



perspective

noun

a particular attitude towards or
way of regarding something;
a point of view.

2. EMBEDDING URBAN INNOVATION: PERSPECTIVES, TRENDS AND EXPERIENCES

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Introduction



Cities are good at generating problems and the city fabric is problem rich... “ [but city environments also have a] problem solving nature.

(Johnson, 2008:149,153)



Although urban innovation has not had any discernible, singular origin, definition or theory behind it, it has been emerging globally as a point of reference alongside the rising international interest in issues of cities and urban development. The concurrent interest is not surprising given that cities are increasingly recognised as playing a vital role in the social and economic development of countries (South African Cities Network, 2011; Johnson, 2008).

While the idea that cities are important and are sites of productivity and innovation is not at all new, the first chapter of this book has explained that this has not always been a popular acknowledgement. Otherwise scholarship as far back as the nineteenth century was beginning to think about territorial economic change in certain parts of the world. Alfred Marshall (1890), in his theorising on industrial agglomeration proposed a set of localised advantages of agglomeration that were logistical efficiencies; large and deep labour pools; development of supporting industries; and knowledge spill-overs. The latter really spoke to innovation.

Essentially, cities create the conditions for productivity and growth because the factors of production, like capital and labour in particular, are relatively more available, abundant and efficient than they possibly are elsewhere. Their production structures tend to be more diversified which supports the development of synergies, and thus innovation. This, in turn, encourages a more robust and dynamic economy feeding back into the same system (Johnson, 2008). American writer Jane Jacobs was writing as far back as the 1960s about the importance of diverse trades and crafts in how cities stimulate innovation and economic growth (Jacobs, 1961). Looking beyond the diversity of occupations, competences and social backgrounds that make up cities, the relatively higher wages and tastes of urban populations also create a high and differentiated level of consumer demand, which invites innovation (Hall, 1998).

So cities demonstrate a fairly unique potential to build innovation-driven economies. In their study of innovation and inequality at a regional level, compared to a metropolitan level, Oliveira and Breda-Vazquez (2012) found that, whereas metropolitan regions are clear centres for innovation and creativity, marginalised regions tend to lack the necessary tools to promote innovation and creativity on a large scale. This difference, they found, is primarily due to the power of agglomerations and their influence on innovation, and creativity, in cities. However, in order for cities to be efficient and productive, they need public and private investment in other enabling framework conditions. These include infrastructure, education and health, improved living conditions, social stability reflected in the reduction of poverty and inequality, public safety, as well as other supporting goods and services. Furthermore, the space and potential of innovation may not always be utilised, and is said to depend on the combination of two particular factors. First, proximity, the physical distances within the urban structure and dense communication networks of well-functioning cities that support interactive learning and innovation; and second, the knowledge of capable and activated human capital (Goldberg, 2006; Johnson, 2008).

Therefore the urban development question primarily concerns how cities can utilise their spatial knowledge and technological systems to recognise and understand their own requirements and challenges. Equally important is for cities to find sustainable solutions through a combination of actors who can assess problems and then develop and implement appropriate solutions. This chapter frames this question within the concept of social innovation, and motivates for a systems perspective on innovation. It then looks to identify instructive international trends and their directions from which South Africa's urban innovation initiative might learn.

Understanding ‘Social Innovation’

The previous chapter usefully mapped out a conceptual terrain for thinking about ‘innovation’. Indeed, one of the challenges in discussing ‘urban’ or ‘social’ innovation is the vagueness with which the term ‘innovation’ itself is generally used. A fashionable buzzword that has evolved into subjective common-sense usage, the term has grown popularly beyond its scholastic definitions which are typically attributed to economist Joseph Schumpeter (1912), among others. Schumpeter defined innovation quite precisely as consisting of one of the following five phenomena: introduction of a new good; introduction of a new method of production; opening of a new market; conquest of a new source of supply of raw materials or half-manufactured goods; and lastly, implementation of a new form of organisation (Godin, 2008). Schumpeter went further to qualify that innovation necessarily includes an economic dimension to distinguish it from mere invention. This implies that the introduction of novelty had to be coupled with consequential application or adoption. Our popular use of ‘innovation’ however, has come to mean everything from a general novelty, creativity and invention, to almost any technological application. Even then, the concept is complicated by its wide-ranging applications to various dimensions and levels of economic, societal and organisational studies (Li et al., 2012).

For the purpose of the South African Urban Innovation pilot, the term ‘urban innovation’ was defined as “the generation and application of new ideas for the management of urban growth to support rising incomes, a better distribution of wealth, enhanced living standards, improved environmental quality and equitable service delivery” (Department of Planning, Monitoring and Evaluation, 2015:2). This definition aligns reasonably to the Schumpeterian definition, and inclines towards what is referred to as ‘social innovation’ in the literature. Social innovation has to do with how innovation acts as a driver for economic opportunities and performance by shifting the focus from social deficits to social assets. This is done by viewing communities themselves as social agents and industries as a sector (Howaldt and Schwarz, 2010; Adams and Hess, 2010). The focus is thus on the local-scale involvement of actors in a context of specific approaches to innovation that meet the needs of residents. This would include anything from the provision of services for the urban poor, such as water, electricity, sanitation and land, to other higher order pursuits (Ghosh and Kamath, 2012).

Social innovation is also referred to as implying ‘inclusive innovation’ in that the concept incorporates “innovation *for* the poor as well as innovation *by* the poor” (Johnson and Anderson, 2012:41, emphasis in original). By linking this kind of innovation to Amartya Sen’s (1999) popular ‘capability approach’, these two authors suggest it becomes important to consider the opportunity to apply them to improving human well-being. This is relevant in the context of development. Development theory increasingly refers to the importance of knowledge and learning together with innovation as fundamental processes in development. Considering the opportunity to apply these three cornerstones, through increased job opportunities and productivity, and increased efficiencies, would be beneficial. In this sense, social innovation is seen as having the potential to lead regular people to a better quality of life by engaging a range of societal actors in innovating in relevant ways.

Amanatidou (2014) argues for critical recognition and qualification of a wide range of perspectives on what 'social innovation' might mean, including 'innovation to meet social needs and create new social relationships or collaborations'; 'innovations that are social in both their ends and means'; 'innovations to satisfy social needs of disadvantaged people or communities through helping to develop their capacities'; and 'innovation to develop alternatives to the market-based economy model adopting [social] principles'. She thus problematises the oversimplification of innovation as just being either 'by people' or 'for people'. Rather than a single conceptualisation or theory clearly defining social innovation, it is therefore left to a wide range of potential interpretations that link innovation to societal issues and agency. Li et al. (2012) suggest that social innovation studies enable researchers to "address the need to strengthen human relations in forms of association, collaboration, and cooperation between agents, in order to change the institutional based infrastructure in the circumstances of everyday life" (ibid.:57). This links social innovation back to the Schumpeterian idea that innovation must involve a change in the factors of production, namely inputs, or in the social context, the social systems, to produce new or different products, the outputs, or in the social context, increased well-being.

'Systems of Innovation' Approach

Defining innovation on its own, however, is not sufficient for the purposes of urban or city development. Importantly, innovation is considered to be systemic: it is an innovation system as opposed to merely a series of innovations. It systemically considers the diffusion, absorption and use of innovation (Lundvall, 1992). The 'Systems of Innovation' (or 'innovation systems') approach locates innovation as the result of complex and multiple interactions, for example, flows of technology and information. These interactions include a variety of actors and their environment, producing a virtuous system of networking, learning and collaboration among the multiple actors of the innovation system. These dynamics result in systemic learning and distribute knowledge throughout the system, leading to strengthening developmental capabilities within it (Lundvall, Joseph, Chaminade and Vang, 2009:2-3 as cited in Karuri-Sebina, 2014:3). This approach also considers the framework conditions that represent the overall conditions in the economy, governance, education and infrastructure. These conditions are deemed necessary for innovation systems to function (Karuri-Sebina, 2014). The systems approach enhances the link between innovation and economic development, a strategy belonging to educational institutions, research and development departments, and universities that provide the necessary impetus for innovation and growth (Niosi, 2008).

These are the four distinct contributors to the concept of 'Systems of Innovation' (Lundvall, 1992):

- The distinct role of actors, such as government departments, political structures, companies, academic and research institutions and civil society organisations.
- The nature and types of interaction between the actors.
- The underpinning role of policies and institutions.
- The constituted knowledge bases of the system.

Together, these combine as an innovation system – a dynamic network of public and private sector institutions “whose activities and interactions initiate, import, modify and diffuse new technologies” (Freeman, 1987:1 in Siyanbola et al., 2012:15). Systems of Innovation thus become the actual determinants of the innovation process; they represent all the important economic, social, political, organisational, institutional and other factors that influence the development, dispersal and use of innovation (Edquist, 2010).

Understanding social innovation within the systems of an innovation approach is important for understanding factors that determine the extent to which city growth problems might be solved through the processes and deployment of innovation. In this light, innovation systems are deemed crucial for the economic growth and development of cities (Johnson, 2008), in that they can both increase our appreciation of city dynamics through innovation as a driver of cities; and promote the sustainable development of cities and society as a whole, through cities as drivers of innovation.

Innovation Ecosystems

Innovation systems have been introduced here as the components that make up the system. An important emerging consideration is that of the innovation ecosystem. The innovation ecosystem is a metaphor that draws on the biological sciences to represent the broader environment or dynamic system of complex feedback loops, causal links and flows. Within these, innovation and innovation systems try to achieve an equilibrium sustaining state or are otherwise disabled or destabilised (Jackson 2011; Spruijt 2015). Applied to the subject of urban development, the ecosystem would refer to the innovation system translating into a strong socio-economic force with impact, rather than to a set of projects or interventions. It refers to the range of people, institutions, policies and resources that enable innovation systems (Freeman 1987; Nelson, R. and Nelson, K., 2002; National Science Foundation, 2010; Blowfield and Johnson 2013; Rajab, 2015).

The innovation ecosystem comprises two distinct but interconnected economies: the knowledge economy, which is driven by fundamental research, and the commercial economy, which is driven by the marketplace (Jackson, 2011). The knowledge and commercial economies tend to interact mutually in city economies, as discussed earlier in this chapter. Government plays an important role in linking the two because they typically play a major role in making the fundamental research and development investments from the public purse available (ibid.). Governments also tend to be central actors in the innovation ecosystems because of the different actors. Interests and communication are challenges that need to be coped with in such systems (Durst and Poutanen, 2013).

The innovation ecosystems perspective is important for Africa in getting beyond the discrete incidents of innovation to the systemisation and scaling required to achieve socio-economic transformation (Adesida et al., 2016). This means that beyond innovation and its many facets, and even beyond systemic understanding, creating the overall environment is essential in order for innovation and innovation systems to flourish.

Conditions for Social Innovation in Urban Contexts

It is useful to consider how social innovation, in all its variety, plays out effectively in the story of successful cities. The variety in cities creates the space for innovation, starting with the demand side, expressed in the complex range of key city issues described by Ravetz and Miles (2015):

- Social: housing, health, education, poverty.
- Technical: transport, communications, innovation.
- Economic: local jobs, businesses, investment, regeneration.
- Environmental: energy, water, climate, habitats, waste, pollution.
- Policy: local governance, organisations and networks.

However, having argued that cities are the premier innovative spaces, Johnson (2008) also proposes that not every city is, in fact, innovative. A city needs a combination of specific factors and conditions for urban innovation to happen on the supply side. He proposes that the following are key conditions for innovation to thrive in a city:

- A creative class that drives innovation.
- Certain qualities that attract and keep the creative class in the city
 - Access to good public services
 - Quality public spaces and opportunities for recreation
 - Diversity
 - Potential for higher incomes
 - Political will
- Appropriate institutional capacity.
- An understanding of the process of innovation in a city.
- Policy that supports innovation.
- Developed knowledge infrastructure, especially knowledge institutions and information technology hardware and software (ibid.)

Considering an innovation ecosystems approach, however, it is useful to note that other authors extend the idea of innovation actors in innovation beyond the idea of a privileged 'creative class' and formal knowledge workers. This introduces more inclusive ideas of citizen engagement in co-production and also of informal or 'grassroots' innovation. Beyond traditional notions of university-based research, Forsyth (2007) argues that numerous actors must be involved in the production of knowledge to develop innovative solutions to problems. However, the complex factors involved in developing innovative solutions, in the importance of research in finding these alternatives, and involving a range of actors to do so, are real. Social, economic and design aspects are derived from real-world practice.

It is also useful to recognise though that, while a narrow sense of where the focus of innovation system interventions is on boosting economic growth, a second broad notion also exists, which sees innovation as necessarily anchored in the everyday activities or routines of firms. These relate to procurement, production, human relations and marketing (Johnson and Lundvall, 2000). This broader notion of Systems of Innovation requires a detailed understanding of process and how innovative new ways of doing things in an organisation can ultimately lead to transformation that is development or system orientated, such as in a city.

The distinction is useful when thinking about the potential of the innovation system or an innovation ecosystem to focus on development outcomes and not merely on economic productivity. In the context of urban development, in particular, it invites innovative practices that would address other critical outcomes too, in large fields of endeavour: resource sustainability, poverty alleviation, the provision of quality public goods and services, promoting good governance and transforming the built environment could be treated as ends in, and of, themselves. It thus manages to exceed limited technicist interests in knowledge, learning and developmental capabilities, seeing them instead as fundamental to the kind of transformative development that the developing world requires.

What remains important is that these expanded notions about innovation systems point even more critically to the role of institutional orientation, capacities, policies, arrangements and infrastructures. It is these that support, or enable, the agents and processes of social innovation in cities. This is duly reflected in the key factors identified as constraining Regional, and Local, Innovation Systems (Spruijt, 2015):

- Short-term orientation of politicians, being the 4- or 5-year term-in-office phenomenon.
- Short-term orientation of managers who tend to be career-focused.
- Democracy, which can tend toward less investment in long-term concerns such as innovation and education
- Science not focusing on innovation policy development.
- Bureaucracy.
- Lack of natural resources, although not so much a factor in Africa.
- Corruption.

The Territorial Perspective

Cities are mainly a territorial construct and indeed, innovations systems are generally studied at territorial or spatial levels. Much debate surrounds the relevant levels and ways in which territorial innovation should be theorised, however. They range from industrial districts, to innovation clusters, localised production systems, regional Systems of Innovation, learning regions and a range of others (Moulaert and Sekia, 2003). Irrespective of the specific dimensions applied, Johnson (2008) builds on Marshall's (1890) ideas to suggest that there are four specific place-attributes that tend to support innovation performance in an area.

First, geographical areas with institutional characteristics that lead to frequent, intense and high-quality interactions. Second, are areas with a certain degree of production and trade specialisation. Areas like this are where people and firms have become good at doing certain things and acquired a production and a noteworthy competence profile. Third, areas that have developed knowledge infrastructures and public policy routines with an established organisation and policies that affect learning and innovation, both directly and indirectly. Finally these attributes may also include areas that over time have acquired specific demand characteristics, which to some extent match specialisation pattern and enable different kinds of user-producer interactions.

However, Marshall also recognises that spatially defined territories displaying all these characteristics simultaneously are not easy to find. City states and culturally homogenous nation states may seem to be the obvious candidates, like the Athens and Rome of antiquity, Florence and Venice during the Renaissance, Hong Kong in present times. These were all areas of great creativity and innovation during their golden periods; they were successful and interaction-rich with common cultural traits and strong political powers. These traits enabled them to develop capabilities and institutional frameworks that allowed competencies of different kinds to be combined. They also accepted transactions and intense connections with other regions and countries (Hicks, 1969 in Johnson, 2008).

These seemingly ideal systems, however, clearly did not guarantee sustainability (clearly not so in the case of Rome, for example!). Undoubtedly geographical territory is insufficient as an explanation for their successes. Cities, in fact, often lack the strong political power centre that can form policies that develop uniform interests. Cities instead tend to be places of diversity and contestation, lacking a strong common culture and sense of belonging that could lead citizens to believe that it is necessary to act together. This is not necessarily a hindrance to performance, and emergent logics may in fact assemble complementary interests and interactions. However, the point is that cities may have to combine and balance several characteristics to constitute an efficient innovation system.

According to Johnson and Lehmann (2006) the notion of 'city systems of innovation', or the city as an innovation system, would be a useful complement to existing concepts of territorially-based Systems of Innovation that might over-emphasise the locational aspects. City Systems of Innovation can be a useful tool towards understanding how to solve key urban order problems sustainably through persistent technical, organisational, political and institutional innovation. Relating institutional innovation to the more technical aspects of innovation is important because urban issues very often have strong institutional attributes. Their solution would require, for example, new property rights to land, new regulations, new types of public and political attention, and new ways of thinking about sustainable development, rather than just new technical blueprints or gadgets.

International Trends in Urban Innovation

Urban innovation and innovation systems have evolved in different ways across the different regions of the world. This section provides a snapshot overview of some of the key directions globally as a means to drawing lessons for South Africa. The information and reflections documented draw upon a literature scan, popular trends and on an analysis of the submissions to the Guangzhou Urban Innovation Awards which were initiated in 2012 (Guangzhou Institute for Urban Innovation, 2012-2014). These have since attracted the nomination of hundreds of urban innovation projects in the public domain from over 50 countries around the world. Although the analysis here does not intend to be comprehensive or representative, it offers some insight based on a broader view looking to experiences elsewhere.

Asia: Japan, South Korea, India, China

Asia is extremely heterogeneous and difficult to discuss as a single region, so this author's review can only highlight some key directions in Asian urban innovation. It will also introduce Guangzhou's urban innovation competition that is used as a proxy for regional trends.

Japan was the flag-bearer of innovation in the 1980s with its famous high-tech innovation and the incredible economic growth that came along with it. Although it has since faced serious challenges economically and, with its ageing population, Japan's industrial successes over the years have also been matched with recognition for its innovative hybrid approaches to development. Strong public-private partnering and a blend of traditional values and systems with modernity in its development and governance models have been a hallmark. Japanese people of today, mere decades after its World War II tragedies, enjoy among the highest quality of life standards in the world. The country is still reputed as having a strong innovation culture on many fronts. Tokyo has been considered a unique and world-class city in recent decades, and its intensive use of urban space and dynamic property market have been studied world-wide.

South Korea has seen a rapid growth trajectory since the 1970s and similarly transformed its economy. It started with industrial development over a transition from a low-wage factor-driven economy, to being a medium wage efficiency-driven economy. Eventually it came into the world-recognised high wage innovation-driven economy (Mazzarol, 2012). Importantly, higher education is identified as having been key in achieving South Korea's innovation progression. Significant investments were made into the sciences even though the functional drivers were mainly technological engineering. What the country appeared to achieve was a balance between effective expedient programmes, while maintaining a series of long-term visions supported by fundamental investments.

Today, South Korea is exemplary in a range of urban innovation areas such as transportation systems and urban farming. It is renowned for developing high-tech urban visions for the ubiquitous city. India has served as a global archetype for social and grassroots innovation. In addition to having a strong formal science and technology system with world-class achievements in several areas, it also has significant offshore corporate research and development undertakings. It also boasts an internationally-renowned medical tourism sector. The series of Indian technological revolutions, the so-called 'green', 'white' and 'blue' revolutions, raised global interest. India is also known for its extensive informal, 'affordable' innovations across a range of domains, the social, economic, environmental and technological. These have arisen from conditions of intense and widespread urban and rural poverty in the country. An example is the impact of non-governmental initiatives, such as the Indian-based Honey Bee Network which aims to "recognise, respect and reward creativity at the grassroots" (Society for Research and Initiatives for Sustainable Technologies and Institutions, 2015), thus acknowledging community-based approaches that are driven by the communities themselves as agents of social change. This happens through people's use of appropriate and low-cost technologies and active participation in an open and inclusive innovation system (ibid.).

Last but not least, the global giant, China. China has only relatively recently driven towards becoming a strong System of Innovation. Having previously focused, and quite effectively so, on innovation through creative adaptation which is essentially copying, in recent years the country is moving towards forging a national innovation policy that adopts an indigenous and systemic approach:

The nation's economic growth shows an excessive dependence on the consumption of energy and resources, with high associated environmental costs; the economic structure is irrational, characterized by a frail agricultural base and lagging high-tech industry and modern service industry; and firms lack core competitiveness and their economic returns are yet to be improved as a result of weak indigenous innovation capability. There are a whole range of problems concerning employment, distribution, health care, and national security that need prompt solution.

(People's Republic of China, 2006)

As such, China focuses on innovation towards overcoming the country's domestic challenges, rather than the usual concern with international competition and recognition. In addition, while there continues to be a strong central drive towards becoming a national System of Innovation, there are also localised efforts and arrangements to drive regional Systems of Innovation, particularly at the city level. The following section will present the Guangzhou initiative as a brief example of global achievements. It is also worthwhile to recognise the emergence of more globally orientated Chinese cities like Shanghai, and the older and more complicated case of Hong Kong, which may signal another direction for Chinese urban innovation. These examples are more inclined to portray themselves as global cities.

An important lesson for South Africa from these Asian examples is that, while an innovation systems agenda does not necessarily have to take the lead initially, most transformed economies do two things. Firstly, they adopt a posture that is contextually relevant. They do so for instance by adopting an internal focus, recognising diffuse and informal innovation, and leveraging cultural advantages. Secondly, they evolve into a focus on building innovation systems as a long-term and committed project.

China: Guangzhou Award for Urban Innovation

The existence of the Guangzhou Urban Innovation Awards programme itself is indicative of the scale of focus and ambition that China has regarding urban innovation at a sub-national level. The South China city of Guangzhou is the capital of Guangdong Province, and is reported to have in excess of 7 million inhabitants. Driven by pressure to be innovative and competitive, the city embarked upon what is probably now the most internationally representative urban innovation competition.

The awards programme is one that allows the city to invite peers from around the world to document and submit their innovative practices to a technical review and jury process. Through this, international experts select top urban innovation practices according to regional and global standards. In addition to signalling the city's interest in urban innovation locally and globally, the concept puts the city into an advantageous position. It is here where innovative cities around the world willingly share their ideas.

The city essentially has the position and structures in place to scan and scrutinise the best ideas in the world for their own consideration. The Guangzhou Urban Innovation Awards platform has drawn strong participation in its two inaugural rounds (2012 and 2014), in which it attracted a total of over 400 applications from over 150 cities from over 50 countries. The 2014 submissions were simply thematised incrementally, and then clustered, based on key words and application descriptions. Best-fit assignments were based on the researcher's judgement. Where projects covered more than one theme, they were assigned to both as duplication was allowed. The purpose of the exercise was to establish frequency of the themes. An analysis of the Award contestants in the most recent round was conducted by the author of this chapter, to identify patterns in urban innovation trends regionally, as represented by this dataset. In order of frequency, the top themes of the submissions were:

- Environment: issues of ecology, sustainability and biodiversity, climate change, resilience, emissions.
- Governance: city governance and administration, corruption, democratisation and participation.
- Information Systems: information technology systems, data and smart technologies.
- Social issues: family and community-building initiatives.
- [Public] Transport.
- Urban and neighbourhood regeneration.

Other recurring themes which emerged to a lesser extent, were waste management, vulnerable populations, particularly issues of gender and disability, arts, culture and heritage, health, economic issues including poverty, architecture and the built environment, education, emergency services and disaster response, housing and human settlements, safety and security, water, innovation, agriculture and food security, and energy.

The Guangzhou Urban Innovation Awards analysis for Asia shows a main focus on public and Non-Motorised Transport, and on environmental issues, like waste or resources management. Some examples of the Asian submissions that were shortlisted or winners are:

2012

- Ahmedabad, India: Janmarg – Bus Rapid Transit System
- Chiang Rai, Thailand: Urban Ecosystem and Biodiversity Conservation towards Sustainable City and Climate Change Resilience
- Kaohsiung, Taiwan: 1999 Anytime, Anything, Anywhere
- Sakhnin, Israel: TAEQ's (Towns Association for Environmental Quality) Green Building of Sakhnin: Center for Environmental Research and Education
- Seoul, Korea: Healthy Seoul Free from Internet Addiction of Children and Adolescents
- Sylhet, Bangladesh: A Disaster Resilient Future: Mobilizing Communities and Institutions for Effective Risk Reduction

2014

- Abu Dhabi, United Arab Emirates: Tailor-made cutting edge green building system
- Gwangju, Korea: 'Incentivising' households to reduce GHG through devolved targets
- Hangzhou, China: Innovation in a large-scale operation and maintenance of public service delivery
- Jakarta, Indonesia: Engagement of political leadership in pro-poor participatory process
- Kunming, China: Free Bus Service by the Elderly in Kunming
- Phitsanulok, Thailand: Phitsanulok Low Carbon city
- Tel Aviv, Israel: The Tel Aviv-Yafo Municipality Residents Club – 'Digitel'

Europe: European Union

The Guangzhou Urban Innovation Awards analysis showed European applications to mainly focus on three broad areas: smart cities; climate programmes, green programmes and emissions; and projects in participatory governance. Some of the leading projects were:

2012

- Bristol, United Kingdom: Bristol's Big Green Week - Inspiring Change, Europe's Biggest Festival of Sustainability.
- Düsseldorf, Germany: Development Concept for the South-eastern Inner Suburbs (EKISO or 'Entwicklungsgebiet Innenstadt Süd-Ost') – Joint Action for a Strong Local Community.
- Kocaeli, Turkey: Prepare Before It's Too Late: Learn To Live With Earthquake
- Perm, Russia: 'Transforming the City' – Perm Strategic Masterplan and the Implementation Engine of the Transition from Industrial City to the Liberal Creative Community.
- Salerno, Italy: Sustainable energy now.
- Tallinn, Republic of Estonia: Free Public Transport in Tallinn – A Brave Step towards the Green Capital.
- Vienna, Austria: Start Wien – A Programme for New Migrants to Help Them Settle In and Facilitate Their Integration in Vienna.

2014

- Bremen, Germany: Liveable streets, liveable city!
- Bristol, United Kingdom: Citizen-centric approach to the Smart city.
- Eskisehir, Turkey: Eskisehir City Memory Museum.
- Hamburg, Germany: Socially-inclusive approach to building a zero-carbon district.
- Linköping, Sweden: Long-term consensus driven alignment for attaining carbon neutrality.
- Malmö, Sweden: Climate Smart Hyllie.
- Sabadell, Spain: Sabadell smart city as a catalyst for building the city of the future.

European institutions have been driving policies and programmes to foster innovation in the European Union since as far back as 1972 when the Union agreed to collaborate in the area of industrial policy. Thirty years of continual innovation programming has thus reinforced the building of Regional Innovation Systems, developed innovation strategies, and also resourced and funded the implementation of their innovation policies (Rosanis, 2011).

The European Commission's Framework Programme (FP) has furthermore been instrumental in stimulating and funding intense European Union research cooperation for their research and innovation programmes since 1984, currently in an eighth cycle. This programme aims "to stimulate cooperation and improve links between industry and research within a transnational framework" (WelcomeEurope, 2016). It has identified and driven specific priority themes that are likely to somewhat define the focus in a large-scale innovation focus. Importantly, the Framework Programme (FP4, FP5, FP6 and FP7) included specific programmes with an urban or city focus. Both environment, with climate change, and Information and Communication Technologies have also had continued focus. As such, the urban innovation programmes and the results achieved through this concerted drive are attributable to the focused capacity of institutional funding and backing. The drive given to particular themes reflects agreed common European Union priority issues. In some cases, it would also appear to have stimulated, or perhaps mirrored, commercially-driven innovation at small and large scales. Evident from a scan of the internet, are a vast number of companies in the space of smart city technology, renewable energy and energy efficiency, habitat models and similar businesses.

A main thrust in Europe has been the importance of the use of Information and Communications Technology in modern urban development as a way of increasing the competitiveness of a city and improving quality of life for citizens (Paskaleva, 2011). Europe has also been a lead experimenter with the so-called 'Living Labs' approaches (Van der Walt, 2009). 'Living Labs' are collaborative programmes involving numerous stakeholders to develop solutions and solve problems, serving as a base for experimentation where new ideas and concepts can be tested. They also work towards the transfer of technology across different domains, trying to address issues of a similar nature in a different community (ibid.).

Latin America: Brazil, Colombia

In the Guangzhou Urban Innovation Awards analysis, South America emerged as having applications that mainly concentrated on social programmes, safety programmes, mainly crime and disaster response, and Information and Communications Technology and big data initiatives. Some of the leading projects were:

2012

- Aguascalientes, Mexico: The Green Line: Social Development Comprehensive Plan.
- Buenos Aires: Public Participation in Commune 8.
- Curitiba, Brazil: The Green Areas of Curitiba – linking environmental preservation to urban development.
- Medellín, Colombia: Medellín Digital.
- Mexico City, Mexico: Support for Social Participation in Action for the Conservation and Restoration of Ecosystems.

2014

- Antioquia, Colombia: Knitting regional territory through innovation in education
- Bogotá, Colombia: Zero Waste Program: a focus in reuse with social inclusion
- Buenos Aires, Argentina: Dialogue for decision making for urban projects
- Porto Alegre, Brazil: Datapoa – the open data project of the City of Porto Alegre
- Recife, Brazil: Recife, part for life – urban safety management)
- Rio de Janeiro, Brazil: Using big data for integrated risk management and action
- São Paulo, Brazil: State Program for Prevention of Natural Disaster and Mitigation of Geohazards

There is unlikely to be an urban development practitioner in the early 21st century who does not recognise the cases of Bogotá (Colombia) and Curitiba (Brazil) as popular urban innovation legends in the areas of urban governance and public transportation systems; or Medellín (Colombia) for its famed achievements in urban safety and community development; and its Metrocable, using sky technology for public transportation; or Brazil's 'Lula Moment', a notable period where the country not only achieved growth but also significant reductions in poverty and inequality over the first decade of the century. In formal terms, Brazil has been the leading champion of innovation in the region, having driven towards a national System of Innovation since its 2007-2010 Action Plan for Science, Technology and Innovation. This initiative had set specific funding targets and was committed to articulating science, technology and innovation in industrial policy. This evolved into the Greater Brazil Plan 2011-2014, which intended to counter de-industrialisation by restructuring Brazil's industrial base so as to develop endogenous, high-productivity industrial capacity (Cypher, 2013).

The rest of the region has long been considered to have weak innovation systems, and it is only in the past decade that the region's innovation performance has been considered as moderately improving (Rosanis, 2011; Alcorta and Peres, 1998). However, Latin America also has a rich history of social movements and dynamic, if volatile, leadership. It has often enabled home-grown experimentation and solution-building, backed with political, popular and institutional support, including international development assistance.

Brazil and Mexico, the two largest markets in the region, have both had a significant commercial focus on big data and analytics, driven by the need for resource optimization and process efficiencies. Following their big northern neighbour, the United States of America, with its teeming technology and applications, the region seems poised to leverage the big data trend towards urban and social innovation. Notably, it is being driven by emerging trends in the region of start-ups influenced by increasing consumer empowerment and social awareness as well as administrations that seem relatively open to creative experimentation and co-production.

From the Latin America case, South Africa may wish to consider:

- The characteristics of urban leaders and managers, as well as their governance and administrative systems, which can enable innovation to thrive.
- How to unleash and leverage the creative potential of communities for urban innovation through grassroots innovation and co-production.
- How new and emerging technologies can be harnessed towards addressing local developmental needs, and not just commercial opportunities.

North America

The balance of the regions applying to the Guangzhou Urban Innovation Awards (Africa, North America and Oceania) had relatively few applications, totalling less than 10% of total applications. They were therefore too small a sample, covering too wide a range of themes, for generalising any trends.

For North America, the leading projects were:

2012

- Vancouver, Canada: Visionary Vancouver: Creating a welcoming and sustainable place for all.

2014

- Boston, United States of America: Empowering youth through participatory budgeting.
- Dubuque, United States of America: Smarter Sustainable Dubuque.
- Ottawa, Canada: Ottawa's Innovative Spirit: Transforming an economy through diversification and entrepreneurship.
- Vancouver, Canada: West End Community Plan.

The United States of America is probably the most renowned region of the world for innovation, having had a proven ability and track record to give birth to whole new range of industries over a relatively short history. Examples include innovations in steel, logistics, electricity, food, financial systems, Information Technology (IT), warfare, corporate structure, governance, and so forth. Somewhat reflective of this, the American submissions to Guangzhou awards were, while few, interesting hybrids of public and private involvement, and most with a strong local focus.

Being home to firms like IBM, Apple and Google, the United States of America is world-renowned as possibly the most fertile innovation ecosystem, pushing the boundaries of innovation at industrial and international levels. It generally has both an institutionalised, corporate and university-based, and a diffuse innovation base comprising Small and Medium Micro-Enterprises (SMMEs), households and individuals. Here, innovation really seems to be anyone's and everybody's business. Significantly, the systems of governance and administration are also driven to innovate and to partner with any other public or private actors to continuously solve, modernise and advance.

To give but one example of the United States of America's active pursuit of innovation, American cities are recognised as the best sources for government innovation (Centre for an Urban Future, 2013). New York City Mayors like Rudy Giuliani and Michael Bloomberg are world-recognised for the stream of innovative practices and policies introduced during their terms. Over the years, the city has studied local and international innovative policies and models that could be used to address challenges faced by their own complex city.

Canada has been a role-model for the South African public service in various ways and, while often overshadowed by the United States of America in terms of innovation, it has seemingly been considered the better benchmark for South Africa on the level of values and context (as evidenced by policy influence in sectors such as finance and planning). Canadian governments have, for many years, recognised the need for and the value of social innovation in achieving development in a context of democracy and diversity. Toronto is hailed as one of the most socially innovative and sustainable cities in the world. It is an achievement credited in no small part to the city's "passionate, creative and energetic" (The Innovation Lab, 2102) public service, and the contributions of research, business and civic actors. Importantly, Canada has a long history of active civil society that serves as a useful source and repository of development knowledge and innovation.

From the North American case, South Africa may wish to consider questions such as:

- How an innovation ecosystem can be actively enabled so as to have a steady flow of supply and diffusion of innovation in the society
- How the full National Systems of Innovation (NSI) can be activated to contribute towards urban innovation practice and activism; this could be achieved by leveraging investments made into research and educational institutions and the public science councils, while activating civil society as key contributors to urban innovation

Africa and Innovation Systems for Development

It is important to understand South Africa's urban innovation story within the challenges and opportunities of its broader context, as they are likely to be interconnected. Several continental plans and strategies, such as The Consolidated [Africa] Plan of Action, Africa Vision 2050 and Africa Agenda 2063, clearly depict Africa's aspirations. As a continent, Africa hopes to have greater food security, eradicated poverty and greater access to efficient energy sources. It seeks to be protective of its natural resources, adaptive to climate change, competitive in its economic endeavours, integrated in the digital age, peaceful and populated with healthy and skilled individuals. While these goals are progressively being translated to the city-level (United Cities and Local Governments of Africa, 2015), it is also acknowledged that it would take both political will, and effective, inclusive innovation systems to achieve these lofty goals (Kraemer-Mbula et al., 2014).

The continent is complex and sometimes contradictory. *“Africa today is home to inventors and entrepreneurs, high- and low- end technological innovation, tinkers and dreamers... Poverty, inadequate social services, poor infrastructure, low agricultural productivity, preventable diseases, limited sanitation and clean water also characterize the continent”* (Adesida et al., 2016:8). African innovation systems remain largely dysfunctional: innovators struggle to find investors, investors struggle to find suitable incentives and programmes; community members struggle to find suitable research outputs; and all around innovation has failed to scale up to its transformative potential at a societal level thus far (Africa Innovation Summit, 2014; Adesida and Karuri-Sebina, 2013).

It has been said that, while there exists a level of capability and innovation that is indeed taking place in Africa to some degree, the region's innovation systems are not fully developed for several reasons. Reference is made to the need for robust policy frameworks and more dynamic and effective institutions supporting innovation and entrepreneurship (Adesida et al., 2016). More fundamentally, scholars have argued for alternative conceptual frameworks to neo-classical economic theory to understand and engage with the problems and challenges of persistent underdevelopment in Africa. Indeed, the innovation systems approach is considered to have significant potential in this regard. Learning case studies across Africa have been used to suggest that Africa can indeed extend beyond discrete and random innovation events and islands to fostering more systemic innovation (ibid.). Southern Africa, Cape Verde, Kenya, Nigeria, Ghana, Egypt and Algeria offer cases in point.

An Africa Innovation Summit held in 2014 concluded that African countries would need to deliberately and decisively act to develop and nurture their innovation systems. These are the key propositions made (Africa Innovation Summit, 2014:71):

- Get and maintain the basics in place: Build the critical mass needed of skills, financing, productivity, and appropriate governance. Also have explicit and contextually relevant National Systems of Innovation (NSI) policies, and Science, Technology and Industry agendas.
- Align key systems to achieve the virtuous cycle: Get the politics, policies, programmes, platforms, people and partnerships right. Ensure that national development agendas are pro-innovation, stakeholders are moving in the same direction, and encourage demand-led innovation.
- Scarcity requires that we be resourceful and responsive: Be creative in using scarce resources, funding, core competencies, and talent. Leverage all available knowledge resources, build home-grown solutions, learn from others, and be very creative in building towards endogenous innovation systems that are robust, efficient and productive.
- Promote experimentation: Build systems that encourage trial and error in order to build knowledge and insight.
- Learning and collaboration: Create platforms to promote and invest in quality education and research; new approaches to learning for today's 'networked/knowledge economy'; standards and systems of accreditation; collaboration within and between educational institutions and industry; and regional collaboration and cooperation in building innovation systems.
- Everyone must be engaged: Recognise that government, industry, academia and communities must play critical roles. Within each of the groups, it is important to have 'creative entrepreneurs' that forge and promote the necessary disruptions to stimulate innovation.

Table 2.1 (below) outlines the high-level roles identified.

Table 2.1: Roles for various National Systems Innovation actors

GOVERNMENT	ACADEMIA	PRIVATE SECTOR	COMMUNITIES
<ul style="list-style-type: none"> • Political will and alignment of intent and action • Policy experimentation • Commitment to evidence based policy • Long-term vision and consistency • Horizontal coordination and policy coherence • Promote social innovation and address barriers to entry 	<ul style="list-style-type: none"> • Demand-driven education and research • New types of scientists that understand social needs. Inter- and trans-disciplinarity • Creative innovations and reforms in the education and research systems • Collaboration and learning without boundaries (using Information and Communication Technologies, regional collaboration, mobility, diaspora) 	<ul style="list-style-type: none"> • Identify and nurture entrepreneurship from an early stage • Mentor and coach • Align skill formation to business needs • Identify and pursue social impact markets • Recognise non-technology and non-research-and-development-based innovation • Brokerage across innovation cycle • Bridge the gap to the market • Promote value chain upgrading and integration 	<ul style="list-style-type: none"> • Be active actors for innovation; raise awareness and capacity to articulate • Creative approaches for knowledge appropriation and open innovation • Communication strategies for the dissemination of research and innovation achievements • Support "learning communities" or learning platforms

Source: Africa Innovation Summit (2014)

Lessons and Conclusions



Government does have a role to play in providing the people and the infrastructure to ensure that nations and regions have the knowledge and creativity they need to compete, along with the capacity to generate new knowledge, ideas and innovations for the future.

(Michael Goldberg, 2006:648)



This review of the scholarship and international experiences reinforces the message that, beyond a technology bias, achieving effective and systemic innovation is largely an institutional issue. For innovation to be developmental, rather than discrete and ephemeral in South Africa, requires a two-pronged approach: first, a systems view of innovation that considers the key elements and actors, in conjunction with an innovation ecosystem perspective that recognises the environment for innovation; and second, policy regimes and institutional support to deal with barriers. Taking the city context into consideration, it is necessary to recognise the important roles of various actors in the urban innovation system. Effective Systems of Innovation are not just about individual innovators, or about government actors or levels, or only industry. It is about all of these and more. A systems perspective would require considering opportunities for effective partnering and co-production, rather than assuming a top-down, 'delivery-to-client' posture.

As cities are indeed problem rich, urban innovation can look locally for demand, grounding, and inspiration to solve problems and leverage opportunities. However, an important city-level lesson seems to be that cities also need to look out and go beyond their limits to be effective and sustainable as innovation systems. For example, the system may have to look regionally, or even globally, to fully explore relevant linkages, scope for competition or application, as well as understand scalability.

Generally, the following points summarise key institutional influences that might positively enable urban innovation in South Africa (Spruijt, 2015):

- Smart infrastructure, hard and soft.
- Decent quality of life with labour quality, housing and leisure amenities.
- Cosmopolitanism in the form of attractiveness for highly educated personnel, a world-wide reputation, a good atmosphere, a shared purpose, highly motivated people.
- Talented human capital.
- A creative cultural environment, attracting and exploiting personal talent, while reinforcing community culture.
- Trust, which promotes knowledge sharing.
- Identity, with individual members sharing a sense of purpose with the collective.
- Diversity, and recognising that knowledge diversity stimulates creativity and innovativeness of the actors in the network.

Specifically, and considering the South African pilot innovation programme and the lessons learnt from this chapter, these points should be borne in mind:

- The discrete innovations need to be connected to an innovation system. What national and local systems exist and where do these innovations connect to them? It will thus be necessary to consider inter-governmental issues and ownership at national, provincial and local levels, as well as the roles of other actors, the private sector, civil society and academe, in relation to the effective diffusion and uptake of the innovations.
- The challenges to effective innovation are often institutional, and therefore the question arises of how conditions involving the infrastructure, the regulatory environment and other support and capabilities regarding facilitation, flexibility and experimentation will be ensured, or deployed, to enable and extend the innovations.
- Where there are systemic or thematic issues, a high intensity of innovation support is likely to be required in the form of large-scale, multi-year funding for networked teams and collaborations. This requires a strategic and sustained, long-term perspective on supporting innovation, and not just an episodic approach .

These are three useful issues to keep in mind as each innovation project is reviewed. Indeed, South Africa has only recently started to focus on its urban innovation potential, and in a general context of economic constraints and social pressures. It will be important to benefitiate and learn from our experiences as we journey along.

References

- Adams, D. and Hess, M., 2010. Social Innovation and Why it has Policy Significance. *Economic and Labour Relations Review*, 21 (2), pp. 139-156.
- Adesida, O. and Karuri-Sebina, G. (eds.), 2013. Special Issue: Building Innovation-Driven Economies in Africa. *African Journal of Science, Technology, Innovation and Development*, 5 (1), pp. 1-96.
- Adesida, O., Karuri-Sebina, G. and Resende-Santos, J. (eds.), 2016. *Innovation Africa: Emerging Hubs of Excellence*. Emerald Books. Forthcoming; pre-publication copy.
- Africa Innovation Summit, 2014. *Africa Innovation Summit Proceedings*. 4-6 February, Praia, Cabo Verde.
- Alcorta, L. and Peres, W., 1998. Innovation systems and technological specialization in Latin America and the Caribbean. *Research Policy*, 26 (7-8), pp. 857-881.
- Amanatidou, E., 2014. Grassroots Social Innovation, Coproduction and Foresight: Community Rebooted. In 5th International Conference on Future-Oriented Technology Analysis (FTA). 27-28 November, Brussels.
- Blowfield, M. and Johnson, L. 2013. *Turnaround challenge: Business and the city of the future*. Oxford University Press, Oxford.
- Centre for an Urban Future, 2013. *Innovation and the City*. June 2013, New York University, Wagner: Graduate School of Public Service, New York.
- Cypher, J. M., 2013. National Innovation Systems, Institutional Path Dependence and Economic Development in Latin America, in Pushchino Symposium, Institute of Economics, Russian Academy of Sciences, 12-13 September 2013.
- Department of Planning, Monitoring and Evaluation, 2015. *Terms of Reference for Urban Innovation publication*.
- Durst, S., and Poutanen, P., 2013. Success factors of innovation ecosystems: A literature review, in R. Smeds and O. Irrmann (eds.), *CO-CREATE 2013: The Boundary-Crossing Conference on Co-Design in Innovation*. Aalto University Publication series SCIENCE +TECHNOLOGY 15/2013. INTERNET: https://www.academia.edu/4007245/Success_factors_of_innovation_ecosystems_A_literature_review, accessed 13 April 2015, pp. 27-38.
- Edquist, C., 2010. Systems of Innovation perspectives and Challenges. *African Journal of Science Technology, Innovation and Development*, 2 (3), pp. 14-45.
- Forsyth, A., 2007. Innovation in Urban design: Does Research Help? *Journal of Urban Design*, 12(3), 461-473.
- Freeman, C., 1987. *Technology Policy and Economic Performance: Lessons from Japan*. Frances Printer Publishers, London.
- Ghosh, A. and Kamath, L., 2012. Decentralisation and Local Government Innovation in Providing Urban Services for the Poor in South and South-East Asia. *Space and Polity*, 16 (1), 49-71.

GLOBELICS (Global Network for Economics of Learning, Innovation, and Competence Building Systems) , 2015. The Cross-Pollination of Development and Innovation Discourses: An integrative literature review, in 13th GLOBELICS International Conference. 23-25 September, Havana.

Godin, B., 2008. In the Shadow of Schumpeter: W. Rupert Maclaurin and the Study of Technological Innovation. Project on the Intellectual History of Innovation, Working Paper No. 2. INTERNET: www.csiic.ca/PDF/IntellectualNo2.pdf, accessed 13 April 2015.

Goldberg, M. A., 2006. Knowledge Creation, Use and Innovation: The Role of Urban and Regional Innovation Strategies and Policies. *European Planning Studies*, 14 (5), pp. 641-664.

Guangzhou Institute for Urban Innovation, 2012-2014. Guangzhou Award Technical Committee Report and database.

Hall, P., 1998. *Cities in Civilisation*. Pantheon Books, New York.

Hicks, J., 1969. *A theory of economic history* (Vol. 163). Oxford: Oxford University Press.

Howaldt, J. and Schwarz, M., 2010. Social Innovation: Concepts, research fields and international trends. May 2010, International Monitoring (IMO), Dortmund.

Isandla Institute, 2015. Reconstituting local governance relationships through a Civic Academy: An innovative response to the challenge of public participation in South African cities. Urban Innovation Project, Johannesburg.

Jackson, D. J., 2011. *What is an Innovation Ecosystem?* National Science Foundation, Arlington, V.A..

Jacobs, J., 1961. *The Death and Life of Great American Cities*. Random House, New York.

Johnson, B. and Anderson, A. D. (eds), 2012. Learning, Innovation and Inclusive Development: New Perspectives on Economic Development Strategy and Development Aid. Globelics Thematic Report, 2011/2012. INTERNET: www.globelics.org/wp.../GLOBELICS2012_I_Indhold_TRYK-copy.pdf, accessed 13 April 2015.

Johnson, B. and Lundvall, B., 2000. Promoting Innovation Systems as a Response to the Globalising E-learning Economy. INTERNET: www.druid.dk/uploads/tx_pictureb/ds2000-106.pdf, accessed 13 April 2015.

Johnson, B., 2008. Part I: City Issues and Importance: Cities, systems of innovation and economic development. *Innovation: Management, Policy and Practice*, 10 (2-3), pp. 146-155.

Karuri-Sebina, G. and Muchie, M., 2014. Townships as Innovation Systems? Towards Transformative Local Development Planning In South Africa. In 12th GLOBELICS International Conference. 29-31 October, Addis Ababa.

Karuri-Sebina, G., 2011. *Towards an Inclusive NSI. Input Paper on Social Innovation and Sustainability Towards Ministerial Review Committee on the National System of Innovation Process*. Unpublished.

Karuri-Sebina, G., 2014. *Applying the Systems of Innovation Approach to Neighbourhood Planning: Assessing Local Development Analysis through an Appreciative Study of two South African Townships*. Doctoral thesis, University of Witwatersrand, Johannesburg.

- Kraemer-Mbula, E., Karuri-Sebina, G. and Adesida, O., 2014. Research Note on Africa Innovation Summit. Unpublished.
- Li, Y., Sun, Y. and Lin, K., 2012. Social Innovation, Local Governance and Social Quality: The Case of Inter-Sectoral Collaboration in Hangzhou City. *International Journal of Social Quality*, 2 (1), pp. 56-73.
- Lundvall, B. (ed.), 1992. *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*. Pinter Publishers, London.
- Lundvall, B.-Å., Chaminade, C., Joseph, J. K. and Vang, J., 2009. (eds), *Handbook of Innovation Systems and Developing Countries: Building Domestic Capabilities in a Global Setting*. Edward Elgar Publishing, Cheltenham.
- Marshall, A., 1890. *Principles of Economics*. Macmillan and Company, London.
- Mazzarol, T., 2012. Building a national innovation system: What can we learn from Korea? *TheConversation.com*, 10 September 2012. INTERNET: <http://theconversation.com/building-a-national-innovation-system-what-can-we-learn-from-korea-9449>, accessed 13 April 2015.
- Mieg, H. A., 2012. Sustainability and innovation in urban development: Concept and case. *Sustainable Development*, 20 (4), pp. 251-263.
- Moulaert, F. and Sekia, F., 2003. Territorial Innovation Models: A Critical Survey. *Regional Studies*, 37 (3), pp. 289 – 302.
- National Science Foundation, 2010. *The Role of the National Science Foundation in the Innovation Ecosystem*. <http://www.nsf.gov/eng/iip/innovation.pdf>, accessed 13 April 2015.
- Nelson, R. and Nelson, K., 2002. Technology, institutions, and innovation systems. *Research Policy*, 31(2), pp.265-272.
- Niosi, J., 2008, *Technology, Development and Innovation Systems: An Introduction*. *The Journal of Development Studies*, 44 (5), pp. 613-621.
- Oliveira, C. and Breda-Vazquez, I., 2012. Creativity and Social Innovation: What Can Urban Policies Learn from Sectoral Experiences. *International Journal of Urban and Regional Research*, 36 (3), pp. 522-538.
- Paskaleva, K.A., 2011. The smart city: A nexus for open innovation? *Intelligent Buildings International*, 3 (3), pp. 153-171.
- People's Republic of China, 2006. *The National Medium- and Long-Term Program for Science and Technology Development (2006-2020)*. State Council, Beijing.
- Rajab, A., 2015. Untitled paper on M-Kopa and iShack. Urban Innovation Project, Pretoria.
- Ravetz, J. and Miles, I., 2015. Foresight in cities and the role of territorial policy intelligence. Unpublished paper, University of Manchester, Manchester.
- Rosanis, S. R. R., 2011. *Innovation Systems: The European Experience and Opportunities for Latin America and the Caribbean*. Thesis, Universidad Autónoma De Barcelona, Barcelona.

- Schumpeter, J., 1912, 1934. *The Theory of Economic Development*. Harvard University Press, Cambridge.
- Sen, A., 1999. *Commodities and Capabilities*. Oxford University Press, New Delhi, Oxford and New York.
- Siyabolola, W., Egbetokun, A., Boladale Abiola Adebawale, B. A. and Olamide, O. (eds.), 2012. *Innovation Systems and Capabilities in Developing Regions: Concepts, Issues and Cases*. Gower Applied Business Research, Farnham
- Society for Research and Initiatives for Sustainable Technologies and Institutions, 2015. Honey Bee Network. INTERNET: http://www.sristi.org/cms/en/our_network, accessed 13 April 2015.
- South African Cities Network, 2011. *State of South African Cities Report 2011*. South African Cities Network: Johannesburg.
- Spruijt, J., 2015. Schematic Overview to Understand the Complexity of the Innovation Ecosystem. INTERNET: <http://www.openinnovation.eu/27-07-2015/schematic-overview-to-understand-the-complexity-of-the-innovation-ecosystem-infographic/>, accessed 13 April 2015.
- The Innovation Lab , 2012. About Us. INTERNET: <http://lab.sites.thecreativeparty.ca/about-us/>, accessed 18 May 2016.
- Trojer, L., Rydhagen, B. and Kjellqvist, T., 2014. Inclusive Innovation Processes – Experiences from Uganda and Tanzania. *African Journal of Science and Technology*, 6 (5), pp. 425-438.
- Tsakarestou, B. and Pogner, K-H., 2014. Cities as Platforms for Co-Creating Experience-Based Business and Social Innovations: An experimental approach, in 7th Art of Management and Organization Conference. 28-31 August, Copenhagen Business School, Copenhagen.
- United Cities and Local Governments of Africa, , 2015. *Africities 7th Edition: What is Africities Summit 2015?* 29 November-3 December 2015, Johannesburg. INTERNET: <http://www.africities2015.org>, accessed 13 April 2015.
- Van der Walt, J. S., Buitendag, A. A. K., Zaaiman, J. J. and van Vuuren, J. C. J., 2009. Community Living Lab as a Collaborative Innovation System. *Issues in Informing Science and Information Technology*, 6, pp. 421-436.
- WelcomeEurope, 2016. Eu fund and call for proposals for research. INTERNET: <http://www.welcomeurope.com/european-subsidies-sector-Research.html#afficheTexte>, accessed 19 May 2016.