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Context matters: the English Science Cities and visions for knowledge-based urbanism

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Abstract

In the mid 2000s the concept of the 'technopole' was re-imagined in the English context via the 'Science Cities' initiative. An economic-political consensus around the importance of the relationship between science, innovation and place-based development had emerged in part as a response to the global interest in replicating the success of projects around the world, such as Silicon Valley. This article develops four rationales for knowledge-based urban development and looks at how the Science Cities initiative was conceptualised and influenced by pre-existing relationships between national and local actors. The differences between national and local visions for knowledge-based urbanism are outlined, as well as the way in which econo-technical discourses become enshrined through governance relations.

Introduction

The concept of the 'technopole' has captured a public imaginary, invoking a relationship between knowledge and place focussed on the potential of technology-driven economic development for cities across the globe. 'Technopoles of the World' (Castells and Hall 1994) takes the pre-eminent success of Silicon Valley as its starting point, examining the interplay between structural transformations, factors of production in an informational age and the social, cultural and institutional conditions of new entrepreneurship. Whilst

the authors acknowledge that the success of Silicon Valley may 'ironically preclude the direct replication of its own experience' (p.28), the proliferation of 'silicon-mania' is nonetheless noteworthy. Koepp (2002) notes that 'siliconisation' has reached to the Silicon Alps (Austria), the Silicon Tundra (Canada), Silicon Fen (England) and Silicon Polder (Netherlands). The focus tends to be on an instrumentally-driven, econo-centric perspective on cities and their contributions to national wealth creation, as these 'Silicon Somewheres' (Hospers, 2006) seek to make real 'high-tech fantasies' (Massey, Wield and Quintas, 1992).

On closer inspection, motivations and rationales for interventions in science, technology and innovation (STI), or knowledge more broadly, can be disaggregated according to sectors, departments and scales of governance. Differences in approaches, values and attitudes between knowledge and place can be distinguished, legitimised through reference to interdisciplinary perspectives. These 'divergent rationalities' (Benneworth et al 2011) may be strategically coupled through technopole projects which bring different interests and stakeholders together; they may alternatively point to different orientations and visions for how knowledge can be harnessed to transform urban fortunes.

Understanding these differences in initial orientation to the issues surrounding knowledge and place is important. All too often policies proceed in the absence of articulating underlying assumptions and presumptions – and how those relate to, or are disjointed from, expectations and desired outcomes. Drivers are assumed to be common between partners in the search for urban knowledge-based development; yet global dynamics are

manifest in different ways as they are mediated through diverse governance, institutional, political and socio-cultural contexts. To develop more 'progressive, socially just, emancipatory and sustainable formations of urban life' (Brenner, Marcuse and Mayer, 2012, p.5) requires greater sensitivity to the values, knowledges and social interests that produce and reproduce knowledge-based futures. Central to such an endeavour are questions of social inclusion, participation and the forging of discourses and approaches that transcend rather than replicate narrow technological or economic viewpoints (Perry et al, 2013).

A wide variety of case studies are being constructed of how different cities are approaching the challenges of knowledge-based growth from Eindhoven, to Barcelona, to Holon and Singapore (Clua and Albet, 2008. Fernandez-Maldono and Romein, 2010. Ooi, 2008. Wong et al., 2006). Emphasis has been placed on different pathways to development, success factors, historical trajectories and the consequences and limitations of such approaches (Carillo, 2006). Dynamics have been illuminated in relation, for instance, to the conflation between creative, digital and knowledge economies, a narrow preferencing of particular forms of knowledge and the socio-cultural implications of dominant approaches (Chapain et al, 2009). What is missing is a specific emphasis on the overall framing of debates and how the interplay between conceptualisation and governance frameworks de-limits the capacities and capabilities of city-regions to work towards alternative knowledge-based futures. Greater attention is needed not only on the governance of the knowledge economy, but on the alignment between national policies

and local priorities (Winden et al, 2007), an issue which tended to be underplayed in Castells and Halls (1994) original work (see p. 227-228).

The early development of the Science Cities initiative in England is a case in point. Heralded as a significant first step in recognising the potential relationships between 'science' and 'cities', the article highlights differences in initial orientation towards the 'science cities' concept from top-down and bottom-up perspectives. It then considers the implications for both national and sub-national science and urban policy and the broader questions this raises in comparative contexts. In so doing, it draws upon research carried out between 2002 and 2010. Academic research on building science regions and cities underpinned the provision of expert advice to and work for the Science Cities Policy Development Consortium between 2006 and 2007. This included documentary analysis, international comparisons and interviews within each of the 6 Science Cities and the production of a report which subsequently informed the Science Cities own submission to the Comprehensive Spending Review in 2007.

The chapter is divided into the following sections. First, it outlines different rationales to knowledge-based urban development with an emphasis upon how the 'urban' and 'knowledge' are conceptualised. Second, it turns to the English Science Cities initiative. It looks at pre-existing policy contexts, the genesis of the initiative and differentiates between interpretations within central and sub-national agencies. The consequences for action at the city-regional scale and the implications for national science and urban policy are discussed. Finally, the article considers the broader ramifications of this analysis in

terms of the relationships between knowledge, space and public policy. It concludes with the need to adopt more context-sensitive approaches to understanding knowledge-based development as an antidote to the aspatiality of global knowledge capitalism.

Framing knowledge-based urban development

A wide range of perspectives are encompassed through the notion of 'knowledge-based urban development' (KBUD). A blurring of boundaries between science, knowledge, culture, society, geography and economy has given rise to a range of inter- and multi-disciplinary writings from a number of perspectives (Lyotard, 1984. Gieryn, 1999). Cutting across these literatures we can identify four economic, political, socio-cultural and scientific rationales for KBUD.

Rationales on Knowledge-Based Urban Development

An economic rationale is apparent in discourses which emphasise the relationships between knowledge and place in the context of globalization, localization, the knowledge economy and the relative importance of different factors for production. Debates around the rise of the post-industrial or post-fordist economy are accompanied by a concern with the emergence of new networked and distributed forms of governance and multi-level arrangements which highlight the relevance of the 'city' - and more recently 'city-regions' - as appropriate units of analysis and action in both political and economic terms (Bache and Flinders, 2005. Brenner, 2004. Neuman and Hull, 2009. Storper 1997). The

relationship between cities and knowledge is often understood through studies of 'innovation' and the city (Marceau, 2009). Here the emphasis is on theories of agglomeration, industrial districts, locational specific advantage, as well as innovative milieux, learning regions and economic advantage through systemic interactions (Uyarra, 2009). The concept of the 'technopole' fits neatly into this conceptualisation, in which particular forms of public-private partnerships are developed to build university-industry-partnerships through new 'growth machines' (Logan and Molotoch, 2007).

A second rationale is given by literatures relating to urban growth coalitions and the new urban entrepreneurialism (Macleod, 2002. Salet et al., 2003). The roles of local governments and authorities have been re-cast in light of discourses of competitiveness and economic development with the result that city governance has become increasingly characterized through a focus on entrepreneurial activities and issues of production, rather than social welfare or consumption (Boddy and Parkinson, 2004. Wilks-Heeg et al., 2003). Barcelona's '22@bcn' project, characterised as a 'top-down redevelopment strategy to capture high-tech activities', has been held up as a central exemplar of urban policy strategy as an exercise in boosterism (Casellas and Palleres-Barbera, 2009, p.1151). Cities have become more concerned with marketing, branding and global success and position, emphasizing the roles of creativity, innovation and knowledge in city futures (Hospers, 2008). Here 'science' is a label, utilized and valued for its ability to conjure up territorial images of the new, engaged, cutting-edge city. Through this focus, it tends to be the vision, rather than the strategy or action plan, that is seen to change urban fortunes.

A third rationale is provided by the debate on the 'creative city' or 'city of ideas'. In the UK this has found particular resonance with policy and practitioner communities through the concept of the 'ideopolis' as a means to capture the essential ingredients of a post-industrial city (Work Foundation, 2006). The ideopolis was initially seen to have three key elements: a set of key physical and economic features; a particular social and demographic mix and a specific cultural climate and set of commonly-held values (Canon et al., 2003). From a socio-cultural perspective the 'creative city' links clearly to Florida's (2002) notion of the 'creative class', concerned with attracting the right kind of knowledge workers, cultural feel and 'buzz', physical regeneration and connectivity as well as the support networks necessary to develop as a smart and modern city. Human capital and the social, cultural and institutional conditions for growth take central stage (Archibugi and Lundvall, 2001). On the other hand, a more econo-cultural perspective emphasises the creative industries and the development of the creative economy (Collinge and Musterd, 2009). Here a hybridised discourse can be seen that links economic competitiveness with branding and positioning in the search for cultural capital at the urban level (Christopherson and Rightor, 2009). Science, knowledge, culture and creativity are conflated to produce particular ways of seeing the urban knowledge economy (Hutton, 2009).

A fourth rationale is provided through literatures relating to large scale changes in knowledge production (Nowotny et al, 2001). A number of shifts, including those outlined above, are said to both result in and be the result of a paradigmatic shift in how

knowledge is produced, for what reasons, by whom, for whom and how it is subsequently judged. New modes of knowledge production emphasize interdisciplinarity, heterogeneity, distributed expertise, the need for user relevance, collaboration and an interactive process between research and practice and implicitly bring issues of scale into focus (Gibbons et al, 1994; May 2006). Local and regional stakeholders become important not only in assessing impact and demonstrating engagement, but also in defining and co-funding research. This is reflected in increasing emphasis placed on impact assessment and innovative methodologies and action research approaches, based on the aspiration that excellence comes together with relevance through place to build localized systems for knowledge exchange (May and Perry 2010). Knowledge management literatures, drawing on business, critical management and organisational studies are also reflected through this window in their focus upon tacit and embodied knowledge, codification and knowledge sharing.

Theoretically-grounded justifications for considering the relationship between knowledge and place are varied. Rationales are both exogenous and endogenous, stemming from within and outside epistemic communities (May with Perry 2011). Embodied within each window are differing conceptualisations of knowledge, the urban and the roles of different actors (Perry, 2008). An econo-centric perspective emphasises products, outputs and particular forms of knowledge more amenable to codification. A narrow understanding of 'science' dominates with implications for those institutions (large research universities or big science industry) best placed to deliver on those agendas. This perspective emphasises the changing nature of the industrial fabric, for instance, in terms

of knowledge-based industries and the linkages between universities and businesses as a precursor for commercialization and spin-offs, rather than to the redefinition of academics' research agendas and ways of working. The urban is then framed as container for or facilitator of 'innovation' with a reliance on trickle down to achieve objectives of increased Gross Value Added (GVA).[1] Knowledge may alternatively be seen as a central element in the re-branding of places, as a tool in global positioning as much as urban regeneration. The acquisition of talent, research expertise, the development of assets and external symbols of success or marketing and image are critical as it is the symbolic value, rather than actual content, of knowledge that matters. It is large 'scientific emblems' and facilities, or stellar 'world class' academics that have the greatest potential for these kinds of representational effects. Universities are seen as tools, instruments, assets and status symbols to be acquired, harnessed and their benefits extracted. In an acquisition-driven view, universities are one among many participants, operating on an institutional basis within strategic alliances with little engagement with individual academics. In the context of the knowledge-economy, universities may be part of urban growth coalitions yet they may alternatively be absent - as it is their existence that is deemed important as assets, rather than the knowledge they produce. Alternatively, what is counted as 'knowledge' may be broader, taking in the sciences, social sciences, humanities and arts. The urban may be important through partnership between different actors within a locality in the definition of research priorities, or the involvement of institutional interests, including local authorities, business interests and city partners as potential users of, or participants in, research processes. On the other hand, it may be

absent, as proximity and localized relationships are seen to take place without according any agency to the 'city' itself.

There is no linear relationship between these different issues and how they translate into policy frameworks and particular interventions. Policies for knowledge-based urban development or innovative urban environments tend to leave such underlying assumptions un-examined, without a clear understanding of the relationship between knowledge and place, intended outcomes and appropriate interventions. The assumption is often that 'doing something' about innovation and the knowledge economy is enough to result in transformation. Rationales for action in practice may relate to theoretical frameworks, but more commonly they have developed in policy and practice borne of experience or justified by necessity, with post-hoc justifications deployed to legitimise prior courses of action.

The Multi-Level Governance of Science and Innovation

Economic, political, socio-cultural and scientific dimensions are not exclusive and may be in tension or even contradictory in terms of their spatial implications vis-à-vis, for instance, concentration or distribution of resources and capacities. This is particularly the case given the increasing multi-level governance of STI in the contemporary era (Edler, Kuhlmann and Behrens, 2003. Perry and May, 2007). In multiple countries within Western Europe, Australasia, Asia and North America, an increasing percentage of national programmes are being delivered by regional and local actors in centralised,

decentralised and federal contexts (Kitagawa, 2007. Holbrook and Salazar, 2007. Sotarauta and Kautonen, 2007). National programmes may have varied sub-national dimensions as regional actors become stages for the implementation of national policies; they may be partners or co-funders in national/regional infrastructures or else develop independent sub-national policies for STI or knowledge-based growth (Perry and May, 2007).

Multiple actors at multiple levels are involved in STI policy and knowledge-based development. Yet institutional, governmental and departmental positions and attitudes vary. As our interviews with representatives in the European Commission in DG Research, Innovation, Enterprise and Regions revealed, acting as joint signatories on warmly worded policy documents masks a range of different perspectives regarding the relationship between knowledge, scale and place. In practice, across a range of national and sub-national contexts, there is little cross-departmental discussion of any epistemological resonance, despite the seemingly endless re-organizations and re-naming of ministries for science, economics, business and higher education that have characterised government restructuring (Dresner and Gilbert, 2001).

Differences have been identified in what 'regionalisation' means in practice, as mediated through national economic and scientific systems (Fristch and Stephan, 2005). A common rationale behind the use of new instruments, such as clusters, technological districts and innovation poles, relates to the economic potential of science and technology. Yet in many countries an additional rationale shared between national and

regional actors is a concern for balanced growth and the potential of STI to address regional disparities. In France, Germany and Italy examples can be seen of national policies with strong sub-national dimensions (Crespy et al, 2007. Koschatzky and Kroll, 2007). These include initiatives to target specific regions and cities to build capacity, such in East Germany or Southern Italy, as well as open competitions to build excellence, in which all regions can participate, but only some will benefit. As we will argue below, these examples contrast strongly with the situation in the UK where regional economic development arguments have not traditionally been accepted at national level as legitimate rationales for influencing the contours of national policy, requiring sub-national actors themselves (the Devolved Administrations, English regions and Science Cities) to link STI and socio-economic development goals (Charles and Benneworth, 2001. Perry, 2007).

What matters is how pre-reflexive understandings about knowledge and space, informed implicitly or explicitly through different theoretical lenses, inter-relate with multi-scalar governance arrangements. As the quantity and quality of interactions across levels of governance increase, so too does the potential for differences in terms of the relationships between knowledge, space and place, with important effects on the capacities and capabilities of sub-national actors to build sustainable knowledge-based futures (Winden et al, 2007).

The English Science Cities

English developments illustrate these dynamics in practice. The concept of the 'technopole' was re-imagined in the 2000s through the lens of the Science Cities initiative. This provides an appropriate focus for analysing how multi-level governance arrangements interact with assumptions regarding the relationship between knowledge and place to shape and re-shape the debate on the roles of cities in the knowledge economy.

Contexts and Catalysts

The genesis of the Science Cities initiative can be seen against a history of policy developments in which 'science' had increasingly come to see 'cities' and, to a lesser extent, urban policy had begun to see 'science' (See Figure 1). In the early 2000s national policies were being shaped by growing awareness of the economic importance of knowledge and science exploitation in wealth creation and competitiveness in light of global pressures, particularly from the emerging economies of Brazil, Russia, India and China. Awareness of the role of economies of scale, critical mass, agglomeration and proximity as a precondition for knowledge transfer and innovation was growing, which led to an increasingly sub-national dimension to policies for innovation and exploitation. Such shifts were reflected in policies for higher education, with a range of initiatives designed to achieve closer synergies between research and industry managed and facilitated through the Regional Development Agencies (RDA).[2]

INSERT FIGURE 1

The roles conceived for RDAs were as implementers of national policy and 'containers' within which innovation could be managed. Economic-scientific rationales predominated with an emphasis on how achieving national objectives would be increasingly dependent on maximising returns on science, research and harnessing the capacity of different places in the interests of UK-plc. The Department for Trade and Industry (DTI) and the Treasury were central departments, while urban strategies remained relatively untouched by knowledge or innovation based discourses. The rise of the sub-national agenda, in the context of the Labour Government's commitment to devolution, introduced a stronger political-economic rationale to concerns about science, innovation and place. National policy had tentatively begun to acknowledge arguments relating to regions, cities, innovation and knowledge transfer, yet 'space' remained a largely secondary consideration. In contrast, issues of spatial location, distribution and effect were central to regional and urban engagement with agendas around STI in the context of the knowledge economy. Decades of regional policy had failed to significantly impact on the gap in productivity and prosperity between England's region, with old industrial regions in the North of England deemed to be 'underperforming' or 'lagging'. Investing in the 'new' economy was not only seen to make economic sense but was seen by some as a 'last resort' for addressing long-term structural issues in regions outside London. Arguments about the increasing political and economic significance of cities and city-regions as motors of regional and national economies combined with a consensus over the need for knowledge-based growth to provide a fertile context for urban STI initiatives.

Legitimacy for cities to independently take actions in this terrain was built over time from the bottom-up, rather than accorded by central government. Science City York (SCY) had already been launched in 1998 as a close partnership between the University of York and York City Council to 'reposition York and North Yorkshire as a hub for R&D and enterprise in new technologies'. The emphasis was on business support in particular sectors, including bioscience, creative industries and information technology and digital industries. On the North-West side of England, Manchester's response to the challenges of knowledge-based growth was encapsulated through the Manchester: Knowledge Capital (M:KC) initiative, set up in 2002. While SCY was set up as a company limited by guarantee, M:KC was established as an unincorporated partnership body between the 10 local authorities, 4 universities and public and private actors and developed a holistic vision for knowledge-based growth, drawing on the concept of the 'ideopolis' and underpinned by an aspiration to be a global pivot in the knowledge economy.

The early 2000s were marked by institutional and policy developments at the regional level. In 2002 the first Regional Science and Industry Council was established in the North West of England in response to the loss of a large-scale scientific infrastructural investment to the relatively prosperous South East. The debate over the location of the 'DIAMOND' synchrotron radiation source brought to the fore strong differences between, within and across national and sub-national actors. Two loose and temporary coalitions of interest emerged, both comprising national and regional, scientific and economic actors, which alternatively mobilised scientific-economic and political-economic rationales in support of different location decisions (Perry 2007).

The legitimacy that the DIAMOND debate gave to the involvement of RDAs in science policy eventually led to the creation of new institutions and posts for science and innovation in all of the English regions. RDAs had already begun to acknowledge the central role of cities in driving regional economies and the two agendas combined at the regional level to provide a receptive context for the Science Cities initiative. At the same time, a re-framing of the rationale behind sub-national interventions in STI also took place. Through the complex inter-relationships, negotiations and dynamics of the DIAMOND debate and the subsequent national – regional forums established to discuss the future of the region, arguments about the relationship between science and economic policy and questions of redistribution or equity were left unanswered.

In this absence, a dominant discourse emerged that emphasized the predominance of a *national* science policy, supplemented by regional investments in STI and a responsibility for regions themselves to harness available scientific assets for regional economic and social benefit. National support for a regional dimension to STI was embedded in the recommendation in the 10 year Science and Innovation Investment Framework for regional science and industry councils (HMT et al, 2004) and national policy documents across the board began to more systematically reference regional developments, where they clearly added value to UK plc. A strong emphasis on the physical sciences, rather than knowledge more broadly, on the roles of research-intensive universities and big industries and on technological developments predominated.

The mid-2000s were marked by the redefinition of the objectives and appropriate scales of action for national regional policy. Following the Labour Party's manifesto promise to redress the democratic deficit in the English regions through the introduction of elected regional assemblies, referenda were planned for the North West, North East and Yorkshire and Humber regions (DTLR, 2002). In 2004 voters in the North East effectively vetoed further referenda, so resounding was the victory of the 'No' campaign (see Sandford 2009). This not only led to a shelving of plans for elected regional government but also a redefinition of roles and responsibilities, through the Sub-National Review of Economic Development (SNR) in 2007. The SNR increased the powers and responsibilities of local authorities in economic development and formally enshrined the variable geometry or multi-track nature of city-regionalism in England, through providing the basis on which some places could institutionalise multi-authority governance arrangements faster than others. In addition, the creation in 2004 of the Northern Way initiative, a partnership between the three Northern RDAs with funding of £100m from central government, sought to redress the fundamental structural problems facing the North, increasingly through an emphasis on the roles of science, technology and innovation (ODPM, 2004. Page and Secher, 2006).

Science Cities: National and Sub-National Perspectives

It is only against these associated developments that the initial shape, form and intent of the Science Cities initiative can be understood, in terms of fertile policy contexts, differential starting positions of city-regions, dominant science-based and technological

discourses and the growing responsibilities and confidence of certain cities in relation to economic development and the city-regional debate. The first three Science Cities were announced in December 2004 by Gordon Brown (then Chancellor of the Exchequer) in his pre-budget report (Manchester, Newcastle and York). This was followed in the 2005 Budget by the announcement that a further three cities would be developed as Science Cities within their respective regions (Birmingham, Bristol and Nottingham).

The birth of the initiative and the criteria used to underpin the choice of cities reflected differing sets of rationales. A strong scientific-economic rationale for investing in science and technology was evident in the initial announcements and press release (see Figure 2). The 2005 Budget report linked the value of Science Cities to their potential to increase investment in science and research, to enhance the ability to exploit excellent science and to compete in the global knowledge economy: 'the six Science Cities, along with other cities and regions, have a crucial role to play in meeting these *national* challenges' (emphasis added, John Healey, then Financial Secretary to the Treasury, Times Higher Education Supplement, 21 September 2005). National endorsement of an urban dimension to the challenges of knowledge-based growth, through support for Science Cities, was driven by globally-oriented, nationally-focussed concerns with scientific-technological development and economic growth. A period of positive discussions between national and regional actors followed, with the Science Cities proudly announcing that they were to spearhead the UK's efforts to build clusters of scientific excellence in support of the knowledge economy.

INSERT FIGURE 2

The announcements did not, however, reflect the emergence of a spatially-sensitive STI policy or the development of an integrated or redistributive national agenda on the relationship between knowledge and place. There was no direct reference to differences in the distribution of scientific resources, assets and capacities across England or the structural deficiencies and problems of productivity facing the RDAs. Whilst the conception of the initiative was strongly based on a scientific-economic rationale led by the Treasury and by those responsible for science and innovation, the implementation of the initiative was justified via the mobilisation of a political-economic rationale around regional development. The development of Science Cities was to be supported through the existing funding given to the Northern Way to close the gap in productivity between northern and southern regions. In other words, from a national point of view, the emphasis was on how cities could support science, technology and innovation, rather than how the latter could be harnessed as a tool in urban regeneration and development.

As a result of the juxtaposition between different rationales, no clear criteria for the choice of cities according to scientific or regional development targets emerged. Manchester and York were obvious first choices, given the developments that had already occurred from the bottom-up. The North East had been quick to follow the North West's lead in institutionalising regional science and innovation capacity and a spatial focus on Newcastle had quickly emerged within regional priorities. In the later designation of cities, an initial concern with regional balance can be seen to the extent that Bristol,

Nottingham and Birmingham were all core cities within their respective regions and members of the Core Cities group.[3] No 'science city' was named in the East or South East of England or London, to the chagrin of some local representatives, which implied again a concern with the unbalanced distribution of STI assets and resources outside the Greater South East. York, however, offered a counter-balance as neither a 'core city' within the region, nor an area of significant overall economic deprivation.

Underpinning the above was little specificity about definitions or boundaries, either pertaining to 'science' or to 'cities'. 'Science city' was a loose label able to mobilise wide-ranging support from both national and sub-national actors, precisely because of its lack of precision. At the same time it was a matter for interpretation within national and sub-national circles as to whether the label was assumed or designated, driven by the RDAs or by developed by national Government. In the initial press releases and documentation, responsibility for the initiative was initially unclear, which laid the seeds for the subsequent disappointment that followed within the cities themselves.

National endorsement did not subsequently materialise into concrete support. No additional funding was attached to the initiative from the science budget or elsewhere and ministerial sponsorship appeared variable depending on where (and with whom) responsibility for science and innovation lay. Warm words remained the currency of successive national representatives, who were keen to emphasise the necessity of cities and regions playing their part in the national race for knowledge-based success – but in a way that devolved responsibility without resource. This was further justified by

acknowledgement that a national plan for Science Cities would be inappropriate and that the role of national government was not to 'dictate' or to 'micromanage local economic development' (Lord Sainsbury, then Minister for Science and Innovation, 2006).

The Science Cities were left with a challenge and apparent opportunity: on the one hand, the question of how to meet raised expectations and ambitions within the context of existing priorities and resource commitments; on the other, the chance to define and shape the meaning of 'science city' according to local priorities and contexts. The Science Cities Policy Development Consortium was established between the six Science Cities with a remit to share experiences, build an evidence base, interchange with all parts of central government, consider joint projects, develop the Science Cities brand and keep under review the possibility of extending the consortium to include other cities (Science Cities Terms of Reference, July 2006). Our research recommended a three-fold approach followed, comprised of representation, learning and development in which the Science Cities sought to influence and shape national government, share best practice through regular meetings and develop their individual approaches. A process of annual summits was instigated at which different elements of the above could be discussed and the Science Cities brand and profile effectively badged.

In what followed clear differences could be seen in the underpinning assumptions made about the relationship between knowledge and place – and the implications for policy. Following the second Science Cities summit in May in 2006 a cross-departmental meeting of the Treasury, Department for Trade and Industry (DTI), Department for

Communities and Local Government (DCLG) and Department for Education and Skills (DfES) took place. The differences in orientation were clear: the DTI focused on knowledge exploitation and transfer; DfES emphasized science education and skills and DCLG expressed concern not to create an exclusive and privileged club. The latter, seen in the light of the absence of clear criteria, explains in part the reluctance of national departments to offer dedicated financial support for the initiative. For the Treasury, individual departments could choose how (or whether) to represent Science Cities in their submissions to subsequent spending reviews.

For the Science Cities emphasis then turned to how a cross-departmental case and justification could be made. We were commissioned by the Consortium to produce a report which looked across national policy contexts and departments and which emphasised the potential for Science Cities to contribute to a range of agendas and public sector agreement (PSA) targets (see Figure 3) (May and Perry 2007). This was to form the basis of the submission on behalf of the Science Cities to the Comprehensive Spending Review (CSR). Underpinning the submission was a debate between and within the Science Cities on its overall purpose, with some in support of directly requesting additional funds, whilst others supported moving away from the language of 'asks' towards an emphasis on dialogue and joint working, particularly in light of the difficulties in justifying, in terms of 'science' or 'cities', the choice of the six cities.

INSERT FIGURE 3

The CSR submission reflected a broader and more holistic view of the potential of Science Cities in the context of debates over the development of the knowledge economy. Spaces of potential were seen in the gaps between and across departments with local initiatives bridging agendas on innovation, skills, widening participation, higher and further education outreach, the creative economy and green and renewable technologies. For the Science Cities, the strength of the initiative may be characterized as not only symbolic, but also additive (in terms of resource and capacity) and transformative (May and Perry, 2006). An emphasis was to be placed not only on buildings and products, but also processes; not only upon 'science', but also 'knowledge'.

The Science Cities had differential starting positions and contexts. Within a shared set of understandings, distinct approaches to knowledge-based growth could be seen. Scientific, economic and cultural rationales were variously mobilised. York's largely business-focussed emphasis could be contrasted with a broader vision expressed at senior levels for Manchester's knowledge-based growth (Garner, 2006). Bristol, for example, developed a strong emphasis on public understanding of science and engagement. The city's scientific and engineering history, through eminent figures such as Isambard Kingdom Brunel and Charles Darwin, were drawn upon to galvanise different publics, industry players and local and regional agencies around a common sense of purpose and potential. Similarly, heritage and community were central themes for Nottingham Science City alongside the commercial exploitation of science.

Research alliances formed important elements of the Birmingham approach, through a collaboration between the Universities of Birmingham and Warwick. This also indicated further variation between the cities in their geographical scope and coverage, whether within existing administrative boundaries or reflecting more fluid city-regional or cross-urban approaches. Levels of support from RDAs were varied, reflected in the centrality of the Science Cities within respective economic strategies, with Newcastle and Manchester appearing as central regional priorities (Couchman et al, 2008).

The point is not to offer an in-depth, exhaustive analysis of differences across Science Cities nor to glibly pigeon-hole particular cities; rather, to identify how bottom-up perceptions of the scope and potential of Science Cities were reflected in the range and diversity of approaches to knowledge-based urban development. In comparison with national perspectives, a more joined up view prevailed within the cities themselves, across urban, STI, skills, cultural and environmental agendas, bringing scientific excellence together with commercial and policy relevance and seeking to make connections with different communities and constituencies.

This holistic view was not shared across government departments reflecting different cultural views of the importance of place in policy conception and delivery (May and Marvin, 2009). National policy-makers have become more at ease with publicly acknowledging the place-based dimensions of innovation policy and the need for New Partnerships for Innovation (DIUS et al, 2008). The role of the National Endowment for Science, Technology and the Arts (NESTA) was influential in shaping this debate

through its innovation and place programme and investments made more recently in the Manchester city-region. Yet the discourse of innovation at national level has remained predominately econo-centric and technology-based. Despite the wealth of initiatives within city-regions, examples which shape national policy tended to be those that emphasise commercialisation, technology transfer or the development of new science parks, incubators or corridors (BIS, 2009, p.44). Incentives and metrics for different organisations – RDAs, local authorities and universities – reflected and reinforced this dominant view.

Against this background the constant challenge for the Science Cities was to deliver on wide-ranging aspirations, in the context of existing governance responsibilities and resource constraints and their capacities and capabilities to deliver. The need to represent economic and technological potential to national organizations meant that representation externally tended to mirror, rather than challenge, dominant approaches to knowledge-based development, leaving the potential of alternatives largely unrecognized and unfulfilled at the local level. Although the cities were able to exploit certain cracks and fissures in hegemonic discourses (Holloway 2010) in order to develop more context-sensitive approaches, the strength of the national polity and the broader context of national-urban relations in England de-limited the potential to go beyond the fantasy of the 'technopole' in practice.

Cities, Knowledge and Consequences

Existing studies of cities and knowledge-based development tend to examine specific case studies from within particular disciplinary perspectives. The discourse of 'technopoles' has become hegemonic, enshrined in particular kinds of public-private partnership in which some partners' knowledge is more valuable than others. This is recognised in writings on Silicon Valley since Castells and Hall's seminal work. O'Mara, for instance, notes that there is an often neglected story of Silicon Valley, 'a secondary definition of the city of knowledge, operating somewhat in tension with the first, that a scholarly community should use its scientific knowledge to improve society in general and urban life in particular' (O'Mara, 2005, p.234). An emphasis on the overall framing of debates in different national contexts has been missing, along with sensitivity to how the interplay between conceptualisation and governance frameworks de-limits the capacities and capabilities of city-regions to work towards alternative knowledge-based futures.

Our analysis of the English Science Cities initiative provides some insight into this issue. Clear differences emerged between a 'national' and 'sub-national' view in terms of the mobilisation of different rationales for policy intervention and the implications for who was involved. Science Cities can be characterised as a peculiarly English initiative shaped by macro changes and the broader contours of the devolution/decentralization debate since 1997. A redistributive agenda for STI was quickly subsumed and forgotten within a discourse that successfully mobilized the acknowledgement that local actors

were best positioned to determine local priorities and strategies in order to diffuse requests for a more balanced economic growth model. From behind the language of freedom and tailored solutions came a national devolving tendency that left responsibilities and commitments clear ('not ours'), but actual support far less apparent. Science cities, as a UK response to silicon-mania, were expected to emerge like phoenixes from the industrial contexts of English urban heartlands. Government policies sought to hold Science Cities to account according to measures that did not consider the relational space in which policy is enacted through, for example, targets and output focused measures of effectiveness. Space was 'seen' according to its ability to live up to the abstract economic criteria of globalised competitiveness. In the case of the Science Cities it also explains why some places became invisible and others visible. The quiet but concerted privileging of particular places against the invisibility of other spaces is manifest in research and development expenditure and in terms of the politics of aspirations for the Science Cities. Expectations are high yet urban hierarchies result from a devolution of responsibility with neither power nor resource.

The Science Cities initiative is indicative of how too many unrealistic hopes can be pinned on limited understandings of 'science', rather than 'knowledge' without considering *how* expectations are to be realised. During a lecture early in 2010, the former Prime Minister Gordon Brown stated that it is to science that Government looks 'to provide new solutions, new technologies, new opportunities to further our common goals…it is science alone that can give us hope…challenges that only science can answer' (Brown, 2009). He went on to compare the dangers of unregulated financial

markets with the dangers of unregulated science, in which 'our progress can outstrip our humanity' (ibid). This was indicative of an excess of expectations going hand in hand with the abdication of any general - or indeed specific governmental - responsibility for mediating change, harnessing potentials, distributing opportunity or creating enabling and supportive framework conditions. The emphasis has tended to be on quick fixes, short cuts or technical solutions, rather than to the work of understanding and learning or to questions of appropriate empowerment. Science can deliver neither alone, whilst a broader concept of knowledge is needed to underpin the latter. Through the narrow deployment of concepts of scientific expertise and its relationship to place, science is being configured to transform the nature of democracy from a politics of sovereign citizens to a politics of diffused experts in which electoral struggle is replaced by expert bodies and specialised technical discourse is threatening democratic discussion (Turner, 2003). Gordon Brown's previous comments exemplify this assertion, as science is seen to provide unambiguous and disinterested technocratic 'solutions' to multiple areas of public policy.

Understanding the pre-cognitive assumptions made about 'knowledge' and 'place' is of central importance in providing an explanatory framework for the above state of affairs. This necessitates in turn an examination of how macro pressures are translated, mediated, magnified, refracted or transformed by meso level institutions and structures and the people within them and with what effects for policies and outcomes at a micro level. The idea that there are 'global forces' over which states have no control frequently works to alleviate governments of responsibility through allusion to economic necessity. Instead

we need an emphasis on the ways in which external pressures can be better managed to meet shared aspirations. Pressures for knowledge-based success are driven by a globalised ideology informed by a continual search for competitive advantage. A fundamental characteristic of this search is not to take context seriously - as to do so would undermine the pursuit of universal growth patterns. This tendency is replicated in the pursuit of scientific success as judged by peer review which focuses upon content through attention to international excellence (Lamont, 2009). Space becomes a passive entity in which things are enacted, but not co-constructed. Overall, what appears is an absolute sense of space according to the pursuit of the universal goals of globalization/excellence.

Our analysis draws attention to a 'missing middle' between the multiple expectations of scientific knowledge and the extent to which it can – and should – deliver on a technocratic political agenda. Existing agendas tend to separate the 'what is being done' from 'how and using what resource and capacities and in what different contexts'. This is a central issue in reimagining the relationship between knowledge and place in the future requiring imaginative approaches to governance, participation and democracy and a willingness to think beyond the black-box of the technopole imaginary.

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[1] Gross Value Added is a measure of the economic contribution of each individual producer, industry or sector in the United Kingdom.

[2] Regional Development Agencies were first launched in 1999 with a mission to take a business-led approach to economic development and regeneration in the English regions.

[3] The Core Cities group network comprises Birmingham, Bristol, Leeds, Liverpool, Manchester, Newcastle, Nottingham and Sheffield.