 'new regionalism' in economic geography groups a collection of theories and approaches that share a focus on the region as a focus for study, on the merits of flexible and localised production systems, on an increased emphasis on institutional and cultural factors underpinning regional economic development, and on the localisation of knowledge production and innovation.

Building on explanations of successful and dynamic regions, at least three main 'schools' of research have sought to account for greater innovativeness in particular regions. The GREMI network (Camagni, 1991) has explored the milieu or environment for innovation within regions and emphasised the networks of informal social relationships between firms and other institutions. The networks of interaction contribute to a process of collective learning, and the formation of a shared knowledge base.

The Italian-focused industrial district explanation builds more directly on Marshallian external economies, but also emphasises co-operation and trust, and the importance of socially embedded conventions. Central to this model is a highly fragmented division of labour between networks of small firms, often family controlled and drawing on informal labour pools.

The California School by contrast originally focused on a more economistic explanation founded on transaction costs, but has been developed by Storper (1997) to focus more strongly on untraded interdependencies. This approach seeks to bring together conventions, rules, practices and institutions which combine to produce frameworks of economic action which themselves structure the worlds of production within which firms operate. Central to this idea is the role of knowledge underpinning production and relating to all production factors, and which can be territorialised.

Many commentators (Florida, 1995; Lundvall, 1992; Knight, 1995 etc.) have focused on the role of successful cities as pools of knowledge, where technological spillovers occur and where business can benefit from place-specific tacit knowledge. Knight argues that cities are the places where knowledge as a 'strategic resource' is created and achieved, and indeed throughout history cities have tended to be the focus for knowledge activities whether in the form of universities, entrepreneurial networks or the knowledge centres of firms.

Because of the high concentration of higher education and public institutions in major cities, they can be considered as knowledge centres, but we need to view knowledge more broadly than in terms which only refer to science and technology and their application to manufacturing.

Knowledge may also be considered with regard to other industries such as financial and business services, retail, tourism, cultural industries and media. The continued success of a city depends on the strengthening of the knowledge base for all dynamic growth industries, whether they are manufacturing or service, addressing local or national/international markets. What is relatively under-researched in general is the way in which local service provision and external markets are linked in the generation of knowledge assets - can cities within weakening regions contrive to pull away from their local base or does the move to export orientation face diminishing returns? And to what extent and in what ways does a region benefit from having located within it a centre of knowledge generation if that knowledge is increasingly externally oriented?

Another key issue in the vitality of the knowledge base is the ability of a city to attract mobile knowledge workers. The success of a city depends on its people and successful cities will attract talented and creative people. Quality of life is often cited as a factor in competitiveness (Rogerson, 1999) but we would argue it plays a marginal role in the location decisions of individuals. However, people do choose between work opportunities and here cities are in competition, and increasingly at a European level. Linked to this are the connections between such cities - road, rail and air. Again, cities tend to be the main hubs for such networks but success depends also on the volume of traffic generated by the wider region, and this relates to the attractiveness of the city and region for those individuals that generate business traffic.

Current economic development theory on knowledge and territorial competitiveness stresses the interaction between access to global sources of knowledge (often represented as “best practice”) and localised knowledge arising from the concentration of sectorally or cluster specific tacit knowledge. Such local knowledge is developed and shared within a socialised process involving groups of knowledgeable workers learning-by-doing, moving between firms, and learning through firm-to-firm interactions (Lundvall, 1992). The local specificity of the knowledge and associated customs and practices does not mean it is parochial however, as the cases of Silicon Valley and other high technology complexes demonstrate (Saxenian, 1994). Indeed it is the ability to derive global advantage from highly localised knowledge that is the cornerstone of competitiveness (Scott, 1988). Sustaining such competitiveness implies that the city or region should be aware of the need to modify behaviour to retain advantage – a process termed reflexivity. As one leading theorist puts it:

> ‘Cities thus contain communities of reflexivity workers who insert geographically generic skills into geographically (and otherwise) specific conventional and relational contexts, such that they are made effective under conditions of uncertainty. These groups of actors engage in a kind of cognitive “translation” between geographical levels: national-regional, national-international, and city-regional hinterland’ (Storper, 1997, 248)

Given the needs for scale of expertise and knowledge, for dense interactions between firms and their supply chains, the need for knowledge infrastructure such as universities, research centres, and the need for connectivity, whether by ICTs or air transport, cities are the logical places where knowledge-based clusters of expertise can emerge. But only some cities are successful in creating and then combining the mix of assets in a way that creates a growth dynamic.

2.3 Universities as knowledge institutions

In the previous section we mentioned the importance of knowledge institutions, but we perhaps need to clarify what we mean by this and how universities fit into this institutional configuration. We see the universities as a one element of regional institutional systems, struggling to adapt to the needs of a global process of competition for investment and jobs. The importance of the universities comes from their role in the knowledge generation and transfer process which underpins the success of regions in attracting and retaining high value added activities, whether in the form of mobile capital or endogenous development. Cultures of learning, association and institutional adaptation are both supported by the work of universities, but also themselves shape the extent to which universities can be beneficial to their regions

An increasing engagement of universities in their regions is taking place in the context of wider set of changes with which universities must contend: changes in the educational role ascribed to universities with the move from elite to mass higher education; changing funding regimes as states seek to control the education budget and increase the "efficiency" of universities; changing uses of technologies in education and research (the "virtual" university); a growing crisis of legitimation around the academic role and identity of the university and its claims to a monopoly of certain types of knowledge and learning; changes in the regime of "knowledge production"; an increasing awareness of universities as having a major economic role (as an employer, through attracting students, as a source of technological know-how, as source of human capital development in promoting a flexible and adaptable workforce) (see, *inter alia*, Gibbons *et al.*, 1994; Readings, 1995; Armstrong 1996, Bauman, 1997).

2.3.1 Knowledge as a commodity

Much of the debate about the role of universities in regional economic development has focused on technology transfer and spin off firms (see for example Brett, Gibson and Smilor, 1991; Oakey 1995), as models of endogenous development in the 1980s identified universities as sources of knowledge which could be commodified for use within the local economy either through licensing or the formation of new firms. Such claims based on the experiences of a few exemplary regions during the 1970s and early 1980s led to a flurry of initiatives such as science parks and technology transfer offices, although with significant national variations, and with significant variations in the degree of success.

The literature on technology transfer and spin-of companies is extensive and has been reviewed in our earlier work (see for example Charles and Howells, 1992). We acknowledge recent work by Etzkowitz (1996) on spin off firms in the US, and the development of a framework linking universities, industry and government in what he terms a triple helix, work on the role of university in industrial innovation (see Mansfield and Lee, 1996;and Rosenberg and Nelson, 1994 among others), and studies of comparative experiences of science parks (see Bruhat et al, 1996; Charles et al, 1995; Luger and Goldstein, 1991).

In such a model, based on the appropriation of knowledge, the ability of the university to exert control over intellectual property (IP) is central: the commercialisation or commodification of knowledge is dependent on the exertion of ownership rights over the knowledge developed within university research (Rappert and Webster, 1997).

Recognition of the need for the motivation of university management, and staff, in this process led to the devolution to individual universities of the rights to manage their own IP in some countries. Subsequently most universities have massively increased their activities in this area, and a number of mechanisms and policies have been developed to enhance the commercialisation process, including the support for spin-off firms.

However the question of who pays and who benefits remains central in a system of publicly funded science, where a presumption of open science as a public good may be regarded as in conflict with the desire for the commodification of the knowledge produced, and ultimate private benefit. There is a conflict inherent in the contract between society and the individual in certain forms of formal intellectual property rights, such as patents, where the individual inventor is expected to make public the knowledge of the invention in return for monopoly rights to exploit that knowledge for a period of time. In more traditional academic discourse, knowledge is made available without such restrictions, through open publication, but other scenarios may be presented whereby knowledge is appropriated without any form of open communication. Given such a variety of forms of appropriation/communication, governments responsible for funding universities, and university management have been much concerned over the effect of policy on the site of appropriation and the allocation of benefits.

Knowledge can be appropriated on three different spatial scales: international, national and local. A common concern of policymakers, and the prime reason for the introduction of a regime of appropriation within the university system is the desire to prevent free appropriation on an international level. Different regimes of governance over the process of appropriation can be used to attempt to control the location of the benefits. If IPRs are managed by the university and traded in return for revenue, then the university can control the location of exploitation to some extent, but the interests of the institution may be best served by international exchange through higher licence fees. For national government or regional interests this may be undesirable, and local appropriation either through an existing local company or a new spin-off may be preferred. The location of benefits, and the ability of the ultimate funder of the research to control that location depends on the negotiation of the interests between the various parties: firms, individual inventors, universities, national government and regional interests.

2.3.2 Knowledge as human capital

A key element of the role of universities in economic development is in the formation of human capital. One means of understanding this role can be found in the concept of the learning economy which emerges from studies of national systems of innovation (Lundvall, 1994). Here Lundvall stresses the importance of interactive learning as the basis for innovation and change in modern developed economies. He defines the learning economy in the following terms. It is an economy where the success of individuals, firms and regions, reflects the capability to learn (and forget old practices); where change is rapid and old skills get obsolete and new skills are in demand; where learning includes skills and the building of competencies, not just increased access to information; where learning is going on in all parts of society, not just high-tech sectors; and where net job creation is in knowledge intensive sectors (high R & D, high proportion with a university degree, and job situation worsens for the unskilled).

Within the learning economy different kinds of knowledge can be identified. First, **know what**, that is facts and information. Second, **know why**, that is principles and laws necessary to reduce trial and error; third, **know how**, that is the skills and capability to do something, skills that are traditionally acquired within the workplace; and finally **know who**, that is information about who knows how to do what and the social capability to establish relationships to special groups in order to draw on their expertise. Each of these different forms of learning uses different channels for information exchange. In the case of know what and why, formal learning in school and universities is the normal channel. Know how depends on practical experience through tacit learning (for example, through apprenticeships) but also increasingly through network relationships with industrial and commercial partners. Finally, know who is learned from social interaction via professional associations, day-to-day dealings with customers, sub-contractors and a wide range of other actors and agencies.

Focusing on network knowledge, this is a hybrid form of knowledge that is neither completely public nor completely private. It depends on trust not the market and is characterised by such considerations as reliability, honesty, co-operation, a sense of duty to others. Network knowledge refers not only to the skills of individuals but the transfer of knowledge from one group to another to form learning systems - the institutional infrastructure of public and private partnerships. Because network knowledge is highly dependant on interpersonal relations, it can most readily be developed within a particular region, thus Florida (1996) argues, 'To be effective in this increasingly borderless global economy, regions must be defined by the same criteria and elements which comprise a knowledge-intensive firm: continuous improvement, new ideas, knowledge creation and organisational learning. Regions must adopt the principles of knowledge creation and continuous learning; they must in effect become *knowledge-creating* or *learning regions*.' Key to such a learning region is the human infrastructure and the institutional mechanisms that foster interactive learning, and a central part of this infrastructure, in terms of the reproduction and adaptation of human resources, are universities.

In the case of human capital, universities in many countries have traditionally produced raw graduates for a national labour market dominated by large public and private sector employers, with little concern for SMEs, the non-profit sector or graduate retention in local labour markets. This model has begun to break down in response to changing patterns of employer demands such as the decentralisation of large corporations into clusters of smaller business units and the greater role of smaller businesses as sub-contractors, suppliers, franchisees etc. with consequent implications for the skills required of graduates and the location of the recruitment decision. At the same time regional agencies are promoting graduate retention initiatives as a way of upgrading the stock of higher-level local skills. In parallel with these demand side changes the expansion of higher education provision together with rising numbers experiencing the need to change career later on in life is leading to a growing supply of mature local students for undergraduate and postgraduate programmes.

Notwithstanding these developments, very little is known about the flow of students through higher education into local labour markets and how this relates to the overall economic performance of regions. Yet a key characteristic of the learning region is the way in which knowledge is transferred from one group to another to create

learning systems. In terms of universities this includes knowledge of the appropriate skills and competencies required of the workforce.

What constitutes "appropriate skills" will depend on the overall regional development strategy, be it indigenous development based on local enterprise, exogenous development based on attracting inward investment, or a combination of the two, for example by upgrading local suppliers to support and "embed" inward investment. In this context, the analogy between regions and organisations is one where the shift from personnel management based around handling individual employment contracts and personal development shifts to human resource development which harnesses people development to the strategic objective of the organisation. So the key question becomes: "Does the region include human resource development as part of its overall strategy?" This question raises a number of specific challenges concerning the type of training programmes, what institutions are best placed to provide the programme, and where within the region or for that matter outside should this provision occur.

2.3.3 Knowledge as social capital

Although most research has focused on the direct contribution of universities to the economic success of their localities, a further question concerns the indirect contribution of universities to the social and cultural basis of effective democratic governance and, ultimately, economic success. For example, Putnam, has shown the strong relationship between a civic culture and institutions (understood as "norms of reciprocity and networks of civic engagement") and wider socio-economic performance. Regions or localities that are rich in such networks 'encourage social trust and co-operation because they reduce incentives to defect, reduce uncertainty, and provide models for future co-operation'. In so far as universities are by tradition classically "civic" institutions, they can play a key role in the development of the cultural and political determinants of socio-economic success. A key challenge is to enhance the role which universities, and their staff and students, play in the development of such networks of civic engagement, and hence in the wider political and cultural leadership of their localities (for example through the formal and informal engagement of universities in local political process, through university staff serving as elected politicians or providing a source of talent for local administrations, contributions to the media etc.).

3 The regionalisation of HE: national regulatory frameworks

3.1 Defining the regional agenda for universities - Overview of issues

Debate about the regional role of universities is now commonplace internationally. International bodies such as the OECD IMHE and the Association of European Rectors (CRE) have both recently undertaken international reviews, although it is perhaps at the national level where debate has been fiercest. Whilst not particularly new, debates about regionalisation, equity of access to universities, and the role of universities as regional development tools, are being articulated in a more sophisticated way than previously. The regional role issue is not one-dimensional and also builds upon very varied national systems and contexts. There are some common themes and trends internationally, but these also represent a degree of harmonisation of what have traditionally been diverse university systems and the regional question is only part of this broader restructuring of higher education.

The regional agenda is not a single process and several different elements can be identified, often co-existing in single university systems. At its most simple, regionalisation can mean both the more equitable distribution of universities and student places, and also the decentralisation of university governance and funding to the sub-national level. These two elements may not necessarily be linked as we will see from our case studies, but both can be linked to a more universal question of the growth of a mass university system. Whilst university education was an elitist system aimed at reproducing national bureaucracies then university provision could be both spatially concentrated and nationally regulated, if not funded. As student numbers grew beyond the 15% of the age cohort deemed by Trow to define mass education, and in many countries now more than twice hat level, so the arguments for ubiquitous provision and more decentralised regulation have become irresistible. This massification, more than anything, has tended to encourage a convergence in university systems, especially given the opportunities and enthusiasm for cross-national learning on how to manage the growth of higher education.

The question of equitable distribution of universities is also linked with the role of universities in regional development. The development role encompasses the question of opportunities for the population of less favoured regions, but is more typically focused on the advantages a university can give a region as a whole. As Moss Kanter has claimed, a university has joined an international airport as a 'must have' element in the list of attributes needed by regions bidding for major inward investment projects. But whilst universities have been seen for many years as bait for multinationals, often as a source of technically qualified labour, it is in the context of endogenous development strategies that universities have risen to the fore. Exemplars of university spin-off inspired growth and high skill economies have become central to discourses of knowledge based economic development, reinforced by European programmes such as the Regional Innovation Strategies (RIS) which emphasise the need to use universities and other RTD infrastructures to support SMEs and regional competitiveness.

The endogenous development argument also reflects a greater emphasis on locally specific responses to the rigours of globalised competition. If the demands of globalisation place limits on the ability of national governments to differentiate firm regulation, partly due to the subordination of national policies to new supranational authorities, then it is argued that local conditions become more important in differentiating firm performance.

This process of rethinking the contribution of universities typified by major reviews of role of HE and key legislation with a regionalist agenda and by the growth of bridging initiatives to encourage greater regional embedding in research, graduate labour markets and other forms of community engagement.

3.2 Role of regional equity arguments in the evolution and location of universities

In most of the countries being studied we have observed a general tendency over the long term from a university system that is elite and nationalist in orientation to one that is more regionalist and caters to diverse needs, with a greater emphasis on relevance to employment. Such trends are often seen as challenging or threatening by traditionalists within the university system, although others may identify these trends

with wider changes in the nature of the economy and the organisation of knowledge production as a whole.

All of our case study countries have seen a spatial decentralisation of universities over time, particularly in the period since the 1960s, but for some with greater impetus in the 1980s and 1990s.

The main characteristics of each system are as follows:

- Germany - Universities are widely distributed across the regions, with a key principle being equity of access. A large number of new institutions were established in the 1960s especially in the Ruhr sub-region, which previously lacked any university
- Spain - Massive growth since the 1980s, with many new institutions in regions previously lacking universities.
- Finland - Establishment of universities in the rural areas to the north and east of the country since the 1960s with a specific mission of encouraging greater access to HE.
- Greece - Historical over-concentration in Athens, but gradual process of decentralisation with small new institutions in almost every region.
- Netherlands - growth in university numbers has been slow and steady with most institutions established by the early part of the twentieth century. Only three new universities were established in the 1960s in areas with low participation. Subsequently with all regions having some form of university there has been little debate about spatial concentration.
- Ireland - Concentration in Dublin, but since the 1960s there has been expansion in the regions with new universities and the upgrading of existing institutions.
- UK - massive increase since the 1960s with several phases of expansion, including the re-designation of polytechnics. Universities are now widely distributed but are highly diverse in character leading to variations in regional orientation between regions.
- Australia - Growth has been accompanied by the emergence of new universities in rural areas, and by a proliferation of campuses, the latter often targeted at either raising participation in rural areas, or else engaging in competition for students in the cities.

3.3 Regionalisation of funding mechanisms

Although a number of university systems have been through a process of increasing relevance to regional needs, this is not always associated with regionalisation of funding. The extent to which funding is regionalised in part depends on the existence of regional tier of government with fiscal responsibilities, hence the federal systems of Germany has a long history of regional funding and Spain has been following that line. In the UK, although there is a partial federated system emerging with the creation of a Scottish parliament and Welsh assembly, there is both a longstanding distinctive Scottish education system, and a new process of regionalised funding emerging.

In Spain the main responsibility for funding universities has gradually been transferred to the regional governments, starting with Catalonia and the Basque

Country in 1985, and concluding with the final regions in 1997. The main proportion of the recurrent income of each university is derived from a core grant made by the regional government.

Germany also has a high degree of regional funding with funding for universities being evenly shared between the Länder and the Federal Government. However the regulatory relationships between the two levels are complex and varied, and even though there is considerable regional-level funding there are countervailing pressures for national conformity and standardisation.

Regional funding is not a general tendency however with a retention of a strong national focus to funding in Greece, Finland, Ireland and the Netherlands. In each of these cases funding is direct from a national ministry or higher education authority and is given using some variant of block grant or student weighted payment, although with some planning for growth in particular locations. The UK as noted above is something of a hybrid, arising from its peculiar national governance. Thus whilst England has all the attributes of a nationally funded university system, the establishment of a separate parliament for Scotland, and other forms of devolution in Wales and Northern Ireland has reinforced the independence of the separate funding systems in these territories.

Even if universities are funded by regional bodies, this does not guarantee that the orientation of the university culture is to the region rather than the national level, and vice versa, as this depends on the implementation of policy levers to shape the internal agendas of universities, either by directing resource allocation to specific kinds of activities, or by providing additional incentives or special funds for new regional activities.

4 Employability and graduate labour markets

A key area of regionalisation of higher education concerns the extent to which regional universities orient their teaching activities to the labour market needs of the regional economy. This begs the question as to whether the regional economy differs in its needs from the national or indeed the international economy, or even whether universities should respond to the needs of their students or regional employers. However higher education policymakers in most countries have recently expressed the need for universities to better reflect employability skills in the curriculum.

A central element in these debates is the extent to which graduates are retained within the home region or the region of study. In trying to understand such migration patterns of graduates we need to take account of the origins of students. It might be expected for example that university systems which encourage inter-regional mobility at the point of entry into higher education would lead to a greater propensity for students to move again after graduation. Some migrants may choose to return to their home region whilst others may be more likely to move to a third region if it offers better job prospects. Conversely, university systems where there is national regulation of university entry in favour of localised study may lead to better outcomes in terms of the retention of human capital within regions. In both cases there may be a need for a more rigorous policy framework to ensure that regions benefit from the knowledge that is amassed in its universities. University systems have also ‘widened’ to enable diversity of access beyond the standard routes of entry and this will have implications for the mobility patterns of students.

Research into the origins of students across regions in Europe and in Australia has enabled us to identify several characteristics which appear to have some impact on the movement of students across regions to study. In the majority of the regions studied students are free to study at any university. This said, it is evident that most students choose to study at the university closest to them. The exception is the UK which has high levels of inter-regional mobility and high proportions of students living away from the parental home. However there are some systems which constrain mobility by directing students to their local university.

4.1.1 National systems of education

The entrance mobility of students is particularly influenced by national higher education systems, which directly control the recruitment practices of universities.

In Spain public universities enjoyed a kind of public 'monopoly' on the number and geographical origin of students they may take in first year enrolments. The total number of seats available at any university corresponded to two different categories, (1) the so-called unique district and (2) the shared district[1]. The unique district refers to the new seats offered to students with residence in the geographical district of reference whilst universities in a 'shared university district' had to allocate at least 5% of their gross capacity to students coming from other regions. In Madrid the public university system was organised around a single district, which meant that universities would receive students mainly from the region of Madrid. Using data provided by Carlos III of Madrid showing the geographical origins of students (1998 figures), we can see that a large proportion of students (93.5%) came from the region of Madrid. In this way the government has shaped the geographical concentration of students at the local university.

In January 2000 a process of university reform took place aimed at increasing access to higher education, whereby all seats would form part of a shared district. It is too early to judge whether this policy has been successful in supporting the regional decentralisation process, in reality there are concerns that mobility may be constrained by other factors such as finance and lack of clear indicators on the teaching quality of different universities.

The governance of the education system in Greece is also in a process of radical changes, from a centrally planned and managed university access system to a 'modern, liberal, decentralised, student-application orientated system.' The current phase constitutes a transitional period where the national contest is abolished and is substituted by school final examinations. Formerly student recruitment followed a national contest and students tended to select as a first priority the institutions they considered the most competitive, and it was assumed that universities within the capital, Athens, were generally better networked nationally and internationally. Choices were also influenced by proximity to the labour market. Figures from the Greek study suggest that 62% of students[2] attending the University of Athens were of Athens origin in 1997. By comparison the share of local students studying at the University of Crete can be considered low, with only 24% originating from the region of Crete.

[1] According to the University Reform Act of 1983

[2] Defined as the place where they finished secondary school

4.1.2 Equity of opportunity

The early phases of the development of university systems in many countries can be characterised as being predominantly confined to large metropolitan centres. Later the achievement of 'equity' of opportunity and concerns regarding the loss of human resources that would result from students leaving regions to study has influenced the establishment of universities in many regions of Europe.

For example, 65% of students from the Rhur, study at universities within the region. This is a consequence of the German university system which is predicated on their being only marginal differences in quality and reputation (in most cases) leading to little interregional mobility of students as a direct result of the German higher education policy of the sixties and seventies, which aimed at guaranteeing regional university access by establishing a decentralised university system.

The establishment of the University of Twente can also be considered a reaction to the specific economic and social situation prevailing at that time in the Netherlands, and more specifically as a reaction to the changing attitude towards the role universities should play in society. The need for a highly educated workforce, especially in technical subjects and the greater role attached to universities in reaching 'social equality,' together stimulated the establishment of new universities in the Netherlands in the sixties and seventies. Compared with some of the other regions in the study the University of Twente is one of the least regionally oriented universities in the Netherlands, which is not surprising since it is one of only three technical universities. The relatively small number of students is recruited from a relatively large area, approximately 30% of which come from the Province of Overijssel.

New universities were also established in eastern, northern and central Finland to correct the concentration of university places in Helsinki and Turku and to boost the developments of the sparsely populated regions in eastern and northern Finland. The University of Joensuu was established explicitly to accelerate the social and economic progress of eastern Finland and offer places for students to study in North Karelia. The regional emphasis of this university can be seen in the origins of the student population 39% of which come from the Province of North Karelia and 60% from the Province of East Finland.

4.1.3 Transparency

There is little competition for students amongst universities in many regions of Europe because of the standardisation of quality amongst systems of higher education. For example the Dutch university system is based on the principles of egalitarianism, which means that there are only minimal differences in status between universities. Admission requirements are set by the national government rather than the university and are therefore equal to all universities. Dutch students generally choose to study in the nearest university, which means that universities have an important role in educating the regional population. In some cases for subjects such as medicine and dentistry the national government determines the maximum number of students admitted to these courses. If demand exceeds supply students are selected by random sample. In this cases the higher your marks, the higher your weight in the lottery.

This is in contrast to the university system in Finland, which is highly decentralised where each university selects its students and defines the details of its selection criteria. This includes an entrance examination, which is arranged independently by

the university faculties and departments. In some cases departments in certain disciplines co-operate nationally in arranging entrance exams. Students from Finland also tend to study at the university closest to them.

4.1.4 Systems with inter-regional mobility

The UK higher education system is organised such that a wide range of qualifications are acceptable for entry into HEIs and students are free to study at any university provided they meet the entry requirements determined by the university of their choice.

The North East of England has a fairly high percentage of students who originate from the local area (31.6%). Of these students however, less than a third choose to study at the 'traditional universities'- Newcastle or Durham - which have a more national intake. In London 41% of students originate from the London region, and a very high percentage go on to take their first job in the London region.

The UK system displays high levels of inter-regional mobility, although there are clear regional variations in this pattern. The table below shows the difference between the number of young students entering the region to study from elsewhere in the UK and those leaving the region to study elsewhere in the UK. For example, the North East takes in more young students than it exports to other regions. For every 100 students from the North East, there are roughly 138 students studying in the North East, a net gain of 38. However one of the problems for the North East is that it retains a low proportion of those graduates who moved to study and statistics also suggest that the North East finds it very difficult to attract graduates from other regions to work.

4.1.5 Destinations of graduates

Graduates are mechanisms through which knowledge is carried from higher education institutions into the external environment, it is implicit then that gains may be lost to other areas through the migration patterns of graduates. It is clear that for those regions that might be considered 'peripheral' and for which data are available there seems to be a clear process of migration of graduates from the 'periphery' towards 'core' regions.

One of the major changes in higher education in many of the regions studied has been the expansion and 'regionalisation' of the system based on the principles of equity and efficiency. Equity has been important in terms of increasing the accessibility of higher education to those students who previously had to travel to study and to provide educational opportunities for the disadvantaged (see previous section on origins). In terms of efficiency, the geographic decentralisation of universities was judged to be an adequate policy measure to increase the flow of highly qualified graduates into lagging regions, regions that in some cases had been severely affected by the processes of de-industrialisation. If, as is indicated by our findings, there is an outflow of graduates from these 'lagging regions,' then we have to question the success of the educational function as a tool for achieving these 'efficiency' objectives.

Many of the regions studied in this project can be characterised as former industrialised regions currently going through processes of restructuring. This reflects a global shift in patterns of employment from industry to services and from large

traditional employers to smaller often higher-tech companies. In addition, the 'evolution of occupations' associated with a growth in skills-intensive, knowledge-based employment will also have a significant impact on the distribution and career trajectories of graduates. In some cases this may lead to an erosion of the skills base in regions characterised by an outflow of graduates and the continuation of a low skill equilibrium as is experienced by the North East of England.

Graduate retention is an important mechanism through which regions retain people with skills, enterprise, innovation and management capabilities. However a region's ability to retain its graduates depends on a variety of factors such as the migratory forces that pull graduates from the periphery towards the core; the evolution of occupations within regions; the embeddedness of employment issues within university agendas; and the origins and socio-economic backgrounds of the student.

The overwhelming impression conveyed by many of our case studies is the strong migratory pull from the periphery to the core and the high percentage of students who stay in the core region once they have been educated there. In many cases this is influenced by better job prospects, a higher salary, uneven growth in service sector economies and established clusters of knowledge intensive activities

It is clear from Irish case studies that in Ireland there is an accumulation of human capital in Dublin, both in terms of retention and attraction of highly skilled labour from other parts of the country. The figures suggest that not only is the intake of Dublin universities largely Dublin based but that the output in terms of graduate employment is overwhelmingly Dublin located. The Shannon region is much less successful in holding on to the fairly high percentage of students who attend the University of Limerick from the local area. This 'weakness' of the Shannon region has been well documented in studies of the region's recent development, Dineen (1995) suggests that 'the problems of peripherality in the Shannon case include emigration and the internal migration pull to the capital city as well as the traditional dependence in these parts on agriculture as a source of income and employment.' This Dublin attraction effect occurs in spite of concerted efforts in the Shannon region by actors such as the University of Limerick and Shannon Development and reflects a number of factors such as the rise of the Celtic Tiger, the shift to high tech serivces and the opportunities created by the rapid increase in the numbers and types of service related employment in Dublin including areas such as software development, financial management and teleservices.

This result is mirrored in our two Australian case studies where the figures indicate that Southern Cross University, draws around 50 per cent of its students from the local North Coast Region, but can only retain around 20 percent of its graduates and only around 13 percent in the Northern Rivers Region. There is therefore a considerable leakage of graduates from the University out of the local region. One of the prime destinations for graduates appears to be the Sydney metropolitan area, which accounts for around 30 percent of the destinations for recent graduates. There appears to be considerable difference between the capability of metropolitan and non-metropolitan regions to be net retainers of students in Australia. The three Adelaide based universities in South Australia consider that approximately 80 per cent of their graduates find employment locally. The Australian Capital region is also successful both in retaining and attracting graduates from other parts of Australia with about 70 per cent of graduates finding employment locally.

Again in the UK, a large proportion of graduates from London universities go on to get high skill jobs in London. Previous work on the graduate labour market in London indicated that there is a strong pattern of relocation to Greater London for a graduate's first job, with those coming from regions closest to the South East being the most likely to relocate. It remains the case that many of the best jobs are still located in London and that this will attract many of the best graduates to relocate there to get them. Research from the Dept of Economics, Newcastle University suggests that since 1985 London remains the only region that is a net importer of graduates.

In countries for which data was not available there was still an indication that core regions gained most from the migrating patterns of graduates. For example the metropolitan region comprising the capital Helsinki 'has gained most from the migration of graduates from other parts of Finland, mainly due to better job prospects in the south of the country.'

Although Dutch universities are not obliged to hold records on student destination, several studies conclude that a relatively high percentage of Amsterdam graduates remain working in the region. One such study suggested that 59% of graduates from the Faculty of Economics, one of the biggest faculties of the University of Amsterdam, find a job in the region of Amsterdam. Although student destinations are not known in Greece there is a sense that most graduates like to start their careers in large cities especially Athens.

There is a sense therefore that universities act as mechanisms to equip graduates both to take up better jobs, but also to take up opportunities involving inter-regional migration, even where students are attending university in their home region. A key issue is therefore what measures are being adopted to encourage local embedding of graduates in order to facilitate local employment.

5 The social shaping of knowledge workers

One specific form of institutional linkage between universities and the knowledge-based development of their regions is the social shaping process (Mackenzie and Wacjman 1985) by which some university students become graduate knowledge workers for key professions in their regions. In particular, we compare and contrast the social shaping of two types of knowledge workers: accountancy and computer science graduates. The choice of these two types of knowledge workers for the analysis is based on a number of factors. While there are theoretical aspects to the accountancy and computer science fields, both are primarily practical university disciplines focusing on applied knowledge geared more or less to the economic realities of their markets and professions. At the same time, accountancy is one of the classical, nineteenth-century professions and computer science is a very modern occupation seemingly in the process of both the certification of its knowledge and the professionalisation of its membership. Yet both occupations have been changing rapidly in terms of their economic structure and knowledges: accountancy through the transcendence of the national basis of the profession by international and European calls for harmonisation driven in part by the emergence of global multi-dimensional firms (Blake and Omat 1993; Nobes and Parker 2000; Nobes 1992); and computer science even more rapidly through the collapsing of boundaries between information communication technologies, the globalisation of the internet and the rise of 'new economy' transnational firms among others (Ceruzzi 2000; Randell et al 1994).

This raises a question about the extent to which these recent global, European and national changes in the occupations of accountancy and computer science are being incorporated at the university level in areas such as curricular design and the knowledge basis of the curricula for the production of graduates in these two disciplines? At the same time, if universities as knowledge suppliers are becoming increasingly involved in their region's development, this raises the further question about the extent to which the curricular design and knowledge basis in the production of the accountancy and computer science graduates reflect the regional development role of universities?

The empirical research examined both the type of social shaping involved in the design process and to a lesser extent the knowledge basis (or the mix of global, European, national, regional and local structure and content) of the curricula for specific degree courses at universities in a region. The empirical results are clearer with respect to the shaping of the curriculum design process and less reliable with regards to the knowledge basis of the degree courses. As discussed below, the reports suggest that the curricular design process for university degree courses varies depending on the type of national higher educational system, the type of university, the faculty or department, the individual staff member as well as the nature of the markets and profession for a particular discipline. These variables also have some bearing on the knowledge basis of university curricula for degree courses which differ largely in terms of the international or global, European and national shape of university curricula.

For example, there tends to be more national state shaping of at least a core university curriculum in state equality systems, while the curricula tends to shaped at the faculty, departmental or individual staff member in state liberal systems in line with 'traditional' university autonomy. Further, the quasi-academic autonomy of state liberal systems allows curricular design space for some external shaping of university courses by, for instance, key external actors in private and public organisations, particularly for more 'professional' or 'vocational' degree courses like law, accounting, medicine or social work among others.

To a certain extent, the knowledge basis of the university degree courses follows this state equality/state liberal system pattern. Specifically, the greater degree of university autonomy in state liberal systems provides relatively more flexibility in the knowledge mix of the curricula including more space for regional knowledge geared to regional structures and issues. Correspondingly, the greater degree of national shaping of university curricula in state equality systems provides more national homogeneity of course structure for university degree programmes as well as more national based knowledge content. Yet, even national core curricula may be shaped according to European or global structures and content depending on the politics of the design process, the comparative commonality of knowledge content in a specific field and the relationship between these and the nature of the markets as well as profession for the chosen field.

For instance, with respect to the politics of the design process, the German introduction of Anglo-American BA/MA degrees with a modular course structure on top of the present 'German' degree and course structure has been explicitly justified n terms of both European harmonisation and global competitiveness (Kunzmann and Tata 1999). Further, while there are identifiable national 'traditions' in many disciplines (such as German, French and British sociologies), academic knowledges in

general still aspire to be ‘universal’ in Enlightenment modernist terms - in spite of what post-modernists claim - or at least globalisable in the sense of being understood and debated by other academics within similar fields across the world. At the same time, the spatial pattern of particular academic knowledges as well as the shifts between national, European and global knowledges remain very much language based with English dominating ‘global’ academic knowledges and English, French, German (and possibly Spanish and Italian) being the main ‘European’ academic languages. The remaining EU treaty languages of the smaller member-states (such as Dutch, Danish, Portuguese and Greek) are for the most part national academic languages only.

Finally, with regards to disciplinary markets and professions, the reports indicate that the knowledge basis of computing courses across the universities in both the state equality and state liberal systems tends to be more globalised, reflecting the globalisation of the computing industry driven largely by American multinational computer firms. On the other hand, the reports show that the knowledge basis of accounting courses in the project’s universities is predominantly national, reflecting the national structure of the accounting profession. Yet, this national basis of the accountancy profession and university curricula is facing increasing institutional demands for greater European harmonisation at the EU level as well as international standardisation driven again largely by American multinational ‘accounting’ firms.

What the reports do not indicate, however, is a high degree of regional institutional and key actor involvement in the shaping of university curricula, or of a regional knowledge basis to, the curricula at least with respect to accounting and computing degree courses. In fact, the results show that overall there is little to no regional shaping of, or a regional knowledge basis to, the curricula for degrees in the fields of accounting and computing across the universities in the sixteen regions of the eight nation-states in the project. What regional influence there is appears mostly in the state liberal systems, yet even in these cases the university’s contribution to regional development seems at best an indirect outcome of the production of accounting and computing knowledge workers, particularly for global, European and national core regions with more developed business services and computer industries.

5.1 The national shaping of accounting

That the national embeddedness of the profession has become so normal and almost banal is evidenced by Nobes and Parker’s (2000, 7) remark that ‘until quite recently, accountants have tended to discuss accounting problems on a national basis only, paying little attention to practices in other countries’.

It is not surprising, then, that two recent textbooks proceed to list and discuss a number of factors - eleven in the case of Blake and Omat and eight in the case of Nobes and Parker - that ‘determine national practice’ (Blake and Omat 1993: 10). While there is considerable overlap in the detailed discussion of these national factors in these two textbooks, Nobes and Parker are clearer in ranking these factors in terms of apparent importance in determining national practices. For them, providers of finance is the key factor with ‘equity’ countries being characterised by ‘large numbers of companies that rely on millions of private [outside] shareholders for finance’ (20). On the other hand, ‘credit’ countries are typified by a smaller number of companies controlled [on the inside] by banks, the state and/or families who largely provide the finance (20-1).

Of the eight nation-states studied, three can be characterised as credit/insider countries (Germany, Greece and Spain) and three described as equity/outsider countries (Australia, Ireland and the UK) with the Netherlands straddling the divide and Finland not being classified due to a lack of data (see also Blake and Omat 1993). In this classification, the Netherlands is the most interesting case since it is 'a country with Roman law' like the credit/insider countries 'but where many other features related to accounting are like those of the United States or the United Kingdom' (28) such as being 'commercially-driven' on a micro-economic 'true and fair' judgmental basis necessitating a relatively large number of accountants (59; Blake and Omat 1993: 161-8).

With respect to this report, though, two of the most important factors in this classification concern taxation and the role of the profession. Taxation is important because the relative conflation of state taxation regulations and accounting rules in the credit/insider countries mirrors to a large extent the greater importance of the national state in higher educational systems based on state equality with respect to issues such as curriculum design. That is, the greater control by the state of the accountancy profession through the use of tax regulations is similar to the state's greater control of universities to achieve equality criteria - in part by homogenising curricula - in countries like Germany, Greece and Spain (even with its decentralisation and devolution to the regions).

Secondly, taxation is significant because the conflation of tax regulations and accounting rules in credit/insider countries is a factor in reducing the numbers of 'accountants' required, who are more likely to be trained as state tax experts (Nobes 1992: 20), leading to more state involvement in the education of accounting students at the university level. On the other hand, the differences between state regulations and accounting rules for companies in the equity/outsider countries necessitates interpretation and judgment by professionals like accountants, increasing the numbers of accountants required, who are trained to be more market oriented and relatively autonomous from the state, resulting in more involvement by professional accountancy bodies in the education of accounting students at the university level. As such, the role of the quasi-autonomous accounting 'profession' is much more important in the equity/outsider countries like the UK, Ireland and Australia (as well as the hybrid Netherlands in this case). In this way, the equity/outsider classification mirrors to a large extent the state liberal distinction in higher education systems in that both the universities and professional bodies like those in accountancy are quasi-autonomous from the state.

These differences do matter, however, with respect to the designing of the university curricula for accounting students. Thus, the reports show that there is much more external non-state influence mostly by the professional accounting bodies in the UK (as well as Australia, Ireland and The Netherlands), while there is almost no reported non-state influence in the design process in Germany (and the other credit/insider countries of Greece and Spain). In the former countries, though, the existence of 'external' shaping of university curricula by professional bodies does not necessarily mean 'regional' shaping since all of the respective accountancy bodies are organised nationally.

More specifically, the regional reports indicate that the curriculum design process for accounting degrees at the university level in the credit/insider countries with state equality systems of higher education like Germany, Greece and Spain are

significantly influenced by the federal state. In the German case, the university curricula for all degree courses (including the general business diploma course with a specialisation in accountancy) is largely determined at the national level through a neo-corporatist process involving the conference of ministers of science and research and the conference of university rectors which formulate the guidelines and frameworks which the universities and faculties have to consider (Kunzmann and Tata 2000b: 33). Other institutional actors which may have some involvement in this process include the conference of the faculties of the disciplines, employers through their national professional associations and professors again through their federal level professional body (ibid). The single possible regional influence mentioned in this case concerned regional level 'SMEs that have organised into a regional association' and in this way may become involved in the neo-corporatist process of university curriculum design in Germany (ibid).

As with the typology of European accounting countries, The Netherlands represents a hybrid case in terms of university curriculum design for accountancy (post-graduate) degree programmes. The Dutch system combines direct state influence in university curriculum design in accounting along with the involvement of the national level professional association of accountants as well as the big five accountancy firms. Specifically, the accountancy curriculum is set by the Institute of Chartered Accountants (NIVRA), 'in consultation with the responsible ministries and the central exam commission' (Van der Meer and Groenevelt 2000a: 84-5).

Significantly, 'representatives of the universities and the big accountancy firms have seats on this commission' while the 'representatives from the university and the big firms are often one and the same person, reflecting the fact that almost all of the professors of accountancy are part-time allowing them to be partners at the big accountancy firms at the same time' (ibid). This rather unique tripartite system of university curriculum design may be influenced by the fact that one of the 'Big Five' international accountancy firms - PricewaterhouseCoopers - has its world headquarters located in Amsterdam (84) and that the original firm (as well as the Dutch university based accounting tradition) developed in close alliance with Philips, the giant transnational company (Blake and Omat 1993: 161. 165). As such, the Dutch 'state equality' system of higher education appears to have accommodated itself to this university-business linkage by accepting representatives from both sectors onto the central exam commission to design the accountancy curricula.

This Dutch compromise has no place in the equity/outsider countries with a state liberal system of higher education or Australia, Ireland and the UK. In general, the university accountancy curricula in all three of these countries is significantly - if not directly influenced - by the various national level professional accountancy bodies which accredit, certify and provide exemptions for students passing these degree programmes. As suggested, though, by much of the literature on regional innovation systems (see, for example, Braczyk et al 1998; Florida 1995; Storper 1995, 1997), there is some evidence for the role of informal, non-institutional linkages in the social shaping of the university accountancy curricula to the extent that the regional reports delve into the black box of informal linkages. Thus, there is some evidence for informal consultations about changes in accountancy curricula with alumni working in accountancy firms, local accountancy bodies and employers associations in the six regions of the three countries, although most of these informal linkages are reported in the national 'peripheral' regions of the Northern Rivers Region of New South Wales in Australia, the Shannon region in Ireland and the North East in the UK. Yet, these

external institutional and key actor influences on the design of the university curricula for accounting in these three countries are reported to be either 'national' or 'local' and not specifically 'regional'.

In terms of the sixteen regions in total, the only 'real' regional influence on the university accountancy curricula suggested by the reports is a rather indirect and at time negative one for some regions mediated through the type of region in which universities are located. The clearest example of this is the Australian National University in Canberra, which has developed an accountancy degree programme with a 'particular emphasis on public sector finance to supply graduates for Federal Government departments' (Garlick 2000b: 34). Overall, though, the tendency is for regions to be broader and more diversified, reflecting the needs of international and the accountancy curricula in universities located in global, European and national core national accountancy firms situated in regions such as London, Amsterdam and Madrid.

However, this national and international bias in university accountancy curricula tends to have a negative effect in some European and national peripheral regions in terms of producing accountancy graduates who do not or no longer meet the specific knowledge needs of regional and local accountancy firms. Thus, in the Northern Rivers Region of New South Wales, regional and local accountancy firms have been 'critical of professional and university moves towards generalist education away from hard core technical training' for accountants (Garlick 2000a: 39-40). These regional and local accountancy firms in a national peripheral region want the 'regional university' to continue producing accountancy graduates 'who can hit the deck running' in terms of being able to do audits as well as process tax and accounting records (ibid). In this case, then, the national changes to the accountancy curricula - driven by the international accountancy firms and the professional bodies (see below) - are perceived as being detrimental to the knowledge needs of regional and local accountancy firms, which depend to a certain extent on the university to produce graduates suited to their more traditional accountancy tasks.

At the other extreme, these few cases of positive or negative indirect regional effects are offset by a number of regions - particularly in Greece - in which there is either a disjunction between the regional and local knowledge needs of firms and the type of accountancy graduate produced the universities in the region or no need at all for the type of accountant produced by the university in the region. Nationally, the type of accountant required by most companies in Greece until 'the rapid economic catching up process in the late 1990s' involved 'accountants employed in a very traditional way as bookkeepers, responsible for the balance sheets and contacts with fiscal authorities' (Tsipouri et al 2000a: 45). The rapid economic growth of the last few years has 'created a sudden need for more accountants, particularly those with knowledge of internal and external auditing, financial engineering and consulting' (ibid).

Yet, the type of accountant produced by the university system has neither the bookkeeping nor the broader business knowledge required by the more traditional or the newer companies (45, 59-60). Instead, 'Greek universities still tend to provide only the theoretical knowledge for accountants' leaving firms and the professional body to provide not only 'the basic rules of accounting' but 'training within an enterprise' in practical accounting skills (ibid). In the national core region of Attica (including Athens), this has led to a severe disjunction in particular between the

knowledge needs of modernising companies for general accountants with a broader range of business related knowledges and the type of graduate produced by the universities armed only with a theoretical knowledge of accounting. In the European peripheral region of Crete, on the other hand, there is no disjunction 'since regional companies...still only request the more traditional form of the bookkeeping accountant and have less needs for the auditing type of accountant' (45), let alone the newer type of general more broadly based accountant. In this case, Cretan firms seem willing to provide graduates with the very basic accountancy knowledge required by them to perform traditional bookkeeping tasks.

5.2 The global shaping of computing

While universities have been important social factors in the shaping of computing, probably the single most important factor until recently has been American federal government, largely through the U.S. military establishment (Ceruzzi 2000: 5-12; Flamm 1988: 2-6, 29-79). In fact, the highly developed linkages between parts of the American government like the military and private sector companies can be seen as an 'American model' for the development of a high-technology industry like computing. Significantly, Flamm contrasts this American model with European practices in countries like England, France and Germany. In particular, he remarks that during the crucial period of the 1950s, 'European governments provided only limited funds to support the development of both electronic component and computer technology' and focused 'their limited support on defence-oriented engineering and electronic firms' while remaining 'reluctant to purchase new and untried technology' (ibid). This had a particularly devastating effect on the British computing industry which had 'rivalled the United States as world leader in research' during the 1950s with its 'sophisticated computer technology base' and linkages between the 'universities and national research labs [that] fed people and ideas to industry' (134, 170).

One result of these developments in the computing industry has been a growing American domination of European (and global) markets. While the global influence of IBM has been replaced by others such as Microsoft, Intel, Dell, Compaq and Oracle among others, American domination of the global computing industry has continued through the 1990s and into the millennium.

The emphasis on the current Americanisation of computing, though, obscures the more the significant point that 'the computer was part of a global industry right at its birth and would stay international in scope as it developed' (Flamm 1988: 6). The globalisation of computing has been driven in part by the 'economics of investments in technology - relatively fixed sums spent on research and development, largely independent of the volume of sales - argued for reaching out to the largest possible market' in order to reduce unit costs and achieve 'the greatest possible return on fixed R&D investments' (ibid).

The globalisation of computing has also been shaped by the 'nature of commercial competition' in this high-technology industry which may be characterised by 'continuous investments in technology creating a sequence of temporary monopolies on new products, with rents earned on current products financing the investments required by the next round of innovation' (4). In this sense, computing is no different than other industries like pharmaceuticals and communications equipment built around a 'high-tech good...in which research and development costs, or other

measures of science and engineering inputs, are a far greater part of the value added or shipped than is generally true for industry' (2-3).

With respect to the regional reports, there is some evidence from the state liberal higher educational systems of Australia, Ireland and the UK that different types of universities cater for the higher, middle and lower levels of the national computing labour market. This is most evident in the UK where older and more traditional universities are more likely to design computer degree programmes that educate graduates for the higher end 'supertech' programmer jobs, whereas the newer and more technological vocationalist universities are more likely to train graduates for the middle and lower levels of the computing labour market or for the professional intermediary and software paraprofessional jobs respectively.

However, these differences between universities in the UK regions are more suited to the national computing labour market centred on the global London core region including the South-East in this case which contains over seventy per cent of the headquarters of the 'world's major hardware manufacturers and software/systems houses' (Conway et al 2000b: 52) rather than the regional labour market of the North-East. Thus, even though the North-East is the location of Sage and QSP, two 'locally owned software houses' that bring 'world-class products to the market' (Conway et al 2000a: 62), there are not enough computing jobs in the region particularly at the high end programming level to retain graduates who often migrate to London and the South-East for better remunerated computing jobs (63).

This issue of graduate retention is not helped by the fact that a successful regional company such as Sage is basically 'a shrink-wrap sales firm' that does not require that many programmers for product development, but instead has 'a significant customer support function which employs large numbers of non-professional staff to support customers, and to provide a front-line of staff to screen their access to the technical support staff' (ibid). At the same time, this difference between the type of software computing firm that is more likely to be located in the North-East (shrink-wrap sales with some business support) compared to those more likely to be located in London (programming development) reflects a wider national division of labour in the computing industry. The universities' role in producing computing graduates to suit this national computing market appears to contribute to maintaining instead of overcoming regional disparities.

In this way, the reports for the state liberal countries suggest an indirect national shaping of university curricula for computing graduates in terms of meeting the hierarchical national (as opposed to the regional) labour market needs of the computing industry in the UK, Ireland and Australia. As with accounting, though, the reports from the state liberal countries indicate that university computing curricula is more directly shaped by 'external' professional bodies organised at the national level especially in the UK and Australia (with emerging influence in Ireland). Thus, Southern Cross University in the Northern Rivers Region of New South Wales 'compiles the computing curriculum…in conjunction with the Australian Computer Society' (Garlick 2000a: 38), while the University of Canberra is 'seeking accreditation for the Bachelor of Engineering in Software Engineering from both the Australian Institution of Engineers and the ACS' (Garlick 2000b: 35). In both cases, these Australian universities 'review and revise the curriculum to ensure that it meets ACS accreditation and industry relevance' every two to three years (35-6; Garlick

2000a: 38). This last fact suggests the rapidly changing knowledge base of computing - at least relative to accounting (see below).

Further, the role of industry relevance raises the point that (as also in accounting) the state liberal countries show some - usually informal - involvement by private sector computing companies in the curricular design of certain university computer degree courses. This is most clear again from the UK reports where there are various levels of informal departmental contacts with the computing industry through alumni, job placements and employer visits among others, but few formal linkages such as the inclusion of computing industry representatives on departmental, faculty or university level boards to review and revise the computing curriculum. The few cases where there is direct and formal involvement of computing firms in the design of the university curricula arise from the Irish regional reports and concern masters level degree courses not the undergraduate curricula.

Yet none of these national, professional or industrial influences on the university computing curricula from the state liberal countries is explicitly regional in nature. Interestingly, the only stated example of a regional level influence cited in the reports comes from the Aachen region in Germany in which the REGINA – a 'regional industry club with more than 50 members in the computer science industry' (Kunzmann and Tata 2000a: 34) – has some influence in the normally federal level shaping of the curriculum, although the degree or practical effect of this regional influence is not specified. On the other hand, the fairly significant Ruhr regional role of the University of Dortmund's Technology Park - forming a software and multimedia industry cluster of over 200 companies and 4,000 employees - does not seem to have any direct influence on the shaping of the computing curricula at the university (Kunzmann and Tata 2000b: 44).

This lack of external non-national influence appears to be the general situation for universities in the state equality countries of Finland, Germany, Greece, The Netherlands and Spain. Yet, there are some variations within this general result such as, on the one hand, more regional state and university autonomy in Spain with respect to non-core courses while, on the other hand, more national state influence in university computing and IT degree courses in Finland in line with the state's goal of 'integrating Finnish higher education policy…to the national development programme' based on 'information technology, electronics and other selected high-tech areas of production' (Holtta and Malkki 2000b: 23). In spite of these variations, though, the relative lack of non-state external influences on university curricula in computing is similar to that for the accounting curricula with the exception of the hybrid Dutch case in terms of accountancy.

The main result, however, for both the state equality and the state liberal higher educational systems is the apparently global shaping of the knowledge basis of the university curricula in computing. That is, the reports from the sixteen regions show a high level of similarity or homogeneity with respect to at least the titles of university computing degrees and course topics across the universities, the regions and the countries in the study. Thus, university computing degree programmes in the eight countries can be largely grouped into more theoretical computer science; software engineering; and more applied electronics or information technology programmes. The range of common computing topics studied or courses listed at the undergraduate and post-graduate levels include: algorithms; artificial intelligence; computer languages (like C++ or Java); computation; files and databases; knowledge

representation; information systems; logic; mathematics; multimedia; networks; object oriented design; operating systems; parallel and distributed systems; programming; robotics; statistics and systems architecture among others.

The principal variations in these computing degree programmes and courses seem to occur between the more traditional and the more technical universities not between regions or nations, suggesting the knowledge basis of university computing curricula is largely dislocated from a specific place (such as a region, nation or Europe). In this way, the reports indicate that the knowledge basis of university curricula in the eight countries studied is primarily global reflecting the globalised nature of the computer hardware and software industry at the present time. At the same time, the institutional moves towards certification of computing knowledge and professionalisation of the occupation in the state liberal countries hint at a longer term shift to an increased national level shaping of the university computing curricula as in the 'traditional' profession of accountancy.

Yet, increased national level shaping by professional computing and engineering bodies may not lessen the global knowledge basis of the university curriculum particularly if the computer industry remains dominated by global American companies that largely set the standards and basis of the knowledge required by computing graduates for the computing labour market. In this way, the global knowledge basis of the computing curriculum has implications for the mobility of computing graduates relative to those from accounting. That is, university computing graduates are more likely to be globally mobile since their knowledge base is more globalised and hence more transferable across nation-states compared to most accounting graduates with their nationally based knowledge, except perhaps for those trained in the international accountancy firms. From this perspective, the international accountancy firms like the 'Big Five' are actively creating a global component to the knowledge base of accountancy graduates, and in the process producing a more globally mobile accountant - at least at the higher end of the profession.

5.3 Conclusion

The evidence from the UNIREG regional reports and thematic studies suggests that there is very little regional influence - from regional institutions and key actors – with respect to the social shaping of university accounting and computing curricula in the sixteen regions of the eight nation-states involved in the project. Further, the reports indicate that even in the cases in which there are formal or informal university-regional linkages, these linkages do not necessarily shape the knowledge basis of the university curriculum. Instead, the significant external institutions and actors in terms of the social shaping of the university curricula for accountancy and computing are at the national, European and global levels. As such, while there is evidence for the influence of 'external' institutions and actors on the social shaping of the curricula for these two disciplines, this influence is not situated at the regional level.

This does not mean, however, that universities have no effect on the development of accountancy and computing in their regions. At the very least, the external national, European and global influences have to be mediated through the university in the region with respect to curriculum design and the knowledge basis of the curricula or, more specifically through individual faculty members, departments, faculties or national state bodies depending on the type of university system as well as the type of university. This very significant 'internal' or university social shaping of the curricula

can directly effect the production of graduates for accounting and computing companies located in the university's region, for example, in terms of matching labour supply with demand in numbers, types of accountancy and computing graduates as well as the knowledge basis of the workers in these occupations.

Further, this matching or mismatching of the supply and demand of knowledge workers between universities, accountancy firms and computer companies has some impact on the region's development. Thus, at its simplest, universities may provide the qualified labour such development requires and, importantly, some of the knowledge workers for knowledge-based regional development. In this sense, it is more important to know if and how the knowledge embedded in the university accounting and computing graduates is used in the region for some form of regional development than whether the social shaping of the knowledge is national, European, global or regional.

6 Universities and regional innovation systems

6.1 Introduction

The contribution of universities to innovation activities in their regions is well researched at the level of case studies, but the emphasis tends to be placed more on individual mechanisms than on the various roles of the university in the regional innovation system as whole. In this section the emphasis is on the range of roles played by the universities in the regions studied, and particularly the interactions between regional and national systems.

Support for innovation in business is perhaps the least controversial area of university regional engagement from a policy perspective and has been subject to considerable international transfer of policy lessons. However there are three key questions to be addressed here

- Do different national systems of HE encourage and adequately resource these activities, and provide appropriate institutional governance systems?
- Do the national systems support interaction with regional innovation systems as distinct from national orientation, and is there dedicated incentives and funding for such initiative?
- How do universities negotiate with local governance systems to deliver mutually desirable policy outcomes?

6.2 National HE frameworks and regional innovation systems

We have already noted the importance of national higher education regulatory systems for the effect on patterns of recruitment of students. Innovation systems must encompass the nature of human capital development, but our focus here is on more direct support for industry through research and technology transfer. National frameworks have a number of specific points of relevance here:

1) The regulation of the appropriation of knowledge – how do universities or their staff appropriate and thereby control the ways in which their knowledge and discoveries can be valorised economically?

2) The role of universities in national research and innovation policies – are universities seen as an economic development motors nationally or regionally, and therefore are they encouraged through public investment and regulation to collaborate with industry?
3) The distribution of research resources across universities – are there differences in the level of research intensity between universities, and how do these differences map out across the regions?
4) How is research in the universities funded? – is it primarily nationally funded or is there a significant regional element and what are the implications for the scale and orientation of research in the universities in different regions?

The question of appropriation is the most fundamental as it lies at the heart of institutional autonomy and freedom, and the public good nature of university research. At one extreme, the Anglo-Saxon model of universities sees the state as a part-funder and regulator of universities, which are independent non-profit bodies. Regulatory control varies but typically permits universities control over their own activities, including intellectual property and freedom to engage in a range of income-generation activities. Thus universities may benefit financially from the stimulation of spin off companies, contracts with industry, commercial property development etc, subject only to the limitations implied by non-profit status where applicable. In this model governments may seek to encourage greater participation in innovation through various grants and incentives.

At the opposite extreme, the state-controlled model sees universities as publicly controlled bodies subject to direct state control, delivering state objectives in teaching and research, but restricted as to commercial activities and in some cases even restricted as to ability to exert ownership over intellectual property. In this model the universities are unable to enter into economic development activities for income generation as their budgets are state-managed. If there is any direct contracting with industry or IP exploitation it tends to be done by individual professors through consultancy operations.

In reality the state-controlled system has been modified in most countries to enable some interaction with industry, whilst the Anglo-Saxon model moves further into a set of marketised relationships, including those relating to core government funding. Thus although rights over intellectual property are now well established in Anglo-Saxon systems such as the UK, Ireland and Australia, there have been developments elsewhere to encourage university IP ownership. Yet in Germany still the universities do not own IP, but it is left to individual professors to patent and licence their inventions.

This question of institutional autonomy links also with the role of universities in national economic development. The role of the universities can be seen in two dimensions – the role of state-funded institutions in innovation and economic development, and the balance between universities and other organisations in the state-funded sector. All of the countries within the study recognised to some degree the responsibility of the state in innovation, although with varying levels of investment. The primary difference however was in the importance placed on non-university organisations. In Germany the universities are but one of many state-funded research institutions, and economic development is more centrally seen as a role for the Fraunhofer centres and Fachhochschulen. So universities' role is seen

more in terms of teaching and basic research. In contrast in Ireland the universities are the primary research and innovation institutions due to a relative absence of other state funded bodies. In Spain and Greece the universities are important in quantitative financial terms, but a historically low level of involvement with industry as a result at least in part of strong state control means that a new emphasis on innovation is resulting in a parallel process of university reform and the creation of new intermediaries.

Questions of the distribution of research resources have a fundamental effect on regional development at several levels: through the direct economic impact, through the spillovers arising from spin offs and labour market interactions, and through wider effects on indigenous and exogenous development strategies. Typically, countries with a primate city and structure and centralist government have seen highly concentrated R&D within the university as well as government and private sectors.

This has certainly been true of Ireland, Greece, Finland and to an extent Spain and the UK too. Only Germany, Netherlands and Australia have had a more balanced distribution of research resources due to a mixture of federalist policies (in Germany and Australia) and a concept of equality among universities (in Germany and Netherlands). Changes in the university system in recent years have in some cases ameliorated these imbalances with the development of new provincial universities, although often with relatively low research budgets, although there may be some new universities established specifically with a research and economic development mission.

The UK and Spain are more complex though. In the UK there has been for many years a widely dispersed system of universities, reinforced by 1960s expansion and the unification of the university and polytechnic systems ion 1992. However despite all regions containing some research excellence, the quasi-market funding of research, based on research assessment, has the effect of concentrating research resources, with 33% going to just 5 institutions in London, Oxford and Cambridge. In Spain also there is a wide distribution of universities with new institutions established in the 1980s and 1990s. The move to regional funding has increased regional R&D capacity, but the historic dominance of Madrid continues alongside Barcelona.

Thus regional variations in the ability of universities to meet the aspirations of their regions in terms of research infrastructure and orientation towards regional innovation systems remains subject to national university policy.

6.3 National programmes for regional innovation

Given the national funding of most university systems then engagement in regional innovation systems is invariably underpinned by national funds, whether general university funds or more specific regional programmes. The latter has been a growing element of the university policy framework in recent years as governments have sought to encourage universities to support SMEs, usually within the local region, and to address regional economic disparities through innovation programmes.

National funding for regional innovation has tended to fall into three categories

- National programmes to encourage innovation involving collaborative activities and implementation in each region.

- National strategic developments in selected regions only, to foster centres of excellence, often in disadvantaged areas.
- National funding for regionally-initiated schemes.

The latter of these will be discussed later, but the first two are our present focus.

National programmes for regional innovation have taken on a wide variety of forms. One dimension is the nature of the support – research infrastructure, technology transfer, graduate placements, consultancy, demonstration sites – the variety is extensive. Another dimension is the institutional orientation – whether project based (often departmental), university level, or based through independent intermediaries or university consortia. A third dimension is whether there is a competitive process or a fixed allocation to each university or region.

The UK shows this trend most clearly with a number of nationally funded programmes for encouraging greater interaction between universities and business. Although to some extent funding is not specifically earmarked for interaction with regional rather than national business, in practice most universities see such national funding as primarily involving regional interaction. The schemes concerned include the Science Enterprise Challenge promoting science-based spin offs and entrepreneurship and largely implemented through regional consortia, and Higher Education Reach Out to Business and the Community (HEROBC) which is largely focused on individual universities and promoting their business interactions. These schemes are supplementing a number of locally and nationally funded collaborative research and business support programmes, by encouraging a more strategic focus for university-business interaction, with new outreach offices, incubators, venture funds and programmes for cultural change within universities.

Elsewhere national networks of technology transfer offices have been established such as the Spanish OTRI centres, but the general emphasis is perhaps more on changing the nature of the university than on providing a focus for regional innovation system development.

Ireland provides an alternative example where national funding has been focused on a specific development pole. The University of Limerick has a number of programmes which directly relate the region to its research policy but the role of the regional dimension in UL's research and technology transfer strategy is perhaps best exemplified in institutional form through the National Technological Park or NTP.

The NTP was founded in 1984 as 'the country's first science/technology park' through a joint partnership between Shannon Development – a government agency, local agencies and the University of Limerick. The structure of the NTP board 'works together around linkages between academia and enterprise' with 'Shannon Development representing the University of Limerick and other development agencies'. Specifically, 'a central activity of for the Park's management is to ensure optimum usage of University facilities and services by client companies, for example, use of University library facilities, participation in Co-Operative Education Programmes and links to university research activity'.

The Park itself is managed by the National Technological Park Plassey Ltd., a wholly-owned subsidiary company of Shannon Development. Currently, the Park is home to more than 90 separate organisations including multinational subsidiaries, Irish

technology companies, R&D entities and support services employing over 3,000 people.

The NTP's 'balanced blend' of overseas and indigenous science and technology companies suggests that the Park provides more than simply a regional dimension to UL's research and technology transfer strategy. This balance reflects the university's overall research policy (as well as institutional ethos) which incorporates local, regional, national, European and global dimensions ideally for the benefit of the region. Thus, the NTP is the home to 'overseas companies that use the National Technology Park as their European base' as well as a 'vibrant [indigenous] sub-supply sector and a concentration of new, Irish high-technology companies' (ibid). While linking these overseas and indigenous companies together, 'the whole thrust of the Park's development has been to harness the technology resources on the site - and particularly those at the University of Limerick campus - towards the needs of enterprise and economic development'.

6.4 Localised innovation initiatives

The third dimension found in the case studies was a primarily regional set of interactions. Two cases will be explored in detail here: the North East of England where interactions were focused around the regional Structural Funds partnership, and the Dutch Knowledge Circle approach.

In the North East of England, the availability of Structural Funds and a concern within the Government Office for collaboration between the universities in the region led to the idea for three regionally-oriented centres based on the needs of particular groups of firms or industries. Each centre was to be located in one of the three urban areas and should underpin the main specialisation of that area such that university and industrial expertise could be brought together to ensure optimisation of innovation and improve firm and regional competitiveness. A plan emerged loosely under the title of the 'Three Rivers', referring to the Tees, Wear and Tyne on which the three main conurbations of the North East, Teesside, Sunderland, and Tyneside are located. The plan was supported by European Structural Funding.

On Teesside, the European Process Industries Competitiveness Centre (EPICC) is based around Teesside University. TU underwrote the creation of the Centre, which received European, SRB and DTI funding as part of its remit to address the particular needs of the process industry (encompassing steel, chemicals and the water industry). The industries were going through rationalisation at a time when there was a need for increasing levels of innovation. Rationalisation had to be sensitive to the need for sufficient human resources correctly organised to encourage innovation, and EPICC assisted through the provision of specialist training in process engineering management, including a formal M.Sc. programme and a series of multi-company interviews, as well as more ad hoc training arranged for particular groups of firms.

The Centre for Achievement in Manufacturing and Management (CAMM) in Sunderland was created to offer similar support services to the high volume manufacturing industry, chiefly but now exclusively represented in the area by the automotive industry. The Centre was renamed the Institute for Automotive and Manufacturing Advanced Practice (AMAP) with a stronger focus on manufacturing in the region, although the links with the automotive sector remain through involvement with Nissan suppliers.

The third centre was to be a centre for engineering, and was to be based on Tyneside related to the existing Engineering Design Centre in the department of Marine Engineering in Newcastle University. The EDC was already operating a club structure for local and national companies wishing to benefit from its research, and had extended its activities through the Regional Centre for Innovation and Design. Each of the centres has enjoyed some degree of success and managed to outlive the initial seed funding.

The North East was also the first UK region to form a university association in the form of Higher Education Support for Industry in the North (HESIN). One of the specific projects to emerge from HESIN, and indeed carried through into a successor organisation, Universities for the North East, was Knowledge House (KH). The idea behind KH was that SMEs faced a range of barriers in accessing the knowledge resources of the universities. In turn, this created barriers within the regional innovation system, and discouraged regional university/ SME collaboration.

KH was created in 1995 specifically to overcome these barriers, and to increase the amount of technology transfer taking place between local firms and universities. The purpose of the scheme was to create a structure which suited SMEs looking for some particular technical service. The main barrier an SME faces in contacting a university in search of such as service is the lack of knowledge of whom to contact. Therefore, KH offered the benefits of a single point of contact for all five universities. KH can be accessed via a central node, based at the Regional Technology Centre in Sunderland, or any of the five university nodes. The initial enquiry would then be sent out to the relevant people at all of the five regional universities, inviting them to suggest academics that could address the identified need. Each university has a co-ordinator responsible for ensuring that the leads are disseminated to the correct contacts. Ideally KH will be able to offer the SME a choice of academic consultants and will facilitate a meeting for the firm's managers to meet with and select the most appropriate person for their needs.

The Structural Funds provided a small amount of funding for the academic involvement. Although the level of support provided was small, it has also been sufficient to overcome the inertia that academics are faced when asked to divert effort away from their core research activities.

The second example here is drawn from the Netherlands where despite the weakness of the regional governance system, the universities have a tradition of close working with local and regional partners.

The University of Twente has a long tradition of institutionalising its relations with the local and regional environment. In accordance with this 'entrepreneurial orientation', the university has made a determined effort to set up working links with the region, especially in the field of regional innovation and knowledge transfer. In partnership with other institutes in the region engaged in economic development, the university has established a variety of special bodies and initiatives to deal with links between the university and the community. Together these links form quite an impressive liaison system. It must be stated that a major contribution to this liaison system has been the role of subsidies from the European structure funds in the light of the Objective two status of the Twente region.

Besides its role as technology provider, the University of Twente also helps local firms in improving networking strategies and identifying their demands for

innovation. They play a role in the governing of regional innovation strategies by providing intelligence, project management skills etc.

The initiative for the Knowledge Circle Amsterdam (Kenniskring Amsterdam) originated with the province of North Holland, the universities and higher education institutions, the Chamber of Commerce, the Innovation Centre, and the municipality. The Knowledge Circle is meant to be a regional discussion network in which higher education, regional institutes related to economic development, the municipality and the regional business community all participate. The main aim of the Knowledge Circle is to achieve a better use of knowledge available in the Amsterdam region, by periodically bringing together the participants mentioned above. In this way, the purpose is to stimulate networking between these actors in order to achieve higher levels of information exchange. Participants meet several times per year to discuss certain themes, for example medical technology or environmental management, or they visit a certain business sector in the Amsterdam region. The purpose of these meetings is to create opportunities for further knowledge transfer, not to work on the transfer project itself. The intention is that on the basis of these meetings smaller separate projects will develop. Until now, its participants have regarded the network as a success. It still shows a low representation of the small- and medium scale business sector. It also appears that although the university is a participant, the meetings held show only a very minimal representation of university staff.

6.5 Integration and innovation

These examples drawn from the case study regions show two main trends that are taking place within the university-industry interface at the regional scale. First, the patterns of interaction depend on a mix of three different scales of policy outlined above. In each region the nature of the specific role of universities in regional innovation systems depends on how they have combined with the strength of regional governance and local institutional thickness. Regional institutions have displayed different levels of capability and opportunity to make use of national frameworks and funding as part of negotiated regional strategies.

Second, individual institutions have sought to combine resources and programmes at the different scales to construct integrated innovation support infrastructures. Often this creativity is left to the individual staff of university departments, but increasingly universities are building specialised units to manage the configuration of these external relations.

7 The role of universities in regional information society initiatives

A special element of regional innovation and learning is the development of information society. Considerable policy effort in recent years has been dedicated to developing ICT-based applications in order to promote new economic activities, to overcome the problems of peripherality and to enhance various forms of public service. As part of these diverse activities universities can play a number of roles, either through their own direct use of ICTs or through their support of regional initiatives. This chapter examines the extent to which the universities in our case study regions assist the development of the information society in their regions.

7.1 National and regional IS strategies

In the cases studied a variety of countries and regions with different approaches to the IS were encountered. National environments are partly but not totally connected with the level of economic development. Computer penetration, internet access, web-sites and portals, use of IS-applications and all that constitutes connectivity indicators seem to be higher in advanced countries.

At policy level it seems that more advanced countries are also more concerned on safeguarding competition rules, even in a case like the information society where market pull remains limited, at least for some specific applications. This does not mean that even in those countries there are no public interventions for either supporting new technologies or less favoured regions, in the case where market failures are fully justified and networks externalities are still limited. On the other hand in the cohesion countries it seems that implicitly or explicitly national policies tolerate the public sector undertaking more consulting or market services, in an apparent effort to stimulate the IS, despite market failures, which extend to a much broader scope than in advanced countries. This latter attitude gives universities a much higher degree of freedom.

Dominance of market orientation	***More emphasis on public support*** *with some concessions in competition rules*
UK	Ireland
Germany	Greece
The Netherlands	Spain
Australia	
Finland	

Accepting the dominance of the market orientation is not identical to limited public intervention or the absence of national strategies. One should distinguish a different dimension, as far as the type and scope of public intervention is concerned. The four developed countries have an explicit national strategy, adopted in all cases before the mid' '90s, with Germany distinguishing itself by giving a much stronger role to the level of the Land. Another relevant distinction between the strategies is that while the core countries have rapidly turned from an infrastructure orientation to hardware plus application/content (soft) strategy the cohesion countries at the national level are still very much ICT-oriented. Applications and content are either less supported or concentrated at lower (regional, local) or different (market) levels of conception and implementation.

At the regional level things are less clear, a proof that the efficiency of public management and proximity matter a lot and may change the average patterns. To start with we had to distinguish the administrative or cultural coherence of each regions:

There is no reason to believe that regional autonomy is in any way connected to the level of initiatives for a regional strategy, the level of activity towards the IS within a region, or even the funds allocated:

1. The level of IS maturity (strategic or project oriented), measured with connectivity proxies, is ceteris paribus high in the capital cities than in the other regions studied.
2. The level of maturity is higher in regions within advanced countries than in the cohesion countries; this is compatible with earlier academic work. Yet, the classification above relates regions at European level, some of the regions studied have a well-above average national performance, despite their lagging behind in European terms.
3. Overall activities are increasing and they are systematically more important as time goes by, even in regions with low connectivity. This tendency to close the gap should, beyond any doubt, be attributed to the CSFs. Where the presence of the CSFs is high public intervention is as high or higher than market-driven initiatives.
4. There is no correlation between the existence of a regional strategy and explanatory variables like maturity of the national market, capital/rural or core/periphery. Capital cities (with the exception of the least developed Athens) do not have an explicit strategy, it is more the non-capital regions study that demonstrate such strategies.
5. In the regions where a strategy exists it is either triggered through incentives (RISI, like in the North East, Shannon and Attica) or it has strong bottom-up elements with initiatives from the local/municipal level. This raises an important question about the appropriateness of the regional level as an IS-strategy designer.
6. The level of maturity and current activity is not correlated with the existence or absence of a strategy. Regions without a strategy have a rich number and variety of projects, market-led or publicly funded, on a case-by-case basis rather than from a centrally co-ordinated budget.
7. From the core regions demonstrating a high level of activity and top maturity only one has a strategy. As these regions belong to countries that give a stronger emphasis to the market forces, it is not surprising that central planning is less pronounced.
8. Of the three LFRs, namely Crete, Shannon and Andalucia, all three of them demonstrating an above national average performance, one has an explicit strategy the other two don't. One may argue that the one with the regional strategy has performed better, yet the spectacular growth rates of Ireland and the efficient management of Shannon development may be the explanation behind the success, rather than the existence of the explicit strategy itself.

These remarks were important because they condition the environment to analyse the issues of:

- the interaction between national-regional-local level and how they can best articulate, and
- how do these very different environments favour/discourage the role of regional universities.

An enabling national environment and a developed economy offer regional actors sufficient opportunities to act and regional government limits themselves to specific

projects that are of interest to the region. This is most pronounced in the case of the capital cities, where the borderline between national and regional is usually difficult to draw: very important projects are developed in the city, possibly piloted in it, but their ultimate goal is a nation-wide application. In this context universities are well positioned to bid for, or co-operate in, those specific projects which are state of the art, and it is the new frontier knowledge of the universities that makes them a key partner. But it is individual ICT skills that are needed and not an active university strategy.

Things are different in less market-led environments, where regional initiatives or individual projects have a diffusion, rather than a radical or incremental innovation, content. Here skills from all faculties can be used and an active involvement of the university can influence regional development.

The role of the university in this context can thus be different and positive in all cases:

1. It can be a ***formal adviser to the region***, in a broader strategy, playing in parallel a role in implementation: the cases of the North East and Shannon are typical. The effort to play a formal adviser's role when the regional authorities are not mature may constitute a waste of resources, in which case it is better to concentrate on a project-based role, as the Athens case demonstrates.
2. If there is no regional strategy, but financial opportunities are offered at the national/EU level, individual university teams can offer ***ad hoc direct services to society***. While one may argue that in this case the university, as a publicly funded actor, may alter the rules of competition, the market failure argument applies. Particular examples of this kind identified were
   - Create awareness for the general public (diminish the risks of exclusion)
   - Train the civil service
   - Support companies (access to the Internet to e-commerce)
   - Support networks of smaller companies (take advantage of reducing barriers to entry)
3. The university can also offer ***indirect services***, working on ICTs, with specific code, framework and platform developments, ensuring privacy of personal information and making transaction secure. University teams of high quality, participating in national or trans-national networks, have no direct influence to regional development, but skills are maintained for future needs.

In conclusion in the very different environments studied both ***institutionalised and ad hoc roles of universities*** were found, with different degrees of involvement and efficiency. No universal patterns appear, but what is clear from the above remarks is that the environment determines to some extent the role a university can play, and that individual or institutional behaviours can amplify this role substantially. This is why it seems more important to turn to individual organizations and projects and learn from these experiences.

7.2 Internal university organisation

All universities studied make extensive use of IS tools. Comparing the regional maturity with the internal facilities of the HEIs there is no doubt that they make well

above average use, out-performed only by multinationals and large national businesses.

All universities studied were found to dispose of the necessary infrastructure, have internal tele-education and tele-work facilities and many of them have started offering important value added services, going beyond the offer of simple access to internet and e-mail facilities and a rudimentary web-service. The merits were even more important for multi-campus facilities. Universities in core regions were connected earlier (late'80s or very early '90s) and upgraded in the late '90s, while their counterparts in LFRs only caught up later. In isolated cases improvements in infrastructure are needed and are in the process to be made. The Structural Funds have played a key role in this catching up process.

Thus, at this point of time it seems that more than ICT infrastructure it is relevant to concentrate on ***applications, content and use*** rather on infrastructure. Applications and content are seen to be more the responsibility of individual teams, while the extent of use of facilities can beyond any doubt be strongly encouraged by central board policies.

It was found that a wide variety of applications are undertaken within universities on a project basis. Dynamic researchers from all disciplines are creating databases, use IS tools for their research and international collaborations and apply telematic means. Central tools like access to libraries and international publications etc are schedules in all universities but their degree and quality of implementation varies. The content varies in quality in general but the incentives offered proliferate rapidly and one can assume that there are no major problems associated with that level. The key for the future of the exploitation of the IS internally lies in extensive use of these facilities.

7.2.1 Tele-education: the potential for diffusion

Tele-education can mean the provision of on-line teaching materials for 'traditional' students or the provision of remote access to on-line materials.

References to tele-education are given in most of the cases studied. All universities have an on-line access possibility and individual faculties, teaching staff or research teams prepare remote courses for students. This includes specific Audio and Video Resources, production of audio and video and multimedia teaching materials, Internet applications to support teaching, research and dissemination of activities.

In the UK and Australia in particular there are very ambitious plans for e-learning currently, both at a regional and at the international scale. Sunderland University for example has been committed to the use of telematics for delivery and support of learning for some time, and has developed a number of on-line telematics projects to assist in the study of for example languages, sciences, literature, art, software and technology skills, with also 'learning support' to enable students to develop their learning skills for example the 'telemath project,' delivers maths worksheets telemetrically via the Internet.

Another interesting case is reported in Northern Rivers, Australia, where the development and delivery of online courses using an integrated course delivery tool has been trialled in three disciplines during 1999. The online program refers to the delivery of units that are delivering primary course materials via the Internet, which exploit the interactivity capacity of the technology. The University is currently evaluating options following the trials. The preferred option is for an integrated

online course delivery shell that would be the centrally supported online environment of the organisation. The architecture of the system envisaged would comprise a number of tools/ modules embedded within a web interface.

However, in the majority of the cases reported tele-education exercises were less ambitious. The impression gained is that for enrolled students tele-education is promoted only at individual pilots and as a test of infrastructure rather than as an alternative mode to traditional teaching. The human factor is found behind the rapid improvement of infrastructures and it is suggested that tele-education strategies makes an issue for discussion in university boards with the help of disciplines like pedagogy and psychology to help ambitious visions and give the opportunity to create new curricula or new tools, making teaching more innovative.

7.2.2 Tele-working: the need for internal transformation

Like with tele-education most universities offer students and staff the possibility to work from home through dial up access to the university centre. The necessary infrastructure exists everywhere, but low and unsystematic use is made, more in the UK and Germany that in other national environments. Compared with big companies (who prefer to save space and where tele-work has been most advanced) universities have no tele-work strategies but tele-work facilities. An interesting remark reported in more case studies in all kinds of regions is that students make more use of tele-working facilities than staff, indicating again that the real bottleneck is the human factor. The younger generation, acquainted already at school with ICT facilities is more open to change.

Beside the strategic and human barriers for tele-work the telecommunications cost may constitute and additional problem. If left to the discretionary power of staff the telephone cost may be an issue considered. The German government seems ahead of others in that respect, as Deutsch Telecom has accepted the negotiation for lower rates for university staff and students tele-working.

Universities were not found to play a role in providing tele-work possibilities for the community. In rural regions in particular, where tele-work cottages are suggested as the solution for stimulating employment, one can imagine universities playing a facilitating role, but this was not the case.

7.3 The role of the university for regional economic growth: between competition and public support

Universities can play many roles for improving economic development, each of which has an IS dimension:

1. They exercise their original mission of education, at various level and thus improve employability and labour productivity, to the extent that the trained labour force remains in the region.
2. They can directly help businesses, by offering services or creating new companies through spin offs or start ups.
3. Finally they can offer directly services to the productive sector. In this case the notion of competition may need closer attention, as the borders on how far publicly supported teams can offer services in the market is an issue that is differently treated in the EU member states.

7.3.1 Contribution to the upgrading of knowledge and skills

Formal education in ICTs is offered by most of the universities studied. The skill shortages in ICT skills all over Europe are well known and apparently no region, whether rich or poor has a good track record. European universities have as yet failed to produce the necessary skills in sufficient numbers. Universities like Crete and Shannon have been very good in training scientists and engineers, suggesting that in general peripheral universities are good in training but lose their graduates through migratory flows.

An interesting feature, very much in line with state-of-the-art academic thinking is the distinction made in the University of Twente between ICT versus ICT related courses. All recent evidence suggests that the basic education in ICT is not a necessary condition for the creation of the necessary skills and the successful employment in the sector. People trained in other disciplines with good ICT related skills may prove equally useful in the labour market. While most universities offer basic training for using the basic software packages multidisciplinary strategies are less described in the case studies. Lessons from the university of Twente can be drawn in that respect.

Further education or adult education is treated differently in the various countries and universities studied, ranging from a total absence of involvement in German universities, since there are other specialised institutions taking over this role, to a very active involvement in the case of Ireland, as demonstrated by the National Distance Education Centre. Similarly in the UK the national government has taken initiatives trying to encourage the involvement of universities in adult education: one such case the University for Industry has subsequently retreated from the university level of provision and has focused more on vocational college training.

There are several issues that need to be discussed in this context:

- As the role of adult education and re-training shifts to the core of the learning society, into which European societies transform, universities may need to increase their contribution in that respect. Everybody almost expects lifelong training to increase in relative importance in the future
- There is of course an issue connected to charging policy in that context. When and how much should a university charge for training, what should the regional policy in the matter be? In the university of Crete complaints were expressed that when fees were adequate the quality of students and teaching was higher. As the national policy became more pro-active and through CSF funds offered subsidised courses the quality deteriorated (because students selected their courses with cost and not quality criteria).
- The cost/quality aspect raises simultaneously an issue for competition. Who is entitled to offer this type of education? If students are willing to pay a fee for improving their own employability, then why should this not be settled in the market? Universities or other subsidised bodies should only step in, when individuals or employers are not ready to carry the restructuring cost. This though may lead again to more important role for universities in LFRs for the particular case of ICT-related skills.

The rapidly changing environments and the ever-increasing importance of continuous training requires new, less rigid organisational structures. No best practices in that respect were reported in the case studies, although examples are well known in other

regions (e.g. Cork in Ireland). What seems to be proliferating rapidly is courses in entrepreneurship offered in many universities. These are necessary in order to improve the regional entrepreneurial culture, notorious for lagging behind in the EU compared to the US. It appears as a strong recommendation to those universities that have not done so yet. Except of the relevance of such courses for the rapid transition into the new economy in general, they are also very relevant for the creation of start ups and spin offs, as described in the next section.

7.3.2 Specific services to the productive sector

Services to companies are often offered by the universities or by individuals. Most of them are profit-oriented activities by the university itself, but charged at lower costs than from private businesses. Scientific excellence (for R&D co-operation with big firms) and market failure arguments (for dissemination work to SMEs) are the major arguments for these services. In the latter case the role of the regional/local authorities is crucial, since an initial incentive is necessary to introduce the service.

Scientific and technological co-operation with big companies is mainly a function of the competence of the university. Spectacular success stories come from the universities in London (e.g. Imperial College) and Germany (the existence of the RWTH was a major influence to the decision of Ericsson and Mitsubishi to establish local research centres). Yet, through the EU Framework Programme even peripheral universities co-operate with big companies and offer their services (as in the case of the microelectronics centre in Shannon and the information technologies institute in Crete). Again in peripheral regions the academic excellence is not linked to regional economic development through scientific excellence (in the case of Crete even less than in the case of Shannon).

Turning to SMEs though the market failure argument seems to be stronger in LFRs, or may be better tolerated by competition policies. Many universities reported that type of services either in a more systematic, regionally supported approach, as in the case of the North East of the UK, or in fragmented actions, as in most others.

Beside the contacts to existing companies universities can play a crucial role in restructuring through their influence in the creation of start ups and spin offs. The cultivation of the entrepreneurial culture through dedicated courses encourages students to start up their own companies and contributes to a more rapid transition to the new economy. In some universities such courses are offered systematically, in others ad hoc and still in others not at all. For the latter it is strongly recommended to introduce them.

In certain cases that constitute best practices, as in the case of the University of Twente a whole range of support services for start ups and spin offs is offered, with support from national and regional funds. The overall economic environment (as the flexible labour market rules and rapid growth in the Netherlands) facilitates these co-ordinated approaches, which cannot be easily transferred in different economic environments.

On the contrary spin offs are more a matter of university IPR management and flexibility/encouragement from the side of the university board. As the case of Forthnet on Crete demonstrates successful ICT spin offs may emerge even under the most unfavourable circumstances.

7.3.3 Other services to the economy

In addition to direct services to the private sector, universities exploit their knowledge for regional actors in specific projects, which are of interest to the community, as in the case of the design of modern transport information systems (Technical University of Athens), air traffic control, port and maritime services etc. This is done on a project basis and exploits regional skills.

Universities seem enthusiastic to play an important role in the introduction of eBusiness. This can be organised by individual research teams, as in the case of the Economic University of Athens or on a broader level, as in the case of the University of Aachen.

Those broader services to the economy lead to the idea of the social rather than economic role of the university analysed hereafter.

7.4 The role of the university for social development: employment, values and the general public

Finally universities can play a role for the wider community, not only through the adult education programmes mentioned above, but through their participation in awareness raising and the activation of the society as whole. They can also play a crucial role in tele-medicine.

The case of the University of Teesside shows how a university can help the regional authority create more public awareness. The Community Informatics Research and Applications Unit (CIRA) has been established by the University to provide a forum for the analysis and development of informatics applications. CIRA is a multidisciplinary unit where social scientists, computer scientists, software engineers, business consultants and designers can combine their respective specialities on particular research projects.

But even if the strategy is not explicit, project based initiatives can help general awareness: examples of HEI-company cooperation in London initiatives include

- The establishment of a Centre for Multi-media Enterprise funded by AZTEC, Kingston-upon-Thames University, Business Link, City Challenge and SRB.
- The development of a local Open Learning/Web Centre and a common IT space for the local area as a joint initiative between South Bank University and Southwark Council.
- Goldsmiths University is responsible for design and multi-media input to EU funded telematics projects. The projects use telematics to improve information flow between the borough and other agencies and citizens.
- Several universities such as Middlesex and East London are involved in Teleregions Project in association with local councils and TECs as discussed previously in relation to the Lee Valley Project.

Finally tele-medicine can go well beyond tele-education. We define “tele-medicine” as tele-medical applications which are used to improve the medical care of patients. This definition includes “tele-radiology”, “tele-pathology” or “tele-medical consulting”. For regions with specific geographical problems that aggravate the already very high cost of medical services and improve medical care in rural areas. It

is likely that such regions are mainly LFRs. Yet telemedicine can be important also for linking universities with university hospitals.

The objective of the Integrated Health Telematics Network of Crete – HYGEIAnet is to provide seamless, accessible, accountable and affordable health telematics services on Crete, thus enabling the delivery of high-quality health services. It is expected that HYGEIAnet will serve as a model for other telematics networks. It aims to revolutionise healthcare on Crete, guided by the principles of universality, accessibility, comprehensiveness, portability and extensibility. Privacy is also a key consideration in HYGEIAnet. The level of privacy protection has the potential to be higher than in today's paper-based world.

7.4.1 Conclusions

Universities all over the regions studied are now endowed with a reasonable infrastructure that allows them:

5. To design and implement a good internal and external information system, improving their management. The degree of implementation varies and university boards can gain tremendously if putting this issue systematically on their agendas, with the target of improving value added services. At that stage there are good practice models that can offer ideas but there are no limits in finding new ways to improve efficiency and effectiveness of the system.
6. Both tele-education and tele-work facilities exist but their creation and use is more often than not based on individual initiatives for pilot projects, with limited or no institutionalised use and encouragement. For tele-work the initiatives do not go beyond the university, for tele-education initiatives for accessing broader parts of the population are undertaken.
7. The limiting factors for disseminating tele-education and tele-work are human and not technical. Universities avoid a strategy that would set milestones and standards, probably because there is lack on knowledge on such issues, while individuals of this generation are still in their majority reluctant to change their mode of work. The next generation (current student generation) is more open to change.
8. Special arrangements on telecommunication costs, like the German example, help at least eliminate cost considerations.

Universities can play a very prominent role for regional economic development through their involvement in:

3. Adult education, an increasing activity, where universities are in a position to offer courses exploiting economies of scope. Policies on fees and competition to the private sector are strategic aspects university boards need to take into consideration, not leaving them to individual teams.
4. Universities can enhance economic development directly though support to companies and economic restructuring. While for certain types of entrepreneurial support the regional environment matters for entrepreneurial courses and spin off policies success is more a matter of active university policies.
5. For a more co-ordinated approach, going beyond individual projects and teams the national or regional government should give funds to universities, assuring

a high quality, systematic offer of services, be it to the productive sector ot for the creation of skills particularly relevant for regional needs.

8 Universities and regional culture

Culture underpins wider processes of regional development in a number of ways:

- As a sector in its own right the culture industries employ significant numbers of people and are an important element in wider leisure and tourism industries, and even interact with some production activities
- Culture is an important element in the attraction and retention of skilled labour within a region in the form of the contribution to the quality of life. Areas with a pool of highly qualified labour will usually generate cultural activity through demand, but regions seeking to reposition and re-image themselves often choose cultural activities as a way of raising their profile and overcoming traditionally negative images.
- Similarly in the desire to attract investment, regions will play on cultural assets as a means of attracting investments in either cultural activities or mainstream economic activities
- Culture is also seen as an element in the promotion of social capital and regional cohesion

Universities can play a critical role in underpinning and strengthening the cultural resources of region

'Culture' can be understood and used in a very broad sense. In our case it includes the arts, cultural facilities (such as theatres, museums, orchestras, libraries, archives), cultural activities (such as exhibitions, performances, concerts, events) and sport[3] and night-life activities.

The term 'cultural industries' includes the 'music industry', the 'literature and book market', the 'art market', the 'film and television industries' and 'performing arts and entertainment'. Relevant criteria for identifying these 'cultural industries' are the 'gainful purpose' of the activities and their 'private sector basis' (cf. MWMTV 1995, S. 4).

In this section we will focus mainly on the different roles, functions and impacts of universities with respect to culture and the regional cultural infrastructure. Undoubtedly one of the main functions is to train people in cultural skills and knowledge. Cultural provision in universities can aim to gain reputation and attract students', or to improve communication and quality of life on the campus (entertainment), it can be also used strategically as complement of the general regional cultural infrastructure which may be weak or have some absent elements. Universities can (consciously) serve the regional cultural labour market and they can generate cultural life outside of the institutions, both, actively as suppliers of cultural events and passively in the sense that staff and students demand cultural offerings of other providers (e.g. public concerts, nightlife activities).

[3] Most of the aspects of this chapter also apply to sport provision. Therefore, generally sport is also implied although it is not mentioned at any point.

8.1 Cultural provision as educational factor

First of all, cultural provision is intended to educate or to 'cultivate' people. This educational factor occurs in multiple respects:

- Courses of study which belong to the ‘normal’ teaching agendas and lead to academic degrees such as theatre studies, musicology, arts, literature studies, architecture etc. as examples of a more classical provision and film studies and TV studies, communication and media studies, or design as more modern examples;
- Offerings of student unions and similar organisations, which are provided in addition to the ordinary courses of study and which are demanded by the students on a voluntaristic basis, such as film clubs, theatre groups, bands and orchestras, campus radio stations etc.;
- Further training / lifelong learning activities for alumnae and/or residents.[4]

Of particular interest at this point is the educational value of the additional extramural cultural provision addressed to students. Although the educational intention is given among others (contact factor, fun factor; entertainment factor) these offerings are valued as significant integral part of “the students’ full academic formation” (excerpt from the statute of the University of Twente; cf. van der Meer et al), a central idea which might apply to all of the investigated institutions. A side effect is that performances which arise from such activities fulfil a further educational function, in that case with respect to the audience.

Typical examples of this are theatre groups, cinematography groups, dancing groups, photographic groups, opera societies, university orchestras, and arts centres.

Such provision is so common, that it makes no sense to list all activities, however it is important to mention that they are often also open to other university members. So the activities have an integrated function in that sense as well.

8.2 Cultural provision as reputation and students’ attraction factor

In the UK and in Ireland there appears to be a correlation between cultural provision and university reputation. The University of Limerick has been mentioned as an example of a university which since the early 1990’s “has strategically developed a distinctive university – and regional – cultural profile through a number of initiatives such as the opening of a 1000 seat University Concert Hall in 1993, the foundation of the Irish World Music Centre, etc.” not only to raise awareness of the university but also to attract people from within and without the region to UL (cf. Boucher). The situation at Trinity College in Dublin is different in so far as the university does not need to create reputation by being culturally engaged. In fact, culture is already a significant part of its image and reputation. The extraordinary cultural position of the institution within the city and the region can be made clear by the fact that the college

4 Sometimes it is artificial to distinguish between cultural courses and activities which are targeted at students (on a volunteer/additional base) and those which are targeted at the public. For example, the cultural courses of the CREA, the cultural facility of the University of Amsterdam, are open to all whereas they are mainly used by students (80%) (cf. van der Meer et al). With respect to lifelong learning: often the free public access to libraries is a significant part of the lifelong learning provision of universities.

itself is one of the major tourist attractions of Dublin and attracts half a million visitors a year. Paid walking tours and a multimedia show are provided. This cultural, virtual touristic relevance distinguishes Trinity from most of the other institutions in this study, with the exception of Durham which is partly based in a castle/cathedral complex which is a UNESCO world heritage site.

In the UK, cultural provision is a reputation factor as well and it is consciously used as "part of a package to attract students and staff" (Conway et al). Of course, in the UK this 'attracting factor' is not of the same relevance everywhere. Universities which are located in more peripheral regions such as the North East might have to use this strategy more deliberately than universities in the capital. But all in all, in the UK the cultural reputation can not be undervalued.

With respect to student attraction, in other European countries the situation is different as cultural provision and reputation are less relevant. For example, in the Netherlands two motifs primarily dominate students' university decision: (1) the proximity to the home region; and (2) the attractiveness of the city in which the university is located (cf. van der Meer et al). These attitudes might be typical for many European countries (Germany, Spain, Greece etc.) so that decision criteria such as 'cultural provision' are more or less restricted to national university systems which are competition-driven such as those in the UK or in Ireland. The situation in Germany (which may be representative for other countries) is that until now the universities do not have to reach a certain position in the 'market of higher education' (e.g. by developing unique selling points) because of the lower competition between the institutions of higher education in this country (a fact which can be symbolised by the marginal differences in quality between the various universities). The factors of decision in these cases are mainly located outside of the institutions.

8.3 Cultural provision as communication factor and as strategy for enhancing quality of life on the campus (entertainment)

'Enhancing quality of life' is an objective which has been often mentioned in the context of our regional case studies. In particular, universities which are located in putative (culturally) less attractive regions are anxious to enhance campus life by providing cultural and entertaining opportunities. A further feature is evident: those universities which are comparably young campus universities, located outside of the city centre particularly stress this topic.

One example is the University of Twente which emphasises the well-being of their student 'clients' (and as the sole campus university in the Netherlands they potentially have to do more in this aspect than other universities). The universities in the Ruhr, as typical German campus universities of the sixties and seventies, are confronted by the same challenge. In particular, the University of Bochum seems to have realised that they have to be more active in enhancing quality of life on the campus. So the university management aim to provide a pleasant campus atmosphere for the students, and cultural activities contribute to that intention.

In some cases the quality of life is to be enhanced by promoting inter-personal communication on the campus. Therefore, communication supporting opportunities are consciously created. For example, this intention is also mentioned in the context of explanations for the cultural provision of the University of Bochum whereby in that special case the lack of communication seems to be one of the most extreme and such

efforts might be very necessary as the campus is known for its cold and anonymous atmosphere.

Campus communication efforts are mentioned in the case of Madrid as well but with a different focus. Culture and sport are seen as "instruments available to introduce certain dynamics within the internal community and (...) to provide the basis for informal exchange relationships between students and faculty members" (Garcia). Enhancing communication and informal exchange processes might be one of the most important (but often at least mentioned) roles cultural activities play.

Writing about culture in the sense of 'quality of life', 'communication', 'entertainment', 'services' gives the opportunity to point to the role of the student unions which is in general very significant. They often run cultural facilities such as bars, discos, cinemas or radio stations but also more service orientated facilities such as book shops or other shops (e.g. for food). In particular in the context of the UK and Finland the student unions have been described as extremely important actors.

8.4 Cultural provision as complement of the general regional cultural infrastructure

It is clear that university members are the main target group for the cultural activities of universities. As mentioned above often these activities aim to enhance the quality of life on the campus. They offer, or lead to respectively, distraction, regeneration and stimulation. All universities of the case study regions make cultural provision for university members.

In many cases university cultural activities are addressed at a broader range of 'clients' and these are often those cases in which universities fulfil a wider mission to supplement the regional culture infrastructure. In the context of the regional cases we examined the extent to which the universities need to compensate for deficits in the regional cultural sector. The result was that nearly all universities offer cultural activities to the wider public although the intention to provide compensation for weaknesses in the public infrastructure is restricted to only some cases.

In the North East of England the universities complete the cultural landscape of the region by providing facilities (museums, galleries, theatres), services and events. This is similar in the case of Crete where the significance of both universities for the cultural landscape of the island has been highly stressed: "The mission is (...) to improve the cultural life not only of the academic community but of the local society as well. All actions organised by the universities target the whole population" (Tsipouri et al). In the case of Chania the Technical University of Crete is able to fill the cultural gap which is especially noticeable during the winter period by providing facilities (like a theatre and a cinema) and other cultural activities. The role of the University of Twente in the cultural infrastructure of Enschede and Hengelo has been described in a similar way. All the universities in these regions have in common that their cultural activities have a regional dimension as they enrich the cultural landscape to a lasting extent.

In London, Athens and Amsterdam the situation is different because of the basic cultural significance of these capital city regions. (The situation in Amsterdam can be described as "cultural overkill".) Nonetheless, the universities of these regions do make offerings to the wider public although sometimes they are not highly used by citizens or tourists (e.g. Amsterdam). On the other hand, it should be noted that with

respect to the cultural role of universities a region like Greater London is not a homogenous space. In fact, a more detailed view makes it clear that there is a crucial difference between institutions in central London and those in the periphery of the capital. The latter do make offerings to the local population as the suburbs often suffer a lack of cultural provision. In that context the role of Goldsmiths College in the cultural life of the Deptford area seems to be typical (cf. Conway et al).

The situation in Dublin is special: although all three universities do make cultural offerings to the wider public, Trinity College dominates the public perception as being a cultural institution mainly because of its long history and tradition and its central location, both conditions which contribute to the fact that it is one of Dublin's main tourist attractions. University College Dublin (UCD) and in particular Dublin City University (DCU) have difficulties in creating a cultural reputation confronted with the long shadow of Trinity College. Nevertheless, both institutions are more and more active in providing cultural activities to the public, not only to improve their cultural image. The best example is the DCU Arts Centre project which after completion will include a concert hall, two theatres, studios for artists as well as conference and workshop venues. The building of this centre is however linked with perceptions which are not restricted to a simple sub-regional community service dimension which is indeed existent (a north Dublin sub-regional strategy which aims at developing a north Dublin cultural area around DCU). In fact, it is also a significant part of the strengthening of DCU's role as a "Dublin regional and national institution in the cultural arena" (Boucher). Interestingly, DCU has taken the University of Limerick (UL) as a model of its cultural strategy as the UL has been successful in enriching the cultural landscape and creating a cultural profile by being culturally engaged. An important project in this regard has been the establishment by UL of the Irish World Music Centre which nowadays is used as example for the DCU Arts Centre (cf. Boucher).

In Germany, universities hardly act as institutions that enrich the cultural infrastructure of the region. Of course, in smaller university cities their cultural impact is higher, so that it can be said that the RWTH plays a more significant role for the cultural landscape of the Aachen Region than the universities in the Ruhr do for their region.

In Canberra the complementarity role is most obvious as the ANU has a contract with the regional government (ACT) which deals with the provision of cultural facilities and services in order to improve the cultural infrastructure of the region of the Australian capital. It is the only case in which such a complementary cultural function is explicitly fixed by a contract. Even details of the engagement are dealt with, e.g. that the university has to supply facilities and staff expertise for the provision of community musical performances or for art and musical tuition to residents (cf. Garlick).

Madrid represents a special case in so far as during the dictatorship the universities played a role "in which they were the most active cultural centres in the diffusion and promotion of international cultural trends" (Garcia). Today the universities have lost this special function. Nevertheless, they still do "act as complement of the cultural and heterogeneous offer of the city of Madrid" (ibid). The universities play this complementary role rather actively. For example, joint initiatives with the regional government have led to the building of a new auditorium for concerts because of the lack of such facilities in Madrid. Additionally a few further basic principles have been

stated in the case study report: avoiding competition with other cultural agents, focussing on non commercial aspects, supporting of small leading edge groups, linking the cultural offer to educational programs (cf. ibid).

In Finland it is felt that universities don't traditionally play a crucial role in cultural life, yet one has the impression the universities in Helsinki do enrich the regional cultural landscape by e.g. providing museums, libraries (with public access) or galleries. This impression is strengthened by the fact that the University of Helsinki has proclaimed the year 2000 as "The Year of Culture of the University of Helsinki", and has organised a large range of ambitious activities such as scientific conferences, lectures, exhibitions, and a number of other events and opportunities targeted at the scientific community and the people of Helsinki. In the words of the rector this one-year-event which is organised together with the City of Helsinki aims to create a positive image of Helsinki and Finland, both nationally and internationally.

Conclusively, it can be said that a basic difference between peripheral and core regions is evident. In the periphery universities do have to complete the regional cultural infrastructure and sometimes they fill out gaps and deficits while universities in national core regions mostly play a marginal role in that sense. (That 'capital region' does not stringently always mean 'core region' is symbolised by the case of Canberra.) This very spatial aspect seems to be the most significant feature to clarify why and to what extent universities make provisions to the wider public. More university-based features such age or size of the institution seem to play a less important role.

8.5 Universities as servers of the regional cultural labour market

Universities are not the only players in the formation of cultural workers, and cultural knowledge and skills can be also gained outside of the academic world. For example, often economic activities in the field of the so-called pop culture are grounded on alternative sub-culture movements and initiatives and it is not unusual that people have gained their skills in an auto-didactic way.

8.5.1 Provision of courses and labour market effects

Nevertheless, universities do have their role. First it should be mentioned that all the cultural activities which universities provide in addition to the ordinary courses of study can have their effect in the sense that, "Students that participated in (volunteer) cultural work have potential benefits for future jobs. Anything you learn during your time at the university can come in handy" (van der Meer et al). Besides there is surely an effect which arises from the broad range of formal cultural education opportunities. The provision of courses runs from the classical music education to web design. Some universities offer the complete cultural program while others do not make any provision. It is obvious that the extent of studying opportunities has to do with the cultural function of the regions in which the universities are located.

Accordingly, the situation of the cultural labour market in the different regions is also very heterogeneous, so that it is not easy to get an overview of this market. This uncertainty can be reflected in the context of the regional case studies in which only statements with a relative vague character can be found.

With respect to studying opportunities and the cultural labour market the differences between national capitals and other regions are evident. Thus, they are dealt with separately.

a) Capital city regions

In most cases the capitals are the national cultural centres as well. So there graduates of cultural disciplines have the biggest chances to have access to the cultural labour market.

London is a very special case as its cultural labour market is probably the most significant one in Europe. With respect to our topic London's outstanding position can be illustrated by two features. On the one hand, London as a world-wide known cultural hub with its huge music and entertainment industry disposes of a cultural infrastructure which can be only compared with New York or Paris. Accordingly the supply of cultural employees is broad. On the other hand, London is also a symbol of an outstanding centre in cultural education and training. One example is Goldsmiths College, a specialised college of the University of London. Goldsmiths mainly focuses on culture, and that not only with respect to education: "the strength of the cultural sector in the provision at Goldsmiths is such that the College sees the cultural sector as its main sector for knowledge transfer, economic development and spin off activity" (Conway et al). The fact that Goldsmiths is planning to establish an Arts Park illustrates its efforts in enhancing cultural entrepreneurship.

In Amsterdam, Dublin, Madrid and Athens the interactions between the cultural education at universities and the development of the regional cultural labour market might not be much less significant. Especially in the case of Amsterdam the increasing meaning of the cultural industry has been stressed. In that context it also has been mentioned that large universities such as the UvA do have difficulties to meet new needs of the labour market by reacting spontaneously through the establishment of new courses. But that it can work can be illustrated by the introducing of the Film and TV studies six years ago (cf. van der Meer et al).

Dublin with its theatre landscape disposes of a labour market for graduates especially in the field of drama. Placement processes may be supported by the fact that universities collaborate with several theatres in education (cf. Boucher).

With respect to the cultural labour market in capitals' regions Canberra plays a special role again as, although a capital, it is not able to absorb all art and music graduates of the ANU Institute of the Arts. Instead, they may go to the metropolitan cities Melbourne or Sydney. Only some of the graduates may set up their own small business (cf. Garlick).

b) Other regions

Universities which are located outside of the national centres play different roles in serving the regional cultural industries. Of course, primarily the universities which provide cultural relevant courses are able to serve the regional cultural labour market. Thus, without an adequate provision it is not a surprise that the University of Twente and the RWTH Aachen do not have a lasting impact on the cultural labour market. In the case of doubt, the few relevant graduates may find a job in not far away cultural centres like Amsterdam or Cologne rather than in the university region.

In the Ruhr the provision of cultural courses is relatively broad. On the other hand, a cultural labour market is absolutely existent. Unfortunately, surveys which deal with

the relation between both sides are missing. It can be only assumed that graduates do find access to the labour market. But to a certain extent they might leave the region, e.g. to get a job in cultural centres like Berlin. In the Ruhr is relevant what was already mentioned above: the cultural sector does not only recruit its workforce from the university. Often autodidacts play an important role.

The Northern Rivers Region is a special case in so far as there a cultural labour market is virtually not existing. Interestingly, the region is a location of cultural knowledge workers. But they prefer to live there because of the lifestyle attractions and work somewhere else (cf. Garlick).

In the North East of England the awareness of the importance of the cultural labour seems to be highly developed compared to other European regions. Two regional organisations are concerned with the development of the cultural industry, both with a focus on skills and workforce questions and both with representatives of HE sector. One is 'Culture North East' established in 1999 as a consequence of a report of the Regional Issues Working Group, a body which was appointed by the national Creative Industries Task Force (CITF) in 1998. The second one is the Northern Cultural Skills Partnership (NCSP), set up two years ago and consisting of many representatives of the regional cultural community. Both organisations focus particularly on "the level of support needed for artists and craftspeople in rural areas and the provision of low cost managed workspaces and tailored business support in order to encourage more young people to enter the sector" (Conway et al).

In the last two years NCSP has concentrated on the following issues (cf. ibid): The NCSP has emphasised the involvement of practitioners to ensure actions which are customer-led and it addresses the 'flexible labour' issues prevalent in the creative industries. Through extensive consultations the NCSP also identified that the sector was not getting what it wanted from the higher and further education sectors and as such, is now developing in-depth relationships with the sector. One positive result arising from this relationship building has been the production of a 'Professional Development Toolkit', an electronic training aid which will help practitioners seeking to develop their artistic, career and business prospects through training and development activities. The NCSP is also active in identifying and developing innovative training and development programs which target at filling the identified gaps. One example is a Junior Management course at the University of Northumbria for training students in cultural facility and event management. Another example is the new master of science course in Enterprise in Multimedia which qualifies students in running their own business including the provision of twelve incubator units.

8.5.2 University spin-offs

In the field of culture, university spin-offs are not very common. Such effects seem to be restricted to core regions of the nations. In general, in cities such as London or Dublin the foundation of a small niche theatre might make more sense than in peripheral regions. Basically, it has to be said that culture is no typical area for university spin-offs due to several reasons:

In many specialised cultural areas students are not trained for doing their own business. In general, the arts are not a field for company foundations in a classical sense. Often the work is done on an freelance base. An additional problem is that such jobs do not always occur in official statistics. But the perception towards culture as source of spin-offs is changing. The Goldsmiths College with its Arts Centre

(inclusive a Design Space incubator) might be trendsetting. And in Dortmund some pilot projects are implemented to establish an infrastructure for cultural start-ups whereas the universities seem not to be that integrated (cf. Kokoschka 2000). In addition, more and more innovative cultural courses are offered which are related to practice such as courses like music therapy or music technology (University of Limerick).

Examples of cultural spin-offs have been identified in the Ruhr:

STADTart (Büro für Stadt - Kultur - Planung, Dortmund) offers consultancy within the triangle city/region - culture - planning which is addressed to private and public customers. Thus, the development of strategies in the field of culture and arts, culture and media industries, cultural tourism, leisure industries and sport industries is a focus of the work. Further, it conducts applied research and works as facilitator in planning and participation processes. STADTart has been founded in 1991 by two members of the *Institut für Raumplanung der Universität Dortmund (IRPUD).* At the IRPUD they already worked on the respective research field.

Oktober Kommunikationsdesign, Bochum has been founded in 1997 by graduates of the Universität Bochum (History of Arts) and at the Fachhochschule Dortmund (Graphic Design). During their academic education the students published 'bospect', a former local cultural magazine which was popular in the late eighties and early nineties. Oktober Kommunikationsdesign offers corporate design solutions whereas they also focus on editorial design and screening design. The clients are mainly from the arts and the cultural area. The enterprise still benefits from contacts the owners made during the 'bospect period'.

Schnitt – Das Filmmagazin, Bochum ("Cut") is a film magazine which has been found in 1995 mainly by students of the *Institut für Theater-, Film- und Fernsehwissenschaften* ("Institute of Theatre, Film and Television Studies") of the Universität Bochum who started the project on a private base. In the meantime, with a circulation of approx. 10,000 the *Schnitt* - which focuses on film reviews, film theory and film history - has become one of the most popular professional magazines in the field of film in Germany. Nevertheless, the work is mainly done on an unsalaried basis.

8.6 Universities as generators of cultural life outside of the institutions

Universities are a strong regional cultural factor as they generate cultural life outside of the institutions, actively and passively. These two facets of enrichment shall be dealt with here.

'Passive cultural enrichment' - the demand side[5]

Universities are not only cultural suppliers, on the other hand they surely generate cultural demand as well. Here, this kind of effect is named 'passive cultural enrichment'. (That the universities for themselves supply the need by providing own

5 In the context of this study two sides of the cultural role of universities have been dealt with, a 'supply side' and a 'demand side'. The reflections on the supply which cover a broad range of aspects have definitely dominated while those on the demand have been dealt with much less extensive. Although it is not always possible and reasonable to separate both sides from each other it is important to remember that they exist.

facilities, services and events which in fact often complete the regional cultural landscape has been already specified).

University members, especially students, do highly demand cultural events and facilities. Therefore they are an important target group for suppliers on that special market. In Germany, surveys often deal with hard quantitative demand effects of universities to illustrate the importance of the universities for its region as income generator. The cases in which such a computation is made for the cultural sector in particular are rare. In the late seventies a broad study with the title *"Universität und Stadt"* ("University and City") (Mayr 1979) dealt with - among a lot of other aspects - the question to which extent university members use (public) cultural facilities such as libraries, theatres or museums. In the UK among others Chatterton deals with the role of universities in improving cultural life in the region (cf. e.g. Chatterton 2000).

Obvious is that the existence of universities, respectively the local presence of students and university staff, do have an impact on the regional cultural infrastructure and on cultural life. This fact can be illustrated by the case studies.

The Dutch state a big impact of the universities on cultural life in the regions. That applies for the University of Twente in particular: "Enschede's and Hengelo's catering industry would be much less significant if there weren't so many students in the region" (van der Meer et al). Especially the nightlife infrastructure is shaped by the students' milieu, the more so as students do not only appear as clients. Sometimes they are initiators and offerers as well. The estimation is non-ambiguous: "Without the university, its students and its supply of cultural activities, services and infrastructure, Enschede would be not more than a common Dutch provincial city. The amount of physical culture supply from the university really does make a difference. Without it, the supply and diversity would be less in the region" (Groenevelt). On the other hand, it is stressed that with respect to high culture (theatre, opera) the students' demand and influence are less significant. On the other hand probably they are not perceived as specific target group by the management of such facilities. The situation might be different with respect to the target group "university staff".

As a whole the situation in Aachen looks similar probably because with regard to factors such as "student culture" and "national/regional role of the city" the framework is not that different to Enschede. Without universities Aachen would be a quiet and rather conservative and provincial city. This estimation is simply grounded on the fact that in this "quarter-million-town" over 40,000 students are enrolled at the universities. (By the way, this proportion of students might be unique in Germany.) Without doubt, students and university staff do enrich the culture and nightlife infrastructure and it is surely no accident that Aachen is known as a city with one of the densest pub scenery in Germany. The impact on the cultural landscape could be even higher if the universities, especially the RWTH, would not be that technical orientated because students of engineering disciplines are often considered as students which are at least interested in culture. It is not quite clear to what extent that impression represents a cliché or the truth.

In the Ruhr for a long time the cultural landscape was shaped by a non-academic milieu. Apart from some working class cultural infrastructure the provision was restricted on typical high culture facilities such as public theatres, operas and orchestras. So the foundations of universities in the sixties was a kind of cultural paradigm change. Since that time a students' milieu has been partly established. One

example is the (sub-)culture and nightlife scenery of Bochum which would not be that extensive without universities. But Bochum is also an example for the fact that youth culture and student culture have been merged. On the other hand, the affinity of classical / high culture and the student milieu is not that big. These two worlds are more or less not linked.

In Amsterdam students are perceived as group with a "large cultural potential" (van der Meer et al). With a population of 80,000 students are a key target group on the market which is in particular served by the gastronomic and nightlife industry. These branches tune their offerings to meet the students' demand. So in spite of being the capital and the cultural hub of the Netherlands it is evident that the cultural landscape is shaped by a student milieu to a significant scale (whereas it should be mentioned that it might be difficult to distinguish student culture from youth culture). In the Amsterdam case it is even mentioned that the university's role in enhancing the culture in the region is more or less restricted on the demographic factor which has lasting effects on the cultural demand and on the cultural climate whereas the role of the university as cultural institution is negligible.

In London students are less visible and less influential as cultural demanders. They are not perceived as key target group but the cultural landscape (at least the central one) is dominated by offerings for tourists and professional service workers who are able to pay relatively high prices. "Students are a niche market and are mainly served by specialist venues in non-central locations" (Conway et al). But the students' influence on sub-cultural provisions and niche market activities might be relatively strong. Thus, the cultural scenery of the suburban areas should be investigated.

Conclusively, it can be said that, that universities and their members, do contribute to the enrichment of the regional cultural infrastructure (outside of the universities) simply because university members do represent a large critical mass within the whole population which wants to be served. Accordingly, offerings which target at university members are existent, regardless of the of size and character of the city / the region. Nevertheless, with respect to the crucial influence on the regional cultural milieu differences which depends on the character of the city are evident. In more peripheral cities such as Enschede or Aachen students play a large role because many cultural offerings are primarily made to meet the students needs. Thus the existence of students has much more relevance for the quantity and structure of the regional cultural landscape than in cases where cities / regions fulfil a central cultural role for the country such as capitals often do. But one can not maintain that in all capitals' regions which have been considered in our project the cultural demand of students play the same role for the design of the regional cultural landscape. Amsterdam and London differ from each other. In Amsterdam students are still a main target group while in London students do hardly appear as such a group. It is not quite clear to which of both groups the other capitals belong. Presumably Dublin tends to Amsterdam and Athens and Madrid to London. Canberra plays a special role again. The situation in Helsinki is not clear.

Maybe the distinction between "high culture" and "pop culture" is relevant in the context of our topic. In general, students might prefer pop culture and this need generates respective facilities and events within the region. On the other hand one should not forget the group of the university staff which is an ambitious cultural target group, often preferring high culture. In that sense, the existence of universities do strengthen the high culture sector as well. Facilities of this market segment are mainly

frequented by "members of the educated classes" (the German expression is *Bildungsbürger*). University members are significant part of this social group.

'Active cultural enrichment' by events - the supply side

Universities do also enrich the regional cultural infrastructure by initiating cultural events within the region. This strategy can be characterised as 'active cultural enrichment'. Extremely active in that context is the Australian National University, an engagement which is grounded in the special cultural mission of the university and its contract with the ACT government (cf. Garlick).

The University of Limerick seems to be comparatively active in strengthening the regional cultural landscape without focussing only on offerings within the university. So it is responsible for 'one-off events' such as the 'Day of the Feet' and the 'Day of the Song', events which do not only have a regional but an international character as well and which aim at " ... trying to take the arts out of the ivory tower into the community" (Boucher). Although is was not discussed explicitly it seems not to be unusual that universities initiate, organise and implement cultural events within their region. Often they might do it by collaborating with other regional partners.

In Enschede the students act as initiators and organisers of cultural events within the region, e.g. they are responsible for a number of parties in the inner city of Enschede and for the 'Batavierenrace', a well-known international university relay which requires a lot of people to organise. Students assume this task on a volunteer base. Another example: the university regularly organises pop festivals in co-operation with regional partners (cf. van der Meer et al).

A further example is the Millennium Festival of Medicine which was staged by the of the King's College London throughout the year 2000 and aimed at exploring moral dilemmas raised by modern medicine. One significant part of the programme which of course also included public lectures and panel debates were the theatre performances at the Greenwood Theatre. The Goldsmiths College is likewise active in participating in local arts festivals (cf. Conway et al).

The Southern Cross University in the Northern Rivers Region of New South Wales (Australia) represents a special case because it enriches the regional cultural landscape by engaging as sponsor, e.g. of annual festivals, art galleries etc. The same applies for some universities in Madrid which sponsor classic music events. Such sponsorship is not common everywhere. In Germany public universities do not appear as sponsors. Here the question is much more who is willing to support the universities' cultural activities.

8.7 Further cultural roles and effects of universities

In the context of the regional case studies many further cultural aspects have been dealt with which shall be summarised at this point. The fact that many of them have been only mentioned in the context of the Australian case studies might be a hint on significant cultural differences between university landscapes in Europe and the Australian landscape.

- *Universities as keepers of the (regional) cultural heritage:* the ANU in Canberra disposes of a Cultural Heritage Research Centre which "... provides an umbrella for many initiatives undertaken by staff with local, Territory and Federal Government agencies, community groups, voluntary groups, churches and schools

in relation to the conservation and management cultural heritage of places and objects in the region, nationally and internationally" (Garlick). Although this centre has no sole regional focus one can assume that questions of the regional cultural heritage are dealt with extensively.

- *Universities as keepers and supporters of the culture of ethnical minorities (e.g. Indigenous people):* this aspect is an element of the overall objective of the Southern Cross University's university plan. It has been specified with respect to Aboriginal and Torres Strait Islanders people. Concretely, they support Indigenous people (especially students) and their culture by running a centre which aims at empowering them for the purpose of self-determination. The integrative and mediative function of the centre is completed by the mission of educating non-Indigenous Australian on Indigenous issues (cf. Garlick). London Guildhall University plays a similar role in its work to integrate the local Bangladeshi community, one of the most under represented groups in higher education, into local cultural activities (cf. Conway et al).
- *Universities as promoters of sports athletes:* in the engagement on the sports field the Australian universities seem to have in common with the US American universities. The Southern Cross University runs a sport academy which aims at identifying and developing young athletes on many different sports areas. In Germany sport facilities and institutions at universities do not have that intention. Instead they focus on recreation purposes or they train and prepare people for the sport job market (trainers, therapists, etc.). In other European countries the situation might be similar whereas in the case of Madrid it has been also mentioned that one motif of the sport provision is to identify and to promote the best athletes. Basically in Spain sport competitions between different universities are used to create and to strengthen a university culture among the students (cf. Garcia), a strategy which is also known from the Anglo-American university culture. At this point a further intention of cultural (incl. sport) provision should be stressed: *the creation of identity*.
- *Universities as cultural advisor / role of regional knowledge transfer:* universities do often have a cultural advisory role in its regions, so e.g. universities of the North East in the context of Newcastle's bid to become European City of Culture. Another example is the School of Humanities of the Northumbria University is involved in an innovative partnership with Newcastle's urban regeneration area of Grainger Town. Often an advisory role is also given when university representatives have been appointed to relevant regional cultural bodies.

9 Universities and regional governance

Historically, universities have played a key role in the process of nation building throughout Europe. Their contribution to the selection of national elites, to the shaping of dominant ideologies, and the development of national innovation systems is generally recognised. Recent years have also seen growing awareness by universities of the significant role they play and can play in their own region. This growing interest must be understood within the broader context of the resurgence of the region as an important arena for political and economic activity, and, at the same time, a shift in emphasis from material to non-material assets such as knowledge, skills, culture and institutions. Within this context, universities, through their resource base of people, skills and knowledge, can play a significant role as a strategic resource

in regional networking and regional governance. This idea corresponds with what we are witnessing in regions throughout Europe: a rise of new regional governance structures where more institutions then before engage in regional development. These regional actors have a growing interest to become more active in establishing regional networks in order to stimulate the sharing of knowledge and expertise and to promote co-operative activity. It appears that universities are often sought as one of the partners in these regional networks. At the same time, universities themselves, in times of diminishing state support and growing student numbers, show more and more interest in engaging in their region. The growing number of local and regional actors engaged in regional development and their desire to build networks appear to offer numerous opportunities for universities to engage locally.

If universities are considered to be of critical importance to the development and enhancement of local and regional networks of knowledge exchange and governance, then how do they engage in the region to ensure a mutually beneficial collaboration? Examples of universities throughout Europe show that their engagement in the regions' governance structures takes many forms and can go through a variety of mechanisms. It can range from informal ad-hoc consultancy roles by individual academics to regional institutions, to formalised partnerships between a set of regional actors aiming to reach certain predefined goals, from university responses to existing policy, to leadership roles where the university is one of the partners setting the regional agenda. Looking closer at the day to day activities of various universities throughout Europe, it appears that there are a variety of different experiences with regard to this regional engagement, dependent on the type of university, its aims and mission, the identity of the region and the national higher education system in which it is functioning.

This section focuses on the role of universities in regional governance structures. Its aim is to show how various universities in particular regions have engaged in several forms of regional governance structures, the value of these engagements in terms of their contribution to an improvement of local and regional knowledge exchange networks, and the problems universities deal with. Furthermore, the section aims to provide a set of general trends and explanatory categories that stretch across these universities, taking into account the differences with regard to the national and local contexts in which the universities operate, and the differences between the universities themselves. These difference between locational contexts and the signature of the universities themselves appear to be very influential in determining the position universities have been able to provide themselves in regional governance structures; On the one hand the sudy contains the story of the *Rheinische-Westfalische Hochschule* in the Aachen Region in Northrhine-Westphalia. This is a prestigious university, in international terms, that has the tendency to dominate its entire regional area. On the other hand, the research contains the experiences of universities located in the metropolitan areas of London, Amsterdam, and Madrid, where the university is only one of the many players in the field of research and development.

The section starts with a brief review of the changing context, which induces the role of universities in regional governance to increase. It expands upon new forms of territorial governance based upon the concept of the learning region, and it describes how and where universities fit into this debate. The second part of this chapter discusses the various ways in which the universities taking part in this research are involved in governance networks of their regions. The chapter continues with an attempt to find some explanatory categories with the help of the experiences from the

various universities. The final part of this chapter provides the main conclusions with regard to the theme universities and regional governance.

9.1 The learning region and university involvement in regional governance

As noted in the early part of this report, the pressure of a globalising economy has greatly reduced the regulatory capacity of nation states for economic development. More and more, it appears to be the nature of the production locality rather than national market characteristics that determine economic success. This situation has forced cities and regions to reconsider their role with regard to regional economic policy, and to focus on their indigenous potentials and expertise. Within this context, regional institutions, public and private, have become more important in the economic regulation process. Together, these institutions contribute to a regional institutional thickness (Amin & Thrift, 1994), encompassing firms, chambers of commerce, government agencies, R&D laboratories, and training and educational institutions including universities. In order for a region to be successful, these institutions would have to be capable of forming closely knitted networks of knowledge and information exchange. This process of geographically concentrated knowledge sharing and cross-fertilisation of ideas is regarded as one of the most important variables explaining the geographical pattern of regional economic success. It is here where the concept of the learning region fits in. The central idea of the concept of the learning region, is that such a region would be better equipped than others to utilise and capture the benefits of innovation, because these regions might turn out to be more predisposed than others to form close networks of knowledge sharing, and, therefore, to support and advance learning processes among regional actors. The learning region ,therefore, depends upon network knowledge which refers not only to the skills of individuals but the transfer of knowledge from one group to another and vice versa. This is also referred to as a region's '*receiving system* ' which means the ability of firms and organisations in the region to exchange, embody, and utilise knowledge in order to advance learning processes. A receiving system is thus organised in the form of closely knitted networks of information exchange between the regional actors.

Universities are considered to be of crucial importance in building the receiving system in the region. The role of the university is to contribute to the less tangible aspects of the system by building social networks that link key actors in the local community and feed their knowledge and expertise in these networks. How far have universities gone in different regions of Europe, building in a structural way the networks of such a learning region? From this study, it appears that the differences between universities with regard to the extent to which they are structurally involved are very large. In some regions, informal personal engagement by some academics accounts for most of the universities' inputs into these regional networks, whereas in other regions universities have established regional consortia of higher education to be better equipped to represent their interests and to feed a combination of their knowledge and expertise into the regional governance structures. Here human assets and cultural factors, deeply embedded in the social fabric of the region might be important in shaping the possibilities for universities in different regions to support and advance learning processes. It appears that for some, especially older, industrial regions, there is the need to 'un-learn' first. To un-learn means to eliminate institutional structures, ideas and beliefs of past successful times before starting to work on new network structures to support the learning region (Maskell & Tornqvist,

1999). An example of the need to un-learn first is given by the German Ruhr region. The Ruhr region shows examples of the failure to introduce new networks for knowledge sharing between regional stakeholders under which the universities (f.e. *the Regionalkonferenzen*). For some observers the failure of the implementation of new networks in the Ruhr is a symbol for the fact that the old networks of the Ruhr of local politicians, large scale industry and conservative lobbies still work and still dominate the regional decision-making machinery, and that potential innovative actors such as small and medium sized firms, universities, and research institutions or grassroots movements are more or less excluded from these networks.

This study also shows that there are still large differences between countries with regard to the extent to which universities have structurally engaged in these regional networks. The ability of universities to participate in the regional governance structures depends on the degree of independence of the institutions from regional and national governments, the extent to which regional policy is formulated in the region itself, the nature of the funding relationship and hence of priorities set through that mechanism. Depending on the relative influence of these variables, universities in different countries are to a greater or lesser extent able to determine the borders of the regions for their engagement. In countries where regional governments are responsible for higher education regulation and control, there may be greater commitment of the universities to participate in regional governance structures. For example, in Spain higher education regulation and control is shared between the central state and the regional governments. Regional authorities are responsible for most of the policy actions influencing universities, including the acceptance of new campuses, large equipment, and the allocation of budgets. Therefore, regional governments are critical in the provision of financial support. Does this shift in power and authority from central to regional tiers of government also mean an increasing effort, either formal or informal, of legitimation and knowledge resources from the Spanish universities to regional authorities? In the case of Spain, this is indeed what has happened. For example, before 1996 university elite and interest groups in the Madrid region exercised lower pressures on regional government, and they responded pretty much to classical elite networking traditionally organised around the Ministry of Education and its Directorates and Sub-Directorates. Nowadays in contrast it is the regional government who provides financial resources, and universities in return are introducing into some of their activities what can be identified as regional concerns. Furthermore, university elites are more than before represented on the boards of regional government bodies. In spite of this, the situation is still far from one in which universities in Madrid shape the regional agenda on higher education or related policy such as R&D. The universities in Madrid lack a clear regional identity. This is not the case in Andalucia, where regional government involvement in the universities dates from longer back. Here, the transfer of competencies to the regional government dates from 1985 (*Junta de Andalucia*). This means that the universities are highly dependent on regional government funding and policies. Linkages between universities and regional governments are much more significant in Andalucia than in Madrid, which results in a strong regional identity of the universities and a close connection between research and regional problems.

We can find the opposite situation in Greece, where the institutional mapping of the universities is quite rigid, leaving very limited degrees of freedom to either universities or regional authorities to use institutionalised channels of communication.

The result is that in both directions relations are fragmented and based on ad hoc personal relations.

In spite of these factors structuring university engagement in the region to a more or lesser extent, it is the case that, in essence, universities tend to operate within a multi-faceted spatial domain, locally, regionally, nationally and internationally. Furthermore, there may be large differences of opinion about what the borders of the region are, both at the corporate management level, as well as the Faculty and Departmental level. The result is a wide range of regions in which universities operate dependent upon the particular purpose and the actors involved. Knowing this, one can question oneself whether it is at all realistic to place such an important role for universities in regional development. Can a region built its economic future on the commitment of this local elite, when the core businesses of this elite, education and research, are most of the time not locally oriented? The question then is if these two roles, local participant in governance, and global orientation in education and research, are mutually exclusive. The rest of this section describes examples, showing that this does not have to be the case: these two roles do not necessarily have to be mutually exclusive, not even in the case of the most prestigious and internationally orientated universities. This is mainly so because every university is located in a certain place, and its members staff and students are part of the regional community. Every university occupies extensive areas of land and numerous buildings, whether owned or not, and staff and students belong to the regional community. This makes every university an important regional player in its own right and will appear from the following examples that it can even be recommendable to strive towards utilising the university to its maximum in regional governance, by exploiting both roles. The dialogue with universities in their role as local players gives the region the opportunity to connect with a global network of knowledge and ideas the university has hold to. As Thomas Bender puts it:

> "No other institution has such rich connections at once to a local intellectual, political, and social milieu and to a global network of ideas, structures, and powers. In other words, universities are perfectly suited by structure and culture to participate in regional networks of ideas structures and powers."

9.2 Forms of regional involvement

9.2.1 Formal representation

Regional & local representation on university governance structures

This kind of involvement is primarily based on the representation of local or regional actors on the governing boards of the university. This kind of formal representation is still a rare phenomenon, although in some cases, regional representation is mandated by the national government. For example, the Irish Universities Act of 1997 mandates the regional representation on university boards. This implies that the membership of University College Dublin's governing authority must include among others the Lord mayor of Dublin and eight persons elected by the member of the General Council of County Councils.

University representation on local/regional institutions

This kind of university representation includes members of the university representing the interests of the university as a whole on the boards of regional institutions in a structural and formal way. These university representatives are usually not appointed on the basis of their specific knowledge and expertise in a particular domain, but rather on the basis of their management experience within the university. This kind of representation appears to be widespread but most of the time of only recent origin. We can find examples of it at almost every university in this study. It appears that in terms of continuity, those most frequently mentioned in the interviews were representations with organisations that have a regional economic development aim, such as Innovation Centres, Technology Parks, and Chambers of Commerce. Furthermore, it appears that in central regions, this kind of representation tends to have a more informal and ad hoc character than in more peripheral regions where it is most of the time formally and strategically planned. The most beneficial in this relationship seems to be the opportunity to share information on a regular basis, not to work on specific projects together. For example, in the UK, the University of Newcastle and Newcastle City Council jointly have appointed a liaison officer. The greatest success of the appointment of the liaison officer has been in the sharing of information through meetings between officers and academics. There has been some success in co-ordinating between senior management in both organisations to facilitate co-operation and to provide the groundwork for mutual interaction. Success has been most limited in the establishment of collaborative research projects, because of the divergent interest sets of the City Council (for whom service delivery is an integral part of all agendas, including research) and the University (for whom teaching and research excellence are the two motivating forces).

Another example of this kind of representation is given by the city of Dortmund which plans to establish the position of a University Representative. Here the relationship between the university and local government is still low profile, and the establishment of such a representative has to strengthen the partnership between the city council and the institutions of higher education and research within the city.

In Ireland, the representation of the University of Limerick in a variety of organisations and committees engaged in regional economic development is an expression of the dense network of relations between the university and regional actors.

9.2.2 Partnerships.

Partnerships are co-operative agreements between local and regional government and other local/regional public, private, and voluntary parties coming together in order to collectively formulate and carry out certain policies in the region in mutual agreement, most of the time aiming at mutual representation in the region and creating regional growth. The partnership is usually not intended to be limited to the duration of one project. Instead, it aims at longer-term co-operation. Furthermore, partnerships do not necessarily have statutory powers. For example, in the London region there are numerous examples of partnerships without statutory powers, drawn together by interest groups overcoming the lack of unitary representation for the region. The partnership principle increasingly is a prerequisite for securing certain forms of European funding and for creating an effective platform for enhancing inward investment. The research found examples of five different sorts of partnerships, which can be distinguished on the basis of their central aim. These are: city regeneration,

regional promotion, strategic development planning &knowledge transfer, science and technology transfer, and ad-hoc project based partnerships

city regeneration

Generally speaking, universities often appear to play important roles at the local scale in terms of participation in local regeneration schemes. In this case, it is mainly the sub-region, not the region, that is of importance, and this sub-region relates to the local communities surrounding the campus sites. Particularly in larger cities, older universities often find themselves located in the older socially disadvantaged area of the city. The need for local partnerships emerges from the need to develop or redevelop the localities in which the universities are located and where so much of their day to day activities occurs. A good example of university involvement in regeneration schemes is the way Dublin City University has fostered the development of an actor network in the area around the university, the Ballymun local community and the north Dublin area, as part of its strategic policy. The university's proposed policy for the redevelopment of the north Dublin area include small business development, tackling educational disadvantage, providing constancy for the management of local services, and attracting cultural sporting and other facilities to North Dublin. Many of these proposals have been put into practice in institutional form by the university. For example, Dublin City University is a founder member of the North Dublin Development Coalition (norDubCo), along with two Local Authorities and three Area Partnerships. Here, there has been a growing emphasis on providing pathways for the socially excluded in these areas into the university.

Another example is given by the University of East London which has regeneration at the core of its mission, and works closely with local authorities and the local colleges in this respect.

Furthermore, Teesside University in the North East of England has retained significant interest in local and community regeneration in the Tees Valley, and so has naturally found itself in partnership with the local authorities in the assembly of particular Single Regeneration Budget (SRB) projects.

regional promotion

More and more, local and regional governments regard universities as strategic institutions in promotional activities of their regions. In the German region of Aachen, the Rheinisch-Westfalische Hochschule is presented by the local and regional authorities as location factor number one. Each organisation involved in public relations for Aachen and the Aachen region stresses the university and its important role for the region's life and economy, in order to attract business investment. Aachen is presented as a successful and dynamic technology region in which the industry benefits from the proximity of the university. This strategy seems to be successful, with in the nineties international companies like Ericsson, Mitsubishi Electric Corporation, Ford and Visteaon choosing Aachen as location for their plants and research laboratories, explaining their decision as linked with the location of the university. Also in Dortmund, the university plays an important role in the urban marketing plans of the city. University representatives are engaged in parts of the marketing strategy of the city, for example in the project *Hochschulstadt Dortmund* and *Innovations- und Technologystadt Dortmundt.* The mayor of Dortmund and the rectors of the University and the *Fachhochschule* belong to the board of this formal network.

In the large metropolitan regions involved in this study, the promotional aspect of universities is relevant to local government. For example, London First is the inward investment promotion body for London. In total, 19 higher education institutions have taken up membership of London First, recognising the link between the promotion of London as a global city, and the attraction of overseas students. Similarly in Amsterdam, both universities play a crucial role in the desire of local government to promote the city as Amsterdam Knowledge City, especially to attract inward investment from abroad.

strategic development planning & knowledge transfer

These partnerships are primarily aiming at co-operative strategic thinking about regional development and the exchange of knowledge and expertise between actors in the region. They are not common in every country in this study. The Netherlands, Germany, and the UK inparticular appear to have well established partnerships in this respect. Universities play crucial roles in these networks. This is not surprising as the role of the university in these partnerships is essentially based on the role of universities as main repositories of knowledge and expertise in a very wide variety of domains. An example is the London Development Partnership. The London Development Partnership was established in 1998 with the purpose of providing some strategic thinking in anticipation of the arrival of the new Mayor in May 2000. The aim of the LDP was to write an economic development strategy for London, paralleling the Regional Economic Strategies in the English regions. Following the election of the Mayor, the Mayor will be responsible for appointing a board for the newly formed London Development Agency, Although there is no guarantee that the appointment will be made, the universities are preparing to ensure their board member guides the mayor to maximise the full potential of Higher Education for the London region and vice versa.

Another example of this partnership specifically aiming at the exchange of knowledge and expertise can be found in the Netherlands. Here, the so-called Knowledge Circles have been established in almost every university city. They are a good example of how universities can take a leadership role in the establishment of a network between local and regional actors. In 1991, the Amsterdam Chamber of Commerce, the University of Amsterdam transfer office, and the regional innovation centre together recommended the establishment of a so-called ‘knowledge partnership’. This partnership would serve as a lobby for advocating and formulating a knowledge-based development strategy for the Amsterdam region. On the basis of these recommendations, the so-called Knowledge Circle Amsterdam was initiated. This is a regional discussion network, headed by the *Rector Magnificus* of the University of Amsterdam. Participants are local and regional government organisations, almost all organisations engaged in local and regional development, the regional business community (large scale companies as well as the SME sector), universities and the rest of the higher education sector in the region. The aim of the Knowledge Circle Amsterdam is to achieve a better use of knowledge available in the Amsterdam region, by periodically bringing together the participants, with the purpose to stimulate networking and higher levels of information exchange. Participants meet several times per year to discuss certain themes, for example medical technology, environmental management, and university dual learning trajects (working and studying at the same time). The purpose of these meetings is to create opportunities for further knowledge transfer, not to work on transferprojects itself. The intention is that on the basis of these meetings, smaller separate projects will develop. Until now,

the participants regard the network to be successful, although there is still a low representation of the SME sector.

Nowadays, almost every university in the Netherlands participates in comparable regional knowledge circles, for example the University of Twente already for a long time is one of the main participants in the Twente Technology Circle.

Another example is the German *Regionalkonferenz* (Regional conference), in the Aachen region. This is an alliance of today 75 regional actors, implemented in 1991 in the context of the *Regionalisierte Strukturpolitik* (Regionalised Structural Policy) of the Landesregierung Northrhein Westfalia. The aim of the conference is the collaborative development and implementation of policies and projects related to regional economic development. Participants are important players in local and regional development, e.g. the local mayors, the local participants of the Bundestag and the Landtag, the IHK, the *Deutsche Gewerkschaftsbund* (Federation of German Trade Unions), and the universities. This Regionalkonferenz of the Aachen region is one of the rare in Northrhein Westfalia, which works well. In the meantime, it has become an established organisation, which develops co-ordinates and moderates regional projects. Secondly, it acts as a network institution for the region. The universities are deeply involved in the Regionalkonferenz. Apart from the fact that they are official members of the organisation they are participating in several projects and in some case university members are as project leaders responsible for its development, implementation and evaluation. Projects relate for example to technology transfer, patents and know-how, innovation management.

Science and technology transfer

Partnerships, which aim at the development of science and technology in the region, appear to be common and they already have a long history. These partnerships are often expressed in the form of science and technology parks aiming at the attraction and establishment of high-tech and ICT firms. The most developed examples of this partnership can be found in the older industrial regions that took part in this study.

In Ireland, the University of Limerick and the regional development corporation Shannon Development have over time created a multitude of inter-institutional linkages and an network, whose institutional expression is best exemplified by their partnership in the National Technology Park for science and technology companies on the University of Limerick's campus.

In the Netherlands, the University of Twente is, together with the polytechnic, the regional development authority and a major Dutch bank, a partner in the Business Technology Centre Twente, an incubator centre at the Business and Science Park.

Also the University of Amsterdam is a major partner at the so-called Science Centre Watergraafsmeer, a major concentration of high-tech and ICT companies. The role of the university in this partnership is to encourage knowledge and technology transfer between the university and those companies, amongst others by moving all the exact science departments to this spot, in order to create a synergy between the university and the economic activities going on there.

In Finland, the University of Joensuu through its Foundation, the city of Joensuu and the Association of North Karelian Municipalities established the Karelian Science Park in the city of Joensuu in 1990. The Science Park has been located in the premises rented from the City of Joensuu, currently in a former school in the vicinity of the University Campus. Also, the North Karelia Polytechnic and North Karelia

Educational Federation of Municipalities entered the Science Park. The University is prepared to rent space and relocate its Department of Computer Science and some laboratories of the Department of Biology to the new premises of the Science Park to encourage co-operation with business firms. The main emphasis in this respect is on the key sectors of expertise in the province: information technology and telematics, forest and environment, optics, laser physics, material technology.

Ad-hoc project based partnerships

Increasingly, the partnership principle is a prerequisite for securing certain forms of European funding. From the case studies in this research, it appeared that the requirement for partnerships in order to win funds from European Union structure funds such as ERDF and ESF is the most important explanation for ad-hoc partnerships between universities and a varied constellation of regional partners depending on the character of the project.

Because it concerns European structure funds, these ad-hoc partnerships are most of the time based in the older industrial regions. For example, in the Dutch area of Twente, the requirement for coalition building between the regional partners has been very important in shaping the so-called Twente Network, which is mainly focussed on the SME sector. The Twente network is based on a multitude of linkages between the university and regional partners. Whenever, there is a project related the schooling, R&D, the SME sector, or technology transfer, the University of Twente is one of the partners. Although these partnerships are ad-hoc, the members of the Twente network are convinced that the European funds have largely contributed to the organising power of this region.

9.2.3 Higher Education consortia

The situation whereby higher education institutions in one region join together to bring out their common interests and combine their expertise in regional affairs is still quite rare. With the exception of the UK and Ireland, there are no other countries in this research where such consortia with regional aims have been established.

In the UK, Universities for the North East (unis4ne) is the regional consortium of the five North East universities. Its aim is to represent the universities in regional consultative processes with regard to issues such as regional development, human resources, and regional governance. The executive board of unis4ne comprises the representative at the Pro Vice Chancellor level of each of the universities, with the responsibility of regional engagement. Universities for the North East is a specific example of how the universities in the region have come together to influence the regional governance structure. Prior to unis4ne, involvement of university representatives in regional activities was ad hoc. Now, unis4ne has pulled together a constituency from which representatives can be provided. It forms the main structural link between the universities and any kind of regional consultative process in which the universities are involved.

In London, the London Higher Education Consortium is the regional consortium of all higher education institutions in the London region. The creation of the Greater London Authority has acted as a stimulus for the universities in the London region to form this consortium, in order to relate collectively to this new to be established London region. The purposes of the consortium are building on existing areas of common interest and specifically looking to the relationship between higher education

and new regional structures. This includes for example representation of the London higher education sector collectively where appropriate such as on the Greater London Authority, the Small Business Service or the Government Office for London, and maintaining liaison and working arrangements with organisations engaged in regional and higher education development.

In Ireland, there is a newly formed regional universities association called the Atlantic University Alliance (AUA) whose current members are the University of Limerick, the National University of Ireland Galway and University College Cork. The association also has some linkages with the Waterford Institute of Technology. The rationale of the alliance is to complement the strengths of the universities in a broad range of science, technology and business skills. The alliance's mission is to create structures and appropriate interventions to support the continued economic development of the alliance's regions via commercialisation and technology transfer between industries and the universities. The mission of the alliance is intended to be operationalised through a number of structures. One of these is the Institute of Technology Management whose first major programme is a technology transfer initiative to develop an inter-regional clustering programme focused on indigenous industry which includes co-operative links between the cluster elements and the universities. This initiative is part funded by Enterprise Ireland and involves close collaboration with the national and regional agencies.

9.2.4 Informal engagement

Informal engagements tend to be based on structural or ad hoc, not statutorily regulated, contacts between university research groups, individual academics, or transfer departments, and local or regional institutions. They often arise during public calls to conduct specific tasks, or to provide expert-advice for specific purposes, such as the revision of regional strategies. For some universities in this study, it appears that these informal structures are the most important and, in some instances, the only channel to influence regional decision-making. This is for example the case in Greece. Especially in the Attica region, which comprises the national capital, informal engagement by certain university research teams or departments is the most important basis of regional engagement. Informally most consultative committees include the input of universities. For example, in Attica the Technical University plays a role in the creation of the Lavrion Technology Park, and the University of Athens is the chief scientific adviser to the Region for the RISI and RISI Plus of Attica.

Other examples in the UK are the relations between the Universities in North east England and the Government Office for the North East (GONE), the office that deals with the administration of national policy at a local level where there is no single delivery mechanism. There are a number of policy negotiations and implementation fora organised by GONE in which the universities participate. However, their participation is limited by the relatively low level of obligation of statutory consultation with the universities.

Characteristic for this kind of engagement is that the relationship between the university or parts of the university and local actors is based on trust, sharing of interests, and often personal acquaintance. This also explains why these contacts very often tend to repeat themselves over time in the same settings. For example, some of the case studies described frequent longstanding contacts between university transfer offices or certain university departments, with local government departments or

chambers of commerce. An example for this is the close network between the *Transferstelle*, (transfer office) of the University of Dortmund and the *Wirtschaftsforderung* (Department of Economic Promotion) of the city of Dortmund. It is characterised by a deep collaboration of the directors of these institutions. Further participants of this informal network are the Chamber of Commerce and the management of the Technology Park in Dortmund. The same sort of relation exists between the University of Amsterdam's Department of Economics and the Chamber of Commerce in Amsterdam. Each year the Department is involved in carrying out economic and cultural surveys in the region of Amsterdam.

9.2.5 Personal appointments

This category concerns the various ways by which university staff participates on the boards of regional and local organisations and activities. In some cases, their appointment is based on their specific expertise in a certain domain. In others, it is based on their general management experience. Within the scope of this research, it is very difficult to gauge the extent to which universities permeate the region through such representation on local and regional organisations such as professional and learned bodies, health authorities, law and other organisations, trade unions, schools, local government committees, development agencies and chambers of commerce. It certainly appears that in some countries and regions this kind of regional involvement is one of the most important in terms of the influence the university has, not only on implementation of policy, but specifically on policy design and negotiation. For example, in Greece, it appears that with the lack of a certain degree of formal network organisation between universities and regional actors, this kind of personal engagement of academics in the region is the most influential. It is certainly true that the increase in the number of regional institutions involved in regional development in many countries has increased the number of positions to which senior university staff can be appointed. Furthermore, it appears from the experiences in this research that the relative amount of personal engagement of university staff in regional institutions is larger in central regions than in smaller, more peripheral regions. In smaller more peripheral regions, informal personal relations are more often institutionalised into larger organisations. In Ireland, for example the importance of informal linkages among Dublin's main institutional actors engaged in regional development seems to be far greater than in the Shannon region, where there exists an dense network of formal relations between the University of Limerick and regional actors engaged in regional development. The same situation applies to Greece: In Crete, university professors are prominent in all Conferences, and their opinion is asked when technical issues arise. In Athens, however, the involvement of academics takes place on a more ad hoc basis.

Overlooking the various ways of engagement in regional governance structures, the question arises what the contribution of the universities is to these governance networks. At which level does the university relate to the policy processes going on in these networks; is it mainly at the level of policy implementation, or also at the level of policy design? Before elaborating on this question, it must be realised that this role is of course also dependent on the structure of regional governance. When government policy for the region is externally formulated, and implementation is regional, then the university's role will be according to this division.

Generally speaking, it appears from the case studies that universities in the various regions are still mainly regarded by local and regional government organisations as

the deliverers of their policies, rather than key-informants in strategic thinking about regional development. Many activities have been concentrated in ad hoc narrow initiatives, which may have been successful in their own right, but have not a wider impact on the institutional scale of regional embeddedness. Engagement often has a instrumentalist character; the university is used as a partner for bids when the involvement of higher education is obliged, but the relationship does not develop any further. Partnerships are sometimes the solution to a more structural relation. They appear to be the most successful in cases where the university is a member on the basis of its capacity to deliver expert knowledge in a great number of fields. Examples are the knowledge circles in the Netherlands and the Regional conferences in Germany. However, it appears that there are a large number of partnerships that have a highly instrumental character, to access particular funding streams, which then disintegrate when funding ceases. This does not always have to be considered as a waste of funds. These ad-hoc partnerships are very important in creating the first working contacts between regional actors, and universities and other regional actors must take care, more than they do now, that these first ad hoc partnerships are developed into more structural relationships, by ensuring future funding bases.

There are some exceptions to this general view of the universities' role being mainly instrumentalist. Firstly, in the more peripheral regions universities already have for a longer time negotiated themselves a position of relative strength in regional governance structures, firstly because of the unique resources they have on offer in these regions, and secondly because of the relative simplicity and clear structure of regional governance structures. This implies that they are considered as crucial partners in regional development processes and they therefore play a more important role in policy design and policy negotiation. This situation applies for example to the University of Twente in the Netherlands, the University of Limerick in Ireland, and the University of Newcastle in the UK.

Secondly, concerning policy design the most remarkable feature is not the role of any particular university as a large institution but the role of specific individuals appointed by regional actors who sometimes occupy relevant positions, and from these positions, have a relative large influence of the policy design process. The relative importance of these kind of personal relations is most clearly shown in Greece and Spain. This raises the general question whether it is in all cases necessary and wise to formalise and institutionalise these personal links.

Thirdly, the few examples of higher education consortia in this study show that these structures can be very successful in engaging in regional governance structures on a more structural basis. Clearly, the structure of combining the higher education interests in the region and representing them by one organisation works to engage more pro-active in policy negotiation. The importance of combining interests is shown in the Greek example of Crete. Crete is characterised by the absence of any institutional contacts between the universities and actors engaged in regional governance. This appears to be partly due to the absence of any formalised links between the University of Crete and the Technical University. The deeply rooted antagonism between Heraklion and Chania seems to have been transferred to the academic system. The two universities have no established links and each one tries to promote its own activities. Despite the relatively short distance, they share no common infrastructure (e.g. the Technical University wanted an incubator in Chania, although the Forth incubator associated to the University of Crete has still ample space to fill). In isolated cases professors from the two establishments apply for

common projects, but again these are personal rather than institutional contacts and they are the exception rather than the rule.

9.3 The organisational structure of universities and the character of regional problems

In many ways, it is natural that local politicians, administrators and academics will not be able to reach a stable relationship, since their basic developments and orientations are different. Although university research is in the process of becoming more and more multi-disciplinary focussed, it still not matches the multi-disciplinary character of regional problems. The global disciplinary orientation of academic scholarship still leads to a premiering of high-level theory over description of local practice. This means that there is a lack of correspondence between the interests of the university, especially on the level of individual members of staff, which are often academic, and the interests of local actors and authorities. This mismatch is most clearly in the case of universities conceived of as international centres of excellence. Although the availability of funds for regional projects through the European Union and sometimes national governments, stimulates universities to engage in regional governance structures, none of the case studies showed examples of reward systems existing within universities in order to change the idea of regional engagement into an organisational idea. The result is often a gap between the directorate of a university and the operational levels in terms of commitment to local involvement. Many of the universities in this study have embodied the goal of contributing to regional development in their mission statements. Very often however, the universities appear to lack the capacity to translate this institutional commitment into operational involvement.

At the same time, it must be realised that universities no longer have a monopoly on knowledge production. Increasingly, knowledge looses its homogeneous, and disciplinary character. Also within universities, research is more and more produced in trans-disciplinary research centres that engage with external research partners and increasingly rely on third stream funding sources. With the increasing multi-disciplinary character of university research, the organisation of regional contact networks also becomes more problematic. Whereas traditionally contacts could most of the time be based on individual contacts of academics, the multi-disciplinary character makes this more difficult.

One solution to the above problem has been the establishment of so-called university single gateway units, which take care of the organisation of outside contacts. These units reach across old university boundaries to link up with outside organisations and groups. Some of them are professionalised outreach offices that work on knowledge transfer, contract-education, fundraising, property rights etc. Examples are the Transfer Office of the University of Twente (more examples). Others are interdisciplinary research groups, linked to a few departments, and better equipped to handle contacts with the outside world (examples from forest department in Joensuu). In all cases they represent a matrix-structure that crosses old academic boundaries. Although the single gateway might be a good solution to overcome the problems of multi-disciplinarity, research on these single gateways shows that they must confine themselves to being an enabling mechanism for the university, rather than an agency responsible for undertaking projects itself. The responsibility of the gateway is to manage the communications and the problems, not the problems themselves (Clark, 1999). This is clearly shown in the case of the University of Twente, where the

transfer office plays a crucial role in the management of local and regional contacts, but where regional actors at the same time declare that although relations may have an institutional character, it is very important for them to know who is behind the knowledge and experience delivered. Transfer agencies can manage the interface but they cannot replace the relationship between knowledge provider and recipient which is based on trust and acquaintance, especially when innovation is at stake.

9.4 Regional identity and local commitment

An important explanatory factor for regional involvement in governance structures, stretching across all the case studies in this study, is the identity of the region itself and the allied problem of the universities' local commitment to regional engagement. There are few aspects related to this regional identity that need further clarification

The first one is related to the character of the institutional and economic partners in the region, and the spatial level to which their work refers. Most of the central regions in this study are the seats of the national government and the main economic regions in their country. Examples are London, Madrid, and Dublin. In these regions, the engagement of universities in their regions is locally based but the content of this engagement is often focussed on the national and international scale. So, in a way: the local is the global in cities like London, Madrid, and Dublin and to a lesser extent Amsterdam (although Amsterdam is not the seat of the national government, it is the prime centre in almost every other aspect of economic social and cultural life). The groups and institutions universities interact with in the region are seated within the local area, but their business is nationally and globally as well as locally or regionally oriented. One can argue that this situation should greatly facilitate regional engagement of the universities in these areas, and that this regional engagement should be more interesting from an academic point of view. The evidence from this study partly subscribes to this idea. Especially with regard to informal personal engagement, it appears that the engagement in central regions is relatively more important than in more peripheral regions. In the Netherlands, for example, it appears that the number of informal and ad hoc relationships with regional, national, and international actors located in the Amsterdam area, is much larger than in the Twente region where engagement is more often of a formal character and related to formal policy initiatives. The same outcome can be found in Ireland, when the Dublin and Shannon region are compared. On the other hand, in more peripheral regions, engagement often has a more formalised character. In these regions we can often observe, amongst regional actors, a common institutional emphasis in creating regional linkages and networks as an integral component of the regional development strategy for a much longer time already. It could be argued that the need for formalised linkages in more peripheral regions is larger because of the spatial scale of the day to day businesses of the regional partners. In a certain way, in more peripheral regions the connection between academic work, which still is highly specialised and globally oriented, and regional actors whose work is mainly focussed on the level of the region is less self-evident. Formalisation of engagement in these regions may be more necessary than in central regions.

Secondly, it appears that the size of the region, and therefore the number of regional stakeholders and lead agencies who articulate regional needs, are of significant influence on the development of a regional agenda within the universities. In smaller, less central regions, universities often represent a unique repository of knowledge, often because of the lack of other institutions providing similar services such as

governmental research laboratories, social science research centres, and business with R&D departments. The result is that the enabling ability of the universities in these regions is greater: universities enjoy a position as vital partners for the success of particular policies and projects, which is in turn derived from the special place they enjoy within the region. This means that universities in these regions are better positioned to shape the institutional environment to their own ends, which has given them the capacity to engage pro-actively and to seek to determine the regional agenda, rather than participating in a re-active fashion. In the case of Spain for example, it appears that in Madrid the influence of universities on the regional policy agenda is less clear than in Andalucia, which can be attributed to the increasing number of actors within the regional system of research and higher education located in Madrid. This situation is also clearly shown in the case of Ireland and the Netherlands. In Dublin, there is a relative lack of formal institutional linkages and networks between the three Dublin universities and external actors in the Dublin region. By contrast, the Shannon region shows a relative multitude of formal institutional linkages and density of the actor network in which the University of Limerick is a vital partner for the success of particular policies and projects. Exact the same situation exists in the Netherlands when we compare the Amsterdam and the Twente region. The University of Twente has reached a position in the region whereby it is one of the determinants of regional policy and one of the main flagships of economic development in Twente, whereas the universities in Amsterdam are one of the many research service providers.

10 Conclusions and policy issues

This report has sketched out some of the emerging findings of the multifaceted nature of university-regional engagement. The research has identified a much deeper engagement of universities in their regions than is evident in the conventional literature on innovation activities, but still revealing considerable heterogeneity across Europe on account of structural characteristics of national higher education systems, and the scope for receptivity within regional institutions. Nonetheless, in spite of barriers and difficulties the diversity of practices and mechanisms results in patterns of interaction that find appropriate or possible forms regardless of the regulatory situation. Formal links emerge where the institutions are in place and where the regional problems are acute, whilst informal mechanisms develop in those situations where institutions do not permit formal relations.

The variations of national system of higher education imply that there will be differences in appropriate forms of good practice, although some underlying principles are common across all regions. The kinds of recommendations that emerge from the work are therefore quite generic although still appropriate in many cases where universities could be more effective in promoting a regional role for themselves.

Recommendations fall into two main groupings: those that emerge from the specific themes pursued in the study, and those that are more strategic and address issues of wider institutional policy. The recommendations listed below are quite briefly described and will be further expanded in a longer and more comprehensive version of this report to be published subsequently on the project website.

Recommendations relating to specific themes:

10. There are considerable national differences in policy on the tracking of students through the university system, monitoring social class and geography of origin and ultimate destination. All universities are recommended to invest resources into understanding the regional origins of students and destinations in order to be able to inform policy on curriculum development, placement and recruitment to regional firms, and to understand the role of the university in the regional labour market. Ideally such tracking should at least in part be managed on a national basis to disentangle the full inter-regional flows.
11. Universities should assess the extent to which they draw upon regional actors in the design of the curriculum and should assess the extent to which curricula should reflect local needs. Such consideration will depend on the localisation of graduates as dependent on adequate destination tracking.
12. Universities should develop a strategic plan for providing local business support, based on their understanding of regional industrial trends and potential links with their own strengths.
13. All universities are investing in the application of new ICTs for their core mission whether in research, teaching or administration. Often these developments are being planned without consideration for the regional implications, but could be implemented in such a way that regional benefits can be achieved. Consideration should be given to the regional consequences.
14. Universities are often considered as key partners in regional information society programmes due to their ICT resources, training role and expertise in application development. They should take a central position in the development of regional information society strategies and examine ways in which their resources can be more widely made available to the local population.
15. Universities should carry out an audit of cultural activities and provision and assess how their activities complements regional provision. Attention should be paid to the potential for enhancing the cultural role where regional collaboration can benefit the university and the region.
16. Each university that has significant provision of cultural education and training should consider the potential for culturally-based spin offs and business interaction alongside any existing strategy for technology-based business interaction.
17. Where universities institutional governance involves regional stakeholders, universities should consider how such relationships could be utilised by the institution to develop deep and productive regional partnerships and better integrate the region into the universities strategic planning.
18. Universities should seek to be active partners in regional governance partnerships, moving beyond the passive involvement of senior staff in committees to seek to shape the strategies of partners with the aid of university expertise. Internal networks within universities are necessary to ensure that those involved in external relations have access to the knowledge of staff within the university.

In addition to these specific recommendations there are a set of general recommendations:

A central concern is the need for each university to review their regional strategies and processes through benchmarking. Benchmarking can identify areas where improvement is needed. Once identified, examples of possible good practice can then be evaluated for potential implementation.

Benchmarking good practice in regional engagement

Benchmarking is becoming a well-established element within the process of continuous improvement for companies. Recently however the benchmarking concept is being applied to other areas, such as public services.

There are several key aspects of benchmarking that are valuable in this context.

- A range of benchmarks can cover the variety of actions and responses undertaken by a heterogeneous set of HEIs. Thus any HEI can identify areas in which it can be successful, without being assessed against a few narrow criteria.
- Benchmarking is a tool to support decision-making: in this case where should HEIs devote more effort in order to better support their regions. In this context benchmarking the HEIs regional engagement can be usefully connected with a parallel exercise at regional level to determine regional priorities.
- Benchmarking approaches have been developed which allow the use of qualitative as well as quantitative indicators, process measures, leading and lagging indicators.
- Benchmarking allows the combination of different forms of measurement, and the development of synthetic forms of representation of performance.

In a related project a proposed benchmarking framework for regional engagement has been developed which evaluates both quantitative performance data and qualitative good practice information concerning the ways in which the operation of the university and the activities of its constituent parts support regional economic and social development.

The tool provides a means for stimulating discussion and internal assessment of where to focus effort both for the benefit of the region and for the university.

- What mechanisms exist within the univeristy to establish a consensus on what strategic priorities should guide the regional development process?
- What mechanisms can be established within the university to link together existing regionally-focused activities and add value to them?
- What mechanisms exist within the university to balance its different geographical roles and create synergy between them?
- What mechanisms exist within the region to think about issues such as health, culture, the economy, and community regeneration, in a joined-up way?
- Finally, what mechanisms can be established to bring together those involved in the regional development process such as universities, regional agencies, community groups and central government, so they can begin to prioritise which regional needs should be addressed?

Monitoring and recording good practice initiatives

There is considerable evidence on good practice initiatives collected in the preparation of this and other projects. Much has only previously been available in a fragmented

way through ephemeral publications and websites, and there has been no opportunity to make comparisons across institutions within particular categories of initiative or problem focus.

Several options exist for making such data available, and universities should collectively assess how to collect and disseminate such information, perhaps with national associations facilitating the process.

One option would be for regional associations to provide a forum within which universities could exchange experiences concerning particular forms of initiative.

Embedding regional engagement in the mainstream

The next priority for universities would be to ensure that the lessons learnt are effectively embedded in the mainstream activities. There are three elements to effective regional engagement:

- Institutional level policy frameworks that set priorities, govern partnership arrangements and establish administrative infrastructures,
- External resources that support those activities where there is benefit to the region, but where mainstream funding council support and full cost recovery are not appropriate, and
- Activities that can be tied into mainstream teaching and research, and often require innovative thinking about combining missions rather than new resources.

Whilst the second of these does require external inputs from central government or regional partners, the other two elements are within the powers of the universities themselves. In some cases it seems that these elements are however almost neglected in the desire to obtain new resources, although greater value added may be obtained by providing a clearer set of signals to staff to encourage more regional engagement through mainstream activities.

Working through regional consortia

Finally, although the key lessons are for individual HEIs to implement good practices internally, there are an increasing number of examples of regional level collaboration, either through regional consortia or through other collaborative partnerships. Many of the problems faced by disadvantaged communities are such that HEIs working together can better assemble the package of knowledge, skills and resources needed.

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Dissemination Activities

Project website publishing

A website has been established for the project as a means to disseminate information about the project, to publish reports on major phases of the research, and to provide a resource for the project team and other interested parties. Part of the website is only accessible by the project team (password protected) as a means of exchanging interim outputs, but other resources include a list of relevant links accessible to the public, a project outline and information on other events organised by the project team.

Following submission of the final report all of the national and regional reports prepared during the project will be made publicly available on the website, as follows:

National background studies

- United Kingdom
- Germany
- Spain
- Greece
- Finland
- Ireland
- Netherlands
- Australia

Regional case studies:

- North Eastern England, London
- Ruhr, Aachen
- Andalucia, Madrid
- Attiki, Kriti
- North Karelia and Helsinki
- Dublin and Limerick.
- Noord Holland, Overijssel
- North Coast of New South Wales, Canberra

Presentations at conferences

Work by the project team has been presented at national and international conferences and symposia.

One such significant event was a conference organised jointly by the OECD International Management of Higher Education programme and the Finnish Higher Education Evaluation Council in Helsinki, March 1999. The conference was on the subject of the regional role of HE and drew upon previous research conducted by IMHE, FinHEEC and the Association of European Rectors. Our involvement in the

design of the programme through Prof. John Goddard enabled us to present a key note paper introducing the UNIREG project to the participants which comprised 80 university rectors, HE policymakers and leading researchers. In addition Prof. Kunzmann, and Dr Holtta presented case studies of their regions. As a result of this event we were able to build links with a number of other researchers and with organisations such as OECD, CRE and FINHEEC.

Conference and other presentations

Benneworth, P. (2000) "Public-private partnerships and strategy - the role of the university as animateur" Research Note presented to "public and private partnerships - the enabling mix" 6th International Conference 24-27th May 2000, Cork Institute of Technology, Cork, Ireland

Charles, D.R. (1999) 'University interactions with their local and regional economies' ESRC Urban and Regional Economics Seminar on Local and Regional Economic Impacts of Higher and Further Education, Carlisle 7th January.

Charles, D.R. (1999) 'The regional development perspective: EU universities and regional development research project UNIREG' OECD IMHE conference on 'The Response of Higher Education Institutions to Regional Needs', Helsinki, 22nd-23rd March.

Charles, D.R. (1999) 'Universities and their regions: regional governance in a learning society?', LEPU seminar on Further and Higher Education in Local Economic Development, South Bank University, London, 28th April.

Charles, D.R. (1999) 'Universities and their Regions: Regional Governance in a Learning Society?' Regional Studies Association European Conference, Bilbao, 20th – 22nd September

Charles, D.R. (1999) 'Knowledge production, localisation and the role of universities in regional development,' NECTS/RICTES conference on Regional Innovation Systems in Europe, San Sebastian, 30th September – 2nd October.

Charles, D.R. (2000) 'The global face of learning regions' invited key note address, Flexible Futures in Education and Training, Queensland University of Technology, Brisbane, 14th April.

Charles, D. & Benneworth, P. (2000) "Universities, learning regions and new approaches to regional planning and policy; case studies and lessons from the English regions" paper presented to Regional Planning and Policy, 30th Annual Conference of Regional Science Association International: British & Irish Section, University of Bath, Bath, 6-8 September 2000

Charles, D.R. (2000) 'The use of ICTs in encouraging learning in SMEs and disadvantaged communities: UK experiences' seminar presentation at SNF Bergen, Norway 9th November

Charles, D.R. (2000) Knowledge production, localisation and the role of universities in regional development, European Commission', Workshop on the regional level of implementation of innovation and education and training policies Brussels 23rd-24th November

Charles, D.R. and Conway, C. (2000) 'Upgrading the regional skill base: an international review of the issues surrounding universities and graduate mobility', Aberdeen 11th-12th December

Charles, D.R. and Cornford, J. (1999) 'Universities and the regional development agenda', Higher Education and its Communities,' 1999 Annual Conference of the Society for Research into Higher Education, Manchester, 14th-16th December.

Goddard, J.B. (1999) 'The response of higher education institutions to regional needs,' OECD IMHE conference on 'The Response of Higher Education Institutions to Regional Needs', Helsinki, 22nd-23rd March.

Goddard, J.B. (1999) 'The role of universities in regional development', Principal's Conference, Napier University, Edinburgh, September 1999.

Goddard, J.B. (1999) 'Assessing the contribution of higher education to businesses and the community,' UACE Vocational Lifelong Learning Conference, University of Derby, September.

Goddard, J.B. (1999) 'The response of HEIs to regional needs: towards a more interactive university?' Aalborg University, Denmark, October.

Goddard, J.B. (1999) 'The response of higher education institutions to regional needs,' SRHE/IMHE/CRE International Seminar, University of Strathclyde, October

Goddard, J.B. (1999) 'Universities, regional development and higher education policy,' CVCP Knowledge Links Conference, London, December.

Goddard, J.B. (2000) 'The response of HEIs to regional needs: the role of universities in driving the process of regional development,' CeCODET, University of Oviedo, Spain, January.

Goddard, J.B. (2000) 'The role of a university in its region,' Special Research Lecture, University of Newcastle, February.

Goddard, J.B. (2000) 'Regional and international collaboration,' CVCP Conference, The Business of Borderless Education. London, March.

Goddard, J.B. (2000) 'Universities and urban regeneration,' Seminar, Prime Minister's Policy Unit, No. 10 Downing Street, London, July.

Goddard, J.B. (2000) Mobilising Universities in Support of Regional Development, Graz, Austria, 22 September

Goddard, J.B. (2000) Universities and regionalisation, International Symposium on the Future of Universities, Newcastle, September.

Goddard, J.B. (2000) Mobilising Universities in Support of Regional Development, Oresund, Copenhagen, 24 October

Goddard, J.B. (2000) Mobilising Universities in Support of Regional Development, Kassel, Germany, 7 November

Goddard, J.B. (2000) Mobilising Universities in Support of Regional Development, Mare Nostrum Conference, Helsinki, November

Goddard, J.B. (2000) Mobilising Universities in Support of Urban and Regional Development, RDA Conference, Nottingham, November

Goddard, J.B. (2000) Universities as a tool for local regional development, Foundation Degree Conference, London November

Goddard, J.B. (2000) Regional Economic Development: A role for Medical Schools? Council of Heads of Medical Schools, Conference, Edinburgh, December

Goddard, J.B. (2000) Mobilising Universities in Support of Urban and Regional Development, UNICA General Assembly, Brussels, December

Hölttä, S (1999) 'Case study of Joensuu University', OECD IMHE conference on 'The Response of Higher Education Institutions to Regional Needs', Helsinki, 22nd-23rd March.

Hölttä, S (2000) 'The Finnish higher education systen- structures, functions and challenges', Sistemas de Ensio Superior/Higher education Systems, Porto, Portugal, 17-18 April

Hölttä, S (2000) 'The model of an entrepreneurial university', The Challenge of Developing Intercultural Competence in Education, 52nd Annual Conference of NAFSA, Association of International Educators, San Diego, California, 28th May-2nd June

Hölttä, S and Malkki, P. (2000) 'Response of Finnish education institutions to the national information society programmes', 21st Annual EAIR Forum, Lund University, Sweden 22-25 August.

Kunzmann, K. (1999) 'Case study of Dortmund University', OECD IMHE conference on 'The Response of Higher Education Institutions to Regional Needs', Helsinki, 22nd-23rd March.

Formal publications

It is intended that the main findings of the project, as reported in an abbreviated form in this report will be published in a more extensive form in a report to be produced in the Autumn of 2001. This report will be published via the project website and disseminated to the relevant policy communities in each of the countries involved in the project as well as at the EU level.

Our current plans are for two project-wide synthesis papers to be prepared for submission to refereed journals: one a theoretical review on knowledge production, localisation and the role of universities in regions, the other a comparative review of the national policy context for university regional engagement. It is also expected that a number of papers will be produced from the regional case study work.

The overall objective remains a collective book project consisting of a theoretical review, a national synthetic review, and the thematic cross-national papers from the second year of the project.

Currently there is agreement from the journal European Planning Studies to accept a special issue drawn from the members of the project team, including around 5 papers.

Existing and Forthcoming Publications

Benneworth P.S. (1999), 'The future for relations between Higher Education and RDAs,' **Regions,** 220 p 15-22

Benneworth, P. S. &Charles, D. (2001) 'Expert or lobbyist? Universities, the new regional agenda and London's governance' in S. Syrett and R. Baldock (eds) **Governing London: competitiveness and regeneration for a global city**, London: Middlesex University Press

Charles, D.R. and Benneworth, P. (2001) 'Are we realizing our potential? Joining up science and technology policy in the English regions', **Regional Studies**, 35, 73-79.

Chatterton, P. (2000), Will the real creative city please stand up?, **City**, 4, (3): 390-397.

Chatterton, P and Goddard, J. (2000), The response of higher education institutions to regional need, **European Journal of Education**, 35, (4): 475-496.

Chatterton, P (2000), The cultural role of universities in the community: revisiting the university - community debate, **Environment and Planning A**, 32: 165-181.

Chatterton, P (1999), University students and city centres - the formation of exclusive geographies: the case of Bristol, UK, **Geoforum**, 30, (2): 117-133.

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Holtta S, (1999) 'Regional co-operation in postsecondary education in Europe - the case of Nordic Countries', **Journal of Institutional Research in Australasia**, 8

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Holtta S, (2000) 'From ivory towers to regional networks in higher education governance,' **European Journal of Education**.

Rappert, B, Webster, A and Charles, D.R. (1999) 'Making sense of diversity and reluctance: academic relations for USOs and SMEs, **Research Policy**, 28, 873-890.

Webster, A.J., Rappert, B. and Charles, D.R. (2000) 'Controlling intellectual property across the high-tech frontier: university spin-offs, SMEs, and the science base' in Blackburn, R. **Intellectual Property and Innovation Management in Small Firms**, Routledge, London.

Project initiated seminars and conferences

An international seminar in September 2000 was hosted by the University of Newcastle and organised by Professor John Goddard. The seminar was chaired by the University's Chancellor, European Commissioner Chris Patten, and was on the subject of the future of universities. One of the seminar themes was the regional role of universities.

A Summer School was held in Newcastle in July 1999, the fourth such event organised by CURDS and ERP (previously building upon the EUNIT Human Capital and Mobility research network). The concept of the Summer School was to introduce the themes addressed by the research to a wider network of young researchers from across Europe and beyond. The summer school involved lectures by three of the partner centres, with participants being a mix of UNIREG and other researchers. A key feature of the summer school is the confrontation of research ideas with the

practice of policy – participants explore concepts and then have opportunities to discuss these with practitioners and undertake agency case study visits. They then analyse what they have discovered and present the results to the wider group. The Summer School had 16 participants from the UK, Finland, Greece, Ireland, Germany, the USA, Australia, Switzerland and France.

User groups and informal stakeholder relations

Each of the project teams established a user group representing the various stakeholders to which the project will be disseminated. Teams have met with their user groups at varying dates during 1999 and 2000.

Related projects and spin-offs

The Newcastle team is extremely active in research on university regional engagement at present, and since the start of this project several other UK projects have commenced which have relevance for UNIREG. These are briefly described below:

- The Role of Higher Education in Learning Cities – This ESF funded project seeks to examine the role of universities in learning city initiatives in the UK. The project is led by Middlesex University and runs to the June 2000.
- The Regional Role of Warwick University – this study, commissioned by Warwick University has involved the examination of the different needs of the regional community, and the different channels by which the University seeks to support those needs.
- Economic Impact of the University of Edinburgh's commercialisation strategy – The University commissioned this study to assess the local economic impact which will ensue if the University achieves its current targets for increased research, commercialisation and spin-off firm formation over the next five years.
- The Regional Role of Higher Education – The Higher Education Funding Council for England has commissioned CURDS to co-ordinate the production of a set of regional reports in conjunction with regional consortia of universities. We will also produce a national overview report to be published with the series.
- Higher Education Business Interaction Survey – A national survey for the UK government on interactions between higher education institutions and business is being undertaken in early 2001.
- Advanced Research Training in University Regional Interaction (ARTURI) is a Marie Curie Training Site, which will further disseminate the findings of UNIREG through the training of PhD students.