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The embedded university in the 'science economy' : capacities, contexts and expectations

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The Embedded University in the ‘Science Economy’: Capacities, Contexts and Expectations

FINAL REPORT

Network funded through ESRC ‘The Impact of HEIs on Regional Economies’ programme

September 2006

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Tim May and Beth Perry, SURF, September 2006

EXECUTIVE SUMMARY

- The network was funded by the ESRC as one of five networks across the UK which were designed to examine the current state of research in relation to higher education institutions (HEIs) and regional economic development. It brought together academics, policy-makers and senior HE managers together in order to formulate a forward looking research agenda that incorporates policy priorities on the role of universities in economic and social development.
- The report provides an overview of the network. It examines the main gaps in understanding in relation to universities and economic and social development, with a particular focus on local and regional science-based economic initiatives.
- Two workshops were held in Phase 1, along with three seminar in Phase 2 in each of the three partner institutions and a final meeting to synthesise and discuss the findings prior to the writing of this report. Core partners, academic collaborators and senior HE managers came together to review current knowledge, assess future areas for research and institutional capacity. Interviews were also conducted with policy-makers and stakeholders that included relevant perspectives on expectations and capacity. In addition, a supplementary literature review supported the overall process.
- Two observations underpin this analysis. First, there is a need to develop a broad understanding of the diverse economic and social roles of HEIs not only in relation to science, but also teaching and outreach more broadly across different disciplines, institutions and geographical scales of activity. An exclusive focus on ‘science cities’ or ‘regional science councils’ is unhelpful in considering the breadth of universities’ roles and impacts.
- Second, there is a need to improve understanding of the relationship between policy drivers and institutional responses. A ‘missing middle’ exists between the *possibilities* represented in attempts to embed universities in their localities and the *realities* of actual implementation. ‘What is to be done’ needs to be matched against institutional capacity to deliver. Research is needed to understand this gap and this should include a sustainable vision of the distinctive role of the university as a site of knowledge production.
- Three areas require further research to inform policy conception and implementation. They are: methodological issues; scales of action and forms of governance and institutional capacities. Key gaps include: how can a variety of university impacts be measured across different activities, disciplines and scales of working? How can we understand universities’ activities within multi-scalar contexts – local, city-regional, regional, national and international - and what does this mean for governance arrangements? What are the implications of engagement in local and regional economic development for internal governance arrangements, leadership and organisational forms? Greater attention needs to be paid to *how* different university activities translate into economic and social advantage and the implications for different groups within sub-national contexts and policy formulation and implementation.
- A description of the network, along with its members, partners and activities can be found at <http://www.surf.salford.ac.uk/EmbeddedUniversity/index.html>.

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1. INTRODUCTION

This network has been funded by the ESRC as one of five networks across the UK to examine the current state of research in relation to HEIs and regional economic development. This report provides an overview of the network and the main gaps in understanding in relation to universities and economic and social development, with a particular focus on local and regional science-based economic initiatives.

1.1 Aims of the Network

This network brought together academics in the sciences, social sciences and humanities to review the existing evidence-base and work with policy-makers and senior HE managers to formulate a forward looking research agenda that incorporates policy priorities on the role of universities in economic development. It focused on regional and local science-based developments in the North of England as a means of illuminating key gaps in understanding and opportunities for universities. The network aimed to foster a productive dialogue between academic and policy worlds about the expectations policy-makers hold for universities, the conditions governing the capacity of those institutions to deliver and the implications for public policies at different levels of scale.

The core partners were the Centre for Sustainable Urban and Regional Futures (SURF) at the University of Salford; the Institute for Policy and Practice/Centre for Urban and Regional Development (IPP/CURDS) at the University of Newcastle and Policy Research for Engineering, Science and Technology/Centre for Research in Innovation and Competition (PREST/CRIC) at the University of Manchester.

The network had two phases of activities. First, a gap analysis of current research in relation to universities and economic development conducted between February and April 2006. Second, a widening and deepening of the network through three seminars – two in Manchester and one in Newcastle – which explored key themes emerging from the seminars around regional and local science-based economic development (June – July 2006).

1.2 Description of Activities

1.2.1 Workshops with Core Partners, Invited Academic Collaborators and Senior HE Managers¹

Two workshops were held as part of the gap analysis at the SURF Offices in Portland Street, Manchester. Workshop 1 brought together the core partners to better understand research synergies and to consider, with the input of invited academic collaborators, key gaps in understanding. Presentations were made of key research interests of the three main partners and discussion then centred on overlaps and areas of further research. Workshop 2 then sought to test the outcomes of the first workshop with a selected group of senior HE managers from 8 universities from the Northern Regions, as well as the Chief Executives of 2 university

¹ The agendas and presentations can be viewed at the network website
<http://www.surf.salford.ac.uk/EmbeddedUniversity/index.html>



associations. Feedback from the first workshop was given and discussed prior to group activities that focused on issues of institutional response to the local/regional science agenda.

1.2.2 Interviews with Stakeholders

The views of policy-makers and stakeholders have been sought in relation to the gap analysis. A total of 25 interviews (7 of which by telephone) were carried out with key representatives of organizations responsible for the delivery of science policy and HE relations at national, regional and local levels. This included the Department for Education and Skills, Department for Trade and Industry and Department for Communities and Local Government, which enabled national level enrolment into the work of the network and engagement with the seminars in Phase 2. Interviews focused around three questions: what can reasonably be expected of universities in relation to local/regional science-based initiatives? How well-positioned are different universities to deliver on this agenda? What are the main gaps in understanding in relation to universities and economic development?

1.2.3 Literature Review

A literature review was conducted to examine existing research underpinning the emerging gaps in understanding. This review was focused around literatures in the areas of measurement and impact; scales of activity and institutional capacities – the three main gaps in understanding emerging from workshop 1. The insights of the literature review have been incorporated within the report and selected references are provided where relevant.

1.2.4 Widening and Deepening the Network

Following the above activity, 3 seminars were hosted, one by each of the core network partners, focussing on key areas emerging from the gap analysis. These areas were: “From Information to Intelligence: University Engagement and Strategic Socio-Economic Development (SURF); Universities, Science Cities and the City-Regional Agenda (IPP/CURDS) and The Role of Universities in Innovation and Economic Development: Theory, Measurement and Practice (PREST).

The aim of these seminars was to identify and draw together an interdisciplinary community of researchers, policymakers and HE managers to address the research questions identified in the gap analysis. The hosting partner then acted as rapporteur producing a report on the discussions and outcomes. A final meeting of the network partners, as a result of consultations with policy makers and HE managers, then took place to draft a ‘Research and Policy Priorities’ document which forms part of this final report.

In order to build capacity for continuation of the network post-funding, an email network list has been established. This is supported by a website that includes network activities and reports, partner information and appropriate links

(see: <http://www.surf.salford.ac.uk/EmbeddedUniversity/index.html>)



1.3 Structure of Report

The report is structured in five main sections. Following this Introduction, there is a gap analysis that draws on the various activities of Phase 1 of the network and constitutes a description of the focus of the network around which particular communities of expertise have been built. This is followed in a third section by a report of the widening and deepening phase of the network, including summaries of the discussions in the three Phase 2 seminars. The future research and policy priorities which arose as a result of the network activities are contained in section 4. This is followed in a final section by an overview of the impact and dissemination activities of the network.

2. THE GAP ANALYSIS

The gap analysis synthesized the insights from the three main activities of Phase 1 of the network: the workshops, stakeholder interviews and literature review. There was considerable overlap between the messages emerging from these activities, such that their individual treatment would not be meaningful. We focus here on two broad areas where further research is needed, from which three specific and inter-related themes emerge: methodological and measurement issues; scales of action and forms of governance and institutional capacities. Each sub-section concludes by summarizing key questions to be addressed through further research to inform effective policy.

2.1 Broadening Concepts

Both in research and policy communities an understanding of the role of universities in economic development has been shifting away from a narrow focus on science and technology to a more complex understanding that includes multiple socio-economic roles. Traditional accounts of the relationship between science and technology focus upon an account of innovation that is both linear and limited in terms of definitions of science, understanding of the needs of relevant sectors and institutional contexts matched against possibilities. The focus has tended to be on ‘big science’, high-tech sectors and research-intensive universities. What this masks is the fundamental contribution of a range of disciplines, sectors and higher education actors to local and regional economic development. Work undertaken by the core partners drew attention to this deficit via, for example, an emphasis on the wider contributions of universities to their localities, including community work, cultural contributions and student and graduate mobility and markets.¹

Limitations to current ways of thinking about regional science-based initiatives need to be seen in historical and comparative perspective. The Science Park-led ‘high-tech fantasy’, inspired by successful regions in the US such as Silicon Valley, has been adopted and emulated in the UK and elsewhere in Europe over the decades. In countries in East Asia, such as Japan and South Korea, technology-based local development has been promoted by the central governments since the 1980s. Starting in 1983, high-technology based local economic development was the key idea of the Technopolis programme in Japan. The R&D contribution to developing research infrastructure in these sites, along with the dense network of Regional Research and Technology Centres, is known to have assisted in translating technological findings at universities and other research institutions into practical applications in SMEs via consultant-type intermediaries. However, legal and organisational constraints at universities, as well as the concentration of R&D and human resources in metropolitan areas, prevented the full development of science-based local economic development in the 1980s and early 1990s. Research has compared regional innovation support organisations in Japan, South Korea and Germany, pointing out the different levels of institutional penetration and the extent of devolution which conditions knowledge transfer processes.

This pointed to the need for greater understanding of current initiatives in the UK via research on the historical significance of ‘science cities’. Included here are the ways in which new agendas can address the limitations of previous approaches through a comparative learning process. Innovation should be constituted through a *learning* process, not *forgetting* in the drive for imagined but unrealisable futures.²

It was widely felt that ‘science cities’ – to the extent the term is useful - had to be more than a re-branding of science parks and incubators. It should encompass all economic, social and cultural impacts of a university in the region and beyond - i.e. it is a product of the university as a whole and the characteristics/strengths of its location. Concern over the limitations of current interpretations of ‘science cities’ or indeed ‘the Northern Science Initiative’ was consistently expressed through the activities.

Overall, restricting an understanding of the roles of universities in economic development to an analysis of the ‘science cities’ initiatives was felt to undermine an important set of other contributions of the university across disciplines and different activities. A key issue emerging in relation to local and regional science-based developments is to better understand the driving forces and actors’ specific agendas, rather than to assume a coincidence of interests between dominant economic and university actors.

Key Questions

1. How can a wider understanding of the multiple socio-economic roles of universities be built?
2. What is the historical and comparative background for the development of the ‘science city’ concept?
3. What can we learn from past failures as well as popular successes?
4. How are ‘science cities’ developing across the UK in particular localities, in relation to institutional arrangements, policy drivers, incentives, governance mechanisms, interests and outcomes?
5. How, in particular, are different actors positioned in relation to ‘science cities’? Who might be the winners and losers?
6. What might be the ‘value-added’ of a “science city”?
7. How can the ‘knowledge economy’ be developed in sub-national contexts in a manner compatible with the aims of social inclusion?
8. What alternative frameworks exist for understanding universities’ roles in economic development?
9. How does this relate to the changing visions, cultures and discourses of the university?
10. How does it relate to formal or implicit rationales for science policy at the national or sub-national level?

2.2 The ‘Missing Middle’: Capacities, Contexts and Understanding

The activities indicated agreement on the need to better understand the relationship between policy drivers and institutional responses within different institutions. A ‘missing middle’ existed between the *possibilities* represented in attempts to embed universities in their localities and the *realities* of implementation: that is, between the realism of expectations and actual capacities to deliver. Further research is needed to understand how such a gap can be populated and also to improve overall understandings that feed into ‘intelligent policy’ that is context-sensitive and so has the capability to be transformative.

Telephone interviews and workshop activities highlighted this divide between context, possibility and policy expectations. First, there was concern for the consistency of expectations in the policy world and issues relating to how different initiatives may be ‘joined up’, rather than conflictual. It was clear that drivers from the Treasury for ‘science cities’, in terms of assumed links between university activity and wealth creation, need more examination in order for a better understanding of what can and can not be expected as a result. Second, local and regional governance arrangements for implementing science-based initiatives are variable, expressed through the consistency of messages in strategic direction and the capacity for concerted action. Third, the relationship between universities - in terms of leadership, partnerships and developmental possibilities - and local and regional governance structures requires more understanding to produce a better match between capacity and expectation. Fourth, university organisational structures and cultures are variable in terms of engaging with local and regional initiatives and a better understanding of this variation, its reasons and effects is required.

Further research into contexts of knowledge production, transmission and reception is core to the above sets of concerns. This is because universities are not best thought of as single purpose actors. Different constituent groups have different expectations of universities from local communities to large multi-national corporations. More investigation is required into the ways different demands are both met and also shaped in partnership for mutual benefit. The tensions between different demands on universities were also raised: for instance, in relation to the core mission of universities and their responsibilities to students, matched against the work of Regional Development Agencies whose remit is solely for economic development.

The result is different expectations in the academic and policy worlds set against a backdrop of continually changing policy initiatives. Better coordination and communication is needed, for instance in terms of the short time-frames of government and the requirement within universities for long-term investment in infrastructures.

Key Questions

1. How do forms of local and regional governance inform the role of universities in economic and social development in different contexts?
2. What types of partnerships within different sectors, in given localities, exist and what effects do they have on university-community interactions?
3. How do different styles of university leadership and culture inform strategic direction and performance?
4. What is the relationship between organizational structure, forms of knowledge and the capacity to inform economic development?
5. What is the role of intermediary organizations, between a university and its environment, in developing capacity for university engagement?

Out of the two broad areas above come a series of themes that need to be explored through further research.

2.3 Methodological and Measurement Issues

A key issue limiting understanding of the role of universities in economic and social development relates to the paucity of appropriate indicators across a range of areas and at different scales of activity.³ Indicators present different challenges depending on varied aims and objectives, i.e., whether they are aimed at profiling the regional economy, monitoring change and identifying trends; benchmarking; measuring progress against targets; making a case for funding of a scheme or for promotional purposes. Indicators have also tended to be developed in relation to a small range of university activities: for example, spin-outs, patents and the analysis of multiplier effects. Whilst Government thinking on universities' roles has changed, appropriate metrics upon which to base understanding and measure effect have not been adequately developed.

The impact of universities on the development of successful localities through the creation of high-tech firms, epitomised by success stories in Silicon Valley with Stanford University, Route 128 with MIT and Cambridge in the UK, has been widely recognised.⁴ More recently, however, there has been a shift in the attitudes of governments towards the role of the universities. In response to new expectations from governments, universities have themselves conducted research on the economic impact of institutions in their localities. During the 1990s, a number of studies were conducted which estimated the local economic impacts of a university.⁵ However, these studies were narrowly focused on the local and direct economic impact through multiplier values and employment or/and technology transfer. This leaves out not only other wealth creation activities via, for example, informal network activity, but also larger social contributions that have beneficial effects upon social cohesion.

A number of literatures have addressed issues involved in the measurement of university activities and assessment of local economic impact.⁶ Efforts have also been conducted to characterise the activities of research labs (such as the compass card model, see Laredo et al, 1992)⁷. Universities can make an economic contribution to their local territory in two ways. First, there is the direct impact of the initial investment and the effects of students and staff spending and universities' operating expenditure on the surrounding economy. This has led to universities being regarded as significant economic actors in their own right. Second, universities are public institutions that carry out missions of higher education, training and knowledge production and dissemination that contribute to the local accumulation of human capital, as well as missions of research and knowledge creation that promote technological progress in the host territory. However, these contributions, along with civic roles and participation in local and regional governance, have tended to be neglected in impact studies.

There are indications that this is changing. HE is widely seen as a crucial ingredient in the 'regional economic development mix' and as fundamental to the development of the knowledge economy. Interest in universities as part of the regional economy has been growing internationally.⁸ In the UK there have been reports commissioned by funding councils and other bodies to identify the economic impact of HEIs in regional economies.⁹ The focus of these reports has been shifting from those narrowly focusing on the economic impact of universities to those identifying various impacts of practices of universities in their localities. For example, HEFCE (2002) issued broad guidelines for benchmarking good practice in assessing regional development contribution of higher education institutions (HEIs).¹⁰

In 1999 HEFCE, in partnership with other bodies, initiated a new ‘third stream’ of funding, albeit in a small way compared with other streams, complementing the Council’s existing grant for teaching and research. The objective was to reward and encourage universities to enhance their interactions with business, industry and the public services and in so doing contribute to economic growth and competitiveness especially in universities’ host regions. Yet national initiatives have tended to focus on a narrow and measurable concept of knowledge transfer or technological transfer, rather than the broader idea of ‘reach-out’ that they were originally intended to foster. Whether third stream activities should be promoted separate from teaching and research is an issue.¹¹

It is important to make a distinction between outreach activities and the outcome of these activities.¹² A wide range of university and multi-tiered scales of activity need to be considered in developing any indicators or measurement tools in order that local and regional knowledge-based economic development can not only be justified, but also assessed. The dynamics of competitiveness need to be investigated, developing indicators to explore the relationship between sources (physical assets, knowledge assets, civic intangible assets) and outcomes of competitiveness (the result of attempts to exploit these resources in relation to universities) across a diverse range of stakeholders. For instance, although there is a significant amount of existing secondary data on the economic impact of universities in the region and the relative research performance of different institutions, there is less understanding of how the HEI sector relates to regional and city-regional priorities and the effectiveness of that engagement from a private sector perspective.

This is evident from the private sector interviews conducted. In the Manchester: Knowledge Capital initiative, for example, an enthusiasm for the possibilities of local and regional science-based developments was found at strategic levels, along with recognition of the role of universities. However, this has not been systematically translated into tangible activities that involve a great number of university staff in inter-institutional collaborations.

Overall, the approach taken by research communities in this area seems to have been rather circumstantial and not robust enough to provide coherent and meaningful policy directions. Impact assessment is poorly equipped to reveal much about the softer impacts in terms of the quality of life experienced by participants at all levels in the higher education system. Methodologically, how measurement takes account of the value-added of partnerships through the concept of social robustness at different time scales, are core issues.

Research is needed to better conceptualise and map knowledge interactions, commercial links and the economic development impacts of universities with firms and other organisations at different levels of scale. This would involve assessing the quality of ‘common currency’ indicators of: research activities, teaching and skills development formation activities and business, community and voluntary sector interaction. At the same time, work is needed to explore how performance measurement systems, such as the Research Assessment Exercise (RAE)¹³, impact upon universities and their activities and how they influence the incentives/ expectations of individual actors and institutions.

What was raised as a significant issue is the lack of a robust evidence base that allows for future planning and which could foster a broader and more strategic understanding of universities’ socio-economic roles. Policy makers are often working with out-of-date economic models,

limited by the absence of appropriate metrics sensitive to different scales of activity upon which public interventions can be justified.

There is an absence of any theoretically rigorous, empirically tested and measurable alternative that links university activities with economic *and* social / cultural / environmental / health benefits. Serious concerns remain about the real benefits that can be expected from scientific investments and questions over the effectiveness of public policy. ‘Science’ has a high attributed value from policy-makers, but its ability to lead to ‘real’ transformations in local and regional economic fortunes has received inadequate attention.

A second set of key methodological challenges relates to the need for new kinds of interdisciplinary urban science. Urban problems cannot be addressed by single disciplines or institutions requiring new research practices, collaborations and relationships with users and stakeholders. Emphasis has been placed within the academic literature on the movement to new modes of knowledge production in which relationships between research and practice are being re-formed.¹⁴

Attention should be given not only to *policy for science*, but *science for policy*: that is, the ways in which science, knowledge and research are translated into meaningful strategic policy intelligence for ‘intelligent policy’. Interactions between universities and local and regional economic actors are not bounded within particular initiatives, but are wide-ranging and varied.¹⁵ Further research is needed on evidence-based policy and the relationship between university knowledge and economic policy decision-making.

Key Questions

1. How can the variety of economic impacts of universities be measured across different activities, disciplines and scales of working?
2. What is the relative importance of different sciences, research, innovation, teaching and outreach activities?
3. How do indicators taken account of indirect economic effects of a university across different time frames?
4. How can economic impact be understood across a range of sectors including culture and creative industries, SMEs and the voluntary sector, as well as communities in general?
5. What economic benefits can realistically be expected from scientific investments and how well is this reflected in dominant policy rationales?
6. How valid is the concept of ‘trickle down’ to local and regional communities and to what extent, if at all, are they beneficiaries of universities’ local economic impacts?
7. How can different research communities collectively address urban policies and contribute to developing an inter-disciplinary ‘intelligent policy’?
8. How can we understand ‘science for cities’ as well as ‘cities for science’?

2.4 Scales of Action and Forms of Governance

Recent work on geographical scale has convincingly revealed the essential importance of scalar hierarchies, relational processes and multi-level dynamics. Certain methodological dangers which accompany debates on ‘the scale question’ have already been pointed out.¹⁶ Universities also operate in a multiplicity of spaces, not only geographical but also epistemic, relational, cultural, hierarchical, etc. The question of how best to conceptualise geographical scales and the tangled, multi-tiered hierarchies in which they are embedded has only just begun to be investigated explicitly and systematically through, for example, an emphasis upon the relations between space and knowledge production and contributions to the formulation of urban policy.¹⁷ This has important consequences for universities. The key issue is to understand the variety of universities’ multi-scalar impacts and engagements and develop a better understanding of forms of ‘embeddedness’ in relation to different activities.

Since the mid 1990s, several authors have drawn attention to the issues specifically involving the university as a ‘regional actor’.¹⁸ Although regional issues have existed for universities since at least the 1960s, an understanding of these was not shared among many of the established universities. Nowadays, in both policy and academic literatures, a great deal of effort is devoted to creating closer links between a university and its region. Since the late 1990s, the higher education funding councils in the UK have developed a range of initiatives with geographical implications, serving as incentives for HEIs to work with their regions and cities. The new geographical groupings of universities reflect the emerging regional partnership arrangements in England.

The White Paper, *The Future of Higher Education* (DfES), published in January 2003, states that the involvement of universities and colleges in regional, social and economic development is critical. Stronger partnerships are encouraged between HEIs in each region and the RDAs and other agencies are charged with promoting economic development. The Lambert Review and recent strengthening of HEIF funding represent further moves in this direction. Yet there remain strong financial pressures upon universities and they may need to place a higher priority on being responsive to their local and regional communities’ needs and on positioning themselves differently in order to receive funding support.¹⁹ For industry, local authorities and regional development agencies, universities are increasingly seen as ‘local assets’ to be exploited for the benefits for the regional economy.²⁰

The issue of ‘territoriality’ is not straightforward for universities. For some institutions to become ‘a regional university’ has been seen as a source of stigma, whilst regional partnerships can alternatively be a route to international research standing. There is a demand for universities to be both local/regional and international in the globalising knowledge economy, whilst many of the legislative decisions about higher education are made at national, and even EU, levels. Universities find themselves having to pay attention to ‘many more political centres’ than before (e.g. research grants and teaching accreditation from both the European, state and the regional level).

There is a paradox about the role of the universities in regional economic development. The assumption is made in much of the literature on innovation and technological change that universities are part of the regional innovation infrastructure. Nevertheless, in practice, universities are difficult to co-ordinate as part of a regional strategy, partly due to their status as

‘autonomous institutions with allegiance to multiple territories’ rather than to specific regions as such.²¹ Indeed, it is not only the UK central government that decides and influences regional policies. Several authors have noted the gradual process of devolution taking place in the UK, with increasing attention being paid to the role of higher education within the regional economy and attribute this to the influence of European policy.

In the European context, the local, regional, national and supranational policy levels are strongly interdependent and interwoven. One of the priorities for the new generation of regional development programmes in the European Union is the promotion of *innovation* whereby the key challenges for policy involve assisting firms and localities to change by enhancing their *learning* capabilities. Whilst regional or local governments may have some influence over universities, the big budgets for scientific research are usually at national or trans-national level. National or trans-national governments are good at setting frameworks for action but less so at detailed strategy in contexts with significant geographical variation.

Such a situation is complicated by the complexity of governance arrangements, independent of the university context. Indeed, the definition of what a region, a city-region, and a city is, could be complex and problematic. Regions have entered the stage of the debate on economic development and policy-making as a result of devolution of national economic power and the emergence of regional governments and development agencies. At the same time, as work conducted by SURF for the Government makes clear, the ‘city-region’ concept is emerging as a new scale of policy intervention for economic development in England.²² Devolution has to be seen as a process that requires multi-level partnership and networking rather than as a simple transfer of power from central to city and regional level.

What this means is a whole set of debates about the relevant scales of activity and the institutional governance of universities in relation to forms of knowledge production and types of knowledge. Different parts of the university are engaged in a range of diverse activities at different scales: multiple geographies are linked to the different roles, activities and impacts of universities. The geography of research excellence or competition for staff and students may be global whilst economic, cultural and quality of life impacts may be local.

The implications are that greater understanding is needed around embeddedness and the relationship between expertise and territory. Universities can be ‘in’ but not ‘of’ localities thereby acting as more or less passive attractors and symbols within regional contexts. They can alternatively be real engines of economic and social growth, actively engaging with local and regional actors in a concerted attempt to transform fortunes at those scales of activity. Again, different parts of the university may be simultaneously acting in both regards, pulling in complementary or contradictory directions.

Scales for action are also intrinsically linked to forms of inter-institutional collaboration, within different spatial configurations that are entangled rather than neatly nested: Science Cities, Northern Science Initiatives, European networks of excellence etc. Research is needed to both articulate and address these issues relating to the spatial nature of universities’ economic activities.

Key Questions

1. How can we understand universities' activities within multi-scalar contexts and what does this mean for appropriate governance arrangements within and between territorial levels?
2. How are different institutions operating in multi-scalar contexts and with what consequences?
3. How do the international, national, regional, city-regional and local levels interact?
4. What does this mean for forms of university embeddedness and the notion of a 'regional university'?
5. How can the spatial boundaries of universities be defined?
6. What are the interactions between these different geographical levels and forms of knowledge-producing activities?
7. Are different scales of activity complementary or conflicting and how is this understood and dealt with at an institutional level?
8. What does this mean for partnerships between universities and the tensions of competition and collaboration at different scales of activity?

2.5 Institutional Capacities and Capabilities

Thus far, the report has covered the issues of scales of activity, governance and measurement. As noted, what is frequently missing from expectations in formal policy and other initiatives is the capacity to deliver. Yet this should not be separated from the other issues discussed or the gap between expectation and delivery will be evident. Regional governance and the accountability of universities' knowledge production within it are areas which have scarcely been touched upon. Devolution processes influence institutional strategies, forms and practices. This has to be examined empirically and methodological issues of evaluating policy initiatives and institutional performance at different geographical levels arise in this respect.

The different roles and functions ascribed to the university at various geographical levels are becoming highly complex, paradoxically leading to overly simplistic expectations. The implications are that universities will need to share more effectively some of their functions with other agencies in a two-way dialogue aimed at understanding the different, but also complementary, roles that they bring to the formulation and implementation of initiatives. It is likely that national policy will need to act as a catalyst to this process, but seen against the centralised tendency of prior policy, frameworks should also be flexible enough to learn from bottom-up initiatives.

A national initiative promoting entrepreneurship with regional implications is "Science Enterprise Challenge" launched in 1999 by DTI. Several Science Enterprise Centres from consortia of regional universities with support from RDAs provide various provisions including university-based entrepreneurship education. Regional mechanisms of collaboration have been set up by the higher education sector supported by HEFCE, the EU, Government Offices, and RDAs. Broadly speaking, there are three kinds of higher education collective mechanisms that exist.²³

- First, Higher Education Regional Associations (HERAs) operate in nine English regions.²⁴ HEFCE encouraged the creation of regional university associations to provide a means of co-operating on research, teaching and access at a regional scale. They are also seen as providing a unified voice for the sector in each region in response to the creation of regional development agencies and other regional governance bodies.

- Second, there are more ad hoc regional HE partnerships, at different levels of scale and with different partners, created for joint bidding for funding to deliver projects. There are partnerships at City-Region level including Knowledge Capital in Greater Manchester.²⁵ These may be bottom-up or in response to top-down national initiatives, or some combination of the two, as is the case with ‘science cities’. They may also be cross-regional as in relation to the ‘Northern Science Initiative’, within the context of the ‘Northern Way’.
- Third, regional networks involving universities are exemplified in the recent development of “Regional Science/Regional Councils”. The Regional Science Council concept reflects the central need to bring together the key stakeholders influencing R&D in each respective region at a strategic level.

It is important to understand these different models more fully and how they relate to university development. This includes conducting an assessment of their effectiveness in terms of the complementarity of existing networks and how they work together at particular scales of activity for mutual benefit.

Importantly, such information feeds into an assessment of the appropriateness of national policy instruments in the role of higher education in economic development. Overall, the national system of higher education in the UK has made institutions compete, rather than collaborate. It is difficult for universities to collaborate regionally or inter-regionally whilst they compete for students, research grants and for provisions for further university-industry links. This calls for greater understanding of the dynamics and implications of competition / collaboration inherent within differing policy rationales.

Between and within institutions there are differing strategic emphases concerning the regional agenda, which makes it difficult to construct a single framework. Innovation is seen to be spatial, whilst research is held to be different, leading to bifurcated and often unhelpful differences. Within institutions the effectiveness of divisions of labour has not been subject to systematic and comparative research. Under HEROBC and HEIF funding, new posts have been created in expectation of functioning as ‘boundary spinners’ within/between different university departments, institutions and sectors. These functions have had to be fully integrated into the organisational mechanisms/culture/incentives of universities.

Institutional capacities need to be built so that absorptive capacity of the city-region /region can be enhanced. For example, building business skills into education and moving human capital into productive locations requires close linkages at all levels of any system. The mobility of people across institutional boundaries is clearly a factor mitigating many of the tensions. It is obvious that the mobility of the highly educated affects the extent to which knowledge created in universities is absorbed by the local economy. What are the expectations that inform such developments in terms of mobility and with what effects on the locality?

The policy implications of how to influence the location decision of new PhDs and graduates working in industry, or setting up their own businesses, are clear in expectations surrounding university-industry interactions. Understanding the mechanisms and processes for inter-organisational network management between universities and other innovation support

organisations is central in constructing partnerships in a region.²⁶ Network formations and developments need to be examined in relation to a sensitivity to conditions of space and time.

Finally, all the above questions also have implications for the individuals working within universities. There is a changing skill-set required from academics that relates not only to their position within institutions, but also their disposition to engage with local and regional science-based initiatives. The advantage of the university is often seen to lie in its differential pace, with a 'slowing down' for the purpose of a systematic investigation of contemporary phenomena.²⁷ Yet parts of the university operate at different time frames.

Flexibility and predictability are not necessarily compatible. The political economy of a university relies upon student numbers and a business planning cycle built around particular time frames. Yet the changes now occurring carry with them an expectation of delivery, without the same levels of resource, and incentive structures, at different rates of time. Spatial scales of activity need to be seen against the ways in which universities deal with these issues in terms of their cultures, structures and appropriate skills of staff and divisions of labour.

Key Questions
<ol style="list-style-type: none"> 1. How appropriate are national incentives and instruments for encouraging regional engagement? 2. How should national support be better targeted across institutions to build capacity and ensure maximum impact for local and regional communities? 3. How do the dynamics of HE competition and collaboration affect local and regional economic and social development? 4. What is the expectation that commitment to local and regional science-based initiatives will move through organisations and with what effects? 5. What skills and capacities are necessary for universities to contribute to local and regional economic initiatives? 6. What are the implications for organisational design and divisions of labour within universities? 7. What is the relationship between academic identity, context and content of work across different disciplines? 8. How does organisational design and culture match not only to different spatial scales of activity, but also different time frames? 9. What is the effectiveness of existing networks and partnerships entered into by universities and how are these translated into practice at an organisational level to provide for engagement with different agendas? 10. What roles do universities and their staff play in not simply responding to agendas, but also shaping and informing those agendas?

3. WIDENING AND DEEPENING THE NETWORK

Phase 1 of the network, comprising the two initial workshops, policy interviews and supplementary literature review, was covered in the previous section. This section covers the aims, content and outcomes of the three seminars conducted by each core partner. The purpose of the seminars were two-fold. First, to identify and draw together an interdisciplinary community of researchers, policymakers and HE managers able to address the research questions identified in the gap analysis, which included comparative lessons from other contexts in order to strengthen the capacity of the network by drawing on existing networks of expertise. Second, in order to explore the perspectives and experiences of a wider group of policy-makers not only as a test on the results of the first phase of the network, but also to enlarge an understanding of the issues surrounding and informing HEI and regional socio-economic engagement.

3.1 Seminar Aims

The seminars were designed in order to take the analysis from Phase 1 into a forum that included different stakeholders to broaden the inquiry between capacities, expectations and content. In this respect, we divided their aims up as follows. First, to explore the content of expectations and processes in those current activities which exist between universities and different sectors (SURF). Second, to examine issues concerned with university-regional engagement and questions of scale with an audience of both policy makers and academics (IPP/CURDS). Third, to provide a forum for researchers in different disciplines to focus upon the issues which inform the development of adequate indicators to assess the impact of universities on the local economy (PREST).

For the purposes of brevity, the content of the seminars is summarised below in the order that they appear above, in separate sections. This is followed by a synthesis of key research and policy priorities in section 4. Further information about each seminar, including agendas, slides and extended reports, may be found at <http://www.surf.salford.ac.uk/EmbeddedUniversity/index.html>.

3.2 From Information to Intelligence, SURF Centre

The sub-title of this seminar was ‘Cross-Sectoral Practices and Expectations for University Engagement and Strategic Socio-Economic Development’. Set against the gap analysis, this was designed to explore the underlying issue of how universities have been attributed a number of key roles in relation to multiple objectives of research excellence, teaching quality, business enterprise and community engagement. More specifically, if universities are to engage in a meaningful dialogue with their stakeholders, they need to be embedded within effective partnerships. As a result, they need to move from a linear model of universities providing information to be acted upon, towards the generation and exchange of strategic intelligence for better policy-making at national, local and regional levels.

Aside from exploring how universities can contribute to regional and local socio-economic development and how regions and cities can engage with their universities, it aimed to build a

better understanding of national Government policy frameworks and local initiatives and focus on cross-sectoral expectations of universities and the nature of different HE partnerships. The first part of the day explored national frameworks and local initiatives which shape universities' engagement with socio-economic development. The second part of the day consisted of a panel discussion between representatives of business, health, media, police and environmental sectors. What is presented here is a summary of the discussions.

3.2.1 Policy Frameworks and Scales of Action

Innovation is one of the five drivers for increased productivity in the English regions, as a means to address persistent regional disparities in growth. Yet Government departments' views on science, space and place are inconsistent, particularly between the DTI, DCLG and DfES in terms of the relative importance of the regional agenda. Gaps in the evidence base were emphasised in terms, for instance, of the potential case for moving scientific facilities between regions as a tool in development, assuming there are no quality issues and the need to learn from the experiences of Scotland and Wales about the potential benefits/detrimental effects of a regionalised HE policy. What is needed is a greater consideration of how funding regimes can be made more sensitive to supporting universities' engagement with their regions and localities in a variety of ways. However, some seminar participants felt that new funding regimes, whether a metrics-based Research Assessment Exercise (RAE) or other system, would only lead to new games between universities.

At the regional level, innovation was recognised as important for performance and efforts need to be maintained in building a Northern growth pole. Differences in opinion were visible, however, between those concerned that regions might be blinded by the 'sexiness of science' for the sake of their 'amour propre' and should rather focus on exploiting their endogenous strengths and those that saw a role for 'iconic' or 'emblematic' regional projects alongside the development of a regional innovation system.

The city-regional scale is rapidly emerging as a relevant level of activity for science-based economic development. Manchester Knowledge Capital (MKC) seeks to place the city-region at the heart of the global knowledge economy, but recognises at the same time that 'there can be no hermetically sealed knowledge-base'. To achieve this, visibility and distinctiveness are seen as key to attracting mobile knowledge, requiring a strategic alignment between knowledge-based businesses in science parks, media and creative corridors and an 'arc of opportunity' that reaches into different communities. Indeed, core to the MKC vision is a knowledge economy that does not lead to social exclusion or polarisation. This highlights differences in what the 'knowledge economy' means to different groups, indeed the OECD North East study revealed ambivalent and fluctuating understandings of the 'knowledge economy'. It was widely felt that the question of what works in different sectors should determine any alterations in governance structures and the appropriate levels of delegation, rather than a one-size-fits all solution.

How then do national frameworks, regional contexts and local initiatives interact to affect the nature of HE partnerships within different sectors? Echoing the findings of the North East OECD study, one business view presented the current climate of HE – business interaction as 'taking a backwards step', the prime difficulties relating to communication, access and cost. Universities were portrayed as poor at 'selling' their services to business, instead asking what business wants to buy. There are clear difficulties in 'weaving through the university maze' and finding someone

that speaks the same language, rather than the ‘world class person’. Engagement between universities and businesses needs to be ‘timely, economical and efficient’ with reference made to the ‘unacceptable costs of R&D’.

In other sectors, training and recruitment were larger issues for engagement with HE. For the police, HE has a role to play in assisting with responding to national demands and frameworks (for national occupational standards, for instance), in raising the standard of recruits and in offering a ‘wider external perspective’ on issues of community engagement. One current initiative between Greater Manchester Police and Manchester Metropolitan University relates to the delivery of a community module, including, for instance, the history of Moss Side and Hulme. Training also emerged as a key issue for the BBC in their potential move to Salford Quays in terms of universities educating a more diverse workforce to improve ethnic recruitment. Yet at the same time, it was noted that the real deficit is in attracting the non-graduate workforce of talented individuals who may, or may not, be academically capable.

Workforce issues found resonance with those in other sectors. Envirolink North West aims to improve the competitiveness of the North West environmental technology sector through learning and skills as well as innovation and technology transfer. In the health sector, three main areas were identified where benefits can arise from better cooperation between higher education and health sectors. First, in learning, there is a need to develop a more coordinated approach to skills development that looks at a range of medical careers and professions allied to medicine. Learning related to health takes place in a range of disciplines and a more joined-up approach between universities and other delivery agencies would ensure a more coherent ‘educational escalator’ for those wishing to work in this sector. Second, service delivery remains an under examined area of synergy between sectors, with many university professors directly involved in providing complex care within the NHS. Research is the third area in which considerable investments are made by the NHS in the HE sector which needs to be better exploited. Spin outs from the NHS make a significant contribution to economic success yet there are many challenges in fostering this kind of activity. Issues equally relate to the economic inclusion and health inequalities agenda, the role of SMEs and the spin-in agenda and NHS procurement.

3.2.2 Partnerships in Action

Distinct forms of partnership have been developed to manage the HE relationship within different sectors and at regional and city-regional levels. In the media and police sectors relationships are more embryonic, through particular collaborations rather than task-specific partnerships. This has hitherto been organised on an institution-to-institution basis. A multitude of business-HE forums exist with differing remits, for instance, in relation to inward investment and knowledge-based sectors. In other cases, such as health, specific city-regional bodies have been established such as the Greater Manchester Research Alliance which brings together universities, the NHS, Manchester Knowledge Capital and the commercial sector. Envirolink North West works at a strategic level with existing bodies, such as the North West Universities Association to develop a ‘lead academic network’ and capabilities brochure, but also works on a project basis through PhD students, active networking, collaborative groups and mentoring. An informal and structural approach is adopted, yet it was noted that goodwill is more easily fostered through informal arrangements. Furthermore, a tension between the strategic and the project-oriented approaches can be seen in terms of the need for outputs to maintain support. The experiences of Envirolink



were that strategic work is obviously longer-term but it is more difficult to generate outputs without external resource.

Across sectors, different forms of partnerships have been developed, operating at multiple scales, at an informal/formal, short-term/long-term and strategic/project-oriented levels. As one participant noted, 'sometimes it is the little partnerships that matter'. The notion of 'strategic intelligence' found resonance in the ways in which universities are seen as able to help foster better 'learning organisations', such as in relation to Greater Manchester Police or in relation to providing intelligence for 'change management not just product innovation'. For some businesses, 'it is not about new products, but small problems solved'. In light of this diversity, seminar participants agreed on the need for a more systematic evaluation of what works in knowledge transfer and intermediation.

Key issues raised during the morning's session were emphasised during the panel presentations and discussions in the afternoon. Graduates and 'people' as mechanisms for knowledge transfer were noted as being of central importance, whilst the Government's KTP (Knowledge Transfer Practitioner) scheme was seen to be excellent yet 'one of DTI's best kept secrets'. At the same time, whilst different sectors do engage with universities within their localities, it was noted that the knowledge for sectoral development may not be bounded either within sectors or within geographical spaces. 'This is not about North West knowledge for North West people'. Scale is important in creating manageable partnerships and local success seen as a passport for accessing national and international possibilities. There is a diversity of need and different scales of engagement within and between sectors, yet a flexible rather than fragmented or incoherent system is essential for effective delivery.

The nature of HE engagement is clearly sectorally specific. It ranges from problem-solving through applied research, training and professionalisation, teaching and learning, to knowledge creation and technology acquisition. What is clear is that how this works in practice is sectorally specific. The seminar scraped the surface of this debate, revealing an important set of dynamics that need to be better understood if universities are to maximise their potential as partners in socio-economic development.

3.3 Universities, Science and the City-Region, IPP/CURDS

The purpose of this seminar was to bring together a constituency of academics and policy-makers to discuss the question of scale of regional engagement - what scales of 'region' do UK universities engage with, and how does central government see the regional agenda? In terms of the content of the day, the first part focused on the way in which universities work with local partners in order to build mutual competitiveness around emblematic physical development. A response from Newcastle City Council then focused on the role of local authorities as leaders of place, looking at the possibilities for city-region governance and the means available to cities to further their ends. Representatives from York then examined the dynamics of partnership with the city and the issues involved in building shared understandings, with the final part of the seminar considering issues of management and governance between universities and regional partners, stressing the specificity of national HE systems.

3.3.1 Territory, Focus and Funding

One of the core issues that informed the discussions were the multiple geographies used by universities in the patterns of engagement, with different parts of the institution working with different territories for different purposes. This was further informed by the funding rules of public bodies: for example, ERDF funded projects. Central government programmes, which are often unconnected with each other, direct universities to work with different territorial scales: for example, the national, city-regional (as in science cities), RDA region and other areas such as where firms are eligible for assistance. Funding Councils tend not to be so prescriptive over territoriality for third strand activities, although the boundaries of the devolved territories are preserved by having different knowledge transfer schemes in each nation. HEFCE does have a regional perspective, if not a regional policy and there are assumptions that RDA areas are the basic units of engagement as a result of their institutionalisation in the form of HEFCE's regional consultants and regional advisory groups.

Universities have been going through a major evolution in response to the demands of an increasingly competitive and globalised knowledge economy. Increasing flows of international students offer HEIs the potential to increase market share, but also encompass a rising challenge from overseas competitors. Governments are stressing the importance of research excellence as a major determinant of resource allocations and this is increasingly determined through positioning within international networks.

In parallel with this increased inter-university competition, the rise of the globalised knowledge economy has increased the importance of universities to the places in which they are located. The role of particular places in the 'glocal' knowledge economy is increasingly determined by competitiveness in attracting and retaining knowledge-intensive industries and services, where this is seen as a core factor in competitive success. Therefore, universities are seen as important determinants of urban competitiveness, as well as being significant knowledge businesses in their own right and the suppliers of the human and intellectual capital on which knowledge businesses depend.

3.3.2 Engagement, Environments and Effects

Universities have sought to build strategic partnerships with localities, notably through the new science cities initiative in the UK, emphasising the physical developments and their role in the changing nature of the university and the opportunities they bring for rebuilding and reshaping local engagement. In this sense, the city-region is becoming of growing significance as a suitable scale of activity.

Transformations in the dynamics of collaborations and competition in the 'global market place of ideas' are affecting urban environments, with a key element being the physical presence of the university. At one level, the redevelopments of universities are reshaping their host cities in often quite significant ways. At other levels, universities are having a more symbolic effect on their urban environments, demonstrating that these cities are places where the knowledge economy does its work which, in turn, acts as an attractor. As a result, universities help to redefine the status of their territories through remaking and reconfiguring urban systems as innovative city-regions that promote improved innovation and contribute to urban development. This, of course, says nothing about the extent to which such impacts have effects on different populations.

It is also informed by such factors as: institutional inheritance; university leadership; local governance; national higher education systems and other external conditions that influence an institution's capacity to produce positive effects on their city-regions.

Discussions turned to international exemplars of initiatives and effects. Governments, at multiple scales, are supporting university and urban initiatives that are intended to underpin urban competitiveness. In Brisbane Australia, for example, a new creative industries precinct has been developed north of the city centre adjacent to one of the campuses of Queensland University of Technology (QUT). The emphasis here is on linking the University with the commercial activities of the creative industries as part of a new urban village. A 16 hectare site was a former army barracks which has been linked with adjacent derelict land, low quality open space and under-used housing and other uses. QUT's Kelvin Grove campus lies to the rear of the site, with poor access and a joint planning framework has been drawn up with the Queensland Department of Housing. This includes a new QUT Creative Industries faculty, around 700 housing units, a 'town centre' with retail and commercial property and other community amenities.

In Barcelona a number of sites are being developed associated with existing university campuses in a major urban regeneration programme that seeks to link science-based investment and commercialisation strategies to the future of the city as a knowledge based economy. Here the attractiveness of these developments for researchers and business is based not just on the funding and the research strategy, but on the attributes of the city as a place in terms of its wider quality of life. As such, the impacts of HE investment are informed by place management strategies and those, in turn, by the forms of governance which exist between cities, regions and national government.

Discussions then turned to the ability and capacity of universities to manage the relationships and sources of funding from a multi-level governance system and integrate them around a consistent vision of the science city and the engaged university. In parallel there is the commitment and resourcing of the strategies from the various scales of governance and whether the resources in the UK, for example, can compete with those of global competitor cities that are not just in Europe, but Singapore, Melbourne and Los Angeles.

These issues need to be addressed alongside current debates about city-region governance and the changing roles of local authorities in the new pattern of public service delivery. If local authorities are to focus not so much on service delivery, but also the leadership of place, then what kind of change of culture is needed for them to actively engage with partners to enhance the quality of place? Whilst science cities may provide a mechanism for this, the interests of the different partners will be highly varied and the notion of the science city itself will be contested. The perspective of the university in terms of opportunities for expansion and cultural change may thus be different from the place-shaping interests of the local authority.

3.4. Economic Development: Issues of Measurement, PREST

The original proposal for the network noted how many initiatives were put in place without due consideration to the capacity needed to achieve their aims, nor an understanding of the suitable means for measuring their effects. This seminar sought to explore the issues involved in this latter deficit. A series of presentations from policy-makers and academics explored three key themes:

theory, evidence and key challenges; policy considerations and gaps in existing metrics and indicators.

3.4.1 Impact, Expectations and Evidence

There is a longstanding interest in understanding the impact of universities. However, in recent years an awareness of the importance of the university in the economy has increased. On the one hand, an awareness of the indirect, underpinning role of basic research in the innovation process has been reinforced by the emergence of dynamic new sectors which are particularly dependent on science-based innovation in fields such as the biomedical sciences. On the other hand, there is a greater recognition of the direct impacts of universities as economic entities in their own right.

Expectations made of universities have also grown, but they are often assumed to be highly flexible, capable and integrated institutions. This fails to recognise the high degree of heterogeneity amongst HEIs, both in relation to their own strategies and abilities to fulfil their regional national and global profiles and in relation to the diversity of regional profiles they are confronted with. They have different profiles and clients and engage with different types of regions. There is therefore a need to better appreciate this heterogeneity in any assessment of their impact. As a result, current metrics and indicators are not valid in their assessment because they lag behind an understanding of this diversity.

The evidence base to assess the wider socio-economic impacts of HEIs is not sufficient at present. However, as well as the need for improved indicators, there is the need for better theoretical frameworks to produce such understanding. There is, for example, a need to better understand the new ecology of industry, in terms of linkages between: large and small firms; patterns of growth; genesis of businesses; transition of firms; collaborative ventures and alliances and the changing nature of outsourcing practices, etc.

Equally, there is also not enough understanding of the changing dynamics of science, as well as how science can be deployed and contributes to the economy: for example, in relation to scientific discovery; publication; production of trained people; development of instrumentation and methods; cumulative expertise for problem-solving; access to external knowledge and commercialisation, patents and spin-offs, etc. An important question here concerns the scope for initiatives to build or enhance such effects given the internationalised nature of knowledge production and the inherent uncertainty of the innovation process.

3.4.2 Policy, Evaluation and Measurement

In terms of the above, it is important to understand the variety of policy needs and policy objectives in relation to measuring the impact of HEIs. Indeed, metrics may be needed for different purposes: evaluation, self improvement and management and public relations. One of the main objectives of measuring impacts is also to demonstrate value for money and make a case for the maintenance and increase of resources. In this sense, under-evaluation due to poor metrics could lead to under-investment in innovation and research. Yet the scale, pace and relevance of recent changes in HEIs may not allow a rigorous impact assessment. There is also a need to separate metrics and evaluation. Metrics are just building blocks, whereas evaluation provides lessons on how things happen.

Relevant time-scales are another factor in measurement of impact. When is the right time to measure impacts and according to what time frames? Policy makers want to know what the timescale of return for their investment is and how it will be known that it has achieved its objectives. Changes and impacts take a long time to become visible and HEIs are long-standing and relatively stable institutions with histories of activity and achievement in their teaching and research missions. In contrast, elected governments often have short term expectations and priorities. Policy agendas can be immediate, volatile and even contradictory. Furthermore, different time frames may apply to the different activities.

Often ignored in issues associated with measurement and impact are negative effects. This may occur with universities over time. There is a clear tendency for impacts to refer to positive effects. However, universities can also have negative economic, social or sustainability impacts e.g. carbon footprint, housing market, etc, which should be accounted for in understanding their relations to the socio-economic development. What is good for one set of stakeholders may have a clear and detrimental effect upon another. Here, issues of appropriate expectation and also civic responsibility have a major role to play.

Besides having a clear message about what policy constituencies need to know and why, there is a need to understand the coexistence of a variety of rationales and objectives at different scales of intervention. Policy is not applied in a vacuum and one of the major elements of the environment in which a policy is enacted is the mix of other policies with which it interacts. Policy mix is important because there are both intended and unintended effects. This mix is made up of policies applied at different levels of governance and with different objectives and rationales, with different time frames. It is often difficult to get consistent policies between different agencies and departments not only across, but also between levels of government, leading to policy tensions and conflicting objectives. There is, for example, a clear tensions between regional equity and the promotion of 'excellence' at the national and international levels.

Overall, the seminar also found there to be a consensus concerning an unsophisticated view of the innovation system on the part of policy-makers. This deficit is often made up by a naïve belief that metrics not only simply reflect a given reality, but will also somehow inform and incentivise behaviour. Of course meeting the requirements of a performance indicator quickly becomes an end in itself and HEIs are very good at learning to "play the game", as successive Research Assessment Exercises have proved. There may also be a mismatch between the incentives driven by indicators and the aims and expectations of universities. For example, third mission policy objectives can conflict with traditional academic incentives (driven by a different policy objective). There are clear gaps in adequate metrics for regions and city-regions. Universities' impacts span multiple geographies and yet adequate metrics that can deal with these multiscale spatial dynamics are lacking. Neither the devolution agenda nor now the emerging 'city-regions' agenda have been accompanied by appropriate attention to the design and set up of adequate statistical frameworks.

4. RESEARCH AND POLICY PRIORITIES

Through the varied activities of the network, a clear set of priorities for future research and policy has emerged. Given the ethos of this network, these priorities do not constitute two separate agendas to reflect alternative academic and policy interests and needs. Rather, priorities for future work have been generated and discussed collaboratively in interactive processes throughout the three seminars held. This section reflects those priorities synthetically and offers suggestions for future policy direction and formulation, based on an enhanced and improved evidence base.

4.1 The ‘Missing Middle’ in Universities and Socio-Economic Engagement

A ‘missing middle’ exists between the aspirations for universities in relation to socio-economic development, the nature of policy frameworks, the governance of spatial relations and organisational forms and capacities. Relatively little is known about the contexts which enable and constrain the relations that exist between policy expectations and the actual capacity of universities to deliver to different groups. Instead, we move from initiative to initiative without sufficient learning from experience, leaving expectations being either too impractical or unmet. Content-less policy initiatives are left to be populated by varying interests, without sufficient time for consultation or a general understanding of the conditions for success. We hear a great deal about ‘what is to be done’, but much less ‘by whom, with whom, with what capacity and according to what desired effects’? The network activities point to four inter-related areas that can populate the ‘missing middle’:

- There is a need to better understand the relationship between policy drivers at multiple scales and institutional responses. *We need to know more about how frameworks for action at international, national and sub-national levels enable and constrain the development of effective partnerships between HEIs and sub-national partners for mutual benefit.*
- Deficits exist in our understanding of the multiple geographies of HEIs and their interactions at different scales. *We need further research into the scalar interactions of HEIs, as complex institutions, and their positive and negative impacts for different communities at multiple scales.*
- The mechanisms through which different institutions can contribute to socio-economic development of regions and cities remain underexamined. *More work is needed on the forms of partnerships that are required to deliver the expected socio-economic benefits across different sectors and in different contexts.*
- The heterogeneity of HEI, industrial and regional landscapes has not been fully acknowledged. *Theoretical analysis and impact assessment need to be more sensitive to the diversity of HEIs, impacts, scales, industrial sectors and contexts.*

The work of the network has begun to unpack these issues and enrolled a wide policy and academic community into the problematic of the ‘missing middle’. From the above deficits, four priorities for research and policy emerge.

4.1.1 *Supportive Frameworks for Action: Concerted Thinking, Joined-Up Policy*

A tension is evident in the coherence, consistency and robustness of Government policy in terms of the degree to which stakeholders outside of Whitehall are involved in policy conception, rather than execution. According to Better Policy Making (Cabinet Office 2001: 14), **modern policy making** should incorporate forward looking, outward looking, innovative, flexible, evidence-based, inclusive and joined up methods of working. However, Government departments exhibit different assumptions and policies in relation to suitable scales for HEI engagement: from the local, to city-regional, national and international. When different signals come from Government departments, policy frameworks will remain ambiguous.

Acknowledging the diversity of values that underpin Government assumptions and targets for the university raises core questions about the **appropriateness of national policy instruments**. Mixed messages are apparent in the drives for international excellence and collaborations for regional benefit. It is assumed that research excellence will lead, in some way, to relevance in a given locality, as if there were some automatic connection between the place in which a university is located and its benefits to that area. Institutions tend to compete, rather than collaborate. As a result some universities may be ‘in’, but not ‘of’ their localities.

Joined-up policy is needed between science and innovation, higher education and regional policy. This is elaborated below in section 4.2. Government attitudes towards regional and local science-based initiatives are not uniformly positive. This is partly based on a scepticism of what might be achieved and doubt as to whether regional investment in science is the best way to spend scarce resources for economic development. Yet without cross-departmental thinking on how science funding structures, university policy, the devolution agenda and regional economic development initiatives can be knitted together to create the capacity to deliver, regional and local science-based initiatives will certainly be relegated to the scrap heap of big ideas.

There is a need to strike a balance between **national co-ordination and regional diversity**. The nature of international competition in science means that it is not possible for all regions to have world-class centres of excellence in genomics, nano- or bio-technology. The location of scientific facilities does have an important role to play in providing hubs around which clusters of activity can be built. Yet scientific infrastructures are getting bigger, more complex and more expensive, with increasing international co-funding. In competitions for big science facilities, there will only be one successful host region across the world or Europe, let alone the UK. What this means is that national co-ordination is important in ensuring that regions and cities play to their strengths, rather than compete for scarce scientific prizes. This also entails learning the lessons of regionalised HE and economic development policy from the devolved administrations and exploring the optimum division of responsibilities between territorial levels in different sectors.

At the same time, it is important to recognise difference and be **sensitive to sub-regional contexts** in policy formulation. Rather than treating all regions and cities the same, policies must be based on recognition of distinctiveness. London has always been deemed ‘exceptional’ with a resultant ‘othering’ of provincial towns and cities. It is time to recognise the exceptionality of all Britain’s spaces and places. Context matters: it is the inter-organisational dynamics, based on understanding institutional positions, hierarchies and different agendas and interests that will ultimately determine success.

4.1.2 *HEIs in a Nested, Multi-scalar World: City-Regions and Effective Organisations*

There is no optimum distribution of resources and responsibilities for science policy that fits all countries, regions or cities. The successful implementation of science-based initiatives necessitates understanding **complex multi-level contexts**, operating in networks, forming partnerships and alliances and playing the scale game. The relevance of the city-region as an appropriate level of scale emerged as a particularly strong priority among academic and research communities. Yet there is no magic bullet or structural solution. Cross-national and cross-regional comparisons are essential in understanding the dynamics of success in different contexts, but the focus must be on transferable lessons not transferable solutions.

Accordingly, the territorial dimension of universities is not straightforward. The **geography of university engagement** is varied, and there are possible conflicts and tensions between global/regional and local roles with potential unrealistic expectations on the part of local and regional policy-makers that HEIs should ‘serve’ the region first. For instance, whereas some local linkages may appear relevant, they constitute only a small proportion of the total research collaboration carried out by firms. Indeed, links are often with individual scientists regardless of where they are located.

At the same time, concerted action does not simply require coherent policy frameworks, but also **effective organisation**. Internal coordination within the university needs to be appropriate to meet external expectations. The traditional centralised and bureaucratic mode of organisation of the university is challenged by the need to respond flexibly to increasingly unpredictable environmental changes, to engage with the varying needs of a locality and in the pursuit of third stream funding. New organisational forms are required that enable interpretations of environmental changes to be rapidly implemented into organisational responses. A balance between centralised bureaucracy and flexible forms for the university demands not only imaginative management and appropriate design, but also the right mix of skills, values and knowledge among personnel across organisational units.

Take the city-region as a level of scale. The **institutional capacities** of universities need to be enhanced so that the absorptive capacity of the city-region may grow through the attraction of inward investment. In part, this means building business skills into education and moving human capital into productive locations leading to close linkages at all levels of the resultant systems. It is obvious that the **mobility of the highly educated** affects the extent to which knowledge created in universities is absorbed by the local economy. Yet incentives for staff to spend time in different sectors are low, although this more intangible element of knowledge transfer emerged as one of the most valued by policy-makers and practitioners. Equally, some universities may see the locality in terms of its attractiveness to potential staff, rather than in terms of the benefits it may directly provide to local communities; all of which leads to an absence of concerted action.

4.1.3 *Frameworks in Action: The Dynamics of Partnership Working*

The enthusiasm with which sub-national actors have embraced science-based growth is remarkable, yet policy developments are proceeding at a faster rate than theoretical and empirical evidence. There are gaps in our understanding of what works in distinct sub-regional circumstances, the **critical success factors** of regional and local initiatives in different contexts and the contribution of different knowledges, disciplines and institutions. As a result, policy is

advancing on the basis of suppositions and investments are being made in attempts to emulate perceived (rather than substantiated) best practice. We need to take stock and consider the scope for local and regional policy interventions which can support and seed the development of globally excellent research with real potential to drive knowledge-based economic growth.

Key to this is understanding the **dynamics of partnership working** for delivering the kinds of benefits (and reducing the negative effects) that policy intends. Knowledge transfer is not a simple construct. It is taken to refer to a range of activities from commercialisation and intellectual property to the generation of **strategic intelligence** for policy development. Less attention has been traditionally given to HEIs' contributions to policy development and strategic capacity for socio-economic competitiveness as 'political' agents and in contributing to the formulation of 'intelligent' policy. Most importantly, knowledge transfer is a non-linear and context-specific process, the success of which is predicated on better understanding cultures of knowledge production and cultures of knowledge reception. Populating the missing middle requires in-depth analysis of the dynamics and content of different partnerships and **knowledge transfer mechanisms** between sectors.

There are a number of **lively and active partnerships** between higher education and other sectors that go beyond the transfer of funds. 'Partnership' is a generic term for a range of structured or unstructured interactions between organisations for mutual gain. Such partnerships have impacts at a number of scales, designed with international competitiveness, research excellence or social objectives in mind. Partnerships involve differing constellations of public sector actors in response to bottom-up imperatives as well as top-down demands. Yet there tends to be seductiveness to collaboration based on an assumed coincidence of interests and presumptions of positive effects which masks divergent drivers, agendas and actual and perceived outcomes. For instance, the potential impact of universities on city-regional competitiveness is likely to be an outcome of a collective and iterative process, related as much to the behaviour of city-region partners as to university policies. The notion of 'competitiveness' is not unproblematic or a necessary positive sum game. There may be trade-offs between notions of competitiveness and winners/losers that have not been systematically explored. Greater understanding is needed of the **contents and contexts** through which joint working between higher education and different sectors impact on a range of communities at national and sub-national levels.

4.1.4 Improving the Evidence-Base

In a modern 'knowledge economy', universities have **varied roles** to fulfil: to educate and train students; to produce excellent research according to peer-reviewed criteria; to innovate in order to enhance productivity through collaborative relations with external partners; to produce relevant research according to the needs of client organisations; to make socio-economic contributions to their localities and businesses in general and to enhance civic value in the public realm. Inherent in these diverse roles are sets of expectations which embody different values. Their overall balance, in the U.K. context, is mediated via Government policy with incentivisation through alternative funding streams.

Differing Government assumptions about connections between research, teaching and third mission activities dictate **'appropriate' measures of success** for the university. Ideas of knowledge transfer, for example, tend to rest upon outputs that are measurable according to patents and/or the setting up of new companies. Matters of organisational accountability are set

according to targets: performance is judged by the ability to attract resources; economic impact is mediated through the production of spin-out companies, patents and the attraction of inward investment, whilst research and teaching scores are taken as demonstrable indicators of excellence.

Views of the socio-economic contributions of HEIs can be narrowly conceived. A view of the world that focuses on world-class universities, international businesses and the desire to codify and consolidate needs to be supplemented with a consideration of how knowledge and innovation can be absorbed locally. The roles of **universities in innovation** are still poorly understood. Whilst the Community Innovation Survey has acknowledged deficits in terms of its failure to highlight regional differences, it does indicate that universities are generally low in importance in terms of the source of new ideas for business. Further work is therefore required in this area to understand the value of knowledge produced in universities and its integration into innovation processes.

Policy-makers at national and regional levels have also emphasised the need to consider the **‘total engagement’** of the university. A scepticism of start-ups as the panacea for local science-based economic development was expressed throughout the seminars, with some poor experiences of start-ups that ‘siphon off money, employ no-one and do nothing’. The **skills agenda** and the importance of graduates in the workforce and widening participation were all felt to be fundamental mechanisms for knowledge transfer and hence worthy of greater attention than they have recently attracted.

Despite the changing role of universities and the heightened pressure to engage with regional and local economies, appropriate **metrics are lacking**. They fail to keep up with the changing nature and diversity of HEIs’ engagement, the multiple scales of engagement and changing policy agendas. For instance, the urban scale is hard to disentangle, partly due to the lack of adequate indicators and there are no appropriate existing tools to map the multiscale spatial dynamics of HEIs impacts. Research metrics, such as patents and citation impacts, do not tell us much about the quality and value of these impacts. Metrics need to reflect what is actually going on, accompanied by a coherent reference in terms of averages or benchmarks, so as to be able to make useful comparisons and draw relevant conclusions.

There is a need to **revisit methodologies and models** for economic impact assessment to make them more robust and comparable. Less well established are indicators on third mission activities, which tend to be highly anecdotal and not systematic. We see the emergence of new activities and roles of universities, both explicit and implicit, and the term ‘third mission’ may conflate a number of distinct and potentially sometime conflicting roles. There has been some theoretical shift, reflected to a lesser extent in policy, from seeing the performance of an economy as the aggregate of the performance of individual firms towards emphasizing systems and inter-connectedness. Yet indicators remain stuck in the former world. In R&D and innovation policy, indicators and concepts also remain largely rooted in assumptions based on the experience of manufacturing sectors. At the same time, despite growing academic and policy interest in the role of city-regions, they are invisible in indicator terms.

This points to an urgent need for public policy to review and enhance the **evidence-base** for regional intervention in STI to examine how the expected benefits from science can be achieved.

Work is needed on multiple and varied measurement tools to capture the multidimensional and complex nature of HEIs activities and impacts.

4.2 Lessons for Policy Formulation

The above set of research and policy priorities reflects the issues that have arisen in the course of the network activities to inform a shared agenda relating to HEIs and their socio-economic engagement. Delivering on these recommendations requires new ways of working between national, regional and sub-regional actors which challenge traditional modes of policy conception and formulation within Government departments and between Whitehall, the devolved administrations, the English RDAs and local authorities. This requires improving understanding of context, as well as coherence, consistency and communication. These issues are elaborated on here, as a precondition for more effective frameworks for action for higher education socio-economic engagement at multiple scales.

4.2.1 *Improving Understanding of Context*

- More effective strategic fit in policy making involves examining regional needs in relation to emerging policy priorities from Whitehall. This requires analysis of the tensions between vertical alignment and horizontal integration in terms of the cross-cutting impact of policy and the effect of variable commitment between Government departments on the development of regional policies and policies for HEI engagement.
- Improved forms of communication within and between Government departments concerning policy development for the science, research and HEI base that has regional implications. This requires the identification of officials who would be responsible for particular substantive areas of activity within and between departments.
- Government Offices have a key role to play in co-ordinating regional responses to policy in relation to HEI engagement. This requires greater sharing of knowledge and understanding in the development of shared strategic directions and partnerships between Whitehall and with officials in the regions. This requires the co-ordination of input from different regional agencies, including the private and voluntary sectors, as well as negotiating between different perspectives and managing the resulting intelligence.
- An improved focus on generating networks and communications with the regions will enable more of the right people to be involved at the right time in policy development. This requires a commitment to building relations between Whitehall and regions that are able to build an honest and shared understanding of what is feasible and what is desirable in policy formulation.
- Regions and their HEIs cannot respond to every new policy concern with equal capacity and commitment. This requires Whitehall, the regions and the HE sector to jointly make informed choices about which policies they are actively intended to respond to through a sustained process of mutual understanding.

4.2.2 Coherence, Consistency and Communication

- Close linkage between policy and evaluation needs a more in-depth understanding of the capacity of different institutions to deliver outcomes according to over-arching purposes. This requires an evaluation process that focuses on how it will be known that a policy is working, as well as appropriate methodologies for communicating that to different audiences.
- Turnover of key personnel reduces important tacit knowledge that makes policy work in particular contexts. This requires consistency and continuity in roles and responsibilities by selecting key personnel in terms of the knowledge and capacity they possess, as well as giving consideration to the time and space needed to perform these roles effectively.
- The evaluation function should not be developed at the end of the policy process. This requires designing evaluation into the planning phase in cooperation with key personnel at different levels to ensure that it is linked with the strategic purpose of policy.
- Restrictive time deadlines exist in uneasy tension with effective enrolment to make policy work. This requires a more systematic approach to developing networks for policy engagement and learning that gives consideration to who is included and why, but also who is excluded, why and with what effect?
- Policy making is often characterised by misalignments and duplication rather than identifying overlaps and interrelationships. This requires the development of a shared ethos across Government departments and in partnership with identified stakeholders with a clear set of aims that are internally coherent and externally communicated in a consistent manner.
- More effective strategic fit between policy areas for regional development, science and HEIs involves the development of a stronger foresight element in the policy making process. This requires the development of prospective techniques and processes that aid identification of the difficulties that will be faced in the process of design and implementation and anticipation of how they might be overcome.
- Establishing programmes of work outside of the normal policy process will benefit different stakeholders. This requires the development of effective and sustainable infrastructures of communication can be built that support and enable developments over time and coordinate effectively between different policies and innovations.

5. DISSEMINATION AND IMPACT

This final section of this report offers an overview of the impact and the dissemination activities of the network. It focuses on organisations enrolled through the workshops and seminars held; virtual dissemination; and other articles written.

5.1 Organisations and Individuals Enrolled

Phase 1 of the network entailed two workshops of the core team, academic collaborators and invited senior HE managers, in addition to interviews with policy-makers within Government departments and local agencies. Phase 2 of the network was then constituted via three seminars, one organised by each of the core partners. The seminars were specifically intended to engage with policy-makers, academics and practitioners at national, regional and local levels. This is reflected in the programmes for the seminars and the speakers obtained.

The organisations enrolled in the various stages of the network are detailed in Table 1. It should be noted that the actual number of participants engaged in the network exceeds the number of organisations, as several representatives of the same organisation participated in activities. All of the participants (over 100) will receive a copy of this report via email and the report will also be placed on the project website.

5.2 Dissemination

A project-specific website has been established for the network at <http://www.surf.salford.ac.uk/EmbeddedUniversity/index.html>. The agendas, presentations and summaries of the workshops and seminars have been placed online and participants directed to download documents via email contact. A report generated on the use of the website has indicated that there have been an average of 500 requests per month for pages on the website and we would expect that this figure will increase for the month of September 2006, once participants have been notified of the availability of the slides and reports for downloading.

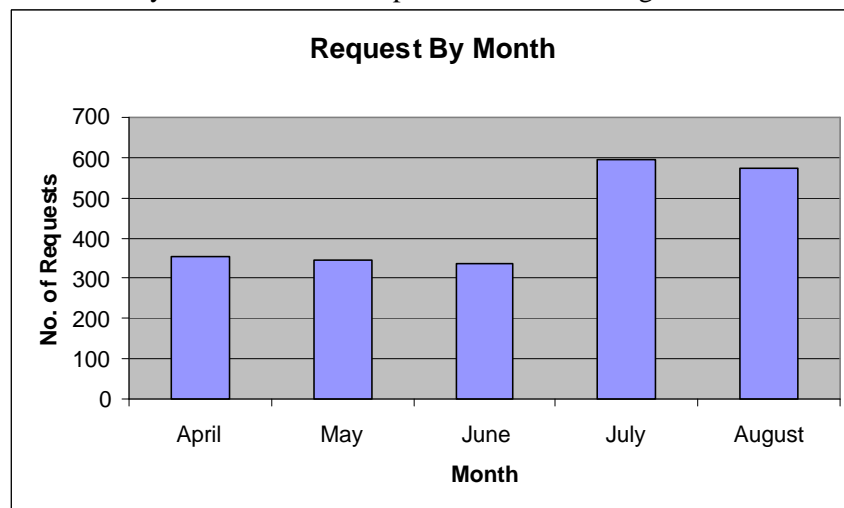


Table 1 Organisations Enrolled

<p>Ascent Media Ltd Association of University-Industry Links BBC Bristol Business School Contact Partnership of Greater Manchester Universities Department for Communities and Local Government Department for Education and Skills Department for Trade and Industry Department of Health Economic and Social Research Council Envirolink North West Eversheds Evidence Ltd Experian Fujitsu Government Office North West Greater Manchester Police Greater Manchester Strategic Research Alliance Higher Education Funding Council for England Higher Education Funding Council for Wales Higher Education South East HM Treasury House of Commons Science and Technology Committee Lancaster University Liverpool John Moores University Manchester Business School Manchester Enterprises Manchester Inward Development Agency Services Manchester Knowledge Capital Manchester Metropolitan University Moonfish Ltd</p>	<p>N8 Universities National Institute for Education Research in Japan Newcastle City Council North West Development Agency North West Regional Assembly North West Textiles Network North West Universities Association Office for Science and Innovation One North East Prospects Career Service Queens University Belfast Scottish Executive Sheffield Hallam University Sustainability North West Tameside Metropolitan Borough Council Universities 4 North East University of Central Lancashire University of Durham University of Glasgow University of Limerick University of Liverpool University of Manchester University of Newcastle University of Northumbria University of Oxford University of Salford University of Strathclyde University of York Ward Hadaway York University Yorkshire Universities</p>
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A summary of the policy findings relevant to the network has also fed into the latest version of SURF's Electronic E-Newsletter. This was circulated in August 2006 to over 800 people on SURF's database and is also available on SURF's website.

5.3 Articles Written

Three articles drawing on the network findings have recently been written for policy / practitioner magazines. Two articles will appear in the next edition of *Regions Newsletter*, issue 263, the newsletter of the Regional Studies Association, within a special issue on 'Building Science Regions and Cities'. This includes:

- May, T. (2006) 'The Missing Middle in Universities and Socio-Economic Engagement: Policy, Organisation and Capacity in the UK'. *Regions Newsletter* 263, p. 14.



- Perry, B. and Uyarra, E. (2006) 'The Embedded University in the Science Economy: Contexts, Capacities and Expectations'. *Regions Newsletter 263*, p.15-16.

In addition, a short article is due to appear in Parliamentary Brief in a special issue looking at regional economic development.

- Perry, B. and May, T. (2006) 'Science and the City: International Excellence and Local Relevance'. *Parliamentary Brief*, forthcoming.

All three articles reflect the main findings of the network. Work is ongoing between the network partners to explore further dissemination activities and to collaborate further, through, for instance, the submission of a joint research proposal to the programme.

6. REFERENCES AND FOOTNOTES

¹ Allinson, G., Charles, D. R., Conway, C., Quinn, P. and Stone, I. (2003) 'Evaluation of Graduate Retention Programmes in the North East'. One NorthEast. Charles, D.R. (2003) 'Universities and territorial development: reshaping the regional role of English universities'. *Local Economy*, 18(1), 7-20. SURF (2003). 'Knowledge Capital: From Concept to Action'. CONTACT Partnership Board (Universities of Manchester, UMIST, MMU and Salford). . Georghiou and J. Cassingena Harper (2008) 'Contribution of Universities to the Knowledge Capital—A Scenario for Success in 2008. PREST. Laranja, M., Uyarra, E., Flanagan, K. (2005) '(Old and New) Rationales for Regional Science and Innovation Policy'. PRIME EPOM Workshop, Seville, Spain.

² May, T. and Perry, B. (forthcoming). 'Cities, Knowledge and Universities: Transformations in the Image of the Intangible'. In May, T. and Perry, B. (eds) special edition of *Social Epistemology* on 'Knowledge Production, Universities and Engagement'.

³ Randles, S., Uyarra, E. Paraskevopoulou, E., Eaton, B. (2006) *The Use and Limitations of Indicators in the Context of City-Region Development Strategy*. Discussion paper draft. PREST.

⁴ Saxenian, A. (1998). 'Regional advantage: culture and competition in Silicon Valley and Route 128. Harvard University Press. SQW Ld (1988). 'Universities, Enterprise and Local Economic Development: An Exploration of Links, Based on Experience from Studies in Britain and Elsewhere. London, HMSO. SQW (2000). 'Cambridge Phenomenon Revisited'. Cambridge: Segal Quince Wicksteed.

⁵ Armstrong, H.W., Darhall, J. and Grovewhite, R. (1997). 'The local economic impact of construction projects in a small and relatively self-contained economy - the case of Lancaster University'. *Local Economy*, Vol. 12, p146-159. Armstrong, H.W., Darhall, J. and Grovewhite, R. (1994). 'Building Lancaster's Future: Economic and Environmental Implications of Lancaster University's Expansion'. Department of Economics and Centre for the Study of Environmental Change, Lancaster University. Bleaney, M. F., Binks, M. R., Greenaway, D. (1992) 'What does a university add to its local economy?' *Applied Economics* Vol. 24, p305-311. Chadwick, A. and Glasson, J. (1998). 'Oxford Brookes University -- Local Economic Impacts'. School of Planning Working Paper No. 174. Chatterton, P. (1997) 'The Economic Impact of the University of Bristol on its Region'. University of Bristol, Information Office. Harris, R.I.D. (1997) 'The impact of the University of Portsmouth on the local economy'. *Urban Studies*. Vol. 34 Issue 4, p605-626. Huggins, R. and Cook, P. (1997). 'The economic impact of Cardiff University: innovation, learning and job generation'. *Geojournal* Vol. 14 Issue 4, p325-337. Impact Assessment Unit (2000) 'University of Sunderland: Local and Regional Economic Impacts'. Oxford: IAU. Robson, B. et al. (1995), *The Economic and Social Impact of Greater Manchester's Universities*, University of Manchester.

⁶ Batterbury, S. and Hill, S. (2004). 'Assessing the impact of higher education on regional development: using a realist approach for policy enhancement'. *Higher Education Management and Policy*. Vol.16. No.3. Mille, M. (2004) 'The university, knowledge spillovers and local development: the experience of a new university.' *Higher Education Management and Policy*. Vol.16. No.3.

⁷ Laredo P., P. Mustar, M. Callon, A.M. Birac and B. Fourest, 1992, *Defining the Strategic Profile of Research Labs: the Research Compass Card Method*, in Van Raan A.F.J. et al. (eds), *Science and Technology in a Policy Context*, DSWO Press, Leiden.

⁸ There have been several OECD conferences relating to this issue through the IMHE programme.

⁹ Lincoln, L., Stone, I., Walker, A. (1993) 'A The Impact of HEIS on Their Local Economy: A Review of Studies and Assessment .Methods'. London : CVCP. CVCP (1994) 'Universities and Communities. A report by the Centre for Urban and Regional Development'. London : CVCP. Committee of Scottish Higher Education Principals (1995) 'The Impact of the Scottish Higher Education Sector on the Economy of Scotland. Glasgow: CSHEP. CVCP (1997) 'The Impact of Universities and Colleges on the UK Economy'. London : CVCF. National Committee of Inquiry into Higher Education (1997) 'The Local and Regional Role of Higher Education'. London : HMSO. National Committee of Inquiry into Higher Education (1997). 'Higher Education in the Learning Society. Report 9: Higher Education and Regions'. London: HSMO. HEFCE (1999) 'Regional Profiles of Higher Education'. HEFCE Report 99/27. Bristol: HEFCE. HEFCE (2000) 'Regional Profiles of Higher Education'. HEFCE Report 99/27. Bristol: HEFCE. Charles, D. and Benneworth, P. (2001) 'The Regional Mission: The Regional Contribution of Higher Education: National Report. London: Universities UK. Charles, D. (2001) 'Universities in Regional Development. TSER Programme Final Report'

¹⁰ Charles, D. and Benneworth, P. (2002) 'Evaluating the Regional Contribution of an HEI. Bristol: HEFCE.

¹¹ See Hatakenaka, S. (2005) 'Development of Third Stream Activity: Lessons from International Experience. HEPI.

¹² For example, see, Charles, D. and Conway, C. (2001) 'Higher Education-Business Interaction Survey: A Report To the UK HE Funding Bodies (HEFCE, SHEFC, HEFCW and DEL) and the Office of Science and Technology'. Newcastle University, Newcastle.

¹³ Howells, J, Georghiou, L. Rigby, J. Glynn, S. and Reeve, N. (2000) Impact of the Research Assessment Exercise and the Future of Quality Assurance in the Light of Changes in the Research Landscape Final Report for prepared for Higher Education Funding Council for England (HEFCE), UK.

¹⁴ Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P. and Trow, M. (1994). The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies. London: Sage. Nowotny, H., Scott, P, and Gibbons, M. (2001). Re-thinking Science: Knowledge and the Public in an Age of Uncertainty. Cambridge: Polity.

¹⁵ Howells, J (2002) "Tacit knowledge, innovation and economic geography" *Urban Studies* 33, 871-884

¹⁶ Brenner, N. (2004). *New State Spaces: Urban Governance and the Rescaling of Statehood*. Oxford: Oxford University Press.

¹⁷ Massey, D. (2005). *For Space*. London: Sage. SURF (2006). 'A Framework for City-Regions. Alan Harding, Simon Marvin and Brian Robson (Manchester). London: ODPM. May, T. (forthcoming). 'Universities: Space, Governance and Organisation'. In May, T. and Perry, B. (eds) special edition of *Social Epistemology* on 'Knowledge Production, Universities and Engagement'.

¹⁸ Goddard, J. and Chatterton, P. (2001) *The Response of HEIs to Regional Needs. Universities and Regional Development in the Knowledge Society*, Barcelona, 12-14 November.

¹⁹ Shattock, M. (1997) 'Managerial Implications of New Priorities'. *Higher Education Management*, vol.9 no.2.

²⁰ Goddard, J. (1997) 'Managing the University/Regional Interface'. *Higher Education Management*, vol.9 no.2.

²¹ Waters, P. and Lawton Smith, H. (2002) 'Regional Development Agencies and Local Economic Development: Scale and Competitiveness in High-technology Oxfordshire and Cambridgeshire'. *European Planning Studies*, Vol.10, No.5

²² SURF (2006). 'A Framework for City-Regions. Alan Harding, Simon Marvin and Brian Robson (Manchester). London: ODPM. ODPM (2006) 'State of the English Cities'. London: HMSO.

²³ Universities and Regional Advantage: Higher Education and Innovation Policies in English Regions, Kitagawa, F. 2005 *European Planning Studies*. Vol.12, No.6.

²⁴ Brickwood, A. and Brown, N. (2005) 'Study of the English Higher Education Regional Associations'. A Report to HEFCE.

²⁵ Current thinking in Manchester is that demand side policies are also feasible at regional level – the University of Manchester is cooperating with Manchester: Knowledge Capital, the Greater Manchester Strategic Health Authority, and the Association of Greater Manchester Authorities in establishing a pilot project in innovative procurement in the City. Georghiou, L., Rigby, J., Uyarra, E. Flanagan, K. (2000) Feasibility Study for the Use of Public Procurement as an Instrument of Regional Innovation Policy in Manchester. PREST.

²⁶ Benneworth, P.S and Dawley, S.J. (2006) 'Managing the University Third Strand Innovation Process? Developing Innovation Support Services in Regionally Engaged Universities'. *Knowledge, Technology and Policy* 2006, 18(3).

²⁷ Pels, D. (2003). *Unhastening Science: Autonomy and Reflexivity in the Social Theory of Knowledge*. Liverpool: Liverpool University Press.