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Towards a unified method for the knowledge based urban development framework

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Structured Abstract

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Purpose—The growing debate in the literature indicates that the initiative to implement Knowledge Based Urban Development (KBUD) approaches in urban development process is neither simple nor quick. Many research efforts has therefore, been put forward to the development of appropriate KBUD framework and KBUD practical approaches. But this has lead to a fragmented and incoherent methodological approach. This paper outlines and compares a few most popular KBUD frameworks selected from the literature. It aims to identify some key and common features in the effort to achieve a unified method of KBUD framework.

Design/methodology/approach—This paper reviews, examines and identifies various popular KBUD frameworks discussed in the literature from urban planners' viewpoint. It employs a content analysis technique i.e. a research tool used to determine the presence of certain words or concepts within texts or sets of texts.

Originality/value—The paper reports on the key and common features of a few selected most popular KBUD frameworks. The synthesis of the results is based from a perspective of urban planners. The findings which encompass a new

KBUD framework incorporating the key and common features will be valuable in setting a platform to achieve a unified method of KBUD.

Practical implications –The discussion and results presented in this paper should be significant to researchers and practitioners and to any cities and countries that are aiming for KBUD.

Keywords – Knowledge based urban development, Knowledge based urban development framework, Urban development and knowledge economy

Paper type – Academic Research Paper

1.0 Introduction

The 21st century has marked the beginning of new advancements in the field of information and communication technology (ICT) which has impacted significantly on the overall spatial pattern and socio economic fabric of cities. The ongoing transformation of advanced economies from manufacturing to services and then to knowledge-based activities has also influenced urban planning, development and management of economic activities. The impact of what has been broadly labelled as the knowledge based economy, coupled with the issues of globalisation and rapid urbanisation has thus mooted new ideas to plan for a development that encompass the needs and requirements of the economy and society. The nature of city development is also changing as society becomes increasingly knowledge based. This is because activities in the knowledge sector are becoming more important and require conditions and environment which are very different from those required by the community-based activities which are declining (Knight, 1995). The rise of knowledge-based economy is also seen as the main driver of global and local economic development (Yigitcanlar, 2009a). The aim of urban planning in the era of knowledge based economy is to achieve a sustainable development by creating a strong urban core, harnessing its economic strength and addressing social exclusion and avoiding physical dereliction.

In answering to the transformation towards knowledge based economy, many research works focus on the emerging knowledge economy, the rising network society and the sweeping impacts of ICT (Graham and Marvin, 1996, Castells, 2000, Ergazakis, 2004, Winden and Berg, 2004). However, limited researches were undertaken to specifically deal with the physical planning and spatial environment of cities that serves to shelter the society of the knowledge economy and their related supporting activities. Knight (2008) argued that little consideration is given to the cities' knowledge resources, the cultures that produce knowledge, the knowledge based activities and the effects which their restructuring have on cities. There is also a growing debate in the literature signifying the weaknesses of present urban planning system as unable to be dynamic and coping with the economic changes and global challenges.

Cities must formulate development strategies for knowledge based development. There is a strong correlation between creative and innovative places to economic growth. Durmaz, Yigitcanlar and Velibeyoglu (2008) agreed that the era of knowledge economy has promoted knowledge generations and acknowledged creativity and innovation as central to urban growth. The symbiosis that exists between the era of knowledge based

economy (where knowledge production is vital) and urban planning and development needs to be investigated. More importantly, the shift in local economies towards the knowledge-based economy has produced more global, competitive, innovative, creative knowledge based activities and relevant developments. These activities have started to reshape the urban environment and will definitely bring effects to the socio-spatial development order. As knowledge economy gains momentum around the world, there is an urgency to analyse, quantify and qualify the foundations at city level since it is in city where knowledge are produced, distributed and marketed.

The era of knowledge-based economy has led to the development of the notion of Knowledge Based Urban Development (KBUD); a beneficial set of instruments in order to improve the quality, welfare and competitiveness of cities (Yigitcanlar, 2007b). KBUD has gained popularity as a powerful strategy for sustainable economic, social and urban growth, and for the post-industrial development of cities (Yigitcanlar, Velibeyoglu and Baum, 2008b). The process of implementing KBUD approaches is neither simple nor quick and it has to be viewed from the multidisciplinary angles (Ergazakis, 2008). Urban planners, however, will still have to play a key role in deciding the future directions of cities development. There are currently many research efforts put forward to the development of appropriate KBUD frameworks and KBUD practical approaches. The examination of present KBUD approaches has permitted one to identify an emerging pattern although a unified method has yet to be established (Ergazakis, 2006). This paper aims to outline and compare the most popular KBUD frameworks and practical approaches, and provide a summary incorporating their important and common features. It employs a content analysis technique whereby it is a research tool used to determine the presence of certain words or concepts within texts or sets of texts. The discussion and results presented in this paper should be significant to researchers and practitioners as well as to any cities and countries that aiming for KBUD. It is structured under five (5) sections. Following introduction, section two (2) examines on the relationship between knowledge based economy and urban development. It explains how the shift in knowledge economy has impacted the socio and spatial aspect of cities development. Section three (3) discusses KBUD as a new paradigm in urban planning. Section four (4) examines selected popular KBUD frameworks identified from the literature. Section (5) evaluates and summarises their common features while the last section (Section 6) provides conclusion and gives recommendation for future research.

2 Knowledge Based Economy and Urban Development

Globalisation and rapid urbanisation have changed the nature of city development. The transition towards knowledge based economy which emphasises on the production of knowledge has certainly affected the process of urban development. Organisation for Economic Corporation and Development (OECD) (1996) defines knowledge economy as a term established to describe trends in advanced economies towards greater dependence on knowledge, information and high skill levels in human resources and combating social exclusion. There are a number of major changes that are bound to have an impact on the patterns of human activity and urban living. Carillo (2004) has categorised these changes into four aspects namely dematerialisation (i.e. a lesser volume of material inputs and outputs); environmentalism (i.e. a greater concern with sustainability); an experience upgrade (i.e. the capacity to attain the same results without the conventional means of space and time and essentialism (i.e. the understanding and pursuit of ever more fundamental values).

Knight (1995, 2008) argued that current cities development has been viewed primarily from the perspective of city planning with a focus on their physical form and built environment (e.g. on land use zoning, building and infrastructure). Very little consideration has been given on their knowledge resources or to the cultures that produce knowledge. Previous emphasis has been made on attracting tangible forms of wealth (i.e. labour, land and capital) and knowledge as an intangible asset is often ignored. With the advent of the global knowledge based society, there is a greater attention that needs to be given to the cities structure and making that knowledge as an input to local development.

The types of environment which need to be developed for knowledge-based activities, therefore, differ significantly from those developed by commodity-based activities and call for different development strategies. Carillo (2004) claims that the most immediate impact of the knowledge based economy in relation to the urban environment is the reduction in displacements made possible by the internet and wireless telecommunications. Working, schooling and shopping pattern will be changed substantially. Some of the most distinctive characters of industrial city such as commuting, suburban residence, central districts and zoning in general are fading and they will be replaced by the distribution of work and learning, e-services, empty office space and zone reconversions. He further points out that the most important aspects of knowledge urban experience will no longer require presence and simultaneity, and therefore the current patterns of transportation, scheduling, configuration, zoning and infrastructure. The present configuration, organisation and life style of urban centres might be more of inheritance of tribal, hierarchical and material production patterns than an urban design and culture fit for knowledge based society (Graham, 2002). The new city designs should, for example, consider the notion of accessibility rather than proximity and contiguity, networked knowledge innovation zones rather than classical land use zoning, and the flow of information, goods and people rather than users and products' movement from one area to another.

Ergazakis et al., (2006) highlight that nations and international organisations have realised that the challenges facing modern societies call for development strategies that are knowledge based. The task for cities in the era of knowledge economy which characterised by globalisation is that, cities need to create environments where knowledge resources are valued, create conditions conducive to their development, and they must ensure that their knowledge resources are securely anchored (Knight, 1995).

A knowledge based approach to city development seeks to address the issue related to cities being a place where knowledge is created and marketed by providing a framework for defining city's role as a knowledge centre. It is important to identify the need of city's knowledge sector and creating conducive city's environment for the knowledge-based activities. Knight (1995) argued that cultures producing global knowledge are of particular concern because as these cultures develop, their local linkages weaken, distanced and disengaged from the affairs of the city. Within the same line, Knight highlighted in 2008 that "The quality of life in cities will continue to decline unless cities protect local values and support efforts to valorise local knowledge." (Knight, 2008; pxv). In the long run, cities will lose out as the knowledge market is global. Hence, the quality of future cities in answering to the global challenge of the era of k-economy will become a crucial question and its answers create a challenge for architects, urban designers, planners, developers, and decision makers alike around the world.

3 Knowledge Based Urban Development

In recent years urban planning has consolidated its interest in the paradigm of post-modern social production under the rubric of KBUD (Carillo, 2004; Yigitcanlar, O'Connor and Westerman,2008a). KBUD has become an important mechanism for the development of cities. It is seen as a beneficial set of instruments in order to improve the welfare and competitiveness of cities (Yigitcanlar,2007b). KBUD is a development approach that aims at sustainable development and economic prosperity, which helps in making cities compatible with the knowledge economy, and provides their citizens with the opportunity to foster knowledge creation, knowledge exchange and innovation (Ergazakis, Metaxiotis and Psarras,2004). The importance of KBUD within the paradigm of knowledge based economy is seen as the best alternative for the present practice of urban and regional planning to respond to the change(s). Cities, being a place where such knowledge is created and marketed, need to respond effectively in order to promote a more sustainable socio-spatial order. The social benefits of KBUD also extend beyond aggregate economic growth as KBUD provides a platform for cities to be resilient to economic changes and secured in a network connections anchored at local, national and global coordinates. It also offers quality of place to attract and retain talent. The promise of KBUD is a secure economy in human setting in line with the sustainable urban and economic development (Yigitcanlar,2007b). Many acknowledged that KBUD is the latest approach in urban planning which offer a dynamic, strategic, flexibility and participatory urban planning.

The creation of KBUD also presents significant new opportunities and challenges to the way the government, people and organisations think, operate, and manage their activities. In the knowledge era, KBUD needs to focus on catering and attracting knowledge-based activities and high-technology industries that are expected to contribute significantly to employment, Gross Domestic Product (GDP) and exports. Factors of production such as labour, capital, raw materials and entrepreneurship remain important but knowledge is the key driving force underlying growth and a valuable commodity, not only as a factor of production but also as a commodity to be traded (Hearn and Rooney, 2008).

There are ten important conditions that are conducive to the development of knowledge-based cities; the community able to define, perceive and value knowledge as a form of wealth; the city acknowledge the importance and contribution of knowledge worker; the city able to make the public understand the nature and role of knowledge; place knowledge resources at regional terms; give priority to improve knowledge infrastructure; ensure all members of society have access to careers in knowledge based activities; promote city as a centre of excellent; offer incentives and mechanisms favouring investment in locally based knowledge resources; futuristic vision emphasising on knowledge and other immaterial factors and develop civic leadership (Knight, 1995).

What need to be emphasised is that the development of knowledge economy requires a different city environment and KBUD is tailoring for this. It concerns primarily with upgrading human and organisational capacities and creating environments which are conducive to innovation, learning, creativity and change. Some of the successful KBUD exemplars include the famous Silicon Valley in California and Route 128 in Massachusetts. The accomplishments of these two developments were based mainly on knowledge network that encompassed both regional learning institutions and profit industry research teams, and the knowledge, in the form of innovations. Their success has inspired many cities and demonstrated that KBUD has been able to provide a platform to

offer a competitive advantage and promote a new form of local socio-spatial and economic development in the era of knowledge based economy (Yigitcanlar, 2007b).

KBUD transcends many areas of economic, social and urban policy, and has three broad purposes (Yigitcanlar,2008). Firstly, KBUD is an economic development strategy that codifies technical knowledge for the innovation of products and services, including urban services, market knowledge for understanding changes in the economy, financial knowledge to measure the inputs and outputs of production and development processes, and human knowledge in the form of skills and creativity, within an economic model (Lever, 2002). It aims at a local economic development that is competitive and integrated with global knowledge economy. Secondly, KBUD indicates the intention to increase the skills and knowledge of residents and employees as a means for intellectual, human and social development (Gonzalez et al., 2005). It aims to increase the quality of life by providing necessary services for societal development. Thirdly, KBUD builds a strong spatial relationship among knowledge community precincts for augmenting the knowledge spill-over effect that contributes significantly to the establishment and expansion of creative urban regions and supports linkages and knowledge transfer between these precincts (Yigitcanlar et al., 2008c). It also aims an urban development that is ecologically sensitive, sustainable and safe. In essence, the main attributes of KBUD are high levels of economic success, high levels of knowledge intensity, diverse knowledge industries, strong academic institutions, excellent communications and transport infrastructure, unique offering to investors and individuals, strategies to ensure all benefit from knowledge and economic success (Yigitcanlar et. al., 2008d).

4 Knowledge Based Urban Development models

Heywood (2009) examines that the measurement method on KBUD vary based on the geographical area being observed i.e. either at national, regional or municipal level. There are a number of models which attempt to provide a general evaluation of KBUD. Also, there are a number of international economic organizations such as the Organization for Economic Co-operation and Development (OECD), World Bank (WB), European Commission (EC) and Asia-Pacific Co-operation (APEC) which have provided some practical directions to build the knowledge economy in developed and developing countries (World Bank, 1999; OECD, 2001; APEC, 2000; European Commission, 2000). The literature, however, indicates that there is no viable framework to develop integrated KBUD strategies exists (Dang and Umemoto, 2009) and the present initiatives towards KBUD are not unified (Ergazakis, 2009). Despite the fact that many cities globally are now considered as successful examples of KBUD, only very few of them that may have managed to formulate integrated strategic approaches, while the initiatives and approaches of the rest of the cities are rather ad-hoc and not based on structured and specific methodologies.

A study by Ergazakis, Metaxiotis, Psarras and Askounis, (2006) also revealed that the present KBUD approaches are fragmented and the need to follow a common approach is apparent and this is also a conclusion of a study conducted by Martinez (2006) on comparing cities. Ergazakis et.al, (2006) have analysed the KBUD approaches of six cities that have explicitly adopted KBUD in their urban development process; Barcelona, Stockholm, Munich, Montreal, Dublin and Delft. They have concluded that each city's approach is different although all are targeting towards the same goal of KBUD. Barcelona has developed a strategic plan to place the city into the leading group of urban regions in the information and communication (ICT) league. Delft has chosen a project

based approach and Stockholm followed a process-oriented approach. Meanwhile, Dublin and Montreal were focusing more on physical infrastructure and ICT related investment. This paper has selected the following five KBUD framework models i.e. MAKCi model, KBUD Analysis model, KBUD Characteristics model, KnowCis model and ALERT model. The common key characters identified from these models will be used for the development of a unified KBUD framework. These models are selected as they are the most popular and relevant in the context of urban planning.

4.1 *The Most Admired Knowledge City Awards Model*

The Most Admired Knowledge City Awards (MAKCi) is an international consulting process which was first established in 2006 by the World Capital Institute to identify and recognize those communities around the world who are successfully engaging in formal and systematic knowledge-based development processes under the flag of Knowledge Cities. It gathers a number of criteria drawn from a wide research and knowledge based development. The MAKCi framework is fundamentally a knowledge-economy model which involves an assessment of the value base on which the future development of a city is made possible. The model has eight knowledge capital dimensions to stand as indicators for the whole KBUD exercise and all are equally weighted. The characteristics offered by this model range from the element relating to physical urban setting such as the identity capital which emphasises on the city's character to the social issues on the value of individual citizen. Table 1 shows the key features of KBUD framework and their respective details highlighted by MAKCi in 2009.

Table 1: The MAKCi Model (2009)

	Characteristics	Details
1.	Identity Capital	All formal and informal elements in the city that have contributed and/or are contributing to determine the city's identity, its clarity and differentiation (i.e. historic profile, city characterization, belonging, etc)
2.	Intelligence Capital	Refers to the city's systems capacity to sense, make sense of and respond to external agents and events which are significant to the city's welfare (i.e. city's strategic planning agencies, city public/private future centres, prospective studies etc)
3.	Financial Capital	Refers to the city's articulation of monetary denomination of production value dimensions which elicit economic sustainability within the capital system (i.e. macro indicators: investment, GDP, tax system, un/employment etc).
4.	Relational Capital	Refers to the city's articulation capital that provides cohesion and makes social integration possible (i.e. ethnic diversity, individual health habits, intellectual and cultural competencies, etc)
5.	Human Individual Capital	Refers to value generating capacity of individual citizens that contribute to the city's system of capitals (health: biological inheritance and physical development; education :holistic personal development)
6.	Human Capital (Collective Base)	Refers to the collective cultural fitness and team based value generating capacities of all citizens that contribute to the city's system of capitals (i.e. demographic structure, public health,

		social welfare intellectual heritage, civic culture, innovation and entrepreneurial capacities etc).
7.	Instrumental Capital (tangible)	Refers to the material-based means of production through which other capitals leverage their value generating capacity. Instrumental capital includes natural existing before the settlement and infrastructure.
8.	Instrumental Capital (intangible)	Refers to the knowledge-based means of production through which other capitals leverage their value generating capacity (i.e. organisation and production systems in electronic and non electronic repositories).

4.2 *The KBUD Analysis Model*

The KBUD analysis model introduced by Yigitcanlar (2008) has classified the requirements for a city which aspire for KBUD into four different characteristics i.e. society, environment, management and economy as shown in Table 2. KBUD needs a “society environment” where an effective education and skill building strategies is required in order to increase skills and knowledge of residence. Secondly, KBUD requires an environment where a strong spatial relationship among knowledge clusters to augment the knowledge spillover effect that contribute to the establishment and expansion of creative urban regions and support linkages and networking between clusters. Thirdly, KBUD requires an institutional arrangement to oversee the development. Finally, Yigitcanlar (2008) insists on “economic environment” where a strong economic development strategy is needed to codify technical knowledge for innovation, market and financial knowledge as well as human knowledge in the form of skills and creativity. He further emphasises that the economic environment must create a local economic development that is competitive and integrated with the local economy.

Table 2: The KBUD Analysis Model (2008)

	Characteristics	Details
1.	Society	Effective education and skill building strategies (Quality of Life, Human and social development, Intellectual Capital)
2.	Environment	Strong spatial relationship among knowledge clusters (Quality of Place, Sustainable, Unique Identity)
3.	Management	Institutional arrangement to oversee development (Strategic and integrated, Democratic and transparent, Social equity)
4.	Economy	Strong economic development strategy that codifies knowledge (Knowledge based, Competitive, Creative and Innovative)

4.3 *The KBUD Characteristics model*

The KBUD characteristics model introduced by Van Winden, Van Den Berg and Peter, (2007) has discerned seven structural characteristics that are conducive to the city in coping with the requirements of the knowledge era. These characteristics are deemed necessary for a city to be able to acquire, create, disseminate and use knowledge effectively for greater economic and social development. They have identified seven main characteristics of KBUD strategies namely the knowledge base, industry structure, quality of life, diversity, accessibility, social equity and scale. Table 3 shows the seven characteristics and their respective descriptions.

Table 3: The KBUD Characteristics Model (2007)

	Characteristics	Details
1.	Knowledge base	Cities with a high score of workers with tertiary education shows a better performance on many economic parameters
2.	Industry structure	Cities with a weak industrial structure (specialised in traditional industry) have many interrelated problems
3.	Quality Of Life	Cities that offer a good quality of life will attract and retain talented population
4.	Diversity	Cities that are more diverse will foster growth
5.	Accessibility	Cities with high accessibility and international connection are more successful in acquiring knowledge
6.	Social Equity	Cities with high level of social exclusion indicates that a large part of its population are insufficiently used
7.	Scale	Cities size matters as an attraction factor for companies and knowledge workers

4.4 *The KnowCis Model*

The KnowCis methodology was developed by Ergazakis et al., in 2006 to assist and support local authorities in the process of planning and developing their cities as Knowledge Cities. It has nine different dimensions as shown in Table 4. According to them, the approach is easily adapted as the proposed approach is generic as they have tried to incorporate most of the aspects that should be considered on a KC development initiative. For the implementation, however, each city can easily determine where its effort will be focused, according to the present strengths and weaknesses.

Table 4: The KnowCis Model (2006)

	Characteristics	Details
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1	Concept	Promotion of the Knowledge Cities concept and continuous improvement of concept's visibility
2	Support	Improvement of Knowledge Management process within the city
3	Infrastructure	Improvement of ICT infrastructure of the city and citizens' ICT literacy level
4	Participation	Assurance of equal participation and involvement of all citizens
5	Business environment	Support of research, business innovation and entrepreneurship
6	Public sector support	Reinforcement of public sector's role in promoting and sustaining the concept
7	Networking	Strengthening of networking and synergies between all social actors
8	Human skill	Increase the availability and skill level of human capital
9	International network	Enhancement of the inclusive, international and multi ethnic-character of the city

4.5 *The ALERT Model*

The Alert Model by Corey and Wilson (2006) is an approach and a normative support system for local and regional planning practice in the global economy and network society. The model which represented in the form of conceptual framework is a planning support system designed for the use of the diverse and wide-ranging stakeholder and planning practitioners who seek to engage planning in the steering of these new technology-enabled and knowledge-based development forces to attained desired outcomes. At its best, the model can catalyse and stimulate the stakeholders to invent their own strategies that capitalise on the unique assets and development potential of the locality's community. The acronym of ALERT is derived from the keywords that define the content of the model: Awareness, Layers, Electronic business (or e-business), Responsiveness and Talk. Table 5 shows the key characters of ALERT model in relation to KBUD framework.

Table 5: The ALERT Model (2006)

	Characteristics	Details
1.	Awareness	Continuously updating information (Compare local facts and economic profile to elsewhere best practice peer city regions ; actionable knowledge level)
2.	Layers	Understand the present position (Identify principle competitor city-regions ; global and national)
3.	E-Business	Present state of a locality's business assets and resources (Analyse the present state of a locality's business assets and resources)
4.	Responsiveness	Access to opportunities (Levels of responsiveness, E-government, broadband)
5.	Talk	Engagement and collaborative behaviour among the principal representative stakeholder individuals, institutions and organisations (Governance, human capital development, enterprise culture development)

5 Evaluation and Discussion

The examination of present KBUD models in the earlier section shows that each model offers a conceptual difference towards the establishment of KBUD frameworks. Common characteristics and certain key features, however, draw a pattern of recurrence among them, and these recurring elements can easily be identified and grouped. Table 5 simplifies and groups the common key features identified from the five most popular KBUD models discussed in the previous sections. These common features can be categorised into four major domains i.e. social, physical environment, economic and management.

A careful examination on these models, however, suggests that, there is room for modification that may lead to the establishment of a more unified and effective KBUD framework in the future. Although all models have comprehensively covered the basic elements necessary in urban planning i.e. social, physical, economy and governance, there has to be some adjustment required. It can be seen that all characteristics within the examined models are equally emphasised and hence, may affect the validity of the model. What is proposed is that, there has to be some weight assigned to each element and as such, these elements can be ranked in a hierarchical order according to relevance and importance.

Table 5: Summary of KBUD Models

Theme of key features	The MAKCi Model	The Analysis Model	The Characteristics Model	The KnowCis Model	The ALERT Model
Socio cultural development	Relational Capital (Soc)	Society (Soc)	Knowledge Base (Soc)	Participation (Soc)	Talk (Soc)
	Human Individual Capital (Soc)		Social Equity (Soc)		
	Human Capital (Soc)				
Physical Environment and Urban Development	Instrumental Capital-tangible (Env)	Environment (Env)	Industry Structure (Env)	Concept (Env) Infrastructure (Env)	Layers (Env)
	Identity Capital (Env)		Quality of life (Env)		
			Scale (Env)		
Economic Development	Financial Capital (Eco)	Economy (Eco)	Diversity (Eco)	Business Environment (Eco)	E-business (Eco)
Management and Governance	Intelligence Capital (Man)	Management (Man)	Accessibility (Man)	Public Sector Support (Man)	Responsiveness (Man)
	Instrumental Capital –			Networking (Man)	

	intangible (Man)				
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Note: Eco – Economic, Env- Environment, Man- Management, Soc- Society,

Table 6 shows the suggested framework for a more unified and effective KBUD framework. It is developed based on the common key features identified from the popular KBUD models, with a further elaboration on measuring the domains. While the columns on “domains” and “characteristics” are more general in identifying the elements that need to be incorporated in the KBUD assessment framework, the “indicators” and “parameters” columns are more specific in providing elements that are quantifiable and measurable. The characteristics that need to be included in the framework can be categorised into four domains covering all aspects of urban planning i.e. socio-cultural, urban development economic development and management (governance). The suggested framework also proposes the respective characteristics as well as indicators and parameters for evaluation. A more comprehensive model will have a different weight in each domain, characteristics, indicators and parameters.

Table 6: A unified KBUD framework

Domains	Characteristics	Indicators	Parameters
Society (Socio Cultural Development) <i>[weight]</i>	Quality Of Life	Housing Affordability	Levels of housing affordability for average income group
		Community facilities	Number of community facilities per capita
	Human & Social Development	White collar jobs	Ratio of white collar: blue collar jobs
		Literacy rate	Trend analysis of literacy rate
	Intellectual Capital	Level of education	Ratio of population with tertiary education
		K-workers	Number of k-workers per capita
Environment (Urban Development) <i>[weight]</i>	Quality of Place	Green area	Ratio of green parks per capita
		Urban amenities	Ratio of selected urban amenities per capita
	Sustainability	Public transport initiative	Percentage of government budget on public transport
		Environmental Programmes	Percentage of government budget on environmental programmes
	Unique Identity	Cultural Factors	Numbers of international cultural events
		Cultural Facilities	Number of cultural facilities

Economy (Economic Development) <i>[weight]</i>	Knowledge-based	Knowledge industries and businesses	Number of knowledge industries and businesses
		R&D centres	Number of R&D centres
	Competitive	FDI	Trend analysis on FDI
		Multinational HQ	Numbers of multinational HQs
	Creative and Innovative	Creative industries	Number of creative industries
		Patents	Number of patents per year
Management (Governance) <i>[weight]</i>	Strategic and integrated	Vision of organisations	Direction of vision of the organisation
		Multidisciplinary personnel	Number of personnel within the organisation
	Democratic and Transparent	E-government	Number of government services with e-facilities
		E-submission	Number of e- submission for planning application
	Social equity	Wealth distribution	Percentage of wealth distribution among the 20% richest
		Access to employment	Numbers of unemployment

6 Conclusion

The advantages that KBUD offers are very important in setting the future direction of cities development. It can be clearly seen that KBUD is a new concept that can guarantee a sustainable form of development and making cities more competitive in the era of knowledge economy. This paper highlights in general five most popular KBUD models identified from the literature. What can be concluded is that these models of KBUD frameworks are fragmented and not unified. Each signifies different strategies although they are leading to the same goal of achieving KBUD. There are various approaches and emphases that each model has developed. However, there are some similar trends and common characters that can be identified from the above models. A pattern of recurrence of the significant features and their key findings can be traced from the analysis conducted. A generic model for future KBUD framework has been suggested in this paper that incorporate four major domains i.e. environment, management, economic and society. More importantly, each domains suggested should be given a certain weight to ensure a more effective and valid model. It has to be noted that the KBUD conception is still evolving in order to produce more sustainable outcomes of cities development. The debate in the literature indicates that the process of implementing KBUD approaches is neither simple nor quick and some argue that the issues should be viewed from the multidisciplinary angles. Although a unified method may have been developed, a continuous review and evaluation are required in order to ensure that the

KBUD framework is more comprehensive and provide a true reflection of the present scenario.

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