

Sustainable Pillars for Township Tools Core Criteria of Community Planning & Design

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Abstract

This paper aims to identify the sustainable dimension pillars (SDP) on neighbourhood assessment sub-criteria of community planning & design particularly in Malaysia. The problem of the study is, do these townships assessment tools fully address sustainability? Or it might be 'green but not sufficient' to be sustainable? This paper aims to evaluate the adaptation and balance of SPD in Community, Planning and Design (CPD), which is one of the core-criteria of Green Building Index (GBI) Township/Neighbourhood Assessment Criteria. The objective is to identify and evaluate the SPD indicators balance towards sustainable urban development in Malaysia. Questionnaires survey and expert interview were gathered for the SPD indicators in the CPD sub-criteria. The significant contribution of research is that the findings will be used as references/guides for future review and refinement GBI Township/Neighbourhood Assessment Criteria.

Keywords: Sustainable pillar dimensions, community, neighbourhood development.

1. Introduction

Since the 1990s, sustainability assessment systems for building which commonly known as green building index have been used to integrate sustainability into the construction industry, and their inspiration currently at global level. Neighbourhood/township are as important as any element in the development of urban system (Choguill, 2008), yet the development of neighbourhood/township assessment criteria has just begun to spread (Singh et. al, 2009) as well as Malaysia which is still relatively new. It is crucial to evaluate the existing neighbourhood/township assessment systems at this stage of their development to determine their strengths and weaknesses and the methods to further improve them. There are an increasing focus and demand on the assessment and certification of neighbourhoods/township, but studies on neighbourhood sustainability assessment tools and certified project are still inadequate and limited. Recent studies compare neighbourhood sustainability assessment tools based on their structure, the methodologies of their application, their performance on case studies (Garde, 2009; Kyrkou and Karthaus, 2011; Sharifi and Murayama, 2014), and the components they assess (Sharifi and Murayama, 2013), their assessment criteria (Berardi, 2013) and their general characteristics (Haapio, 2012). These studies give a general description of neighbourhood sustainability assessment tools, however their scope does not fully cover the details of the assessment systems, and there is no methodology by which rating systems can be objectively evaluated (Garde, 2009).

Sustainable assessment criteria systems consist of indicators that developed from a thorough literature. Several studies on assessment indicators indicate the purpose definitions and characteristic, development methods of a new indicator groups (Olsson et. al, 2009; Dahl,

2012; Mori and Christodoulou, 2012; Niemeijer and de Groot, 2008; Repetti and Desthieux, 2006), indicator values baseline (Niemeijer, 2002) and indicators frame work (United Nations, 2007). Currently there are various rating system methodologies available; hence, it is quite difficult for stakeholders to effectively compare the most comprehensive one. Different sets of requirement, baseline, geographical factors and locality policies render differentiation. At present, sustainable urban development are mainly promoted by governmental related guidelines, frameworks, policies, incentives and programs (Shen et al., 2011). Synergize by third party organization such as professional institutions, the development of sustainable urban assessment systems which is driven by market approach has gained significance and increasingly adopted by developers.

Sustainability assessment criteria systems and indicator sets have an obvious impact on attempts towards sustainable environment, particularly on sustainable policy development. Sustainability assessment criteria systems and indicator sets provide guides, information and input to development policy making (Reed, Fraser and Dougill, 2006). Besides, sustainability assessment criteria also influence policy making directly whereby the provision of incentives, monetary aids and grants (Walton et al., 2005), for the application of assessment criteria systems, or their implementation process can be sufficiently abridged (Council, 2006). In some municipalities, cities or countries, assessment criteria systems have even become compulsory for new urban developments (Lee, 2013). However, for non-compulsory market-driven township / neighbourhood sustainability assessment criteria systems can also increase the risk of implementing the least sustainable, instead the most cost effective indicator sets in an urban development (Garde, 2009).

1.1 GBI Township Assessment Criteria in Malaysia

Green Rating tools are conceived to be able to assist architects, planners, designers, builders, property owners, government bodies, developers and end users to understand the impact of each design choice and solution towards being more environment-friendly. The Malaysian Green Building Index (GBI) was created to provide the building industry a common and verifiable mechanism to benchmark buildings within the Malaysian context. GBI Township Assessment Criteria and this framework takes it to another level and sets out a vision for sustainability within the built environment and provides guidance that will assist end users to deliver sustainable townships.

Sustainability is central to the long-term viability of our society. Green buildings are a key component of a sustainable society, but the construction of green buildings by themselves will never allow us to effectively address issues that sit outside of the scope of an individual building. Holistic sustainability within the built environment is about the relationship between the environmental, the social and the economic factors, and how the community then uses it. GBI Township Assessment Criteria will allow key stakeholders to take an integrated approach to addressing the environmental, social, and economic and design factors associated with the delivery of a sustainable township. It provides an opportunity for the application of partnership based approach throughout the development process and will assist key stakeholders plan, design, build, manage and operate sustainable communities.

Over the last decade in Malaysia, an interest in 'green', or environmentally preferred, building indexed in green rating has increased dramatically. The Malaysia Green Building Confederation (MGBC) Green Building Index (GBI) certification program reports that from its launch in May 2009 (Figure 2), a staggering total of 50 million square feet of building were 'green' as in May 2013. From Year 1 (May 2009), the number of Registered Project steadily grew, from 55 project to 91 project (Year 2); and to 121 project (Year 3 & Year 4). The Certified Project also increased from 1 certified project in Year 1; 15 certified project in Year 2; 42 certified project in Year 3 and 68 certified projects in Year 4 (Table 1). However,

in order for this positive trend to continue, these buildings need to be evaluated to determine if actual performance is in line with the predicted outcome. Such evaluations should not only include technical and economic performance, but also the experiences of the users/occupants.

Table 1: GBI Project Statistic, May 2009-May 2013.

GBI Projects	Registered Projects	Certified Projects		Registered Projects	Certified Projects		Registered Projects	Certified Projects		Registered Projects	Certified Projects
2009 Q2	17	0	2010 Q2	14	6	2011 /Q2	27	10	2012 /Q2	27	15
2009 Q3	5	1	2010 Q3	23	1	2011 /Q3	25	13	2012 /Q3	45	22
2009 Q4	12	0	2010 Q4	20	5	2011 /Q4	39	7	2012 /Q4	27	13
2010 Q1	21	0	2011 Q1	34	3	2012 /Q1	30	12	2013 /Q1	22	18
Y1 Total	55 4.5/m	1 0.08/m	Y2 Total	91 7.5/m	15 (1.25/m)	Y3 Total	121 10.1/m	42 3.5/m	Y4 Total	121 10.08/m	68 5.67/m

Source: Boon (2013)

1.2 Methodologies and Analysis

The research is to identify all the sub-criteria in CPD of GBI Township/Neighbourhood Assessment Criteria with the goal to evaluate balanced of SPD according to pillars of sustainability framework that leads towards a more sustainable urban neighbourhood development. In order to achieve this aim, the following research process is as shown in Figure 3. The study is carried via experts questionnaires survey of qualified GBI industry stakeholders in Malaysia whom are GBI industry stakeholders; the Councils of MGBC, GBI Facilitator + Assessor. The targeted expert also is extended to the other related stakeholders in GBI, who are the Urban Planners, Architects, Engineers and other similar professionals involved in sustainable neighbourhood development projects. The study involved 14 experts from GBI industry stakeholders.

Data from experts was gathered and analyzed using 1 to 10 likert scale where; 1 - no adaptation of SPD, 2 - extremely very weak, 3 – very weak, 4 – weak, 5 – moderate, 6 – less strong, 7 – slightly strong, 8 – strong, 9 – very strong and 10 – extremely very strong. The analyzed data is representend in the form of radar chart. This was conducted via interviewing GBI expert panels. The objective of the interviews is primarily to discuss the perception from the expert on indicating factors for assessment by evaluating the balanced adaptation of SPD in each sub criteria, score weight indicators and implementation.

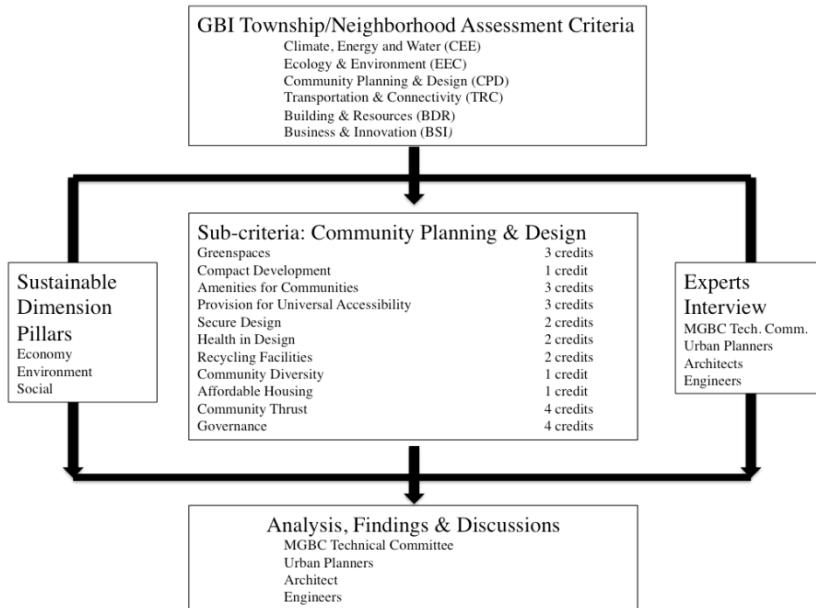
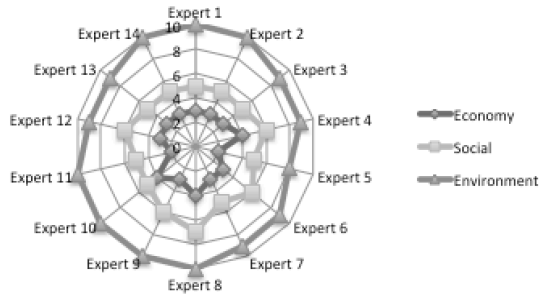


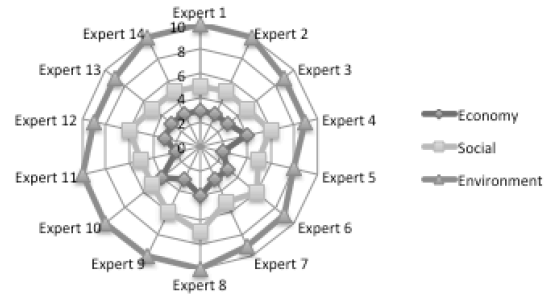
Figure 1: Theoretical Framework of Research

The contribution of this research is to evaluate and the balanced adaptation of SPD in each of sub-criteria Community Planning & Design in GBI Township/Neighbourhood Assessment Criteria. The overall idea is measure the expert’s opinion of SPD in CPD sub-criteria in order to find out a balanced sustainable indicator. This evaluation scalable study is for effective sustainable neighbourhood development that addresses the gaps and the limitations of the existing assessment criteria. It takes into the account the core issues of neighbourhood sustainable development which including environmental, social, and economic (Figure 1) against GBI neighbourhood assessment CPD criteria. The core of SPD has three dimensions, which must be integrated in order to achieve the goal of this study.

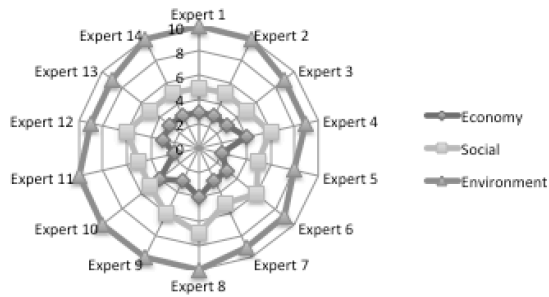
It was found that the data gathered from experts opinion for each sub-criteria (S-C) were ; S-C 1: Greenscapes resultant high scoring values for environment pillar, followed by moderated score for social pillar and less value score in economy. S-C 2: Compact Development scoring values opposite the S-C 1, high scoring values in economy pillar, slightly more than moderate in social pillar and low score in environment pillar. S-C 3: Amenities for Communities high score for social pillar; average 9-10, environment pillar average 1-3 score and economy pillar average at 3-5 score. S-C 6: Health in Design, social pillar average at 8-10, economy pillar 7-8 score and environment pillar average at 2-3 score. S-C 7: Recycling Facilities, environment pillar average at 8-9, social pillar average at 7-8 and economy pillar average at 6-7. S-C 8: Community Diversity, environment pillar average at 4-5, social pillar average at 9-10 and economy pillar average at 7-8. S-C 9: Affordable Housing, environment pillar average at 4-5, social pillar average at 9-10 and economy pillar average at 7-8. S-C 10: Community Thrust, environment pillar average at 3-5, social pillar average at 10 and economy pillar average at 8-9. S-C 11: Governance, environment pillar average at 8-9, social pillar average at 9-10 and economy pillar average at 10.



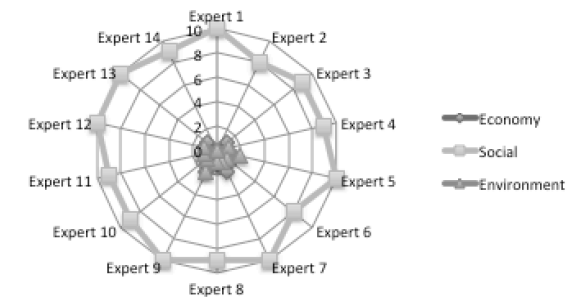
Sub-criteria 1: Greenscapes



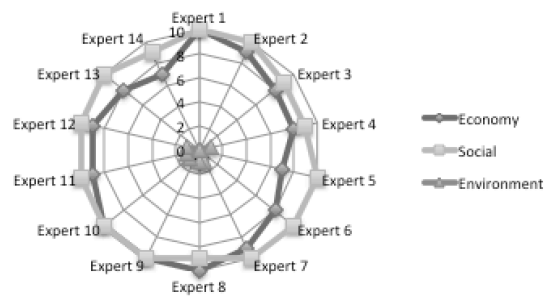
Sub-criteria 2: Compact Development



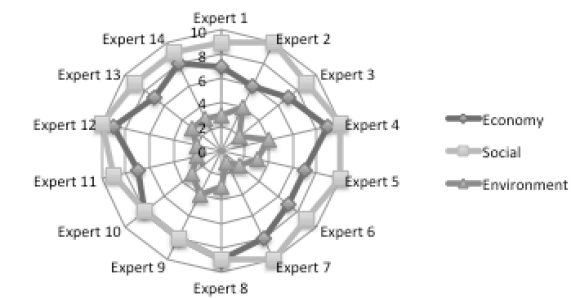
Sub-criteria 3: Amenities for Community



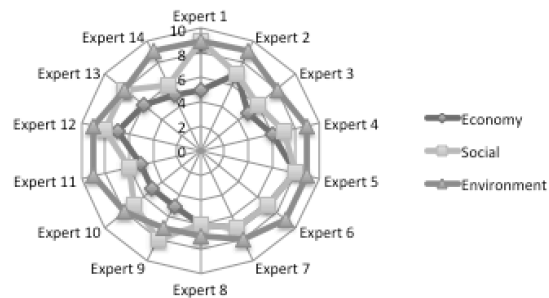
Sub-criteria 4: Provision Universal Accessibility



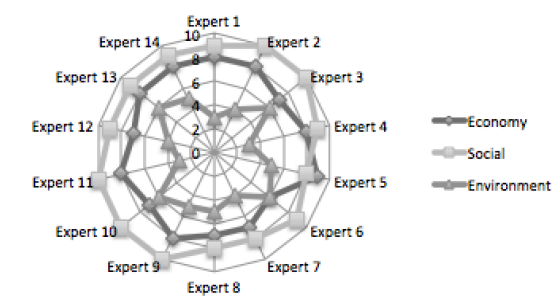
Sub-criteria 5: Secure Design.



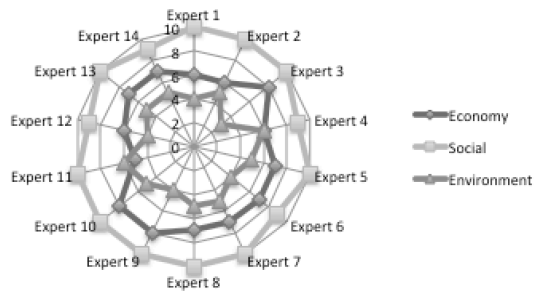
Sub-criteria 6: Health in Design.



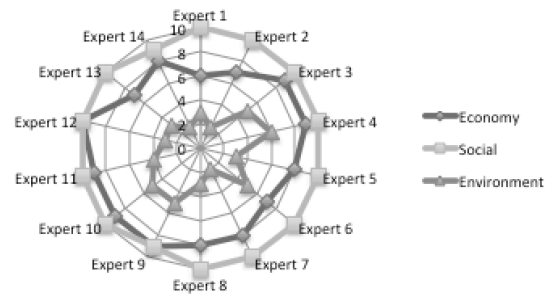
Sub-criteria 7: Recycling Facilities



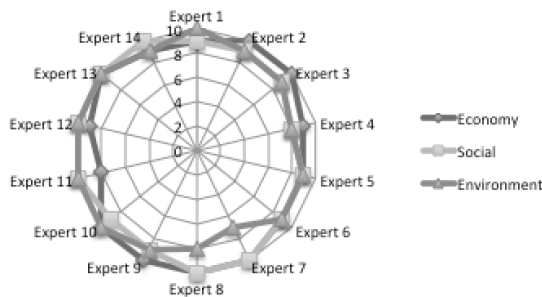
Sub-criteria 8: Community Diversity



Sub-criteria 9: Affordable Housing



Sub-criteria 10: Community Thrust



Sub-criteria 11: Governance

Figure 2: SC1 – SC11, Sub-criteria for Community Planning & Design.

Based on the findings, this townships assessment tools generally address all sustainability dimensions. However, the limitation of this townships assessment tools is unbalance adaptation in all sub-criteria. The findings also suggested there is a gap or venue in balancing each dimension for a more holistic sustainable development. Hence, the weightage values for each indicator are varies. Based on analysis values from 1 – no adaptation of SPD to 10 – extremely very strong adaptation of SPD, the least balanced adaptation is sub-criteria 4: Provision for Universal Design has a 0 value or very less score for economy dimension pillar and sub-criteria 5: Secure Design has the lowest score and 0 values for the environment pillar.

3. Conclusion & Recommendation

This research seeks to develop an economically, socially and environmentally balance and responsive approach to GBI neighbourhood assessment criteria, by which the principles and strategies of assessing and benchmarking are positioned to facilitate holistic pillars of sustainability concept through incremental improvements in sustainable neighbourhood indexing. The analysis suggested the method and gaps in green building and environmental development in addressing the sustainable dimensions within CPD core criteria. The approached used in this study gather experts’ opinion on CPD for sustainable neighbourhood development for Malaysia. The conclusion of this study is GBI Township/Neighbourhood Assessment Criteria under CPD core-criteria adapted SPD; however there is certain sub-criteria which is not well balanced in addressing SPD. Hence, sustainable development may not be developed as envisaged. The findings for S-C 4 and S-C 5 showed highly imbalance scoring values on studied sustainable dimension indicators, thus, addressed the research objectives and gaps in research problem. By addressing the unbalanced sustainable dimension adaptation, the implications is that can be use as reference for future GBI Township Assessment Criteria review and improvement. This study is also timely as more new green label township is developed in the country. From research point of view, this

study can be further elaborated to other core criteria of GBI Township/Neighbourhood Assessment Criteria. However, the limitations of this study are the number of the experts involved and subjective opinion by the experts. Each expert may have different backgrounds, experiences and schools of thought. An implication for future research is to study all other core-criteria in GBI Township Assessment Criteria. The study could also be extended in longitudinal and comparative ways. Further research could also study each sub-criteria score weightage and descriptions.

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5. References

- Olsson, J.A., Bockstaller, C., Stapleton, L. M., Ewert, F., Knapen, R., Therond, O., and Bezlepkina, I., 2009. A goal oriented indicator framework to support integrated assessment of new policies for agri-environmental systems. *Environmental Science & Policy*, 12(5) pp. 562-572.
- Berardi, U., 2013. Sustainability assessment of urban communities through rating systems. *Environment, Development and Sustainability*, 15(6) pp.1573-1591.
- Boon, C.W., 2013. Overview of green building development in Malaysia. [online]. Available at:<http://www.greenbuildingindex.org/Resources/GBI%20esp/GBI%20BEX%20Asia%202013.pdf> [Accessed 6 October 2016].
- Choguill, C. L., 2008. Developing sustainable neighbourhoods. *Habitat International*, 32(1) pp. 41-48.
- Council, U. S. G. B., 2006. LEED for Neighbourhood Developments. *Washington, DC: US Green Building Council*. Berardi, U. (2013). Sustainability assessment of urban communities through rating systems. *Environment, Development and Sustainability*, 15(6) pp. 1573-1591.
- Dahl, A. L., 2012. Achievements and gaps in indicators for sustainability. *Ecological Indicators*, 17 pp.14-19.
- Garde, A., 2009. Sustainable by Design?: Insights From U.S. LEED-ND Pilot Projects. *Journal of the American Planning Association*, 75(4) pp. 424-440.
- Haapio, A., 2012. Towards sustainable urban communities. *Environmental Impact Assessment Review*, 32(1) pp. 165-169.
- Kyrkou, D., and Karthaus, R., 2011. Urban sustainability standards: predetermined checklists or adaptable frameworks? *Procedia Engineering*, 21 pp. 204-211.
- Lee, W. L., 2013. A comprehensive review of metrics of building environmental assessment schemes. *Energy and Buildings*, 62 pp. 403-413.
- Mori, K., and Christodoulou, A., 2012. Review of sustainability indices and indicators: Towards a new City Sustainability Index (CSI). *Environmental Impact Assessment Review*, 32(1), pp. 94-106.

- Niemeijer, D. (2002). Developing indicators for environmental policy: data-driven and theory-driven approaches examined by example. *Environmental Science & Policy*, 5(2) 91-103.
- Niemeijer, D., and de Groot, R. S. , 2008. A conceptual framework for selecting environmental indicator sets. *Ecological Indicators*, 8(1) pp.14-25.
- Reed, M. S., Fraser, E. D. G., and Dougill, A. J., 2006. An adaptive learning process for developing and applying sustainability indicators with local communities. *Ecological economics*, 59(4) pp. 406-418.
- Repetti, A., and Desthieux, G., 2006. A Relational Indicatorset Model for urban land-use planning and management: Methodological approach and application in two case studies. *Landscape and Urban Planning*, 77(1-2) pp. 196-215.
- Sharifi, A., and Murayama, A., 2014. Neighbourhood sustainability assessment in action: Cross-evaluation of three assessment systems and their cases from the US, the UK, and Japan. *Building and Environment*, 72 pp. 243-258.
- Sharifi, A., and Murayama, A., 2013. A critical review of seven selected neighbourhood sustainability assessment tools. *Environmental Impact Assessment Review*, 38 pp.73-87.
- Shen, L.-Y., Jorge Ochoa, J., Shah, M. N., and Zhang, X., 2011. The application of urban sustainability indicators – A comparison between various practices. *Habitat International*, 35(1) pp. 17-29.
- Singh, R. K., Murty, H. R., Gupta, S. K., and Dikshit, A. K., 2009. An overview of sustainability assessment methodologies. *Ecological Indicators*, 9(2) pp.189-212.
- United Nations, 2007. *Indicators of Sustainable Development: Guidelines and Methodologies*. Economic and Social Affairs. October 2007: 3rd.ed. New York: United Nations
- Walton, J. S., El-Haram, M., Castillo, N. H., Horner, R. M. W., Price, A. D. F., and Hardcastle, C., 2005. Integrated assessment of urban sustainability. *Proceedings of the ICE-Engineering Sustainability*, 158(2) pp.57-65.