IDENTIFYING THE INDICATORS OF LIVEABLE COMMUNITY: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

Sustainability in higher education has become a global imperative. Understanding the successful implementation Liveability is a buzzword describing a community's satisfaction with city living. With the pressure of urban development and the complexities of the interests and aspirations of the community, the translation of the liveability concept into concrete proxies is more demanding than ever. Against the background, this paper has two objectives: 1) to identify the assessment tool used to measure the liveable community and (2) to examine the indicators and sub-indicators used in the liveable assessment tool. Using the PRISMA standard, this paper conducted a systematic literature review. After screening 3,800 articles from electronic databases (WoS, Scopus, Science Direct, and Emerald Insight), the study included about 20 articles. After referring to the reference list of selected papers, the researchers had only 27 papers in this systematic literature review. Three dimensions - social, economic, and environmental - were used to divide the indicator of a liveable community. This study focuses on the indicators within each dimension that contribute to developing liveable communities. Future research should investigate and identify context-specific indicators for assessing liveability in specific locational or geographic areas.

Keywords: Liveable, Indicator, Community, Systematic Literature Review (SLR)

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1. INTRODUCTION

The term "liveability" has been defined widely and in various ways by groups interested in improving the health, quality of life, accessibility, or sustainability of a community or location (Randhawa et al., 2017; Shank et al., 2016). The existence of liveables formed a new ideology that garnered the world's focus on achieving a steady level of quality in the built environment (Ley, 1990). However, one issue persists and remains to be addressed: there is no standard agreement on what constitutes liveability and what does not (Hegazy, 2021). The rudimentary liveable is a sense of social, which includes employment, housing, and public services (Ley, 1990).

Table 1 demonstrates the significant development of the idea of liveability throughout history. It shows a paradigm shift from solely focusing on physical amenities to a comprehensive strategy for considering social, economic, and environmental concerns (Florida, 2002; Jacobs, 1961). Historically, the liveability concept focused on clean air, access to green areas, and low crime rates. However, the notion of dynamic liveability has now expanded to include a more comprehensive range of social, economic, and environmental factors. The inclusion of this aspect ensures the integration of all the important aspects related to quality of life and overall well-being emphasises the need and dynamic for more comprehensive urban planning and design strategies (Joss, 2017; Onnom et al., 2018b).

Table 1: Evolution of the Liveable Concept

Cervero and Kockelman (1997); Jacobs (1961)	Build a pleasant physical setting with low crime levels, affordable housing options, and excellent educational opportunities.
Florida (2002); Gehl (2013); Townsend (2013)	Broader factors impacting well-being and quality of life include social and cultural factors, environmental considerations, and initiatives to address climate change and improve resource efficiency.
Beatley (2015); Townsend (2013)	Highlights the significance of social and cultural factors, including community participation, equality, a sense of belonging, and diversity within the community.
Joss (2017); Onnom et al. (2018b)	The concept has been expanded to encompass all three pillars of sustainable development, namely the social, economic, and environmental.

2. LITERATURE REVIEW

2.1 In The Quest for Liveable Community Indicators in Malaysia

Despite the growing attention on the liveable study, the lack of common agreement on the elements that contribute to creating liveable communities and the efficacy of different interventions and policies designed to promote liveability persists. On top of that, due to differences in values, needs, and socio-cultural contexts, the liveability assessment tools are ineffective and thus cannot be applied equally to different regions (Al-Qawasmi, 2021). Against the backdrop, it is apparent that Malaysia has a liveable community framework that can be uniformly applied.

Generally, there are five mainstream assessment tools for measuring the liveability of the community: i) the American Association of Retired Persons Liveability Index (AARP); ii) the Economic Intelligence Unit Liveability Index (EIU); iii) the OECD Better Life Index; iv) Mercer's Quality of Living Ranking; and v) Monocle's Quality of Life Survey. These tools are widely applied to analyse the quality of life and community liveability. Table 2 simplifies the indicators used in every assessment tool above.

Table 2: The Assessment Tools and Their Indicators of Liveable

Assessment Tools	Indicators	Total
American Association of Retired Persons Liveability Index (AARP)	• Housing • Neighborhood • Transportation • Environment • Health • Engagement • Opportunity	7

Table 2: The Assessment Tools and Their Indicators of Liveable (continued)

Assessment Tools	Indicators	Total
Economic Intelligence Unit Liveability Index (EIU)	• Stability • Healthcare • Culture and environment • Education and infrastructure	4
OECD Better Life Index	• Housing • Income • Jobs • Community • Education • Environment • Governance • Health • Life satisfaction • Safety • Work-life balance	11
Mercer's Quality of Living Ranking	• Safety • Education • Hygiene • Health care • Culture • Environment • Recreation • Political-economic stability • Public transport • Access to goods and services.	10
Monocle's Quality of Life Survey	• Safety/crime • Medical care • Climate/sunshine • International connectivity • Public transportation • Quality of architecture • Environment and nature • Landscape • Economy • Policy development • Tolerance	11

As observed, each assessment tool does not use the same indicators as the others, even though these are widely used in analysis. Comparing different frameworks for assessing urban livability uncovers discrepancies and potential limitations. Although tools such as the AARP Livability Index and the EIU Liveability Index provide extensive assessments, they may not consider essential aspects crucial for a complete comprehension of urban well-being (AARP, 2022; EIU, 2023). Similarly, despite the extensive coverage provided by the OECD Better Life Index and Mercer's Quality of Living Ranking, their inherent subjectivity and varying priorities present challenges in aligning assessments and drawing holistic conclusions (Mercer, 2023; OECD, 2023). Furthermore, while Monocle's Quality of Life Survey and AARP's Livability Index extensively analyse urban well-being, they may unintentionally neglect important local intricacies necessary for comprehensive assessments (AARP, 2022; Monacle, 2023).

In examining urban liveability through various frameworks, each provides valuable insights; integrating holistic approaches and utilising local data can enhance the validity of assessments and assist policymakers in developing more effective strategies to improve urban well-being comprehensively. Since SDGs are the main milestone in achieving liveability and a resilient community, studies have categorised the indicators according to community characteristics, which are environmental, economic, and social (Adams et al., 2020).

The following section discusses the research methodology employed to unpack the liveability concept. This research conducts a systematic literature review of the existing research on liveable communities, including the domain and indicators of liveability in creating liveable communities. To achieve the aim, dual research objectives are formulated: i) to identify the assessment tool used to measure the liveable community and ii) to examine the indicators and sub-indicators used in the liveable assessment tool. It is hoped that this paper can enhance our reading on the livability indicators in the context of Malaysia. Eventually, this will benefit policymakers, practitioners, and academics in boosting liveability and establishing more equitable and liveable communities with insights and solutions.

2.2 Integrating Liveability and Sustainable Development Goals (SDGs)

With the complexities of human challenges, Sustainable Development Goals (SDGs) have become a more urgent priority for all countries (Ammari et al., 2022). Ergo, it is unsurprising that the United Nations adopted SDGs in 2015 as a guidance document and a roadmap for peace and prosperity for people and the planet (SDGs, 2023). The concept of 'leaving no one behind (LNOB)' cements the United Nations' priority in bridging the gap between the community and the country. The goal is novel: to avoid a community where the affluent remain wealthy and the poor remain impoverished (Sachs, 2022). In this sense, cities, in particular, must have deliberate policies and comprehensive action to create a conducive living environment. Popularising successful examples of sustainable cities is important(Bać, 2014; SDGIndex, 2023).

Movements such as New Urbanism, Smart Growth, and Sustainable Urbanism brought the notion of liveability to the forefront in the 20th century (Hooper et al., 2020; Miller et al., 2013; Sheikh & van Ameijde, 2022; Wey & Hsu, 2014). In the United States, the U.S. Department of Housing and Urban Development states that the purpose of new urbanism is to encourage varied and liveable communities with a considerable diversity of housing types, land uses, and building densities (Wey & Hsu, 2014).

Still, sustainability is an exclusive idea that is difficult for the individual to understand, complicated to operationalise for the planner, and challenging to apply locally (Ruth & Franklin, 2014). Building liveable communities, as opposed to sustainable ones, is also the responsibility of local authorities, planners, architects, and policy and investment makers, who construct the context in which people's wants and ambitions develop. Most of the time, the requirements assure the promotion and maintenance of safe structures, dependable water and energy supply, a clean environment, education, employment, and public health, among other facets of a liveable city (Ruth & Franklin, 2014). Achieving liveable communities is arranged by themselves (individuals and families) according to their values and places because of their fluctuating preferences throughout time and space and the varying qualities of space itself. They will move to cities deemed "liveable." (Ruth & Franklin, 2014). Because of set requirements, theoretically responsible by the organisation and policymakers in liveability orders (Ruth & Franklin, 2014).

The Sustainable Development Goal (SDG) about livability, particularly SDG 11 regarding Sustainable Cities and Communities, emphasises advancing urban environments that are both sustainable and inclusive. This includes developing eco-friendly infrastructure, improving public transportation systems, enhancing affordable housing availability, and efficient resource management (Nations, 2015). By incorporating Sustainable Development Goal 11, communities can experience healthier, safer, and more productive urban environments while safeguarding the surrounding environment for future generations (Nations, 2015). The significance of these initiatives cannot be overstated, as they contribute to creating a more livable world for all strata of society.

The nexus between SDGs and liveability could be directly viewed from the sustainability perspective. Ergo, as Figure 1 shows, the objectives of the Sustainable Development Goals (SDGs) and the liveability concept are interconnected. It simplifies three primary branches: Social and Economic Development and Environmental Stability. Key objectives of the statement, namely poverty elimination, healthcare enhancement, and educational promotion, are crucial in achieving SDGs like No Poverty, Zero Hunger, Good Health and Well-being, and Quality Education. Concerning that, the concept of Environmental Stability, which involves prioritising goals such as Clean Water and Sanitation, further highlights the importance of ensuring everyone has access to clean water and adequate sanitation facilities. Furthermore, SDG 11 emphasises the importance of developing sustainable and inclusive urban spaces with strong infrastructure, effective transportation systems, and affordable housing. These objectives, when combined, create a comprehensive structure for worldwide development that tackles social, economic, and environmental obstacles to promote a fairer and more sustainable planet.

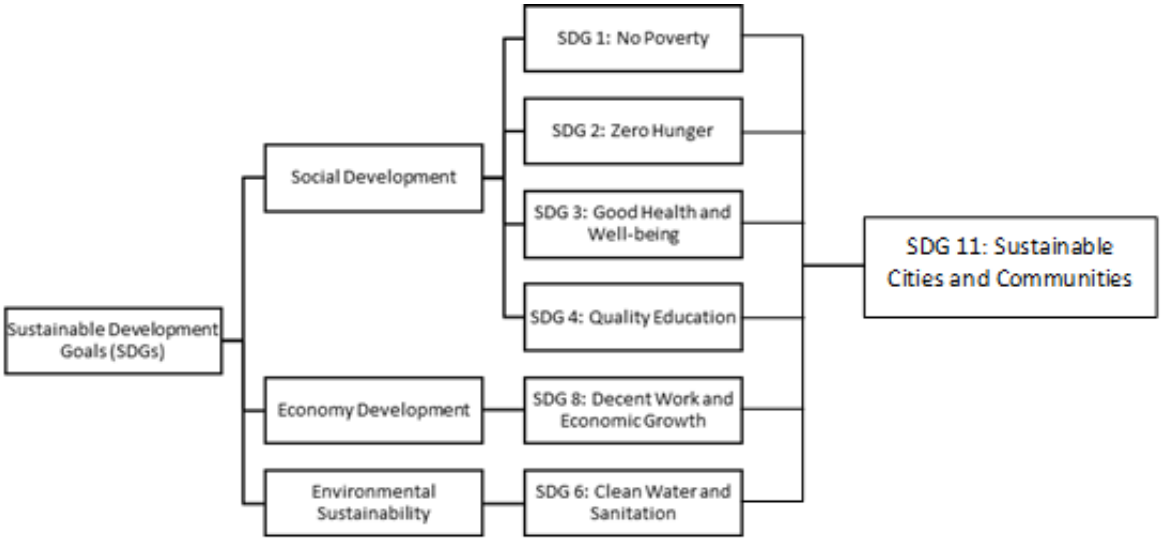

Figure 1: Connection Between SDGs and Liveable Communities

3. METHODOLOGY

3.1 Inclusion Criteria

A systematic literature review (SLR) is a research approach that entails a thorough and organised search for relevant literature on a particular subject. It is a detailed and transparent method that reduces bias and assures all appropriate research identification, evaluation, and synthesis (Wang et al., 2021). This SLR followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) standards (Moher et al., 2015). Peer-reviewed articles related to the indicator of liveable community were published between 2013 and the mid-year of 2023. Articles with the following criteria were included:

a. Limit the research to 10 years, and the study can focus on the most recent developments and emerging trends in liveable and provide insights that will be useful soon (Kuijer et al., 2009).
b. The paper must be published in English, which is a universal language.
c. The article must focus on liveable community indicators used in different places.
d. The researcher writes primary articles, which are results and findings.

3.2 Search Keywords and Terms

The search keyword and term are based on the research questions (Wang et al., 2021). This paper aims to find out the indicators of a liveable community. The term 'liveable' refers to synonymous terminologies such as sustainable, safe, healthy, resilient, accessible, and age-friendly. With this in mind, while looking for the databases, the keywords used are liveable community, liveable indicator, sustainable community, healthy community, resilient community, accessible community, age-friendly community, quality of life indicator, well-being indicator, urban planning indicator, and environmental indicator.

The electronic database allows the use of Boolean operators and wildcard asterisks. The word 'AND' is used to join terms, and the word 'OR' is used to include synonym keywords (Brereton et al., 2007), while the wildcard asterisk is used to find the root word ending. The keyword string used is ("livab* community" OR "sustainable community*" OR "age-friendly community" OR "healthy community" OR "resilient community*" OR "accessible communit*") AND ("liveable indicator*" OR "quality of life indicator*" OR "well-being indicator*" OR "urban planning indicator*" OR "environmental indicator*"). These keywords were used to find related articles, and Figure 2 shows the results.

3.3 Literature Review Process

As previously mentioned, this review followed the PRISMA guidelines and Endnote 20 software. This

software helps simplify the duplicate and screening process for researchers. Figure 2 shows the flow of the review process.

First, an identification search with keyword strings was conducted using two major electronic databases. This database is searchable on the UiTM Perak Library website, allowing researchers to access articles the university has purchased or subscribed to. Indirectly, this will assist the researcher in obtaining the full text of the article included in the last step. The Scopus and Web of Science databases were used in this literature review since both are published in high-quality journals. Meanwhile, the Emerald Insight and Science Direct databases are excluded because the databases are expected to provide similar articles or papers. Emphasis on two databases will give more relevant research and transparent results. Using the Endnote 20 software, a similar article is automatically detected and removed from the initial search.

Second, the screening process begins by screening the title and abstract of the article. All the articles that did not meet the inclusion criteria will be excluded. Third, after reading the title and abstract, full-text reading will be done, and unrelated articles will be excluded. Forward searching is done based on the related Article (Google Scholar) and reference list. Finally, only the included text will be eligible for the analysis.

3.4 Analysis and Coding

The selected studies have been reviewed and screened based on the initial search. Only articles that meet the inclusion criteria will be chosen. As a result, the researcher performed analysis and coding during the literature review process. The research was divided into three categories based on Mayeda and Boyd (2020) study:

i. When it became clear that the article did not meet the criteria, it was removed from the systematic literature review.
ii. It was kept if it was unclear whether the article met the earlier criteria.
iii. If the paper seemed probable, its whole paper was reviewed to meet the criteria.

Guided by the research objectives, 27 articles were chosen and analysed. The article must include the assessment tool used and discuss the indicators and sub-indicators used to measure the liveability index in the study area.

4. RESULTS AND DISCUSSION

Following the keyword string and included criteria, 1,565 articles were identified from Web of Science, 1,924 from Scopus, 67 from Emerald Insight, and 244 from Science Direct. In total, 3,800 articles were identified, as shown in Figure 2. After removing duplicate articles (311), 3,489 were eligible to screen the title and abstract. Throughout the screening process, 3,321 articles were identified to be excluded from this analysis. The reason for exclusion is 1) the study area did not relate, especially most of the articles related to the science subject areas such as medicine, biochemistry, computer science and so on; 2) the Article is not a primary study, for example, critical review paper, comparing or commenting article, and 3) the participant of the study must be a community or expert or even a stakeholder since this paper is about liveable indicator for the community.

Only 114 articles are eligible for full-text reading after all criteria are removed. Only 25 articles were included after 89 articles were excluded. The articles are excluded due to the focus on irrelevant studies, such as urban liveability challenges or implementation of urban policies, mentioning no liveable community. The selected paper's reference list is then reviewed for another related paper. Google Scholar is also used to find relevant papers. Finally, this analysis included only 27 studies. The screening process of the selected paper is depicted in Figure 2.

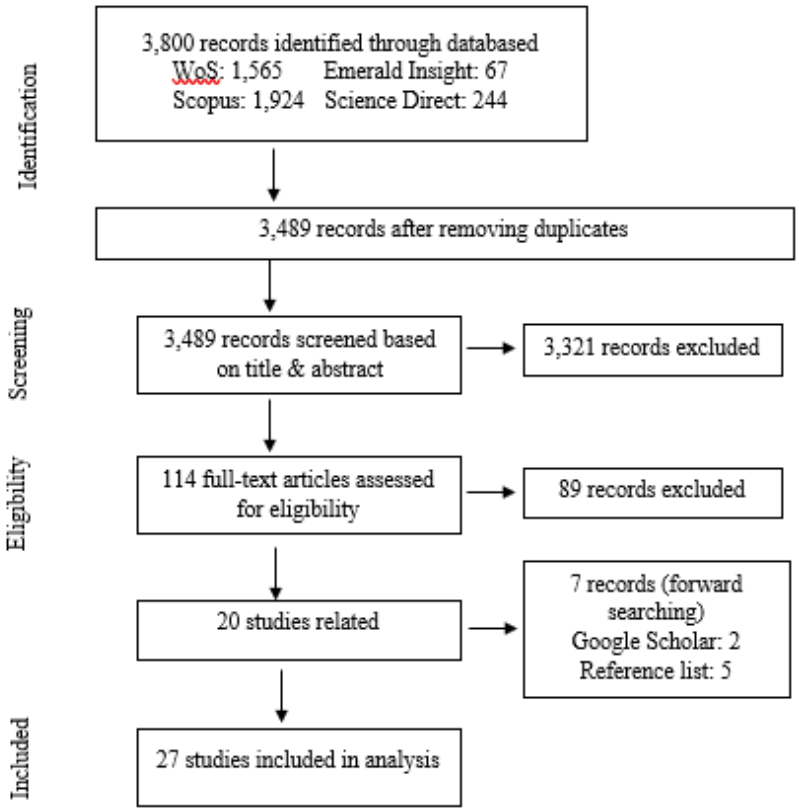

Figure 2: Process of Screening

4.1 Liveable Assessment Tools

All the eligible articles provide liveable evaluation tools that measure the community's liveability in the research location. These tools are crucial because they give a thorough and systematic assessment of the community's general state and the data required to evaluate the degree to which the place fits the demands of a good life. Researchers may use this data to conduct a deeper analysis of the elements that influence the community's well-being and liveability, resulting in a more comprehensive knowledge of social and neighbourhood concerns.

This study is a comprehensive approach to worldwide research, incorporating the selection of publications from different nations using search engines. The study's analytical scale includes three major geographical levels: from micro (city/metropolis) to macro (international) as stated in Table 3. This shows a broad and intellectually rigorous approach to analysing the facts of life at different geographical and social levels.
The articles coded from T01–T27 represent each article and assessment tool, as shown in Table 4. Three articles—T03, T11, and T15—used established indices such as the AARP Index and the Community Capacity Conceptual Model. Meanwhile, the remaining articles adjust the indicators correspondingly. By adapting the indicators according to the conditions of each area, these studies can provide a more accurate and relevant view of the factors that affect the feasibility and sustainability of the community in the local context.

Previous studies cover a wide range of research fields encompassing the entire city, state, or country, as well as international studies. Of the 27 articles examined, 13 focus on specific cities, while seven articles discuss the state perspective, and six articles take a perspective on countries as a whole. Overall, only one article involves an international cooperation study.

4.2 Dimension and indicators of a liveable community

The SDG dimensions become the standard for measuring the liveability index, well-being, quality of life, and resilient communities. Seven studies use the sustainable development dimension of liveable community

studies. While the remaining study directly labels it as an indicator without grouping it into any dimensions.

Furthermore, although there are multiple dimensions, each depends on the others to attain the SDGs and liveability (Eldin et al., 2017; Mohamad et al., 2019). However, some studies use additional dimensions, such as those of Istrate and Chen (2022), which are physical and functional characteristics. Based on the literature review, tables 5, 6, and 7 show the indicators and sub-indicators by dimension.

The primary interrelated components of social, economic, and environmental aspects in the conceptual framework of liveability are shown in Figure 3. The social component encompasses aspects like public participation, education, culture, recreation, safety, transportation, housing, and health. These aspects influence the overall social welfare of a society. Meanwhile, the economic component emphasises factors like household income and employment opportunities, which play a crucial role in an area's economic attractiveness and sustainability. Finally, in assessing ecological balance and environmental sustainability, the environmental component encompasses environment quality, including air and water quality and land usage.

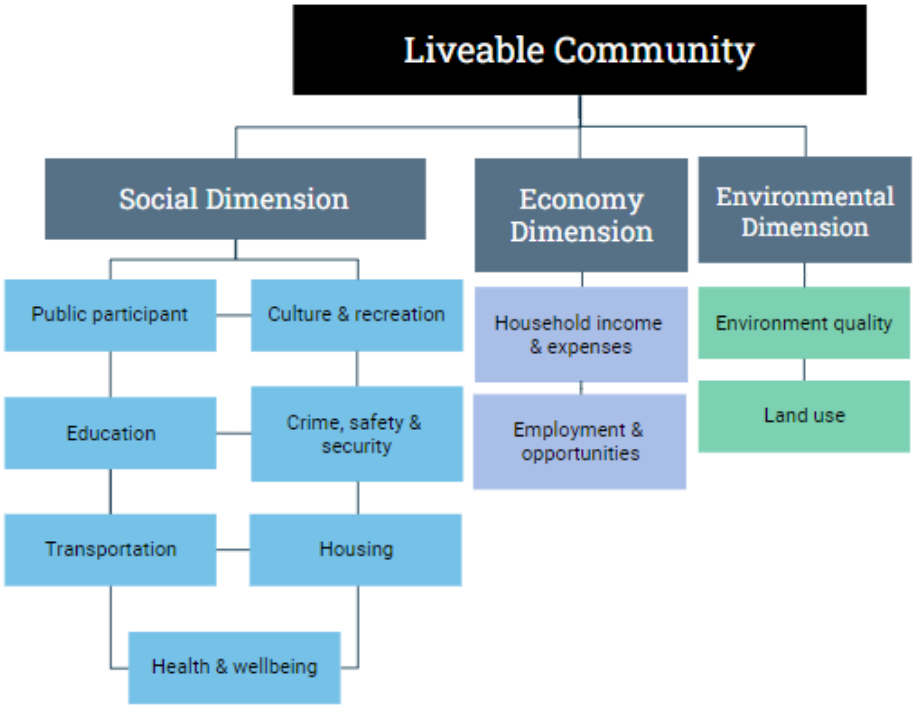

Figure 3: Dimension and Indicators

Table 3: Summary of Liveable Assessment Tools

Code	Assessment tool name	Country	Scope	Community/ Expert	Reference
T01	QOL Comprehensive Indicators List (QOL-CIL)	Saudi Arabia	National	Expert	Al-Qawasmi (2021)
T02	Neighbourhood Satisfaction: Green Township Malaysia	Malaysia	Metropolis/ City	Community	Tan (2016)
T03	Al-Rehab City evaluation score (Based on the AARP Index)	Egypt	Metropolis/ City	Community	Sims et al. (2023)
T04	Gulf Regional Planning Commission (GRPC)	United States	Metropolis/ City	Community	Gough (2015)
T05	Index of Liveability in Aizawl City	India	Metropolis/ City	Community (household)	Saitluanga (2014)
T06	Social Production Function Instrument for the Level of Well-being (SPF-IL)	Netherlands	Metropolis/ City	Community (older)	Nieboer and Cramm (2018)
T07	State Sustainability Barometer (SSB)	Brazil	National	Community	Cetrulo and Cetrulo (2014)
T08	Neighbourhood characteristics and urban liveability	Greece & Norway	Metropolis/ City	Community	Mouratidis and Yiannakou (2022)
T09	Integrated Urban Geographic Factors (IUGFs)	India	Metropolis/ City	Expert urban planning	Paul and Sen (2018)
T10	Conceptual Liveability Framework	Austria	International	Community	Kovacs-Györi and Cabrera-Barona (2019)
T11	Community Capacity Conceptual Model (adapted)	Malaysia	Metropolis/ City	Expert	Mohamad et al. (2019)
T12	Age-Friendly Rural Communities	China	National	Community (older)	Yu et al. (2021)
T13	Gauteng City-Region Observatory (GCRO) Quality of Life	South Africa	Metropolis/ City	Community	Cohen et al. (2018)
T14	Evaluation Index System of Liveable Community	China	Metropolis/ City	Community	Wang et al. (2021)
T15	International Planner Engagement Survey by AARP	United States	National	Expert	Zhang et al. (2019)
T16	Urban Liveability Dimensions	Egypt	Metropolis/ City	Community	Eldin et al. (2017)
T17	Elements of Liveability	India	Metropolis/ City	Community	Pandey et al. (2013)
T18	Key Resilience Indicator for Indigenous Community	Taiwan	Metropolis/ City	Community	Tseng et al. (2022)
T19	Resident's Perception of Liveability	Pakistan	Metropolis/ City	Community	Amin et al. (2020)
T20	Theoretical framework for rural liveability evaluation	China	Metropolis/ City	Community	Yurui et al. (2020)
T21	liveability indicators of the metropolitan Tehran's districts	Iran	Metropolis/ City	District communities	Namini S. et al. (2019)
T22	Liveable City Index (LCI)	Thailand	Metropolis/ City	Community	Onnom et al. (2018a)
T23	New Zealand Health, Work and Retirement (NZHWR)	New Zealand	National	Community (older)	Stephens et al. (2018)
T24	AARP AFC Survey	United States	Metropolis/ City	Community (older)	Kim et al. (2022)
T25	Key Indicators for Melbourne Neighbourhoods	Australia	International	Expert	Lowe et al. (2015)
T26	LEED for Neighborhood Development (LEED-ND)	North America	National	Community	Szibbo (2016)
T27	Liveability of Arak City	Iran	Metropolis/City	Community	Sasanpour (2017)

Through the implementation of this hierarchical framework, the conceptual map serves to visually depict the intricate interplay among diverse factors that shape the liveability of a community or city. A thorough comprehension of the interconnectedness of social, economic, and environmental dimensions is of utmost importance in urban planning and development, as it informs the creation of well-rounded and sustainable policies. The map highlights the significance of incorporating different viewpoints and interests in decision-making to attain fair and well-rounded development objectives.

4.2.1 Social dimension

The social dimension is a crucial argument, particularly in establishing appropriate measures to quantify the liveability of the urban community (Mohamad et al., 2019). Social dimensions include education, leisure, health and well-being, social security, housing, social interaction, and social acceptance (Al-Qawasmi, 2021). Parallel to that, Cetrulo and Cetrulo (2014) study represents demographics, education, economics, social justice, health, and safety for the social dimension. The association of urban community residents built the social capital of the community to assess the urban community's resilience (Mohamad et al., 2019).

4.2.1.1 Public Participant

Prior research has used social interaction and support indicators in twenty (20) studies. Create an effective residential management platform that encourages community engagement and interaction, promotes community-level cultural activities, and increases communication among residents to cultivate a stronger sense of attachment to the community (Mohamad et al., 2019; Wang et al., 2021). Social engagement embraces and empowers older people to contribute their wisdom and warmth to communal ties Kim et al. (2022) by attending activities together, such as shopping, farming and paying bills (Yu et al., 2021).

Additionally, the community must be allowed to express their opinions on the issues they encounter in their housing area (Tan, 2016). This was supported by Tseng et al. (2022) said that planning should be directly involved with the residents and should be community-focused. This issue also arose in Sierra Leone when local government did not involve the community in street governance (Conteh, 2016).

Table 4: Indicators and Sub-Indicators for Social Dimension

Indicators	Sub-indicator	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	Total
Public participant	contribution in community hall	2	1				1					1							1	1					1	1		1	10
	attend community meeting (local improvementa)	1	1	1								1	1	1		1			1						2				10
	involve in decision making/ give opinion		1	1			1					1							2						1			1	8
	involve with local activities (include older)	2	1	1		1	3					1	2	1	1	1			1		1	1			4	1	1		23
	networking with the gov											1			1			1	3	1					1	1			9
	solve community problems		1	1												1			2		1				1	1		1	9
Culture & recreation	preservation cultural resources/ cultural activities	1																1	2		1	1			1	1	1		9
	maintaining traditional	1												1				1	2										5
	recreational centre	2				3				2				1	1	1		2		2	1	2	1			1	1		20
	community hall		1											1				1											3
Education	education fare	1																											1
	preschool education	1																											1
	availability education institution	1	1	2	1				1	2					1				1		1	1	1		2	1	1	1	18
	quality education services	3			1	2				1																		1	8
Crime, safety & security	low crime rate	6	2		1	1					1						1				1					1	1		15
	number of police station	1								1					1		1						1					1	6
	lighthing																1												1
	level of security and safety	1		1	1	1			1	1	1		3		2		2	1		1				1		1			18
Transportation	parking space	1	1				1		2											2		1			3	1	1		13
	time spent in traffic/ traffic condition	1													1					1	1				1	2	1		8
	availability public transport	1				1	1			1			1					1		2						2	2	12
	efficiency transit			1									1							1					1	1	3		8
	street sign/ system design	1		1		1		1			3		3				3			2					4	2			21
	Transportation quality/ well-maintanence	1									1		2			1	1			1	1				2	1	1	1	13
	transport option to access amenities (bus)/ more transportation choices/ assebility	1	2	4	3	5			1	3	2		3	1	1			2		2	2	2	1	1	3	5	1		45
	own personal transportation	1				2					2															1			6
	affordable public transport			1	1					1			1												1	1		1	7
	pedestrian networks/ walkway	1	2	2	1		2				1		1				2			1		1			1		2		17
Housing	availability & affordable	1		2	1	4	1			1			1	1		1	1	1		1		1			1	1		1	20
	continue living		1										1			1										1			4
	suitability (older)			1	1		1						1					1							1				6
	maintanence services			1									1					1							5				8
	housing density																1	1		1					1	1	1	1	7
	comfort/ harmony	2	2	1						1	1		1	1	1			2	1	1				1		1			16
Health & wellbeing	pharmacy walking distance/ health facilities/ nearest facility			1		1	2	1	1				1							1	1	1		1	1	1		1	14
	medical services	4		3	1			1		2			1	1	1	1				2	1	1	1	1	7	5		1	34
	mortality rate	2																											2
	quality of health care services (eg: ambulance)	2		2				2		1			1	1											1	1			11
	affordable health and awareness activity (eg: nutrition, smoking, weight control)	2				1	1	1								1				2					3				11

4.2.1.2 Culture and recreation

Sixteen (16) studies discuss culture or recreation indicators. Amin et al. (2020) found that communities or residents were unhappy with how the parks were managed and maintained when the community had difficulty engaging in recreational activities with friends or family in their free time. Amin also said that the liveability of an area can be promoted by making road networks more efficient (Amin et al., 2020). Leisure is also a group of activities for enjoyment or relaxation (Namini S. et al., 2019).

4.2.1.3 Education

Sixteen (16) studies measured their liveability using education indicators. Education is highlighted as a resource that provides people with resources and social skills (Nieboer & Cramm, 2018). In the Netherlands, people with lower educational levels find it challenging to take part in any activities compared to the community with a high level of education (Amin et al., 2020). It finds that quality education is very effective in fighting

poverty, building democracy, and forming a prosperous society that supports the development of liveability.

4.2.1.4 Crime, safety and security

The indicator with the most significant impact on liveability was community safety. Twenty (20) studies made use of these indicators. Most participants identified safety as the salient factor in determining whether a place is liveable (Onnom et al., 2018a). In Sheikh Zayed, residents in open communities are more exposed to crime than in gated communities (Eldin et al., 2017). As for an open community, no security infrastructure, such as checkpoints or barricades, provides protection. Therefore, study Tan (2016) solved the problem alone. Despite safety concerns, they use private security guards for their home enclave. Wang et al. (2021) suggest to repetitive entrances and exits should be closed, and vehicle entrances and exits should be screened by security booths and barriers to restrict the entry of unauthorised individuals and vehicles. Enhancing the safety measures in community surroundings will greatly enhance the quality of life in our community.

4.2.1.5 Transportation

Transportation has been used to measure liveability in twenty-five (26) studies. The Amin study found that the availability of transportation services is well-liked, but the community dislikes the frequency of transit services (Amin et al., 2020). Concerns have been raised about the safety of roadways for the elderly and driving conditions due to the lack of speed breakers and a high crash rate (Amin et al., 2020). Walking and cycling are viable forms of transportation in densely populated locations such as Shanghai due to the high population density (Namini S. et al., 2019). It was demonstrated that the primary cause for everyday car use in emerging areas was a lack of competitive alternatives, such as safe cycling infrastructure or accessible public transport (Kovacs-Györi et al., 2019). The choice of transportation mode in a community depends on its suitability. Transportation is a key part of living that includes how easy it is to get to, how fast it moves, how safe it is, and how long it will last. These things affect how people get around and their overall well-being.

4.2.1.6 Housing

Twenty-two (22) studies found that using housing is an indicator of a liveable community. It has been found that housing developers should consider social harmony and create a safe and healthy environment for those who live there (Tan, 2016). The study found that housing satisfaction was found to be relatively positively associated with the quality of life, and it was related to neighbourhood security, accessibility, social cohesion (Amin et al., 2020; Stephens et al., 2018), affordability and sustainability (Amin et al., 2020). Yu et al. (2021) study that older adult housing must be safe and comfortable. The characteristics of the chosen house must meet the suitability of residents, such as the housing types, sizes (Hegazy, 2021; Stephens et al., 2018), and safe density, diverse, and socially active communities neighbourhoods (Hegazy, 2021).

4.2.1.7 Health and well-being

Twenty-one (21) studies highlight health and well-being as a liveability indicator, as the facilities for being healthy are supposed to be provided. For example, healthy diet, availability to the quality of health care, and access to exercise (Amin et al., 2020). Thirteen (13) studies prove that the study area provides health facilities and support to ensure community health. Among that, Wang et al. (2021) find that the Houzaimen Street health service centre is to raise the standard of medical care and pensions in the community for the elderly. Egypt provided medical facilities 24 hours a day, seven days a week, and the community could meet with specialist doctors without going to the hospital (Hegazy, 2021).

4.2.2 Economy dimension

Economy dimensions include income, employment, job security, and working opportunities (Al-Qawasmi, 2021). In Cetrulo and Cetrulo (2014), the economy dimension is categorised as monthly household income per capita, GDP *per capita*, monthly income and household income per capita. Economic growth is often seen as one of the most essential components in creating a liveable city (Onnom et al., 2018a). Furthermore, sustainable urban system growth cannot be realised without addressing the urban inhabitants' economic challenges (Namini S. et al., 2019).

Table 5: Indicators and Sub-Indicators for Economy Dimension

Indicators	Sub-indicator	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	Total
Employment & income	cost of living	4				1		1				3		1															10
	employment status											1					1		1							1			4
	enough employment opportunity	8			1	2			1	2				1	1	1	1		1	1	1	1			3	1	1	1	28
	monthly income (demo)	4				1		4	1		1	1					1		1	1						1		1	17
	business opportunity	3		1	1							1				1	1		1	1	1					1			12
	insurance policy	1				1																							2
	pension services																				1								1
	electric bill					2																							2
	online business											1					1		1	1									4

4.2.2.1 Household income and expenses

Eleven (11) studies used the household income and expenses indicator to assess liveability. Income, income distribution, and employment rate are sub-indicators in the Lowe et al. (2015) study. (Kovacs-Györi & Cabrera-Barona, 2019) studies indicate that lower-income individuals are less satisfied with city living (Kovacs-Györi & Cabrera-Barona, 2019). Household income and expenses are crucial liveability measures since they represent a community's financial well-being and affordability.

4.2.2.2 Employment and opportunities

Employment and opportunity are critical in supporting economic growth, financial stability, and human fulfilment to create a lively and liveable community. Eighteen (18) studies have examined employment and opportunities as key liveability indicators. Amin et al. (2020) claim that it is critical to achieve equitable opportunities and income equality across all strata of society in terms of employment and income distribution. Addressing individual or family needs is critical, so they must find suitable jobs that meet their satisfaction (Mouratidis & Yiannakou, 2022). Employment and opportunity are critical in supporting economic growth, financial stability, and human fulfilment to create a lively and liveable community.

4.2.3 Environmental dimension

Indicators of the environmental dimension include health, environmental health, plant cover, soil contamination, and institutions (Al-Qawasmi, 2021). The environmental dimension indicates that urban development preserves the environment. Although the country is developing, the environment should be prioritised following the SDGs. Al-Qawasmi (2021) study found that Saudi Arabia was unconcerned about environmental issues. A liveable environment fosters an optimistic future for quality and living comfort, which eventually become determining factors in creating a sustainable built-up environment for the entire community (Eldin et al., 2017).

Table 6: Indicators and sub-indicators for environmental dimension

Indicators	Sub-indicator	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	Total
Environment quality	air quality	4		1	1			1					1		1		1	2		1	1					1			15
	water quality	2		1				1									1	1		1	1					2	7		17
	reduce greenhouse emission				1			2											1			1				1	2		8
	sound pollution					1		1	1								1	1							1				6
	visual disturbance																1	1									1	1	4
	energy efficiency	1		1	2							1									1					1	3		10
Land use	green spaces	1	2	1			1	1			2	1			1				1			1	1				1	1	15
	open spaces	1	1	1		1				2	1		1		1	1	2	1	1		1	1	1		1	3	1		22
	tree cover					1			1		1	1			1	1	1		1										8

4.2.3.1 Land Use

Thirteen (13) studies evaluated green spaces as a key indicator for determining liveable communities. In Egypt, a study found that all residential sections are planned in clusters, with groups of apartment buildings surrounded by green open spaces (Hegazy, 2021). It is reasonable to expect that having more accessible green areas will lead to better neighbourhood satisfaction (Tan, 2016). Communities can provide relief from crowded environments and opportunities for relaxation, physical activity, and connection with nature by creating open spaces, parks, and other green areas (Namini S. et al., 2019; Wang et al., 2021). Green spaces contribute to residents' well-being, offer recreational opportunities, and promote environmental sustainability

4.2.3.2 Environment quality

Eighteen (18) studies found that environmental quality was crucial in determining a liveable community in their research location. Amin et al. (2020) study proves that water quality is an important indicator that assesses water's suitability for human consumption or specific purposes. In the case of New Cairo, they focus on the wastewater treatment plant process, which was initially designed with two treatment stages but later extended to include a third treatment step to provide the community with safe and suitable water (Hegazy, 2021).

Ten (10) studies examine a liveable community's air quality and pollution indicators. A liveable community recognises the importance of air quality and works to reduce pollution levels, ensuring the well-being and satisfaction of its residents. Amin et al. (2020) mention that the main environmental problems are air and water pollution, which should be a priority for the municipality.

5. CONCLUSION

This study aims to ascertain the criterion for a liveable community by drawing upon previous research. The results indicate that environmental, economic, and social factors are crucial when assessing the liveability of a community and calculating its liveability index. By considering these dimensions, communities can enhance their comprehension and ability to improve their residents' overall quality of life. The literature review consistently identifies seven indicators comprising the study's social dimension: health and well-being, public participation, culture and recreation, education, crime, safety and security, transportation, and housing. The economic aspects addressed two prominent indicators, namely household income and expenses. Lastly, the environmental dimension includes environment quality and land use indicators.

This study focuses on findings from previous research at the global level, as the study by Salleh et al. (2023) has already examined liveability indicators domestically in Malaysia. Their research highlights that Malaysia's development blueprint outlines several significant indicators for establishing liveable communities. However, a key limitation identified is the absence of a comprehensive and dedicated framework or model for liveable communities aligned with the nation's development agenda. The significance of the identified indicators in their study stems from a combination of various short- and long-term planning initiatives in Malaysia, which still require further adaptation to become more systematic and contextually relevant.

Upon scrutinising and discerning these indicators, the research indirectly illuminates the challenges specific to the region. The research offers valuable perspectives on the community's social, economic, and environmental aspects by assessing diverse liveable community indicator dimensions. Illustratively, law enforcement, public transportation, health facilities, road conditions, and water quality are all inadequate in Lahore, Pakistan (Amin et al., 2020). This discovery can compel the government or a stakeholder to undertake significant measures to attain community living satisfaction.

According to the literature review, forthcoming investigations regarding liveable community indicators establish a region-specific indicator system Wang et al. (2021) because the identical indicator is not applicable in another nation. It is imperative to ascertain the primary indicator in a study due to the variations in values, requirements, and socio-cultural contexts across countries (Al-Qawasmi, 2021). To make the liveable community indicators effective and applicable, indicators that correspond to the values and requirements of the community must be identified and prioritised. Subsequent investigations may yield precise evaluations of liveability and direct the development of context-specific policies and interventions (Al-Qawasmi, 2021).

Second, by advise analysing all extant index indicators and limiting the number of indicators as a matter of course. A lengthy enumeration of indicators may cause perplexity and potentially detract from the primary concerns (Alpenberg et al., 2018). By streamlining the indicator set, stakeholders can enhance the efficiency of resource allocation, intervention prioritisation, and progress monitoring to enhance liveability (Lowe et al., 2015). This promotes a more streamlined and targeted methodology for evaluating and quantifying, facilitating a more comprehensive comprehension of the elements contributing to a superior quality living environment.

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