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Longhouse Spatial Elements for Sustainable and Affordable Housing Construction

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Abstract

Traditional longhouse of the Dayak people in Sarawak was considered as a village under one massive roof. Some longhouses can have around twenty to thirty families living under one roof. Despite the concept of living together under one roof, the different families have their own private apartment. Longhouses basically have four spatial elements namely the open veranda, long gallery, apartment, and loft. Open veranda and long gallery are shared among the different families while apartment and loft are private spaces for them. In response to the Malaysian Government's effort in the Twelve National Plan (2021-2025) for every Malaysian to have equivalent right to affordable housing with sustainable approaches, the idea of integrating traditional longhouse spatial elements in sustainable and affordable housing development seems indispensable. Study had been conducted to fifteen Dayak longhouses around Sarawak. Collection of data had been done by inspection on the existence of the longhouse spatial elements and data were collected in Inspection Checklists and Record Card. The outcome from the study found four types of spatial elements arrangements in existing traditional longhouse with the presence and absence of the four main spatial elements. From the outcome can be used as an idea for sustainable and affordable housing. Rather than constructing stratified dwellings, implementing traditional longhouse as a model could be another cost saving option. The application of this type of housing is expected to enhance the quality of life and capable of meeting the needs of local population.

1. Introduction

The Dayak people in Sarawak was living in the communal dwellings known as longhouse since the past time. The Dayak people in Sarawak comprised of the Iban, Bidayuh and Orang Ulu people. The Iban and some Orang Ulu sub-ethnic such as the Kayan, Kenyah and Kajang still strongly maintaining their longhouse lifestyle. Some Bidayuh in Serian and Padawan also still maintains their longhouse lifestyle. Other than Dayak, the Melanau people along the Sarawak's shoreline also live in the massive longhouse in the past. But nowadays only one Melanau longhouse still exists in Kampung Sok, Oya.

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Communal living is when few families living under one roof. In the Dayak society especially the Iban people one massive longhouse can be considered as one village when few families are living under one roof [1]. Under the one roof of the longhouse, the families have their own apartment for their privacy. Longhouse spatial elements can be divided into public spaces and private spaces [2]. Basically, traditional longhouse has four spatial elements namely the open veranda, long gallery, apartment, and loft [1], [3], [4], [5], [6]. Open veranda and long gallery are the public spaces while apartment and loft are the private spaces for each family living in the longhouse.

The open veranda is an open space without roof that used as a reception place for the visitors and as an area to dry the food products of the longhouse dwellers. The long gallery is an enclosed space located after the open veranda but before the apartment. The long gallery is used for social activities of the longhouse dwellers and to entertain the visitors. The apartment is the private area for each family in the longhouse. The apartment comprised of private spaces such as family living room, bedroom, kitchen and washroom. In the past the apartment is an open space and does not have partitions between the spaces. Lastly is the loft that located on top of each apartment. The loft used as a space to keep family heirlooms and agricultural products. Sometimes the loft used as a place for unmarried ladies to sleep in the past.

The idea for sustainable and affordable housing can be adapted from the traditional longhouse spatial arrangements which have the concept of one village under one roof. Among the criteria of sustainable housing are affordable housing that have acceptable quality, available to the market, use sustainable materials, energy efficiency and good accessibility to amenities [7]. The adaptation of longhouse spatial arrangements has the potential for the design of new concept of affordable housing that can provide the desired quality and accessibility to amenities just under one roof. The centralization of society, housing, and amenities under one roof able to avoid development of sprawling housing development which have more challenges in applying the sustainable concept. Urban sprawl should be avoided by proper planning of development to prevent unsustainable development.

Uncontrol development or sprawling housing without proper planning led to deforestation and use a lot of reserved land. Solutions need to be formulated to overcome the sprawling housing issues. The idea to centralize every housing community is not impossible when looking into the benefits that experience by the Dayak communities living in the longhouse. The safety of the community that live under one roof and the social closeness can provide harmonious living within the community [8], [9]. Deforestation is possible to be reduced if housing can be centralized in one area. The adaptation of longhouse housing concept not only for urban affordable housing but also for any settlement that being relocated. The idea of adapting the concept of longhouse housing not only to support sustainable requirements but also give opportunities to the dwellers to live on landed property. Landed properties are much more preferred especially in Sarawak [10].

2. Sustainable Housing Concept

Sustainability of a development is a major focus in this new era to protect the environment, natural resources, and humankind. Providing sustainable housing to the society is a challenge that need to be addressed with careful measure to implement it successfully. Maintaining the implementation of sustainable housing for the long term is more challenging. There are many ways on how to define the concept of sustainable housing. Once need to understand the concept of sustainable housing to maintain it for longer time.

Smet & van Lindert (2016) had distinguish five relevant fields to explain the relationships between sustainable and low-income housing. The five fields include ecology and energy, technology and production, economy, social considerations, and targeted policies. Sustainability in term of ecology and energy involving low carbon use, environmental protection, and resources usage in manageable way [11]. Land is one of the resources on earth that need to be sustained for future generation. Sustainable housing in term of ecology and energy need to avoid urban sprawl so that land resources will not be wasted. Good planning of housing development is important to sustain the land resources.

A housing development also can be considered as sustainable if development of technology relating to the materials and features of the sustainable housing can accommodate the character of sustainable development. The development of existing sustainable materials and newly eco-materials from recycled waste help in realizing the goal of sustainable housing development [11].

In the aspect of economy, the sustainable and affordable housing should not far from the employment area, entertainment, social facilities, and education of the dwellers [11]. The housing development also need to be affordable so that the dwellers able to sustain their own economy for long term and at the same time owning a property. Another aspect that needs to be considered is on the social dimension. Social dimension is on the closeness of the society in the housing for better society management of the housing area [11]. If the longhouse housing concept adapted to new type of housing the society living within it will benefit from the closeness of the society. The society can cooperate with each other to ensure the safety, comfort, and welfare of the society. Lastly targeted policies needed to protect the environment and reduce the threat from hazardous materials.

Roshanfekr et,al. (2016) lists seven criteria of sustainable housing which includes inexpensive, socially and ecologically suitable, accessible and flexible, resource and efficient, safe, secure and healthy, long-lasting and architecturally proper [12]. Inexpensive or in the other words affordable is one of the important criteria of sustainable housing. This indicates that affordable housing is most related to sustainable housing. The ability to afford the house unit must come with the ability to sustain economy after purchasing the property then the housing development can be considered as sustainable.

3. Affordable Housing Development

The urbanization process leads to the increasing number of housing projects due to migration of people into major cities. People are looking for house as it is the most fundamental human needs. In Malaysia, a study indicated the need for affordable housing for low and middle-income earners. Nevertheless, these middle-income groups living in the urban areas are facing greater challenges in house ownership. It is due to the high prices of housing, difficulty in gaining access to finance and fluctuation in prices, which are often not synchronized with income, affordability, and availability (Mohemed Osman et al., 2017). Some young people need to sacrifice their life events such as reducing entertainment spending, delaying their marriage and childbirth, and being cautious in daily expenditures to reserve money for the house rental or down payment.

The National Housing Department categorizes affordable housing as houses with the price below RM300,000 each. The PR1MA Corporation being the main provider for affordable houses delineates affordable houses between the range of RM100,000 to RM400,000. Syarikat Perumahan Negara Berhad also another provider, characterizes a price tag as low as RM35,000 to RM250,000 depending on the states. Meanwhile, the Selangor State of Government describes affordable houses between the range of RM85,000 to RM150,000 [13].

Meanwhile, Malaysian Government is committed in ensuring all the citizens afford to pose their own residential units in line with the increasing number of populations. Qualitatively the type of low-cost housing in Malaysia has not been satisfactory to the family housing needs, comfort, social, cultural, and religious needs (Abed e al., 2013). Despite the affordable housing development that has become a crucial agenda of the country, it should comprehend the sustainability criteria in this housing scheme neither. This paper will review on some relevance Critical Success Factors (CSFs) of affordable and sustainable housing with regards to traditional longhouse spatial elements. In view of these special elements, the literature findings reflect more to social sustainability matters as many people seek for more social way of living nowadays [14]. To achieve this objective, a systematic review and thorough analysis focusing on critical criteria of sustainable and affordable housing concepts was carried out based on the relevant literature.

4. Critical Success Factors (CSFS) of Social Sustainable Affordable Housing

The frequency of selected CSFs was identified, and a table was constructed to document the quantification of the repetition CSFs in the 8 literatures. The comprehensive literature reviews and analysis emphasized the major finding of social sustainable affordable housing CSFs that significantly related to the arrangement of spatial elements in the traditional longhouse design. Table 1 demonstrates the criticality ranking of the social success factors.

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Table 1 *Critical success factors (CSFs) of social sustainable affordable housing*

Social Sustainability Aspect	Safety performance (crime)	House price in relation to income	Commuting cost from the location of housing to public facilities	Technical specification of housing	Local value creation by design	Integrating green building aspects	Social acceptability of design, design privacy	Compatible with local culture and lifestyle	Maintainability of design	Flexibility of design	Simplicity of design	Compatibility of design with new construction methods	Economical design	Functionality of layout	Adequate living spaces within small size unit	Link between indoor–outdoor spaces	Type of building (e.g., Apartments, condominiums, semi-detached etc)	Shared amenities and resources	Building typology and orientation	Effective land use planning
Moghayedi et al.(2021)	√	√			√	√	√	√	√	√	√	√	√	√	√	√		√	√	
Sunday et al. (2021)	√	√						√	√			√						√		
Pirinen & Tervo (2020)	√					√	√	√					√	√	√		√	√		√
Saidu & Yeom (2020)	√	√				√	√					√								√
Ezennia & Hoskara (2019)	√		√				√	√	√					√			√		√	
Chan & Adabre (2019)	√	√	√	√	√				√									√		
Abdul Hamid et al. (2018)	√		√			√	√	√						√				√		
Oyebanji et al. (2017)	√		√				√	√								√		√		√

The outcome reveals that safety performance is ranked as the main CSF of social aspect in achieving sustainable affordable housing. Social sustainability features of safety performance are where residents are generally satisfied with their null crime living and peaceful environment. Security of lives and properties in terms of vacant sites serving as hide-out for criminals, less vehicle crime, burglary, robbery and violent crime leads to creating a sense of place to live [15]. This is consistent with Saidu & Yoem (2020) that mentioned security in housing developments is of optimum fundamental as a priority to satisfy and ensuring comfort to the homeowners [16]. Hence, the concept of traditional longhouse which everything is centered under one roof, the safety elements is much applicable. The long gallery that has the same function as multi-purpose hall can be turned into a community hall or gathering place for the community safety meeting [3]. In fact, the long gallery that located in front of the apartments presently act as a public area to welcome guests, socializing and event celebration.

The second ranked of critical success factors have been identified as social acceptability of design or design privacy, compatible with local culture and lifestyle and shared amenities and resources. These three CSFs obtained similar number of frequency occurrence. The social acceptability of design or design privacy refers to well-designed house that is secured and well protected [16]. The architectural applications and specifications in house design units need to consider the norm of multi-person households; residents who live with their

partners and family members. Despite sharing spaces and other resources is a regular practice in affordable housing, residents would like to have some privacy that makes them comfortable. In addition, house design should be socially adaptable in terms of ensuring the appropriate density and dwelling size for a respectable habitation [17]. Longhouse spatial elements consist of loft which is the space located on top of each apartment, used to keep family possessions, paddy and even as a sleeping place for the single women or girls of the family [1]. Thus, it could be implemented to affordable sustainable house design following the concept of mezzanines floor. It can be used to increase the functional floor space in a building without necessity to add onto the building itself or additional land use. Space layout planning measures dealing with land will create an enabling environment for sustainable housing projects [16].

The next social critical success factor which also ranked second is compatibility with local culture and lifestyle. The affordable sustainable housing criteria needs to cater interest and activities of society in local community. As reminded by Czarnecki et al. (2010), sustainable development is one of the leading ideas about civilization. The communities are freely with their economic activities in housing consequently link them with the wider economy, cultural and social structure of communities (UN Habitat, 2012). The traditional longhouse layout is shaped strongly by culture, weather, and geographic location [18]. The longhouse may look like row of terrace houses, but the significant aspect is the intimate relationship between the dwellers thus creating a place where people can meet and do their daily activities such as pounding the rice husks, making craft and as a playground for the kids [3].

The last social CFS which also indicates six frequency of occurrence is shared amenities and resources. Social sustainable housing which consists of residents with different economic, cultural, and social backgrounds promotes social cohesion by using common social facilities such as sports center, market, transport, health and education [15]. Instead of having own swimming pool, sustainability living can access a shared pool as well. The same applies to stairs, lifts and lobbies, gymnasiums, kids' playground, cafeteria, or coffee shop. The world is moving from old world thinking of own "castle" to a more co-operative way of living. Despite living in a small home, the residents share all the amenities they aspire to their neighbors [19]. Research by Janet et al., (2015) shows the uniqueness of some longhouses which used the front part of it as a mini mart. Other than that, the residences also shared a multi-purpose hall which located under one roof [3].

5. Methodology

Fifteen Dayak longhouses around Sarawak from the Iban, Bidayuh and Orang Ulu people had been chosen for the study. The longhouses were located around Kuching, Serian, Saratok, Bintulu and Sungai Asap, Belaga area. The longhouse chosen were based on the availability of traditional spatial elements. Record card and inspection checklists had been used to record the data collected during the inspection. The availability of traditional longhouse spatial elements was inspected during the site visit.

6. The Availability and Pattern of Spatial Elements Layout

Basically, the Dayak traditional longhouse comprised of four main spatial elements namely the open veranda, long gallery, apartment, and loft. The arrangement of the four spatial elements usually starts from the open veranda that is located at the front of the longhouse followed by the long gallery and apartment. The loft is built on top of the apartment area. There are four spatial layout that had been determined from the inspection of the fifteen Dayak longhouses. Figure 1 shown the two layouts that almost similar with the traditional form.

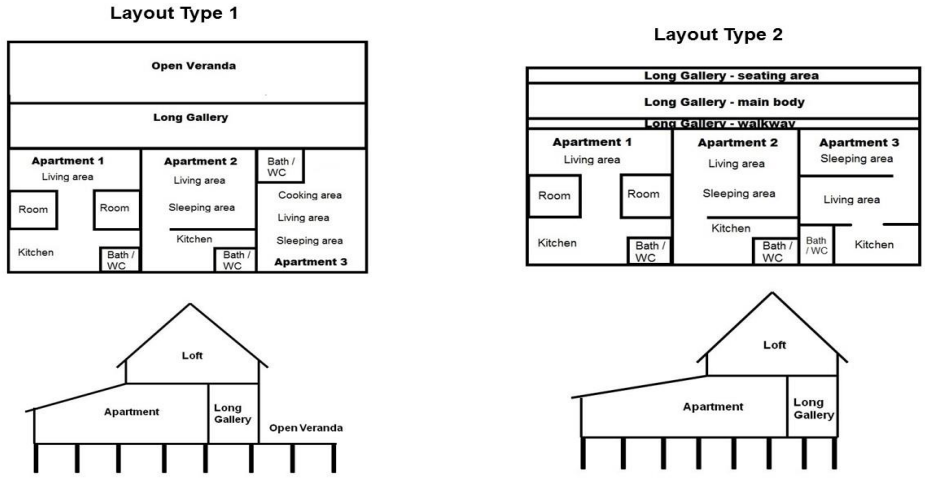

Fig. 1 *Traditional longhouse layout type 1 and type 2*

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Layout Type 1 have all the basic traditional longhouse spatial elements. The open veranda, long gallery, apartment and loft still exists in Layout Type 1. While Layout Type 2 does not have the open veranda. Only long gallery, apartment and loft still exist in Layout Type 2. The open veranda had been demolished to give way to road and car porch. Due to modern lifestyle the significant function of the open veranda as a platform to dry food and commodities decreases and finally being demolished.

Layout Type 3 and Layout Type 4 are the least to be in the traditional form. Figure 2 shown the arrangement of spatial elements for Layout Type 3 and Layout Type 4. Layout Type 3 commonly to be found in the Orang Ulu longhouse while Layout Type 4 is common for modern longhouses. Layout Type 4 only have the long gallery and the private apartment without the existence of loft and open veranda due to relevancy of the spatial elements in modern lifestyle. The loft in the modern longhouse usually replaced with the second floor of the longhouse and used as a space for several bedrooms. Apartment 3 in Layout Type 3 has separated kitchen from the main apartment. The reason behind the layout design in Apartment 3 of Layout Type 3 is for fire safety due to availability of fire sources in the kitchen.

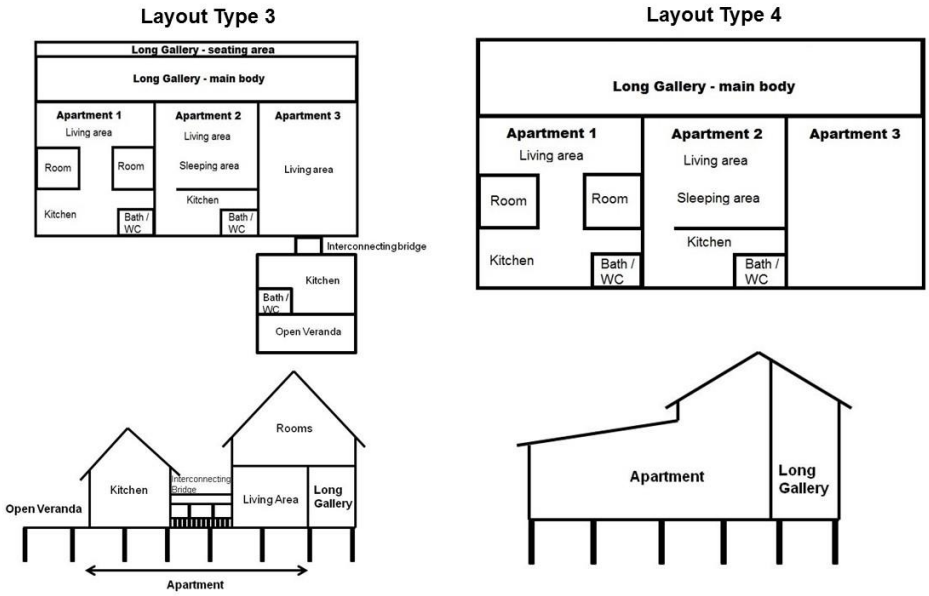

Fig. 2 *Longhouse layout type 3 and type 4*

From the findings on the four types of longhouse spatial arrangements can be used as an idea for sustainable and affordable housing. The idea to housed one village or one community under one roof might help in saving the land and encourage more space for greener environment. At the same time the dwellers still can enjoy living on landed properties without forced to live in stratified dwellings. The intimacy of the society under one roof also helps in guarding the housing from intruder and crime.

The space in traditional longhouse divided into public and private area. Each family in the longhouse have their own private living space which is the apartment. The long gallery and open veranda are public spaces of the traditional longhouse. Adapting the spatial concept of the traditional longhouse into affordable and sustainable housing will have both the private and public spaces. The families living in this kind of housing still have their own privacy and at the same time enjoying the benefits of close society. The existence of long gallery differentiates the housing with the longhouse spatial concept with the terrace house. The advantages of the long gallery provide the intimacy of the dwellers with each other, and the space can be used for social activities. Conventional village or housing development need to have separate community hall for social activities but in longhouse type of housing can used the long gallery as the community hall.

Amenities such as mini groceries stores, clinic, mini post office or any relevant amenities can be integrated into the housing with the longhouse spatial concept. The dwellers can enjoy the proximity to the amenities under one roof without need to go far from their living unit. The concept of integrating the amenities into the longhouse concept housing had been happen in Vietnam with the row houses also not only used for residential but also for commercial. The upper part of the row houses used as residential, and the lower part used as a convenience shop [20].

The advantage of row houses on spatial aspects is the flexibility to be expanded and integration of living, working and commercial function [20]. Longhouse also can be considered as a type of row housing. The housing concept of using the longhouse spatial layout provide the possibility of centralization of housing area under one roof where the disadvantage of sprawling housing can be overcome. At the same time under one roof the community will have the social intimacy, safety assurance and enjoying the common amenities provided.

7. Conclusion

Traditional longhouse spatial arrangements can become the future inspiration and solutions for affordable and sustainable housing. The housing concept can be centralized under one roof for every dweller's convenience and protection to natural resources especially land. Environment also can be protected from sprawling development if centralization of housing can be done. The future of sustainable housing development has lots of concept to be explored including the concept exhibit by traditional longhouse. More idea can be explored to support the sustainable and affordable housing to make it possible and practical to be realized.

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References

[1] Sim, T. T., & Khan, T. H. (2014). Reimaging Iban Longhouses in urban context: A study in Sarawak, Malaysia. *Scottish Journal of Arts, Social Sciences and Scientific Studies, 18(1),* 3-11.
[2] Patterson, A. H., & Chiswick, N. R. (1981). The role of the social and physical environment in privacy maintenance among the Iban of Borneo. *Journal of Environmental Psychology, 1(2),* 131-139.
[3] Janet Victoria, Siti Akhtar Mahayuddin, Wan Akmal Zahri Wan Zaharuddin, Siti Norlizaiha Harun, Balkhiz Ismail & Noorsaidi. (2015). Sustainability of building elements in Bidayuh traditional longhouse construction.
[4] Sarawak Museum. (2015, April). Collection: Longhouse Model. www.museum.sarawak.gov.my.
[5] Ting, J. (2005). The Egalitarian Architecture of the Iban Longhouse. 22nd Annual Conference of the Society of Architectural Historians, Australia and New Zealand, at New Zealand.
[6] Winzeler, R.L., (2004). The Architecture of Life and Death in Borneo. University of Hawaii Press.
[7] Jamaluddin, S. Z. H. S., Mahayuddin, S. A., & Hamid, S. H. A. (2018). Challenges of Integrating Affordable and Sustainable Housing in Malaysia. IOP Conference Series: Earth and Environmental Science 140.
[8] Noble, A.G. (2014). Vernacular Buildings, A Global Survey. London: I.B Tauris & Co Ltd.
[9] Steiner, H. (2007). People of The Longhouse and Jungle Sarawak. Kota Kinabalu: Opus Publications.
[10] Butcher, H. (2022, June 22). Sarawak Stable and Growing in 2022. www.nst.my.
[11] Smets, P., & van Lindert, P. (2016). Sustainable housing and the urban poor. *International Journal of Urban Sustainable Development, 8(1),* 1-9.
[12] Roshanfekr, S., Tawil, N. M., & Goh, N. A. (2016). Investigation of Sustainable Housing Criteria. MATEC Web of Conferences 66.
[13] Abdullah, Y. A., Jamaluddin, N. B., Yakob, H., Marzukhi, M. A., & Zaki, Z. A. (2021, March). Affordable housing for the middle-income group in Malaysia. IOP Conference Series: Earth and Environmental Science, 685(1), p. 012019). IOP Publishing.
[14] Pirinen, A., & Tervo, A. (2020). What can we share? A design game for developing the shared spaces in housing. Design Studies, 69, 100941.
[15] Oyebanji, A. O., Liyanage, C., & Akintoye, A. (2017). Critical Success Factors (CSFs) for achieving sustainable social housing (SSH). International journal of sustainable built environment, 6(1), 216-227.
[16] Saidu, A. I., & Yeom, C. (2020). Success criteria evaluation for a sustainable and affordable housing model: a case for improving household welfare in Nigeria Cities. *Sustainability, 12(2),* 656.
[17] Pullen, S., Arman, M., Zillante, G., Zuo, J., Chileshe, N., & Wilson, L. (2010). Developing an assessment framework for affordable and sustainable housing. *Australasian Journal of Construction Economics and Building, 10(1/2),* 60-76.
[18] Mahayuddin, S. A., Zaharuddin, W. A. Z. W., Harun, S. N., & Ismail, B. (2017). Assessment of building typology and construction method of traditional longhouse. Procedia Engineering, 180, 1015-1023.
[19] Johnson, C. (2017). Growing Sydney: advocacy for urban density. In Growing Compact (pp. 369-383). Routledge.
[20] Seo, D., & Kwon, Y. (2017). In-Migration and Housing Choice in Ho Chi Minh City: Toward Sustainable Housing Development in Vietnam. Sustainability, 9.
[21] Chan, A. P., & Adabre, M. A. (2019). Bridging the gap between sustainable housing and affordable housing: The required critical success criteria (CSC). Building and environment, 151, 112-125.
[22] Ezennia, I. S., & Hoskara, S. O. (2019). Exploring the severity of factors influencing sustainable affordable housing choice: evidence from Abuja, Nigeria. Sustainability, 11(20), 5792.

[23] Hamid, S. H. A., Jamaludin, S. Z. H. S., & Mahayuddin, S. A. (2018, September). Achieving sustainable affordable housing scheme from the perspective of multi eco-system. In IOP Conference Series: Materials Science and Engineering (Vol. 429, No. 1, p. 012029). IOP Publishing.
[24] Moghayedi, A., Awuzie, B., Omotayo, T., Le Jeune, K., Massyn, M., Ekpo, C. O., ... & Byron, P. (2021). A critical success factor framework for implementing sustainable innovative and affordable housing: A systematic review and bibliometric analysis. Buildings, 11(8), 317.
[25] Safronova, N., Nezhnikova, E., & Kolhidov, A. (2017). Sustainable Housing Development in Conditions of Changing Living Environment. MATEC Web of Conferences 106 (2017).
[26] Sunday, D., shukor Lim, N. H. A., & Mazlan, A. N. (2021). Sustainable Affordable Housing Strategies for Solving Low-Income Earners Housing Challenges in Nigeria. Studies of Applied Economics, 39(4).