

Building Localised Interactions Between Universities And Cities Through University Spatial Development

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Abstract

Universities are important players in the global development of the knowledge economy, alongside being significant contributors to the economic development of their host cities. They are both significant knowledge enterprises, as well as the suppliers of the human and intellectual capital on which the knowledge-based economy depends. What seems under-explored is how deliberative partnerships between universities and city authorities can develop around projects of mutual benefit, especially based on campus development. In this paper, with the help of five case studies (QUT, MIT, Harvard, Twente and Newcastle universities), we investigate how the spatial development of universities can be one of the main meeting points between the city and university, and how it can be used for stimulating economic development and managing growth. These cases show that university-city collaborative initiatives focused on university properties represent a desire to produce creative and competitive new urban spaces which reinforce the position of the university and the city in global economy. They also show that these developments need to be jointly managed to avoid undesirable impacts on either side.

Keywords: urban, competitiveness, campus development, governance, knowledge economy

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1. Introduction

Universities have been going through a major evolution facing the demands of an increasingly globalised knowledge economy, with intense competition for staff, students and research funds. In response, the physical form of the university – its campus – is changing. To date, a huge amount has been written about the drivers of change in universities, and how universities have reacted, articulated through concepts such as Mode 2 knowledge production, the entrepreneurial university and the triple helix (*cf. inter alia* Gibbons *et al.*, 1994; Clark, 1998; Etzkowitz, 2004; Boucher *et al.*, 2003 for a review).

In parallel with a greater inter-university competition, the rise of the globalised knowledge economy has also increased the importance of universities to the places in which they are located (OECD, 2007). The role of particular places in the knowledge economy is increasingly determined by their competitiveness in attracting and retaining knowledge-intensive industries and services, where knowledge is seen as a factor of competitive success (Beaverstock *et al.*, 2000). Universities can therefore be important determinants of urban competitiveness as significant knowledge enterprises, as well as the suppliers of the human and intellectual capital on which other knowledge enterprises depend.

We argue that these two trends are inter-related. Firstly, globalisation is driving university responses which also have a spatial (urban) manifestation – the response to competition involves physical developments as well as academic changes. Secondly, universities are impacting upon territorial competitiveness through their knowledge outputs. Yet there remains little research into how these two trends have intersected. Indeed, these two impacts appear quite different, and we distinguish two key perspectives in the literature. Firstly, universities are changing their space-using behaviour as their spatial needs change, in response to remote student enrolment, flagship facilities to attract the best researchers and becoming commercial landlords to exploit their land holdings (what we call the stand-alone model). Secondly, universities are seeking assistance from regional partners to adapt to these new pressures, to improve their competitiveness as universities, and to achieve this are developing science parks and incubators, which we term the “high-technology engagement” model.

The power relations underpinning these two perspectives are very different; in the former, universities are regarding as determining their own responses to external drivers, and the role of the urban or regional authorities could be reactive and subordinated. From the second perspective, local agencies can place substantial new demands and regulations upon what universities do, and in so doing seek to improve the spatial competitiveness of their own locality. But clearly in physical development projects there are strong interdependencies between both sides, with both having much to gain from successful co-operation, universities improving their international competitiveness, and cities benefiting from new knowledge districts, and branding and image benefits.

These benefits do not automatically accrue, and the existing literature has failed to indicate the conditions under which partnerships can be mutually

successful. Our hypothesis is that tangible urban-development projects can be a place where both partners learn to work together for mutual benefit and to bridge between the irreconcilability of the two preceding models. Our research question is: (how) can city-university relations be managed and strengthened through university spatial development and expansion schemes?

Through five case studies of universities engaged in urban development projects, we highlight that these universities are using their urban context to support their international ambitions, but mobilising that local context inevitably requires the university to also improve its contribution to the host city's development, strengthening urban management capacity. We begin to classify the contributions which universities can make to urban management processes and their underlying institutional behaviours, and reflect upon the emergence of university-influenced urban landscapes as places integrating and reflecting pressures on both universities and cities in the new knowledge economy.

2. Universities, regions and institutional change in the new knowledge economy

2.1 The importance of knowledge to cities

There is an increasing sense of the importance of 'place' in the 'knowledge economy', and of the concentration of knowledge in particular places (Temple, 1998; Madanipour, 2010). Much knowledge is "tacit", embodied in the capacities of individuals, rather than being easily codified and transferred (Nonaka, 1994), often conceptualised in terms of know-how, know-who, learning-by-doing and learning-by-copying (Asheim, 2001). The creative and innovative process is, furthermore, inherently social, involving the acquisition and combination of diverse types of knowledge to solve problems that have broader social or economic value (Desrochers, 2001).

As tacit knowledge is not easily transmitted, innovations combining tacit and codified knowledge cluster around places with appropriate tacit knowledge resources, imbuing the knowledge economy with strongly centripetal geographical tendencies (Camagni and Capello, 2005). Furthermore, increasing specialisation of knowledge production has differentiated those involved in the production of domain knowledge from those in the production of supporting knowledge (Muller and Zenker, 2001; Wood, 2002). This gives rise to places with such strong complementary clusters of knowledge assets that they attract knowledge-intensive, innovating activity (Bathelt, 2001).

This concentrating tendency has manifested itself in the significance of cities and the rise of a global urban hierarchy. At the top, a handful of "world cities" such as London and New York act as primary agglomerations where a range of knowledge-intensive industries come together to produce complex systems of competitive advantage, often linked through financial services (Gordon and McCann, 2000; Beaverstock *et al.*, 2000). Underneath them, a tier of globally visible 'regional' capitals, such as Chicago, Frankfurt and Seoul, have strong positions in particular niche sectors (Smith, 2003). They are followed by a range of cities with particular technological strengths.

The performance of cities is not however purely a function of size and global nodality. Some smaller cities have been able to capture significant levels of knowledge-intensive activities, especially in the creative economy, supported by what Florida (2002) terms the “creative class”, success being a consequence of the concentration of technology based activities, and an urban environment attractive to talented workers.

Urban competitiveness policy in the knowledge economy has therefore become fixated on attracting and developing knowledge-intensive services and technology-based industries, talented people, and the amenities that facilitate attracting and retaining people and firms. Increasingly this includes recognition of universities’ roles, as key knowledge institutions, attractors of talent and contributors to civic amenity. Regional and local authorities are therefore increasingly looking to harness universities to support their economic development ambitions both as global players and regional providers of knowledge and skills (Goddard and Chatterton, 1999).

2.2 Universities’ urban engagement as a “third mission” task

This has led to strong pressures on universities from local partners to engage with the economic development of their regions (Goddard *et al.*, 1994; Charles and Benneworth, 2001; Lambert, 2003). The European Commission initiated a debate about the role of universities in the ‘Europe of Knowledge’, describing them as ‘an instrument of regional development and of strengthening European cohesion’ (CEC, 2003, p.21). In the United States, regional engagement has long been a concern for state-funded higher education institutions.

This engagement – an international phenomenon - is also encouraged through changes in the nature of urban and regional governance (Madanipour *et al.* 2001), in which universities as large organizations are expected to play a significant role alongside other major regional stakeholders from the public and private sector in new regional governance networks. Pressure can be high from urban and regional authorities for universities to be present in more sites and activities across city-regions, to stimulate new activities and create new nuclei for economic and social development.

These pressures have become entangled with the parallel emergence of the idea of a ‘third university mission’, namely the increasing emphasis on the social, cultural, political and environmental benefits which universities can bring (CERI, 1982). Although the idea of “engagement” that emerged in the 1980s was defined very broadly, there has latterly been an appreciable and potentially worrying narrowing of emphasis towards primarily economic benefits (Benneworth & Jongbloed, 2009). Pressure is mounting on universities to support regional clusters of spin out companies. Recently, regional development agencies have begun to recognise the importance of universities as drivers of economic development, and have begun to invest in universities to improve those benefits (Charles, 2007).

We contend that the narrowing of the view of the spatial role of universities has driven a focus in the literature on those spaces oriented specifically towards a vision of engagement that fits with commercialisation of innovation. Commercialization of innovation may be coupled with commercial exploitation

of land and property, with universities black-boxing their view of their spatial contribution to the places which are directly relevant to their engagement and reach-out missions. There are clearly risks in such a reductionist perspective on universities' physical contributions, in particular obscuring other pressures to which universities are subject, which equally influence their space-using behaviour, and ultimately their impacts on urban competitiveness.

2.3 External drivers on universities' behaviour

A number of structural changes have transformed universities in the last quarter century: the rise of the knowledge economy (Lundvall and Borrás, 1997) and changing patterns of urban and regional governance (Madanipour *et al.*, 2001), the concentration of knowledge production processes in cities (Beaverstock *et al.*, 2000), as well as the previously outlined increasing pressure for regional engagement (OECD, 2007). The rise of the knowledge economy and the growth of knowledge-based occupations demands greater numbers of graduates. Massification in higher education has dramatically altered universities' social mix, including more mature and home-based students, coupled with the retreat from student grants (cost-sharing, Johnstone, 2006) and a demand from government that more university capacity should be devoted to employability. Additionally the forms of knowledge demanded from universities are shifting further away from traditional disciplinary lines to new problem-focused themes in new centres and departments combining expertise that better maps onto employers' needs (Gibbons *et al.*, 1994).

These current changes can be regarded as elements of the last of four "revolutions" in university organisational approaches and institutional nature (Delanty, 2002). The first 'revolution' replaced cloistered communities of scholars with the Humboldtian university in 19th century Germany, constituting universities as a modernising nation-building force, rational, secular and universal, professionalized through an elite professoriat, linking teaching and research for the first time. This model evolved in the late 19th century into the American civic university, shifting teaching beyond the professor to the disciplinary departments, embracing vocational training, and introducing in many cases a civic or local service mission, notably amongst the land grant universities.

Social change, increasing demands for access to universities, and a wider student social mix in the 1960s precipitated the third revolution, producing the 'democratic mass university' (Daalder & Shils, 1982). Knowledge became more democratic, typified by increasing student participation, and critical dialogue. Engagement was seen as an individual political act for radical academics and students, often against dominant public authorities.

The most recent revolution has been characterised by Delanty as the "virtual" university, characterised by a diversity of missions and approaches. Driven by weakening state funding and increasing competitive threats from globalisation, universities have been forced to seek alternative funding sources, to innovate in their managerial structures, engage with business and government, become entrepreneurial and import private sector models and morés into the academy. Various authors suggested archetypal forms, from the entrepreneurial university (Clark, 1998), through the virtual university

(Cornford & Pollock, 2002), the engaged university (Watson, 2003), the ethical university (Garlick, 2005) and the useful university (Goddard, 2007). These drivers have done more than just encouraging a third (commercialisation) mission, but have profoundly changed the way education is managed (Greenwood, 2007).

2.4 Responding to globalisation and universities' urban impacts

It is not just science parks and incubators which have formed universities' spatial responses as they seek to fit their spatial assets to their missions and needs. Universities' built environment are often the result of decades - if not centuries - of planned or *ad hoc* change, balancing changing needs with available funds (Larkham, 2000). These buildings and spaces' quality has a direct link to the nature of the university, its ability to meet its mission, how it works as an organization, and how it manages its resources.

Financial pressures on universities have led to more active financial management strategies of university resources, now expanded to cover their intellectual properties and their real estate. (Shattock, 2003). Different waves of rising property prices placed large assets in the hands of universities, often otherwise cash poor organizations. Universities may shift activities between locations, sites and even cities to maximise their financial returns, with profound consequences for their host cities. Universities are developing new sites, sometimes overseas, to build up new core markets, and generate resources to cross-subsidise less profitable but important campuses. The spatial configuration of an organization's buildings and grounds has a direct impact on its relationship with the city, either linking the organization to its wider context, or isolating it from its surrounding environment.

This has a wider urban significance given the role which land and property development plays in the urban economy, shaping its social geography, and transforms the future conditions of the urban environment (Harvey, 1985; Logan and Molotch, 1987; Madanipour, 1996). This physical development role is a further reason why the engagement of the university, as a large institution, in land and property development, can have major implications for the local economy, society and environment. The spatial form of the 'campus' affect the role that the university plays in both the wider urban environment, and in wider urban hierarchies. Depending on a university's location, in the centre of a large city, in a small town, an out of town campus, or a completely disembodied virtual institution, the nature of such linkage – and hence its overall impact – varies.

Urban locations provide a university with greater access, connections and linkage to the urban environment, which mean that the minutiae of university policies to make its spaces available and open, or closed and monitored, all have implications for the quality of the urban environment. Urban and regional authorities who act as university landlords may see these assets as too valuable for educational use, and prefer relocating the university to a greenfield campus, leaving a large urban site for upmarket housing and offices, hoping to create a vibrant new urban district as well as releasing funds for investment in public services. The potentially adverse effects of university relocation on the vibrancy of the city centre may not always be a consideration in such calculations.

3. University campus change supporting urban development

3.1 A taxonomy of university urban development benefits

Universities may choose to redevelop their estates for a range of reasons (see above). The pressure of maintaining research quality and attracting discerning students is great, and universities require significant ongoing investments. This has required an improvement in the quality and nature of the campus, as universities have invested in ensuring they provide conducive environments but also new facilities for new inter- and multi-disciplinary research programmes and evolving scientific teams. As part of this, universities have sought to enrol (local) partners to help fund those developments' costs, with projects consequently becoming compromises including activities that also fulfil local and national stakeholders' objectives.

We distinguish three kinds of benefits which universities' broader campus development activities can offer to urban development and cities' competitiveness processes. The first are those which help to create new knowledge-intensive spaces, either creating whole new knowledge districts, or in improving facility provision in particular locations. Secondly universities can contribute to the quality of urban governance, and in particular, working with local authorities to plan campus developments can create city-regional planning capacity more generally. Thirdly, universities can contribute to the intangible development of the city, directly contributing to place branding whilst also becoming involved in strategic urban projects which help repositioning the city's profile to external investors and knowledge workers.

Turning to the first of the three, some universities have had a significant impact on urban environmental quality through investing new resources in campus redevelopment, which can change the nature of an urban quarter. Although campus developments may be extremely spatially limited, universities' attempts to support their own international status can underpin other activities which help creating new mixed-use growth centres within the city. On the other hand, universities' internal spatial changes can drive internal differentiation within urban areas, and developing specialist facilities in particular urban locations can contribute to localised clustering within a city. In larger urban economies, such as London, universities do not themselves have a significant footprint on their localities, but together contribute to maintaining those cities' status as world cities (Boucher *et al.*, 2003). Conversely, in smaller urban areas, universities may be key actors by virtue of their size, especially if a strong commercial real estate sector to promote physical city centre development is not present. This seems to suggest a distinction in the types of physical campus development which really affect individual urban trajectories.

Secondly, universities may also contribute to the quality of governance with their development activities, particularly in cities with fragmented metropolitan governance (Tödtling & Trippel, 2005). While local and regional authorities may welcome the economic benefits a university generates, they may also be concerned about managing the spatial impacts of this change. University expansions have major consequences for local transport and housing infrastructure, creating new tensions and conflicts between universities and regional planners over housing availability (Smith, 2004). Universities may

demand specialised infrastructures necessitating pan-regional investments, stimulating debates over who bears the costs and receives the benefits of university developments. Having these debates can facilitate subsequent strategic regional infrastructure discussions, such as ports, airports, railway stations, or business estates to which such cost benefit discussions are also applicable.

Thirdly are those impacts which university campus developments can have on the intangible attractiveness of the city to knowledge-intensive businesses and employees. University developments may contribute to building a global urban brand, and cities may find themselves funding universities to undertake activities with relatively little direct local economic impact other than profiling the city as a centre of excellence, such as 'national' research centres. Cities may also make attempts to promote the types of urban development which make the city more attractive, such as 22@ in Barcelona and the Västra Hamnen district of Malmö, and in which the university contributes a degree of "local buzz".

3.2 Beyond 'happy family stories': tensions and barriers in universities' urban contributions

The previous discussion suggests that a university working together with regional partners can build a strong local presence which underpins the university's global networks and strengths. Warwick in the UK exemplifies a strongly locally embedded institution, working closely with local manufacturing industry, and using these local resources to compete very effectively in becoming a world-class institution (Clark, 1998). However, it is – following Lagendijk & Oinas's (2005) admonition – necessary to also admit that there are tensions in these arrangements and in particular in drawing conclusions from these optimal scenarios which are dependent on territory-specific conditions.

On the one hand, local authorities may have unrealistic ambitions for what universities can achieve, as regional development policies in the knowledge economy are characterised by a huge amount of me-too-ism, with local authorities seeking to promote a similar mix of biotechnology, nanotechnology and tourism with little regard for local economic needs and capacities or linkages to the science base (Hospers, 2005). Many local authorities idealise new campus developments as necessary to establish a global city as were markets and churches to define towns: the reality is that many campuses may have local benefits, but do not substantially improve that locality's global positioning. Campus developments in cities with derelict land can be concerned with reclaiming land and reducing vacancy rates, rather than attempting to build attractive high density spaces as centres of the knowledge economy (Charles and Benneworth, 2001). Finally, there is no reason why local authorities will necessarily share the university vision; if urban development plans do not support the university's strategic vision e.g. permitting site assembly, then the university may face insuperable barriers to realising its strategic vision.

On the other hand, there may also be rationales for universities to develop sites outside cities to access particular resources but at the same time reducing the university's urban development contribution. Agricultural and

astronomical test stations require environments often found in remote rural areas. Universities' land trading activities necessary to assemble new campus development sites can be highly risky, with universities potentially facing significant losses if land markets move against their strategic positions. If universities invest in particular urban spaces, and the business plans are reliant upon future windfalls from land sales, then that is clearly a risk which a university may be unwilling to assume, choosing instead to rent existing space or develop much less risky Greenfield sites with much less strategic imprint on the city.

This suggests that a reason for a failure to achieve mutual benefit might be a misalignment of universities' and urban authorities' strategies. Their perspectives on the appropriate responses to key drivers may also be misaligned, universities focusing on a stand-alone (risk-reduction) model whilst civic authorities have their own favoured (but restrictive) high-technology incubator model. The crucial element is whether and how the two sides can work together under such circumstances to develop mutually beneficial outcomes. Good projects suggest that these barriers have been overcome, and universities are contributing to these urban development processes in ways that satisfy local partners.

In the following section, we consider three types of successful projects by which universities have contributed to urban competitiveness, creating new knowledge districts, promoting spatial specialisation and improving urban governance. This provides a means to reconceptualise university engagement with their cities that goes beyond the reductionist 'third mission' view of impact creating spin-offs and jobs, or universities' stand-alone model, extending to improving wider urban competitiveness.

4. University expansion and the city

This section examines the spatial relationship between five universities (Twente, Newcastle, Queensland University of Technology, Massachusetts Institute of Technology and Harvard), and their cities (Enschede, Newcastle upon Tyne, Brisbane, and Cambridge). These universities have all been expanding successfully in collaboration with their cities, highlighting that the city-university collaboration can be mutually beneficial, but also that their spatial relations can be very diverse and complex, causing problems and tensions. University locations, the character of its expansion, and the nature of its host city all play a part. The cases have been chosen to cover a range of types of institutions in different national systems, and have been selected on the basis of case studies developed by the authors in other studies, each involving a mix of interviews and documentary analysis in the region concerned (eg Benneworth and Charles, 2005; Benneworth *et al.*, 2005). These cases are shown in the context of three models of engagement which are distinguishable from the usual stand-alone and high tech incubator models in the literature.

4.1. Spatial separation and regional engagement

The city and the university can work together towards regional economic development, but be spatially separated, as exemplified by Twente University, with its campus built on a country estate just outside the city of Enschede in

the Netherlands. The University of Twente (UT) was created in 1961 in response to the severe regional economic problems as a result of textiles' decline (Sorgdrager, 1981). Although working frequently with its host municipality (Enschede), the university built up links across Twente to build a 'post-textiles' corporate mission, with its spin-off companies and graduates spread out across the region. The university's status as a 'regional' actor enabled it to mobilise a regional coalition to lobby, plan for and to build a new knowledge campus for the Twente urban region. However, this has required the university to slowly build up a set of assets to make other regional partners 'believe' in and trust the university's potential.

Since 1979, the university has actively engaged with regional partners. In 1984, UT began its renowned spin-off programme, producing over 700 companies to date employing over 5000 in the Twente region (University of Twente, 2008). The university used its world-class research reputation to persuade local partners to fund 'shared' activities which have supported this regional mission. An agricultural development bank and the regional development agency (RDA) part-funded a technology centre (BTC) next to the university, with the RDA later creating a seed capital fund in recognition of the many opportunities for investment in spin-off firms. The municipality developed a 40 hectare greenfield area immediately south of the university into a vibrant science park, which was filled over time by spin-off companies working closely with the university.

There were two factors which attracted other regional partners to participate in these activities. The science park was very clearly a successful economic development project, hinting at the university's further untapped economic development potential. From the late 1990s, the university promoted the idea of a Twente Knowledge Park, extending the science park westwards for a further 100ha, to create a hub with a critical mass of regional high technology activities. The university initiated this development to provide resources for the modernisation of its own campus. The Knowledge Park concept caught the eye of two separate actors who incorporated it into their own development policies, instrumental to the plan's success.

Firstly was Twente Network City, representing the four main urban municipalities, who were otherwise unable to agree on common economic development policies for the city-region (Netwerkstad Twente, 2004). The second was the (national) Ministry of Economic Affairs which adopted the scheme as one of three "science parks of national strategic significance" in its 2004 regional development policy (MINEZ, 2004). The fact that local partners worked together to plan regionally, and national actors recognised the strategic national significance of a 'high-technology Twente', allowed regional partners to plan for a central knowledge district for the Twente urban area without stumbling over local rivalries between municipalities.

The presence of the university helped to attract a number of high-technology firms who wanted to recruit UT graduates and work with UT spin-offs. These large firms such as Lucent, Logica and Ericsson in turn commissioned flagship premises, and although some businesses down-sized or closed after 2001, those buildings still remain. The real innovation in the Business and Science Park is that it represents a new central knowledge district for the city-

region of Twente, supporting not just the Enschede economy, but is also critical in supporting knowledge intensive businesses across the Twente city-region

This example is eye-catching because it is rare for campus universities to have much of an urban impact where they are located outside the city. In the UT case, its location has allowed the university to expand and meet regional objectives in economic development. This has minimized the impact of the university spatial development on the city, with both positive and negative implications. On the one hand, the university's growth has not created undue pressure on the city's development, and has been able to expand in several stages without putting pressures on urban land. On the other hand, like many other science parks, it has been an engine for suburbanization, with all its associated strains on environmental sustainability and city centre vibrancy, as well as a challenge to other local authorities.

4.2. Specialised dispersal and multiple interfaces

Rather than full separation, some universities may expand on new sites inside the built-up area, generating new interfaces with the city and new local centres of activity, as exemplified by Newcastle University in the UK and Queensland University of Technology in Australia.

Newcastle University is located in the centre of Newcastle upon Tyne in Northeast England. In the last twenty years, the university has engaged pro-actively with regional partners, recognising that its own ambitions of international excellence and the region's needs for new technology based investment could be linked through mutually beneficial investments. In the last decade the university has begun to think more strategically about how the campus could be developed organically within Newcastle to promote particular types of knowledge-based economic development. The university is concentrated on a central campus at the north of the city centre which includes a number of public cultural amenities. A key element of the university's strategy included a campus master plan which sought to create specific functional zones within the university, and built better links to adjacent city areas.

A new direction in the University's approach to regional engagement came through the development of a new mini-campus integrating science, education, leisure and commercial uses, drawing on local, regional, national and European funding streams and initiated by an Urban Development Corporation - the International Centre for Life (ICfL). The university supported ICfL's creation in 2000 by transplanting a select and diverse set of activities onto a new location near the Central Station. ICfL's diversity was supported by governance arrangements which aimed to hold together a diverse constellation of actors and funding streams. ICfL's vitality depended on juxtaposing heterogeneous activities into a delimited and branded space, in the hope of making the site and its surroundings attractive to others and so stimulating a wider wave of regeneration.

The ICfL's focus on biotechnology became a template for a new response to the region's industrial decline, and subsequently the regional development agency One NorthEast has attempted to develop a series of high technology

clusters in life-sciences, off-shore engineering and marine technology: tourism and leisure; arts, culture and creative industries; information technology and multi-media production; as well as the more traditional sectors of food manufacturing, processing and distribution (ONE, 2005).

In 2004, the central government designated Newcastle as one of six (national) 'science cities'. Building on the experience of ICfL, the university developed the "Newcastle Science City" concept, including creating a new urban quarter. This concept is in part underpinned by key elements of Newcastle University's research base, but – as with the ICfL concept - also involving other research, housing and infrastructure developments. Consequently, the university, together with the city council and the regional development agency, have acquired a 8.1 ha site on the western edge of the city centre. A masterplan has been prepared to develop a new form of major extension to the university, like ICfL bringing together a range of university and urban activities, to raise the attractiveness of the area and the competitiveness of the city⁴.

Queensland University of Technology (QUT) in Brisbane, Australia was a former technological institute, becoming a university in 1989. It is a large university mainly based on two campuses either side of the city centre, Gardens Point and Kelvin Grove. In the 1990s senior management developed a strategy to increase public and business engagement, notably around cultural and creative industry activities, involving significant physical developments, improving the quality of place and public access to the main city centre campus. This has included developing a cultural precinct at Gardens Point to attract visitors as an extension of the city centre, and a new creative industries precinct near Kelvin Grove on a brownfield redevelopment site linked with office and residential development. These developments reflect Brisbane's longer-term strategic re-orientation prioritising growth in cultural and creative industries.

The new creative industries precinct has been developed north of the city centre adjacent to the QUT campus in the inner suburb of Kelvin Grove. It linked the University with the commercial activities of the creative industries as part of a new urban neighbourhood. The 16ha site was a former army barracks linked with adjacent derelict land, low quality open space and under-used housing. QUT's Kelvin Grove campus lies to the rear of the site, with poor access, and a joint planning framework was drawn up with the Queensland Department of Housing to include a new QUT Creative Industries faculty, around 700 housing units, a 'town centre' with retail and commercial property, and other community amenities.

The initiative was developed alongside restructuring within the University to bring together a range of creative industries into a new integrated faculty which seeks to encourage better collaboration between performance, production, writing and design disciplines. The studios are available for use by QUT staff and students as well as private sector partners. (QUT, 2000). The development reflects both a need to enhance the attractiveness of the

⁴ [At the time of writing the first stage of construction of this new development was about to commence, although construction has been delayed by the global financial crisis.](#)

university for students and for the local community as well as the creation of new kinds of interactive space.

Kelvin Grove's emphasis is much more on creating a new kind of institution and new partnerships. These new partnerships seek to be both within the urban regeneration policy community as well as target industries, to develop a new kind of inner urban neighbourhood – higher density than the immediate surroundings – and linking the formation of a focus for an emerging local cluster to a particular quarter. Kelvin Grove also helps to connect the campus more closely to the CBD, and in particular, to bridge across the ring road and rail line that currently restrict the natural interaction between the campus and city centre.

These two cases show how the spatial development of the university can contribute to local economic development, both in growing and facilitating new knowledge-based economic sectors, as well as regenerating sites in low demand areas. Expansion on new sites may be mutually beneficial for the city and the university in generating new interfaces and stimulating new activities in new areas. It may provide local authorities with strategic levers around which broader strategies and visions can be articulated, providing tangible means of achieving new, desired outcomes. These two examples also highlight some of the challenges that can arise on these contexts, putting pressure on the university's integrity within its existing sites, as splintering into multiple sites and interface with the outside activities may reduce the internal interactions between different departments. It may also undermine the social vitality of an integrated site, although this may be less problematic for larger universities.

4.3. Spatial integration and collaborative growth management

As the degree of integration between the university and city increases, competition for space may be intensified, as exemplified by the Massachusetts Institute of Technology and Harvard in Cambridge, Massachusetts in the United States. These two world class universities are the top employers in Cambridge, far ahead of the third employer, which is the city government. In addition to students and scholars, the universities act as magnets for the companies that wish to be associated with their prestige, and for tourists who visit part of American cultural heritage. There are now more than 200 MIT-related firms in Cambridge, and over 70 biotech companies within a mile of its campus.

Since its move to Cambridge in 1916, MIT's campus has evolved through two periods of intensive development (Simha, 2003). A third phase, ending in December 2005, saw ten major projects and renovations undertaken over eight years, that changed the look and feel of the campus while preserving its architectural heritage. Recently, Harvard University has developed extensive new sites around Allston to the west of the Boston CBD, although plans to continue its building programme have been badly affected in recent years by the decline in its institutional endowment.

The two universities provide many of Cambridge's major nodes and landmarks, thereby intertwining the life and identity of the city and the universities. The city benefits from the universities' economic and cultural

activities, and students and employees of the universities benefit from services provided by the city. However, there are inevitable conflicts. Universities have grown and prospered, with unavoidable impact on their urban environment: higher competition for housing, higher housing densities and costs, changing mix of businesses and jobs, traffic congestion, and reduced tax base for the city. House prices are high and around half of the students and two-thirds of the university employees live outside Cambridge (City of Cambridge, 2003; 2005).

The universities control 460 buildings and own 10% of the city's area, which means their property development and transactions have a major impact on the city. Educational establishments, like government and non-profit organizations, are exempt from paying real estate tax. In 1990, the local authority became particularly concerned about the universities' growing ownership and development of Cambridge's taxable real estate. As a result of these concerns for the loss of potential tax revenues, a committee was formed in 1991 to bring together representatives from the city's neighbourhoods, city officials and the universities, resulting in what became known as the 'town-gown report' (City of Cambridge, 1991). It recommended that the city and the universities work together on their future growth, the universities pay attention to the fiscal health of the city, and consider their roles as economic enterprises and neighbours as well as educators.

Since then, the Cambridge Planning Board has conducted an annual joint review, in which each university, on a voluntary basis, submits a town-gown report, providing information about its existing conditions and future plans (e.g., Harvard, 2004; MIT, 2004), followed by a presentation to the Board. The City continues to pursue formal agreements with both Harvard and MIT to protect the City's future economy and ensure no negative financial impact upon taxable commercial and residential property. In 2004, the City and MIT signed a 40-year tax agreement, making MIT now the largest tax payer in Cambridge. Following the universities' more active role in urban governance, both the universities and city authorities are anxious to show the contribution that these very rich institutions make to the economic and social life of the city. Harvard University (2005), for example, which is the world's richest university, announced that a set of its resources, including campus arts, sports, lectures, classes and religious services, community partnerships, programmes, and planning, would be placed at the service of the local community.

These two cases show how the university and the city can both benefit from spatial integration, but the parallel need to collaborate to manage the inevitable conflict over space towards a balance between their educational and urban roles and duties. There was an evolution of university thinking in both cases from a stand-alone model to one engaged with the local municipality to recognise and address the negative externalities caused by the universities which threatened their overall attractiveness. The institutional agreements between the city and the university have instigated a process of growth management, in which the universities can expand within the city while attempting to reduce any negative impact on the life of the city.

5. Discussions: fitting projects into universities and cities' needs

This paper reports successful collaborative activities, and therefore it is important to be mindful of the limitations that this creates for drawing wider conclusions. What the cases demonstrate is that there are a range of examples of what we might think of as 'engaged' university campus development going beyond the two models for development highlighted in the literature, either the high-technology incubator, or the new campus developed purely to respond to the changing needs of a 21st century university. The case study campuses are engaged in the sense that they contribute to wider urban development processes through physical development projects that are also core to university interests, helping them adapt to their changing external environment. We highlight three particular salient features which help to address the initial research question.

Firstly, the five cases reported demonstrate that it is possible to link urban development processes to university institutional development processes in the form of physical developments and building projects. Critically, this is not a straightforward process, and problems arise in the course of that interaction. In Enschede, the university had to persuade the city and the region that its development was not purely suburbanisation but the creation of a new knowledge quarter. Newcastle and QUT highlight that universities can be very resistant to demands to create specialist off-site activities, out of a desire to avoid dilution of their excellence. In Cambridge, both MIT and Harvard in the end had to directly fund their local authority to ensure that public investments from the city matched the universities' own private investments.

Secondly, we have been concerned with urban management processes undertaken by local authorities seeking to shape the development of their cities – these studies have not been sufficiently long-term to consider how these activities have changed real urban development trajectories. What we have pointed to however is a change in the mode of urban management, either at the level of encouraging local partners to take knowledge-based economic development more seriously (UT, QUT and Newcastle) or to take a broader view of what constitutes urban management, from the taxable property base to all those elements contributing to urban dynamism (MIT, Harvard).

Thirdly, from the university perspective, the kind of engagement which is undertaken differs reflecting the different needs of the host city. In Enschede, the university was prepared to completely reorganise its spatial structure to optimise its engagement activities (albeit compelled to do so by the need to completely rebuild its campus). In both QUT and Newcastle, engagement involved both strengthening research structures to allow coherent units to be moved to campuses, but also rethinking the relationship between different physical zones of the campus to ensure sufficient access to services. In Cambridge, MA, there was almost a 'developmental' form of engagement with the two universities encouraging the local government structure to regard the universities more seriously as a strategic asset.

We argue that these features come together to suggest a set of modes of 'urban engagement' by universities which go beyond the stand-alone or the

incubator/ science park models dominant in contemporary literatures. Their key features are in contributing to universities competing in their own global networks, they help the cities improve their urban management as a first step towards improving urban competitiveness, and that there are learning processes between university and city actors in seeking to resolve the problems and tensions that arise in promoting these projects. These 'modes of engagement' have salience as much for universities' teaching and research missions as for the third mission, through the provision of space for teaching and research activities, and its role in their competition for staff, students and resources. In turn this suggests that these forms of engagement may also more substantially influence university institutional arrangements than the weak influence of high-technology engagement. The modes of engagement encountered in this paper are summarised in table 1 below, which also includes the modes of engagement already present in the literature.

Table 1 Putative modes of civic engagement by universities

[Table 1 goes about here]

6. Conclusions

Our overall response to the research question is that city-university collaboration, which is increasingly more important for both sides, can partly revolve around, and improve through, university spatial development. As Table 1 above highlights this brings about new challenges that need to be addressed collaboratively through new institutional arrangements. Universities are increasingly important players in both global and local knowledge-based economies. Through collaboration with regional and local stakeholders, particularly with public authorities, they can grow and expand in mutually beneficial ways. This expansion in the range of their activities inevitably involves a degree of spatial development.

As we have seen in our case studies, the spatial and social impact of these expansion schemes may be diverse, even if they all contribute positively towards local economic development. As spatial engagement increases, conflict over space may intensify, which needs to be negotiated and managed jointly with authorities. Spatial separation may offer spatial flexibility for growth, but may generate and intensify social disjunction between the life of the city and the university, or indeed, the benefits and costs might be unevenly distributed.

Dispersal of the university across several sites may contribute to new economic activities and the regeneration of urban localities, but may place pressure on the integration of the university itself. At Newcastle University, there are internal concerns that the Science City strategy – which covers only a few disciplinary areas – may actually fragment the university between participating and non-participating research groups. Full spatial integration may be beneficial for both sides, or it may be seen as beneficial for the municipality where the campus is located, but detrimental to outlying localities which are expected to provide sufficient housing, services and transport to deal with an influx of staff, students and/ or employees of new businesses.

The case studies confirm our hypothesis that universities and cities have successfully worked together around campus developments, contributing both

to local economic development and the university's global academic status. We would argue that this mutual interaction and development has interactions at three distinct scales, cities' positions within the knowledge economy, the local city-regional environments, and within the universities themselves as they come to terms with Delanty's fourth academic revolution. The direction of these dynamics is not uniform, and we see that whilst it is easy to agree high-level collaborations seeking to reposition universities and cities, these ambitions can founder on the more prosaic lower-level challenges such as infrastructure provision or intra-institutional resource allocation.

At the highest scale, it is clear that there is scope for universities and cities to work together to enhance both those places' and institutions' status. This is not always global in scope; both Twente and Newcastle Universities have been involved in changing the way that primarily national actors perceive those places, two peripheral regions where nevertheless 'good science' is being done.

At the intermediate level, that of the local interactions between universities' and cities' global competitiveness strategies, this collaboration between universities and cities to improve their competitive positions can lead to quite negative unforeseen local consequences. MIT has had a very dramatic effect on the availability of affordable housing in Cambridge, Newcastle University's student accommodation policies have been extremely disruptive to the city's housing markets, and the University of Twente has had to negotiate over traffic amelioration measures. In the rush for global, networked competitiveness, it may be that universities and local authorities are neglecting these concrete territorial needs such as infrastructure availability, balanced regional development and the availability of housing. Just as the rise of the knowledge economy has seen increasing social exclusion in the largest cities, university/ city global competitiveness strategies may also be exacerbating regional social inequalities in these more middle ranking cities.

It is also clear that these changes are having impacts in the way universities organise their business and develop their corporate strategies. The case studies all highlight how universities' attempts to become entrepreneurial through remaking their urban settings have important consequences for their own institutional capacity. The universities in Cambridge dominate regional economic development, with local partners lacking additional capacities to add value to the universities' own strategies, reducing the universities' own global positioning efforts.

The difficulties with collaboration in these five examples emerged primarily at this intermediate level, the level of the ordinary and the mundane. This leads us to agree with Oinas and Lagendijk (2005) that there are limited numbers of conditions under which universities and cities can work effectively together to reinforce each other's competitiveness. Partnerships work best where projects emerge from these intermediate and lower levels, such as a physical project where both sides are working within their respective expertises, and both can see immediate outcomes from the partnership. Partnerships require trust and build upon previous collaboration – most cases involved an evolving relationship and several rounds of collaboration to build understanding, with

trust building up not in agreeing high-level common visions, but in addressing more quotidian yet insuperable problems.

This helps to further nuance the regional role of universities (e.g. OECD 2007) as there is no guarantee that all partners are institutionally interested in collaboration, and will align their available resources sufficiently to ensure that their activities create direct benefits for other partners. It may be assumed that regional partnership organisations can effectively articulate territorial visions and are hence the best arenas for co-operative relations, but partnership governance might hinder resolution of the conflicts that emerge reconciling the perspectives of different parties. Allied to this is that there may be a lack of vision amongst the partners that can produce a lowest common denominator strategic vision rather than aggressively targeting available resources to create creative and differentiated urban environments. Yet our research suggests that it is not vision which is the sticking point here, but the capacity to align needs and desires within physical (urban) development projects.

These issues all provide insights into the way the fourth academic revolution, previously highlighted, is manifesting itself in a broader set of social changes within the knowledge economy. From the analysis above, it is clear that universities themselves can compete more effectively by drawing on this urban differentiation. The tension between Delanty's virtual organisation and Clark's entrepreneurial university can also be regarded as two competing spatial models for the knowledge economy, between networked islands of excellence amongst global mediocrity, and a hierarchy of differentiated urban regions developing in parallel through knowledge-based entrepreneurship. Our research suggests that the process of engagement with local actors in campus development can help both parties to deal with the various spatial scales at which local advantage is constructed, and help better position them to effectively compete and develop in the contemporary knowledge economy.

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Table 1 Putative modes of civic engagement by universities

	University institutional approach	Contribution to urban management	Tensions between university and urban needs
<i>High-technology engagement</i>	<i>Creating 'extended development periphery</i>	<i>Building new economic sectors, raising demand</i>	<i>Isolation between new sectors and old industries</i>
<i>Stand-alone campus</i>	<i>Creating a new campus or re-erecting walls to minimise local uncertainties</i>	<i>Delegating responsibilities for negative externalities to local authorities</i>	<i>University brings big costs to locality whilst spreading benefits more widely</i>
Regional engagement	Creating new regional role for localised campus	Image building of a new urban quarter	Winners and losers (commuting, housing) not same
Multiple interfaces	Selected opening up to support existing growth clusters	Strengthening localised specialisation/ clustering	Undermining coherent campus , diluting research excellence
Collaborative growth management	Creating/ working with new institutional structure set	Developmental role: helping existing networks	Tangling of interests – partners or developers?

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