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Indicators for Sustainable housing

Zaineb Salman Shama[1], Jamal Baqir Motlak[1]

[1]Center of Urban and Regional Planning for postgraduate studies, University of Baghdad, Iraq

E-mail: zaineballamy_2018@yahoo.com, Jamalmotlak@gmail.com

Abstract. With the beginning of the twenty-first century, the world is undergoing rapid changes, but adequate and affordable housing remains a concern for all countries. This requires a new understanding of housing to address pressing issues such as slum reduction, economic and social development and climate change. Housing is no longer just a roof but is now playing an important role in achieving sustainable development - as envisioned in the idea of sustainable housing. Sustainable housing provides a comprehensive framework for the form of sustainable housing policies and practical actions. Although sustainable housing is often viewed from a resource-based perspective, it is a more comprehensive approach that recognizes the multiple functions of housing as a physical and social system. Sustainable housing policies must deal with affordability, social and cultural equity and the economic impact of housing and contribute to making neighborhoods healthier and more sustainable.

The study deals with a number of issues related to sustainable housing, focusing on the relationship between the concept of sustainable development and housing and the most important concepts in the recent trends in urban planning related to sustainable housing for the purpose of developing a system of indicators for evaluating housing sustainability based on the views of experts in housing and urban planning. The research assumes that housing indicators provide an important step towards sustainable housing, and indicators must be evaluated in a broad context because they are influenced by a wide range of indicators that affect the quality of life of society. The research aims to develop indicators that represent sustainable housing through local privacy, helping to bring together the linkages between housing and sustainability issues together.

1. Introduction

Sustainable housing is one of the most important objectives of sustainable social, economic and environmental development, which is one of the fundamental indicators in assessing the degree of development of countries.

Through their literature and conferences, different countries and organizations have sought to develop numerous and varied indicators to assess sustainability in housing. Measuring these indicators is an important issue. It requires accurate data on the housing situation of the country, which may not be available, and will require considerable effort, time and money to obtain them. It is one of the main challenges facing the standardization of housing sustainability.

The aim of the research is to achieve a system of indicators that are efficient, efficient and result from local, measurable and non-repetitive privacy based on the opinions of experts in housing and urban planning.

For the purposes of this research, weights will be used to determine the importance of the indicators and the use of some statistical methods to achieve the objective of the research.

2. The relationship between sustainable development and housing

2.1. Concepts and literature

The World Commission on Environment and Development has defined the concept of sustainable development as those that meet the needs of the present without compromising the ability of future generations to meet their own needs. This definition embraces a long-term perspective as it seeks to provide adequate housing and services, an environmental perspective is designed to preserve and strengthen the natural resource base, and sustainable housing is linked to the quality of life and long-term well-being of families.

The complex links between resource consumption, climate change and community development are among the most important challenges being discussed. Global literature in the mid-late 20th century showed growing concern for environmental impact and environmental advocacy centered on the centrality of the environment, which had a clear impact on sustainable housing projects [5]. The global discourse called for equal opportunities for community development in the 1950s and 1960s. This speech was a development in the global community, focusing on development while preserving or renewing the environment within the term "green economy" [24].

There are several definitions of sustainable development. William Rolls-House defined it as: the process that recognizes the need to achieve economic growth that is compatible with the capacities of the environment, in the sense that economic development and environmental conservation are complementary and not contradictory, and thus can be said to seek to improve the quality of human life [11].

The housing sector is closely intertwined with all areas of sustainable development and aims to improve the quality of life of individuals as the first step to improve their quality of life for stability and a safe and healthy environment with basic services.

Sustainable housing has the potential to produce good quality housing at a reasonable price in the short and long term. Therefore, sustainable housing targets economic, social and environmental sustainability from planning to implementation. The most salient characteristics of sustainable development are [6]:

1. Helping the poor.
2. The idea of cost-effective development, which means that development should not cause deterioration in environmental quality, nor should it at the same time reduce productivity in the long term.
3. Disease control issues, food security, clean water and shelter for all.
4. Community participation.

Therefore, in order to be sustainable, housing initiatives must be economically, socially acceptable, affordable, technologically feasible and environmentally friendly.

2.2. Global propositions

It is possible to deal with sustainability in housing through the planning and design aspects. It is possible to study the dimensions of sustainability in housing through theses, theories and studies:

2.2.1. Recent trends in urban planning

There are many modern approaches to urban planning, such as Harmonious City, New Urbanization Movement, New Pedestrian Movement, Ecological City, Flexible City and Intelligent Growth. These concepts include interrelated ideas.

The most prominent principles of modern trends in sustainability can be summarized in the following points:

1. Increase in housing densities.
2. Mixed use
3. Encouraging pedestrian movement
4. Multiple housing options
5. Sense of place
6. Social empowerment

7. Multiple transfer options

2.2.2. International organizations
- Principles of UN-Habitat [2]
For the purpose of creating and creating sustainable residential neighborhoods, UN-Habitat has developed a set of principles that promote the concept of sustainability in neighborhoods and communities as follows:

1. High densities: As a result of high population growth and large urbanization, there is an urgent need for the rational use of land to accommodate growth and urbanization with a minimum of 150 people / ha.

2. Social interaction: States can achieve social interaction by providing different types and sizes of housing units and prices are within the capacity of the various groups of society, provided that the countries allocate 20-50% of the total area of housing and low cost.

3. Mixed use of land: Mixed use provides many economic and environmental advantages, providing jobs and various commercial activities, increasing pedestrian traffic, limiting the use of cars within residential areas, allocating 40% of land for commercial use of each residential neighborhood for the purpose of strengthening the local economy.

4. Single use function: promote mixed use and reduce the use of single - function to not exceed 10% of any neighborhood.

5. Efficiency of street networks: promoting the use of public transport, cycling and pedestrian development to encourage pedestrian traffic and street development.

Table 1. shows the most important vocabulary and indicators extracted

Orientation	The main item	Secondary	Detailed indicators
Recent trends in sustainability	Urban Design	Inclusion and increased densities	• High housing densities • dependence on vertical construction • Mixed use of land
		Multiple Housing Options	Multiple types of housing units
		Sense of living	• Human scale • Pedestrian friendly ways • Maintain open space
		On the neighborhood level and residential neighborhood	Clear center and boundaries of the residential area
UN-Habitat	Social Empowerment	Community participation	Engage community members effectively in the process of transition towards sustainability
	Urban Design	High densities and mixed use	• Adopting high housing densities • Reliance on mixed land use
	Transport	Efficiency of	• Reliance on public transport

ation	street networks	• Encouraging the movement of pedestrians and bicycles
Social Empower ment	Social interaction	• Diversity in sizes and types of housing units
		• Affordability of housing
		• Allocation of a percentage of low housing

2.3. Housing Contribution to Sustainability

The housing sector contributes significantly to sustainability because of its close association with the environment through the following points:

1. Consumption of buildings for large quantities of natural resources, whether in construction or maintenance.
2. Buildings are a fixed asset with a long operational life.
3. Buildings are among the basic necessities of a good quality of life, and therefore their effects go beyond housing where they affect transportation, health, employment and society.
4. The possibility of using recycled materials in construction works.
5. Adoption of innovations in the efficient operation of buildings, including the use of recycled materials for construction and wastewater treatment, and the use of solar energy, creation of green spaces.

2.4. Sustainable houses

Sustainable houses are those that are designed, constructed and control as [20]:

1. Healthy, constant, safe and secure.
2. Affordable for the whole spectrum of incomes.
3. Using ecological low-potency and affordable construction materials and technology.
4. Resilient to relieve potential natural disasters and climatic blowy.
5. Connected to decent, safe and affordable energy, moiré, sanitation and recycling facilities.
6. Using energy and irrigate most effectively and equipped with undoubting on-place renewable Life generation and water recycling capabilities.
7. Not polluting the environment and protected from accompanying pollutions.
8. Well adjunct to jobs, market, health- and boy-caution, education and other services.
9. Properly unified into, and enhancing, the social, cultural and economic fabric of the local neighbourhood and the wider cultivated areas.
10. Properly extend and assert, timely renovated and retrofitted.

3. Sustainability Indicators

3.1. Dimensions of sustainability

The traditional framework of sustainability is divided from the perspective of the triple bottom line of sustainability to the environmental, economic and social dimensions. Some scientists [22] have emphasized the importance of integrating the institutional dimension into sustainability, as it facilitates the link between other dimensions of sustainability and is complementary to it [22].

Indicators of environmental sustainability include energy use, water use, green open spaces and so on; indicators of economic sustainability include business, housing prices and housing affordability; social sustainability indicators including community, crime, safety, etc.; institutional sustainability indicators include local authority service Local partnership, etc. In the integrated assessment of housing projects [14].

There are some specialists who have called for the inclusion of the cultural dimension in the system of evaluating a green society [25]. They argued that culture can act as a connecting factor and mediate other dimensions of sustainable development through the creative sensitivity and aesthetic experience provided by the building. They then listed a number of cultural sustainability indicators for green buildings, such as cultural vitality, cultural continuity [22], cultural diversity [25], and so on. In

general, the environment, economy and society are the three pillars of sustainability, but some researchers also suggest institutional dimensions and cultural dimensions should be included in the Sustainability Assessment System (Figure 1).
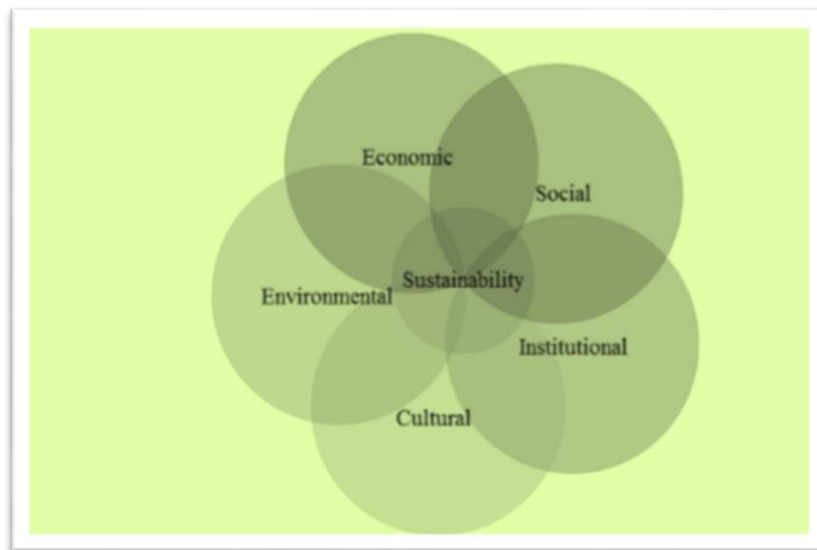

Figure 1. Five dimensions of sustainability

4. To Establish a sustainability assessment system

In this section, some important indicators for assessing sustainability in the housing sector are drawn in general, based on recent trends in urban planning and the international organizations' perspectives on sustainable development indicators related to housing. A set of indicators is available to assist in the development of the sustainable housing indicators system. For each specific indicator.

Indicators can provide information on the status or change of the system [12] in order to describe the level of sustainability in society, where the level of sustainability refers to the degree of sustainable development of society. This is the general assessment of the resulting society by summarizing the values of individual indicators. The indicator can be used individually as part of a group, or as a composite indicator, where scores of individual indicators are combined into a single number to represent the level of sustainability.

As a result, it is necessary to involve experts and policy makers in the selection of indicators. With a need to pay attention to the role of public participation in developing indicators to assess the sustainability of a particular type of society. End users or target groups must be fully integrated into the sustainable development process. It is understood that allowing the target community to participate in conceptual development or development of indicators will also use the results. Engaging experts and specialists in the development of a system of indicators will help to benefit from different levels of knowledge of sustainability, and thus a better way to assess sustainability. Incorporating stakeholder views into the use of indicators can make the system of indicators more effective and likely to cover the core issues associated with housing sustainability. Based on this logic, some experts and specialists were involved in housing and urban planning [21].

The Sustainability Indicators system includes a set of indicators that help to improve the level of sustainability in housing, drawing on recent trends in urban planning and the aspirations of international organizations, and previous studies (41) indicators, of which seven were indicators of environmental sustainability, ten indicators of economic sustainability, seven indicators of social sustainability and the same for housing, four indicators of urban sustainability, In Table 2.

Table 2. Sustainability indicators for the housing sector

Se.	Sustainable housing indicator	Criteria derivation: literature	Indicator
C1	Number of housing units versus number of households	[7].	economic
C2	- Average rent as a percentage of per capita income	[13]	
C3	- Annual increase in the number of housing units (private and public sector)		
C4	- Provides support for low to middle income people	[16] & [17]	
C5	- Multiple types of residential units and their spaces in the housing market	[17]	
C6	- Number of people who do not have residential units	[13]	
C7	- Total cost of housing units	[7]	
C8	- Housing prices in relation to income		
C9	- Percentage of households with the ability to purchase a single-family home	[13]	
C10	- Services available in housing (public facilities, cooling and heating, electrical means)	[7]	
C11	- Occupancy rate of residential units	[13]	housing
C12	- Quality of accommodation	[16]	
C13	- The proportion of housing is not valid and crowded		
C14	- Average number of individuals per room	[7] & [17]	
C15	- Average prices of building materials and manpower		
C16	- The size of the gap between housing supply and demand		
C17	- High density of housing	Recent trends in sustainability	
C18	- Safety (low crime levels)	[10]	social
C19	- The quality of public transport and the efficiency of pedestrian corridors	[8]	
C20	- The availability of schools of good quality	[17] & [7]	
C21	- Availability of open spaces relative to housing and structural densities with minimal access	Recent trends in sustainability	
C22	- Availability of health services with easy access		
C23	- Childcare provision	[7] & [8].	
C24	- Availability of entertainment facilities and public services		
C25	- Indoor and outdoor air quality, thermal, acoustic and visual comfort, etc.	[4]	environmental
C26	- Efficiency of orientation of housing units and buildings	Recent trends in sustainability	
C27	- The possibility of recycling local materials	[26]	
C28	- Availability of open spaces and green areas	[14]	
C29	- The extent to which local building materials are used in projects	Recent trends in sustainability	
C30	- Electrical energy efficiency in the dwelling	[3] & [16].	
C31	- The impact of pollution, emissions, household	[26]	

	waste on the environment		
C32	- Provides mixed uses of land with easy access		physical
C33	- The availability of high building densities (rational exploitation of the land)	Recent trends in sustainability	
C34	- The suitability of open spaces for structural intensities		
C35	- Compatibility of urban design with the characteristics of the place and benefit from the natural conditions of the site	[23] & [9]	
C36	- People have a sense of place, roots and belonging		Cultural Identity
C37	- The existence of cultural diversity of the community encourages cultural exchange and acceptance of different cultures	[18]	Culture Consensus
C38	- The community has the capacity to adapt and accept local values	Ipet,2014.	Cultural fusion
C39	- Level of local government services		Policy support
C40	- Legislative environment regulating the residential and real estate sector	[21]	Legislation
C41	- The aesthetic and cultural value of buildings and landscapes	[25]	Aesthetic values

Research has shown that there are many indicators to assess sustainability in the housing sector, which requires the reduction of convergent indicators and the identification of the most influential indicators at the local level.

As a result, experts and policy makers were involved in reducing and selecting influential indicators. With a need to pay attention to the role of public participation in developing indicators to assess the sustainability of a particular type of society. End users or target groups must be fully integrated into the sustainable development process. It is understood that allowing the target community to participate in conceptual development or development of indicators will also use the results.

Engaging experts and specialists in the development of a system of indicators will help to benefit from different levels of knowledge of sustainability and thus a better way to assess sustainability. Incorporating stakeholders' views makes the system of indicators more effective. Based on this logic, some experts and specialists in housing and urban planning achieved a kind of balance of scientific and practical through the inclusion of workers in executive institutions such as the Housing Department in the Ministry of Construction and Housing and Municipalities and workers in the academic field, such as universities.

To demonstrate the importance of the indicators, the weight of their scores is determined, and the weighted scores for each indicator are then collected, followed by the adjustment of the higher score indicators according to the systematic and comprehensive approach to obtaining the final housing sustainability assessment indicator system.

4.1. Questionnaire

The questionnaire included two parts. The first part contains general information about the participants in a quotation. The second part included weights of (1-9) degrees of relative importance to determine the importance of evaluating sustainability in housing.

4.1.1. Outputs of the questionnaire

The outputs drawn from the questionnaire are as follows:

1- General information

The general information relates to the questionnaire of the academic achievement, where the participants work in the questionnaire, and the years of experience, and the response was as in Table 3.

Table 3. Response Rates for Sample

Description	No.	%
Number of distributed forms	25	100
Response	20	80
Non - response	5	20
Total	25	100

Source: both researchers

- **Qualifications**

The research was based on the sample of the purpose, which specialized in the experts of housing and urban planning, who hold the scientific qualification in the specialization. The percentage of those holding a doctorate was estimated at (64%) of the total sample size, (24%) of the total sample size, and those with a bachelor's degree estimated at 12% of the total sample size, see Table 4.

Table 4. Qualifications of the sample

Qualification	No.	%
Ph.D.	16	64
M.A.	6	24
B.A. degree of Architecture	3	12
Total	25	100

Source: both researchers

- **The Experience**

The sample of those with experience ranging from 11-20 years was the highest percentage (76%) of the sample size, see Table 5, which enhances the achievement of the accurate and qualitative answer when giving the weights to the indicators.

Table 5. shows the years of service for the questionnaire sample

Years of service	No.	%
Less than 10	2	8
11-20	19	76
21-30	4	16
Total	25	100

Source: both researchers

- **Employers**

The number of participants in the questionnaire and the employees in the Housing and Engineering Consultancies within the Ministry of Construction, Housing and Public Municipalities (52%) of the total sample size. The percentage of academics working in universities reached 48% of the total sample size. In the development of basic urban designs and urban development plans in general and housing in particular, see Table 6.

Table 6. Labor Sector for Sample Members

Sector	No.	%
The Ministry of Construction and Housing	13	52
The academic	12	48

Total		25	100

Source: both researchers

2-Determining the importance of indicators
- **Reliability Analysis**[1]

The questionnaire indicated that the indicators included in the questionnaire are acceptable but to varying degrees, and some of the responses suggested that some indicators be merged to converge. The (descriptive stats) of the sample responses revealed a difference in the significance index, but all of them were important. The coefficient of (Cronbach's α) stability was (0.974)[2], while the coefficient of (McDonald's ω) was (0.977) and the average inter item correlation (0.494), Table (7) This indicates that the measuring instrument has a high degree of stability.

Table 7. Scale Reliability Statistics

	Cronbach's α	McDonald's ω	Average inter item correlation
scale	0.974	0.977	0.494

Preparation of the researchers based on the questionnaire and treatment with the SPS program
Note. Of the observations, 9 were used, 0 were excluded list wise, and 9 were provided.
The results obtained from the use of stability measures were very high and therefore did not meet the purpose of the questionnaire by determining the degree of importance of each indicator and excluding the weak indicators. The item-rest correlation[3], which measures the strength of the paragraph correlation with the indicator scale.

- **Likert scale**

The indicators representing expert opinions were compiled and evaluated on all sub-indices for determining the Housing Sustainability Assessment System using the (Likert scale) and setting the "cut-point threshold"[4] for the purpose of evaluating the indicators. The research found that the point is at a measurement level (5), the calendar either strong or weak.
To determine the most important indicators and in light of the levels of preference in the questionnaire, the indicators were evaluated in light of the cut-off points to strong, medium, and weak indicators.

Table 8. Order of sub-indicators in light of the cut-off point according to their respective scales.

Se.	Description of the indicator	Indicator	Cronbach's α	McDonald's ω	inter item correlation %	priority level

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[1] The measurement instrument is consistently meant to give the same results if the questionnaire is re-applied to the same sample in the same conditions. It is measured in three ways, including the use of the Cronbach alpha constant. It is calculated using the SPSS program. It is weak or negative

[2] The test's reliability (as measured by Cronbach's Alpha) for all 41 items is 0.974. Note that one would typically need at least a reliability value of 0.70 for low-stakes assessments and a value of 0.90 or higher for high-stakes assessments.

[3] A correlation value of less than 0.2 or 0.3 indicates that the corresponding element is not well connected to the macro scale and, therefore, may be dropped.
See source: Churchill, G.A., (1979). "A paradigm for developing better measures of marketing constructs", Journal of Marketing Research, 16(1) pp 64–73

[4] Cut Of Point : It is also known as the relative importance, which in the light of its results make a decision on the degree of importance of the indicator, in light of The standard of the cut-off point is at the scale of (5) = 55.55, Measurement grade (3) = 33.33, measurement grade (7) = 77.77

C1-1	Number of housing units versus number of households	economic	97.5	97.8	42.60	weak
C2-1	Average rent as a percentage of per capita income		97.4	97.7	68.00	Medium
C3-1	Annual increase in the number of housing units (private and public sector)		97.3	97.6	82.10	Strong
C4-1	Provides support for low to middle income people		97.3	97.6	86.10	Strong
C5-1	Multiple types of residential units and their spaces in the housing market		97.3	97.6	89.00	Strong
C6-1	Number of people who do not have residential units		97.4	97.7	68.80	Medium
C7-1	Total cost of housing units		97.3	97.6	85.10	Strong
C8-1	Housing prices in relation to income		97.4	97.7	65.70	Medium
C9-1	Percentage of households with the ability to purchase a single family home		97.4	97.7	57.30	Medium
C10-1	Services available in housing (public facilities, cooling and heating, electrical means)		97.3	97.6	91.50	Strong
C11-2	Occupancy rate of residential units	housing	97.3	97.7	73.60	Medium
C12-2	Quality of accommodation		97.3	97.7	76.90	Medium
C13-2	The proportion of housing is not valid and crowded		97.3	97.7	73.10	Medium
C14-2	Average number of individuals per room		97.3	97.7	76.80	Medium
C15-2	Average prices of building materials and manpower		97.5	97.8	19.70	Not important
C16-2	The size of the gap between housing supply and demand		97.4	97.7	70.10	
C17-2	High density of housing		97.3	97.6	86.50	Strong
C18-3	Safety (low crime levels)	social	97.4	97.7	59.60	Medium
C19-3	The quality of public transport and the efficiency of pedestrian corridors		97.3	97.6	80.80	Strong
C20-3	The availability of schools of good quality		97.4	97.7	61.40	Medium
C21-3	Availability of open spaces relative to housing and structural densities with minimal access		97.3	97.6	86.20	Strong
C22-3	Availability of health services with easy access		97.3	97.6	86.20	Strong
C23-3	Childcare provision		97.4	97.7	50.30	weak
C24-3	Availability of entertainment facilities and public services		97.4	97.7	56.70	Medium
C25-4	Indoor and outdoor air quality, thermal, acoustic and visual	environmental	97.3	97.6	89.10	Strong

	comfort.					
C26-4	Efficiency of orientation of housing units and buildings		97.3	97.6	78.40	Strong
C27-4	The possibility of recycling local materials		97.4	97.7	59.50	Medium
C28-4	Availability of open spaces and green areas		97.3	97.6	81.40	Strong
C29-4	The extent to which local building materials are used in projects		97.3	97.6	88.30	Strong
C30-4	Electrical energy efficiency in the dwelling		97.4	97.7	69.70	Medium
C31-4	The impact of pollution, emissions, household waste, etc. on the environment	physical	97.3	97.7	76.60	Medium
C32-5	Provides mixed uses of land with easy access		97.3	97.6	85.80	Strong
C33-5	The availability of high building densities (rational exploitation of the land)		97.3	97.6	80.90	Strong
C34-5	The suitability of open spaces for structural intensities		97.3	97.6	79.10	Strong
C35-5	Compatibility of urban design with the characteristics of the place and benefit from the natural conditions of the site		97.3	97.6	84.40	Strong
C36-6	People have a sense of place, roots and belonging	Cultural Identity	97.4	97.7	46.30	weak
C37-6	The existence of cultural diversity of the community encourages cultural exchange and acceptance of different cultures	Culture Consensus	97.4	97.8	46.40	weak
C38-6	The community has the capacity to adapt and accept local values	Cultural fusion	97.5	97.8	8.60	Not important
C39-6	Level of local government services	Policy support	97.4	97.7	61.90	Medium
C40-6	Legislative environment regulating the residential and real estate sector	Legislation values	97.4	97.7	69.60	Medium
C41-6	The aesthetic and cultural value of buildings and landscapes	Aesthetic	97.4	97.7	46.90	weak

Source: Preparation of the researchers based on the questionnaire and treatment with the SPS program.

The results of the questionnaire showed the existence of (17) indicators of very strong importance, which were distributed to the economic indicators group with the first ranking (5) indicators, (4) indicators for the group of environmental indicators, the urbanization in the second order, In the third place and housing in fourth place with one index, in terms of the number of strong indicators contained in the Questionnaire.

At the level of sub-indices, the indicator (C10-1) the services available in housing (utilities, cooling, heating, electrical means) (economic index) ranked first with importance (91.50), Followed by the indicator (C25-4) internal and external air quality, thermal, acoustic and visual comfort, (environmental index) ranked second and the degree (89.10). The (C5-1) index is characterized by multiple types of residential units and their areas in the housing market (economic index), the third ranking with a significance of(89.00), (C29-4), the extent of the use of local building materials in projects (environmental index) ,with significance (88.30), the (C17-2) high housing densities (housing indicators), with significance (86.50), and the (C21-3) provides open space relative to housing and structural densities with minimal access, and (C22-3) provides health services with easy access (social indicator) in the fourth order, with significance (86.20).

According to Table 8, the research found that the indicators that obtained the lowest scores and were considered weak were the seven indicators. Therefore, they will be removed from the indicators system for assessing sustainability as follows:
1. Childcare is a social indicator
2. The aesthetic and cultural value of buildings and landscapes is an indicator of aesthetic values
3. The existence of cultural diversity of the community encourages cultural exchange and acceptance of different cultures is the compatibility of culture
4. The people have a sense of place, roots and belonging is cultural identity
5. The Number of housing units versus number of households is an economic index
6. The Average rate of building materials and labor is a housing index
7. The community has the capacity to adapt and accept local values are cultural fusion.

-   **Reduction of convergent indicators**

In the questionnaire, the experts were asked to reduce the convergent indicators. The answers were collected and evaluated based on the importance of the indicators in Table 8. A comparison was made between the indicators proposed to be reduced and the indicator of least importance was deleted to prevent recurrence. Reduction of indicators, but the research found that the degree of importance of strong, so it was retained as shown in Table 9.

Table 9. Reduced indicators according to the opinions of experts.

Se.	Description of reducible indicators	inter item correlation%	the decision
C1-1	Number of housing units versus number of households	**42.60**	Previously deleted in the first stage
C6-1	Number of persons who do not have residential units	**68.00**	
C7-1	Total cost of housing units	**85.10**	
C8-1	Housing prices in relation to income	**65.70**	Reduce
C10-1	Services available in the accommodation	**91.50**	

	(public facilities, cooling and heating, electrical means)		
C30-4	Energy efficiency in the dwelling	**69.70**	Reduce
C8-1	Housing prices in relation to income	**65.70**	They are reduced in the index (c7-1) because they are in the same direction
C9-1	Percentage of households with the ability to buy a single-family home	**57.30**	
C11-2	Rate of occupancy of residential units	**73.60**	Reduce
C13-2	The percentage of housing is not valid and crowded	**73.10**	Reduce
C14-2	Average number of individuals per room	**76.80**	
C21-3	Provide open space relative to housing densities and construction with the lowest access	**86.20**	
C28-4	Provides open spaces and green areas	**81.40**	Reduce
C33-5	The availability of high building densities (rational exploitation of the earth)	**80.90**	
C34-5	The suitability of open spaces for structural intensities	**79.10**	Reduce
C26-4	Efficiency of orientation of residential units and buildings	**78.40**	Reduce
C35-5	Compatibility of urban design with the features of the place and benefit from the natural conditions of the site	**84.40**	
C37-6	The existence of the cultural diversity of society encourages cultural exchange and acceptance of different cultures	**46.40**	Previously deleted in the first stage
C38-6	The community has the capacity to adapt and accept local values	**8.60**	
C39-6	Level of local government services	**61.90**	
C40-6	Legislative environment regulating the residential and real estate sector	**69.60**	
C41-6	The aesthetic and cultural value of buildings and landscapes	**46.90**	Previously deleted in the first stage

Source: Preparation of the researchers based on the questionnaire

The number of indicators of the sustainability assessment system in housing (26) index, after reduction (8) indicator by the answers of experts and the deletion of (7) indicators (low importance) see table (10).

The analysis of the indicator of importance between the research from the statistical point of view that the selection of experts for these indicators is true in terms of objectivity, as the ranking of indicators contributed to the degree of importance in the identification of objectivity, one of the methods used in the experiments.

Table 10. Housing Sustainability Assessment Indicators System

Se.	Description of the indicator	inter item correlation%	priority level
C10-1	Services available in housing (public facilities, cooling and heating, electrical means)	91.50	Strong
C25-4	Indoor and outdoor air quality, thermal, acoustic and visual comfort.	89.10	Strong
C5-1	Multiple types of residential units and their spaces in the housing market	89.00	Strong
C29-4	The extent to which local building materials are used in projects	88.30	Strong
C17-2	High density of housing	86.50	Strong
C21-3	Availability of open spaces relative to housing and structural densities with minimal access	86.20	Strong
C22-3	Availability of health services with easy access	86.20	Strong
C4-1	Provides support for low to middle income people	86.10	Strong
C32-5	Provides mixed uses of land with easy access	85.80	Strong
C7-1	Total cost of housing units	85.10	Strong
C35-5	Compatibility of urban design with the characteristics of the place and benefit from the natural conditions of the site	84.40	Strong
C3-1	Annual increase in the number of housing units (private and public sector)	82.10	Strong
C33-5	The availability of high building densities (rational exploitation of the land)	80.90	Strong
C19-3	The quality of public transport and the efficiency of pedestrian corridors	80.80	Strong
C12-2	Quality of accommodation	76.90	Medium
C14-2	Average number of individuals per room	76.80	Medium
C31-4	The impact of pollution, emissions, household waste, etc. on the environment	76.60	Medium
C16-2	The size of the gap between housing supply and demand	70.10	Medium
C40-6	Legislative environment regulating the residential and real estate sector	69.60	Medium
C6-1	Number of people who do not have residential units	68.80	Medium

C2-1	Average rent as a percentage of per capita income	68.00	Medium
C39-6	Level of local government services	61.90	Medium
C20-3	The availability of schools of good quality	61.40	Medium
C18-3	Safety (low crime levels)	59.60	Medium
C27-4	The possibility of recycling local materials	59.50	Medium
C24-3	Availability of entertainment facilities and public services	56.70	Medium

Source: Preparation of the researchers based on the questionnaire

Recommendations
1. Sustainable development is a dynamic process that is influenced by time and is based on many measures. There is no concurrent perception of sustainability unless indicators are good.
2. The quality of life provided by sustainable housing, makes the house in its various parts, and adapting to the natural conditions and features of the place is an integral part of nature beautiful harmony allows the provision of all kinds of comfort and thus saving the costs of energy exchange.
3. Adopting the stages of time towards the sustainability in housing, as it requires good planning process, and good management with the availability of a specialized center follow the implementation of the terms of sustainability when the construction of housing projects.
4. To spread the culture of sustainability in society, and the need to introduce citizens to their principles and foundations, to build a generation based on future sustainability.
5. The results of the questionnaire showed that a comprehensive reflection on the multiple dimensions of sustainability and reliance on the opinions of experts and specialists with varying levels of knowledge and experience helped to achieve a system of indicators of sustainable housing in the light of local privacy characterized by rationality and objectivity to some extent.
6. The results of the survey showed that experts considered that access to sustainable housing starts from the housing by containing all the requirements that provide all kinds of comfort.
7. The degree of sustainability in housing can be increased locally by focusing on strong indicators, diversity of housing patterns, adoption of high building densities, urban design efficiency, attention to air quality, development of the legislative environment, and reduction of energy waste through optimal guidance, high densities and mixed use.
8. Dependence on local materials when construction and recycled, which reduces the cost of housing units.

It is possible to adopt the indicators reached by the research when the construction of residential complexes, in the first phase, and then circulate as much as possible at the level of the residential district for the purpose of raising the quality of life in the city.

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