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Establishing Content Validity for Urban Sustainability Dimensions for Low-Cost Housing in Kuching Malaysia

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ABSTRACT

Issues related to urban sustainability among Sarawakians seeking access to sustainable, low-cost housing accelerate widespread debate on the level of problem and policy intervention that is most effective. Therefore, an explorative investigation was conducted to determine the urban sustainability dimensions of low-cost housing in Kuching Sarawak. Data were collected through interview protocol and analyzed using the semantic analysis of Atlas.ti. The qualitative findings have supported the research conceptual model through face validity. This study has found that the ten constructs: sustainable construction, urban planning design, well-being, economy, culture, environmental quality, public policies and governance, mobility and accessibility, community services and amenities, and safety and security of urban low-cost housing were valid dimensions. The finding reveals that investigating urban sustainability and resident satisfaction dimensions will help private and public developers provide better quality, sustainable, low-cost housing for Sarawakians. Considering housing needs and urban sustainability will improve the quality of life of the target group of low-cost housing schemes.

1. Introduction

The housing aspect has become a critical issue as people's living standard of achievement and the prosperity of a city. Malaysia has experienced rapid urban development due to the increased human population and other economic activities. It has a strong relationship, which can result in long-term implications in various sectors, especially in the residential property market [1]. The rapid urban growth due to rising population, income level, education, and household size have contributed significantly to housing growth. The migration of people from rural to urban areas also increases the urbanization rate, which means more people need housing in the urban areas. The CIS 26 of the National Housing Standard, on the other hand, focuses on the sustainable, affordable housing concept to achieve the goals and vision of the National Housing Policy in providing liveable, inclusive, comprehensive, and quality housing [2]. The Standard sets the minimum

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requirements for providing quality housing in Malaysia and references the parties involved in the planning, designing, and building housing projects in Malaysia. This comprehensive standard aims to create a sustainable, liveable, and inclusive neighborhood for the residents.

A new strand of discourse on sustainable development is emerging around urban sustainability. When determining the urban sustainability dimension of low-cost housing, a broader variety of elements must be considered. This makes it appropriate to empirically investigate the urban sustainability dimension of low-cost housing in Kuching, Sarawak, for research purposes. The availability and affordability of housing are key sources of worry that impact individual households and have implications for the larger economy and environment, such as employment opportunities, health, and environmental sustainability [3]. To contribute to the Malaysian government's sustainability plan, affordable housing must now be addressed as a problem that has to be resolved. It is widely acknowledged that the concept of sustainability does not just refer to being economically viable but also to being socially and environmentally sustainable. Therefore, it will be necessary to make trade-offs between various environmentally friendly aspects to achieve inexpensive, environmentally friendly housing. Given the current economic climate, housing with a sustainability component is particularly relevant. As a result, sustainable housing must be economically viable, socially acceptable, technically practicable, and environmentally compatible [4].

The notion of sustainable development in urban contexts, particularly in developing nations, often lacks consensus regarding the key elements of sustainability and the acceptability of compact urban forms. This is a critical issue due to the large populations and rapid economic growth in these regions, which means that the social sustainability of major metropolitan areas can significantly impact the overall sustainability of the entire region [5]. In metropolitan areas, the scarcity of land and the high cost of development have led to the advocacy of high-density, compact urban forms as a solution to urban expansion and densification challenges [5]. These forms can contribute positively to urban life by offering affordable and comfortable living conditions, and therefore should be encouraged [6]. Thus, considering urban sustainability is crucial when planning low-cost housing developments.

Abdul-Rahman, Wang, Wood, and Ebrahimi (2015) addressed this by developing a Fuzzy Weighted Hierarchy for Triquetrous Sustainability (FWH-TS) for residential buildings, utilizing structured interviews with industry experts. They identified six major sub-criteria under social sustainability: site and equipment considerations, health and comfort considerations, job opportunities, safety issues, stakeholders' relationships, and architectural issues. Among these, safety received the highest weight [7]. Similarly, Oyebanji, Liyanage, and Akintoye (2017) identified Critical Success Factors (CSFs) for achieving Sustainable Social Housing (SSH), which include sufficient funding, affordability, effective economic planning, suitable building technology, environmental protection, use of eco-friendly materials, efficient land use planning, suitable design, security, provision of social services, and social cohesion [8].

Most studies on affordable housing sustainability primarily focus on environmental performance criteria [7]. However, Maleki et al. (2019) highlighted that many earlier studies neglected the social dimension, which significantly affects residents' satisfaction [6]. In Sarawak, specifically, there is a lack of research on the urban sustainability of low-cost housing environments. While issues related to the quality of life and well-being of low-cost housing residents are widely debated, precise diagnostics have not been thoroughly executed. This study aims to fill that gap by exploring and investigating the sustainability dimensions of low-cost housing indicators in Kuching, Sarawak. By doing so, it seeks to expand the knowledge of urban sustainability in housing development, addressing not just the environmental and economic aspects but also the social factors that contribute to a sustainable and livable urban environment. This research can help inform future policies and practices, ensuring that low-cost housing developments are both sustainable and capable of improving residents' quality of life.

2. Previous Research Addressing the Problem

Said et al. (2016) attempted to identify the best region in Sabah for developing a sustainable, affordable housing scheme. They focused on assessing various regions based on their utility degree, a metric that evaluates how well a region aligns with the goals of sustainable housing affordability. The study's outcomes

indicated that regions with high utility degrees are the most compatible with sustainable housing affordability. Conversely, regions with lower utility degrees were identified as the worst performing in terms of meeting the criteria for sustainable and affordable housing. This assessment helped to pinpoint the most and least suitable areas for such developments. Sembulan emerged as the top location for sustainable housing affordability, characterized by its high utility degree. This suggests that Sembulan possesses the qualities and conditions necessary to support sustainable and affordable housing initiatives effectively. Interestingly, the study found that most of the population in Kota Kinabalu prioritized house prices over other factors. Despite this, respondents showed a willingness to discount price concerns in favor of housing quality and environmental considerations. This indicates a significant shift in priorities, with residents valuing sustainable living conditions and environmental benefits even if it means higher costs. These findings underscore the importance of considering various dimensions of sustainability—economic, social, and environmental—when planning housing developments. They also highlight the need for policymakers and developers to balance affordability with quality and environmental sustainability to meet residents' evolving preferences and needs. This approach can lead to more effective and widely accepted sustainable housing solutions in Sabah [9].

Said et al. (2017) explored the owners' perceptions of sustainable housing affordability in Kuching, Sarawak. The study aimed to identify areas where existing affordable units at the time of purchase and affordable rents in the rental market could sustain and enhance residents' quality of life, whether they were living in or renting the units. The researchers focused on Kuching and its surrounding areas, using the Complex Proportional Assessment (COPRAS) method to evaluate various locations. Kuching Utara emerged as the best location for sustainable housing affordability, indicating that it met the criteria for providing both affordable housing and a high quality of life. The results highlighted that house price was the most significant concern for residents in Kuching. Other important factors included safety levels and proximity to the workplace, both of which are critical for enhancing the quality of life. However, respondents were surprisingly indifferent to the development theme or concept and the position of the unit within the layout plan. This suggests that practical considerations such as cost, safety, and convenience outweigh aesthetic or design-related factors in residents' decision-making processes. This study underscores the importance of addressing key practical concerns such as affordability, safety, and accessibility when planning and developing sustainable housing. Policymakers and developers should prioritize these factors to meet the needs and preferences of residents effectively. Additionally, the findings suggest that while design and thematic concepts are less critical, ensuring affordability and safety can significantly contribute to the overall sustainability and desirability of housing projects in Kuching [10].

According to Mulliner and Maliene (2011), a criteria system representing sustainable housing affordability was developed to understand the factors influencing housing affordability. The study involved housing professionals from seven local authorities within Merseyside and Cheshire, who participated in semi-structured interviews. These professionals were asked to share their thoughts on the concept of housing affordability and the criteria they believed would impact it. The findings revealed that monetary criteria were deemed the most important for sustainable housing affordability. Specifically, income-related house prices were considered the highest priority, indicating that the relationship between household income and house prices is a crucial determinant of affordability. Rental costs relative to incomes followed closely behind, emphasizing the importance of rental affordability alongside homeownership costs [3].

Housing quality emerged as the third most important criterion in the research. This indicates that while financial considerations are paramount, the quality of housing also plays a significant role in sustainable housing affordability. Quality housing can include aspects such as construction standards, maintenance, amenities, and overall living conditions, which contribute to residents' well-being and satisfaction. The insights from this study highlight the need for a multifaceted approach to sustainable housing affordability. Policymakers and developers should prioritize financial criteria, ensuring that both house prices and rental costs are aligned with local income levels. However, they must also address housing quality to ensure that affordable housing options do not compromise residents' living standards. By considering these criteria, housing policies and development strategies can better meet the needs of residents, promoting sustainable and affordable housing solutions that enhance overall quality of life. The study underscores the importance

of a balanced approach that integrates economic and qualitative aspects to achieve long-term housing affordability and sustainability [3].

Mulliner, Smallbone, and Maliene (2013) conducted an assessment of sustainable housing affordability using a multiple-criteria decision-making (MCDM) method. Their approach was two-staged: first, they developed a criteria system, and then they weighted these criteria to assess their relative importance. Initially, the researchers conducted an extensive literature review and semi-structured interviews with local authorities in Merseyside and Cheshire, England, to identify relevant criteria for sustainable housing affordability. These criteria encompassed various dimensions beyond mere financial considerations, including social and environmental factors. Following the identification phase, the criteria system was validated and weighted through questionnaire surveys to ensure the robustness and relevance of the selected criteria. The study's results highlighted that incorporating a range of social and environmental criteria significantly impacts the determination of an area's housing affordability compared to focusing solely on financial attributes. This indicates that sustainable housing affordability is a complex issue that cannot be adequately addressed by examining economic factors alone. For instance, social criteria may include aspects such as community amenities, access to public services, and neighbourhood safety. Environmental criteria might involve energy efficiency, green spaces, and proximity to pollution sources. By including these diverse factors, the assessment provides a more holistic understanding of what makes housing truly affordable in a sustainable context. This research underscores the importance of a comprehensive approach to evaluating housing affordability. Policymakers and developers are encouraged to consider a wide array of criteria that reflect the multifaceted nature of housing needs and sustainability goals. By doing so, they can develop housing strategies that not only ensure economic accessibility but also enhance social well-being and environmental quality. Ultimately, the findings suggest that effective housing policies should integrate financial, social, and environmental dimensions to create more sustainable and livable urban areas. This holistic perspective ensures that housing affordability is addressed in a manner that supports long-term sustainability and the overall quality of life for residents [11].

Mulliner and Maliene (2016) analyzed professional perceptions of criteria related to sustainable housing affordability and found that views were largely consistent across various regions of the United Kingdom. The study aimed to understand which factors housing and planning professionals deem most critical for sustainable housing affordability. To gather data, a questionnaire was distributed among professionals working in six different sectors across the UK: developers, housing associations, local authority planners, housing services in local authorities, affordable housing consultants, and those involved in urban regeneration work. This broad approach ensured a comprehensive understanding of the different perspectives within the housing industry. The results found that key stakeholders in the housing industry currently considered the economic factors, such as "income-related house prices," "income-related rental costs," "interest rates and mortgage availability," and "rented accommodation availability" to be the most significant when assessing sustainable housing affordability [12]. These findings indicate that economic considerations are at the forefront of professionals' assessments of sustainable housing affordability. However, the study also highlights the importance of integrating social and environmental criteria to create a more holistic approach to housing affordability. By understanding the predominant focus on economic factors, policymakers and developers can better address the immediate concerns of housing affordability. However, to achieve long-term sustainability, it is essential to also consider the social and environmental aspects that contribute to the overall quality of life. Mulliner and Maliene's study underscores the need for a balanced approach to sustainable housing affordability, one that integrates economic, social, and environmental dimensions. This comprehensive perspective ensures that housing policies and development strategies are robust, inclusive, and capable of meeting the diverse needs of communities across the UK.

Maleki et al. (2019) employed multi-criteria decision-making (MCDM) to assess the social sustainability of high-density residential buildings. They created an MCDM method specifically designed to evaluate sustainability using the Integrated Value Model for Sustainability Assessment (MIVES). This approach allowed for a comprehensive evaluation of various sustainability dimensions, focusing particularly on social factors. The findings from their study showed that most aspects of high-density residential buildings positively affect both the characteristics of the buildings themselves and their surrounding environments. These aspects also

significantly influence the psychological needs of the residents, contributing to their overall satisfaction and well-being. This is important because, historically, numerous studies have predominantly focused on economic and environmental issues, often neglecting the social dimension, which is crucial for resident satisfaction and quality of life [6].

In the context of Sarawak, particularly concerning low-cost housing, issues related to residents' quality of life and well-being have been widely debated. However, there has been a notable lack of research evidence and precise diagnostics on urban sustainability in this specific environment. This gap in research indicates a need for a more focused approach to understanding and improving the social sustainability of low-cost housing in Sarawak. The study by Maleki et al. highlights the importance of considering social factors alongside economic and environmental ones. For policymakers and developers, this means that sustainable housing strategies should not only focus on affordability and environmental impact but also on enhancing the social aspects that contribute to the residents' quality of life. In summary, Maleki et al. (2019) underscore the critical role of social sustainability in high-density residential buildings and call for a more integrated approach to housing development. Their research provides valuable insights that can inform future studies and policies aimed at improving the living conditions and overall satisfaction of residents, particularly in low-cost housing environments like those in Sarawak. This comprehensive approach is essential for creating truly sustainable urban areas that meet the diverse needs of their inhabitants.

3. Research Methodology

3.1 Preliminary consideration of the research paradigm

This research adopted a qualitative approach, which is geared towards gaining a deep and nuanced understanding of phenomena or concepts. Qualitative research emphasizes exploring the contexts and settings in which these phenomena occur, aiming to uncover meanings, experiences, and perspectives of individuals involved [13,14]. Qualitative research is characterized by its interdisciplinary nature, transcending traditional disciplinary boundaries. It draws on methodologies and theories from various fields, including the natural and social sciences, to provide a comprehensive framework for inquiry. This interdisciplinary approach allows researchers to explore complex issues from multiple angles, incorporating diverse viewpoints and insights [15]. Moreover, qualitative research is often transdisciplinary, meaning it integrates different disciplinary perspectives to address research questions holistically. It encourages researchers to engage with diverse stakeholders, incorporate varied methods of data collection (such as interviews, observations, and document analysis), and interpret findings within their broader social, cultural, and environmental contexts. By adopting a qualitative approach, researchers can delve deeply into the complexities of the issues under investigation, uncovering rich data that illuminate the intricacies of human experiences, behaviors, and social interactions. This methodological choice is particularly suited for studies seeking to explore and understand phenomena in their natural settings, capturing the nuanced realities that quantitative approaches may overlook. Qualitative research offers a robust strategy for exploring and understanding the multifaceted dimensions of phenomena, providing valuable insights into contexts, meanings, and social processes that contribute to a deeper comprehension of the issues at hand.

This qualitative method study was conducted within the interpretivist paradigm [16], emphasizing the subjective interpretation of social phenomena. The interpretivist paradigm focuses on understanding the world from the perspectives of the participants, acknowledging that reality is socially constructed and can vary based on individual experiences and contexts [17]. By focusing on the meanings and experiences of participants, the study aimed to uncover deeper insights into their perspectives and behaviours. This approach enabled the researchers to capture the richness and complexity of human experiences, which are often lost in quantitative research. Qualitative methods, such as in-depth interviews, participant observations, and focus groups, were employed to gather detailed and nuanced data [19]. These methods allowed for the exploration of participants' thoughts, feelings, and motivations, providing a holistic understanding of the research topic [20].

Furthermore, this research employed an inductive approach, deriving conclusions from the qualitative data gathered through detailed observations, interviews, and thematic analysis. An inductive approach means that instead of testing predefined hypotheses, the researchers allowed patterns, themes, and theories to emerge from the data [20]. This approach is particularly useful in exploratory research, where the aim is to develop new understandings and theories based on the data collected. The flexibility and richness of qualitative methods facilitated a comprehensive exploration of the research topic, providing valuable context-specific insights. This approach is well-suited to studies that aim to understand complex social phenomena, where the context and setting play a crucial role in shaping the outcomes [21]. By immersing themselves in the research context and engaging with participants, researchers can gain a deeper understanding of the issues at hand and produce findings that are grounded in the lived experiences of those being studied [22].

3.2 Research Design

In this case study design, two stages are involved to systematically investigate and understand the phenomenon of interest. The first stage entails collecting and analyzing qualitative data to establish a conceptual framework. This step is crucial as it lays the foundation for understanding the unique aspects and complexities of the subject under study [17, 18]. The rationale for adopting this approach is rooted in the use of an intrinsic case study methodology. This type of case study focuses on gaining insights into a particular, distinctive phenomenon within its natural context [19]. By delving deeply into the specifics of a single case, researchers can uncover intricate details and nuances that might not be apparent in broader, more generalized studies.

Stake (1995) provides further clarity on different types of case study designs. An instrumental case study, for instance, employs a specific case to gain a comprehensive understanding of a broader phenomenon or theory. This approach allows researchers to examine how a particular case exemplifies or challenges existing theoretical frameworks. On the other hand, a collective case study involves the simultaneous or chronological study of multiple cases. This method aims to build a holistic understanding of a phenomenon by comparing and contrasting various instances or contexts where the phenomenon manifests [19]. This comparative approach helps in identifying common patterns, unique variations, and underlying factors that contribute to the phenomenon across different settings. Overall, the case study design described combines qualitative data collection with a strategic approach to case selection, aiming to provide in-depth insights into the chosen phenomenon while allowing for nuanced comparisons and theoretical development.

3.3 Interview Method

In this research context, the interview protocol served a critical role in evaluating the conceptual framework related to urban sustainability in low-cost housing. The process involved converting interview questions into thematic areas that directly aligned with the research objectives [23]. This approach ensured that the data collected during interviews were focused and relevant to the study's aims, facilitating a structured analysis of key issues pertaining to urban sustainability and low-cost housing. The selection of participatory organizations for the interviews was deliberate, based on their expertise and knowledge in housing. These organizations were chosen because their insights were deemed valuable contributions to the research, aligning with specific attributes identified by the researchers. This strategic selection helped ensure that the interviews gathered diverse perspectives and comprehensive information relevant to the study's conceptual framework.

One of the primary goals of conducting these interviews was to establish the content validity of the conceptual framework developed for the study. Content validity refers to the degree to which the content of a measurement instrument (in this case, the conceptual framework) is representative of the construct it purports to measure. By engaging with experts and stakeholders through structured interviews, researchers could verify and refine their conceptual framework, ensuring that it accurately captured the essential dimensions of urban sustainability in the context of low-cost housing. Overall, the interview protocol in this research was designed not only to collect data but also to validate and enhance the conceptual framework

through expert input and thematic analysis. This methodological approach strengthens the credibility and relevance of findings concerning urban sustainability and affordable housing initiatives [23].

4. Data Analysis and Interpretation

This was accomplished by primary documents analyses and asking the expert from a sample of 10 consisting of government bodies, universities, and non-governmental organizations in Kuching Sarawak to describe their views on the study to provide a full picture of the extent of coverage of urban sustainability of low-cost housing dimension. The text documents and interview transcript were analysed by the help of the Atlas ti. The qualitative findings then were used to guide the development of the items. To ensure the measure would be appropriate for assessing urban low-cost housing sustainability, government bodies, public universities, and non-governmental organizations took part in the study. The interview protocol was conducted to determine the urban sustainability dimensions of low-cost housing, and investigating the changing developmental needs in housing market that satisfy the aspirations of all stakeholders through the analysis of the views of an expert.

The network analyses of Atlas.ti (Fig.1) has determine ten dimensions of urban sustainability for low-cost housing: sustainable constructions; urban planning design; wellbeing; economy; culture; environmental quality; public policies and governance; and mobility and accessibility; community services and amenities; and safety and security. Cirman (2006) emphasized that the physical aspect related to the external and internal design of the housing [24]. Solari and Mare (2012) point out that the size of the house and the population of people living in the building will make the house appear very crowded, affect the wellbeing of the residents and make the residents feel depressed [25]. Karim (2012), the building materials quality of the house are also very important. This can ensure the durability of the house and the safety of the residents. House leaks, cracked walls, and collapse are common problems in affordable houses [26]. Building materials used in buildings not only threaten the health and quality of life of residents but also affect the environment [27].

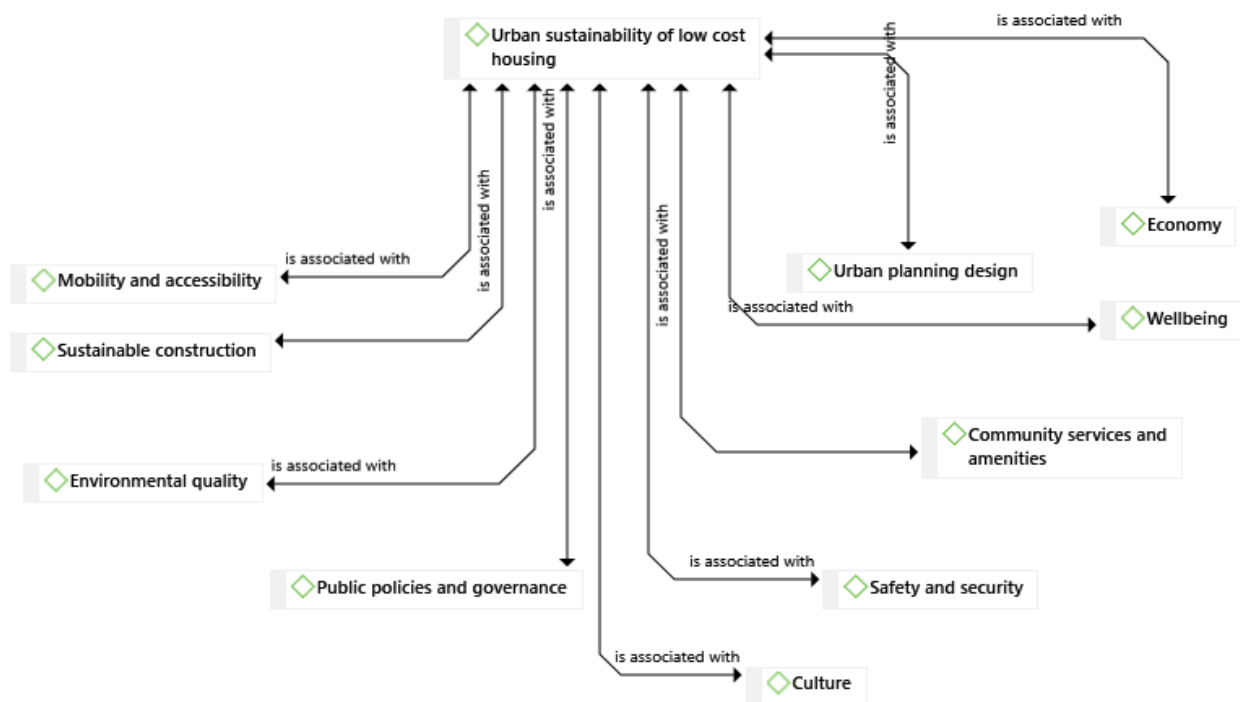


Fig. 1. Semantic network of urban sustainability dimension of low-cost housing

Besides, community design refers to the layout of the neighbourhood with various architectural and planning elements to meet the residents' needs and requirements. Effective community design involves careful planning of spaces and structures to create a functional and aesthetically pleasing environment. It helps in creating the configuration and provision of a variety of centres, such as parks, community centres, and commercial areas, which encourage residents to engage in diverse activities within the neighbourhood [28]. This can include recreational facilities, educational institutions, healthcare centres, and retail spaces, all strategically placed to be easily accessible to all residents. The movement network in the neighbourhood, characterized by high interconnectivity, enhances the connection between different parts of the community [28]. This network includes a well-planned system of roads, pathways, and public transportation options that facilitate smooth and efficient movement. High interconnectivity ensures that all parts of the neighbourhood are easily accessible, reducing travel time and promoting convenience. It can help to promote the mobility of the residents in the community through walking, cycling, or driving. A well-connected movement network encourages residents to choose sustainable modes of transportation, such as walking or cycling, over driving, thereby reducing traffic congestion and environmental pollution.

Moreover, a well-designed movement network supports social interactions and community cohesion by making it easier for residents to visit friends, family, and neighbours. It also enhances safety by providing multiple routes and escape options in case of emergencies. Furthermore, interconnected neighbourhoods tend to have higher property values and attract more investment, leading to overall economic growth and development. Properly planned community design and movement networks play a crucial role in fostering a sense of belonging and improving the quality of life for residents. Additionally, incorporating green spaces and pedestrian-friendly pathways within the community design can significantly improve the physical and mental well-being of residents. Green spaces provide areas for relaxation, exercise, and social gatherings, contributing to a healthier lifestyle. Pedestrian-friendly pathways make it safer and more enjoyable for residents to walk or cycle, promoting physical activity and reducing reliance on vehicles. Integrating these elements into the community design ensures a holistic approach to urban planning that prioritizes the well-being of its residents while fostering a sustainable and interconnected neighbourhood.

According to Zainal et al. (2012), existing studies suggest that the proximity of public facilities significantly impacts the well-being of residents in affordable housing. Shorter distances to public facilities facilitate easier communication among residents, enhancing social interaction and community cohesion. This proximity also improves the efficient use of time and enhances the capacity for material transfers within the community [29]. The availability and proximity of public facilities are crucial factors that contribute to the well-being of residents. These facilities play a vital role in enhancing convenience and quality of life by meeting essential living needs and ensuring a suitable standard of living per capita [30]. Access to amenities such as schools, healthcare centers, recreational areas, and public transportation not only improves daily life but also fosters a sense of security and belonging within the community. By emphasizing the importance of proximity to public facilities, Zainal et al. underscore how urban planning and housing development can positively impact residents' well-being. Designing neighborhoods with easy access to essential services promotes a healthier and more connected community environment, ultimately enhancing the overall quality of life for residents of affordable housing. This perspective highlights the significance of integrated urban planning approaches that prioritize accessibility and social infrastructure alongside housing development.

Furthermore, neighborhood environments play a crucial role in shaping people's behavior, health, quality of life, and satisfaction with their living spaces [31]. The design and characteristics of a neighborhood can significantly influence residents' daily activities, social interactions, and overall well-being. For instance, Stoeckel and Litwin (2015) highlight that older adults residing in neighborhoods with easy access to essential services—such as healthcare, retail, and recreational facilities—tend to report better physical health, improved quality of life, and greater well-being compared to those in less accessible areas [32]. Accessible neighborhood environments facilitate residents' ability to maintain an active lifestyle, access timely medical care, and engage in social activities. These factors collectively contribute to enhanced health outcomes and increased happiness among residents. Moreover, the presence of convenient services reduces barriers to participation in community life, fostering a sense of belonging and social integration. Stoeckel and Litwin's findings underscore the importance of urban planning strategies that prioritize service accessibility and neighborhood design to promote residents' health and well-being. By ensuring that neighborhoods are designed to support easy access to essential amenities, policymakers and planners can create environments

that enhance both physical health outcomes and the overall quality of life for residents, particularly older adults. The accessibility of services in neighborhood environments plays a vital role in shaping residents' lifestyles and well-being. Designing neighborhoods that support active living, social engagement, and access to healthcare not only improves individual health outcomes but also contributes to a more vibrant and connected community fabric. This holistic approach to neighborhood planning underscores the broader benefits of creating environments that support residents' needs across the lifespan.

In addition to Ismail and Dempsey's (2021) findings, residents' perceptions of safety constitute a critical dimension of neighbourhood satisfaction. Safe neighbourhoods are characterized by residents feeling secure both in their homes and in public spaces, free from the threat of crime and violence. Ismail and Dempsey's study emphasizes that citizens' perceptions are deeply influenced by their lived experiences, particularly concerning crime and safety issues. The research underscores the importance of effective crime prevention and response strategies implemented by local governments. Residents expressed dissatisfaction with how crime issues were managed, reflecting the significant impact of safety perceptions on neighbourhood satisfaction. A sense of safety not only contributes to residents' mental well-being but also enhances their overall quality of life. When people feel safe, they are more likely to engage in outdoor activities, interact with their neighbours, and participate in community events, fostering a sense of belonging and social cohesion. By highlighting these aspects, Ismail and Dempsey emphasize the multifaceted role of safety in shaping residents' daily lives and community interactions. Their findings suggest that urban planning and community development efforts should prioritize creating safe environments through proactive safety measures and community engagement. This approach not only enhances residents' satisfaction with their neighbourhoods but also contributes to the broader goals of social inclusion, health promotion, and sustainable community development [33].

Therefore, policymakers, town planners, and developers should prioritize incorporating sufficient safety elements into neighbourhood development. This includes designing well-lit streets, providing ample public surveillance, creating community policing initiatives, and ensuring quick emergency response services. Urban planning should also consider the physical design of spaces to deter criminal activity, such as incorporating natural surveillance, access control, and territorial reinforcement in the layout of buildings and public areas. Moreover, fostering community engagement and social cohesion can enhance the sense of safety. When residents know their neighbours and have strong community ties, they are more likely to look out for each other and report suspicious activities. Initiatives that promote social interaction, such as community centres, local events, and shared public spaces, can help build a supportive and vigilant community. Incorporating these elements into neighbourhood design not only improves residents' safety but also contributes to their overall satisfaction with their living environment. Safe, accessible, and well-planned neighbourhoods support healthier lifestyles, foster social connections, and enhance the quality of life, making them more desirable places to live. As such, urban development must take a holistic approach that integrates safety, accessibility, and community engagement to create sustainable and thriving neighbourhoods.

5. Conclusions

The network diagram in the study provided a comprehensive visualization of how various dimensions of urban sustainability interconnect and influence each other. This holistic approach allows for a deeper understanding of the multifaceted nature of urban sustainability in the context of low-cost housing. By mapping out these connections, the network diagram helps to identify key leverage points where interventions can have the most significant impact. The identified dimensions are critical to ensuring that low-cost housing developments not only provide affordable shelter but also positively contribute to the broader urban ecosystem. These dimensions might include factors such as energy efficiency, environmental impact, social cohesion, economic viability, and health outcomes. Understanding and addressing these interconnected aspects are essential for creating sustainable and livable urban environments.

Further research is essential to enhance housing development, leading to better housing units and improved productivity and well-being for current and future residents of low-cost housing in Kuching. This research can help refine the understanding of the critical factors that contribute to successful sustainable housing projects. Practically, the findings of this study can serve as a valuable guide for assessing low-cost

housing projects. They can provide direction to developers, NGOs, and government agencies in allocating resources for sustainable housing provision. By highlighting the key dimensions of urban sustainability, stakeholders can make informed decisions that promote the long-term viability and resilience of housing projects. This means prioritizing features that not only meet immediate housing needs but also ensure environmental sustainability, social inclusivity, and economic feasibility over the long term.

Policymakers need to set higher standards for building and neighbourhood designs that incorporate sustainability features. This will require increased research and innovation from the building and land development industries. Stricter sustainability standards will not only improve residents' quality of life but also enhance the overall sustainability of urban areas. To ensure the robustness and relevance of identified constructs for urban sustainability in low-cost housing across different contexts, further validation is necessary. Future research should explore the interrelationships between variables of urban sustainable low-cost housing. Understanding how changes in one dimension (e.g., energy efficiency) may affect others (e.g., affordability, social cohesion) is crucial for creating comprehensive sustainability strategies. Longitudinal studies are also needed to track the long-term impacts of sustainable housing initiatives on residents and urban environments. These studies would provide valuable insights into the effectiveness of various sustainability measures over time, helping to inform future policy and practice. For instance, examining how energy-efficient building practices affect residents' health and utility costs over several years would offer a deeper understanding of the benefits and challenges associated with these initiatives. By continually refining and validating the constructs of urban sustainability, researchers and practitioners can contribute to the development of more sustainable and livable urban spaces. This ongoing process of improvement ensures that sustainability measures remain effective and relevant, adapting to new challenges and opportunities in urban development. In this way, urban areas can evolve to better meet the needs of their residents while maintaining environmental and economic sustainability.

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References

- [1] Bujang, A. A., Jiram, W. A., Zarin, H. A., & Anuar, F. M. (2015). Measuring the Gen Y housing affordability problem. *International Journal of Trade, Economics and Finance*, 6(1), 22.
- [2] Construction Industry Development Board (2019) CIS 26 National Housing Standard, Construction Industry Standard.
- [3] Mulliner, E.; Maliene, V. (2011). Criteria for Sustainable Housing Affordability. In Proceedings of the 8th International Conference on Environmental Engineering, ICEE 2011, Vilnius, Lithuania, 19–20 May 2011.
- [4] Karuppannan, S. and Sivam, A. Sustainable development and housing affordability. Paper presented at the European network for housing research conference. 28 June–1 July 2009, Prague, Czech Republic.
- [5] Dave, S. (2011). Neighbourhood density and social sustainability in cities of developing countries. *Sustainable development*, 19(3), 189-205.
- [6] Maleki, B., Rubio, M. D. M. C., Hosseini, S. M. A., & De La Fuente Antequera, A. (2019). Multi-criteria decision making in the social sustainability assessment of high-rise residential buildings. In *IOP Conference Series: Earth and Environmental Science* (Vol. 290, No. 1, p. 012054). IOP Publishing.
- [7] Abdul-Rahman, H., Wang, C., Wood, L. C., & Ebrahimi, M. (2015). Integrating and ranking sustainability criteria for housing. In *Proceedings of the Institution of Civil Engineers-Engineering Sustainability* (Vol. 169, No. 1, pp. 3-30). Thomas Telford Ltd.
- [8] Oyeibanji, 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.
- [9] Said, R., Majid, R. A., Alias, A., Adnan, Y. M., & Razali, M. N. (2016). Sustainable housing affordability in Sabah. *Planning Malaysia*, (5).
- [10] Said, R., Daud, M. N., Esha, Z., Majid, R. A., & Najib, M. (2017). Owners' perception towards sustainable housing affordability in Kuching, Sarawak. *Journal of Design and Built Environment*, 194-206.
- [11] Mulliner, E., Smallbone, K., & Maliene, V. (2013). An assessment of sustainable housing affordability using a multiple criteria decision making method. *Omega*, 41(2), 270-279.
- [12] Mulliner, E., Malys, N., & Maliene, V. (2016). Comparative analysis of MCDM methods for the assessment of sustainable housing affordability. *Omega*, 59, 146-156.
- [13] Dainty, A. (2008). Methodological pluralism in construction management research. *Advanced research methods in the built environment*, 1, 1-13.
- [14] Aspers, P., & Corte, U. (2019). What is qualitative in qualitative research. *Qualitative sociology*, 42, 139-160.

- [15] Denzin, N. K., & Lincoln, Y. S. (Hrsg.). (2005). Introduction. In *The Sage handbook of qualitative research* (3. Aufl., S. 1–32). Thousand Oaks: Sage.
- [16] N. K. Denzin, & Y. S. Lincoln (Eds.). (2011). *The Sage handbook of qualitative research*. Sage.
- [17] Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 209–240). Sage.
- [18] Hirose, M., & Creswell, J. W. (2023). Applying core quality criteria of mixed methods research to an empirical study. *Journal of Mixed Methods Research*, 17(1), 12-28.
- [19] Stake, R. (1995). *The art of case study research*. Thousand Oaks, CA: SAGE Publications.
- [20] Patton, M. Q. (2002). *Qualitative Research & Evaluation Methods* (3rd ed.). Thousand Oaks, CA: SAGE Publications.
- [21] Merriam, S. B. (2009). *Qualitative Research: A Guide to Design and Implementation*. San Francisco, CA: Jossey-Bass.
- [22] Marshall, C., & Rossman, G. B. (2016). *Designing Qualitative Research* (6th ed.). Thousand Oaks, CA: SAGE Publications.
- [23] Boeije, H. (2010). *Analysis in qualitative research*. London: Sage
- [24] Cirman, A. (2006). Housing tenure preferences in the post-privatisation period: the case of Slovenia. *Housing studies*, 21(1), 113-134.
- [25] Solari, C. D., & Mare, R. D. (2012). Housing crowding effects on children's wellbeing. *Social science research*, 41(2), 464-476.
- [26] Karim, H. A. (2012). Low cost housing environment: compromising quality of life?. *Procedia-Social and Behavioral Sciences*, 35, 44-53.
- [27] Isnin, Z., Ramli, R., Hashim, A. E., & Ali, I. M. (2012). Sustainable issues in low cost housing alteration projects. *Procedia-Social and Behavioral Sciences*, 36, 393-401.
- [28] Hooper, P., Foster, S., Bull, F., Knuiman, M., Christian, H., Timperio, A., ... & Giles-Corti, B. (2020). Living liveable? RESIDE's evaluation of the "Liveable Neighborhoods" planning policy on the health supportive behaviors and wellbeing of residents in Perth, Western Australia. *SSM-population health*, 10, 100538.
- [29] Zainal, N. R., Kaur, G., Ahmad, N. A., & Khalili, J. M. (2012). Housing conditions and quality of life of the urban poor in Malaysia. *Procedia-Social and Behavioral Sciences*, 50, 827-838.
- [30] Li, S., Li, X., Tian, S., & Cong, X. (2021). Exploration of the Residents' Quality of Life Based on the Distance of Public Service Facilities: Case of Dalian. *Journal of Urban Planning and Development*, 147(2), 03121001.
- [31] Ibem, E. O., Opoko, P. A., & Aduwo, E. B. (2017). Satisfaction with neighbourhood environments in public housing: Evidence from Ogun State, Nigeria. *Social Indicators Research*, 130, 733-757.
- [32] Stoeckel, K. J., & Litwin, H. (2015). Social cohesiveness and neighbourhood environmental deprivation: how are they related to life satisfaction in late life. *Ageing in Europe—Supporting policies for an inclusive society*, 149-158.
- [33] Ismail, W. A. W., & Dempsey, N. (2021). Examining the Concept of Liveability in Urban Neighbourhoods in Iskandar Malaysia. *Environment-Behaviour Proceedings Journal*, 6(18), 28.