Urban Knowledge and Innovation Spaces

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FROM THE GUEST EDITORS

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Background

The effects of globalization, urbanization, and deindustrialization, particularly in the twenty-first century, are rapidly changing contemporary local economies, forcing cities across the world to adopt advanced information and communication technologies (ICTs), and pushing them to become more innovative and thus competitive (Bulu, 2011; Lee et al., 2014; Yigitcanlar and Lee, 2014). In this era of global rivalry, the key driver of penetration in global knowledge markets is excelling in the knowledge economy by adopting innovative mechanisms for knowledge generation (Bulu et al., 2014; Pancholi et al., 2014). For this reason, many cities are pursuing knowledge-based urban development (KBUD). As a popular development approach, KBUD aims to bring economic prosperity, environmental sustainability, a just socio-spatial order, and good governance to cities. This development model also encourages the production and circulation of knowledge in an environmentally conserved, economically secure, socially just, and well governed human setting—a knowledge city (Bulu, 2014; Yigitcanlar, 2014). This is to say, following a robust KBUD pathway may create cities that address the economic, social, spatial, and institutional needs of their inhabitants (Carrillo et al., 2014).

KBUD helps create cites that foster, attract, and retain high-skilled workers and innovative companies (Yigitcanlar & Bulu, 2015). Cities are the natural hosts of these industries, workers, and their economic and socio-cultural activities (Yigitcanlar, 2010). In other words, knowledge and innovation spaces, particularly in the urban context, are the natural hosts of talent and investment that generate the added value that is critical for success in the knowledge economy (Yigitcanlar and Lönnqvist, 2013). For instance, international best practice experience indicates that knowledge and innovation spaces—such as clusters of innovative industries (Boschma, 1999)—make an effective contribution to the development of regional innovation systems by encouraging knowledge transfer between academic institutions and knowledge-intensive establishments, thereby resulting in start-ups and growth in innovation industries (Cooke, 2001; Mudambi, 2008; Inkinen and Suorsa, 2010). Knowledge generation and innovation systems—e.g. networks of organizations, enterprises, and individuals focused on bringing new products, new processes, and new forms of organization into economic use—are spatially interlinked (Bunnell and Coe, 2001; Scott, 2001; Coenen et al., 2004; Asheim and Coenen, 2005; Cooke, 2008; Asheim et al., 2011), and commodification of science, technology, and arts takes place in knowledge and innovation spaces in

the form of generated knowledge and innovation that has a high market value (Makkonen and Inkinen, 2014). Hence, these spaces demonstrate the potential to enhance economic growth in a city or region (Hommen et al., 2006; Ratinho and Henriques, 2010).

Urban knowledge and innovation spaces are integrated centers of knowledge generation, learning, commercialization, and lifestyle experimentation. In other words, they are high-growth knowledge industry and worker clusters, and distinguish the functional activity in an area, where agglomeration of knowledge and technological activities has positive externalities for the rest of the city as well as firms located there. Besides being spaces of innovation and knowledge generation, these spaces have been considered as a solution to complex political and economic issues in societies—e.g. regional industry problems, under-commercialization of publicly financed research, shortage of new product development, productivity issues, and unemployment (Link and Scott, 2003; Carrillo et al., 2014; Yigitcanlar et al., 2015). Urban administrators often view knowledge and innovation spaces as a significant policy instrument for promoting or supporting urban development and economic growth (Scott, 2006; Fikirkoca and Saritas, 2012). Many have pursued the ideal of creating a knowledge and innovation space that is able to attract global flows of ideas, knowledge, people, and capital, and become a trend-setting innovation hub (Anttiroiko, 2009; Florida, 2012; Makkonen and Inkinen, 2013). However, developing knowledge and innovation spaces and catering to the needs of innovative industries have been major challenges for most cities—due to a low level of science and technology expenditure, a high level of government involvement in financing and undertaking research, a low level of private sector R&D, a lack of collaboration among firms, and exceptionally high dependence on foreign technology (Dodgson, 2011).

The past few decades have witnessed an increased interest from local and national governments in the development of knowledge and innovation spaces—particularly in Europe, North America, and Australia (Cooke, 2002). Consequently, today, cities around the world possess model knowledge and innovation spaces (Anttiroiko, 2004; Yigitcanlar, 2009; Katz and Wagner, 2014). Pioneering examples of knowledge and innovation spaces include industry, science, or technology parks—e.g. Stanford Industrial Park (USA), Cambridge Science Park (UK), Sophia Antipolis Technology Park (France). Following the success of Silicon Valley, which emerged from the Stanford Industrial Park, the "silicon" tag has become a ubiquitous trademark for cities positioning themselves as the next major center of innovation—e.g. Silicon Hills Austin (USA), Silicon Alley New York (USA), Silicon Roundabout London (England), Silicon Glen (Scotland). Some knowledge and innovation spaces created identities based on their industrial heritage—e.g. Arabianranta Helsinki (Finland), Strijp-S Eindhoven (The Netherlands), and Ørestad Copenhagen (Denmark). Many others used more descriptive labels to indicate the specialization area—e.g. Brisbane Creative Industries and Ecosciences Precincts (Australia), Biotech Bavaria (Germany), and Solid State Pharmaceutical Cluster (Ireland). Others seek to integrate R&D, technology, and medical activity with top universities in an urban setting including those Innovation and Knowledge Districts in Boston, New York, San Francisco, Pittsburgh, Providence (USA), and 22@Barcelona (Spain).

Knowledge and innovation spaces take on many different forms and highlight different industries, which vary according to local contextual features. While there are some common features among all, many of them are typologically

dissimilar from each other. For example, they are found in different settings (i.e. urban, suburban, exurban), they may host different anchor industries, possess different physical layouts, size, developmental constraints or objectives. They may be driven by different regional industries, policy and planning regimes, and institutional characteristics. Although some evolved organically or without government assistance, in most cases, their development was planned or incentivized by government—e.g. One-north, Singapore; Ørestad, Denmark; Hsinchu Science and Industrial Park, Taiwan (Hu, 2008: Yigitcanlar et al., 2008b). In both organic and planned knowledge and innovation spaces, local contextual features play a key role in determining their shape and outcomes (Baum et al., 2009; Grodach, 2012) According to the literature, human, physical, and institutional capital (Kozak, 2011; Lönnqvist et al., 2014), economic development policymaking (Leydesdorff, 1995; Cooke and Leydesdorff, 2006; Huggins and Strakova, 2012), and planning systems (Knight, 1995; Yigitcanlar et al., 2008a; Grodach, 2013) play an indispensable role in the formation of knowledge and innovation spaces.

In recent years, "knowledge precincts" or "knowledge community precincts" have gained popularity. They form the nucleus of KBUDs because they offer a home for knowledge industries and their workers—and most recently, for their families. Knowledge precincts are mixed-use environments of housing, business, education, and leisure in an urban-like setting designed to gather the creative class of knowledge workers and innovative knowledge industries (Yigitcanlar et al., 2008b). The relation between creativity, human capital, and firm growth rates shows fostering, attracting, and retaining knowledge workers to knowledge precincts is a force of successful economic and sustainable development (Boschma and Ter Wal, 2007). Likewise, during the last decade, the importance of attracting talented workers to innovate and generate new knowledge, especially in knowledge precincts, has been highlighted in numerous urban and regional development policies (Verdich, 2010). While knowledge workers are highly-mobile and their choices regarding place are influenced by different economic, social, environmental, and individual factors, a comprehensive understanding of these factors and correlations between them remain challenging issues. Yigitcanlar et al. (2007) and Yigitcanlar and Dur (2013) have elaborated some of these challenges and the key role of knowledge workers in developing knowledge precincts.

The Focus Issue

Against this background, it is possible to state that while there is a growing literature in the field, there is still rather limited research that systematically investigates knowledge and innovation spaces and the specific roles that assets, policy, and planning play in the formation, stimulation, and sustained success of knowledge precincts. Therefore, the main purpose of this Focus Issue on "Urban Knowledge and Innovation Spaces" of the *Journal of Urban Technology* is to contribute to the knowledge pool in this area, particularly with new evidence driven from empirical research. The Focus Issue contains the full versions of a selection of best papers that were presented at the 7th Knowledge Cities World Summit (KCWS-2014) held on September 23–27, 2014 in Tallinn, Estonia—co-organized by the World Capital Institute and Tallinn University. This issue consists of six papers focusing on the complementary aspects of empirical urban knowledge

and the investigation of innovation space. The guest editors have selectively identified and invited the authors to rewrite and extend their conference papers for resubmission to the Focus Issue. These extended versions underwent a second round of independent double-blind and editorial review before the final decision for their inclusion was made. Collectively, we hope this group of papers, which provide rich and diverse perspectives on the topic, will help produce thriving KBUDs, bridge research gaps, and shed light on new research directions.

Following the editorial commentary, the Focus Issue starts with a paper by Willem van Winden and Luis De Carvalho ("Urbanize or Perish? Assessing the Urbanization of Knowledge Locations in Europe") that explores the drivers behind a recent urban turn in the spatial orientation of knowledge hubs or urban knowledge and innovation spaces. The study associates this urban turn with: the consolidation of a knowledge economy with more interactive and distributed modes of knowledge creation; shifting working, living, and consumption preferences of knowledge workers; and the rising expectations placed on knowledge hubs as urban regeneration engines. The authors argue that the spatial integration of knowledge locations in dense and vibrant urban settings is not equally relevant for all types of knowledge-based activities because of nuanced worker preferences and knowledge-sourcing modes. The paper suggests that activities that more intensively rely on symbolic knowledge for innovation tend to have a stronger preference for urban settings, while this is less the case for analytical and synthetic knowledge. The research provides support from the case studies of Kista Science Park in Stockholm (Sweden), The Digital Hub in Dublin (Ireland), and Biocant in Coimbra (Portugal).

In their paper, "Economic Geography of Knowledge Intensive Technology Clusters: Lessons from the Helsinki Metropolitan Area," Tommi Inkinen and Inka Kaakinen analyze industrial clusters as urban knowledge and innovation spaces of Helsinki (Finland). The research, first, identifies significant clusters through statistical analysis to provide analytical perspective on the study's knowledge-intensive economic geography. Then, the paper analyzes these knowledge-intensive industrial clusters and their internal structures with the following research questions in mind: How diverse are the identified clusters in terms of their internal structure? Are there spatial irregularities identifiable in these structures? The analysis reveals that knowledge-intense clusters are strongly localized close to the infrastructural nodes as their physical localization is also closely linked to road and rail structures and terminals. Additionally, the findings indicate: Helsinki's clusters are plural entities and their diversities do not follow clearly identifiable predetermined logic; that knowledge-based industries focusing on immaterial products tend to have closer central proximity than other industries but variations are extensive; and that the cluster diversity indicates that Helsinki has reached a critical threshold for manifesting agglomeration gains that generate and extend industrial diversities within key-clusters.

The next paper, "The Spatio-Relational Nature of Urban Innovation Systems: Universities, Knowledge Intensive Business Service Firms, and Collaborative Networks," by Andrew Johnson and Robert Huggins, offers a study that aims to contribute to an enhanced understanding of the urban knowledge networks existing between knowledge-intensive business service firms and universities. The paper examines the extent to which urban knowledge-intensive business service firms engage in collaborative relationships with research institutes. The research uses a dataset containing details of formal collaborative linkages between urban

knowledge-intensive business service firms and universities (in the United Kingdom). Using a logistic regression model, the empirical analysis examines the factors influencing the spatio-relational scope of these linkages, specifically the propensity to enter into collaborations beyond the immediate vicinity of the firm. The analysis provides a contribution to understanding the factors that underlie the development of urban knowledge spaces, especially the spatial limits of effective urban knowledge networks. The paper contributes to theory relating to innovation system formation as well as to that concerning network space. It also provides insights for policymakers seeking to establish or reinvigorate urban knowledge and innovation hubs.

In his paper, "Concentration and Mobility of Knowledge Workers: An Intercity Analysis of Sydney, Melbourne, and Brisbane," Richard Hu looks at the contribution of knowledge workers to the development and growth of knowledge and innovation spaces. The study particularly investigates the knowledge capacity and the competitive relationship between cities in contemporary globalization. Drawing upon the global city thesis on advanced producer services and the city network model, the research measures the concentration and mobility of knowledge workers among three global cities: Sydney, Melbourne, and Brisbane (Australia). The author argues that knowledge workers are important agents in the making of urban knowledge space and intercity knowledge flow. The investigation finds that Sydney's dominance in the Australian urban system has been strengthened despite challenges from Melbourne and Brisbane. Moreover, the findings which ascertain the linkage between the ranking of a global city and its knowledge capacity, provide new insight into the debates on Australian global cities, and suggest possible new directions for global city aspirations in the case of Melbourne and Brisbane. The paper indicates that the study is an effort to bridge the global city and the knowledge city discourses, and that cross-fertilization suggests a potential need for new policy thinking.

Gökçen Arkalı Olcay and Melih Bulu use their paper, "Technoparks and Technology Transfer Offices as Drivers of Innovation Economy: Lessons from Istanbul's Innovation Spaces," to focus on their investigation of university-initiated technology parks and technology transfer offices, as urban knowledge and innovation spaces. The study explores whether the growth of technology parks enhances the innovation capabilities of an organization and a city. The paper also investigates various university-industry linkage mechanisms such as the licensing of university-developed technology, consulting arrangements, and agreements regarding the commercialization of technology in evaluating the success of university-industry cooperative actions. The findings highlight the contribution of universities through technology parks and technology transfer offices to help Istanbul (Turkey) become an innovative city that houses prosperous urban knowledge and innovation spaces. The paper provides a concise yet up-to-date review of studies from the recent literature to understand the contribution of universities on cities' innovativeness, and compares and discusses the position of Istanbul as an innovative city from the perspective of innovation built up by its universities.

The final paper by Tan Yigitcanlar, Mirko Guaralda, Manuela Taboada, and Surabhi Pancholi, "Place Making for Knowledge Generation and Innovation: Planning and Branding Brisbane's Knowledge Community Precincts," explores the role of planning and branding in developing thriving knowledge and innovation spaces. The paper investigates the relationship between planning, branding,

and the conceived space with a particular focus on knowledge community precincts, as urban knowledge and innovation spaces. The paper addresses two questions: What are the signifiers that inform conceived place in the case of knowledge community precincts? How effective are branding and planning strategies in developing knowledge community precincts? The paper reviews the literature thoroughly, develops an analysis framework constituted of several brand and plan indicators, and uses the framework to analyze case studies of knowledge community precincts. The research adopts an empirical approach for the investigation of the case studies focusing on the planning and place branding experiences of three knowledge community precincts from Brisbane (Australia)—namely Boggo Road Knowledge Precinct, Kelvin Grove Urban Village, and the University of the Sunshine Coast Knowledge Town.

Concluding Remarks and Research Directions

The Focus Issue generates new insights by investigating urban knowledge and innovation spaces from various disciplinary angles (i.e. economic geography, urban planning, urban design, architecture, marketing, urban studies, knowledge management, engineering, and strategic management) and country contexts (i.e. Australia, Finland, Ireland, Portugal, Sweden, Turkey, and the United Kingdom). Besides, the issue highlights a number of ongoing discussions, including "whether the success of Silicon Valley can be replicated," "whether planned knowledge and innovation spaces can compete with the organically evolved ones," and "whether Florida's (2012) Creative Class Thesis is reliable in the particular setting of knowledge and innovation spaces." Along with these, some of the papers of the Focus Issue bring related questions to mind, such as "What role does quality of life play in making knowledge and innovation spaces?" In response to this question, the literature (e.g. Ling and Dale, 2011) claims that quality of life and place is a key attractor for knowledge workers who are seeking diversity of opportunities, ideas, and amenities—such as access to green space, culture and arts, and sources of creativity and innovation—that provide them high-level wellbeing. However, further empirical evidence is needed to produce a comprehensive understanding of the quality of life and place and location choices of knowledge workers. Linked to the quality of life and place issue, place making and branding are other areas that require further research and empirical testing in particular looking at their effectiveness in developing thriving knowledge and innovation spaces. These two interconnected issues bring the key question of—asked by Pancholi et al. (2014), and also stands as a major challenge in utilizing urban space as a center for innovation— "What are the major factors that determine the success of urban knowledge and innovation spaces?" In the light of these issues, we compile the following sets of generic research questions focusing on the "context," "policy," and "planning" domains of urban knowledge and innovation spaces. We believe investigating these issues further in prospective research projects by scholars of the interdisciplinary field will shed light on better conceptualization and utilization of urban knowledge and innovation spaces.

(i) What are the key attributes, contextual features, and factors of success for creating and stimulating knowledge and innovation spaces?

(ii) How does the local asset base influence the development and management of knowledge and innovation spaces?

(iii) What is the role of economic development policymaking in the formation of knowledge and innovation spaces?

(iv) Which aspects of the local context frame the direction of policy supporting the formation of knowledge and innovation space?

(v) What are the unintended consequences of policies promoting the formation of knowledge and innovation spaces?

(vi) What is the contribution of urban planning and design to the development of knowledge and innovation spaces?

(vii) What are the essential urban development characteristics and conditions of knowledge and innovation spaces?

(viii) How can knowledge and innovation spaces be planned and successfully integrated into the urban fabric?

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