

SSHRC Knowledge Synthesis Grant  
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**MOBILIZING NEW URBAN STRUCTURES TO INCREASE THE PERFORMANCE  
AND EFFECT OF R&D IN UNIVERSITIES AND BEYOND**

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## CONTENTS

ACKNOWLEDGEMENTS .....	1
1. EXECUTIVE SUMMARY .....	3
1.1 The premise .....	5
1.2 Methodology .....	7
2. PLACING THE UNIVERSITY AND THE CITY .....	7
3. WHAT IS THE ROLE OF UNIVERSITIES IN THE GEOGRAPHY OF KNOWLEDGE TRANSFER AND INNOVATION? .....	9
3.1 (Moving beyond) replicating success stories .....	10
3.2 Spillovers and spin-offs .....	11
3.3 Regional innovation systems and cultures .....	12
3.4 Geographic proximity .....	13
3.5 Challenges and lacuna .....	15
4. HOW HAVE CHANGING GOALS AND GOVERNANCE REGIMES IMPACTED UNIVERSITY ORGANIZATION AND ENGAGEMENT? .....	16
4.1 From Mode 2 universities to Triple Helix theoretical models .....	18
4.2 Broadening mandates: From economic engines to civic leaders? .....	19
4.3 What research is valued? .....	22
5. REGIONAL UNIVERSITIES, UNIVERSITY REGIONALISM: HOW ARE HEIS ADAPTING TO, AND SHAPING, NEW URBAN STRUCTURES? .....	23
5.1 Addressing reterritorialization and changing spatial relations .....	24
5.2 Adapting universities for knowledge or resource economies? Views from the center and periphery .....	26
5.3 Branch campuses .....	28
5.4 Mobilizing universities and the structure of the metropolis .....	31
6. CONCLUSIONS .....	33
7. WORKS CITED .....	36

## 1. EXECUTIVE SUMMARY

The relationships of cities and universities have started to shift as globalization and neoliberalization have left their imprint on Canada's economy. In turn, cities and universities have been active participants in the creation of these new economic structures. In a country where 80 percent of the population is now urbanized, the location, role and function of higher education institutions (HEIs) is crucial to understand the relationships of geography and economy of knowledge-based economic activities. In this paper, we treat these relationships in both spatial and institutional terms and recognize that actors and decision-makers in both government and academic bodies understand their links as a combination of both: cities and universities as complex sociospatial entities are neighbors in functional and land use terms which has implications for social and physical infrastructure needs (transportation, housing, social services), cultural life and integration of everyday spatial practices; but cities and universities also relate to each other as self-interested institutional actors as both municipal bodies and decision-makers at the postsecondary institutions function involve themselves in planning and policy debates and decision-making processes.

Universities have created a number of spatial strategies to tap into potential student populations downtown, in the suburbs, or even abroad. Only recently, for example, the President of the University of Toronto, David Naylor spoke to the Toronto Board of Trade about the multisectoral strengths of the Toronto economy and the crucial part played by the region's HEIs (Naylor, 2012). Canadian universities have been particularly active as place-makers. Former York University Vice-President Research and Innovation, Stan Shapson said in 2011:

York University is York Region's research and innovation university... We have a critical role to play in collaborating with entrepreneurs, industry and municipal partners to develop new ideas, products and services that will help Ontario gain a competitive advantage in the global economy. [Innovation York's] presence throughout York Region will make the world-class expertise of over 1,500 researchers integral to accelerating R&D growth and strengthening communities where people want to work and enjoy a high quality of life (cf. Monier-Williams, 2011).

While York University is cultivating its suburban 'hinterland', Ryerson University's President Sheldon Levy nurtures his institution's relationships with the urban core:

Ryerson University is proud to be part of the revitalization of Toronto's downtown core. With the vision and support of Councillor Kyle Rae and local business and community leaders, Yonge-Dundas and Toronto Life Square is springing to life. We are delighted to be working with AMC [AMC Entertainment Inc.] to provide innovative classrooms designed with students in mind. This is exactly what we envisioned when we launched Ryerson's Master Plan and declared our intention to focus on 'the University as city-builder': with energetic partnerships and great ideas, our aim is to move Ryerson and Toronto forward together (cf. Kearney, 2008).

And on the West Coast, as early as 2002 Simon Fraser University proudly declared at the occasion of establishing its operations in the city of Surrey: "SFU has a history of community outreach and an excellent record in running satellite campuses. The Harbour Centre campus has added to the vitality of downtown Vancouver for over 13 years" (Aberle, 2002) and has since established an even stronger presence in various parts of the Vancouver region.

It is important to note here that for these universities spatial and locational decisions seem to be made with a mix of academic and research considerations. These institutions attempt to bolster their research presence in formerly less recognized parts of the urban region (less glamorous spaces in inner cities such as the Yonge Street corridor in Toronto or the Downtown Eastside in Vancouver as well as new – Markham, Surrey -- and old suburbs – the Black Creek neighbourhood of Toronto. Canadian universities are also increasingly cognizant of their need to be present in these communities for recruitment of students into their academic programs. Together, these spatial strategies amount to no less than deliberate place-making in a rapidly changing metropolitan environment. These strategies seem to aim at both gentrifying inner city ‘bohemian’ neighbourhoods, and new immigrant ethnoburbs and technoburbs in the outer periphery of the urban region.

But the relationships between town and gown and the potential impact of deepening and diversifying the relationship on either side are neither fully understood nor simple. While there has been some tendency to view universities as mere “farm systems” and “germ plasma for innovation” for regional clusters (the Stanford-Silicon Valley relationship has been cited in this context: Auletta, 2012), the picture is more complex and subject to investigation in this knowledge synthesis paper.

In the process of deepening understandings of the impact of rapid sociospatial change in the economic geographies of urban regions on universities’ teaching and research practices, we propose to examine the specific conditions under which “public investments in Higher Education Research & Development (HERD) do more to stimulate innovation and economic growth.”

Three questions guide our synthesis:

- Can and should the core ideas associated with the sociospatial structure of the university hold firm while the sociospatial structure of societies is spreading across an increasing scale?
- Should higher education funders and providers progressively adjust institutional infrastructures, pedagogical practices, and broad ways of operating, to better serve people *in places*, versus drawing people to *a place*?
- Do the locations of branch campuses that have been established in fast changing world regions (and in the heart of global urbanization) offer unprecedented opportunities to reach humankind like never before?

It must be noted from the start that while in the present report we were able to outline the contours of these questions more clearly in synthesizing the extant research on the subject of the (urban) geographies of HERD, definitive policy-ready answers cannot yet be obtained at this point. But a clear agenda for further research and action is taking shape in these results. What we know, for sure, is that city-regions have both opened up to demands from a rapidly globalizing economy and settled into metropolitan patterns of development through which these demands are met. This includes the simultaneous horizontalization (see for example the continued sprawl of businesses and residences across the urban region) and verticalization (see for example the increased densities of creative or financial industries in particular downtown locations) of urban economies. Universities at their end have at once expressed distinct loyalty to place and added new ‘internationalization’ strategies to their portfolio.

Here are some highlights of our preliminary findings:

- The shifting nature of geographic/spatial city-university relations destabilizes established normative understandings regarding the sociospatial structure of the university and the interrelations between HEIs and urban space.
- Exchange processes between HEIs and their urban sociospatial environment are complex and often unpredictable, place-dependent and historically situated. Outcomes cannot be forced.
- Spatial relations are multi-layered, multi-scaled and multiply topological: formal and informal networks can range from the local to the global.
- There is a very uneven level of awareness, within HEIs, and funding agencies, about the nature of the above spatial relations. At any one time, most senior administrators do not know what their HEI's "footprint" is with respect to teaching, research, and service-related activities.
- The strongest relationships between universities and cities seems to continue to focus on the production of the soft infrastructure of innovation – a well-educated and trained labor force – rather than hard physical infrastructures.
- The shifting demands on Canadian universities to foster and commercialize innovation has resulted in a geographically-defined power struggle between institutions to ensure their funding, and centrality, within the national higher education system.
- A narrow focus on making university research more economically relevant oversells the immediate commercial capacity of the university and undersells: (1) the more far-reaching contribution universities make by generating creative human capital in urban regions; and (2) the potential impact of low value (\$) but high societal impact innovations.
- Through knowledge mobilization (KM) activities, universities may be well positioned to adopt a proactive role in shaping both development and civic agendas.
- There are benefits for HEIs to move away from the medieval construction of the university as an autonomous learning institution.
- HEIs have no privileged position in their communities, especially if the knowledge resources of the institution are not used in a positive way: HEIs can be a growth-oriented member of the growth machine, as much as an actor pursuing altruistic agendas of urban improvement and a space facilitating public participation in the urban process.
- Branch campuses (regional, domestic and international) have potential to redefine and reshape higher education and urban landscapes and open new channel for research and development linkages between industry and the academy – but there are nascent issues that we need to be cognizant of and require further study.

### *1.1 The premise*

Universities and cities are often perceived to be in a symbiotic, if sometimes complicated relationship. Boston's economic success has often been credited to the strength of its region's universities. Silicon Valley has been called a spin-off of innovative research done at Stanford University. The University of Waterloo has been portrayed as a product and propeller of smart urban development in the tri-city-region of Cambridge, Kitchener and Waterloo (Gillmor, 2012). Cities and towns are parts of ecosystems of the new IT revolution that also "combine a university, an educated populace, a dynamic business community" (Friedman, 2012a, p. A23). The term "town and gown" has often been used to capture this rapport. In economic geography, cities have recently been discussed in the context of innovation through creative economies that

are often seen as a direct consequence of particular sociospatial arrangements. The creative class is considered to be key driver of innovation and economic development (Florida, 2002). Urban regions overall have been described as the key locations of growing economies (Glaeser, 2011). Moreover, global city-regions have been seen as both the location of innovation-relevant industries in producer services and the seedbed of societal and technological innovation and renewal (Brenner and Keil, 2006, Olds, 2007).

Universities have been subject to much self-searching in the recent past. Anthony Grafton (2011) has summarized the debate in an article in the *New York Review of Books* in November 2011. Lately, the relationships of cities and universities have been in the news because of a spectacular and much noticed initiative by Mayor Bloomberg of New York City to embark on a series of applied science campus developments in city, with significant international collaboration (McGeehan, 2012). A competition was held to select a winner among seven consortia of universities across the United States (some with partners abroad). After a much publicized selection process, Cornell University with its partner, Israel's Technion-Israel Institute of Technology, was chosen to build a \$2 billion campus on Roosevelt Island. Indeed the competition for 'Applied Sciences NYC', as it is known, has been extended such that one more winning bid was announced in April 2012: a Center for Urban Science and Progress (CUSP), which will be jointly developed and funded by the City of New York, New York University, NYU-Poly, Carnegie Mellon University, the City University of New York, the Indian Institute of Technology-Bombay, the University of Toronto, and the University of Warwick. The CUSP is being designed to function as a 'living laboratory' such that it will forge relationships with key public and private agencies and organizations in New York City, and ideally further the development of urban-oriented innovations in "energy, transportation, water use and public health" (Maxmen, 2012).

This New York competition has rekindled a debate on the relationship of cities and universities. At a recent event in Los Angeles senior university administrators asked "Can universities save cities?" The panelists did not think their institutions alone can be the saviors of cities but they agreed that universities contribute to the competitiveness of urban regions at a range of scales (regional, national, global). Economic justice, infrastructure investment and structural improvements in social and educational services can be immediate outcomes of universities' activities in their local and regional territories. Research and development (R&D) relationships are central here. Berg (2012) concludes: "And as these universities and the knowledge-based economy they enable become more important, the interrelationship between universities and cities will become even closer." The universities and the urban regions are partners in a competitive dance that they both need to involve themselves in in order to survive.

Globalized urbanization "raises some interesting opportunities and challenges for higher education systems and institutions" (Olds, 2011). One of the most visible changes is that urban regions have been on a trajectory of dispersed growth. While traditional centers tend to lose population and even economic power, people settle in the suburban or exurban reaches of urban regions (Cox, 2011). This does not mean that all this ends in sprawl. Quite to the contrary, dispersion produces new decentralized (and interdependent) cores that often mimic the patterns of traditional centers but also lead to new qualities of urban densification (Spirou, 2011; Sieverts, 2003; Young et al., 2011). We are seeing not just the growth of the proportion of the world's population living in cities, but also the emergence of new spatial patterns and orders; ones associated with more dispersed and therefore less dense concentrations of people than in older

(denser) ‘urban’ areas. This emerging pattern is associated with terms like extended metropolitan regions, exurbs, edge city, borderless cities, megapolitan areas, the ‘100 Mile City,’ and the like.

It is undeniable that these emerging spatial patterns have an immediate impact on the way universities will have to conduct their business as populations tend to relate to space and place differently now than in the past. Universities are both regionalized and globalized. In suburban universities such as York University in metropolitan Toronto, these consequences are already plain to see. York enjoys successful teaching, research and R&D synergies with the surrounding “905” exurban belt but also increasingly with the inner suburban areas where concentrated immigrant populations and innovative businesses have come to be located. In smaller university towns, the pattern is replicated in a similar fashion as is the case of the Waterloo urban region and its universities where there is a symbiotic “co-operation between business and academia, and the high levels of philanthropy and local reinvestment” (Gillmor 2012, p. 44). With that, the Waterloo region has been able to avoid the detrimental effects of industrial decline and could benefit from the spatial changes that occurred.

### *1.2 Methodology*

This research paper is based on an extensive scoping review of academic and grey literatures. Eligible materials were identified through online database searches (Web of Science) and citation tracking. Studies have also been obtained from authors presenting at academic conferences, who were contacted with requests for copies of their papers. Key governmental and university documents were identified through an on-going survey of contemporary debates in global higher education. Newspapers, higher education blogs and online journals provided pertinent information regarding current policy debates, innovation and economic development strategies, and urban development plans. The combination of these data sources has allowed for a comprehensive literature review and synthesis of the theoretical approaches to the geography of innovation transfer from HEIs, as well as an international survey of the emerging relationships between HEIs, key political and economic actors and urban space. The findings are conceptually organized to address our central questions, and to identify directions for future research.

## 2. PLACING THE UNIVERSITY AND THE CITY

The origins of the university are deeply implicated in the emergence of the city, and relatively dense concentrations of people. This symbiotic relationship was initially forged in the context of the desire to create conducive spaces to share ideas, and then to produce new forms of knowledge. Clearly, then, the university and the city (which themselves have contested meanings and should not be considered homogenous or monolithic entities) have developed in a dynamic and complicated relationship (Bender, 1988a). The shifting nature of these relations is important to note at the outset as we seek to destabilize established normative understandings regarding the sociospatial structure of the university and the interrelations between HEIs and urban space. Although some universities have remained in the same location, and even in the same buildings, for centuries (Kerr, 1982), their spatial meaning, civic function, educational role and institutional arrangements have evolved through a series of adaptive responses to new social, economic, political, cultural and environmental demands (Arbo and Benneworth, 2007; Calhoun, 2006).

Arbo and Benneworth note that “unlike the policies and theories of regional development, higher education can trace its roots back to ancient times” as the university

evolved from the monastic schools of the late medieval era (2007, p. 23). Emerging in Oxford, Paris and Bologna from 1088 to the early 1200s, European universities developed at time of urban growth. The city, as a cultural and intellectual meeting ground – and locus for trade guilds – provided the spatial interactions that opened the monastic influence over medieval education. Cities, in turn, prospered culturally and economically from the milieu of the universities located at their center. While early Italian universities were vitally tied to their city-states, other medieval education institutions were more problematically located within, but not of, their cities (Brookliss, 2000). The productive, but often tense, relationship between cities and universities continued into the Enlightenment era, and indeed universities and the unruly knowledge produced in them provided some of the foundational ideas for the Enlightenment. Whereas most universities resisted the burgeoning interest in natural philosophy being pursued by societies and academies (or adopted programs of practical state administration), key universities in Edinburgh, Geneva and Leiden – with the vital, active support of their municipalities – redefined their missions; supplanting the reproduction of authorized knowledge with the generation of new knowledge (Arbo and Benneworth, 2007). Universities like Leiden also played formative roles in the establishment of now taken-for-granted concepts like academic freedom (Olds, 2005).

The city, as a social and political space, therefore lay at the heart of the emergence of the modern university (Bender, 1988a). The establishment of distinct research agendas in the maturing modern universities of the nineteenth century (supported by a renewed municipal civic humanism) reconfigured the mission of universities from their previous function of knowledge dissemination through teaching. This transition – which Rodrigues (2011) constructs as the “first academic revolution” – engendered a cleavage between universities and the cities they were located in. As scientific enquiry strived from universalism, the modern university exhibited a “denial of place” (Bender, 1988b, p. 8). At the same time as the physical and mental spatial connections between universities and their local surroundings evolved, HEIs increasingly became bound to both the state and the corporate development of research and design (Arbo and Benneworth, 2007). The global expansion of suburban and rural modern campuses in the postwar period spatially expressed the modern university as an “ivory tower” in which universal non-spatial knowledge was generated following the “first academic revolution”.

Conditioned by the medieval model of Cambridge and Oxford, Bender (1988b) has argued that the North American imaginary of the university is fundamentally tied to the anti-urban valorization of the rural campus -- at the expense of foregrounding the important, yet complex, relations between universities and urban settings. While such spatial imaginaries persist, the evolving function of HEIs, and contemporary processes of neoliberalization and globalization, have re-centered the city, urbanity and community engagement within the core experience and mission of many universities. The spatial and functional separation of universities and cities is seen by some as a possible source of (post-)industrial decline. Reflecting on Scott Martelle’s (2012) book about Detroit’s fall from economic grace, Joshua Kim (2012) has observed: “What would Detroit look like today if the University of Michigan had not moved from the city (after the university's founding in 1817) to Ann Arbor in 1837? Imagine what U of M's \$8 billion endowment and 40,000 students would mean to the city today?” For Rodrigues, the increased integration of economic development into the mission of universities, through the commercialization of knowledge, represents a “second academic revolution”. The sociospatial structure of HEIs is being reconfigured; breaking away from the modern “ivory tower” as institutions and governments pursue the successes of Silicon Valley. Further, Florida’s (2002) influential and pervasive “creative class” thesis frames the importance of urban creativity and

knowledge production for cities' global competitiveness. Cities and universities are mutually dependent; yet they can't rely solely on each other to resolve major foundational problems, or ensure their continuing vitality in an era of neoliberal competition (Berg, 2012). Still, given the dynamic nature of contemporary urbanization, we expect universities, urban space and globalizing economic networks to unfurl in a complex, symbiotic relationship. The sociospatial impacts of higher education's massification and commercialization, together with the deep restructuring associated with the new knowledge economy, will subsequently be of paramount importance for our understanding of contemporary urban and economic development (Smith, 2009).

### 3. WHAT IS THE ROLE OF UNIVERSITIES IN THE GEOGRAPHY OF KNOWLEDGE TRANSFER AND INNOVATION?

In many regions, universities are increasingly portrayed as vital actors within the global knowledge economy, central players within emergent innovation systems, and active agents that can play a driving role in the innovation process and commercialization of knowledge (Deiaco, Hughes and McKelvey, 2012; Huggins, Johnston and Steffenson, 2008; Kitagawa, 2004). Both governmental institutions and HEI administrators have embraced the potential of universities to stimulate and sustain economic growth across a number of scales (Drucker and Goldstein, 2007; Etzkowitz and Zhou, 2006). The OECD (2007; Arbo and Benneworth, 2007), noting the limited examples of HEIs actively serving regions over the past 150 years, has called for universities and public policy institutions to strategically focus on innovation at the national and city-regional levels to enhance their competitiveness in the globalizing knowledge economy. A clear consensus now posits that HEIs can contribute to regional growth through a diverse set of direct mechanisms and indirect externalities, and there is a trend for universities to adopt "business-like" approaches to their academic and entrepreneurial offerings (Galbraith, 2010). Positioning HEIs as regional drivers inherently acknowledges a broadening of their mandates and a shift in the nature of university-industry and university-society relations; with HEIs assuming diverse development, innovation and regional leadership functions in addition to their established teaching and research missions (Freeland, 2005; Goldstein and Drucker, 2006; Isaksen and Karlsen, 2010; Lendel, 2010). However, while universities can contribute to innovation, there is often an uncritical conflation between regional development and excellence in higher education research and the university-economic development relationship is often clouded by other processes and circumstances (Beer and Cooper, 2007; Power and Malmberg, 2008).

Varying schools of thought attempt to conceptualize the emerging geography of university entrepreneurship and knowledge transfer. The predominant scholarly approaches within the literature – including the "regional innovation systems" approach and its offshoot "triple helix" and "engaged university" models (see p.18 below) – adopt an economic perspective, even when assessing the political frameworks of innovation development.<sup>1</sup> Kim and

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<sup>1</sup> Caniëls and van den Bosch usefully summarize that the regional innovation systems literature conceptualizes nations as "composed of actors including companies, universities and research institutes, whose activities are governed by institutions (routines, habits and practices), of various kinds," with the central idea being "that interactive processes between varied and diverse actors, networks, continuous learning processes and innovation-conducive institutions such as policy incentives and trust will give rise to economic growth, technological dynamism and competitiveness" (2010, p. 273). The triple helix model of university, industry and government relations "conceptualizes a non-linear interactive approach to innovation in which interactions between universities, industry

Koo (2009) suggest traditional studies focus too heavily on knowledge creation, and call for further attention to be paid to knowledge commercialization and retention. Scholars also draw from institutionalist approaches, centralizing individual agency, institutional evolution, trust networks and socio-economic interdependencies within their analysis (Farole, Rodríguez-Pose and Storper, 2010; Martin, 2002). For Gertler (2001) though, the role of institutions is still poorly understood within economic geography. Other approaches highlight the crucial role of universities in producing creative, skilled labor (Florida, 2002) and stress the relationship between institutional social capital and regional economic performance (Hoyman and Faricy, 2009). Tomaney and Wray, however, suggest that much research exhibits a propensity to draw from ‘grey literature’ and advocates for an enhanced regional development role for universities rather than critically deploying growth theories and advances in economic geography. The results therefore concentrate on policy prescriptions for universities (drawn from key successful regions) rather than engaging the contradictions under which HEIs operate (2011, p. 914).

### *3.1 (Moving beyond) replicating success stories*

Success stories in the Anglo-American context play a key discursive role in promoting universities as engine for regional development. The most prominent examples – Silicon Valley and Route 128 in Massachusetts in the United States, Cambridge in the United Kingdom, and the southeast Netherlands (e.g. Roberts, 1968; Saxenian, 1994; Tödtling, Prud’homme van Reine and Dörhöfer, 2011) – present a model in which universities “are expected to stimulate economic development by transferring knowledge to collocated industries, as well as by encouraging new business formation in university-centered incubators and science research parks of the region” (Hedge, 2005, p. 375). Such regions not only establish best practices and benchmarking indicators for universities seeking to contribute to their regions but further, the resulting policy prescriptions – embedded within the rise of the knowledge economy – have been internalized by powerful organizations and influential analysts (e.g. Florida, 2002; OECD, 2007).<sup>2</sup>

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and government lead to innovation processes that involve benefits for all actors” while the engaged university literature focuses on the “active and initiating role of universities in regional development” (ibid, p. 274).

<sup>2</sup> Gertler (2001) notes this discourse has found considerable currency within Canada, with Ottawa (dubbed “Silicon Valley North”) and Canada’s “Technology Triangle”, the information, communications and technology cluster centered on the Waterloo, Ontario region, presenting a Canadian Silicon Valley narrative (Canada’s Technology Triangle, 2012, Gillmor, 2012). Bramwell et al. (2008) point to the salient role of the University of Waterloo in providing the training and labor to supply the region’s vibrant technology sector and spin-off firms. They further HEIs facilitate important technology transfers through R&D consulting, joint university-industry research and innovative programs rotating students between companies and the classroom. The result embeds both Waterloo firms and HEIs within a strong regional innovation system. Gillmor (2012) lauds not only the policy of allowing university staff and student to retain intellectual rights to their ideas (replicating those of Stanford) in establishing a strong relationship between the “the outside world and the school”, but the positive changes the University’s successes engendered on the urban regeneration and revitalization of the city of Waterloo. Lukas et al. (2009) forward the Waterloo region as an effective industrial cluster and, in contrast to commonplace understandings, contend governmental policy has played a vital role in establishing the preconditions for regional development. However, despite its apparent success, Bathelt et al. suggest, our understanding of the Waterloo region’s economic development is limited and, given the limited examples of strong technology links between regions and their universities, “we might need to lower our expectations regarding such exchange processes” (2011, p. 482). Gertler is more skeptical, arguing that cases throughout Canada illustrate that “the wellspring for innovation and home-grown high-technology successes was in fact federal research laboratories, not the local universities... even in the case of Waterloo, the most celebrated putative example of a university spin-off – Research in Motion – was in fact not a

Replicating the experience of successful regions in other cities and universities is highly problematic (see Peck and Theodore, 2010). Power and Malmberg (2008) are highly critical of the causal reasoning elevating specific regions as development models as any possibility of replicating successes depends upon key local conditions. Even major research universities, including Chicago, Berkeley, Harvard and Johns Hopkins only have a marginal stimulative impact on their local economies apart from that indirectly generated by salaries, general expenditures, and sourcing dynamics (Rutherford and Holmes, 2008; Winling, 2011). Several crucial factors account for policy transfer failures, including; (1) divergent regulatory contexts, governmental supports and policy frameworks; (2) uneven geographical development; (3) power asymmetries between universities and industry (from the outset, Stanford and MIT had strong connections with local nonlocal industries, Adams, 2011); (4) differing university cultures and research mandates; and (5) differences between industries in fostering innovation networks and dynamic R&D relations (Abramovsky, Harrison and Simpson, 2007; Benneworth and Dawley, 2005; Rutherford and Holmes, 2008; Tödting, Lehner and Tripl, 2006).

An expanding literature thus questions the analytical and policy application of “one-size-fits-all” approaches to maximize the impact of universities in regional industrial development (Isaksen and Karlsen, 2010). There is a need to broaden our analytical focus from successful clusters to examine the experiences and potential of alternative industries (Rodrigues, 2011, Rutherford and Holmes, 2008) and the structural disadvantages – e.g. fewer and less-specialized firms, business services, knowledge organizations and HEIs, as well as institutional and governance fragmentation – faced by less competitive regions (Benneworth and Hospers, 2007b; Franz, Lengauer and Hoglinger, 2011; Lejpras and Stephan, 2011; Tomaney and Wray, 2011). Benneworth and Charles (2005), for example, suggest that while less competitive regions face significant challenges (as they lack the critical mass of knowledge capital to stimulate accumulation) university spin-offs can still be successful in such areas, particularly with government policies fostering their growth.

### *3.2 Spillovers and spin-offs*

Universities provide key competencies and research expertise for urban regions and industrial clusters and in doing so, contribute both directly and indirectly to regional development (Berggren and Dahlstrand, 2009; Bramwell and Wolfe, 2008; Etzkowitz, 2006). Benneworth and Hospers (2007a) suggest the direct development initiatives (i.e. university spin-offs and science parks) and the indirect benefits universities can foster, in terms of increased network thickness, deepened untraded interdependencies and extend regional capacity to absorb new technologies and innovations, can cumulatively establish an extending regional “footprint” over time. In terms of industry, smaller firms are particularly likely to reap the benefit of academic knowledge spillovers as they have less capacity to engage in R&D (Huggins et al., 2008). Benneworth and Hospers’s conclusions, drawn from Twente in the Netherlands, are supported by Berggren and Dahlstrand (2009) in Halmstead, Sweden. Here, two waves of university spin-offs have helped to create an absorptive capacity and regional renewal with an initial core of academic entrepreneurs mentoring and investing in later spin-offs. Thus, while spin-offs directly generated new high-skilled jobs, Berggren and Dahlstrand suggest the indirect benefits of academic spin-offs are of

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spin-off” (2001, p. 7). Wolfe and his collaborators support Gertler’s conclusions regarding the role of government policy in catalyzing the growth of Canada’s Technology Triangle (Bramwell and Wolfe, 2008, Lucas et al., 2009).

greater importance for regional development. The key function of the university in this case centers on recruiting, training and retaining an expanding stock of regional human capital.

University spin-offs provide an interface through which new technological innovations pioneered in academia may enter industrial knowledge bases (Andersson, Quigley and Wilhelmsson, 2009; Benneworth and Dawley, 2005; Jauhianen and Suorsa, 2008; Steffensen, Rogers and Speakman, 2000). However, the substantial literature examining the role of universities in the creation of knowledge-intensive industrial clusters – largely through science parks and spin-off clusters – points to the general conclusion that while universities are major players, they tend not to be the catalyst of regional economic development (Caniëls and van den Bosch, 2010; Hershberg, Nabeshima and Yusuf, 2007). Indeed, the limited resources often available to spin-offs lead many to struggle (Soetanto, 2010) and, since spin-offs often start and remain small, Harrison and Leitch (2010) contend they may receive an undue amount of research and policy attention. Furthermore, in exploring the case of metropolitan Adelaide, Beer and Cooper (2007) highlight the problematically peripheral position of universities in regional development practices. They suggest the marginalized position of academic institutions in regional communication networks presents a significant impediment to the deepening of productive industry-university relations. Although the weak linkages between universities and regional development processes is surprising, given HEIs local fixity and generation of skilled labor to local markets, as Beer and Cooper suggest, the multiscalar economic impact and increasingly international focus of universities transcends a strong, yet basic, interdependence with their surrounding communities and industrial networks.

### *3.3 Regional innovation systems and cultures*

Industry acquires external knowledge through various mechanisms; including R&D and innovation collaboration with other firms and universities, relations to spin-offs, and informal knowledge interactions within local milieu and “open innovation campuses” (Tödtling et al., 2011). Goldstein and Drucker suggest universities form a component of “regional knowledge infrastructures”, which themselves are constituted not only by public and private knowledge producers, but also “the innovation and learning capacities of firms, workers, and institutions and the network of connections among them” (2006, p. 23). Boucher et al. (2003) propose that universities’ impact on regions is dependent upon varying local social, structural and institutional factors, the number and scale of university in a given region, and the nature and culture of HEIs themselves. Still despite the important impacts of HEIs on regional research, knowledge production and average incomes, Goldstein and Drucker caution “factors external to universities, including the stock of business services and the educational attainment level, remain the most influential determinants of regional economic progress over all size regions” (2006, p. 37). Universities are important, yet not *the* essential element of spatial knowledge infrastructures.

Lawton Smith (2007), however, notes the increasing recognition afforded to universities’ role in shaping the innovation culture of technology clusters. Lendel argues that once a region’s intellectual infrastructure and skilled workforce “provide a sufficient level of special knowledge to become recipients of knowledge spillover and new technology diffusion... the knowledge spillover culture of the region becomes an environmental part of university-industry partnerships through R&D” (2010, p. 213). With the implementation of policies promoting investment in innovation by academic and governmental institutions and the local provision of “institutional enablers” such as physical infrastructure and quality-of-life amenities, she posits the elements of

an “entrepreneurial culture towards innovation” can coalesce within regions. Tödtling et al. (2011) advocate the promotion of “open innovation” – producing and disseminating knowledge through regional networks, improved by geographic proximity that creates space for knowledge sharing – in contrast to methods of internal, closed innovation developed within firms. They contend policies fostering open innovation “need to address both ‘hard’ economic (e.g. infrastructural) and ‘soft’ cultural issues” and can succeed when long-term investment, research and teaching are seamlessly linked to knowledge commercialization (ibid, p. 1889).

The process of innovation can be expected to vary across regions, depending upon: the competitive status of companies; specialization or diversity of local economies; and existing shared practices and norms. Srinivas et al. (2008) argue less-favored regions, with high levels of organizational entrepreneurship, but uncompetitive, small, fragmented and relatively weak local private clusters, are more inclined to actively attempt to develop regional based knowledge networks and coalesces around common “development spirit”. Regional characteristics, including geographically differentiated innovation cultures, condition innovation and networking, so they are always contingent phenomena.

### *3.4 Geographic proximity*

Geography is fundamentally important to the nature and expression of the innovation processes, despite the suggestion that digitalization and globalization have led to the “death of geography” (Feldman and Florida, 1994; Morgan, 2004). A significant body of literature frames the region, as a geographic unit, as the emerging locus for knowledge creation and learning in an age of global, knowledge intensive capitalism (Asheim, 1996; Corona, Doutriaux and Mian, 2006; Florida, 1995; Reichert, 2006; Scott, 2001; Storper and Walker, 1989). “Learning-” or “knowledge regions” are argued to function as the loci for knowledge creation and in doing so, provide the underlying environment for innovation (Florida, 1995).<sup>3</sup> The emergence of regional clusters and urban-industrial agglomerations, however, represent an expression of uneven geographical development and local conditions – and spatial sensitivity – are fundamental for establishing an effective regional strategy (Morgan, 2004). Jauhianen and Suorsa note the impact of institutional conditions in shaping the formation of regional innovation networks but importantly highlight the geographical and contextual variations between places:

In metropolitan areas, a general challenge is the fragmentation of economic activities. In old industrial regions, lock ins of earlier activities constrain. In peripheral regions, the institutional thinness, namely the small amount of key actors, such as higher education and research institutes and financial support organizations and innovative firms, hampers innovation activities (2008, p. 290).

Gertler suggests the “geography of economic advantage and innovative capability is highly uneven, owing primarily to spatial variation in the socio-institutional character of places” (2001, pp. 12-13). In addition to socio-political conditions, a region’s underlying technological infrastructure generates and reinforces locational advantages (or disadvantages) that impact upon local innovative capacity and the ability of actors to maximize the benefits of knowledge spillovers (Feldman and Florida, 1994).

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<sup>3</sup> Hassink (2005), however, suggests the conceptual fuzziness, normative character and position between national innovation systems and global productions render the concept of the “learning region” of limited analytical use.

Although HEIs act as spatial loci producing knowledge and high-skilled labor, this does not ensure the products of this process will be appropriated by their local economies as they need to be rendered economically viable through commercialization (Grasjo, 2008; Koo and Kim, 2009). Actors within regional innovations system need similar levels of technological sophistication in complementary sectors to maximize university-industry interactions and appropriate locally-produced knowledge. If absorptive capacity mismatches occur between innovation actors within regions – or mismatches emerge between the knowledge being produced and required locally – firms or HEIs may bypass locally collaborations to seek superior knowledge and relationships further afield (Huggins et al., 2008) or with non-HEI actors.

The role of geography within the literature on regional development, universities and innovation transfer is primarily framed through the issue of spatial proximity. Spatial proximity between firms and HEIs serves as a significant influence of cooperative activities between industry, academia and university-generate spin-offs (Davenport, 2005; del Barrio-Castro and Garcia-Quevedo, 2005; Hershberg et al., 2007; Huggins et al., 2008). Both Abramovsky and Simpson (2011) and Anderson et al. (2009) suggest productivity gains for industry-university are highly localized as a result of knowledge spillovers, while Hedge (2005) finds companies located around universities can introduce innovations at a faster pace than rival firms located elsewhere. A broad, commonsense consensus indicates that firms located nearby universities are more likely to engage in repeated collaborations with HEIs and receive the benefits of university-generated knowledge spillovers as a result of direct face-to-face interactions (Abramovsky and Simpson, 2011). Studies in North America and Europe have posited that proximity is notably important for radical innovativeness and the transfer of new scientific knowledge and high technology content from universities (D’Este and Iammarino, 2010; del Barrio-Castro and Garcia-Quevedo, 2005; Tödtling, Lehner and Kaufmann, 2009). Abramovsky et al. (2007), however, point to variations between industries regarding the correlation between the location of R&D facilities and high-tier university departments, with biotech and pharmaceutical firms exhibiting a strong relationship while the auto-industry evinces a weak locational connection.<sup>4</sup> These ideas are supported by D’Este and Iammarino who conclude that science-driven fields, opposed to manufacturing and engineering for example, may benefit significantly from geographic proximity to universities; although research quality is a key factor in “shoring up the spatially bounded nature of knowledge spillovers” (2010, p. 338).

Geographic proximity though, does not necessarily foster collaboration. Boschma (2005) reasons other complementary relative connectivities – social, institutional, organizational – maybe required to enable effective knowledge transfers between universities and industry. Laursen et al. (2011), drawing from data from the 2002-2004 UK Innovation Survey, suggest that firms express an increased tendency to locate near higher-tier universities, while lower-tier HEIs experience a reduced propensity to foster local collaborations. Yet further, their research indicates that, if faced with the choice, firms favor partnerships with high-quality HEIs over lower-tier, geographically proximity institutions; particularly in the case of R&D intensive companies. The institutional structure of university departments themselves play a role in shaping the nature and success of spin companies and clusters (Jong, 2006) while star scientists at universities can influence firms’ locational decisions (Gertler, 2001; Hedge, 2005).

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<sup>4</sup> Plum and Hassink (2011) suggest differences in the knowledge bases required by specific industries affect these processes. Distinguishing between: (1) analytical, science-based knowledge; and (2) synthetic, engineering-based knowledge, they suggest the latter exhibits a stronger sensitivity to proximity between innovation partners.

Lejpras and Stephan (2011) stress the importance of cooperative activities in determining firm innovativeness. While arguing geographic proximity engenders important local conditions which cultivate knowledge transfer, they suggest, that in disadvantaged regions in Eastern Germany – and contrary to popular understanding – nonlocal collaborations, rather than those fostered through local proximity, are more conducive to innovativeness. Their study results indicate local conditions beyond direct collaboration (including skilled labor pools and transportation infrastructure) have no effect on the cooperation intensity or innovativeness of university spinoffs. Relatively weak knowledge networks and concentrations of knowledge capital in these regions may account for the increased importance of nonlocal collaborations as regional actors attempt to draw from more developed and institutionally thick networks. If knowledge is codified, or if tacit knowledge is distributed through strong, established social networks, geographic proximity may become less relevant (Abramovsky and Simpson, 2011, Ponds, van Oort and Frenken, 2010). Further, Franz et al. conclude that geographic proximity “tends to be less important for knowledge links with suppliers and customers than with universities, technical colleges and research organizations” (2011, p. 1261).

Ponds et al. (2010) note increasing attention is being paid to nonlocal knowledge flows, and suggests there is an increasing understanding that intellectual spillover and technology transfers from universities are conducted across multiple scales. Spillovers may be localized in so far as their underlying mechanisms are geographically bounded<sup>5</sup> but since the university is not confined to the regional scale, both formal and informal networks can range from the local to the global (Benneworth and Hospers, 2007a). Ponds et al. therefore claim that a sole focus on the regional scale is unlikely to adequately capture the geography of spillovers and knowledge transfer, rendering “policymakers’ assumption that a university can be regarded as a booster for regional development is at least incomplete” (ibid, p. 247). Rather, they posit innovation policy should be framed at the national or international scale. On a related note, there is also an emerging debate, generating much consternation in US university technology transfer offices, about a drive to unhinge researchers from the current practice of having to work with their own institution’s office. The Kansas City-base Kauffman Foundation is pushing for legislative change that will instead permit researchers with commercializable findings to work with any university’s office, a significant change that has the capacity to unbundle the university-territory relationship, for good and bad (Kiley, 2012).

### *3.5 Challenges and lacunae*

While geographic knowledge externalities, and issues of spatial proximity, are central to the innovation process, the predominant conception of geography within this literature is abstract and absolute.<sup>6</sup> Space relations are largely treated as instrumental. Innovation networks often

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<sup>5</sup> D’Este and Iammarino (2010) suggest the literature on knowledge spillovers is markedly vague in terms of the actual processes of knowledge transfer and focuses on university-industry co-location rather than actual interactions. Further, Power and Malmberg (2008) note that while there is undoubtedly some spillover from research centers into industry through geographic proximity, we need to question whether policy should necessarily focus on studying/building/designing regional innovation networks that centralize universities. A rejoinder is offered by Ponds et al., who highlight three central spillover mechanisms: (1) the commercialization of academic knowledge; (2) mobility of employees between organizations; and (3) informal knowledge exchanges (2010, p. 233).

<sup>6</sup> Massard and Mehier (2009) begin the task of breaking down normative binaries regarding the geography of innovation transfer and the role of HEIs by problematizing the equation of local and tacit knowledge, and the global and codified knowledge, as well and the construction of geographic proximity as buzz in opposition to relational

appear separated from the contingencies of place, or divorced from broader processes of contemporary urbanization (although scholars such as Christopherson, Gertler and Morgan are careful in their construction of regional initiatives). As such, there is a noted lack of recognition or analysis of the co-constitutive and symbiotic relationships between HEIs, regional innovation and economic development and the sociospatial dynamics of contemporary metropolitan regions. Physical, often urban, infrastructures – e.g. science, research and technology parks and business incubators – are central to universities’ strategies of knowledge transfer (Huggins et al., 2008), yet their impact on surrounding communities and social spaces is notably secondary to concerns relative to the production of innovation and economic growth (Benneworth and Hospers, 2007b).

Morgan (2004) poses the central question whether learning and innovation are organic and self-activating or if they can be consciously induced through collective action. The literature presents evidence both denying and supporting the contention that government policy and regional governance can foster local innovation systems. Porter’s (e.g. 1996, 2000) established dictum that innovation clusters cannot be established by fiat has a strong rhetorical significance (Lorinc, 2011; OECD, 2001). However, in assessing the emergence of the Waterloo ICT cluster, Wolfe and his collaborators contends governments can play a vital role in establishing the conditions that catalyze and stimulate innovation (Bramwell et al., 2008; Lucas et al., 2009).

The distinct governance of Canadian higher education may offer a reason for this disparity. Given that the majority of Canadian universities are public entities the emerging trend towards promoting university-industry collaboration has been shaped by the development of aggressive science, technology and innovation policies by federal and provincial governments (Rutherford and Holmes, 2008; Salazar and Holbrook, 2007). Gertler finds that in both Ottawa and Waterloo, “the loosely articulated federal institutional architecture, in which the Canadian state has thus far shied away from imposing Bayh–Dole-style<sup>7</sup> national uniformity on university practices with respect to technology transfer, has created considerable room for provincial and local institutions and actors to shape economic outcomes in this area” (2010, p. 8). Canadian HEIs are not as open to neoliberalization, but suffer from inflexibility and limited funding options. As such Canadian universities’ “most profound and lasting” impact on their surrounding communities arises from the production of skilled labor, rather than their function as “‘knowledge factories’ generating readily commercializable technology” (Gertler, 2001, p. 8).

#### 4. HOW HAVE CHANGING GOALS AND GOVERNANCE REGIMES IMPACTED UNIVERSITY ORGANIZATION AND ENGAGEMENT?

Canadian cities are increasingly recognizing the importance of supporting business and innovation hubs to ensure their position within an internationally competitive, knowledge-driven economy. While certain regions are able to capitalize upon their local specializations (energy resources in Calgary, transport and logistics in Vancouver), recent studies suggest that Toronto performs well in finance, transportation and food and beverage manufacturing, the GTA is only ranked top in the (declining) auto industry (Blackwell, 2012). Diversity has been a long-standing

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proximity as global pipelines. There is a need, they contend, “to take into account both the potentials of ‘places’ and the geographical and relational ‘space’ of knowledge diffusion in the firm’s location choice” (ibid, p. 86).

<sup>7</sup> The 1980 Bayh-Doyle Act “gave universities, rather than individual researchers, title to innovations established in their confines, as well as allowing universities to own patents arising from federal research grants” resulting in the United States developing a “vibrant and decentralized” commercialization system (Huggins et al., 2008, p. 325).

strength for the GTA's economy (Courchene, 2001).<sup>8</sup> The Toronto Board of Trade (2009) views the region as comparable to Silicon Valley in terms of manufacturing, scientific, technology and profession sectors, but contends Canada is not keeping up its international competitors in terms of R&D spending. In response, they have called for an exploration of potential federal and provincial policies to increase efficiency in venture capital and general credit markets to stimulate innovation and support start-ups, and further, have lobbied for increased investment in post-secondary education to ensure Toronto's success in a knowledge-based global economy (ibid, p. 34). James Milway, executive director of the Institute for Competitiveness and Prosperity, suggests federal tax credits for private-sector R&D, combined with recent cuts in corporate tax rates, should produce economic incentives to stimulate innovation (Lorinc, 2011).

Yet Canada continues to face an "innovation gap" and realizes poor returns for its investment in science and technology (Hawkins, 2012). The problem, as put forward by John Molloy (2012), president and CEO of PARTEQ Innovations, centers on the failure to commercialize innovation in Canada: Canadian universities do not have a mandate to commercialize innovation while industry may not be aware of advances being pioneered in the academy (Gertler, 2001). Rutherford and Holmes (2008) note that while governments in Canada push 'hard sell' projects over peer-reviewed 'grand science', the reward structure for faculty remains largely unchanged and indeed in some disciplines (e.g., Economics, Political Science) is shifting towards a concern of pure theory and bibliometric-related outcome measurements (also see Power and Malmberg, 2002). Both Molloy and Milway subsequently point to the absence of a culture of innovation in Canada, and the need to foster entrepreneurial R&D. The answer, for Molloy, "is not to cut discovery research; that is a national strength. Rather, we need to invest in an aggressive commercialization strategy that forces innovation into bearing fruit" (2012, p. A15). In contrast, however, Roger Martin, Head of the University of Toronto's School of Management posits low productivity in the manufacturing sector of Canada's heartland lies at the base of the country's innovation gap, arguing policies focused on scientific inventions do not lead to consumer-demanded innovation (Blackwell, 2012).

The shifting demands on Canadian HEIs to foster and commercialize innovation have resulted in geographically-defined power struggles between institutions to ensure their funding and centrality within the national higher education system. As Woodward (2010) reported, the nation's five largest research institutions – the Universities of Toronto, British Columbia, Alberta, McGill and Montreal – have called for a greater share of future increases in research funds in order to maintain their, and Canada's, global competitiveness. In arguing that "resources are finite, and we have to be smart in a small country about how we use them", University of Toronto President David Naylor frames the need to restructure the funding and base missions of universities as induced by logics of globalization: large institutions would get funding, smaller institutions in the periphery would focus on undergraduate teaching as a "free trade approach" compels institutions to find their own competitive advantages (cf. ibid). Woodward thus poses the question whether the promotion of Canada's global competitiveness comes at the expense of peripheral regions' aspirations for national competitiveness.

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<sup>8</sup> Lendel (2010) argues that industrial specialization and diversification do not influence the transformation of university research into regional economic outcomes of employment. Huallachain and Lee (2011) challenge the idea that cities are either diverse or specialized by asserting that spillovers within and across sectors means they can effectively be both. Asheim et al. (2011) argue that "related variety" of technological sectors in regional innovation systems, rather than diversity (a lack of shared competencies) or specialization (inter-sector competition), is most likely to induce collaboration, knowledge transfers spillover and significant innovative advancements in industry.

#### 4.1 From Mode 2 universities to Triple Helix theoretical models

Harloe and Perry (2004) argue that the increased entrepreneurial and developmental role of universities – driven by the need to seek alternative sources for funding in light of budget cuts at all levels of government – has both supported, and been facilitated by, a transition from *Mode 1* ‘traditional science’ (generated within disciplinary contexts) towards *Mode 2* research focused on applied uses beyond academia (Reager et al., 2009; Swan et al., 2010). The (re)emergence of *Mode 2* universities represents a shift in the societal value place on particular type on university-produced knowledge (Lawton Smith, 2007; Perry, 2006).<sup>9</sup> By focusing on the causal imperatives of an increasingly knowledge-based economy, they contend the potential exploitation of (in particular) scientific knowledge to achieve various socio-economic goals “necessitates a new role for universities in which priority is placed upon extracting economic and competitive benefits from knowledge production” (Harloe and Perry, 2004, p. 214). With governments worldwide viewing universities as vital and multifaceted economic contributors, it is not surprising that HEIs now hold an elevated position within many government agendas. Subsequently, public policy orthodoxy (outside the United States where a wider array of mechanisms are available) promotes the regulation and stimulation of universities (including introducing financial incentives) to optimize their instrumentality to achieve social and (predominately) economic goals (Boulton and Lucas, 2008).

Boulton and Lucas, however, contend that the increased governmental investment in university science and innovation is the result of neoliberal policy frameworks premised upon a flawed logic and “simplistic reduction” of the relations between universities and globalization (ibid, p. 6). Consequently, policies aimed at fostering entrepreneurial academic knowledge networks (often targeted in poorly-performing regions) do not necessarily engender the production of knowledge appropriate for local economies (Huggins et al., 2008; Power and Malmberg, 2002). Indeed, Florida (2006) suggests a narrow focus on making university research more economically relevant oversells the immediate commercial capacity of the university and undersells the more far-reaching contribution universities make by generating creative human capital. However, conforming to *Mode 2* analysis, Florida conceives of the relationship between universities and regional economies as “a simple transmitter-receiver system, with the university transmitting a signal that the regional economy must be able to absorb” (ibid).

In assessing the “urban renaissance” in cities such as Montreal and Edinburgh, Leydesdorff and Deakin (2011) argue bottom-up cultural reconstruction was necessary to complement the trans-disciplinary knowledge produced by *Mode 2* universities. Consequently, they advocate a shift in conceptual lens from the *Mode 2* university (and nationally framed knowledge systems) towards a more complex “triple helix” university-industry-state framework (also see Etzkowitz, 2003; Etzkowitz and Leydesdorff, 2000; Etzkowitz and Zhou, 2006). In contrast to *Mode 2* accounts, the triple helix model of knowledge production challenges the concept the economic growth is a spontaneous product of market economies, but rather, is inherently structured by government policy. Agents within the three institutional spheres act reflexively to produce an evolving, socially-constructed system of communication and coordinating mechanisms in particular contexts (Barge-Gil, Santamaria and Modrego, 2011;

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<sup>9</sup> Etzkowitz and Leydesdorff argue *Mode 2* knowledge production is not new, but rather reflects the original format of science prior to its institutionalization in the 1800s, noting that “when one opens the black-box one finds *Mode 1* within *Mode 2*, and *Mode 2* within *Mode 1*” (2000, p. 119, also see Perry, 2006).

Leydesdorff and Deakin, 2011; Powell, 2007).<sup>10</sup> Triple helix approaches provide an effective lens to analyze knowledge production in urban centers; city-regions concentrate the economic, intellectual and political elements necessary for the innovation process and with this, their ecologies are characterized by internal collaboration and competition (Srinivas et al., 2008).

Leydesdorff and Deakin pertinently put forward that triple helix accounts of creative communities address the tendency of Mode 2 models (e.g. Stolarick and Florida, 2006) “to remain managerial and become locked into neo-liberal policies” while opening analysis on the broad potential contributions of academic knowledge capital, industrial wealth creation and governmental policy frameworks (2011, p. 59). For urban regions to effectively mobilize the economic capacity of university innovation, cities not only need to coordinate intellectual capital to the requirements of wealth creations, but further, need to “become centers of creative slack”, opening, discursively shaping, and reflexively absorbing this growth and development (ibid, p. 54). Smilor et al. (2007) posit the mobilization of triple helix relations played a fundamental role in the successful development of the high-tech centers associated with the universities of Cal-San Diego, North Carolina State, Texas-Austin, Duke and North Carolina-Chapel Hill.<sup>11</sup> They suggest their cases disclose the central importance of research universities’ move from isolated “ivory tower” to promoter, collaborator and magnet for talent, technological innovation and entrepreneurial activity in forging a proactive and entrepreneurial development agenda. Srinivas et al. (2008), pointing to the fluidity and flexibility of knowledge-based economies as well as their competitive yet insecure labor markets, suggest new institutions (i.e. universities) need to establish legitimacy as agencies of coalition and region building.

Despite Leydesdorff and Deakin’s assertion, however, triple helix approaches still formalize the entrepreneurial function of universities and centralize their role in producing knowledge spillovers for regional wealth creation (Benneworth and Hospers, 2007a; Huggins et al., 2008; Uyerra, 2010). Jauhianen and Suorsa (2008) note a lack of triple-helix-based studies in less-favored regions and observe peripheral regions lack established regional innovation systems with intertwined innovation-related actors. Power and Malmberg (2008) suggest triple helix models, as with other regional innovation systems approaches, adopt a systemic view of universities’ role in regional economic development. There is a tendency for policymakers and commentators to overestimate universities’ agency as rational, monolithic and capable actors, while regional engagement is only one of many HEI agendas, and the region just one of several scales over which universities operate (Christopherson, Kitson and Michie, 2008; Uyerra, 2010).

#### *4.2 Broadening mandates: From economic engines to civic leaders?*

Uyerra establishes a five-fold typology of regional roles for universities (which are neither mutually exclusive or temporally successive): (1) knowledge factories, that impact local economies through spillovers; (2) relational universities, who collaborate in bi-directional knowledge sharing with firms; (3) entrepreneurial universities, in which the relations imperative is commercialized and spatialized through science parks, technology transfer offices, incubators

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<sup>10</sup> This contrasts to perspectives that construct the innovation process as a linear movement from research to development to production and ultimately commercialization (Caniëls and van den Bosch, 2010).

<sup>11</sup> Across cases, Smilor et al (2007) identify a combination of committed leadership, the power of mobilizing events, organizational capacity to influence change, the arrival of key corporations, available financial resources and a tolerant mind-set as highly influential factors in the development of university-engaged high-tech centers. However, even in the “overnight success” cases of Austin and San Diego, these projects take time to come to fruition.

and incentive structures; (4) systematic universities, that act as boundary transcending nodes influence within regional systems; and (5) engaged universities, that adopt an proactive role in shaping both development and civic agendas (2010, p. 1229). The nature of spatial influences shifts with the model, from a regional development agenda structured by geographic proximity through expanding processes of organizational and institutional reterritorialization. Huggins et al. (2008) find that the literature on the “engaged university” embeds HEIs within regional and social development as these institutions not only pursue entrepreneurial technology development, but exhibit responsiveness and adaptability in relation to their local community’s needs (see Benneworth and Hospers, 2007b; Gunasekara, 2006).

Analysis of engaged universities reflects the increasingly formalized expanding roles and expected contributions of universities (Guri-Rosenblit, Sebková and Teichler, 2007). Expanding university mandates from those of Mode 1 institutions presents a fundamental challenge, for identity and purpose of HEIs (May 2006). The key tension May posits centers on whether the university serves as a “space of reflection” – providing the opportunity for sustained contemplation of issues when outside is a frenzied search for adaptation – or a “space of expectation,” where HEIs are increasingly driven by their expected relevance to service the economy.<sup>12</sup> The tension between the civic and social goals of universities – the “third mission” of HEIs – and the imperative towards commodification and private sector funding is particularly significant as the knowledge economy largely rests on the “assumed publicness” of knowledge benefits arising from university-collaboration (Srinivas et al., 2008). Shifting political-economic and discursive contexts are crucial in defining universities’ roles and social functions, as well as in establishing their legitimacy of regional actors (Chatterton, 2000; May, 2006; Thrift, 2012).

May (2006) notes that while universities may be seen as a bastion against the short-term imperatives of current economic necessities, there are benefits for HEIs to move away from the medieval construction of the university as an autonomous learning institution. Benneworth et al. suggest universities’ broader campus development initiatives can benefit urban development and competitiveness through a combination of practices – a “mode of urban engagement” – which

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<sup>12</sup> It should be noted though, that it is not only the mission of particular universities that are broadening, but the form and function of HEIs themselves. In order to overcome barriers to the development of human capital within regions, the OECD (2007) has called for HEIs to educate a broader array of people in local areas. They suggest the need to widen access to higher education – a policy mandate embraced by President Obama amongst others – in order to ensure local labor has the skills necessary to promote employability in a competitive global economy. Perry (2006) notes that national governments are increasingly attempting to diversify the nature of academic institutions to enhance their innovation systems’ flexibility. The resultant massification of higher education attempts to open educational opportunities (albeit under neoliberal imperatives) for a broader section of society, but also forces universities to focus on marketing themselves and developing applied specializations within the emerging, increasingly competitive world of entrepreneurial education (Lowrie and Wilmott, 2006). With this, Perry (2006) argues the proliferation of diverse HEIs and training institutes (including for-profit universities such as the University of Phoenix) are not so much driven from the bottom up, but by national governments impelled by the imperatives of globalization. However, in addition to the imperatives of globalization and competition, austerity regimes have also compelled university to pursue increased commercialization of their products and offerings. For both universities and local governments operating in an economic climate marked by drastic fiscal restraints “which deeply cut into budgets that help deliver programs, services, and research needed to address community issues”, Lederer and Seasons find university and local governance agencies have embraced in resource sharing partnerships and engaged in attempts to secure alternative program funding opportunities (2005, p. 242). Rutherford and Holmes (2008), however, suggest government underfunding of universities may not be offset by increased funding for applied research; and this trend may further threaten the training role and instructional quality of HEIs. This, of course, would have problematic ramifications for regional and national competitiveness.

include: (1) creating new, or improving existing knowledge-intensive spaces; (2) contributing to the quality of urban governance – notably through their involvement in city and regional planning processes; and (3) improving cities’ place-branding and profile (2010, p. 1616). See (2010) suggests that HEIs, notably those concentrated in urban areas, can mobilize research missions aligned with local community goals through the application of locally adapted and applied ideas. Locally engaged education institutions, can focus students’ enthusiasm towards local problem solving “and bring us closer toward realizing an ideal city” (ibid, p. 549).<sup>13</sup>

Yet, despite a perceived optimism regarding the capacity of HEIs to perform an increasing array of academic, economic and civic roles, Uyarra (2010) questions whether universities can support their increasingly broad mandates and adequately respond to multiple policy expectations; citing a lack of evidence of the benefits and mechanisms associated with community engagement in differing types of HEIs beyond a handful of anecdotal examples. Community engagement is conditioned by the density and structure of HEIs, and the maturity of the connections within local or regional innovation systems (Boucher et al., 2003; Lambert-Chan, 2008; Uyarra, 2010). Further, “town and gown” relationships have tended to disclose inherent tensions between universities and their surrounding communities and community-university partnerships have produced mixed results across North American cities (Lederer and Seasons, 2005; Morris, 2005).<sup>14</sup> The influence of Richard Florida’s creative class/cities theses (2002, 2005) has increased actors’ interests across the triple helix in engaging their surrounding communities in order to produce environments which attract top students and workers and generate cultural capital. Harner and Kinder suggest universities are adopting powerful positions as local developers but, by highlighting how an urban infill project adjacent to the University of Colorado at Colorado Springs “devolved from a progressive vision to a generic, placeless landscape”, they point to the fact that HEIs can be a growth-oriented member of the growth

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<sup>13</sup> Supporting this position, Rodin (2005), a former president of the University of Pennsylvania, lauds the University’s community engagement strategy in West Philadelphia. While their short-term strategy centered on urban beautification, sanitation and safety in a locally-targeted urban neighborhood, Penn’s broader goals have sought to operationalize applied public policy research to promote civic engagement. Rodin concludes their community-university initiatives exemplify the “belief that the university’s identity and academic mission are deeply linked to the future of cities” (ibid, p. 247). Similarly, in examining Cleveland State University’s role in the planning process for Cleveland’s 2002 lakefront redevelopment, Kellogg and Hexter (2004) forward universities’ potential to foster community engagement, specifically when HEIs adopt a broader definition of “education”.

<sup>14</sup> “Studentification” fundamentally changes the social and cultural composition of place, as well as providing an important seasonal consumer body in university towns. While the effects of studentification are typically exaggerated in small towns and communities (given the relative sized of student and “local” populations), the recent massification of higher education has placed increased demands on cities’ social and physical (e.g. housing) provisions (Hubbard, 2008, Smith, 2009). Yet, as Hubbard notes, theories of student populations and sociospatial concentrations are not widely encapsulated in studies of urban restructuring and consequently, “students are rarely described as an asset whose contribution to local social life needs to be protected and enhanced, and the dominant policy understanding remains one in which students are regarded as temporary residents who consume local services but are not part of the community” (2008, p. 339). One study on this topic by Fincher and Shaw (2011) further highlights significant cleavages in the social and spatial experience of international and domestic students in Melbourne. The authors note the labeling and division of students as domestic or foreign induces diverse processes of segregation and marginalization “exacerbated by the locational reality in which international students find themselves, living in and on the edge of the busy central city, while local students rarely do” (ibid, p. 548). These issues can be further intensified through the production of university built environments and student housing which remove students from the milieu of the city and the associated cultural and innovative exchanges of the urban (Hubbard, 2009) and are a concern given the intended, or at least idealized, cultural, social and intellectual outcomes of international education.

machine, as much as an actor pursuing altruistic agendas of urban improvement and a space facilitating public participation in the urban process (2011, p. 731).

#### *4.3 What research is valued?*

While local development initiatives are increasingly science-based, several scholars have questioned the social construction of value underpinning increased investment in science R&D (Martin, 2012). As science is regulated and directed into a “new form of ‘knowledge politics’”, the social sciences and humanities have often been overlooked as the “soft side” of the innovation process (Perry, 2006, pp. 204, 210). The OECD (2007) has suggested that policies have often prioritized high-tech industries while concerns with social entrepreneurship and the innovative needs of wider groups (e.g. marginalized communities in rural areas and inner cities) have tended to be limited. Such thinking has had direct implications for the structure, mission and funding of HEIs. Boulton and Lucas (2008) argue basic societal contribution lies in the production of “useful knowledge” and engaging in its social application. Yet by defining utility in this context too narrowly (and assuming useful knowledge is only that which strategically deployed in the contemporary economy), they suggest universities – across their research, teaching and learning mandates – are neglecting the significance of developing the conceptual skills and critical thinking habits in their graduates; skills that will become more important “as the service sector becomes pre-dominant in developed economies” (2008, p. 12). Furthermore, there is a need, as Basu (2012) argues, to recognize certain mechanisms of university-community engagement as “non-traditional scholarship” as this would formalize collaborative research and civic engagement in local communities, and; (1) valorize universities’ divergent contributions to meeting regional needs (beyond wealth creation); while (2) incentivize professors to explore innovative engagement practices as this work could formally contribute to tenure portfolios.

The allocation of public funding for research, however, has become demonstrably tied to its perceived economic potential (Levine, 2009; Peters, 2012; Uyerra, 2010). Through the developed world, Power and Malmberg (2008) find that specialized research environments are being created, but these are highly localized as funds are allocated to a limited number of research centers. With research excellence constructed in relation to the commodification and commercialization of knowledge, HEIs have to rethink their academic and entrepreneurial functions. Whereas universities previously utilized licensing to transfer knowledge to businesses, they are now turning to more direct involvement in the commercialization process, with entrepreneurial training and human capital development emerging as important components of graduates’ educations (Barge-Gil et al., 2011, Rutherford and Holmes, 2008). Proactive approaches to technology transfer are gaining a foothold in Europe where national governments, over the past 10-15 years, have begun to employment tactics pioneered in the United States following the 1980 Bayh-Doyle Act (including establishing technology transfer and licensing offices) (Blumenstyk, 2005, Bourellos, Magnusson and McKelvey, 2012). Moreover, many US universities, including their technology transfer offices, have been ‘at the job’ for decades. For example, the Wisconsin Alumni Research Foundation (WARF), the oldest university-affiliated technology transfer office in the US, with a long track record of ‘winners’ (e.g., blood thinners for treating cardiovascular disease; the first isolation of human embryonic stem cells), regularly

advises visiting EU officials that the secret to its success is “80 years and a \$1.5 billion endowment.” However, as Blumenstyk (2005) notes, cultural difference between (continental) Europe and the United States – a less entrepreneurial culture, higher personal costs of failed ventures, and institutional barriers to commercialization – present hurdles for the aggressive implementation of American-style innovation policies in HEIs.

Similar barriers to the commercialization of innovation exist in Canada. In the absence of a federal Canadian Bayh-Doyle Act, policies and practice issue “vary widely from one province to another and, within each province, from one university to the next” (Gertler, 2001, p. 8). Further, as Canadian post-secondary HEIs are public institutions, they rely on governmental funding for their operating funding rather than receiving financing from private philanthropy of revenue streams available from commercialization.<sup>15</sup> Still, Rutherford and Holmes have observed a transition in Canadian higher education policy from direct support to science and technology research towards backing for early and applied research in universities (2008, p. 253). This move is supported by the federal National Science and Engineering Research Council (NSERC), who have placed an increased weight on the application of science and technology research in the funding allocations (Fisher et al., 2007; Rutherford and Holmes, 2008). The Social Sciences and Humanities Research Council (SSHRC) has also paralleled this move by emphasizing “knowledge mobilization” but, as Fitzpatrick (2008) notes, the transfer impulse in the context of social sciences is less concerned with commercialization and economic development and more focused on accessibility and inclusiveness. Yet there is a need here to point out the problematic potential consequences of the increasingly stress, and concentration of funds, on applied research – particularly in the spheres of science, technology and engineering. The imperatives of commercialization guide funding allocation towards certain questions and research fields, putting blinkers on the broader social and critical functions of academia and neglecting the development of important skill sets for students entering the knowledge economy (see Thrift, 2011).

##### 5. REGIONAL UNIVERSITIES, UNIVERSITY REGIONALISM: HOW ARE HEIS ADAPTING TO, AND SHAPING, NEW URBAN STRUCTURES?

The spatial and territorial dimensions of HEIs have changed alongside the broadening of university mandates and expected contributions (Benneworth et al., 2010; May and Perry, 2006). Despite the apparent dematerialization of production in the knowledge economy, and the increasing flexibility and mobility afforded by globalization processes, knowledge capital has tended to agglomerate in key, highly specialized niche spaces and large global city-regions (Benneworth and Hospers, 2007a; Sassen, 2001). Drawing from Brenner (2004), May suggests HEI restructuring and rescaling “not only work at the level of promoting economic development, but also represent crisis management as a result of deficits and conflicts from previous [restructuring] attempts” (2006, p. 339). Enhancing the political and economic function of universities can therefore be read as a necessary (though largely unsustainable) supporting mechanism for austerity projects and neoliberal governance regimes (see footnote 12).

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<sup>15</sup> This tendency has recently been evinced in York University’s ultimate rejection, in April 2012, of a \$60 million joint global law program in partnership Jim Balsillie’s Waterloo-based think tank, the Centre for International Governance Innovation (CIGI). The initiative (funded by the Government of Ontario and CIGI) would have hired ten experts and taken in 20 graduate students to research issues including intellectual property and international and environmental law. The deal collapsed in the face of stringent faculty opposition surrounding issues of academic freedom, independence and integrity; notably CIGI’s proposed veto over faculty hiring (Brown, 2012, Smith, 2012).

### *5.1 Addressing reterritorialization and changing spatial relations*

Benneworth et al. (2010) argue that the conceptual definition of university “engagement” has undergone a problematic narrowing – increasingly focusing on economic concerns – since its introduction in the 1980s. The gradual economic-based targeting of engagement practices, they suggest, has profound impacts upon universities’ perception of their spatial relations and distinct spatial expressions.<sup>16</sup> This reductionist perspective may lead universities to overlook their diverse non-economic interdependencies with local/regional sites, resulting in the (potentially negative) reinforcement of development programs and space-using behaviors that ultimately influence urban competitiveness (ibid, p. 1614). The pervasive trope of globalization as the driving catalyst for transformations in HEIs and education policies in much of the literature provides a central rationale for the pursuit of narrow, competitive spatial roles. Benneworth et al. (2010), however, note that the relationship between HEI restructuring, reterritorialization and globalization is more complex. In addition to the globalization-as-catalyst viewpoint, universities are active agents reshaping territorial competitiveness through their knowledge outputs.

The contemporary pressures faced by both universities and cities – conditioned by their geographic fixity and local dependencies – are forcing academic and local state institutions to reconsider their spatial relationships and, particularly for HEIs, their engagement with their surrounding communities, neighborhoods and regions (Freeland, 2005; Lambert-Chan, 2008). The local territorialization of university-industry relations is itself dependent upon the nature and institutional capacities of the HEIs and firms involved, as well as being further conditioned by the social, political and economic culture of particular places (Boucher et al., 2003; Lawton Smith, 2007). Unequal power relations further complicate the issue. The advent of regionally-focused science policy in the United Kingdom presents universities with the opportunity to access new resources but Perry suggests, “regional support for science has not necessarily been matched by science’s support for the region, which is implicit and assumed” (2006, p. 210).

There is an apparent tension between the spatial roles, relations and imaginaries adopted by cities, regional governance bodies and HEIs as they pursue (territorialized) economic development strategies that arise from divergences in each actor’s local dependencies. Echoing a tension present at the outset of medieval university, HEIs remain located both in, and apart, from their urban and regional context. Importantly, issues of “functional distance” and concerns with immediate geographic proximity are increasingly being challenged by a more complex, multifaceted and multiscalar understanding of universities’ spatiality (Benneworth and Hospers, 2007a; Uyarra, 2010).<sup>17</sup> Conceptually locating of universities within territorially-embedded

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<sup>16</sup> Benneworth et al (2010) find universities actively change their space-using behaviour in order to exploit land holdings, attract top faculty and students and to advantage of new technological advances, such as remote, online teaching. At the same time, they note HEIs are lobbying regional partners to enhance their competitiveness and ensure the successful development of science parks and incubators etc. These differing perspectives imply differing power relations and structural capacities to enact change for the actors involved. However, they add that “clearly in physical development projects, there are strong interdependencies between both sides, with both having much to gain from successful cooperation, universities improving their international competitiveness and cities benefiting from new knowledge districts and branding and image benefits” (ibid, p. 1612).

<sup>17</sup> May (2006), however, argues university managers, as well as academics, continue to hold an aspatial view of HEIs and “context-free knowledge production” which perpetuates discourses exacerbating, rather than addressing, the tensions inherent in the organizational restructuring of HEIs. Further, he finds universities often lack concerted attempts to understand the changes presented by institutional and urban restructuring. The problematic “absence of institutional capacity” results in fluctuating institutional aims that inhibit the necessary mobilization of institutional

knowledge networks enables policy frameworks to reflexively target “a more diverse configuration of networks of universities and other actors at multiple geographies (cities, multi-regional, local) addressing different sets of development needs” (Uyarra, 2010, p. 1241). Still – in contrast to the growing consensus that universities should play a central role in regional development – Power and Malmberg (2008) argue that the multiscalar nature of the university as a space of flows problematizes the basic notion that the spatial interests of HEIs are immediately local and as a result, they forward higher education policy may be better focused on promoting global competitiveness rather than fostering local connectivity (ibid, p. 243).

For Olds (2012b), Mayor Bloomberg’s 2010 request for applications to establish an Applied Science Facility in New York City offers a glimpse of a possible articulation of such policy prescriptions emerging at the nexus of globalization and higher education. In attracting applications from 27 national and international universities, the Applied Sciences project – ultimately awarded to a joint proposal Cornell University and Technion-Israel Institute of Technology in December 2011 – discloses both the deterritorialization ushered in by processes of globalization, and the reterritorialization of knowledge production in the heart of a major global city-region. While its consequences are yet to be realized, when developed the Applied Sciences campus will likely open the possibility for new deep partnerships (university-university and university-business) across nodes, new teaching and research opportunities with significant latitude for the actors involved and new mechanisms for the City to access and exploit these resources (ibid). Still, it is worth introducing a cautionary note of the potential relationships that may emerge in this institutional space, given the questions surrounding the lack of barriers between Silicon Valley and Stanford (Auletta, 2012).

The complex spatial relations of universities presents challenges in terms of identifying and optimizing their territorial organization, but moreover impact upon the spatial conceptualizations utilized by HEIs; whether in the case of universities increasingly their physical and symbolic presence in core downtown districts (D’Andrea, 2012), or turning their attention to the emerging space of the suburbs (Martinez-Fernandez and Potts, 2008). Universities and HEI networks can operate with, and within, territorially and functionally defined regional contexts, and discursively mobilize urban space to meet their ends (Arbo and Benneworth, 2007). Boucher et al. suggest that traditional universities (regardless of their relative geographic centrality) “tend to be more concerned with their position in the national and international hierarchy of universities than with engaging in their region’s development” given an institutional hierarchy that privileges established HEIs; consequently newer technologically oriented universities in multiplayer core regions often compensate for their relative marginality by deepening their engagement with their local communities (2003, p. 896). The result is a differing spatial understanding of institution’s own spatial roles and scale of operation, notably regarding city-regional space (Golden, 2012; Naylor, 2012).<sup>18</sup> However, these reconfigured

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power – matched with available symbolic and material resources – that May sees as vital for universities’ “success at the game of scales” (ibid, p. 342). Engaging the concept of regional resilience, Christopherson et al. (2010) and Wolfe (2010) both point to the importance of creating institutional capacity to build the human, civic and cultural capital, and specialized regional assets to enable region’s to respond to changing economic circumstances.

<sup>18</sup> Talking before the Toronto Board of Trade, both Anne Golden (2012) and the University of Toronto’s president David Naylor (2012) have stressed the importance of regionalism and a regional spatial imaginary for Toronto. Naylor (2012) constructs the region’s geography of innovation as based around a series of incubators and accelerators including; the MARS Discovery District, the world’s first Fashion Incubator, the Food Business

spatial discourses often offer limited critical appreciation of what city-regions are, their uneven and unequal sociospatial structures and why regional governance is important for fostering innovation and maximizing localized returns from university R&D; limitations reflected in the literature on new regionalism and learning regions more generally (Arbo and Benneworth, 2007; Harrison, 2010; MacLeod, 2001; Ward and Jonas, 2004).

These issues are evident in Powell's (2007) discussion of creative city-regions. In particular, Powell uncritically reifies the city-region as a collective and monolithic actor that is able to interact with other agencies naturally, and with a common, unified purpose (see Harvey, 1989; and Le Galès, 2002 for critiques of reifying city-regions as collective actors). For example, he forwards that "it is not only the academic community that needs to be creative in its outreach leadership and governance. The city-region has to permit, support and encourage creative change and, ideally, act as a driver for it" (ibid, p. 327). What is often missing in these debates are accounts of inequality, sociospatial polarization and uneven development within city-regions, as well as a concern with what is actually changing in the internal and external relationships and organization of the contemporary metropolis. Spatial sensitivity may be afforded to geographic proximity or global interconnectedness, but not on the impact of changing commuter and demographic patterns and information economies on the geography of innovation and education.

### *5.2 Adapting universities for knowledge or resource economies? Views from the center and periphery*

Kim and Koo (2009) posit the central importance of human and social capital in the retention of locally produced knowledge; noting the importance of R&D for regional growth increases and levels of commercialization. Likewise, Miguelez et al. (2011) note that social capital correlates with innovation. They demonstrated that social capital and public R&D efforts perform markedly complementary roles in high-income Spanish regions, yet suggest that the impacts of public R&D funding are less pronounced in low-income regions with weak networks of untraded interdependencies. The economic, institutional, social and cultural composition of place play an important role in the ability of particular cities and regions to attract and retain creative workers and knowledge-intensive firms (Benneworth et al., 2010). Differences in the accumulation of human capital in key urban nodes is connected to global migratory flows – including student populations, whose decision to invest in an education is intrinsically an investment in place – with certain cities able to realize a consistent net growth in knowledge and creative workers (Brown, Newbold and Beckstead, 2010).

In this context, Florida's creative class and creative cities theses have proved particularly influential in public policy circles. Florida (2005) is critical on the "naïve" view of universities as engines of innovation which churn out ideas that are readily adaptable for industrial commercialization and regional growth. Instead, he posits the chief importance of HEIs is as producers of knowledge and creative talent. In order to leverage universities as engines for economic growth, he contends federal, state and local policies need to focus on strengthening to attractiveness of universities – and their cities – to top global talent. Analyzing Florida's creative class argument in Toronto, Gertler finds that during the period 1991–2004, "employment in creative occupations grew at more than three times the rate of the total labor force in the Toronto

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Incubator, The Mississauga Technology Business Accelerator, VentureLab and the Markham Convergence Centre, and the Digital Media Zone at Ryerson, which have fostered "buzzing startup and entrepreneurial activity".

census metropolitan area” (2010, p. 10). He reasons this is due to the influence of the Province, which has provided key legislation and defined “the rules for property taxation, revenue pooling, and redistribution, as well as the framework for local and metropolitan government” (ibid, p. 11). Urban creativity has been further embraced in Toronto following Florida’s arrival at the Martin Prosperity Institute in 2010, supporting the influential role of “star” academics to the marketability of place (Gertler, 2001; Hedge, 2005).

However, complications exist for local and regional governments pursuing “creativity” as an economic development strategy; beyond the inherent tensions and inequalities engendered by such policy frameworks (Peck, 2005). Morgan contends “glib references” to the knowledge economy obscure problems facing firms as they attempt to manage intangible, relational and knowledge-based assets and elides the fact firms have to cost-justify their outlays (2004, p. 6). Examining the factors influencing the attraction and retention of creative workers in Halifax, Grant and Kronstal (2010) submit that while local HEIs provide a supply of skilled labor, the city still loses creative workers to the career opportunities and higher salaries offered in core regions.

In contrast to a focus on high-technology industries or the production of human capital, Friedman (2012b) points to the need to develop an innovation agenda targeting the more efficient use of natural resources. Hawkins (2012) has embraced such thinking, calling for Canada to focus its innovation agenda on the specific context of the nation’s industrial and historical composition; thus placing extractive and resource industries at the center of a national innovation policy.<sup>19</sup> For Hawkins, federal and provincial policies do not adequately address the actual composition of Canada’s economy: “Let’s be honest about it. And let’s not assume that Canada’s future is the iPad. Because it isn’t” (cf. Berkowitz, 2012). Academic knowledge needs to be reconnected with the nation’s industry base in order to establish an accurate picture of Canadian innovation and the strengths and weaknesses of Canadian R&D across the spectrum of national industries (Berkowitz, 2012). Although Canada’s economy is advantageously based upon both resource and knowledge industries, the tensions and competition between the nation’s two central economic bases poses problems, particularly in Canada’s “have not” provinces.

Universities in Canada’s Atlantic Provinces have looked to augment their (declining) resource-based economies by utilizing university-based knowledge to drive innovation and economic development in locally specialized industries (Woodward, 2010). Rather than abandoning traditional industries in the face of globalization and the rise of knowledge and service economies, academic and state governance collations, such as the New Brunswick Innovation Foundation, are embracing the overlay of new technologies onto existing industrial specializations.<sup>20</sup> The attempted centralization of research funding by Canada’s five largest research universities, however, presents a discrete challenge for the development of such peripheral-region innovation agendas. In response, Eddy Campbell, President of University of New Brunswick, has called for an “equal footing” and funding awards based on excellence (*not* discursively framed as an explicit regional equalization within the nation), rather than a new national state strategy focusing on primary global hubs, which would push HEIs in “have-not” provinces into predominantly teaching institutions (cf. *ibid*).

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<sup>19</sup> Hawkins suggests Canada’s “innovation gap” may, in part, be a consequence of R&D statistics focusing on high-tech sectors and therefore overlooking innovations made in major resource industries driving national growth.

<sup>20</sup> The University of New Brunswick is pursuing an innovation-driven growth strategy which attempt to position themselves at the forefront of sonar-based ocean floor mapping the analysis of materials with MRI machines, and the creation of advanced wood composites; fields directly tied to the region’s resource economy (Woodward, 2010).

HEI networks in peripheral Canadian regions are also under increasing pressure to restructure their organizational and operating arrangements. Neary (2007) reports that in 2007, debates erupted in Newfoundland and Labrador as to whether Sir Wilfred Grenfell College should become a separate institution or continue to be part of Memorial University. The Province initially favored establishing Grenfell College as an autonomous university, viewing institutional restructuring as a means to stimulate development and innovation. Memorial, in contrast, suggested the province would be best served by having its HEI infrastructure governed by a single, overarching governance framework to avoid duplicating services and squandering resources. Ultimately, the Grenfell campus was granted its own budget and renamed Grenfell Campus, Memorial University of Newfoundland, but this stopped short of full autonomy.

### *5.3 Branch campuses*

Over the past two decades, many North American universities have embraced the development of overseas branch campuses – notably in Southeast Asia, China, and the Arab states but have also established beachheads in Europe – as a means to increase their global connectivity and foster the benefits of internationalization for both home and overseas communities (Altbach, 2011; Olds, 2007, 2012a). The branch campus model is also shifting the spatial and territorial structures of HEIs domestically, and the growth of regional campuses has contributed to universities concern and engagement with the health of their regions (Beer and Cooper, 2007). Domestic, in-country branch campuses offer a means for institutions to expand their revenue base and institutional brand without the complications of working across international political and regulatory boundaries but further challenge on-line and for-profit universities (Altbach, 2012; Fonseca and Pond, 2007; Lane and Kinser, 2012).

There is no fixed definition of a branch campus (and it is important to note there are significant distinctions between international and domestic branches, as well as between types of domestic campuses) but several central tenants underlie the discursive rationale for their expansion: increasing student enrollment (notably for low-income and nontraditional students), expanding institution's brands and enhancing regional economic development (Brady-Myerov, 2012; Briscoe and de Oliver, 2006; Lane and Kinser, 2012; Morrill and Beyers, 1991).<sup>21</sup> Niva (2011) posits the two central goals of branch campus legislation in Washington State – increased student access and regional economic development – remain as vital now as when it was passed in the 1980s (see Morrill and Beyers, 1991). Given President Obama's mandate to increase college enrolment, Niva suggests Washington's regional campus system has proven a tremendous success by establishing the institutional infrastructure necessary to generate a competitive, flexible American workforce.

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<sup>21</sup> Fonseca and Pond suggest the rapid growth in branch campuses is closely tied to the geographic and economic restrictions faced by students, with 79% of students in the United States attending university of college in their home state, and "within a few hours' drive" from home. Reflecting the varying and evolving roles played by HEIs, there are a great variety of shoot-off institutions including (in the American context); two-year (Wisconsin) or four-year (Ohio, Pennsylvania State, New York) campuses, networked community colleges (particularly in the South and West), and locally-targeted, disciplinary specific branches. Several prestigious universities have embraced branch campuses as a means to spread their catchments and extend their influence and brand, while in some cases, branch campuses foster institutional collaboration in order to exploit geographic locations or combine resources (Virginia and Virginia Tech in Washington) (Brady-Myerov, 2012; Fonseca and Pond, 2007).

Canada is witnessing the first extensive expansion of branch campuses since the 1960s, characterized by diverse and innovative partnerships, often between HEIs and governmental agencies. Canadian HEIs, small and large, are looking to expand beyond their immediate surroundings in order to reach students, branching in to remote communities or rapidly expanding suburbs (Lorinc, 2007).<sup>22</sup> Marketing, as Lowrie and Wilmott (2006) contend, plays an important role for branch campuses as they attempt to position themselves within the higher education landscape. Simon Fraser University, in developing a suburban campus in Surrey, BC, stressed the need to provide alternative, yet complementary, offerings to the University's other campuses, focusing the new campus on IT, business and entrepreneurship (Lorinc, 2007).

Evidence from Canada suggests HEI expansion strategies are proving beneficial for local young people and students from lower-income backgrounds in terms of access to educational opportunities. Students from lower-income families witnessed the largest increases in university participation following the opening of local HEIs (Frenette, 2007; Lorinc, 2007). As many (particularly low-income and nontraditional) students are tied to place by financial constraints, personal commitments, family responsibilities and lifestyle choices, they desire education options within a 30-minute commuting distance. Campus proximity therefore opens access by not only reducing the transportation and accommodation costs of university and college attendance, but enables the maintenance of social and familial commitments. Fonseca and Pond (2007) suggest the expansion of the branch campuses reflects both a response to, and facilitation of, the expanding enrollment of nontraditional students in HEIs, with the social and spatial dynamics of contemporary higher education unfurling in a symbiotic relationship. However, despite their proliferation over the past two decades, there is a paucity of research on the effectiveness of branch campuses as educational institutions and their impact in reshaping urban spaces in which they are embedded.<sup>23</sup> Fonseca and Pond (2007) call for research to identify how universities can take advantage of the new sociospatial structures possible for HEIs.<sup>24</sup>

Branch campuses have a great potential to redefine and reshape higher education and urban landscapes and open new channels for R&D linkages between industry and HEIs. Branches may be able to foster and facilitate strategies of KM if the campuses are established with these objectives embedded, spatially and institutionally, within their design. Branch

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<sup>22</sup> Geographic proximity between main and branch campuses may vary dramatically, with Lakehead University, based in Thunder Bay, developing a new campus from scratch in Orillia – 1000km away – in 2005 (Lorinc, 2007).

<sup>23</sup> The rapid growth of demand at branch campuses brings significant pressure to reconfigure educational and urban space. Nipissing University's Muskoka branch (opened in 1996) rapidly outgrew its initial strip mall location and in 2008 relocated to a five-hectare downtown location on land donated by the municipality of Bracebridge (Lorinc, 2007). However, it is important to note that to talk of a university branch "campus" often evokes particular mental conceptions of the university and university life (student unions, athletic facilities, libraries) which may not be met by actually-existing satellite campus infrastructure. Although the alternative physical environment of branch campuses may open more inclusive space for nontraditional students and adult learners looking for workplace training, their divergence from expected spatial norms has led some students to be dissatisfied with the education experience being provided (Brady-Myerov, 2012).

<sup>24</sup> Fonseca and Pond (2007) highlight the importance of technological innovation in enabling the expansion of branch campuses, with online teaching formats allowing flexible course delivery and web-based libraries offering digital materials which provide an alternative to costly physical library buildings and holdings. In this regard, it is worth considering the impact of free massive open online courses (MOOCs) designed to further lifelong learning and sometimes the simple acquisition of a certificate versus a credit or a degree. In principle some of these could be scaled at the city-regional scale, or across multiple city-regions, helping to facilitate the expansion of knowledge transfer and democratic education opportunities..

campuses set up with teaching mandates are less likely to engage in university-industry R&D collaborations and as a result, will likely be less inclined to develop and support the hard infrastructure of innovation (although they perform an important function in extending educational opportunity and producing human capital). In contrast, the flagship multi-purpose, intra-HEI campuses being developed at New York's Applied Sciences campus and the University of Wisconsin-Madison's Institutes for Discovery demonstrate the development of branch campuses founded upon the principles of innovation and KM. These innovative facilities territorialize and bind global knowledge flows in place and in doing so, internalize proximity within their institutional and physical structures. However, the capacity of branch campuses to serve as loci for innovation and knowledge transfer is contingent upon the relative strengths, maturity, sectoral composition and culture of HEIs, firms and the state within localized regional innovation systems (see Howells, Ramlogan and Chen, 2012). Following Laursen et al. (2011) – who suggest firms are more likely to engage in collaboration with top-tier universities over lower-tier, but geographically proximate HEIs – we can posit the potential of branch campuses to catalyze KM in localized environments is contingent upon a number of complex variables, with no guarantees of their effectiveness.

Although Frenette (2007) suggests regional branch campuses have improved access for low-income and nontraditional students, there appears to be an important geographical bias to the experience, function and success of such expansions. Questions surround the function and utility of branch campuses in both domestic and international settings; are the educational offerings, teaching quality and ultimately the standard of degrees being conferred at branch institutions equivalent to those of main institution? Briscoe and de Oliver suggest disparities between the offerings of the University of Texas San Antonio's branch campus, "created subsequent and subordinate to the main campus", and the central suburban institution undermined the downtown branch's ability to increase access for centrally-located underprivileged residents (2006, p. 220). Early studies in the United States suggest significant incongruence in terms of quality and access to library services between main and branch campuses (Lebowitz, 1997) while emerging distance learning techniques negatively impact upon the quality of instruction (Briscoe and de Oliver, 2006; Thyer, Polk and James, 1997).<sup>25</sup>

Given the costs required to set up HEI satellites, are branch campus expansions sustainable once start-up grants – for both domestic and international ventures – expire (Altbach, 2011, 2012; Brady-Myerov, 2012)? Establishing, and maintaining, a resident faculty is imperative for branch campuses to develop as genuine, sustainable campuses rather than storefront operation but this, Fonseca and Pond (2007) posit, presents substantial issues for HEIs. Questions linger over resident faculty's tenure and promotion – particularly with branch faculty taking on heavier teaching loads with less opportunity to conduct original research – that will likely affect institutions' ability to attract quality professors. Faculty removed from the main campus face academic isolation and are required to more aggressively pursue the academic, business and community ties that occur more organically at larger institutions (Lorinc, 2007).

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<sup>25</sup> In assessing the formation of the University of Washington's two-campus branch campus model, Morrill and Beyers (1991), suggested the social and spatial differences between the northern campus – located in new, affluent and auto-oriented suburban territory with close proximity to high-tech software and genetic engineering clusters – and southern campus in less-affluent, more diverse and transit accessible waterfront Tacoma, would likely "lead to divergent development paths which will tend to perpetuate their different character and 'class' (ibid, p. 171).

Briscoe and De Oliver argue that “the establishment of higher education institutions, particularly the choice of location, within an ever intensifying commercial landscape, exposes these initiatives to commercial forces that are often contrary to a university’s democratic objectives” (2006, p. 204). In this regard, Altbach (2012) suggests we approach the expansion of branch campuses – as “yet another element in the increasing commercialization of higher education” – with some skepticism. Still, in the absence of a systematic body of research on these issues, critics suggest HEI administrators are likely to continue the clamor to establish branch campuses and develop the technological and spatial infrastructure, lest they miss the perceived opportunities presented in the latest wave of university expansion.

#### *5.4 Mobilizing universities and the structure of the metropolis*

Urban innovation and creativity discourses and policy frameworks predominantly focus on downtown. Many Canadian universities are either moving to or expanding their locations in downtown city centers. Ryerson University’s expansive campus development, including significant street frontage on Toronto’s Yonge Street presents a clear indication of this trend (Kearney, 2008). The reasons for this are twofold: many urban actors see downtown expansion as a form of urban renewal and revitalization for declining downtown cores, while universities see this as a way of simultaneously creating goodwill as well as gaining badly needed space (D’Andrea, 2012). Downtown campuses offer municipalities a means to increase land values and local tax bases while boosting surrounding retailing, yet concomitantly they may increase congestion and push out community services. Despite these challenges, Michel Trocmé claims “the advantage urban campuses have is that they can grow in step with the market and in concert with other businesses, residential communities and other institutions that make downtowns so vibrant” (cited in D’Andrea, 2012).

Against this urban-centric perspective, May and Perry note that in Manchester, a spatial tension exists between the city-regional core and suburban hinterland in terms of the benefits extracted from the knowledge economy. The emergence of a “new, almost virtual architecture of city-regional governance” previously masked the regionalization of education policy in northwest England, but has now served as the basis for key governmental and industrial actors to formulate the “Manchester: Knowledge Capital” initiative (2006, p. 267). They contend that while the Knowledge Capital framework may be successful in attracting a pool of talent workers to Greater Manchester, there is no guarantee they will stay in the central city. Given the “patchy” quality of education provision, the authors suggest there will likely be a migration to “the leafy suburbs of Cheshire to the south of the city”, raising problematic questions regarding the lack of mechanisms in place to open participation in, and direct the benefits of, the knowledge economy boom towards deprived urban areas (ibid, p. 273). They conclude interlinked global-local aspirations vanish with the presumed benefits of the knowledge production; the focus on global competitiveness enables universities to exploit their position within localities on the basis on uncritiqued notions of economic growth and wealth diffusion.

Martinez-Fernandez and Potts (2008) note the literature on the knowledge economy and the strengths of cities in an era of globalization have tended to focus on city-region’s central business districts and inner-city neighborhoods at the expense of outer suburbs, which are dismissively constructed as bedroom communities (see Fiedler and Addie, 2008, Keil, 2012). In

contrast to this dominant suburban discourse, they argue “peripheral suburbs in metropolitan regions have particular innovation processes that require specific planning strategies for innovation intensity”, and as such, traditional policy approaches to innovation may not be immediately applicable in differing metropolitan and city-regional spaces (Martinez-Fernandez and Potts, 2008, p. 554).<sup>26</sup> Exploring innovation in the peripheral suburbs of Sydney, Australia, the authors find local innovation systems (with diverse connections (and disconnections) to the broader metropolitan networks) that require systematic planning to promote innovation intensity. Knowledge intensity, environmental dynamics and accessibility are argued to be the key innovation drivers in these outer suburban spaces, while knowledge generation and transfer, as well as issues of livability were seen to be of marginal importance. Indeed, in analyzing the locational decisions pursued by the University of Texas, San Antonio, Briscoe and de Oliver contend the positioning of the university on the urban fringe “was governed by the same dynamics of a mass-market consumer outlet”, where “mass-market consumer outlets are premised on space and automotive access and are subject to the gravitational pull of privileged developers on the periphery” (2006, p. 221). The relative disconnectivity and auto-centricity of suburbia inhibits access for underprivileged, racialized, inner-city communities.

It is also important to highlight how the role, function and spatial relations of suburban HEIs change over time, and in relation to the expansion of urban areas. Tomaney and Wray (2011) draw out some key transformations in their analysis of the evolving social and spatial position of Monash University, originally established in 1958 in a relatively isolated suburban area 20km from downtown Melbourne (Mees, 2010). By focusing on the manifestos of differing Monash campuses, Tomaney and Wray (2011) highlight how the nature, structure and intent of regional integration and collaboration at Monash have shifted, not necessarily because of their “suburbanity” per se, but because senior managers viewed suburban branch campuses as more peripheral and more focused towards serving local, rather than competitive global needs. During the 1990s, an aggressive period of HEI consolidations in Australia led Monash (after doubling in size) to emerge as an international institution that could compete with Melbourne for privileged and middle class students while providing education access in the suburban peninsula through a network of suburban branches. With this growth, regional development has emerged as a hotly debated priority for key stakeholders, but Tomaney and Wray note regional engagement strategies have been subsumed into the wider project of commercialization.<sup>27</sup> Subsequently, the main campus attempted to link Monash’s research directly to regional economic development and knowledge-economy growth in central Melbourne. Branch campuses then engaged in

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<sup>26</sup> Felsenstein (2002) notes a paucity of research on the differential impacts of economic activities on metropolitan expansion. In response, his study seeks to tie the growth of outer suburban high-tech agglomeration surrounding Chicago to the expansion of urban sprawl. In terms of industrial location behaviors take, he notes companies take advantage of inter-locality competition and municipal boosterism, as local politicians and development practitioners pursue firms that will have the largest impact on their local tax base (at the expense of other, more local appropriate economic development strategies). In terms of residential development, Felsenstein highlights the middle and upper income high-tech workers’ ability to offset commuting costs to employment locations throughout the region given the savings realized through suburban living. In comparison, low income workers are tied to residences closer to their place of employment. As a result, he suggests metropolitan expansion, at least in the American context, “seems inevitably” tied to the growth of high-tech clusters (ibid p. 678).

<sup>27</sup> This reflected divergent views of regionalization within the extended Monash system. Senior managers: (1) assumed “regional” branch campuses would take responsibility for “regional engagement” while the main, now metropolitan campuses had few, if any local expectations; (2) viewed suburban branch campuses as large employers and an instrument for urbanization; and (3) considered the primary role of regional branches was to provide educational opportunities to local residents rather than pursue research agendas.

regionalism through creating community advisory councils and close connections with local employers. The authors suggest the position of Monash's regional branches is expected to change as population growth in Melbourne increases and the southeast becomes more urban. As such, the suburban branch campuses offer the potential to play a significant role in in shaping a civic identity for southeast suburbs.

The experience of Monash University may provide useful lessons for several Canadian universities; particularly York University as it refocuses its territorial lens and strengthens its engagement strategies with the booming residential and business communities in York Region (Monier-Williams, 2011; Williams, 2011). Indeed Olds (2011) posits that the profusion of branch campuses and for-profit universities scattered through the metropolis (and around the world) reflect both HEI's capacity to identify and serve new student markets, but also the changing social and spatial geography of global urbanization. The dynamic and intertwined nature of higher education provision and urbanization means many emergent strategies mobilizing urban space are currently under-researched, but deserving of a concerted future study.

## 6. CONCLUSIONS

Clearly, the relationship between the university and the city is evolving. The world's population has increased exponentially, and we now live in the era of global urbanization. Processes of massification have fueled the expansion of the number and sizes of universities in most countries. Economic transitions, including the relative rise of the services industries, have generated the demand for workers with higher levels of education. More broadly, the development of the so-called 'knowledge economy' has enhanced the pressure on HEIs to produce both skilled labor and relevant knowledges that are increasingly defined through their capacity for commercialization. The other broad contextual force reshaping the relationship of universities and cities is neoliberalization; the interlinked processes and ideologies emphasizing market-based solutions to a whole host of public policy concerns (e.g., infrastructure, transportation). Given this, and given the declining level of state support for higher education, HEIs are searching for new streams of revenue to supplement base levels provided by the state, or students (i.e. tuition). These implications of these broad shifts are, however, being intensely debated and are not easily resolvable. It is in this context that mobilizing new urban structures to increase the performance and effect of R&D in universities and beyond needs to be situated.

We posed three related questions at the outset of this review:

- Can and should the core ideas associated with the sociospatial structure of the university hold firm while the sociospatial structure of societies is spreading across an increasing scale?
- Should higher education funders and providers progressively adjust institutional infrastructures, pedagogical practices, and broad ways of operating, to better serve people *in places*, versus drawing people to *a place*?
- Do the locations of branch campuses that have been established in fast changing world regions (and in the heart of global urbanization) offer unprecedented opportunities to reach humankind like never before?

Our review began (see section 2) with a historically situated discussion about the relationship between cities, HEIs, and the innovation process. Even before the invention of the nation-state,

universities were formed by, and dependent upon, relatively dense concentrations of people. Universities helped foment the production of innovations – economic, political, socio-cultural – as well as the creation of now taken-for granted concepts like academic freedom. Such concepts have played a formative role in enabling universities to evolve as engines of creativity and critical thinking.

In the remainder of our paper, which was divided up into three sections, we reviewed a large volume of research on the evolving relationship between universities and cities. Section 4 focused in on the practices and outcomes of university-industry linkages. We began by offering a caveat that scholars and policy makers need to recognize that replicating the experience of successful regions in other cities and universities is a problematic exercise destined for failure. In some ways there is a cottage industry about city-regions like Silicon Valley, as well as HERD, and we need to be wary of falling into the trap of thinking that there is a recipe book that can be purchased ‘off-the-shelf’ to encourage innovation. This said, in our findings, we have noted the important role played by universities in city-building and place-making in a changing urban-regional environment. This is true both for the home areas of universities – their traditional ‘turf’ – and for areas not conventionally considered HEI’s natural ‘home’. The literature on this aspect of the development process focused on spillovers and spinoffs, and regional innovation systems and cultures. As we noted, university spin-offs provide an interface through which new technological innovations pioneered in academia may enter industrial knowledge bases. However, the substantial literature examining the role of universities in the creation of knowledge-intensive industrial clusters pointed to the general conclusion that while universities are major players, they tend *not* to be *the* catalyst of regional economic development. More broadly, there is a noted paucity of recognition or analysis of the co-constitutive and symbiotic relationships between HEIs, regional innovation and economic development and the sociospatial dynamics of contemporary metropolitan regions.

In section 5, we shifted to a review of broader debates, concepts (e.g., the ‘triple helix’) and phenomenon. What is noteworthy is that several decades of more nuanced research is beginning to recognize, as implied above, that there is no singular model to be adopted by universities or policy makers. However, austerity and the search for new streams of revenue are putting pressure on universities, such that, for good and bad, many are focusing in on the more economic of these models. What this is doing is valorizing select forms of knowledge (including disciplines), and types of HEI-non-HEI relations. Ironically, perhaps, just as cities need enhanced civic leadership from universities, universities are focused on potentially higher impact (in a revenue generation sense), practices and relations. To be sure there are some universities that seek to develop a broad based approach of being ‘engaged,’ but success on this front is dependent on the development of a clearly demarcated mission statement, and the capabilities to implement a mission-related strategy.

In the final section, we reviewed material about how the spatial and territorial dimensions of HEIs have changed alongside the broadening of university mandates and expected contributions. As this literature points out, the contemporary pressures faced by both universities and cities – conditioned by their geographic fixity and local dependencies – are forcing academic and local state institutions to reconsider their spatial relationships. Again, it is important to point out that in this era of global urbanization, society (including people and the firms they constitute) is metropolitanizing and located in and across wider and wider swaths of the earth’s surface.

However, HEIs often struggle to keep up with the depth and scale of this transformation.<sup>28</sup> There is an apparent tension between the spatial roles, relations and imaginaries adopted by cities, regional governance bodies and HEIs as they pursue (territorialized) economic development strategies that arise from divergences in each actor's local dependencies. HEIs remain located in, yet apart from, their urban and regional context. Importantly, linear notions of functional and spatial distance/proximity are being replaced by a more complex, multifaceted and multiscalar understanding of universities' spatiality. We found mirrored in these strategies the complex structure of econo-spatial relations that are typical of a globalized and largely market-determined capitalism where actors find their terrain of operations in a mix of near- and far-oriented strategies. Conceptually, this also confirms the intricate mix of place-based (topological) and territorial (scalar) strategies we find present in much urban-economic activity today (Keil and Mahon 2009).

What are the implications of these findings? While it is rather obvious from our findings that HEIs are present and active in urban-regional environments near and far through knowledge transfer and academic operations, it remains less clear how knowledge transfer in these changing environments *actually takes place*. Surely, there are specific strategies (such as York University's KM unit) that more or less deliberately act in and upon those changing sociospatial relationships by motivating participation in KM processes by less traditional partners (suburban municipalities rather than the downtown, emergent immigrant organizations in ethnoburbs rather than established civic or business elites). But it remains to be seen how these strategies establish sustained processes of knowledge transfer rather than falling in line, eventually, with existing strategies and institutional frameworks. Qualitative empirical research among both emerging institutions in those peripheral and expanding urban areas and researchers and students who work there as well as quantitative assessment of KM activities there would certainly be instructive here. But such research lies beyond the confines of this present exercise.

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<sup>28</sup> An indicator of the growing disconnect between the fixity of HEIs and the spread of society is online higher education, including the recent emergence of massive open online courses (MOOCs).

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