BUILDING CONTEMPORARY URBAN SPACES OF KNOWLEDGE AND INNOVATION
Lessons from Australian practice

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In the era of global knowledge economy, urban regions that are seeking to increase their competitive edge, become destinations for talent and investment, and provide prosperity and quality of life to their inhabitants have little chance achieving their development goals without forming effective knowledge-based urban development strategies. This paper aims to shed light on the planning and development of the knowledge-based urban development phenomenon with respect to the construction of knowledge community precincts aimed at building contemporary urban spaces of knowledge and innovation. Following to a thorough review of the literature on knowledge-based urban development, the paper undertakes policy and best practice analyses to learn from the internationally renowned Australian knowledge community precincts, from Sydney, Melbourne and Brisbane, to better understand the dynamics of knowledge community precinct development practices. The paper provides a discussion on the study findings and recommendations for successfully establishing contemporary urban spaces of knowledge and innovation.

1. Introduction

The changing and challenging conditions of the 21st century have been significantly impacting our economy, society and built and natural environments[1,2,3]. Today innovation and generation of knowledge—mostly in the form of science, technology and arts—are seen as a panacea for the adaptation to changes and management of challenges[4,5]. Building contemporary urban spaces that concentrate on innovation and knowledge generation to support knowledge economy and society formation, thus, has become a priority for many nations and cities. Concepts like 'knowledge city' and 'knowledge precinct' are coined as places where citizenship undertakes a deliberate and systematic initiative for founding its development on the identification and sustainable balance of its shared value system and bases its ability to create wealth on its capacity to generate and leverage its knowledge capabilities[6]. In recent years, the term knowledge precinct in its most contemporary interpretation evolved into 'knowledge community precinct (KCP)', which is a mix-use post-modern urban setting—e.g., flexible, decontextualized, enclaved, fragmented—including a critical mass of knowledge enterprises and advanced networked infrastructures, developed with the aim of collecting the benefits of blurring the boundaries of living, shopping, recreation and working facilities of knowledge workers and their families—i.e., knowledge community[7]. In the literature this type of development—a place containing economic prosperity, environmental sustainability, just socio-spatial order and good governance—is referred as a knowledge-based urban development (KBUD)[8].

Successful examples of KBUD is generally achieved through strategic asset-based planning, which is a strategic planning approach grounded in focusing on the positive endogenous attributes and assets in order to become competitive, attract new resources and bring about the desired outcomes[9]. Mostly driven by global market forces a KBUD requires a strategic asset-based planning approach that includes flexible planning regulations. Hence, in this paper, we aim to provide a clear understanding on the planning and development processes of the KBUD phenomenon with respect to the construction of KCPs—particularly in the Australian context. In order to do so, the paper, first reviews the key literature on KBUD and strategic asset-based planning thoroughly. The paper, then, undertakes policy and best practice analyses from Australia to shed light on the planning and development processes of KCPs and learn from the success stories—i.e., Sydney's Australian Technology Park, Melbourne's Parkville Knowledge Precinct, Brisbane's Kelvin Grove Urban Village. Based on the learnings from the literature and global best practices, the paper provides a discussion to better understand the nature and dynamics of KCPs.

2. Knowledge-Based Urban Development

The concept of knowledge economy—grounded by endogenous growth theory[10,11]—emerged from an increasing recognition of the requirement for the generation, circulation and use of knowledge within modern economies, however, in recent years, increasing attention has been paid in emerging economies to make the transition to knowledge economy. Thus, making the knowledge economy phenomenon a fairly global one[12,13]. In the era of global knowledge economy, the world is increasingly becoming integrated, and knowledge is becoming the driving force for economic growth, societal development, and improvement of the competitiveness of not only industrial system and firms[14], but also urban regions[15].

Lever[16] demonstrated the correlation between economic growth and the extent of the knowledge base in European cities, suggesting urban regions that are centres of growth are also centres of knowledge. What this means is, the competitive advantages of urban regions are no longer based on their natural resources or cheap labour, but are increasingly viewed in terms of their knowledge resources and exploitation of these knowledge assets[17]. How well an urban region respond to the challenge of knowledge economy depends on how well actors exploit new knowledge in the form of new product or process innovations, making use of their intangible assets, such as skills and creativity[14].

As Asheim[18] puts forward, since the beginning of the century strong evidence has been presented substantiating an argument for an urban turnaround that is taking place. Traditional focus on urban regions and development mainly concern of 'business climate'—launching policy measures intending to attract new business to support the growth of industries—has been changing in recent years towards also providing a strong 'people climate' to attract and retain the talent in urban regions to form knowledge bases—i.e., analytical (science-based), synthetic (engineering-based), symbolic (art-based)[18,19]. Urban regions are now being viewed as having a specific role to play in creating the prosperous knowledge milieus—hence establishing 'spatial climate'—and in the management and humanisation of knowledge and setting the scene for enabling conditions—establishing 'governance climate'[20,21,22]. This broadened perspective, makes knowledge-based development underpinning growth trajectories of urban regions[8,23].

Knight[20,24] sees knowledge-based development of urban regions—also referred as knowledge-based urban development (KBUD)—as the transformation of knowledge resources into local development to provide a basis for sustainable development and also a social learning process as a way for citizens to inform and become informed about the nature of changes occurring in their city. Kunzmann[25] gives KBUD a more operational perspective as a key planning approach that provides an important collaborative development framework for all parties—i.e., public, private, academic, community—in the development of future strategic and knowledge-intensive urban and regional policies for attracting and retaining

knowledge workers and knowledge-intensive industries and also for the nurturing of knowledge cities—and their nucleus of KCPs.

Perry[26] points out to the differing perspectives of KBUD as she identifies the three dimensions to KBUD as process, product and acquisition, where in each case the relative importance of knowledge and space alters. In process-driven KBUD, knowledge is central and subject to change as a result of external pressures; whilst in acquisition-driven KBUD, knowledge itself is only a small part of KBUD processes, embedded in a wider set of economic, social, and cultural processes, and; in product-driven KBUD, much like the process-driven KBUD, urban is only implied and peripheral and place is central to the concept of the knowledge city. However, only a combination of all three dimensions into a more holistic KBUD vision can deliver desired outcomes.

Van Wezemael[27] emphasises on the heterogeneous context of KBUD due to its multidisciplinary and multi-faceted nature—which is a complex and fuzzy concept—limiting its globally widespread inception. He suggests KBUD to reach beyond a neoliberal agenda of economic progress, and be viewed as a multiplicity and offer a rich potential to seek for alternative urban becomings. Further dwelling on the idea of alternative urban becomings and combination of KBUD perspectives, Maldonado and Romein[28] argue that a sustainable KBUD only rests on a proper balance between: (i) economic quality, which depends on a good business climate to produce prosperity; (ii) socio-spatial quality, which is based on a good people climate for all people, and; (iii) organizational quality, which depends on coherence and consensus in the urban region, as well as a good interaction between main stakeholders to deliver concrete projects and initiatives.

In line with Maldonado and Romein's[28] argument, Yigitcanlar[5] defines the KBUD: as the new development paradigm of the knowledge economy era that aims to bring economic prosperity, socio-spatial order, environmental sustainability, and good governance to cities; and produce a city purposefully designed to encourage the generation, circulation and use of knowledge in an economically secure, socially just, environmentally sustained and well-governed human setting—i.e., knowledge city (and its nucleus of KCPs). Correspondingly, KBUD is concerned of economic, societal and spatial (both built and natural environmental) development along with institutional development as an enabler of the former three.

KBUD's economic development perspective aims to place endogenous knowledge assets in the heart of economic activities as it sees knowledge as a locally embedded strategic and vital resource rather than exogenous, imported and supplementary[16,29], and build a knowledge economy within an urban region producing prosperity achieved through strong 'macro-economic' and 'knowledge economy foundations'. KBUD's socio-cultural development perspective aims to increase skills and knowledge of residents as a mean for individual and communal development and societal high-level of achievements [1,30], and build a knowledge society within an urban region producing social equity achieved through strong 'human and social capitals', and 'diversity and independency'. KBUD's environmental and urban (enviro-urban) development perspective aims to promote conservation, development and integration of both natural and built environments, work towards building a strong spatial network relationship between urban development and knowledge clusters while driving an urban and environmental development that is ecologically friendly, high quality, unique and sustainable[24,31], and build a knowledge milieu producing sustainability in an urban region achieved through 'sustainable urban development' and 'quality of life and place'. KBUD's institutional development perspective aims to democratise and humanises knowledge, institutionalises interdisciplinary collective learning processes and knowledge-based organisations, play a critical role in the orchestration of the development by bringing together actors, stakeholders and sources to prepare a civic vision, plan strategically, organise and facilitate necessary knowledge-intensive bases and activities[20,32], and build a knowledge governance producing enablers for KBUD in an urban region achieved through strong 'governance and planning' and 'leadership and support'. These four development perspectives form the KBUD pillars—economy, society, environment, governance.

Implementation of KBUD requires a planning approach that is strategic and asset-based. In this context, asset-based planning is put forward in parallel to the communicative rationality and strategic planning approach. In this type of planning, instead of pursuing a traditional need-based planning approach, it purports communities to be planned by considering their endogenous assets and emphasising the strong and positive aspects of their developable assets[33]. One of the most important components of this planning is the community involvement in identification, management and utilisation of the assets. Traditionally, asset-based planning approach has been widely used, particularly, in urban regeneration and poverty alleviation projects. In the global knowledge economy era, this asset-based approach has been also utilised in the strategic planning domain, thus making, 'strategic asset-based planning' a planning approach that places its focus on urban assets as the key value to be driven to sustain competitive advantage and prosperity[34]. This planning approach is now heavily employed in KBUD projects—including planning of KCPs.

In line with the strategic asset-based planning endeavours, fundamental urban assets are categorised as below. This capital system and asset categorisation provides some useful insights on the effective asset management planning process and helps to delineate best strategies to endow these assets for the community and the city. In fact, not being much different from the traditional strategic spatial planning approach, it specifically highlights the main constituents of economic, social, cultural, environmental and institutional resources available—in line with KBUD framework—and helps to designate the key stakeholders. Thus, the asset categories—of symbolic, social, human, heritage and cultural, natural, environmental and infrastructural, financial, knowledge, and relational that are derived from [34,35,36]—are used in the next section to investigate Australian KCP initiatives.

3. Australian Practice

3.1 Australian Technology Park, Sydney

Being the largest city in Australia, Sydney—internationally recognised as a Global City—is one of the main actors in the global economy. While, the city is dominated by finance and insurance, business and property services, there are a number of sub-centres specialised in creative industries, health and biotechnology fields. Particularly higher quality of academic and research facilities around these sub-centres have facilitated the emergence of business hubs as a consequence of the KBUD movement. Australian Technology Park (ATP) has been one of the successful examples of KCP creation in terms of planning, funding, implementation and operation as a triple helix approach. First ATP master plan was prepared in 1994 and ATP officially opened in 1996. The precinct has developed gradually according to the corporate plan of ATP and in 2005 a new master plan was prepared. The construction works had been continued until 2010 and now it is nearly completed and fully functional. The precinct covers 14 ha area. There are over 100 of ICTs and biomedicine organisations on the site employing over 2,000 people[37]. Due to close proximity to Central Spine of Sydney and Redfern neighbourhood, the precinct also has a wide range of business, entertainment, culture and recreation services. Surrounding and nearby dwellings provide various residential options to ATP's knowledge workers and their families.

Asset identification and valuation: Symbolic assets: Being the largest city in Australia, Sydney—internationally recognised as a Global City—is one of the actors in the global knowledge economy. ATP is located on the southern part of the Central Spine of Sydney and is marked as catalyst for excellence in research and technology development. This KCP is particularly well known in the South East Asia region and has good connection with Asia-Pacific markets[31].

Social assets: ATP has already had a civic characteristic due to renovated heritage buildings and as being close to the busy Redfern train station. There are plans to develop cultural and

exhibition facilities in and around the precinct to attract local and research communities and further develop the precinct as a more vibrant hub.

Human assets: Due to the world-class education and research institution of Sydney, there is no significant shortage of qualified workforce in the R&D sector and the city itself also has a tick service sector[38]. Sydney attracts knowledge workers from all over the world particularly Central and South East Asia regions.

Heritage and cultural assets: The precinct was developed on an old manufacturing site—i.e., locomotive workshops and goods stores—and shown as one of the most significant areas for renewal in the Sydney City Strategic Plan[39]. There are other important heritage sites around this area, which are being planned for conservation and incorporation with the precinct. ATP has a cosmopolitan urban environment due to significant culture mixture of the inhabitants—particularly areas around the CBD—where community tolerance is quite high. This is one of the reasons for an elevated migration movement.

Natural, environmental and infrastructural assets: Sydney is located close to a number of environmentally significant areas, which has been protected by the state and local governments, and has a good infrastructure to support urban services and growing demands of the population. The precinct takes place next to Redfern train station and has a very good public transport and pedestrian network.

Financial assets: Federal and state governments fund the R&D endeavours. The incubator facilities are designed for spin off SME technology firms as direct support. Sydney has adopted an economy strategy to develop ICT and biomedical sectors by involvement of the stakeholders. This enables firms to access governmental and private funds from various institutions, which ATP firms also benefit.

Knowledge assets: University of Sydney and University of Technology Sydney support a number of SMEs on ICTs and biomedicine in the area[39]. However, the marketing strategy for ATP as a prime business real estate limits attracting and growth potential of innovative firms due to higher location costs.

Relational assets: ATP has been developed as a mutual initiative of the private sector, government and universities; the current management—i.e., The Redfern–Waterloo Authority, semi-governmental firm—of the precinct has been following proactive approach to further development of the area emphasising the sustainability concept. Particularly, making the precinct sustainable is the virtue governed by the collaboration of the state government, precinct management and the tenants.

Asset management plan, implementation and performance monitoring: In the regional strategy plan, ATP is listed as a knowledge asset and shown as one of the magnet infrastructures considering its proximity to the major transport route and knowledge cluster—R&D facilities and universities—, support to an existing centre, and ability to reduce environmental impact. The main planning theme for this sub-region is to connect ATP precinct to Green Square development site. In the same plan, the Redfern-Waterloo Authority has been authorised for preservation and revitalisation of heritage buildings, implementing residential (including affordable housing) and business development, improvement of public transport network (Redfern station and airport connection), provision of safe and functional civic spaces, and implementing ecologically sustainable development through urban renewal[39]. This approach is also adopted for the other sub-regional authorities to support innovation and strengthen the industry clusters. Additionally, the master plan of ATP was amended in 2005, and ATP management published the targets for sustainable practices in the precinct in energy conservation, reducing waste production and water consumption[37]. Relocation of one of the national broadcasting companies is expected to foster the media industry presence in/around the area. The regional plan details urban form and function related issues in and around the precincts without specifying any performance criteria. On the other hand, ATP management provides targets for sustainability related information for benchmarking purposes.

3.2 Parkville Knowledge Precinct, Melbourne

Considering the metropolitan characteristics of Melbourne, a number of specialised activity centres have proliferated particularly around world-class education and research institutions. Parkville knowledge (medical and bioscience) community precinct is an outcome of this trend and of the organic synergy between health research facilities around University of Melbourne. Even though investment and development of the precinct has been ad hoc basis, it has been purported that coordination and integration between other research institutions and industry can bring more effective results for the Parkville KCP. Among other initiatives from Melbourne, Parkville comes forward with its organic development as a specialised knowledge sector and the global reputation in cancer research. It is expected that the developments advised in 2005 Parkville Precinct Strategy Plan will be completed by 2016.The precinct covers around 550 ha area. In 2006, there were approximately 1,800 people living in the Parkville precinct and over 23,000 people were involved in health (14,362 ppl.) and education (5,113 ppl.) activities in the precinct[40].

Asset identification and valuation: Symbolic assets: Melbourne is the second largest Australian city, famous for arts, culture, sports and entertainment scenes. Parkville is located on the Northern section of Melbourne CBD and has a strong biomedical sector recognised globally. Similar to Sydney, it has good connections with the Asia-Pacific markets.

Social assets: Parkville KCP has followed a relatively more organic development path to become a learning, healthcare and biomedical hub in the region. The precinct highly benefits from the social and cultural activities of the adjoining University of Melbourne.

Human assets: Melbourne has globally recognised education and research institutions and attracts a large number of international tertiary education students[40]. The opportunity of international university graduates—who completed their minimum two-year studies in Australia—migrating as skill-workers makes accessing to qualified labour force easier. The city itself has a mature service sector. Likewise Sydney, Melbourne—internationally recognised as a Knowledge City—attracts knowledge workers from all over the world particularly from Central and South East Asia regions[21].

Heritage and cultural assets: The University of Melbourne campus is a heritage site and the precinct also has other heritage sites in the close proximity[40]. The precinct and its surrounding area inhabit many people with various cultural backgrounds and community tolerance is quite high. Melbourne is one of the most culturally vibrant cities in Australia—in a big competition with Sydney—, where integration of immigrants to the community is highly successful.

Natural, environmental and infrastructural assets: The University of Melbourne campus and surrounding urban fabric have provided a unique urban characteristic to the precinct, which enhances the residential amenity as well. Due to its proximity to the city and higher densities around the precinct have also supported a mixed-use development organically[40]. The precinct has well-connected public transport, pedestrian and cycling networks allowing good accessibility to the area[41].

Financial assets: State government promotes the area by providing incentives to the new firms and also maintaining the existing healthcare facilities. The University of Melbourne provides research facility and researcher supply to the businesses, and bridges graduates and firms, which benefits the companies located at the precinct[41].

Knowledge assets: The University of Melbourne, Bio21 Institute, the Royal Melbourne Hospital and Royal Children's Hospital, relocated the Royal Women's Hospital are prominent institutions that have elevated the growth potential of the precinct[41]. There are a number of SMEs located in the precinct having significant number of biomedical patents and producing medicines.

Relational assets: With support from the state government, City of Melbourne and the University of Melbourne, Parkville has become one of the successful examples of triple-helix collaboration. Particularly the University of Melbourne and regional hospitals in the area has

facilitated a synergy between the university, healthcare facilities and the firms that invest in biosciences R&D[41].

Asset management plan, implementation and performance monitoring: The strategy document of the city[40] outlines the needs of becoming a world-class knowledge city, role of universities in creating synergies in urban context, and effective ways of collaboration to cultivate city-based learning. In addition to this, Victorian Government prepared a strategic plan for Parkville precinct giving details of policy options and implementation strategies. Plan explains the role of the precinct as the major cluster of medical and biotechnology research, education and healthcare. It clearly states, collaboration to drive innovation within the Precinct is vital to its ongoing status as a world-class biomedical precinct, and its contribution to high levels of health, social and economic benefits for the State[41]. The precinct's connection to CBD, key infrastructure and research facilities has been shown as the prominent competitive advantage in cancer research and these also facilitate a biotechnology precinct in close proximity. In terms of implementation, the growth requirements of the existing research facilities and start-up firms are planned to be met either through rezoning irrelevant uses in the precinct—even though it is hardly possible when highly developed status of the precinct is considered—or encouraging urban development of mixed-use areas in close vicinity[41]. City of Melbourne employs several benchmarking tools—including RMIT Global University Cities Index and MACKi's the Most Admired Knowledge City Awards—to evaluate the performance of the city and its KCPs[40].

3.3 Kelvin Grove Urban Village, Brisbane

Kelvin Grove Urban Village (KGUV) is a proof of commitment of the Queensland Government and Brisbane City Council to 'Smart State' initiative and considered as an alternative solution to sprawling urban form. This is a joint initiative of the Queensland Government and the Queensland University of Technology (QUT). This has also been the foundation of the QUT's Kelvin Grove Campus This multi-award winning project was planned in 2001 and construction started in 2002. The precinct covers about 16 ha area and is only 5 km distance to Brisbane CBD. Until now more than $1 billion was spent for this mixed-tenure, medium density, inner city planned knowledge community. As of 2008, KGUV inhabits around 4,000 people from all age groups (being mostly young professionals) in approximately 2,000 individual dwelling units.

Asset identification and valuation: Symbolic assets: KGUV is located at the inner city of Brisbane with close proximity to the CBD, which is the third largest city in Australia. Even though Brisbane is not as globally famous as Sydney and Melbourne, the city has been recognised as one of the emerging global cities considering the growth in population and economy. The two brands of the state—i.e., Smart State, Sunshine State—reflect the symbolic strengths of the city, which are investing on knowledge and the perfect weather.

Social assets: Cultural and performing arts activities attract local inhabitants and tourists to the precinct. There is a mixture of people from different age groups and cultural backgrounds in the precinct considering the international student and researcher flow and local inhabitants.

Human assets: Brisbane has a growing skilled workforce considering the contemporary immigration trend. QUT is the only education and research institution facilitating R&D activities and business development in the precinct. However, the other two large universities of the city are within 10 km distance.

Heritage and cultural assets: Albeit limited in numbers, the heritage remainings of indigenous people and former military barracks have been preserved in the precinct area. Brisbane has been one of the focal points of international students and immigrants in Australia; therefore, there is an increasing openness and tolerance between the existing inhabitants and newcomers.

Natural, environmental and infrastructural assets: Compact urban development concept—i.e., urban village—is adopted as design principles, which has been recognised with a national design excellence award. KGUV is a master planned community and reflects characteristics of both traditional Queenslander style urban fabric and modern research facilities with surrounding amenities. The precinct has a convenient public transport and non-motorised transport network, however, its connection to the CBD has been considered as rather weak[7].

Financial assets: State government played an important role in initial investment of the precinct and then the management has been handed to a QUT-based firm. There are no direct incentives to the firms at the moment, but state government has been investing in hard and soft infrastructures, and also in branding of the precinct.

Knowledge assets: Creative industries and health are the main sectors that are aimed to be located in the precinct. While the former is developing consistently, the latter requires more time, support and effort to grow. No apparent success stories recorded from the precinct yet. However, on paper quality accommodation, recreation, urban design, research facilities and infrastructures make it an ideal KCP model.

Relational assets: KGUV is a joint initiative of Queensland Government and QUT, with support and involvement of the Brisbane City Council. At the moment, QUT is responsible for development and marketing of the precinct.

Asset management plan, implementation and performance monitoring: In the regional plan, adaptation to knowledge economies are covered in support for business centres and employment policy sections, which clearly advocates creation of key KCPs considering the urban sustainability principles and creating highly skilled jobs and employment diversification opportunities[42]. KGUV project is a good example of 'Smart State' of the Queensland Government and is regarded as a social experiment in Australian urban design due to ambitious implementation of the new urbanism principles[43]. Quality of the urban space—i.e., medium density, mixed-use development, accessibility to the services by non-automobile means and attractive civic environments—is detailed in the master plan. Housing diversity and provision is another topic highlighted as a wide range of demographics has been included in the accommodation options including student accommodation, disability support options, aged accommodation, and people living in government assisted housing via the Brisbane Housing Company[43]. QUT has provided education and research infrastructure for the creative industries and health, and is responsible for the development and marketing of the KGUV precinct. The health research is local and provides clinic level services. Queensland applies performance based planning on all levels of planning and implementation practices, and measure the success by desired regional and environmental outcomes, which set out a generic achievement statement at the regional scale or a performance indicator at the local scale. While the regional outcomes are very similar to the concerns mentioned in the Smart State initiative, environmental outcomes are related to the building structures and impact assessment of the construction.

4. Discussion

KCP cases that we explored in this paper to better understand the planning and development characteristics and processes provide us rather interesting findings.

First of all, even though each case to a certain degree has unique characteristics, there are a lot of similarities observed. For example, all cases include a government-led initiation process. Developing a 'good business climate' is seen as the primary driver of such development. In most of them a triple-helix model partnership is occurred. Central urban areas are chosen as physical locations for the precincts—proving the claims of the literature of knowledge generation is generally being an urban phenomenon. Even if all precincts are aiming to facilitate endogenous assets for knowledge generation and community development, in almost all cases, policies for attracting exogenous talent and investment

exist. In most of these developments a great value to the innovation and knowledge generators—i.e., knowledge workers—are given. Besides, in some of them forming knowledge communities even comes before generating knowledge—i.e., KGUV—further highlighting the importance of 'good people climate'. In global and Australian cases a special attention is given to the natural and built environments to attract and retain talent from the city/region or abroad—investing on a 'good spatial climate'. Management of KBUD and also knowledge-based activities of the precincts are practiced fairly well all across the case studies—establishing a 'good governance climate'.

Secondly, in addition to commonalities among the case studies, each precinct has its own unique qualities. In the case of KGUV a top-down model, despite the bottom-up planning tradition, is followed. ATP was a regeneration project of an inner city Sydney railway hub and government played a central role for the orchestration of the development. Melbourne's Parkville is the only organic development case in contrast to the other two cases. An extension of University of Melbourne Parkville now merged with the inner Melbourne providing a true KCP.

Thirdly, in the Australian cases, when compared with other European and Asian examples, first thing we notice is the effects of the tyranny of distance, which made international connections. Albeit, the beauty of knowledge economy comes with the advanced ICT that gaps most of the problems caused by the distance, limited proximity and face-to-face knowledge exchange mostly restricts the impact area of the Australian knowledge industry and businesses to the Asia-Pacific region. Another challenge Australian cities and hence KCPs are facing is the standing of the country in the knowledge economy rankings, and even worst having a development paradigm shift away from knowledge economy prioritisation— i.e., considerations on the abolishment of Smart State strategy of Queensland and further investing on the traditional sectors of Australia such as mining, agriculture, tourism, construction. In the case of ATP, the planning and development process was top-down, nonetheless, a semi-government firm managing this process. The development was originally planned as a knowledge precinct and not including any residential and recreational/cultural facilities, and now moving towards to be converted into a KCP, these facilities are tried to be located either on site or nearby. Focusing on the physical precinct boundary, the precinct is a relatively small scale one, however, when the blurring boundaries with the surrounding Sydney's rich urban amenities considered, the precinct can be considered quite well integrated with the city centre. Parkville knowledge precinct is contrary to other examples is a bottom-up and organic development, and a natural growth of the University of Melbourne's industry collaboration around the campus. Having plans to further expand and become a globally acknowledged KCP, the development is now seeking a more comprehensive approach to coordinate/integrate KBUD endeavours. KGUV is a unique case aimed to develop a true knowledge community with a top-down approach. Started very ambitious project, however, later on due to potential political complications/rivalry strong support behind the development is pulled off, leaving the university to manage and promote the development pretty much by itself. Even there was no creative industry in the region, QUT initiated the research education in the sector at the precinct, which is to surprise becoming one of the strongest in Australia. Urban form related strategies of the precinct are prominent and the design quality of the precinct is widely recognised.

Lastly, the limitations of this study and the analysis are apparent, and hence, require planning to undertake a more in-depth prospective study. Thus, although the findings of this research revealed useful insights for Australian KCP development, the study results should be taken into account by considering the limitations—i.e., case selection, data collection/availability, and potential bias of qualitative analysis.

5. Conclusion

In this paper, we explored the literature and current successful practices to shed light on the planning and development processes of the KBUD phenomenon with respect to the construction of KCPs. Firstly, the literature has underlined the usefulness of strategic asset-based planning approach for the knowledge-based development of such precincts and provided an analysis framework to qualitatively investigate globally successful Australian practices. Secondly, in general, the have revealed that despite to their branding and characteristic differences, KCPs do provide space for knowledge generation and place for knowledge communities—thus establish contemporary urban spaces for knowledge and innovation. More specifically, such precincts are initiated with the lead of public sector, but received support from either industry or academy or both down the track—i.e., triple-helix model. The investigated KCPs cases from Australia are exemplar initiatives with their salient characteristics showing varying degrees of uniqueness. All cases highlight the importance of central urban locations as home for such precincts in order to benefit from the rich socio-cultural amenities of the city they are placed in. All cases not only demonstrate the importance of economic, social and spatial measures for a KBUD success, but also underscore the role of governance. Lastly, Australian cases, still with room for further development, have the potential to set standards for other cities seeking similar achievements in establishing contemporary urban environments.

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