

# Assessment of Livability Factors as an Adaptation of Settled Behavior to Improve Sustainable Housing

Dwira Nirfalini Aulia<sup>1,\*</sup> and Beny O Y Marpaung<sup>2</sup>

<sup>1</sup> Department of Architecture, Universitas Sumatera Utara, Medan Indonesia

<sup>2</sup> Department of Architecture, Universitas Sumatera Utara, Medan Indonesia; [beny.marpaung@usu.ac.id](mailto:beny.marpaung@usu.ac.id)

\* Correspondence author: [dwira.nirfalini@usu.ac.id](mailto:dwira.nirfalini@usu.ac.id)

**Abstract:** Livability includes similar understandings of sustainability, quality of life, character of a place, and public health. Can the livability of housing be maintained or increased? The purpose of this study is to develop factors of livability to improve sustainable settlements. This is descriptive research that describes an object and subject being studied without any engineering. The research variable is the formulation of factors for the level of living power of formal housing based on a literature search. The Descriptive Review method is used to obtain livability factors in supporting literature. Factors forming livability are (1). Physical residential units (2) Affordability of facility (3). Housing Amenities (4). Safety and security (5) Social interaction Community (6) Circular economy. Security and safety factors are the main criteria for shaping the adaptation of settled behavior in the face of climate change. Community social interaction factors are criteria for forming livability on a neighborhood scale. The results of this study contribute to the formation of adaptation of resilient settlement behavior to climate change. In addition, the results of this study can also be used as a guide in housing planning that is adaptive to climate change.

**Keywords:** factors; livability; adaptation; formal housing; sustainable housing

## 1. Introduction

Livability includes notions similar to sustainability, quality of life, the character of a place, and public health. Livability includes a similar definition of sustainability (Wolff and Haase, 2019), Quality of life (van Mossel and Jansen, 2010), Character of a Place (Schwann, 2018), and public health (Crane et al., 2021). The concept of livability has been extensively explored and discussed by academics, practitioners, and policymakers in the past decade to enhance sustainable development. The research question that always arises is: What is the level of livability in formal housing for Low Income? Can the livability level of a building be maintained or improved?

Urban livability is the ability of urban spaces to fulfill the expectations of its inhabitants for wellbeing and quality of life. Socioeconomic indices were regressed on urban form variables to assess the importance of the built environment on predicting livability-related qualities. (Martino et al., 2021). Some mitigation and adaptation measures, can be implemented to improve the livability in cities, their sustainability and the well-being of their populations. Specifying the key concepts and mechanisms of urban livability and establishing a quantitative assessment framework is critical to urban studies (Leal Filho et al., 2023). A definite preference for individual livability over participatory governance and sustainability awareness when it comes to urban morphology, particularly for large-scale developments supported by private developers. Greater livability for inhabitants, close proximity to green areas, and compact urban architecture are the main recurring elements that larger projects base their strategy on (Tanguy et al., 2020) New paragraph: use this style when you need to begin a new paragraph.

Urban deficiencies and leftover spaces present a difficulty to city development. These areas are very amenable to creative intervention through incrementally sustainable urban planning and micro-level initiatives that promote sustainability and livability. The multidisciplinary field of urban design integrates



opportunity growth, equality promotion, community building, and livability enhancement (AL-Mohannadi et al., 2023). A happy population, which reflects the standard of living, may be the key to sustainability. Enhancing the quality of life and livability of cities requires more extensive improvements to urban infrastructure than supplying end consumers with technology products (Chen, 2023).

The concept of livability with the aim of increasing sustainable housing. In order to construct sustainable housing successfully, it is necessary to strike the ideal balance between customer satisfaction and sustainable housing. When evaluating housing in general using the rating system, it may be said to be a fairly accurate complex for the construction of sustainable housing (Ibrahim, 2020). In comparison to traditional housing and neighborhood projects, finding common ground in partnership becomes more difficult due to a number of extra interests and concerns related to sustainability. Furthermore, as the project progresses, the kinds of stakeholders involved and the problems they are worried about shift. While creating more sustainable neighborhoods, these requirements must be taken into account. (Hamdan et al., 2021). Nikezić et al. (2021) specify the topics and theoretical framework that will be applied in the process of creating sustainable housing identities for modern cities. Future cities' social aesthetic can be enhanced by implementing the ideas of meta-housing, custom-made habitation, and maximal minimum. These ideas show the way toward sustainable housing patterns that support mobility, adaptation, domestication, and participation.

Research on 'Livable' formal housing has been carried out by researchers in the last few decades. However, because the assessment indicators are also developing dynamically, showing the state of the art, this research can be seen from the research carried out in the last 5 years.

Changes in livability assessment indicators can be seen from research on urban area planning frameworks (Riggs et al., 2020) and the transformation process of livability assessment indicators in research (Webb et al., 2018); (Crane et al., 2021). Especially in research (Soma et al., 2018) more emphasis is placed on the contribution of stakeholders in the transition to a livable city.

The new conceptualisation of Sustainable Community presented (Winston, 2022) is distinguished by mix use, sustainable energy, waste, and water usage, community resources that are social, cultural, and environmental, and a high standard of living for both people and the natural world. Vehbi et al. (2010) aims to determine and suggest a model based on a number of variables for quantifying and evaluating the degree of sustainability in housing environments. According to him, a unique collection of indicators is required for every case study site because their social, economic, environmental, and geographic systems differ.

The livability of a housing can be maintained by providing residential preferences. It is necessary to take into account the opinions and preferences of the locals when designing sustainable and livable communities. But it's rarely acknowledged that practitioners' attitudes and tastes can also influence how neighborhoods develop (Tiitu et al., 2023). Utilizing tools for participatory planning may be necessary in order to incorporate various aspects of liveability into the planning process. Planning livable neighborhoods for all people while taking noise pollution and traffic safety into account can begin with aiming for safe, walkable neighborhoods and preserving nearby green spaces. Social development toward sustainability and well-being as well as creative placemaking suggested that users might have distinct preferences from other stakeholders. The values and effects of location characteristics linked to social opportunities were frequently expressed in the responses (Ramli & Ujang, 2021).

Urban green spaces are vital components of cities that are crucial to both human health and urban sustainability (Kefale et al., 2023) examine how users feel about urban green spaces and what their preferences are. The findings indicated that half of the participants "never" took part in any activities related to the development of green spaces. Since efforts have solely focused on the built environment, particularly in developing nations, urban expansion has been creating environmental problems on its own and making it difficult to accomplish sustainable urban development. User behavior in public space is defined by the emotional and mental perceptions of the physical environment, which encompass various social, cultural, and educational factors. Emphasizing the synchronization of design with public expectations at a specific moment will result in the temporary popularity of a location, leading to the selection of popular places that will be considered for redevelopment in the future when their popularity decreases. This approach is employed to sustain the quality of life (Aguila et al., 2019). The rapid rate of urbanization in public spaces has limited children's opportunities for outdoor recreation. Research indicates that the physical surroundings of a community are influenced by various social elements in addition to the desires and choices of children's recreational activities. The rules prioritize games that include diverse spatial characteristics, incorporate spatial functionalities, necessitate extra parental assistance for children's play, and allow children to adapt to outside spaces (Zhao et al., 2023).

The livability of a housing can be improved by meeting the satisfaction and lifestyle of residents in housing amenities. The prerequisites for community livability may vary based on geographical areas and urban construction agendas. The indication system must be tailored to individual construction scenarios

and elevated planning criteria, necessitating adjustments in various locations. Wang et al. (2021) A study was conducted to develop an assessment indicator system for evaluating the livability of historic urban neighborhoods. The study examined the deficiencies in the development of livable ancient urban neighborhoods by considering the experiences and satisfaction levels of local residents. It then formulated proposals for reform based on these findings. The analysis of data on subjective perceptions of residential satisfaction involved examining many variables to address issues concerning the quality of residential surroundings. The inhabitants residing in the organized sectors of the city express contentment with the visual appeal and ease of access in their localities, whereas those residing in the unorganized sectors of the city express contentment with their level of emotional connection to their communities (Türkoğlu et al., 2019). The primary determinants of the overall Quality of Urban Life for persons residing in various residential neighborhoods were their contentment with the neighborhood and the urban services provided at the city level, as well as the quality of neighborhood relations and sense of belonging (Koçak Güngör & Terzi, 2022). The prerequisites for a livable neighborhood include a community that offers a good standard of living, a comfortable and secure physical environment, and is well-suited for social interaction (Tanguy et al., 2020). Policymakers have the opportunity to strongly encourage the inclusion of citizen input in the planning processes, especially for bigger neighborhood developments (Temeljotov Salaj & Lindkvist, 2021).

Achieving livability in housing as the final stage in achieving Sustainable Housing. It is imperative to prioritize the well-being of inhabitants in urban planning since it directly impacts the quality of life and future prospects of cities (Chen, 2023). In order to prevent severe alterations in Earth's systems that would significantly diminish the habitability of the planet for all organisms, including humans, it is imperative that we promptly alter our methods of production and consumption, therefore decreasing both resource extraction and environmental emissions (Thøgersen, 2022). Sustainable housing should encompass more than just fulfilling fundamental requirements; it should also enhance the overall livability and quality of life by considering economic, social, and cultural factors (Vehbi et al., 2010). The long-term development plans of emerging countries prioritize sustainable physical and spatial design in order to create a resilient and habitable nation. At the state level, national plans and policies are implemented through physical and spatial planning to promote growth, resilience, livability, and sustainability (Rasoolimanesh et al., 2022). Consumers residing in the downtown Jakarta Metropolitan Region have greater demands and requirements compared to those in nearby areas due to the absence of amenities, accessibilities, geographical benefits, and livability level often seen in most residential locations (Rahadi et al., 2015).

## 2. Literature Review

The factors forming livability are adaptive factors to achieve sustainable housing. The factors that city officials and decision makers should take into account in order to facilitate the transition to sustainable, resilient, and adaptable cities are regulatory, structural/operational, behavioral, awareness, and resource-related triggers of change (Mendizabal et al., 2021). An adaptive planning system provides decision-makers with the flexibility to react to unforeseen events or opportunities and to integrate new information regarding physical circumstances, social and economic impacts, and unintended outcomes (Nadin et al., 2021). Since 2000, numerous governments have implemented substantial planning reforms that have enhanced their ability to facilitate integration across policy sectors, effectively adjust to evolving socioeconomic and political circumstances, and actively involve citizens in decision-making procedures. Effective social well-being policies require increased public engagement, approval, and assistance in addressing and adjusting to environmental risks, including climate change and other disasters (Hagen et al., 2017). Vulnerability, in its most basic definition, is the idea of susceptibility to damage or harm; with relation to climate change, vulnerability is a function of exposure, sensitivity, and adaptive capability. Adaptive capacity refers to the capability of a system or population to effectively handle and respond to both current and anticipated stressors. Similar to vulnerability, adaptive capacity is influenced by various elements such as income, education, information, skills, infrastructure, and managerial capabilities (Wollschlaeger et al., 2022). In order to accommodate increasingly dynamic socio-economic situations, the built environment and planning must adopt a more intricate approach to planning and development, rather than a simplified one (Muldoon-smith & Moreton, 2022). How can we effectively strategize for the adjustment of a comprehensive land and built developing? This study aims to find factors that form livability as an adaptation to improve Sustainable Housing.

Adaptive factors are identified based on the adaptation of residential residents to climate change. The farmers' motivation to practice climate change adaptation and mitigation methods was predicted by their perception of the severity of climate change, their perception of vulnerability to the threat of climate change, their perception of their own ability to respond, the effectiveness of their response, and the cost of implementing these practices. These are the elements that influence the strategies for adapting to and

mitigating climate change, using the framework of Protection Motivation Theory. (Regasa & Akirso, 2019). The theory presents a theoretical structure to clarify the factors that forecast risk prevention behaviors. There is a dynamic relationship between the increasing speed of change in the constructed surroundings and the corresponding requirement for careful preparation for adjustments. By acknowledging the intricate relationships inherent in the process of adaptation among stakeholders and providing an understanding of how different levels of planned governance can effectively coexist (Muldoon-smith & Moreton, 2022).

In order to effectively serve as a receiving community, it is necessary to modify both the physical infrastructure, such as power, water, and transportation systems, and the social infrastructure, including community networks and organizations (Teicher & Marchman, 2023). In order to examine its wider spatial aspect, (Ahn et al., 2023) enquires about the role of three analytical aspects (structural conditions, policy design, and political opportunity structure) in influencing the specific possibilities and obstacles of implementing participatory budgeting for climate change adaptation at the local level. In the absence of these design principles, local experiments including participatory budgeting may fail to transcend the widely recognized constraints of citizen participation, resulting in a superficial emphasis on diversity and transparency in public decision-making. Protection of citizens can be achieved by implementing adaptation strategies in the environmental domain, which often entail utilizing the natural environment to alleviate the impacts of severe natural weather events (Lisowska & Tiukała, 2021).

Adaptation to climate change gives rise to resilient settlement behavior to disasters. The concept of stewardship is currently undergoing a reevaluation in light of enhanced comprehension of complexity and acknowledgement of previous detrimental impacts on watersheds. Adaptive management has gained popularity as a concept for stewardship and resilience, indicating progress over the past two decades. By monitoring the adaptive ability and enhancing resilience, managers and community members would be able to make necessary modifications to watershed policy (Duffy et al., 2018). The urban nexus concept is based on the recognition that urban areas serve as locations for human growth, climate action, and adaptation. The objective is to facilitate the shift of metropolitan regions towards a circular economy and attain resilience (Nhamo et al., 2021).

The systematic self-help strategy effectively improves urban resilience for the sustainable homeownership of low-income earners. The practice of self-help was prevalent in rural areas and gained prominence in urban regions over the twentieth century (Ebekozi et al., 2023). Cities have ongoing challenges or sudden effects, so it is crucial to prioritize the establishment of policies and incentives to address the interplay between climate change, urban adaptation, and resilience. This should be done with an emphasis on transitioning towards urban resilience (Young, 2016). The absence of coordination between different sectors presents a significant obstacle to integrating local knowledge about occurrences, vulnerabilities, and resilience into buildings and infrastructures. Similarly, this collaboration is crucial, as it has the potential to result in improved plans, policy instruments, and guiding documents (Flyen et al., 2018).

Safety and security criteria are the main criteria in achieving Livable Housing. The presence of urban design qualities strongly correlates with the perception of safety. Aly et al. (2023) identified crucial urban design characteristics that have the potential to enhance the perceived feeling of safety. These characteristics, namely imageability, transparency, complexity, and human scale and confinement, were found to have a high positive link. The extensive utilization of space as a crucial element in the feeling of safety, sometimes referred to as the "eyes on the street" concept. Projects for public space typically have well-defined urban forms, but these forms are always influenced by existing conditions that play a significant role in shaping the initial design. These conditions include various factors such as infrastructure, morphology, socio-economic aspects, and cultural considerations, among others (Bambó Naya et al., 2023).

The concept of livability in affordable housing is defined as a combination of seven variables, including physical characteristics, community and neighborhood factors, public amenities, economic development, resident well-being, safety and security, and psychological impact (Rangga et al., 2019). The primary characteristics and amenities that promote relaxation in the park are the presence of fences and the assurance of safety and security. These concerns are associated with the apprehension of rising crime rates in rapidly urbanized places, both domestically and internationally. The utilization of urban green areas, namely urban parks, predominantly relies on their appropriateness, flexibility, and durability for effective and efficient purposes (Kefale et al., 2023). The association between the features of public spaces, such as sociability, uses and activities, access and linkage, and safety, comfort, and image, revealed the problems impacting the pedestrian environment in Dhaka (Israt & Hassan, 2022). Implementing high-quality street amenities in urban areas can significantly improve the overall quality of public spaces and residents' quality of life.

Social interaction criteria are the main criteria for the residential environment (neighborhood) in

achieving Livable Housing. Social sustainability encompasses various factors, including active involvement in society, ensuring safety and security, promoting fairness and equality, fostering happiness with one's community, encouraging social contact and engagement, and cultivating a sense of belonging. (Mohamed et al., 2022) The arrangement, positioning, architectural styles, and spaces between buildings in a community offer unique chances for fostering and enhancing social relationships associated with the involvement of neighboring individuals. Long-term community sustainability can be achieved by fostering satisfaction with the living environment and enhancing its strengths through social resilience and livability (Hagen et al., 2017). In the past 15 years, advancements in technology and the rise of wireless communities have led to the emergence of new types of social relationships and interactions. This has significantly altered the nature and communication of social capital. Communities are characterized by key elements such as trust, reciprocity, fellowship, sympathy, incorporation, participation, involvement, and social interaction among individuals and families. Applying particular and significant design concepts is crucial in adopting new types of social interaction that influence social capital.

These urban design principles have a direct impact on the feeling of community and promote social engagement by increasing the number of possibilities for residents to interact purposefully or spontaneously. They promote the collective understanding of ethical principles, shared goals, and a feeling of affiliation with a particular location. The robust connections enhance the feeling of belonging, individuality, communal assistance, and confidence (Alhusban et al., 2019). The aim is to enhance the visibility of spatial and social interactions within a cluster cohousing context. This will help to establish a clear understanding that the collective spaces of the cluster-house concept apartment are designated as housing areas, determined by the residential community rather than by individual occupants or families (Khatibi, 2022). An enhanced sense of belonging and attachment to the community and settlement fosters social interactions, hence increasing recognition among neighbors (Mangut & Ozsoy, 2020).

The application of livability forming factors<sup>2</sup> in designing housing can improve Sustainable Housing. The implemented design strategy has a direct correlation with the behavior of the indicators. This relationship improves the capacity to construct sustainability benchmarks for several categories of landscape changes utilizing (Yoffe et al., 2023). Klingmann (2023) examine the potential link between Saudi Arabia's social and economic changes, urban megaprojects, and sustainable urbanism in order to determine if they may collectively establish a comprehensive lifestyle for residents. The project offers initiatives to enhance the quality of life in metropolitan areas by focusing on urban design, environment, infrastructure, transit, social involvement, and safety. Additionally, it provides various economic and educational prospects for different demographic groups.

Safeguarding and promoting local identity and culture yields various advantages, including bolstering social cohesiveness and the well-being of urban residents, protecting the city's reputation, fostering people-centric and livable urban environments, and offering high-quality public open spaces. (Nikezić et al., 2021). Efforts should be made to implement adaptation strategies in public health and health-care systems, particularly in tropical cities of low- and middle-income nations. Public health interventions encompass several strategies such as infectious disease surveillance, early warning systems, vulnerability mapping, and resilient health-care services. (Leal Filho et al., 2023). With the discovery of housing livability factor<sup>2</sup>, the adaptation process of settling in the face of climate change can be implemented. The results of this discovery are very urgent because climate change increasingly has a negative impact on humans who live on this earth. With the achievement of Livable Housing, the conditions of Sustainable Housing that can be achieved are increasing, especially in responding to the impact of climate change on human settlements.

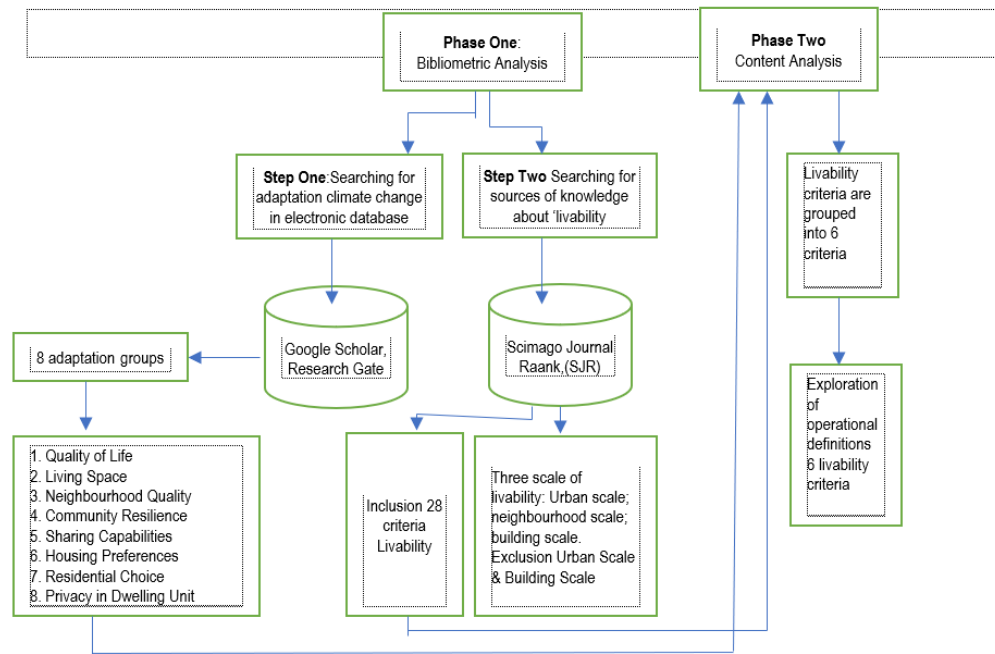
The novelty of this research can be seen from the focus of the research which aims to obtain livability criteria as an effort in achieving livable housing. From the previous study, it was concluded that the criteria for transforming livability depend on the external conditions and situation of housing. In this study, the analysis of housing criteria is carried out based on the adaptation of residents to external conditions such as climate change and efforts to achieve livable formal housing.

### 3. Research Method

This research uses a rationalistic approach based on empirical facts and related theories. This research is a descriptive research that describes an object and subject being studied without any engineering. In the first stage, organizing variables that contain stages, how to organize these variables and their operational definitions. The research variable is in the form of the formulation of criteria for the level of living power of formal housing based on literature search. The Descriptive Review method is used to obtain livability criteria in supporting literature. Author use their own knowledge and experience to synthesize the literature by evaluating similarities and differences in the purposes, methods, and findings of high-quality research (Picture 1). The validity of a descriptive synthesis or author's findings depends



on the subject matter expertise and critical imagination of the author and on the quality of the available literature. (See Picture 1). The identified livability criteria are then summarized and grouped based on the components and scope of the field so that six livability factors can be identified, namely: (1). Physical occupancy unit (2) Affordability of facility (3). Housing Amenities (4). Safety and security (5) Social interaction Society (6) Circular economy.



**Figure 1.** Research Method.

In [Figure 1](#), you can see the literature review process carried out. The first stage was to search for research literature on the adaptation of residents' behavior to climate change in the Google Scholar database. Because the source of this database is broader and comes from various disciplines and more diverse housing stakeholders. At this stage, 8 adaptation groups were obtained. In the second stage, a more specific literature search about livability was carried out in the database of reputable journals. This stage is a process of filtering the meaning of livability in the field of architecture and urban planning. Because many disciplines also apply livability but from a different point of view. The definition of livability is also limited to the neighborhood scale only. (28 livability criteria were obtained from the perspective of architecture and urban planning on a neighborhood scale.). In the third stage, the definition of livability was resynthesized so that it produced six criteria/factors of livability as findings from the results of this study.

The six identified factors are used as keywords in finding climate change adaptation research. From this search process, an operational definition was obtained that residents carried out in adapting to climate change ([Table 2](#)). This operational definition can be used by housing developers in planning Livable housing. This finding is also compared with the results of the distribution of questionnaires among housing residents regarding the adaptation process carried out by residents, especially in terms of mobilization ([Figure 2](#)) and changes in the residential environment that occur ([Figure 3](#)). The number of respondents in this second phase of research was 122 respondents.

## 4. Result

At this stage, the search for articles that discuss adaptation to climate change to achieve livability produces a list of articles below. From this articles, it can be identified the factors of livability in achieving Livable housing.

**Table 1.** Articles that define Adaptation of Settled Behavior to achieve livability.

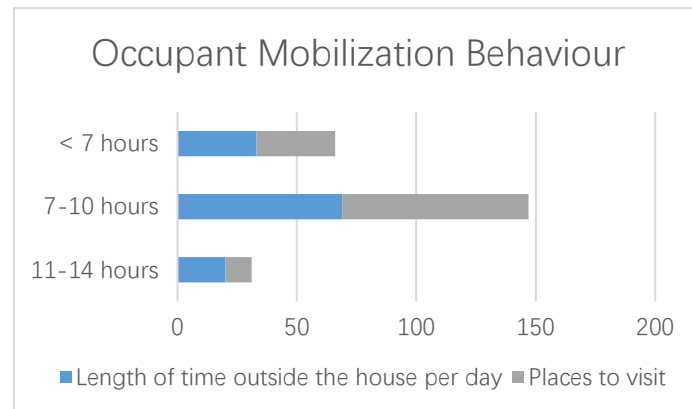
Article Source	Adaptation of Settled Behavior	Factors of Livability
(Saeed et al., 2022)	Kualitas hidup	Spatial planning & Growth Urban economy Connectivity & Infrastructure
(Li et al., 2022)	Living Space	Interaksi sosial masyarakat Ekonomi
(Rashid & Ara, 2019)	Disain & Kualitas lingkungan	Management & security Kualitas Lingkungan Fisik Hunian
(Surjono et al., 2021)	Community resilience	Social Life Urban Environment Economy
(Mukhija & Takahashi, 2022)	Sharing Capabilities	Neighbourhood design Regulation Investment
(Yang et al., 2022)	Housing Preferences	Accessibility Transportation
(Yang Wang et al., 2021)	Residential Choice	Physical Environment Social Environment Life Convenience
(Minami et al., 2022)	Living Space	Amenitas perumahan Keselamatan dan Keamanan Interaksi sosial masyarakat
(Bashari et al., 2021)	Privacy in Dwelling Unit	Social Life Interaksi social Masyarakat Life satisfaction

Primary data were analyzed using tabulation and frequency analysis. Analysis of the discovery of factors 2 forming livability is carried out through the determination of criteria and operational definitions. Then the livability criteria can be grouped into 6 groups of livability criteria. The six groups of livability criteria are (1). Physical Residential Unit (2). Affordability of Fasum (3). Residential amenities (4). Safety and security (5). Social Interaction of the community and (6). Economics. Then these six criteria will be analyzed again for their implementation in the field by identifying their operational definitions in cases of adaptation of settled behavior based on research that has been done. The analysis can be seen in Table 2 below.

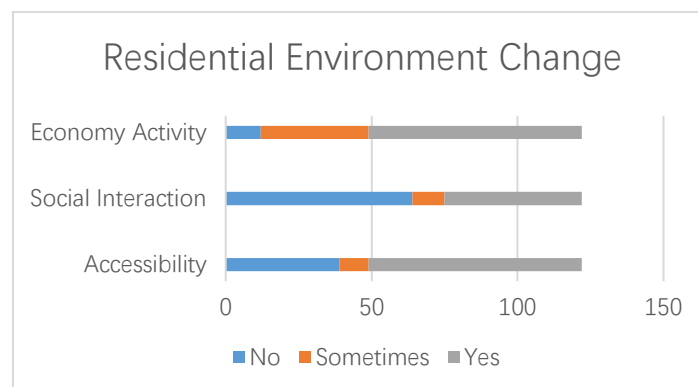
**Table 2.** Operational Definition of Six Factors of Livability.

No	Factors	Climate Change Adaptation	Operational Definition
1	Physical Residential Unit	(Williams et al., 2013); (Clar & Steurer, 2021)	Energi Saving Water Conservation Health & wellbeing Tipologi hunian Green Roofs
2	Facility Affordability	(Rashid & Ara, 2019)	Health services, Social care Disain & Kualitas Lingkungan
3	Residential Amenities	(Privitera et al., 2018)	Pedestrian Space Connectivity Atractiveness Public Space design Layout urban fabrics
4	Safety and security	(Buser, 2020); (Penning-Rowell, 2020)	Healthy indoor spaces Gated community Housing Layout Shoreline Management Planning

			Floating architecture
5	Community Interaction	(Meerow & Woodruff, 2020)	Community activity Space Public Participation
6	Economy	(Klemm et al., 2017)	Green Infrastructure



**Figure 2.** Occupant Mobilization behavior.



**Figure 3.** Residential Environment Change.

## 5. Discussion

Factors forming livability are: (1). Physical residential units (2) Affordability of facility (3). Housing Amenities (4). Safety and security (5) Social interaction Society (6) Circular economy. The alignment of Facility Management with community facilities addresses the growing expenses and disregard for the operation of facilities and related services. The built environment primarily prioritizes technical aspects, while non-technical dimensions might be more disruptive by failing to meet livability standards despite meeting technological requirements (Temeljotov Salaj & Lindkvist, 2021). An examination of sustainable efforts reveals a distinct emphasis on urban morphology's impact on the quality of life for individuals, often at the cost of participatory governance and awareness of sustainability, particularly in the case of major projects endorsed by private developers (Tanguy et al., 2020). A community is an integral part of a city, and the creation of livable communities is essential for enhancing the quality of the living environment, which is necessary for achieving a livable city (X. Wang et al., 2021). Physical livability serves as a fundamental basis for all possible receiving communities. Socioeconomic factors, particularly the degrees of inequality at the local level, play a significant role in defining outcomes (Teicher & Marchman, 2023). The city's emphasis on public outreach and citizen participation played a crucial role in directly creating the social aspect of sustainable neighborhood development. (Hagen et al., 2017).

The adaptation of housing residents to climate change can be seen from the operational definition of each factor forming livability. Institutional flexibility is an internal catalyst for change that enables the achievement of sustainability. The organization should possess flexibility, not just in its structure, but also in its current policies and internal working procedures. (Mendizabal et al., 2021). The investors need to enhance their operational efficiency through successful purchases and reevaluating the financial aspects of their portfolios. They asserted that in the context of property management operations, this effectiveness entails decreasing maintenance expenses and securing more favorable lease agreements



with tenants (Autio et al., 2023). The maintenance process utilizes diverse resources and carries out numerous operations. The presence and control of these resources are crucial to guarantee the sustainability of urban facilities and utilities during their operational phase. The availability of resources was established by the integration of expert knowledge in human resources, financial resources, and technical resources (Rathnasiri et al., 2023).

Opinions regarding the essence of social sustainability are highly divergent. Social sustainability is unambiguously defined as the act of addressing fundamental human needs in order to fulfill the criterion of sufficiency. Ensuring 'sufficiency' is vital for guaranteeing the supply of welfare while staying within the limits of our planet, by firmly integrating the social and environmental aspects. (Winston, 2022). As the sustainability goals for the years 2030–2050 become more difficult to achieve, society, company management, and policymakers are in need of greater assistance from Artificial Intelligence and Information Technology in order to meet these targets. The analysis examines the functional and operational perspective of the utility of implementing methods that complete resource loops, in accordance with the principles of a circular economy (Yazan et al., 2022).

Resilient settlement behavior to disasters based on security and safety criteria. Organisational flood resilience capacity refers to an enterprise's capability to predict a flood occurrence, withstand it through preventive measures, promptly recover to a functional state, and implement adaptive measures following a flood disaster (Skouloudis et al., 2023). The individuals and groups who are at risk of a decline in their resilience levels, together with the associated dangers and elements that provide protection. (Shapira et al., 2020).

The absence of coordination between different sectors poses a significant obstacle to integrating local knowledge about occurrences, vulnerabilities, and resilience into buildings and infrastructures (Flyen et al., 2018). The four performance dimensions of a resilient community include spatial pattern, environmental components, public services, and management system. (Yun cai Wang et al., 2018). The specific resilience of a community can be characterized by eight key attributes across four performance dimensions. These include the multi-functionality and flexibility of the community's spatial patterns, the interactivity and diversity of the community's environment components, the intelligence and humanity of the community's public services, as well as the predication and collaboration of the community's management systems. The prediction of future growth paths and ideological presumptions for constructing urbanized regions, serving as the foundation for establishing the resilience of the functional and spatial organization and the natural system in urban areas undergoing transformation (Starzyk et al., 2023).

Safety and security criteria both physically, socially, psychologically and legally. In nations with limited resources, a prevalent issue emerges from inadequate urban planning, leading to additional problems such as traditional land utilization and inadequate safety measures. There is a pressing need to enhance the planning of the built environment in Indonesia in order to foster a more conducive living environment that promotes physical activity among citizens, hence cultivating a healthier society. (Muzayanah et al., 2022). The concept of livability in affordable housing encompasses seven elements, including physical characteristics, community and neighborhood, public facilities, economic growth, resident well-being, safety and security, and psychological influence (Rangga et al., 2019).

Certain participants found economic security by reducing the size of their apartment through the sale or rental of a portion of it during difficult living circumstances (Tarpio & Huuhka, 2022). The lack of safety and presence of insecurity have a role in influencing consumers' decisions to visit urban green spaces. The parks should be planned to prioritize physical accessibility, ensuring the safety and security of visitors, as well as providing clear visibility of the surroundings (Kefale et al., 2023). The position of women within their extended families and the intricate structures of households in urban areas also impact their capacity to get homes and attain tenancy security (Meth et al., 2019).

The criteria for social interaction can be seen from community activities in public spaces and community participation in neighborhoods. In order to enhance our understanding of the social and spatial aspects of our community and create a strong and adaptable urban society, (Alhusban et al., 2019) Proposing a theoretical urban neighborhood design concept known as the heterotopia concept, which offers urban planners and architects a valuable cognitive tool for designing settings. Neighborhood-based research promotes the development of innovative design concepts for residential areas that can accommodate emerging forms of social interaction. The social contact within the cluster cohousing environment is a result of successful cooperation and the strong social bonds within the residential community. (Khatibi, 2022). The arrangement, positions, structures, and spaces between buildings in a community offer unique chances for fostering and enhancing social connections associated with the involvement of nearby residents. Put simply, altering urban patterns to enhance spatial connection results in enhanced social engagement inside residential neighborhoods. (Mohamed et al., 2022).

The duration between occupation or construction plays a crucial role in shaping the social structure

of the neighborhood. An explanation for this phenomenon is that the degree of social interaction among individuals residing in the community tends to develop and change as time progresses. The level of recognition among neighbors, along with an enhanced sense of belonging and loyalty to the community and settlement, fosters social interactions. (Mangut & Ozsoy, 2020). Active involvement of individuals, responsible use of resources, and fairness can play a crucial role in fostering strategic planning to guarantee urban sustainability (Rahman, 2016).

## 6. Conclusion

Factors forming livability are: (1). Physical residential units (2) Affordability of facility (3). Housing Amenities (4). Safety and security (5) Social interaction Community (6) Circular economy. The ability to adjust established behavior in response to unpredictable external circumstances is crucial in the current era. Adaptability offers a very intricate safety measure that allows housing occupants, housing managers, and governments to collaborate on resource sharing, produce supplementary services, and maintain social innovation.

Physical housing planning criteria such as, Physical housing units, residential amenities, and affordability The location of public facilities from housing is a preference criterion for residents in choosing their housing.

The non-physical criterion of housing that can form livability is the achievement of social interaction of the community in housing so that residents feel more at home living there. The next non-physical criteria are the achievement of economic sustainability such as increased income, free education and health, and ease of public transportation.

Long-term comprehensive urban greening strategies and policies are essential for the development of sustainable, livable and resilient cities. However, urban greening strategies are increasingly being tailored to provide short-term benefits, facing changes in external conditions that will occur.

Security and safety factors are the main criteria for shaping adaptation of living behavior in the face of climate change. Community social interaction factors are criteria for forming livability on a neighbourhood scale. The results of this study contribute to the formation of adaptation of resilient settlement behavior to climate change. In addition, the results of this study can also be used as a guide in housing planning that is adaptive to climate change.

The six housing livability criteria is used as a criterion for residents in choosing residential preferences. The findings of these six criteria are input for housing developers when designing so that livability in housing can be achieved. This input will be very helpful later in efforts to build Livable housing which is part of the Formal Housing Development system.

## References

- Aguila, M. Del, Ghavampour, E., & Vale, B. (2019). Theory of place in public space. *Urban Planning*, 4(2 Public Space in the New Urban Agenda Research into Implementation), 249–259. <https://doi.org/10.17645/up.v4i2.1978>.
- Ahn, B., Friesenecker, M., Kazepov, Y., & Brandl, J. (2023). How Context Matters: Challenges of Localizing Participatory Budgeting for Climate Change Adaptation in Vienna. *Urban Planning*, 8(1), 399–413. <https://doi.org/10.17645/up.v8i1.6067>.
- AL-Mohannadi, A. S., AL-Mohannadi, M. S., Pokharel, S., Ayari, M. A., & Furlan, R. (2023). Mitigation of urban voids in traditional neighborhoods: The case of the Al-Najada zone in Doha, Qatar. *Journal of Urban Management*, March. <https://doi.org/10.1016/j.jum.2023.07.003>.
- Alhusban, S. A., Alhusban, A. A., & AlBetawi, Y. N. (2019). Suggesting theoretical urban neighborhood design concept by adopting the changing discourse of social capital. *Journal of Enterprising Communities*, 13(3), 391–411. <https://doi.org/10.1108/JEC-09-2018-0064>.
- Aly, T. F., Ehab, S., & Lotfi, Y. A. (2023). Identifying key urban design attributes for enhanced sense of safety – the case of El-Sherouk city in Cairo. *International Journal of Architectural Research: Archnet-IJAR*. <https://doi.org/10.1108/ARCH-02-2023-0041>.
- Autio, P., Pulkka, L., & Junnila, S. (2023). Creating a strategy framework for investor real estate management. *Journal of European Real Estate Research*, 16(1), 22–41. <https://doi.org/10.1108/JERER-09-2022-0027>.
- Bambó Naya, R., de la Cal Nicolás, P., Díez Medina, C., Ezquerro, I., García-Pérez, S., & Monclús, J. (2023). Quality of public space and sustainable development goals: analysis of nine urban projects in Spanish cities. *Frontiers of Architectural Research*, 12(3), 477–495. <https://doi.org/10.1016/j.foar.2023.01.002>.
- Bashari, S., Hashim, A. H., Samah, A. A., & Ahmad, N. (2021). The Moderating Effect of Privacy in the Relationships between Residential Livability and Residents' Life Satisfaction. *Journal of Construction in Developing Countries*, 26(1), 45–62. <https://doi.org/10.21315/jcdc2021.26.1.3>.
- Buser, M. (2020). Coastal Adaptation Planning in Fairbourne, Wales: lessons for Climate Change Adaptation. *Planning Practice and Research*, 35(2), 127–147. <https://doi.org/10.1080/02697459.2019.1696145>.
- Chen, C. W. (2023). Can smart cities bring happiness to promote sustainable development? Contexts and clues of subjective well-being and urban livability. *Developments in the Built Environment*, 13(September 2022),

100108. <https://doi.org/10.1016/j.dibe.2022.100108>.
- Clar, C., & Steurer, R. (2021). Climate change adaptation with green roofs: Instrument choice and facilitating factors in urban areas. *Journal of Urban Affairs*, 00(00), 1–18. <https://doi.org/10.1080/07352166.2021.1877552>.
- Crane, M., Lloyd, S., Haines, A., Ding, D., Hutchinson, E., Belesova, K., Davies, M., Osrin, D., Zimmermann, N., Capon, A., Wilkinson, P., & Turcu, C. (2021). Transforming cities for sustainability: A health perspective. *Environment International*, 147(May 2020), 106366. <https://doi.org/10.1016/j.envint.2020.106366>.
- Duffy, L., De Wilde, L., Spellman, K., Dunlap, K., Dainowski, B., McCullough, S., Luick, B., & Van Muelken, M. (2018). Resilience and Adaptation: Yukon River Watershed Contaminant Risk Indicators. *Scientifica*, 2018(Figure 1). <https://doi.org/10.1155/2018/8421513>.
- Ebekozien, A., Aigbavboa, C., Samsurijan, M. S., Salman, A., & Amadi, G. C. (2023). Urban resilience for sustainable homeownership: the role of self-help in the ancient city of Benin, Nigeria. *International Journal of Building Pathology and Adaptation*, 41(6), 201–216. <https://doi.org/10.1108/IJBPA-03-2023-0033>.
- Flyen, C., Hauge, Å. L., Almås, A. J., & Godbolt, Å. L. (2018). Municipal collaborative planning boosting climate resilience in the built environment. *International Journal of Disaster Resilience in the Built Environment*, 9(1), 58–69. <https://doi.org/10.1108/IJDRBE-10-2016-0042>.
- Hagen, B., Nassar, C., & Pijawka, D. (2017). The social dimension of sustainable neighborhood design: Comparing two neighborhoods in Freiburg, Germany. *Urban Planning*, 2(4), 64–80. <https://doi.org/10.17645/up.v2i4.1035>.
- Hamdan, H. A. M., Andersen, P. H., & de Boer, L. (2021). Stakeholder collaboration in sustainable neighborhood projects—A review and research agenda. *Sustainable Cities and Society*, 68(July 2020), 102776. <https://doi.org/10.1016/j.scs.2021.102776>.
- Ibrahim, I. A. (2020). Sustainable housing development: role and significance of satisfaction aspect. *City, Territory and Architecture*, 7(1). <https://doi.org/10.1186/s40410-020-00130-x>.
- Israt, A. S., & Hassan, A. S. (2022). User-friendly street- a study on users' perception ranking on physical attributes of pedestrian environment of Dhaka city. *Open House International*, 47(2), 218–234. <https://doi.org/10.1108/OHI-03-2021-0058>.
- Kefale, A., Fetene, A., & Desta, H. (2023). Users' preferences and perceptions towards urban green spaces in rapidly urbanized cities: The case of Debre Berhan and Debre Markos, Ethiopia. *Heliyon*, 9(4), e15262. <https://doi.org/10.1016/j.heliyon.2023.e15262>.
- Khatibi, M. (2022). Socio-spatial interactions of a cluster-house concept apartment in mehr als wohnen project in Zurich, Switzerland. *Frontiers of Architectural Research*, 11(2), 191–202. <https://doi.org/10.1016/j.foar.2021.10.002>.
- Klemm, W., Lenzholzer, S., & Van Den Brink, A. (2017). Developing green infrastructure design guidelines for urban climate adaptation. *Journal of Landscape Architecture*, 12(3), 60–71. <https://doi.org/10.1080/18626033.2017.1425320>.
- Klingmann, A. (2023). Rescripting Riyadh: how the capital of Saudi Arabia employs urban megaprojects as catalysts to enhance the quality of life within the city's neighborhoods. *Journal of Place Management and Development*, 16(1), 45–72. <https://doi.org/10.1108/JPM-D-06-2021-0062>.
- Koçak Güngör, M., & Terzi, F. (2022). Residential satisfaction and quality of urban life: examining diverse housing environments. *International Journal of Architectural Research: Archnet-IJAR*. <https://doi.org/10.1108/ARCH-01-2022-0014>.
- Leal Filho, W., Tuladhar, L., Li, C., Balogun, A. L. B., Kovaleva, M., Abubakar, I. R., Azadi, H., & Donkor, F. K. (2023). Climate change and extremes: implications on city livability and associated health risks across the globe. *International Journal of Climate Change Strategies and Management*, 15(1), 1–19. <https://doi.org/10.1108/IJCCSM-07-2021-0078>.
- Li, X., Yu, B., Cui, J., & Zhu, Y. (2022). Building a New Framework for Evaluating the Livability of Living Space on the Basis of the Daily Activities of Rural Residents: A Case Study of Jiangnan Plain. *International Journal of Environmental Research and Public Health*, 19(17). <https://doi.org/10.3390/ijerph191710615>.
- Lisowska, A., & Tiukalo, A. (2021). Adaptability in Environmental Policy at the Commune Level Carried Out in Poland Based on the Example of the Urban Plan of Adaptation to Climate Changes. *Polish Political Science Review*, 9(1), 80–94. <https://doi.org/10.2478/ppsr-2021-0006>.
- Mangut, B., & Ozsoy, F. A. (2020). Housing neighborhoods as an interaction of enclosure and disclosure. *Archnet-IJAR*, 14(1), 45–59. <https://doi.org/10.1108/ARCH-04-2019-0084>.
- Martino, N., Girling, C., & Lu, Y. (2021). Urban form and livability: socioeconomic and built environment indicators. *Buildings and Cities*, 2(1), 220–243. <https://doi.org/10.5334/bc.82>.
- Meerow, S., & Woodruff, S. C. (2020). Seven Principles of Strong Climate Change Planning. *Journal of the American Planning Association*, 86(1), 39–46. <https://doi.org/10.1080/01944363.2019.1652108>.
- Mendizabal, M., Feliu, E., Tapia, C., Rajaeifar, M. A., Tiwary, A., Sepúlveda, J., & Heidrich, O. (2021). Triggers of change to achieve sustainable, resilient, and adaptive cities. *City and Environment Interactions*, 12, 100071. <https://doi.org/10.1016/j.cacint.2021.100071>.
- Meth, P., Buthelezi, S., & Rajasekhar, S. (2019). Gendered il/legalities of housing formalisation in India and South Africa. *Environment and Planning A*, 51(5), 1068–1088. <https://doi.org/10.1177/0308518X18792898>.
- Minami, K., Ohi, K., & Takenoshita, Y. (2022). Study on long-term occupancy records of public rental housing. *Japan Architectural Review*, 5(2), 179–191. <https://doi.org/doi:10.1002/2475-8876.12258>.
- Mohamed, A. N., Elmokadem, A. A. E., Ali, S. M., & Badawey, N. (2022). Improve Urban Form to Achieve High Social Sustainability in a Residential Neighborhood Salam New City as a Case Study. *Buildings*, 12(11).

- <https://doi.org/10.3390/buildings12111935>.
- Mukhija, V., & Takahashi, L. M. (2022). Enhancing Sharing Capabilities: Housing and Neighborhood Planning Opportunities for Improving Health. *Journal of the American Planning Association*, 0(0), 1–8. <https://doi.org/10.1080/01944363.2022.2052157>.
- Muldoon-smith, K., & Moreton, L. (2022). Planning Adaptation: Accommodating Complexity in the Built Environment. *Urban Planning*, 7(1), 44–55. <https://doi.org/10.17645/up.v7i1.4590>.
- Muzayanah, I. F. U., Damayati, A., Indraswari, K. D., Simanjuntak, E. M., & Arundina, T. (2022). Walking down the street: how does the built environment promote physical activity? A case study of Indonesian cities. *International Journal of Urban Sustainable Development*, 14(1), 425–440. <https://doi.org/10.1080/19463138.2022.2135099>.
- Nadin, V., Stead, D., Dąbrowski, M., & Fernandez-Maldonado, A. M. (2021). Integrated, adaptive and participatory spatial planning: trends across Europe. *Regional Studies*, 55(5), 791–803. <https://doi.org/10.1080/00343404.2020.1817363>.
- Nhamo, L., Rwizi, L., Mpandeli, S., Botai, J., Magidi, J., Tazvinga, H., Sobratee, N., Liphadzi, S., Naidoo, D., Modi, A. T., Slotow, R., & Mabhaudhi, T. (2021). Urban nexus and transformative pathways towards a resilient Gauteng City-Region, South Africa. *Cities*, 116, 103266. <https://doi.org/10.1016/j.cities.2021.103266>.
- Nikezić, A., Ristić Trajković, J., & Milovanović, A. (2021). Future housing identities: Designing in line with the contemporary sustainable urban lifestyle. *Buildings*, 11(1), 1–23. <https://doi.org/10.3390/buildings11010018>.
- Penning-Rowell, E. (2020). Floating architecture in the landscape: climate change adaptation ideas, opportunities and challenges. *Landscape Research*, 45(4), 395–411. <https://doi.org/10.1080/01426397.2019.1694881>.
- Privitera, R., Palermo, V., Martinico, F., Fichera, A., & La Rosa, D. (2018). Towards lower carbon cities: urban morphology contribution in climate change adaptation strategies. *European Planning Studies*, 26(4), 812–837. <https://doi.org/10.1080/09654313.2018.1426735>.
- Rahadi, R.A., Wiryono, S. K., Koesrindartoto, D. P., & Syamwil, I. B. (2015). Comparison of the property practitioners and consumer preferences on housing prices in the Jakarta metropolitan region. *International Journal of Housing Markets and Analysis*, 8(3), 335–358. <https://doi.org/10.1108/IJHMA-10-2014-0043>.
- Rahman, M. A. U. (2016). Urban sustainability through strategic planning: A case of metropolitan planning in Khulna city, Bangladesh. *Journal of Urban Management*, 5(1), 16–22. <https://doi.org/10.1016/j.jum.2016.06.001>.
- Ramli, N. A., & Ujang, N. (2021). The functions of urban design social attributes in creative placemaking: the case of Kuala Lumpur event festivals. *Open House International*, 46(2), 230–249. <https://doi.org/10.1108/OHI-12-2020-0172>.
- Rangga, W., Jiram, A., Ismail, A., & Aziz, F. (2019). Determining the Dimension of Liveability of Malaysian Affordable Housing. *International Journal of Recent Technology and Engineering*, 8(3S2), 699–703. <https://doi.org/10.35940/ijrte.c1224.1083s219>.
- Rashid, M., & Ara, D. R. (2019). Bringing design back: resetting liveability of a ‘near but not in the city’ housing environment in Sydney. *Journal of Urban Design*, 24(2), 210–231. <https://doi.org/10.1080/13574809.2018.1440175>.
- Rasoolimanesh, S. M., Badarulzaman, N., Abdullah, A., & Behrang, M. (2022). Integrated sustainable urban planning: a new agenda for future urban planning in Malaysia. *Journal of Place Management and Development*, 15(3), 284–297. <https://doi.org/10.1108/JPM-02-2020-0014>.
- Rathnasiri, N. E., De Silva, N., & Wijesundara, J. (2023). Urban space maintainability factors based on life cycle approach. *Facilities*. <https://doi.org/10.1108/F-04-2023-0032>.
- Regasa, D. T., & Akirso, N. A. (2019). Determinants of Climate Change Mitigation and Adaptation Strategies: An Application of Protection Motivation Theory in Konta District, South Western Ethiopia. *European Review Of Applied Sociology*, 12(19), 49–73. <https://doi.org/10.1515/eras-2019-0010>.
- Riggs, W., Appleyard, B., & Johnson, M. (2020). A design framework for livable streets in the era of autonomous vehicles. *Urban, Planning and Transport Research*, 8(1), 125–137. <https://doi.org/10.1080/21650020.2020.1749123>.
- Saeed, U., Ahmad, S. R., Mohey-ud-din, G., Butt, H. J., & Ashraf, U. (2022). An Integrated Approach for Developing an Urban Livability Composite Index—A Cities’ Ranking Road Map to Achieve Urban Sustainability. *Sustainability (Switzerland)*, 14(14). <https://doi.org/10.3390/su14148755>.
- Schwann, A. (2018). Ecological wisdom: Reclaiming the cultural landscape of the Okanagan Valley. *Journal of Urban Management*, 7(3), 172–180. <https://doi.org/10.1016/j.jum.2018.05.004>.
- Shapira, S., Cohen, O., & Aharonson-Daniel, L. (2020). The contribution of personal and place-related attributes to the resilience of conflict-affected communities. *Journal of Environmental Psychology*, 72(April), 101520. <https://doi.org/10.1016/j.jenvp.2020.101520>.
- Skouloudis, A., Leal Filho, W., Deligiannakis, G., Vouros, P., Nikolaou, I., & Evangelinos, K. (2023). Coping with floods: impacts, preparedness and resilience capacity of Greek micro-, small- and medium-sized enterprises in flood-affected areas. *International Journal of Climate Change Strategies and Management*, 15(1), 81–103. <https://doi.org/10.1108/IJCCSM-09-2022-0122>.
- Soma, K., Dijkshoorn-Dekker, M. W. C., & Polman, N. B. P. (2018). Stakeholder contributions through transitions towards urban sustainability. *Sustainable Cities and Society*, 37(October 2017), 438–450. <https://doi.org/10.1016/j.scs.2017.10.003>.
- Starzyk, A., Donderewicz, M., Rybak-Niedziółka, K., Marchwiński, J., Grochulska-Salak, M., Łacek, P., Mazur, Ł., Voronkova, I., & Vietrova, P. (2023). The Evolution of Multi-Family Housing Development Standards in



- the Climate Crisis: A Comparative Analysis of Selected Issues. *Buildings*, 13(8), 1–26. <https://doi.org/10.3390/buildings13081985>.
- Surjono, Yudono, A., Setyono, D. A., & Putri, J. C. (2021). Contribution of Community Resilience to City's Livability within the Framework of Sustainable Development. *Environmental Research, Engineering and Management*, 77(4), 33–47. <https://doi.org/10.5755/j01.arem.77.4.29184>.
- Tanguy, A., Breton, C., Blanchet, P., & Amor, B. (2020). Characterising the development trends driving sustainable neighborhoods. *Buildings and Cities*, 1(1), 164–181. <https://doi.org/10.5334/bc.22>.
- Tarpio, J., & Huuhka, S. (2022). Residents' views on adaptable housing: a virtual reality-based study. *Buildings and Cities*, 3(1), 93–110. <https://doi.org/10.5334/bc.184>.
- Teicher, H. M., & Marchman, P. (2023). Integration as Adaptation: Advancing Research and Practice for Inclusive Climate Receiving Communities. *Journal of the American Planning Association*, 0(0), 1–20. <https://doi.org/10.1080/01944363.2023.2188242>.
- Temeljotov Salaj, A., & Lindkvist, C. M. (2021). Urban facility management. *Facilities*, 39(7–8), 525–537. <https://doi.org/10.1108/F-06-2020-0078>.
- Thøgersen, J. (2022). We need a sustainable consumption pattern. *RAUSP Management Journal*, 57(3), 347–353. <https://doi.org/10.1108/RAUSP-05-2022-267>.
- Tiitu, M., Nyberg, E., Halonen, J. I., Pasanen, T. P., Viinikka, A., Lehtimäki, J., Lanki, T., & Vierikko, K. (2023). Comparing city practitioners' and residents' perceptions of a liveable neighbourhood in Finland. *European Planning Studies*, 0(0), 1–28. <https://doi.org/10.1080/09654313.2023.2263053>.
- Türkoğlu, H., Terzi, F., Salihoğlu, T., Bölen, F., & Okumuş, G. (2019). Residential satisfaction in formal and informal neighborhoods: The case of Istanbul, Turkey. *Archnet-IJAR*, 13(1), 112–132. <https://doi.org/10.1108/ARCH-12-2018-0030>.
- van Mossel, H. J., & Jansen, S. J. T. (2010). Maintenance services in social housing: What do residents find important? *Structural Survey*, 28(3), 215–229. <https://doi.org/10.1108/02630801011058942>.
- Vehbi, B. O., Hoskara, E., & Hoskara, S. Ö. (2010). A Theoretical Approach for Assessing Sustainability in Housing Environments. *Open House International*, 35(1), 26–36. <https://doi.org/10.1108/OHI-01-2010-B0003>.
- Wang, X., Shi, R., & Wang, T. (2021). Research on the fuzzy evaluation of the livability of old urban communities using an analytic hierarchy process – a case study of Nanjing city in China. *Open House International*, 46(2), 213–229. <https://doi.org/10.1108/OHI-02-2021-0040>.
- Wang, Yang, Yue, X., Zhang, H., Su, Y., & Qin, J. (2021). Relationship between urban floating population distribution and livability environment: Evidence from guangzhou's urban district, china. *Sustainability (Switzerland)*, 13(23), 1–16. <https://doi.org/10.3390/su132313477>.
- Wang, Yun cai, Shen, J. ke, Xiang, W. ning, & Wang, J. Q. (2018). Identifying characteristics of resilient urban communities through a case study method. *Journal of Urban Management*, 7(3), 141–151. <https://doi.org/10.1016/j.jum.2018.11.004>.
- Webb, R., Bai, X., Smith, M. S., Costanza, R., Griggs, D., Moglia, M., Neuman, M., Newman, P., Newton, P., Norman, B., Ryan, C., Schandl, H., Steffen, W., Tapper, N., & Thomson, G. (2018). Sustainable urban systems: Co-design and framing for transformation. *Ambio*, 47(1), 57–77. <https://doi.org/10.1007/s13280-017-0934-6>.
- Williams, K., Gupta, R., Hopkins, D., Gregg, M., Payne, C., Joynt, J. L. R., Smith, I., & Bates-Brkljac, N. (2013). Retrofitting England's suburbs to adapt to climate change. *Building Research and Information*, 41(5), 517–531. <https://doi.org/10.1080/09613218.2013.808893>.
- Winston, N. (2022). Sustainable community development: Integrating social and environmental sustainability for sustainable housing and communities. *Sustainable Development*, 30(1), 191–202. <https://doi.org/10.1002/sd.2238>.
- Wolff, M., & Haase, D. (2019). Mediating sustainability and liveability-turning points of green space supply in European cities. *Frontiers in Environmental Science*, 7(May). <https://doi.org/10.3389/fenvs.2019.00061>.
- Wollschlaeger, S., Sadhu, A., Ebrahimi, G., & Woo, A. (2022). Investigation of climate change impacts on long-term care facility occupants. *City and Environment Interactions*, 13(September 2021), 100077. <https://doi.org/10.1016/j.cacint.2021.100077>.
- Yang, Y., Lewis, R., & Parker, R. (2022). How Accessibility and Transportation Options Affect Neighborhood Livability: Evidence from the 2017 Oregon Livability Survey. *Planning Practice and Research*, 00(00), 1–23. <https://doi.org/10.1080/02697459.2021.2024968>.
- Yazan, D. M., Capelleveen, G. van, & Fraccascia, L. (2022). Decision-Support Tools for Smart Transition To Circular Economy. *Advanced Series in Management*, 28, 151–169. <https://doi.org/10.1108/S1877-636120220000028010>.
- Yoffe, H., Raanan, N., Fried, S., Plaut, P., & Grobman, Y. J. (2023). Sustainable urban landscapes: a computation framework for enhancing sustainability in early-stage design. *International Journal of Architectural Research: Archnet-IJAR*. <https://doi.org/10.1108/ARCH-06-2023-0152>.
- Young, A. F. (2016). Adaptation actions for integrated climate risk management into urban planning: a new framework from urban typologies to build resilience capacity in Santos (SP). *City, Territory and Architecture*, 3(1). <https://doi.org/10.1186/s40410-016-0042-0>.
- Zhao, X., Hussain, N., Shukor, S. F. A., & Ning, J. (2023). Neighbourhood physical environment influences on children's outdoor play: a systematic review. *Frontiers in Built Environment*, 9(June), 1–13. <https://doi.org/10.3389/fbuil.2023.1193309>.