

A Critical Review of Livability and Identifying the Models for its Measurement

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ABSTRACT

Livability is a fundamental guiding concept for urban planning and governance, and its definition and evaluation have become a focus of research. The term 'livability' is mostly centred on phrases such as 'Quality of Life,' 'Well-being,' and 'Life satisfaction'. It was invented and widely used to refer to a complete, systematic strategy for reversing elements of twentieth-century urban planning techniques; yet the concept maintains its ambiguity. This research paper attempts to provide a clear explanation of this term by looking at various studies and approaches used for analysing cities in terms of livability. The paper also identifies various models for measuring livability and recommends a model that could be used to measure the livability index of community.

Keywords: Livability, Urban Planning, Livability Models. Quality of life, Well-being

Introduction

Livability refers to the condition of living environment that provides inhabitants with an adequate quality of life (Pandey, et al., 2013)(Lukumanab, et al., 2017). It is a place-based notion where a simple daily characteristic may have a tremendous influence on the wellbeing/happiness of a person, his family, and the community. Livability measures how effectively a city's-built environment or services meet citizens' needs and aspirations(Kamp, et al., 2003). Livability is a behaviour-related function of the combination of environmental and human variables (Gough, 2015). It is also a very subjective term: what is considered a livable community in one place may be despised in another. Cultures and lifestyles change expectations for urban design, transportation, and other infrastructure, as well as service provision. Nonetheless, livability is a compelling concept.

The concept of livability represents overall quality of life and wellbeing, wherein the

attributes of the place helps in meeting the economic, social, cultural needs of the residents of a place, promoting their health and well-being while protecting the resources and the ecosystem (Council, 2002)(Badland, et al., 2014).

History

The growing amounts of environmental design research in the 1950s and 1960s laid the foundations for livability design. Campaigners like Jane Jacobs and William Whyte launched the neighbourhood preservation movement in the 1950s to protect dense, mixed-use urban communities. Affordability, accessibility, control efficiency, and equity were all identified as livability by Kevin Lynch (1960). To develop a framework for analysing urban livability, Lynch (1981) proposed the "Good City Form" idea (Patil & Patil, 2016). In the 1970s, the US and Europe started studying methods to improve urban livability by

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conserving open spaces, reducing traffic, and building bicycle lanes (Wheeler, 2001).

In the 1980s, women's perspectives on urban environments were investigated, focusing on livability. Women felt isolated, uncomfortable, and dangerous in public because public places, transportation, and urban planning were planned by males for men's needs. Their primary issue was that they had to spend much of their time driving children to and from day-care or healthcare institutions (Hayden, 1986). Since 1985, a successful and important worldwide series on making cities livable conferences has been held to examine and codify strategies and means to enhance the quality of life in cities. Moreover, the organisers and participants agreed that planners must learn from successful historic city centres and small towns and explore ways to enhance quality of life for urban inhabitants of all classes and socioeconomic groupings (Wheeler, 2001).

The 1990s witnessed an increase in pedestrian and bicycle planning. The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) fostered the expansion of public transportation networks in many US cities, giving people additional alternatives. The Gore/Clinton Livability agenda increased Livability usage in municipal planning in 1999. This plan saved billions of dollars, reduced traffic congestion, and promoted "smart growth" practises (Panda & Thakur, 2019). Many new sorts of environmental design research have also been evolved in recent decades to enhance urban livability. The effort to increase neighbourhood livability became the major project to improve urban livability. This paradigm not only implies a political point of view, but also covers social and environmental challenges. A traditionalist/vernacular approach to preserving quality of life by focusing on historic urban fabrics for

interventions was also in focus during 90's. This decade also witnessed certain livability movements being criticised, the Left and right wing condemned the New Urbanism approach, which was centrally planned and produced in big scale without any participation from end users, aimed at building better-designed suburbs for the rich (Ghorbi & Mohammadi, 2017). Till the early 20s, livability programmes were market oriented. As such, it was perceived as preserving or improving public goods, while ignoring characteristics not properly valued by the market, such as clean air, social and handy communities, unclogged streets, and the preservation of local ecosystems. Traditional planning methods such as zoning, urban and construction rules, and area planning were used to create livability programmes (Basiago, 1998).

By 2010, livability was more closely tied to sustainability. It sought to achieve the environmental, economic, and equitable aims of sustainable planning (Basiago, 1998). Creating a pedestrian-friendly public realm helps the environment by lowering pollution, the economy by increasing foot traffic and fairness by boosting transit alternatives for people without automobiles. By creating a market for local companies and minimising congestion on necessary highways for commerce, affordable housing near public transportation and town centres benefits the environment, the economy, and equality by giving housing alternatives for individuals with low or moderate incomes. In summary, livability and sustainability overlap significantly and both may benefit communities (Wheeler, 2001). The Sustainable Development Goals (SDGs) and the New Urban Agenda (NUA) are two recent international landmark accords that concentrate on urban concerns and enhance

quality of life in cities (NUA). It focuses on the number of activities necessary to enhance cities globally. SDG11 targets inclusive, safe, resilient, and sustainable cities. The SDGs address livability issues such as health, clean water, sanitation, waste management, air quality, basic services and infrastructure, and sprawl control, while the NUA focuses on livability. However, the SDGs and NUA are merely the beginning of any solution to make cities more livable (Kovacs-Györi et al., 2019),(Wheeler, 2001).

One can see that in recent decades, activism and urban planning movements centred on livability have gained enormous momentum throughout the world. To gain a more holistic knowledge of livability, the following sections examine the working definitions used in various regions/countries.

Definitions

Numerous studies have been undertaken worldwide to establish livability indicators, however there is no universally accepted definition. Also, the most current livability criteria are for cities, and none evaluate livability just for individuals (Giap, Thye, & Aw, 2014). Vukan R. Vuchic (1999) defines livable cities as economically efficient, socially sound, and ecologically friendly. It includes house and neighbourhood aspects that promote safety, economic opportunity, health, convenience, mobility, and leisure (Vuchin, 1999).

In the United States, livability is associated with 'quality of life' and 'wellbeing,' and a livable community is one that provides a safe and secure environment, affordable and appropriate housing with transportation options, and supportive community features and services, according to the AARP Public Policy Institute. The livability index is derived using a series of Key Performance Indicators

(KPIs) that assess a city's capacity to sustain and enhance its viability and vitality(Harrell, et al., 2014).

In the United Kingdom, livability is primarily concerned with cleanliness, safety, and greenery: the local environment. Livability is closely related to sustainability. LIFE1 is one of the measuring tools used by the UK government. It measures and assesses the livable sustainable performance of UK cities using 346 indicators, the majority of which deal with sustainability, which promotes healthy living with minimal energy consumption and decoupling economic vitality from CO2 emissions.(Joanne M. Leach, n.d.).

In Australia, livability is linked to happiness and living conditions. According to the State of Australian Cities 2013 study, a city's livability is determined by the health, welfare, and quality of life of its residents. It is assessed subjectively by asking individuals about their quality of life, as well as objectively by assessing social and economic characteristics such as income, wealth, education, health, and so on.(OCSE, 2015).

In India, the Ministry of Urban Development has developed a city livability index that employs 'Quality of Life' as a primary element to measure the degree of livability in Indian cities. The index is a composite assessment of the social, environmental, economic, and civic aspects that influence a citizen's inclination to live in a city. The Indian Livability Index 2010 model measures the four pillars of comprehensive development: institutional, social, economic, and physical, which are regarded as the driving factors in providing its population with a recognised quality of life.(CII, 2010). The Ease of Living Index is calculated by collecting, validating, transforming, and rating data (EoL: MoHUA, 2019).

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While the aforementioned notions of livability are mostly centred on phrases such as 'Quality of Life,' 'Well-being,' and 'Life satisfaction,' the livability standards/measures vary across locations and throughout time, particularly when comparing a developed country to a developing one. While livability is a tough notion to define and measure, one might argue that it pertains mostly to the characteristics of metropolitan areas that make them appealing places to live. The properties of livability may be classified as tangible or intangible. The tangible characteristics would include the availability of physical infrastructure, social infrastructure, and the state of housing, while the intangible characteristics would include a feeling of place, local identity, and social network, among others. Although not often expressly stated, the following concept of livability is implicit: Community livability is defined as the sum of the physical and social characteristics of places — including the natural environment, economic opportunity near diverse housing options, and access to a diverse range of services, facilities, and amenities — that contribute to a community's overall quality of life (Gough, 2015).

Livability is also considered as a subgroup of sustainability that affect people in a community with respect to their economic growth & development, affordability, health, social equity and exposure to pollution.

Indicators and methods commonly used to measure livability

According to a research paper titled "the indicators and procedures used for evaluating urban liveability: a scoping review," there are five distinct domains that are key components of livability. These include economic, environmental, institutional, social, and governance domains, with the most often utilised subdomains being environmental

friendliness and sustainability, sociocultural conditions, economic vitality, and competitiveness (Zahra Khorrami, 2021). They also found seven unique methodologies and six grading systems for measuring urban liveability from these literatures. Three quantitative methodologies accounted for 89.6 percent of the papers. These methodologies were the Analytical Hierarchy Process and Entropy, Factor Analysis & Principal Component Analysis, and Spatial Multi-criteria Decision-making Method.

According to Emmanuel Robert's thesis report on "Liveability-Indicators: Technologies of (Iconi-) City for a Numerology of Liveability," the most commonly used comparative ranking on urban liveability is the Quality of Living Survey (QLS) from Mercer and the Global Livability Index (GLI) from the Economist Intelligence Unit, with the addition of the Quality-of-Life Survey Monocle 2017 and World's Best Cities Ranking by Resonance, 2017. However, the most common are the QLS and GLI. These two ways of rating were created by two global economic giants: the American financial business Mercer created the Quality of Living Survey (QLS) kit, while the British advising firm, the Economist Intelligent Unit (EIU), created the Global Livability Index (GLI). These were created to give guidelines on compensation programmes for workers who were had to transfer to less hospitable places, sometimes known as "hardship allowances." 2020 (Robert & Littoz-monnet, 2020).

Method to Measure Livability

Most of the above methods to measure livability uses scoring systems for data analysis because to their ease of use and comprehension, however, they are problematic because they do not account for the analysts' incorrect perceptions - i.e., they do not account

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for the effect of cognitive bias. Individuals interpret the qualitative descriptions supplied to each score differently. When analysts utilise scoring procedures on range-based indicators, they tend to assign same ratings to quantitatively very dissimilar characteristics. Scoring procedures frequently use the assumption that the factors being assessed are unrelated to one another - that there are no correlations between them. This presumption is rarely validated or justified (Hubbard, 2009). These data demonstrate that the concept of livability is a complicated phenomenon that is perceived differently by each human being depending on their physical, social, environmental, and economic circumstances, it analyzed and inferred differently based on analyst skillsets, hence measuring it without biases is difficult.

An alternate method recently developed for aggregating multiple indicators in the context of measuring multi-dimensional poverty is the Alkire-Foster Method. Poor households are usually deprived in respect of several indicators including housing, education, employment, social status, income, etc. Alkire-Foster multi-dimensional poverty measure integrate these deprivations into an aggregate index. No one has so far attempted to this method for measuring livability and it's a flexible technique that uses several dimensions, indicators, and cut-offs to create measures tailored to specific uses, situations, and contexts, it is also suitable for measuring other phenomena (Alkire and Santos 2013).

A detail comparison between the scoring method and Alkire-Foster Method is explained below:

Scoring Method

The scoring system is used in a variety of circumstances to aid in the evaluation of options and decision-making. Additionally, it

is utilised to determine customer preferences and satisfaction levels (Brown, 2007). The technique is as follows:

- Developing a set of evaluation criteria, frequently classified into a few categories.
 - Developing a scoring scheme for each of the evaluation criteria;
 - Providing a set of numerical weights to indicate the relative importance of the criteria and evaluation categories; and
 - Computing the total score by assessing individual scores using the numerical weights.
- The most crucial step in using a scoring technique is establishing assessment criteria. The assessment criteria must meet the following requirements:
- Write as plainly as possible in order to convey a single message. Avoid ambiguous keywords such as "visitor friendly" and speculating words such as "typically," "usually," and so on.
 - Criteria that include conjunctions (and, or, with, or moreover) must be broken down into separate criteria.
 - Do not combine evaluation categories such as location, infrastructure, housing, and design.
 - Avoid phrases such as "completely safe," "excellent atmosphere," and so forth.

The next step is to describe how each criterion will be evaluated and scores awarded. A frequently used scoring method is the "Likert scale," a five-point scale developed by educator and psychologist Rensis Likert. The five-point scale and associated scores are as follows:

Strongly disagree (dislike).....	1
Disagree (dislike)	2
Neutral	3
Agree (like)	4
Strongly agree (like).....	5

Finally, weights 'wi' are assigned to each criteria. These weights operate as scaling factors, indicating the relative weight of each criteria. They should be nonnegative values that add to unity, since they are scaling factors that describe relative relevance in the context of the whole collection of criteria. There is no one-size-fits-all strategy for selecting weights. The decision is made based on the decision maker's preferred principles and axioms, the amount of detail wanted for the weights, and the computational resources available for calculating the weights.

After establishing the assessment criteria, individual scores, and weights for evaluation, an additive utility function is utilised to obtain the total score for each product. It takes the following form:

$$S = \sum w_i * s_i$$

The calculation of aggregate indicators of measurement using the scoring technique is reasonably straightforward and is employed in a variety of disciplines, including the satisfaction levels of housing project beneficiaries. The scores, however, are not unique, and the weights are often arbitrary. Consequently, the outcomes may vary depending on the scores and weights chosen. Additionally, it does not meet some desired characteristics of indices.

Alkire-Foster Method

The Alkire-Foster (AF) approach, created by Sabina Alkire and James Foster at the University of Oxford's Oxford Poverty and Human Development Initiative (OPHI), is a versatile tool for quantifying multidimensional poverty. It may include a variety of dimensions and indicators to develop metrics that are context specific. This model is based

on the axiomatic method and capacity theory of Anartya Sen. (1976).

Numerous research on the AF approach demonstrates its versatility. Numerous dimensions, indications, and cut-off points may be utilised to customise measurements to particular applications, circumstances, and settings.(Ophi, 2015)(Alkire, 2015).

A multidimensional poverty measure which combines information on the prevalence of poverty and the average extent of a poor person's deprivation.

The index has various beneficial characteristics, which are stated below:

- The index meets the requirement for dimensional linearization. This indicates that the index's value grows when a poor person's deprivation in another dimension increases.
- Decomposability is another desired attribute. Thus, if a population is divided into two separate groups, the aggregate poverty index is the weighted average of the groups' poverty indices. The weights are the population shares of the groupings,
- Another attribute of the index is replication invariance. This means that if a new population is created by permuting the existing population, the index value remains constant.
- The index's equalisation attribute ensures that it has a minimum value of 0 and a maximum value of 1.

The steps to measure the multidimensional poverty is as follows(Alkire, 2015):

Defining the Unit of Analysis: The unit of analysis is usually a person or a home, but it might also be a community, school, clinic, corporation, district, or other entity. However, all data for an individual or family must come from the same source.

Selecting the Dimensions: The choice of dimensions is important, and the selection are made either alone or in combination. The general considerations taken while selecting the dimensions are to collect participants values and views, using official list of data, making assumptions on what an individual value implicitly and explicitly based on researcher's educated predictions, or they can be based on convention, sociological or psychological theory, or philosophy, collecting data about consumers preferences and behaviours

Selecting the Indicators: for each of the dimensions the indicators are selected based on the principles of accuracy and parsimony.

Statistical properties such as choosing indicators that are not highly correlated are relevant.

Setting the first Cut-Off: A cut-off is set for each indicator so that the thresholds can be used to identify the different categories of deprivation.

Count the Number of Deprivation factors for each person: For convenience normally equal weights among indicators are assumed. However, general weights can also be applied, in which case the weighted sum is calculated.

Setting the Second Cut-off for measuring multidimensional aspects of poverty: Assuming equal weights for simplicity, a second set of cut-offs, k , is generated which gives the number of indicators in which a person must be deprived/enabled to be considered multidimensionally poor or enabled.

Apply Cut-off k to Obtain the Set of people who are deprived

Calculate the Headcount: Divide the number of people identified as by the total number of people.

However, the multidimensional headcount does not give insight the level of poverty across groups rise as poverty increases for which additional measures are taken up:

Calculate the Average Poverty Gap: It is computed by multiplying each person's fraction of overall deprivations by the total number of impoverished people.

Calculate the Adjusted Headcount: If the data are binary or ordinal, multidimensional poverty is measured by the adjusted headcount. Headcount poverty is multiplied by the 'average' number of dimensions in which all poor people are deprived to reflect the breadth of deprivations.

Chapter Summary

Livability is a behavior-dependent characteristic that is influenced by environmental and human elements. Though livability is difficult to define and quantify, one might argue that it refers to the characteristics of cities that make them desirable places to live. Numerous studies of environmental design have arisen in recent years to increase urban livability. Until the early twentieth century, livability programmes were based on market economics. By 2010, livability had become increasingly linked to sustainability. Livability is described as the whole of one's life's quality and well-being. It encompasses all components of the home and community that contribute to the promotion of security, economic opportunity, health, convenience, mobility, and pleasure.

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Livability is associated with a "greener, cleaner, safer" environment.

The Global Liveability Index, published by The Economist, assesses cities according to their overall quality of life. They range from zero (inacceptable) to one hundred (outstanding) (ideal conditions). Each of these categories is scored using 30 criteria. The Ease of Living Index seeks to quantify the level of comfort experienced by urban people. The Index's objective is to assist policymakers in making evidence-based decisions. Additionally, it aims to catalyse action toward larger developmental goals, such as the SDGs. The Ease of Living Index 2019 is built on three pillars: quality of life, economic competence, and sustainability.

Alkire-Foster assesses many dimensions of poverty. It may be used to produce metrics that are context sensitive. Adjustment of measurements is feasible for specific applications, conditions, and settings. As a result, the AF technique may be used in a variety of ways. The index value is between 0 and 1. Replication invariance, decomposability, and dimension monotonicity. The aggregate poverty index is the weighted average of the two distinct poverty indices, which were developed to measure multidimensional poverty and are more successful than the scoring approach.

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