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## Place making for innovation and knowledge-intensive activities: The Australian experience

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### ABSTRACT

Making space and place for innovation and knowledge-intensive activities has been an important task for urban administrators in order to foster, attract and retain talent and investment in the age of global knowledge economy. The paper sets out to derive the efficient approaches for practical integration of place making as a multidimensional strategy for the successful and sustainable generation and dissemination of knowledge in contemporary knowledge and innovation spaces. This research embraces a multidimensional conceptual framework to carry out the investigation in three case studies from Sydney, Melbourne and Brisbane (Australia). As the methodological approach an interview-based qualitative analysis method, by involving a range of key stakeholders, is adopted. The study finds that, considering the challenges these locations are exposed to, the role of place making extends from merely physical aspects to holistic economic, social, cultural, spatial and organisational outcomes. This paper makes a contribution to the literature by generating insights from the Australian knowledge and innovation space context with the application of an innovative multifaceted approach for fruitful place making.

### 1. Introduction

Place making is increasingly manifesting itself as a popular strategy adopted by the competitive cities for retaining talent force in order to sustain creativity and knowledge generation in their blooming spatial assemblages of innovation and knowledge-intensive activities and functions (Edvardsson et al., 2016; Yigitcanlar, 2009). These locations—better known in the literature as knowledge precincts, knowledge locations, and innovation clusters or districts—are referred as knowledge and innovation spaces (KISs) in this paper. Incorporating multifaceted developmental motives, KISs are seen as the growth engines aimed at holistic and sustainable growth in terms of economy, society, governance and environment (Carrillo et al., 2014; Van Winden et al., 2013; Yigitcanlar et al., 2008a). However, these globalised knowledge-nurturing locations—in addition to the retainment of talent force—are facing a number of economic, social, political and environmental challenges (Baum et al., 2009; Florida, 2005; Peck, 2010). Interestingly, despite acknowledgement of place making as a strategic solution and its multidimensional definition—as accentuated by recent studies—knowledge regarding the applicable approaches for its practical integration in KISs remains an understudied subject. This research gap widens further considering the mentioned challenges unique to

KISs (Carvalho and Winden, 2017; Pancholi et al., 2014; Yigitcanlar et al., 2008b, 2017a).

This study aims to explore planning and policy approaches for place making as a strategic solution for complex challenges of contemporary KISs. The research question, thus, is: ‘How can place making be integrated as a strategy to combat the challenges of KISs?’ This paper places case studies of three leading Australian KISs—Macquarie Park (MQP), Melbourne Employment Cluster (MEC), and Dutton Park Knowledge Precinct (DPKP)—located in Sydney, Melbourne and Brisbane under the microscope. An interview-based qualitative method is adopted as the methodological approach, and findings are presented in line with a multidimensional conceptual framework of place making. Conclusions are drawn on the basis of identifying the common as well as unique patterns related to place making through an empirical spatio-temporal investigation across the three cases. In doing so, the study scrutinises the refined role of place making and elucidate key attributes of the framework. The paper does not focus on comparing the three cities or evaluating their success; rather it aims to derive general implications on the grounds of research findings. The paper contributes to the existing knowledge by pointing out the theoretical and practical implications for planners and policymakers looking for innovative approaches to integrate place making as a strategy to achieve desired

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denouements from KISs—the spatial nexus of knowledge-based urban development (KBUD).

## 2. Literature review

### 2.1. Place making

In order to comprehend the “contingent, multi-layered, complex and contested” nature of place making as asserted by Arefi (2014, p.4), it is necessary to consider related theoretical assertions. Place has remained a topic of long-held debate amongst scholars from crosscutting disciplines—such as sociology, cultural geography, political geography, human geography, economic geography, psychology, spatial science, planning and design. Considering place as a location in spatial science, stature of place is juxtaposed within two major schools of thought. One stream of discussions strongly accentuates the ‘placelessness’ of knowledge with the ‘death of distances’ and world getting flat due to rapid globalisation (Harvey, 1989; Markusen, 1996; Massey, 1991). Parallel thought stream contends how the claims over diminished stature of location are overemphasised and place—as a location—still remains as relevant as it was in shaping up of innovation and creativity and the significant role of physical environment in it (Livingstone, 2003; Ophir and Shapin, 1991; Zhao, 2005).

Not limiting the extent of meaning of ‘place’ in static sense like spatial science, theoreticians from interrelated disciplines draw attention towards place as a product of social, economic and political processes over a period of time extending far beyond the confines of location (Lefebvre, 1991; Massey, 1991; Merrifield, 1993). Pioneered by the classic work of Lefebvre (1991), in consecutive years, group of renowned theoreticians have postulated the need to understand place as coherence between its conceived, perceived and lived forms (Cresswell, 2004). Montgomery (1998) proposes a well-defined framework that identifies place as form, activity and image. In addition with people, the role of internal and external factors such as market, regulatory force or globalised forces also cannot be ignored in the shaping up of a place. The solution for problems of a place can be solved not only by design, but also by apprehending it as interplay of management placed in urban policy context and the wider social and economic processes that they are embedded into (Adams and Tiesdell, 2013; Carmona et al., 2010; Jones, 2009). In his recent works, Arefi (2014) asserts that places are not only physically built, but also socially mobilised and politically contested. Place making, therefore, needs to be considered multidimensionally not only as a physical product but as socioeconomic, political and organisational processes, people’s perceptions and experience of a locale as well as the context that shapes it (Makkonen and Weidenfeld, 2016; Pancholi et al., 2015a).

### 2.2. Contemporary knowledge and innovation spaces

Knowledge flows related to innovative activities are a core component of KISs. As stated by Witt (2016, p. 3), “innovations mirror new cognitive concepts, which emerge when inventors, researchers, developers, or entrepreneurs (re-)combine—often in team work—already existing cognitive concepts into something that can be given a novel meaning”. Rapidly gaining importance of innovation along with bringing together urban development in evolutionary economic geography with regional resilience in urban planning and Markusen’s (1996) industrial districts concept, in recent years, generated a new model of space formation for innovation in cities—so called KISs (Clark et al., 2010).

Globally the effect of shifting from manufacturing-based economy towards knowledge economy can be seen being manifested as few significant transformations in the contemporary cityscape (Stehlin, 2016; Yigitcanlar and Lee, 2014; Yigitcanlar and Lonnqvist, 2013). The most evident spatial transformation is growth of spontaneously developed or deliberately planned locations or KISs. In these locations

innovation and knowledge-intensive activities aggregate together and socially, which has led to the growth of knowledge workers as a new class of society (Elia et al., 2016; Landry, 2000; Yigitcanlar et al., 2007). Depending on the context and conditions—in addition to their contribution as spatial nexus of KBUD, these knowledge-producing locations also contribute in: (a) Knowledge economy stimulation; (b) Strengthening of the local innovation ecosystem; (c) Creative revitalisation of inner-city areas, and; (d) Global competitiveness of their cities and regions (Reynolds and Uygun, 2017; Scott, 2006; Van Winden et al., 2013).

The phenomenon of spatial agglomeration of economic activities is not new and remains a widely discussed concept in literature (Glaeser, 1999; Jacobs, 1969). Scholars like Saxenian (1994), Porter (2000) and Storper and Venables (2004) favoured the role of geographical proximity in enabling ‘face-to-face’ interactions that create ‘buzz’—necessary for cross-fertilisation of ideas and innovation. Recent works have asserted the role of ‘relational proximity’, i.e., proximity in terms of society, organisation and institution, to develop a social ecosystem of learning—vital for the new knowledge generation and, henceforth, the economic success of KISs (Bathelt et al., 2013; Berkes, 2009; Boschma, 2005; Phillips and Yeung, 2016). With the rise of network society and new ‘open innovation’ model, the economic environment of contemporary KISs has advanced towards being more collaborative and people-oriented rather than the earlier competitive and merely economy-oriented model (Chesbrough, 2003; Kodama and Shibata, 2015; Tallman et al., 2004; Yun, 2015; Yun et al., 2016a, 2016b, 2017).

Katz and Wagner (2014) emphasise the necessity of an integrated relationship between people, firms and place for simultaneous development of economic, networking and physical assets of KISs. With the growth of cultural economy, spatial ensembles characterised by the intersection of technology, culture and place mushroomed up—better known as ‘new media spaces’, ‘new economy spaces’, ‘creative industry clusters’ or ‘creative clusters’ followed (Evans, 2009; Hutton, 2004). Spatially, therefore, transfiguration or ‘urban turn’—as referred by Van Winden et al. (2013)—of KISs from their earlier introvert, secluded and mono-functional counterparts to modern physically extrovert and functionally mixed-use versions distinguishes the contemporary agglomerations from their older counterparts (Pancholi et al., 2017; Yigitcanlar and Sarimin, 2011).

Socio-organisationally, triple-helix model of governance, i.e., a partnership between public, private and academia, has become their *modus operandi* (Lonnqvist et al., 2014; Leydesdorff and Ivanova, 2016.). The need for a synergistic and holistic balance of economy, society, environment and governance for successful KBUD has been emphatically accentuated in renowned works (Carrillo et al., 2014; Yigitcanlar and Dur, 2013). Further to their economic contribution, the specialised role of KISs in providing social equity and inclusion for a democratic society achieved through strong social and human capitals have been propounded by a number of scholars (Fernandez-Maldonado and Romein, 2010; Pancholi et al., 2017). Besides, the redefined role of governance, acknowledged role of public participation, as the factor of social change, and recognised role of smart environments for smart communities, that encourage innovation, complement the process (Henton and Held, 2013; Jung, 2013; Komminos, 2016; Yigitcanlar et al., 2017b).

### 2.3. Challenges for contemporary knowledge and innovation spaces

In order to apprehend the specialised role of place making of KISs, it is also inevitable to understand the major challenges that contemporary KISs are facing. Recent research studies have delineated that despite the theoretical acknowledgement regarding the significance of multi-faceted factors in the success of KIS—as explored above—there exist certain challenges in the process (Cooke, 2017; Esmailpoorabi et al., 2016). Firstly, the knowledge workers generally prefer the vibrant and diverse downtown areas to the secluded and monotonous environment

of KISs—making it a challenge for the companies to retain the talent force (Castells, 2000; Friedmann, 2007; Yigitcanlar et al., 2016). Consequently, KISs face an exodus of businesses as shown by Graham and Guy (2002) in their study on Silicon Valley. As a result of this exodus and added economic value, issues such as gentrification of areas entail—that drives the existing users out to the cheaper areas pushing land prices to soar high (Peck, 2010). Recent works also emphasise other social pitfalls such as partial integration of culture—largely limited to integration of physical assets such as heritage structures—and the development of ‘mono-culture’ in the city marginalising the groups other than knowledge workers in the society (Stehlin, 2016). Economically, studies have displayed lack of collaboration despite the clustering and agglomeration of economic activities. Though displaying strong international connections, a number of concurrent KISs fail to establish strong knowledge-exchange relations at local level (Garnsey and Heffernan, 2005). The role of place making, therefore, extends from merely developing a creative physical environment for attracting talent force to finding solutions for these enlisted challenges.

### 3. Empirical investigation

This research applied a case study method for the empirical investigation. The method was considered appropriate for this research because it allows defining the topic more broadly (i.e., to identify the issues around successful integration of place making as a strategy to combat the challenges of KISs) by taking into account contextual issues in each case and relying on multiple sources of evidence (Yin, 2011). The two most common approaches of case study research include inductive approach based on the Grounded Theory (Glaser and Strauss, 1967) and deductive/testing approach (Yin, 2003). The basic difference between the approaches is that while the Grounded Theory relies on data to generate new theories (there is no initial preconceived framework of concepts and hypotheses), the other approach develops a theory at the beginning of the research and focuses on testing and validating the theory in case settings. Another approach proposed by Eisenhardt (1989) lies in-between these two approaches—i.e., aligns with the Grounded Theory approach—that is inductive, but there are elements that follow a more planned approach. Given the rich literature on the role of incentives on innovation, this research follows the deductive approach to identify the issues around successful integration of place making as a strategy to combat the challenges of KISs.

In order to carry out the empirical investigation in three cases from Australia, a semi-structured interview based qualitative analysis approach has been adopted. Data from primary and secondary sources—i.e., policy and plan documentations obtained from government organisations, planning and design firms, developers, research institutes, and on-site tenant firms are also utilised by integrating them with the interview findings. Additionally, sources such as field observations, photographs, physical plans, and maps also contributed to the analysis as primary data sources. Questionnaire—hinged on the conceptual framework—is moulded in each case in accordance with the issues identified with the help of data from secondary sources. To gain a comprehensive understanding regarding place making, a wide range of key stakeholders related to projects were interviewed—in total 44. The interviewees are selected to form five major groups—government executives, planners and designers, networking groups, firms and institutions, knowledge workers (Table 1). For each group, interviewees were selected as experts at key positions associated with the case. Interviews commenced in the second half of 2015, each lasted about 45–60 min, digitally recorded, and transcribed into text manually. An inductive approach of content analysis—informed by the phenomenographic methodology—was adopted to analyse findings.

In order to carry out the analysis, a multidimensional conceptual framework for place making in KISs has been adopted that integrates the diverse interdisciplinary perspectives together (Pancholi et al., 2015a). It rests on the theoretical paradigm propounding the multi-

faceted nature of place making manifested as coherence between conceived, perceived and lived spaces (Castells, 2000; Lefebvre, 1991; Montgomery, 1998). The five dimensions of place making here are context, feature, function, form and image (Fig. 1). Any KIS is an outcome of the broader context that surrounds it—that forms the first and foremost dimension. This refers to spatial, political, institutional, economic and socio-cultural context—each to be considered spatio-temporally, i.e., in terms of its history, current dynamics and related future plans in place. In order to succeed, it is necessary for a KIS to display unique selling factors that give it a competitive edge over other KISs. Henceforth, in the conceived layer, ‘feature’ as second dimension includes the attributes defining marketability of KIS. Another dimension in conceived layer is ‘form’ that refers to the spatial and physical factors pertaining to KISs. Groups 1 and 2 mostly contributed into assessing feature and form. Pertinent to the ‘lived space’ layer, ‘function’ forms the third dimension integrating all the processes happening in KIS to be assessed for the functional factors required for knowledge generation and dissemination. Data from Groups 3, 4 and 5 was considered for analysing function. In the ‘perceived’ layer, ‘image’ forms the last dimension which analyses the joint perceptions of all the groups of stakeholders and the meanings associated by them appertain to KIS.

The three cases selected for investigation are MQP (Sydney), MEC (Melbourne) and DPKP (Brisbane)—these cases are the top KISs in their cities with established or emerging global reputation (Fig. 2). The diversity of context in each case—in terms of age, proximity to city, leading sectors, and spatial design, i.e., whether planned or spontaneous—make the study further robust and interesting. While two of the KISs, i.e., MQP in Sydney and DPKP in Brisbane, have been deliberately planned on the lines of the internationally successful cases, MEC in Melbourne evolved as a spontaneous agglomeration.

#### 3.1. Context

Spatio-environmentally, the location of MQP is noteworthy as it forms an integral part of global economic corridor of Sydney being at only 12 km from the centre of the city. Melbourne's MEC has a significant location 20 km from Melbourne CBD towards its south-east displaying strong connectivity with key transport corridors crossing through it—Monash Freeway, and Clayton, Blackburn and Dandenong Roads. Being the second biggest KIS agglomeration in Australia, it is acknowledged to play a significant role in the decentralisation of urban core. Similarly, Brisbane's DPKP boasts a strategic location being only 3.5 km south of the city. Socio-culturally, existing cultural and ethnic diversity acts as another success factor of KIS in the form of local asset. Sydney, Melbourne and Brisbane boast a culturally diverse community and are all known for their art, sports and culture making them a lucrative choice for the young talent force representing different nationalities and origin. Greater Sydney has an average of 20%—with the case study area having 48%—of its population as overseas born reflecting the multiculturally rich and tolerant society. Melbourne displays a representation from about 200 nationalities within its boundaries as authenticated by Interviewee#14, “*One of the advantages that Australia has is that we are quite multiculturally diverse.*”

Politically, support for innovation is a critical factor determining the development of KIS and creation of a reliable local and international identity. Interviewee#30 expresses, “*Without government none of this would have happened because government is the only one that will invest where there is no return, when you are still doing the discovery.*” This support was in the form of: (a) Policy and planning, and; (b) economic support. More importantly, as evident from interviews, continued high-level prioritisation in policies is necessary for sustaining success as evident by the cases of Melbourne and Sydney. Conversely, in DPKP, shifted prioritisation with the change in government resulted in slowing down of developmental plans. Group 4 in Brisbane's case discussed the necessity for extending governmental support from seed funding to operational funding. Institutionally, existence of a strong institutional

**Table 1**  
Interviewees.

Group	ID	Position	Relevance	
Group 1: Government executives	Interviewee #1	State government executive	Leading team member of the regional plan	
	Interviewee #2	Local council executive	Involved in local economic development plans of the site	
	Interviewee#3	Local council manager	Involved in strategic plans effecting the site	
	Interviewee #4	Local council executive	Key involvement in planning and execution	
	Interviewee #5	Local council manager	Key involvement in local economic development plans	
	Interviewee #6	Executive director	Key involvement in planning and functioning	
	Interviewee #7	Department head	Leading team member of the precinct plan	
Group 2: Planners and designers	Interviewee #8	Senior urban designer	Involved in master planning of the site	
	Interviewee #9	Senior urban planner	Involved in master planning of the site	
	Interviewee #10	Chief architect	Involved in master planning of the university	
	Interviewee #11	Senior urban planner	Key involvement in master planning of the precinct	
	Interviewee #12	Senior urban designer	Key involvement in master planning of the campus	
	Interviewee #13	Urban designer	Key involvement in on-site infrastructure projects	
	Interviewee #14	Senior urban planner	Key involvement in social and urban planning of site	
	Interviewee #15	Senior urban designer	Key involvement in urban design of site	
	Interviewee #16	Senior architect	Involvement as a design expert	
	Interviewee #17	Design manager	Involvement as a design expert	
Group 3: Networking groups	Interviewee #18	Director	Head of a formal local networking group	
	Interviewee #19	Manager	Coordinator of a formal local networking group	
	Interviewee #20	Manager	Key role in formal group	
	Interviewee #21	Community team leader	Key member of leading team	
	Interviewee #22	Chief executive officer	Involvement by leading a major on-site networking group	
	Interviewee #23	Committee member	Key member of an active community group	
	Group 4: Firms and institutions	Interviewee #24	Chief executive officer	Active participant of a local networking group
Interviewee #25		Manager	Executive of an on-site anchor business	
Interviewee #26		Director	Executive of an on-site business	
Interviewee #27		Director	Key position in an on-site institution	
Interviewee #28		Director	Key position as collaborator in an on-site institution	
Interviewee #29		Director	Leading an on-site business	
Interviewee #30		Executive manager	Executive position in an on-site anchor institution	
Interviewee #31		Senior manager	Key position in an on-site anchor institution	
Interviewee #32		Division director	Leading a key anchor institution	
Group 5: Knowledge workers		Interviewee #33	Chief technology officer	All participants in this group are interviewed for their perceptions as users of the site
		Interviewee #34	Director	
	Interviewee #35	Manager		
	Interviewee #36	Senior researcher		
	Interviewee #37	Executive position		
	Interviewee #38	Lead associate		
	Interviewee #39	Technology expert		
	Interviewee #40	Research officer		
	Interviewee #41	Technical officer		
	Interviewee #42	Principal scientist		
	Interviewee #43	Senior researcher		
	Interviewee #44	Senior researcher		

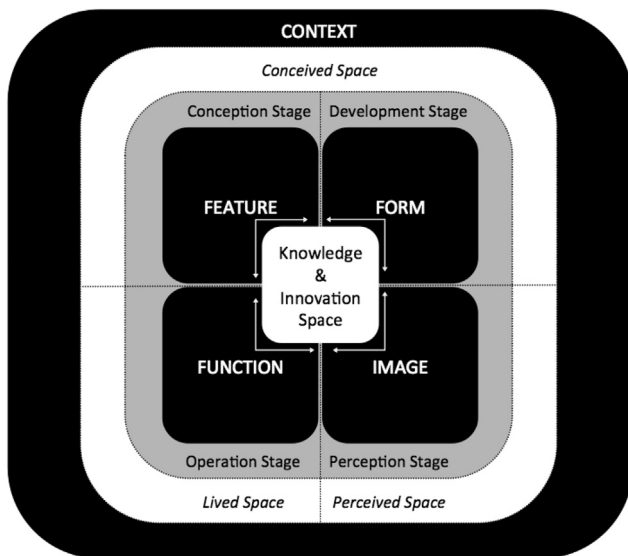


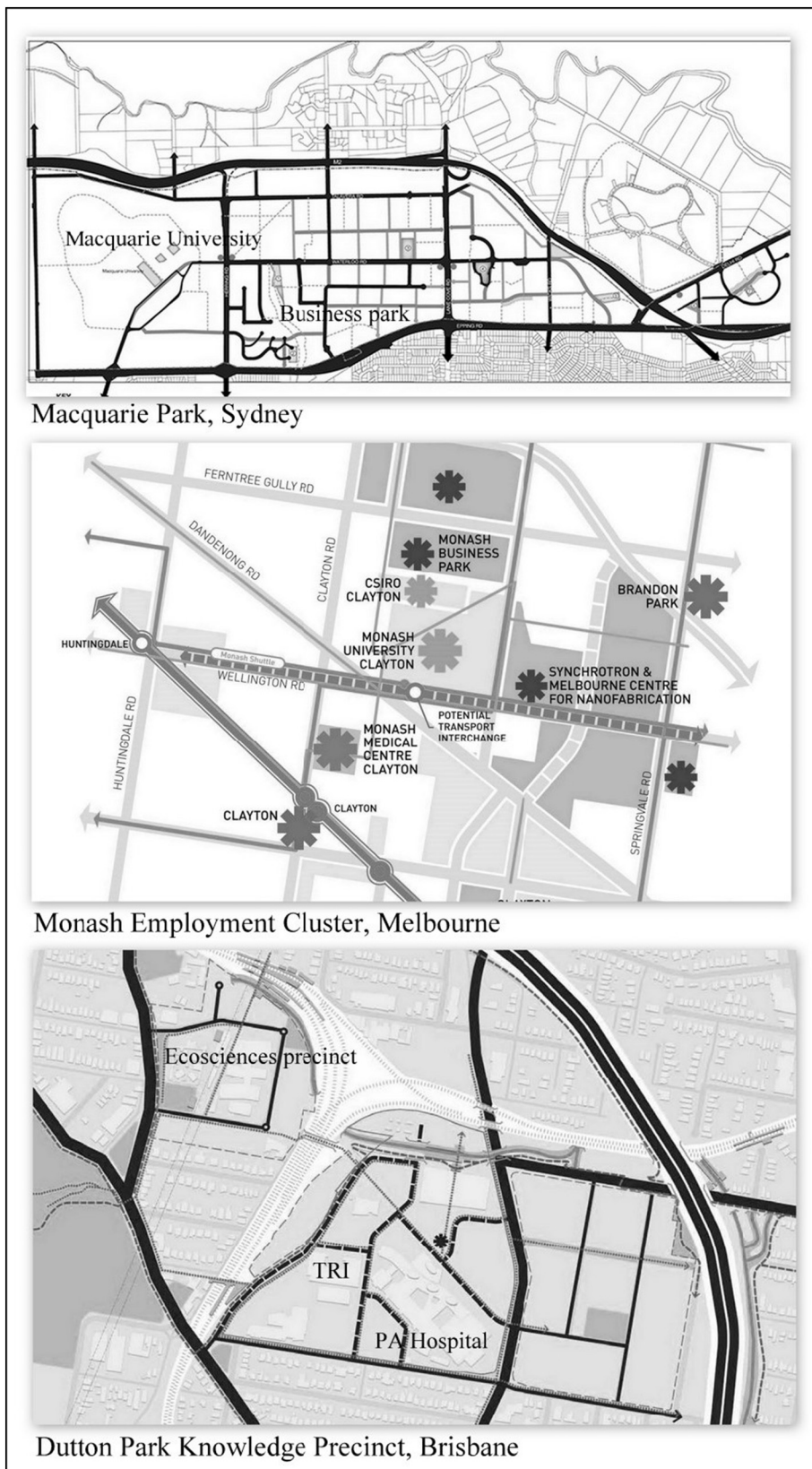
Fig. 1. Conceptual framework of place making (Pancholi et al., 2017, p.77).

framework at state and city level facilitates a favourable context. While high-level universities and research institutions provide the knowledge base; specifically dedicated bodies and networking organisations act as catalyst—initially, in the process of design and development with co-ordination and networking in later stages. Metropolitan Planning Authority in Melbourne is a specifically dedicated organisation focusing on planning of such sites that function by bringing stakeholders together. The existence of a dedicated body for urban design at local level further complements this. Interviewee#8 believes the potential for MEC's future development rests in this, “The fact that we have an in-house urban design and sustainability group has some influence.”

3.2. Feature

Existence of strong anchor and sub-anchors strengthen the profile of KIS as evident in all three cases with renowned universities and other well-acclaimed institutions acting as anchors. In Sydney, Macquarie University (one of the world's top-250 universities) is the key anchor with many other global players from diverse fields and Australia's top 100 companies such as Johnson and Johnson, Microsoft, Sony, Optus, Cochlear and Foxtel. In Melbourne, a number of world-class institutions and sub-clusters such as Monash University (one of the world's top-100 universities), Commonwealth Scientific and Industrial Research Organisation, Synchrotron, Melbourne Centre for Nano-fabrication,

Fig. 2. Layout of investigated KISSs.



Monash Health Translation Precinct, Monash Business Park and Monash Technology Precinct and so on gives MEC as an area a distinguished address that attracts other. Similarly, in Brisbane, collocation of regional health providers like Princess Alexandra Hospital, Mater Hospital and others as well as renowned institutions, such as

University of Queensland (one of the world's top-50 universities), Queensland University of Technology (one of the world's top-250 universities), Griffith University (one of the world's top-350 universities), Ecosciences Precinct, Translational Research Institute, Pharmacy Australia Centre of Excellence, Biopharmaceutical Australia,

Commonwealth Scientific and Industrial Research Organisation makes it the most-renowned KIS at regional level. Additionally, interviews demonstrate that specialisation as sector-based product or process specialisation and availability of world-class researchers serve as unique selling point. In MEC and DPKP, globally acclaimed specialisation of institutions in the field of biopharmaceuticals contributes as a key feature. Pointing towards the role of world-class researchers as a prime feature, Interviewee#30 elucidates, *“The way companies come here is through a leading researcher. Because they know that she will get these projects that will mean that more people will use their technology.”*

Effective marketing strategies are required to make a KIS lucrative both to the firms and people. Unlike MQP with a well-defined integrated identity, Melbourne's KIS was seen as an agglomeration of individual sub-clusters rather than having a whole identity of its own—until recently when in 2014 Plan Melbourne designated the overall area as MEC. Similarly, in DPKP, the need for an integrated identity due to the lack of a well-defined name of KIS is apparent from the interviews. Other uniqueness defining factors such as specific focus on societal and place making aspects contribute in indirect branding of KIS. In MQP, this refers to the core focus in agenda on developing live-work-learn-play environment. In DPKP, heritage integration by redevelopment of Boggo Road Gaol makes the project unique. Summarising feature as a place making element, Interviewee#14 asserts, *“It comes back to that unique selling point, that unique advantage that your precinct has over anybody else”*.

Highlighting the need to provide additional support to small-scale businesses in the success of KISs, Interviewee#22 conveys, *“Start-ups are only as good as their access to cash and their next experiment.”* In MEC, local council—with the support of state, national government and key on-site anchor tenants—has developed Monash Enterprise Centre and Eastern Innovation Business Centre to support SMEs and innovative businesses. In MQP, plans are underway for the establishment of an innovation district with university's support. However, DPKP is still lagging behind in providing such amenities except for the individual initiatives by anchor institutes that organise regular training sessions and host companies. Cost-effectiveness emerges as another key factor from interviews that affect the viability of location. As seen in the case of Melbourne, due to competitive land and rent prices, it proves cost-effective for companies to locate themselves in MEC in comparison to CBD with an added advantage of decent block sizes. As a CEO, Interviewee#24 highlights, *“Firstly you have got the space for industry to expand and grow but also the rent is also much lower than in the city as well.”* Interviewee#5 from Sydney exclaims, *“The biggest thing for companies was it's the cheapest place”*. Conversely, in DPKP, soaring land prices has been an impediment in attraction of companies owing to site's proximity to the city. This has also resulted in push in market demand towards residential development. In addition, lack of affordability of houses is one of the major pitfalls in developing a live-work-learn-play environment. As Interviewee#14 points out, *“Again it is a bit of a problem in this area because the land is so expensive”*.

### 3.3. Form

Both Melbourne and Sydney's cases have been historically developed as low-scale business park setting and strictly zoned developments on big blocks of land. As evident in MEC wherein, to ensure a sense of quality and greenery, development followed the ‘garden city’ character under local council's strict site planning guidelines and land use zoning—catering to the companies' preference of consolidating their segregated offices at one location. While it gave a unique character to the area and facilitated the favourable conditions for its development as a KIS, it also conversely led to non-walkable environment and segregation. Large isolated corporate campuses behind a boom gate—having their own cafes and restaurants—exist as a current norm that Interviewee#13 in Sydney—an urban designer—denominates as *“A private internalised world not a public rich environment.”* Interviews pointed

towards the lack of common green areas, vibrant public realm and walkability as major issues. Interviewee#33 expresses, *“Buildings are so close to each other without enough spaces to generate activities between them. I would love to have more green areas and larger open spaces between buildings.”* In recent proposals, therefore, there has been a growing acknowledgement to develop more connected, high-density and people-oriented environment as revealed from the interviews with Groups 2 and 5. Interviewee#13 emphasises, *“We need public realm that's going to encourage I suppose the high-end workers to leave the city and not see it as a major disadvantage. You got to deal with it in order to get people out of the buildings and engaging with each other.”* Additionally, due to the absence of public art, heritage or innovative element the KISs lack uniqueness of character necessary for developing a sense of place. Initiatives like climate-sensitive, creative, collaboration-oriented designing and heritage integration strengthen the innovative character of KIS as apparent in DPKP. Buildings like Ecosciences Precinct and Translational Research Institute are awarded at national level as buildings ‘without walls’ for their collaborative environment through use of shared spaces and resources as well as sustainability. Interviewee #17 considers the redevelopment of the historical jail as *“a beneficial prospective move”* which not only aims to making the KIS more vibrant, creative and people-oriented, but heritage integration also adds to its innovative character.

An integrated development as a site is a critical aspect to ensure proper exchange of knowledge and people. In DPKP, interviews highlight the lack of order and flow. The site—being punctuated by the passenger and freight lines—gets divided into two halves. Interviewee#15 emphasises, *“What missing out in the precinct is a highlighting order”* and Interviewee #17 states the *“need to connect two parts of the precinct”*. In MQP, current planning proposal, i.e., Herring Road Urban Activation Precinct Proposal is demonstrative of initiatives to make the precinct more people-oriented and enhancing its vibrancy. These include, but not limited to developing: (a) Land-use re-zoning to mixed land-uses; (b) Higher density urban community with more height allowance; (c) Pedestrian-friendly environment by providing better connectivity and fine-grained roads, and; (d) Landscaping, amenities, community facilities, green spaces and places to meet. Connect Macquarie, i.e., a formal group with representation from key stakeholders aimed at transport solutions, contributes in strengthening the people-oriented character further. Herring Road Urban Activation Precinct Proposal illustrates that in order to integrate the diverse knowledge community and society in KIS, a genuine and fine intermix of diversity in housing options is necessary. The plans for redevelopment of Ivanhoe Estate—an on-site social housing estate—will enhance the current 259 existing social dwellings into a mix-housing estate neighbourhood with at least 556 social housing dwellings. Integrating more social housing will also contribute in combating social issues such as gentrification and marginalisation.

### 3.4. Function

Analysing function as a place making dimension, participants from Groups 1, 2, 3 and 4 across the three cases equally acknowledged the enhancement in importance of networking and its critical role in the sustainable success of KIS. Interviewee#20 synopsis, *“Final comment on this is, the whole concept of open innovation is much stronger as compared to keeping everything secret. Companies are recognising they need new ideas and to work in collaboration rather than just relying on themselves.”* Melbourne's MEC emerges as the leading example out of three displaying the strong role of virtual networks existing as its networking assets. Here groups like Victorian Platform Technologies Network—a state-level centralised networking group—and Monash Technology Research Platform—a KIS-level subset platform of Victorian Platform Technologies Network active in Monash—play a proactive role in MEC as an ideal collaboration for government, research organisations, universities, industry, researchers and innovators. Managers from

Melbourne commended the role of these groups in social networking expedited within groups of managers and others leading to fruitful collaboration. Interviewee#27 formulates, “*So I think in addition to the physical structure and the spaces and so forth, you cannot underestimate the social networks and structures that are important for success.*”

Another key aspect that defines place making through function is how vital the location is. This depends largely on the vibrancy of activities, diverse functions or uses that exist in the KIS as well as the usability of its public amenities. Analysis shows that the role, exchange and interaction of universities with rest of the KIS slightly vary from case-to-case depending on their simultaneity of establishment relative to the KISs. While already established ones like University of Queensland in the case of Brisbane tend to have a higher influence as anchor, the process has been time consuming those that have been established simultaneously like Macquarie University in Sydney and Monash University in Melbourne. With their opening up in last few years, they have already started reflecting a significantly positive augmentation in their impact by lubricating the networking within the KIS. They act as a common platform for firm, institution, government and society as evident by the statement of Interviewee#28, “*Some of the companies don't have a natural way. It's hard whereas we can introduce them naturally in a very relaxed way. And they can follow up by doing business together.*” The cases of Melbourne and Sydney have been initially developed as business parks and hence functions were deliberately zoned to prioritise the development of corporate and commercial-based functions. This lack of proper mixed-use functions and public amenities can negatively impact on the vitality of KIS, safety and achieving a 24/7 vibrancy. Consequently, the current plans are addressing this as an issue by introducing more mixed-uses. Explaining the future plans, Interviewee#15 says, “*The proposal is to find ways to bring activity into the precinct both through retail and leisure, food, obviously. Try to make it more porous, try to open it up a bit, try to actually get people to come in and spend time in these spaces—like a third space.*”

### 3.5. Image

This section focuses on capturing the perceptions of group of stakeholders that investigates attraction, image sustenance and repulsion factors related to three KISs. In MQP and MEC, while users appreciated the quality of environment and openness of site, but physical factors such as lack of amenities, casual spaces, walkability, 24/7 active precinct model and economically housing affordability are common concerns raised by knowledge workers and firms in all three cases. Interviewee#36 elucidates, “*I like the peace and quiet but at the same time I did not like that there is nothing else there.*” In addition to these, factor such as commuting distance from the city emerges as an issue for the companies to retain the knowledge workers who prefer CBD to remote locations in KISs as evident from interviews of Group 4 in MQP and MEC. However, local community in MQP displayed great sense of attachment and pride in belonging to the area owing to its accessibility, amenities and other assets. The cases display a quadruple helix model of governance and planning, i.e., an equal participation from public, private, academia and community through consultation from initial stages to final stages of planning and functioning. In all the three cases, ample efforts from policymakers and planners, i.e., Groups 1 and 2, are evident to make the planning processes democratic. Analysing firm and institution's perceptions, Interviewees from Group 4 show high degree of satisfaction regarding the role of government in three cases. Interviewee#25 from Melbourne expresses, “*The government provides implicit support.*”

Considering its initial stages, Brisbane's DPKP revealed that even a people-oriented proposal can face conflicts due to lack of clarity in its communication to community. These conflicts in DPKP were later converted into coordination by the active role of planners in community consultation. MQP is a strong case representing the efficiency of communication and public engagement as evident by interviews with the

key community group. To make the communication effective, initiatives here were not limited to online dissemination of information, but extended to hand-delivered letters with clear information translated into multiple languages. Interviewee#21 recounts, “*Staff on the site was very understanding, very compassionate, very patient with people, I do not think we could have asked for much more in terms of how the government has handled itself.*” Pointing towards the significance of effective communication, he sums up, “*We did the research, with such teams like Macquarie University and we know having an answer just had a caustic effect on people's well-being.*” Coordination within different hierarchy of government is critical too. In Sydney and Melbourne, while interviews with Group 1 display substantial coordination, certain issues at planning stage such as land use conversion in KIS from zoned to mixed-use emerges as a point of conflict between local and state level. Interviewees from Group 1 associated at local level displayed some reluctance towards the conversion of existing land-use model owing to their qualms about the effect of change on current commercial success of both KISs.

## 4. Discussion and conclusion

As stated by Witt (2016, p. 4), “in a historical perspective, successful innovations have been the main drivers of economic growth creating wealth and raising the standard of living of the masses. Innovations are, therefore, often considered in a wholesale manner a desideratum in politics, in the public, and, not least, in innovation-related research”. The literature points out KISs, hence, as the nexus of innovation activities and KBUD, which have caught the attention of urban administrators and policymakers. In theory, place making practices provide an opportunity to shape KISs as innovation hubs to deliver desired outcomes concerning economic prosperity and beyond (Pancholi et al., 2015b). However, in practice it is not clear how place making can be integrated as a strategy to combat the challenges of KISs. This paper, hence, aimed to address this issue though an investigation of the Australian context. The key findings of this qualitative empirical investigation are discussed below.

Summarising the empirical investigation, each of the cases—on account of their respective strengths and weaknesses—represent the role of different dimensions in the overall process of place making in KISs (Table 2). MQP in Sydney is an illustrative example of place making through design and societal integration in contemporary KISs. Investigation of MEC in Melbourne strongly demonstrates the role of virtual networks—formal and informal—as well as institutions and governance in place making. DPKP is noteworthy for exploring the community-related conflicts and critical role of individual actors in shaping a knowledge location and, additionally, exhibits how heritage integration and innovative designs brings character to KISs.

While the investigation on three major cities of Australia explores individual spatio-temporal integration of place making, few significant theoretical implications that stands common in terms of definition, characteristics and role of place making in KISs are identified. These are:

- Any location is shaped by the complex interplay between its context, socioeconomic and political processes, physical and spatial factors and relationship between actors. Place making, thus, is a multi-faceted concept that needs to be seen in the conceived, perceived and lived aspects of space being manifested as five pivotal dimensions, i.e., form, feature, function, image and context. KISs evolve over time.
- The role of place making corroborates itself across the various stages of KISs from pre-establishment conditions, planning, functioning to perceptions of its users.
- Considering the current challenges of KISs—the role of place making in KISs, hence, should not be considered limited only to the retention of talent force by creating a desired physical environment. But

**Table 2**  
Attributes, components and implications.

Attributes	Components	MQP	MEC	DPKP	Implications
<b>Context</b>					
<i>Conditions</i>					
Spatio-temporal	Site location	+	+	+	Building upon local assets
	Development history	+	+	+	
Socio-economic	Socio-cultural diversity	+	n/a	+	Sustained funding
	Sectoral strength	n/a	+	+	
<i>Support</i>					
Political	Policy and planning	+	+	+	Continued prioritisation in policies
	Economic	+	+	n/a	
Institutional	Organisational	–	+	–	Dedicated institutionalisation
	Knowledge assets	+	+	+	
<b>Feature</b>					
<i>Profile</i>					
Marketing	Strategic branding	+	–	–	Effective marketing
	Indirect branding	+	+	+	
Identity	Anchor Image	–	+	+	Anchor and specialisation as asset
	Specialisation	n/a	+	+	
<i>Competitiveness</i>					
Resource	Innovation support	+	+	+	Cost-effective resources for SMEs
	Business support	+	+	–	
Viability	Rent and land prices	+	+	–	Ancillary amenities for knowledge workers
	Housing affordability	+	n/a	–	
<b>Form</b>					
<i>Integration</i>					
Permeability	Urban-spatial integration	+	–	+	Horizontal and vertical permeability
	Land use mix	+	–	–	
Order	Sub-cluster level flow	+	+	–	Special local bodies for design
	Campus-site relationship	–	+	–	
<i>Character</i>					
Uniqueness	Design innovativeness	+	+	+	Unique identity
	Enviro-cultural sensitivity	+	+	+	
People-orientedness	Public space character	+	–	–	Developmental incentives
	Housing diversity	+	n/a	–	
<b>Function</b>					
<i>Connectedness</i>					
Formal networks	Anchor-tenant collaboration	+	+	+	Hierarchical networking groups
	External formal networking	n/a	+	n/a	
Social networks	Knowledge worker level	+	+	+	Focus on social networking
	Community-integration	+	n/a	+	
<i>Vitality</i>					
Vibrancy	Role of anchor	+	+	+	Timely planning of mixed functions
	Use of space and amenities	+	–	–	
Diversity	Size and sector of firm	+	+	–	Planning for diverse size and type of firms
	On-site functions	+	–	–	
<b>Image</b>					
<i>Sense of ownership</i>					
Transparency	Planning stage	+	+	+	Effective communication
	Implementation stage	+	+	+	
Inclusiveness	Pre-planning stage	+	+	–	Democratic participation
	Decision-making stage	+	+	+	
<i>Identity</i>					
Sense of trust (of stakeholders)	Stakeholder coordination	+	+	+	Coordinated governance
	Government coordination	–	–	n/a	
Sense of attachment (of users)	Knowledge worker satisfaction	+	+	–	Collaborative body and leadership
	Community pride and belonging	+	n/a	+	

Notes: (+) = strong, (–) = weak, (n/a) = not available.

it needs to be extended to integrate the solutions that cater to the social, economic, organisational and cultural needs of knowledge communities, society and spaces.

- This refined and extended multidimensional role of place making is to ensure:
  - An efficient governance environment that facilitates supportive conditions for the growth and sustenance of KIS;
  - Developing and strengthening a unique identity derived from identifying and building upon local assets;
  - Economic sustainability of KIS by facilitating support and an efficiently managed vision;
  - Sustained knowledge and innovation generation, nurturing,

exchange and dissemination in a well-networked and vibrant functional space;

- A sense of attachment and place by creating a connected, permeable, creative, character-rich and people-oriented spatial environment;
- A sense of trust and ownership by fortifying a transparent, well-informed, democratic society displaying equal participation of all stakeholders, and most importantly;
- Constructive societal integration for sustainable growth of a cohesive and resilient community as well as to disseminate knowledge and reap the benefits of KBUD.



The role of planners and policymakers in place making for KISs shifts from direct intervener to facilitator of conducive conditions. Consequently, for practically integrating place making as a strategy for the definition of planning policies, aimed at combating the unique challenges of KISs, major implications—as relative to each dimension—derived here on the basis of investigation are:

A. Context-wise—for ensuring support and favourable conditions:

- a. Continued prioritisation: Irrespective of change in government and henceforth political agendas, it is crucial to prioritise KISs in policies for the sustenance of growth and success. This prioritisation specifically refers to policies such as: Strong recognition as key project; multidimensional vision for their planning and physical development, and; investment in KISs for innovation and knowledge growth. More importantly, specific consideration of place making in relation with KIS is also inevitable.
- b. Sustained funding: The funding support by government need to extend from seed funding to operational funding for sustainable growth and success.
- c. Dedicated institutionalisation: Specific government authorities dedicated to KIS's development, design, management and co-ordination—between stakeholders and different hierarchy levels in government—should be institutionalised to make the processes related to them efficient, fast, coordinated and organised.
- d. Building upon local assets: Place making strategies need to identify and build upon the local economic and socio-cultural assets.

B. Feature-wise—for enhancing competitiveness and viability of project:

- a. Effective marketing: Branding strategies make them unique and competitive at local and international level. A brand that gives KIS an integrated identity can be defined by: A well-defined name and logo for the area; integration of socio-cultural aspects, and; specific focus on place making.
- b. Anchor and specialisation: During conception, it is to be considered that the global and local image of institutions existing as anchors and their talented researchers contribute as a strong appeal nationally and internationally. Specialisation in particular sectors, processes or at individual level is also critical for the success.
- c. Cost-effective resources for SMEs: Investing and planning for cost-effective resources required by SMEs and start-ups that provide them innovation support—in the form of physical infrastructure such as presence of accelerators, a range of collaborative working environments such as hot desks, break out zones, work stations, laboratories and private office spaces with 24/7 accessibility and shared facilities—as well as business support—through flexible leasing arrangements, access to finance, training and exposure to information—make KISs economically more inclusive and innovative.
- d. Ancillary amenities: Provision of formal and informal amenities required by knowledge workers act as a key attractive feature. These include a common accessible management, physical and digital infrastructure and other casual amenities.

C. Form-wise—for ensuring permeability and uniqueness:

- a. Horizontal and vertical permeability: For promoting 24/7 activities and diversity, mixed-use zoning is vital. An integrated and permeable design, i.e., having connection at various levels such as between: Buildings and their surroundings; sub-clusters; lower floors and outside of buildings, and; adjacent campuses.
- b. Local bodies: Facilitating local bodies or departments specifically dedicated for designing can contribute positively in the process of place making.
- c. Unique identity: By integration of heritage and cultural elements as well as integrating sustainability and innovativeness in design features, KIS can achieve the unique character necessary for

establishing an identity for itself.

- d. Developmental incentives: Developmental incentives can be used as planning tool to achieve the desired people-oriented physical character of KIS, such as ensuring housing diversity, on-site permeability and fine-grained mixed-use development. Introducing diversity in housing not only caters to the diverse socio-cultural needs and income-groups to make resilient, cohesive and vibrant community but initiatives such as integration of social housing also act as a strong place making factor at social level.

D. Function-wise—for improving connectedness and vitality:

- a. Hierarchical networking groups: Centralised networking organisations with subsets at KIS-level that strengthen formal networks in diverse sectors need to be supported and invested into. They contribute by: Being a common platform bridging the interface through common events and meetings; providing open access to core facilities, common service and expertise; skill development through workshops; bringing diverse sectors together; leading to fruitful collaborations, and; social networking. The success of their functioning depends on the openness of university that act as lubricator, ability of leadership, support and investment from government, accessibility to researchers, innovators, small-scale businesses, private and public sector as well as their scale of reach.
- b. Social networking: Social or informal networks that develop in lieu with the formal networking sessions and training prove to be highly helpful for strengthening knowledge exchange and dissemination and developing a sense of attachment and trust.
- c. Timely planning of diversity of functions: For planned KISs, process of designation or rezoning the land area to mixed-uses needs to be implemented in earlier stages for its fruitful integration, i.e., to ensure functional use of spaces from commencement itself, and also discouragement for market demand to push towards dominant sector. This diversity in functions and amenities is vital for making the contemporary KISs vital.
- d. Diverse size and type of firms: This diversity needs to be extended to the size and type of firms too. While the innovation depends on an exchange between diverse sectors such as biopharmaceuticals, technology, engineering and creative sectors, it also depends on co-existence of small-scale, medium-scale and large-scale firms.

E. Image-wise—for developing a sense of ownership and identity in range of stakeholders:

- a. Effective communication: Through an efficient plan for proper communication of information, team of architects and planners can garner support by avoiding conflicts and developing a sense of trust. Three main requisites for effective communication are ensuring it is transparent, personalised and explicit.
- b. Democratic participation: Knowledge communities should pioneer the development as a quadruple helix model with an equal participation from public, private, academia and community and effective stakeholder engagement in decision-making process, plan implementation and functioning of KIS.
- c. Coordinated governance: Equally important is the coordination between various tiers and departments of government for the successful and timely accomplishment of vision.
- d. Collaborative body and leadership: A common organisational setup with efficient leadership and a team of experts in designing, developing, functioning and coordinating acts as a lubricator by overseeing the overall process and serving as a common platform for various stakeholders for quick and fair decision-making process.

The investigation on the Australian KIS experience reveals the necessity of an integrated, efficient and multidimensional place making approach—aimed at not only physical outcomes, but also a holistic set of objectives including economic, societal and management aspects.

This holistic approach will help in the achievement of a milieu containing the qualities of: (a) Sustainable and collaborative business environment; (b) supportive governance and organisational environment; (c) connected and characterful spatial environment, and; (d) vibrant people environment comprising cohesive communities with strong sense of place.

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