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The Blue-Green Urban Living Labs of Kuala Lumpur

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Abstract

The extraordinary societal challenges demand cities to be innovative and adaptable to the needs of urban citizens. In the Malaysian context, the Blue-Green Infrastructure (BGI) has not been well incorporated into the ULLs. This paper seeks to address this gap by exploring the potential of the Blue-Green Urban Living Labs (BGULLs) at the Sungai Bunus catchment area. Using Google Form, survey questionnaire is conducted among professionals and the public. Findings of this unprecedented study suggest the BGULLs offer beyond beautification works, and it is voicing the virtual idea of the BGULLs into a real setting that reflects the public-private-citizen partnerships.

Keywords: Urban living labs; Blue-Green Infrastructure; Innovation; societal challenges

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1.0 Introduction

1.1 Background of Research

Most cities in the 21st century are facing rising urban complexity and extraordinary societal challenges. Hence, there is an increasing demand for cities to be innovative and inclusive, yet more adaptable to the needs of urban citizens (Chronéer, D. et al. 2019). The Urban Living Labs (ULL) approach is proliferating around the world, particularly in Europe and some countries in Asia. The urban sustainability challenges urgently call for new urban solutions, which in turn require experimentation on suitable scales and multiple stakeholders (Brankaert, R. & den Ouden, E. 2017). The ULLs strengths and popularity stem from its real-life setting, citizen empowerment, and fostering innovation and experimentation (Steen, K. & van Beuren, E. 2017).

Managing water bodies in urban areas requires a new approach that integrates knowledge of the terrestrial ecosystem and processes into the development management practices. Thus, urban water infrastructures such as rivers and lakes and should be studied and managed as an integrated system with its green riparian landscapes that can reduce runoff, increase biodiversity, offer social and health benefits to the urban community (Bacchin, T. et al. 2014). The symbiosis of rivers and the green riparian landscapes, which often referred to as the Blue-Green Infrastructure (BGI) and its contributions to community well-being and urban resilience is vital to be integrated into new urban solutions (Andersson, E. et al. 2019; Haase et al. 2017).

1.2 Research Issues and Aim

In the Malaysian context, the central focus of the ULLs research is on campus and education (Zen, I.S et al. 2019; Omar, W. et al. 2018; Zen, I.S. et al. 2016) and health care (Sek-Khuen, T.T (2017). Meanwhile, for the BGI in Malaysia, researchers have paid attention to new townships (Rizzo, A. 2019) and stormwater management (Ismail, M.S.N. et al. 2019). Despite its benefits to climate change adaptation, enhancing quality of life and urban biodiversity, the Blue-Green Infrastructure (BGI) so far has not been well incorporated into the ULLs.

Hence, this paper seeks to address this gap by exploring the potential of the Blue-Green Urban Living Labs (BGULLs) to navigate and co-create visions towards a more provisional and adaptive understanding complex city environment. Where policy, planning, and management have historically treated grey and green infrastructural networks as separate, the BGI could play a significant role to address urban resilience and sustainability goals together with prevailing technical infrastructures (Meerow, S & Newell, J.P. 2017; Kabisch et al. 2017; Grimm et al. 2016). Additionally, the BGULLs approach explores in this study provide insight into the hybrid of urban landscape planning, BGI planning, and water catchment management, which is pivotal in achieving urban sustainability.

2.0 Literature Review

2.1 Underpinning theory of Urban Living Labs (ULLs)

The ULLs has become a contemporary approach in cities' contemporary urban solutions. The term used signifies a wide variety of local experimental projects of a participatory nature (Steen, K. & van Beuren, E. 2017), which aims at creating urban areas that are more adaptable to different communities' needs (Baccarne, B. et al. 2014). Living labs are usually defined as "user-centered, open innovation ecosystems based on a systematic user co-creation approach in public-private-people partnerships, integrating research and innovation processes in real-life communities and settings" (ENoLL, 2014). In the urban living lab, the whole city is viewed as a living laboratory where citizens and other stakeholders are actively involved in the process of designing, developing, implementing, testing, and evaluating an innovation (Veeckman & van der Graaf, 2015; Schuurman et al. 2013). Nesti G. (2018) highlights a more specific characteristic of the 'real-life-setting' of the ULLs as public spaces where local authorities engage citizens to develop innovative urban services.

2.2 Impacts of ULLs on sustainability

The link and impacts of the ULLs to support urban sustainability are evident in the works of foreign and Malaysian researchers. The call to find new ways of addressing societal challenges such as climate change, urban quality of life degradation and urban gentrification has given much attention in the academic and political arena (Schot & Steinmueller, 2016; OECD, 2015). Most research on sustainability has shown that these challenges call for innovative resolutions, which require deep-structural changes of the socio-technical configurations underlying the respective sectors (Markard, J. et al. 2012; Van Den Bergh, Truffer, & Kallis, 2011).

The empirical works done by von Wirth, T. et al. (2019) at the four ULLs in Rotterdam and two Malmö Innovation Platforms reflect prominent strategies and exemplary practices of initiating a more comprehensive sustainability transition of the ULLs. In the Malaysian context, Sek Khuen, T.T (2017) provide fascinating results on the elderly preferences of the community centre design that should be designed using adaptive, viable and flexible with a framework to support a wide range of uses, and allowed multiple modes of management and operation for different generations. In searching for the best method of the involvement of universities in Malaysia as living-learning labs, Omar, W. et al. (2018); Zen, I.S. (2017a); Zen, I.S. (2017b); Zen, I.S. et al. (2016) mark the importance of the application of sustainability science in the university living-learning lab that helps to facilitate inter-, trans-disciplinary and issue-based approach by using the new academic learning innovation.

2.3 Blue-Green Infrastructure

Blue and green spaces and their functional connections and interrelations within and adjacent to cities have the potential to provide a broad range of ecosystem services (ES) to urban residents (Haase et al. 2014; Gómez- Baggethun et al. 2013). Meanwhile, the Blue-Green Infrastructure (BGI) refers to a network of green spaces that provides multiple water-related ecosystem services (Liao, K.H. 2019). In the common practice, the "green" assets (e.g., parks, riparian network) and "blue" assets (e.g., river, catchment area) are planned and designed separately. However, the BGI offers a feasible, economical, and valuable option for urban areas to be efficiently planned, designed, and managed. A more recent study shows that proper planning of BGI will enhance multiple aspects of regional sustainability and resilience of the catchment area (Gofhrani, Z. et al. 2020).

3.0 Methodology

3.1 Study Area

This study is about the idea of implementing the concept of Blue-Green Urban Living Labs in Kuala Lumpur. An area in Kuala Lumpur has been chosen as the case study's site for this research, which is the stretch of Sungai Bunus, Kuala Lumpur. As shown in Figure 1.0, the river of Sungai Bunus runs past Kampung Baru, Jalan Semarak, and parts of Setapak. The specific site to be studied on Sungai Bunus is the stretch that flows through and along Pusat Latihan Polis (PULAPOL) Jalan Sultan Yahya Petra, Universiti Teknologi Malaysia (UTM) Space Jalan Semarak Campus, National Library Kuala Lumpur, Malaysian National News Agency (BERNAMA),

Department of Survey and Mapping Malaysia (JUPEM) and the notable Taman Tasik Titiwangsa. According to Bavani (2014), this arm of Klang River falls under Class IV-V and is ill-reputed for being one of the utmost polluted rivers in Kuala Lumpur. Being categorized as a Class IV-V river, it is undoubtedly that this river is very unhygienic and considered unfit for bodily contact or recreational purposes.



Figure 1.0: Location plan of the study area, Sungai Bunus Retention Area, Kuala Lumpur.

Source: Google Map



Figure 2.0 & 3.0: The current condition of the study area.

Source: Authors, 2019

3.2 Data collection

This research uses primary data that was collected through a survey questionnaire. The survey was conducted online via Google Form for a week starting from 29th January 2020 to 9th February 2020 and was done in two different sets of the questionnaire. The first set of questionnaire was designed for the target group of professionals who are working in the authorities and organizations related to the urban landscape development and the professions that are thought fit to the topic, such as Town Planning, Landscape Architecture, Architecture, Engineering and etc. A total of 71 responses was managed to be collected from this target group. Meanwhile, the second category of target crowd is the public that is working, staying or living at and nearby the study area. The focus was given to the community of PULAPOL, UTM Kuala Lumpur Campus, National Library Kuala Lumpur, BERNAMA, and JUPEM. The total responses for this group are 62. The survey questionnaire was separated into four sections, which are Part A: Sociodemographic Profile – to identify respondents' profession for the professional's category and from which community they come from for the public; Part B: Understanding & Perception – to evaluate people's knowledge on BGULL; Part C: Application Implementation – to appraise on what the community wants to be

integrated as part of BGULL and their readiness for BGULL to be implemented at the study area; and Part D: Participatory Planning – to assess people's inclination to involve in transforming the study area into BGULL.

Figure 4.0: Images used to evaluate what kind of elements people want to be implemented as part of BGULL at the site.

3.3 Limitations of the Study

The study area is not residential. Therefore, the survey questionnaire was distributed among the staff of PULAPOL, UTM, National Library Kuala Lumpur, BERNAMA, and JUPEM to represent the public there. Furthermore, there are not many professionals working in



the relevant fields that can be included in the specified target group.

4.0 Data Analysis

Survey questionnaire obtained results provide insights into the professionals and public's response on their knowledge, awareness, preference, and also keenness to take the concept of Urban Green-blue Living Labs if it were to be implemented at Sungai Bonus, and their willingness to partake in the programme. The statistics from the survey are also used to compare the perspective on the programme between the professionals and the public.

5.0 Result and Findings

This part highlights the findings from the four sections of the survey questionnaire, which are: the socio-demographic profile, understanding and perception, application and implementation, and participatory planning.

5.1. Socio-demographic profile

Seventy-one responds were managed to be collected from the professionals set of questionnaire. From the 71 respondents, the majority is from Kuala Lumpur City Hall (DBKL) which are 27 respondents or 38% out of the total respondents, 16.9% are from National Landscape Department (JLN), 12.7% are from Think City, 9.9% are from PLAN Malaysia, and the others are 22.5%. In term of their scope of work, majority of the respondents (56.3%) are working in the Landscape Architecture profession, 15.5 are working in the Town Planning, 11.3% are the Architecture professionals, 7% are working in the administrative and management, 2.8% are from Engineering and technical, and 7% is from the other professions.

Meanwhile, for the public, the majority out of 62 respondents are from PULAPOL (59.7%), followed by UTM Space with 12.9%. The respondents from BERNAMA and National Library Kuala Lumpur are each 9.7%, 6.5% are from JUPEM, and another 1.6% are from the other places or communities. Out of the 62 respondents for the public category, 77.4% stay or live in Kuala Lumpur, while only 33.8% out of the 71 respondents for the professional category are staying or living outside Kuala Lumpur.

5.2 Understanding and perception

From this part of the survey questionnaire, it can be seen that 45.1% out of 71 professionals have heard about the BGULL. Moreover, out of that 45.1% (32 persons), the majority of them (28.9%) have a moderate amount of knowledge about BGULL, and another 28.9% have very little or no knowledge of it. 23.7% of them considered themselves to have much knowledge on the topic, and 18.4% said they have a little knowledge of it. However, none of the respondents is an expert on the topic.

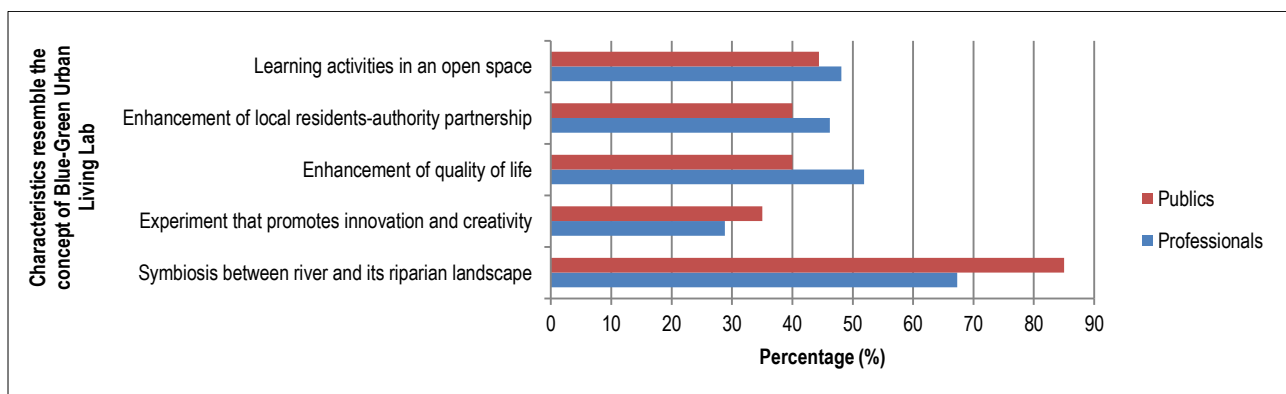


Figure 5.0: Comparison between professionals & the public's answers on the characteristics that resemble the concept of BGULL.

The respondents' understanding of space's characteristics for BGULL can be seen in Figure 5.0 above. The majority of the respondents knew about the symbiosis between the river, and its riparian landscape is a part of the characteristics in BGULL, where 85% of the respondents (publics) and 67.3% of the professionals chose it as the BGULL's main characteristic. However, not many of them are aware of the experiment that promotes innovation and creativity as one of the characteristics of BGULL where only 28.8% of the professionals and 35% of the public respondents chose it as one of the characteristics. It shows that not many Malaysians understand the concept of BGULL just yet.

5.3 Application and implementation

Out of the 71 professionals, the majority (63.4%) of them never been to Sungai Bonus Retention Area, while only 36.6% of them have been there. Besides that, most of the professionals (76.1%) also do not know about the current condition of the study area. Meanwhile, the highest percentage of the public respondents (54.8%) has been to the study area, and 45.2% of them have not. In term of their frequency in visiting that area, majority of them (55.3%) visit the area about 0-2 times per month, 21.1% visit it 3-7 times per month, 15.8% of them go to that area more than 15 times per month, and another 7.9% visit it about 8-14 times monthly.

There are several reasons the respondents went or have been to Sungai Bonus Retention Area, as displays in Figure 6.0 below. Majority of both professionals (50.8%) and public (72.2%) have been to the study area by passing by or using it as a route to commute from one place to another, which show the similarity between these two groups. As compared to the public, a higher percentage of professionals also went to that area for the other reasons, which are the recreational activities (40%), tree planting programme (38.5%), river clean-up (33.8%) and meeting point (26.2%). It shows that the professionals most likely went to that area to participate in the events or programmes organized by their organizations and work-related based. Though, the higher percentage of public can be seen going to the study area for community gardening activity (25%) compared to the professionals (18.5%).

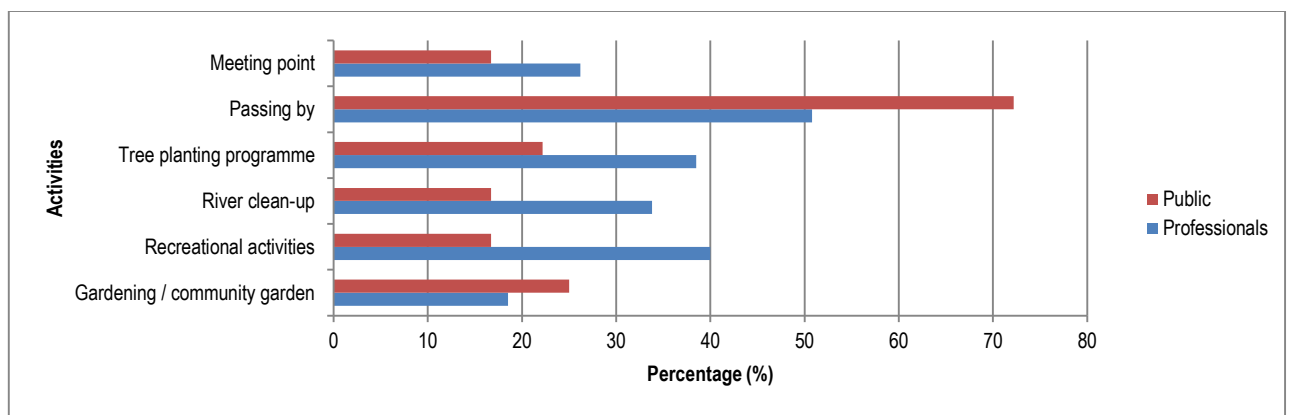


Figure 6.0: Activities done at the Sungai Bonus Retention Area by the public and also the professionals.

Under the application and implementation section in the survey questionnaire, the respondents were asked to vote in the range of least to most favourite for the images that they prefer to see at Sungai Bonus Retention Area if that place is to be developed as the BGULL. The summary of the response is shown in Figure 7.0 & 8.0 below.

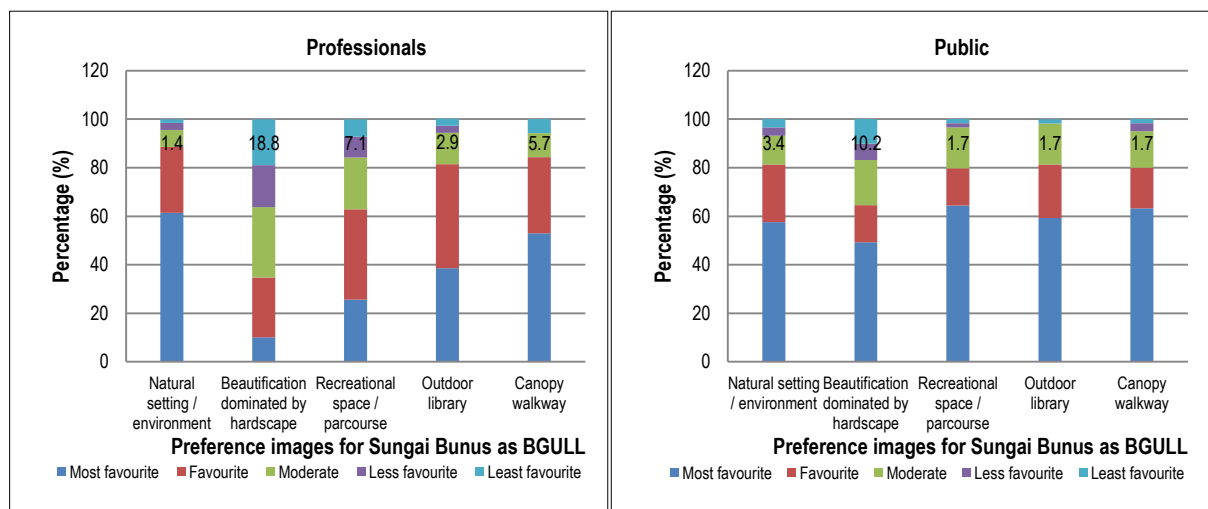


Figure 7.0 & 8.0: The professionals and public's preference of images for Sungai Bonus Retention Area.

In term of the preference of image, it can be seen that there is a similarity between the professionals and public respondents. For the first choice of image, the natural setting/ environment have received the most favourite votes from the majority of both groups of

respondents, professionals (61.4%) and public (57.6%). For the second image which is the beautification dominated by hardscape, majority of the professional rate it as moderate (29%) meanwhile most of the public still voted it as most preferable with the total votes of 49.2%. The third image which is the recreational space/ par course has obtained the majority vote as favourite from the professionals (37.1%) while it received the highest votes of most anticipated from the public compared to the other images, with the total votes of 64.4%. For the outdoor library, most of the professionals (42.9%) voted it as the favourite, while the majority of the public (59.9%) chose it as most-awaited. The last image – the canopy walkway had received the majority of votes as most desirable from the professionals (52.9%) while the public also voted it the same with the percentage of votes 63.3%, which is the second-highest most popular vote from the public. In summary, it can be seen that the professionals have the specific and defined images that they want to see at Sungai Bunus Retention Area as GBULL, while the public has liked all of the proposed images as long as the area is to be upgraded or beautified.

Other than that, more than half of both groups of respondents agreed with the idea of transforming the Retention Pond of Sungai Bunus as a BGULL, which to be exact 54.3% of professional respondents (54.3%) and 73.3% of the public respondents. The professionals also think that the local communities are ready for the idea of transforming Sungai Bunus Retention Area as a BGULL as 31.4% of the respondents said that the public is maybe ready and 30% of them think they are very ready for the idea. However, there 5.7% of the professionals feel that the local communities are not really there yet to accept this concept, while another 5.7% do not think the public is ready for this idea at all.

5.4 Participatory planning

In term of participatory, 77.5% of the professional respondents are willing to get involved as a volunteer or local authority that helps local residents in transforming Sungai Bunus as a BGULL, while 55.7% of the public respondents also keen to volunteer in helping for that transformation. Furthermore, from the respondents who are willing to participate, the majority (40.4%) of the professionals is ready to get very much involved; meanwhile, majority of the public are set to get involved in just a moderate level. The summary of the level of involvement the participants are willing to give are demonstrated in Figure 9.0 below. Moreover, the professionals agreed that public involvement plays a vital role in developing BGULL in Sungai Bunus Retention Area where a whopping of 97.2% of them think so, while 96.7% of the public respondents agreed so too.

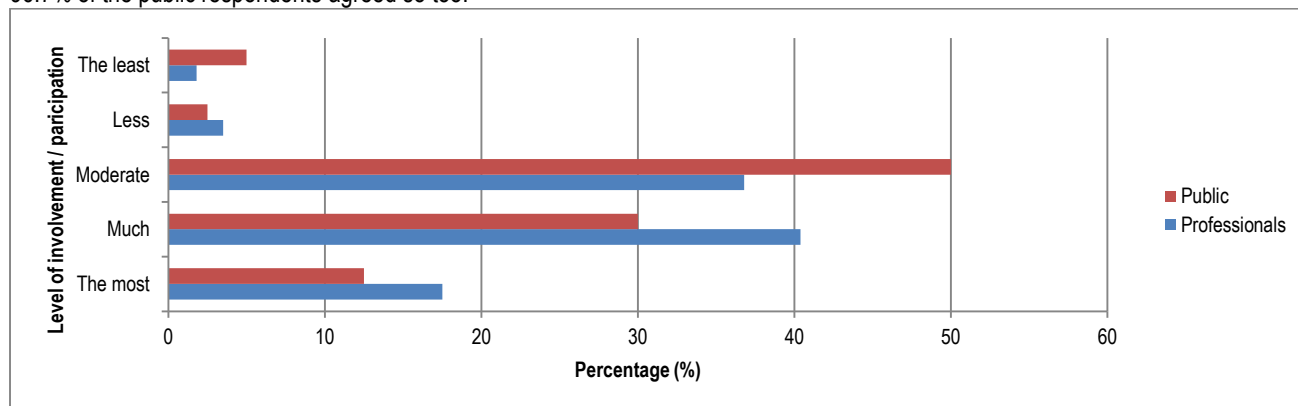


Figure 9.0: The level of involvement that the respondents are willing to give.

6.0 Discussion

The survey questionnaire conducted among professionals and the public in this study promotes the top-down and bottom-up approaches in urban planning. This approach is in line with the first characteristic of the ULLs which inspired by the 'quadruple helix', i.e. collaboration among public authorities, firms, research organisations and people (Battaglia, A & Tremblay, D. G. 2011). Results and findings in section 5.0 of this exploratory research will be discussed using the following characteristics of the ULLs as proposed by McCormick, K & Hartmann. C. (2018).

6.1 Geographical embeddedness

The ULLs are predominantly not virtual and requires a platform embedded in a geographical area. Figure 6.0 and 7.0 show professionals and public agree that the Sungai Bunus Catchment Area has potential to be developed as BGULL, in which it becomes a platform of a breeding ground for experiment and innovation of projects that suits with community's need.

6.2 Learning and experiment

The overall aim of living labs is to learn and experiment by integrating processes of research and innovation (ASC, 2016; ENoLL, 2006). The result from the survey suggests that professionals have better knowledge and understanding of the BGULLs as compared with the public. As ULLs embrace new solutions and policies in highly visible project ways, professional groups could share and disseminate their knowledge with the public from the early stage of the experimental project. Hence, open innovation could be efficiently diffused within communities.

6.3 Participation and user involvement

According to Mascha, M. et al. (2018), the key success to the ULLs is user involvement, where they are often viewed as co-creators who shape the BGULLs outcomes by contributing their knowledge, experience and interest. Figure 8.0 demonstrates an interesting finding where both professionals and the public agreed that public involvement is vital; the former is keener to participate in the project. This is perhaps could be linked with the lack of understanding among the public on their roles as users in the co-creation programme such as the BGULLs.

7.0 Conclusion and Recommendation

This study has presented an expression and impression of the professionals and the public towards the idea of transforming Sungai Bunus catchment areas into the BGULLs. As our results have illustrated, the concept of integrating the BGI into the ULLs have been well received by the respondents where the new insights of the ULLs in Malaysia can be obtained for expanding this concept beyond university campuses and particular target group as mentioned in the literature. The proposed BGULLs in the study area also demonstrate strong support for developing an innovative project that catalyses the urban sustainability transition.

The Tenth World Urban Forum (WUF10) that has held in Abu Dhabi from 8-13 February 2020 (WUF10) highlights three major key points which are: making sustainable development a reality, old models are untenable and concrete action is essential. Captivatingly, these core topics discussed in the WUF10 towards promoting the Decade of Action for the accomplishment of the SDGs by 2030 are aligned with the aim and characteristics of the ULLs and BGULLs specifically. The user-centred, open innovation ecosystem based on a systematic co-creation approach, integrating research and innovation processes in real-life communities and settings of the BGULLs proposed is certainly fit with the call from the WUF10.

The BGULLs involve eight steps, namely the initiation, plan development, co-creation design, implementation, evaluation, refinement, dissemination and replication. This research has explored the first step of the BGULLs, which provides a path for further research as well as other researchers to venture into the other remaining steps. One particular urgent action departs from this study would be the identification of the configuration of the BGULLs, which is divided into three ideal types - the strategic, civic and grassroots. Since this study is conducted based on the academic perspective, the civic type which often led urban actors such as universities, cities and urban developers seem appropriate where the BGULLs at Sungai Bunus Catchment Area represented by either a stand-alone project or a city district that have co-funding as central to a partnership model.

In conclusion, the proposed BGULLs conducted in this study resemble two domains of the ULLs. First is the focus on integrating diverse stakeholders in research through a questionnaire survey of the professional groups and public, which becomes a key ingredient to the success of the ULLs. Second, the proposed BGULLs at the real-setting of Sungai Bunus would establish a new sense of community and belong and turn into a source of knowledge and inspiration for the livable city of the future innovation and practice are intertwined in a dynamic urban experiment.

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