



Quality Of Life Assessment Methodology For New Urban Communities In The Kingdom Of Saudi Arabia

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Abstract:

Given the numerous studies, literature, theses and discussions that debated the definition of the quality of life (QoL), however, one can argue that this multidimensional concept, the QoL, is generally related to many aspects, including improved living conditions, subjective well-being, positive emotions, and life satisfaction. To evaluate the extent to which these aspects are fulfilled, and to which the individual's needs, which are associated with better quality, are met, many models have been proposed as indicators for the individual's right to the QoL, in relation to the capabilities provided by countries to individuals. While these models are primarily relative to the multiple concepts of QoL, and as most of the indicators focused on the most important objective aspects of QoL, including the economic, social and environmental aspects, it has been concluded that there is a need for a reference ecosystem ensuring the comprehensiveness of all appropriate means of QoL in the different urban and developmental communities, to capture the grounds required to achieve the QoL for these new urban communities. In this analytical study, we have concluded that the efficiency of QoL in the new urban communities can be measured, analyzed and evaluated by four aspects. These aspects are general indexes for population; environmental planning and design, environmental operation of urban communities, and technical support for the available environmental resources, which have been integrated into one application that enables those in charge of developing new urban communities to assess the efficiency and measure the QoL, by analyzing the statistical data generated from this application. In applying the methodology for measuring, analyzing and evaluating the QoL in the new residential areas of KSA, the housing index scored 205/160, at 78%, as it achieved more than half the QoL requirements. The Environmental Planning and Design Index scored 530/280, at 53%, as it achieved more than half the QoL requirements. The Environmental Operation of Urban Communities scored 45/95, at 47%, as it achieved more than half the QoL requirements. The Technical Support for Available Environmental Resources scored 70/30, at 43%, as it achieved less than half the QoL requirements.

Keywords: Quality of life-New urban communities- Quality of life in urban communities Environmental urban design-Indicators of quality of life

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1- Introduction:

The development of a definition for the QoL represents a challenge, as it has many aspects interacting with each other, and no precise definition has yet been agreed upon, which may be due to the novelty of the term. Many psychologists studied positive subjective experiences, positive individual traits, and positive institutions' promises to improve quality of life and prevent the pathologies that arise when life is barren and meaningless⁽¹⁾.

Among the most important previous studies that addressed the concept in a simplified manner, despite the overlap between the concept of QoL and related concepts, psychological literature is abundant with several definitions, which we shorten as follows:

Definition of the World Health Organization (WHO): WHO defines QoL as “an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns⁽²⁾.”

Definition of Bonomi, Patrick, and Bushnell: Also, Bonomi, Patrick, and Bushnell⁽³⁾ have emphasized that the QoL is a broad-ranging concept incorporating in a complex way the persons' physical health, psychological state, level of independence, social relationships, personal beliefs and their relationships to salient features of the environment. Therefore, it is necessary to study, research and analyze these applications and come up with important points on which the foundations and elements of achieving quality of life for new residential areas are systematically built. The research focused on six basic points to be available in any residential community to achieve the foundations and elements of quality of life for residential projects.

2- Dimensions of the individual's QoL to be achieved in the new urban communities

As there is disagreement among researchers about the conceptualization and dimensions of QoL, they were compiled by the researcher as shown in the attached figure:

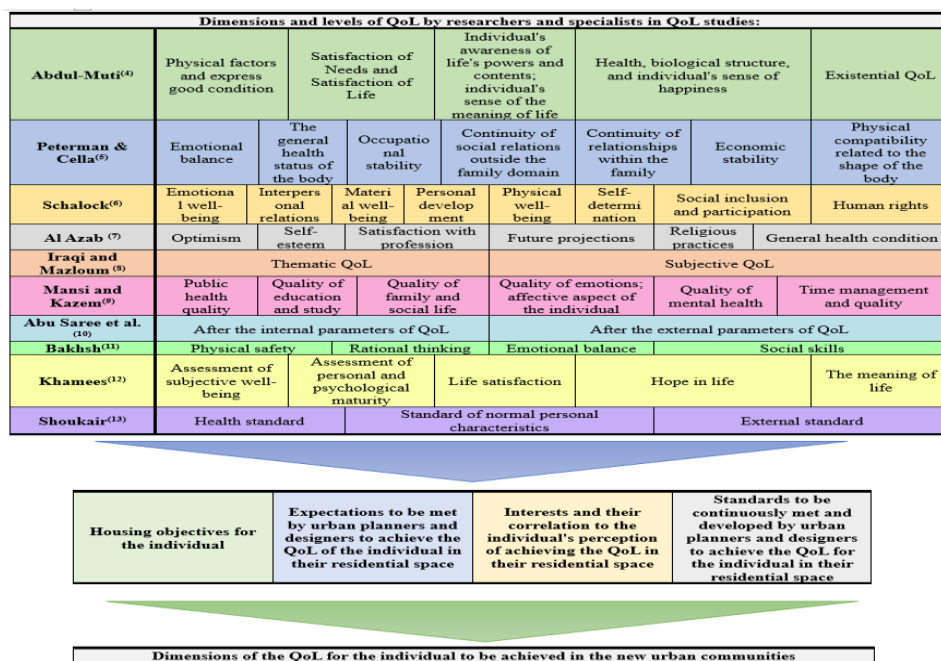


Fig. 1 shows the dimensions of the individual's QoL in the new urban communities
 Source: Data collected through intervention by the researcher

The world's developed countries have scrambled to find appropriate ways to achieve a quality of life in different residential communities. They have successfully applied many ecosystems and ideas for projects, aiming to coexist and benefit from the

environment and the various resources, as well as technological and scientific advances in such fields by many specialized agencies, institutions, schools and research centers. Therefore, it is necessary to study, research and analyze these applications and come up

with important points on which the foundations and elements of achieving quality of life for new residential areas are systematically built. The research focused on six basic points to be available in any residential community to achieve the foundations and elements of quality of life for residential projects.

3. Foundations and components of QoL for the new urban communities

1. Identifying residential area and urban context to measure the efficiency of analyzing the location, components and characteristics of the residential area. This also entails an assessment of the residential area's impact of development on the urban context development, and a correlation of the mutual impact on the form of the urban fabric, and the architectural product of the residential area and surroundings. The selection of the location of the residential area is functionally related to the appearance and conditions of the city. However, this residential area must have sufficient available capacity for the population, as well as services to operate the perimeter of the residential area. It also includes the suitability of the location and the correlation with the new development pillars, access routes, the perimeter of the site and surrounding projects, and the future of the site and surrounding areas. It is also important to identify the total area, floor area ratio, open ratio of access to building density and ratio, and components of the residential, service, commercial and recreational parts.

2. Environmental Coordination of the site of the residential area to assess the efficiency of planning and urban and environmental fabric of the residential area, the efficiency of utilizing the available resources, and the reflection on the design of the residential community and environmental and operational dimension, by the following:

Environmental Planning and Design

It covers the correlation between the planning and design of urban communities' environmental performance. This is derived from the study and analysis of the quality and form of the site master plan and landscaping

form. It also covers the importance of such correlation with residential buildings and the urban fabric in general, and all its planning components, in particular. It aims at assessing the efficiency of the design of site-specific features⁽¹⁴⁾.

–**Environmental Direction** is an important component in the environmental design foundations. We conclude that it can be evaluated by analyzing and calculating the ratio of units relative to the rest of the residential area and the quality of these targeted spaces. It aims at assessing the efficiency of the design of the overall direction of the units' blocks and spaces to achieve the quality of life within them.

–**Visual Direction** affects the provision of an aesthetic environment. Therefore, an integrated design study of the form, type and ratio of guidance⁽¹⁵⁾ is required.

–**Sound effects surrounding the residential community** are an introduction that is studied to avoid the negative effects of noise of all kinds to provide a comfortable social and living environment.

–**Environmental Landscaping and its suitability** for the site conditions and its impact on the paths of traffic and pedestrians, through the site topography and impact on the block stacking and position and the extent of exploitation of the characteristics of the plot⁽¹⁶⁾.

–**Environmental and natural materials** are covered in all the details and elements of site landscaping. Their nature is compatible with the site design and landscaping in the project and meets the requirements of service activities on the site.

–**Site environmental Landscaping** and all items related to the provision of horizontal landscaping and vegetation filter strips, as well as respect for the transition from public areas to semi-public and private areas. This also includes the impact on the thermal aspect. It aims at assessing the efficiency of design and operation⁽¹⁷⁾.

–**Landscaping, green shrubs, and the types of plants** that are in alignment with the nature of the site and the adopted irrigation methods. The horizontal and vertical elements of the site include natural raw materials and their

proportions. These are also used in the implementation of the external and internal walls. It aims at assessing the efficiency of design and operation ⁽¹⁸⁾.

3. Environmental design of residential community blocks, to measure the efficiency of the block design of the project buildings and the types of finishes and their impact on the quality of the environmental design for the climatic and visual comfort of the outdoor block and its correlation with the indoor spaces through the following ⁽¹⁹⁾:

Form of exterior block

- This covers an analysis of block borders and measuring the ratios and form of the block borders of the block, reflected in the projections and their designs, and how they are systematic. To access the standard design, the design of the outdoor block must be compatible with the site's climatic parameters ⁽²⁰⁾.
- The form of the facades** is analyzed to reach the efficiency of the environmental design of the block form, including designs, outdoor lines, and the form of projection, in addition to the treatments. It aims at assessing the efficiency of design.
- It covers studying and analyzing the form of the roof design and the type of added treatments (design, construction, natural) to evaluate the design integration with the environment.
- Heights of buildings and floors (the total external) are analyzed and compared as they are important for calculating the thermal performance of buildings due to their impact on the mechanical loads required for cooling, the environmental performance of spaces and their impact on the total loads for cooling and heating. This also includes increased consumption of building materials, which is economically undesirable. It aims at assessing the efficiency of design.
- Block composition is reflected in the environmental comfort of the space, due to its impact on the volume of light entering the space and solar radiation falling on the building and the heat transmitted to the

inside of the building. It aims at assessing the efficiency of design.

- Interior courtyards are one of the most important sustainable thermal treatments and the first design requirements for environments. To evaluate the efficiency of the design, these are based on measuring the form and size of the courtyard and its proportion to the building.
- It covers designing outdoor terraces on buildings as they are one of the components that form a large proportion of the exterior cladding of the building. The efficiency of design is evaluated by analyzing and measuring the form and design proportion in relation to the unit as a whole and to the used methods and thermal treatments (design, construction or environmental).
- The openings are considered among the top priorities of the study in terms of design and the thermal treatments added. They are important as their effect on the thermal transfer of the spaces by increase or decrease.

4. Environmental design of indoor residential spaces: To measure the foundations of the environmental design of spaces and ensure their quality and environmental and living comfort, including all components of spaces in all their details. This includes the following:

(A) Efficiency of natural ventilation in the indoor spaces of the residential community
The establishment of any residential community entails that the site on which the area is built be suitable for the building's activity, including compliance with the permissible limits for air pollutants. Also, all urban communities must meet adequate ventilation means commensurate with the area of the place, its capacity, and the type of the relevant activity, to ensure circulation and purity of air and maintenance of an appropriate temperature. This includes the importance of directing the building openings in the direction of the prevailing winds. Furthermore, there must be more than one opening in the architectural spaces, to create an appropriate air current as required. It also

includes examining the form of the openings to provide sufficient performance, including the transmission or thermal insulation, in terms of the projection's shape, dimensions and direction, and efficiency of natural lighting. With the emphasis on the importance of identifying different ways to reach the required thermal comfort using thermal treatments (structural, industrial, natural), along with other techniques and technologies. For humidity treatment, porous materials can be used, and for temperature control in the morning, with light and white colors on facades. ⁽²¹⁾.

(b) Efficiency of natural lighting in indoor spaces in urban communities:

The possibility of relying on natural lighting whenever possible was concluded as an economic dimension for energy Rationalization, as 40 to 50% of the total energy is consumed in residential buildings. A study must be made in relation to the type of activity and the surrounding environment, in order to reach the QoL and ensure the continuity of lower costs. This has an economic dimension for energy rationalization, as it was concluded that 40 to 50% of the total energy is consumed in architectural interiors, as they have no adverse effects on the indoor structure. Therefore, it was stressed on the necessity of distributing and selecting window places while avoiding direct light, in addition to studying direction, as this considers integration into the design. Direction can be linked to lighting as well as heat gain. Overhead lighting openings, roof openings and skylights are effective to provide this required natural lighting ⁽²²⁾.

(C) Efficiency of acoustic design in urban communities

It covers studying components of acoustic design, for avoiding and controlling the negative effects of noise, to provide a more appropriate environment that contributes to raising the components of the QoL therein. It has environmental, social and economic aspects that affect it, as well as the use of appropriate architectural environmental treatments, the form of exposure and the distance between them, planning and making

the necessary barriers, especially through the components of landscaping. It also includes direction studies, at the architectural level, by reducing exposure to noise sources. It also facilitates reducing noise from the source by planting trees between residential buildings and the source of noise, especially large-leave trees that help absorb sound ⁽²³⁾.

(D) Efficient finishing of residential buildings to improve the QoL therein

The priorities of studying the indoor finishing of residential units come through the provision of environmental materials that are not contaminated and recycled as far as possible, to be used in flooring using high thermal capacity ores, minor maintenance and an outstanding commercial feature, or in the walls, using water-based and harmless paint materials without toxic materials.

5. Environmental operation of indoor and outdoor components of the residential community and measuring the operating efficiency of the indoor and outdoor components of the residential community, by using eco-friendly renewable energy, through the following: At the outdoor level

- The need to utilize solar energy as an environmental source in site lighting, by analyzing and studying the form of utilization of solar energy using photovoltaic cells ⁽²⁴⁾.
- The need to utilize the available water as an environmental source in feeding the components on the site, by analyzing the form of utilization ⁽²⁵⁾.
- Centralization of common services for the residential community, using environmental components. The efficiency of the residential community's reliance on environmental resources, such as the use of chilled water production plants with environmentally friendly technology, is analyzed.
- The necessity of solar energy utilization, to support electrical networks installed in urban community buildings, relying on environmental resources to support electrical consumption with alternative energy ⁽²⁶⁾.

At the indoor level

- Importance of solar energy utilization in supplying units with hot water (solar heaters), to measure the extent to which the electrical energy used in heating water is provided by the daily uses of any living space (27).
- Importance of solar energy utilization to heat spaces (thermal heaters) by adding systems for heating spaces using thermal heaters within the program and to evaluate the efficiency of their operation.

6. Environmental operation of the residential community by relying on basic resources, to measure the standard use methods for basic resources for the operation of the residential community (water, energy, natural gas), in addition to environmental methods for safe disposal and recycling of liquid and solid waste, through the following:

(a) Use of natural and basic resources for residential community operation

- Paying particular attention to the use of components that rationalize water consumption is one of the most important

foundations of environmental QoL in urban communities (28).

- Paying attention to the uses and supply of electrical energy-saving components is one of the most important foundations of the environmental QoL in urban communities, to evaluate the efficiency of community operation (29).
- Paying attention to the uses of natural gas with environmental resources in all residential and service activities (31).

(b) Waste recycling methods

- Paying particular attention to environmental disposal methods by recycling liquid waste, given that it represents an operational burden on the project's sewage systems and its uses, such as using it in irrigation of landscaping areas of the residential community (31).
- Paying attention to the methods of environmental and safe disposal of solid waste, given that it represents an expenditure burden on the safety of operation and its continuity. Therefore, it must be applied with the identification of the means and methods used, methods of separation, operation and maintenance (32).

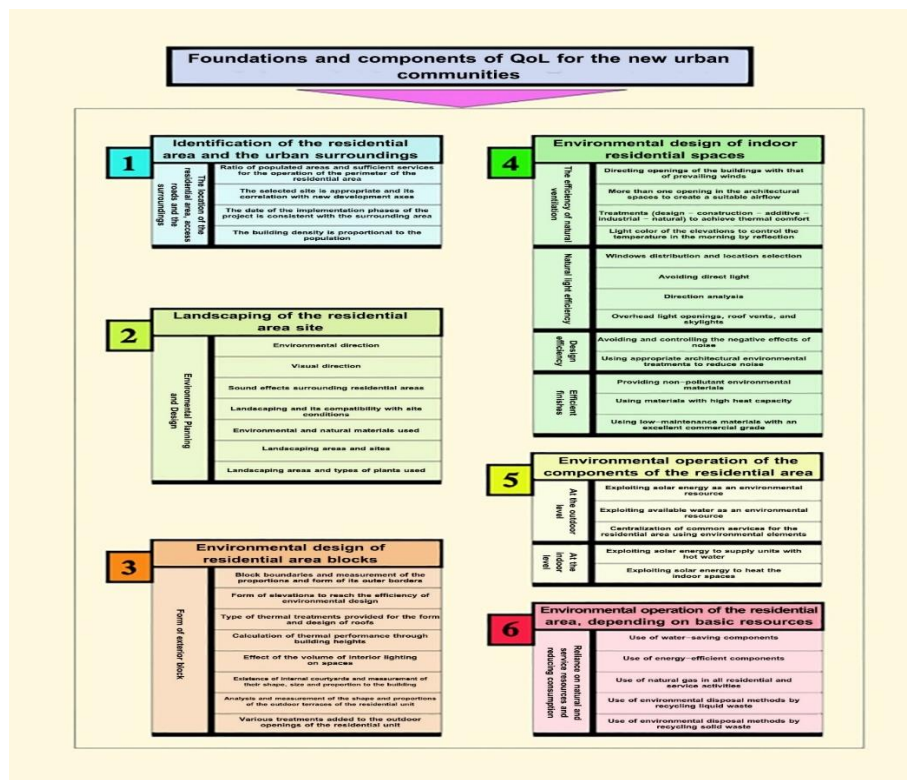


Fig. 2 Foundations and components of QoL for the new urban communities
Source: Data collected through intervention by the researcher

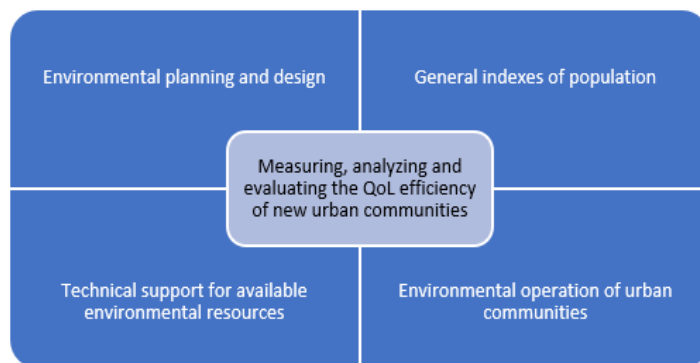


Fig. 3 shows indexes for measuring, analyzing and evaluating the QoL efficiency of the new urban communities

Source: Data collected through intervention by the researcher

After reviewing all designed aspects of the QoL in urban communities, ensuring a comprehensive concept of the environment in the form of foundations and development pillars for new residential projects and settlements, to improve the cognitive aspect of the form of urban communities in developed countries. All studies have proven the success of projects similar to such projects in the field of study, especially those with an environmental orientation. It has been concluded that there is a need for a reference ecosystem ensuring the comprehensiveness of all appropriate means of QoL in the different urban and developmental communities, to capture the grounds required to achieve the QoL for these new urban communities. In this analytical study, we have concluded that there are four aspects under which the efficiency of QoL in the new urban communities can be measured, analyzed and evaluated by four aspects, which are shown in Fig. 3.

- General indexes of population
- Environmental planning and design
- Environmental operation of urban communities
- Technical support for available environmental resources

4- The application used to measure, analyze and evaluate the QoL efficiency of the new urban communities:

It is an application available at (<https://digitalskep.com/saudilifequality/>). It aims to measure, analyze and evaluate the efficiency of the QoL in new urban communities. It consists of an opening page with an introduction to the objectives, reasons

and establishment of the application. It also includes the researcher statement and an overview of the the application execution mechanisms., as shown in Fig. 4.



Fig. 4 shows the opening page of the application for measuring, analyzing and evaluating the QoL efficiency in the new urban communities

Source: Data collected through intervention by the researcher

Then we navigate to the home page that contains four indexes of the global QoL, in line with the the QoL program indexes, under the Saudi 2030 Vision. The indexes are the housing, environmental planning and design, the environmental operation of urban communities, technical support for available environmental resources as shown in the Fig. 5.



Fig. 5 shows four indexes for measuring the global QoL in line with the requirements in the QoL program of under the Saudi 2030 Vision.

Source: Data collected through intervention by the researcher

5- Mechanisms for using the Quality of Life Assessment Methodology for New Urban Communities in the Kingdom of Saudi Arabia:

The application is based on four QoL general indexes. The first index is for population, with 42 questions to be answered by the application user in order to assess the QoL indexes. The second index covers environmental planning and design of new urban communities, with 88 questions, to be answered by the application user, aiming at the assessment of environmental planning and design of new urban communities. The third index is for the environmental operation of the new urban communities and contains 19 questions to be answered by the application user, to reach an assessment of the QoL assessment of the environmental operation of the new urban communities. Finally, the fourth index, which is for technical support for the available environmental resources, contains 14 questions to be answered by the application user, to reach an assessment of the QoL of the technical support of the available environmental resources.

After filling in the answers to the questions in the previous four indexes, the results are generated, producing the assessment of the efficiency of life in any new residential community. The application was developed so that the correct answers get the highest score, and the incorrect answers get the lowest score, and the scores between them are gradual to the lowest.

The application makes the final analysis and the graph expressing the efficiency of the performance of each index, respectively. After reviewing and checking each question in each group within each of the four indexes.

The application contains an automatic saving feature by which you can follow up on answering the questions at any time within a maximum of 14 days. Then the application collects the answers, makes statistics and graphs for them, then saves them in (WORD) or (PDF) file format and prints them from the website

(<https://digitalskep.com/saudilifequality/>). Then it can then be used to reach actual results to measure the quality of life for any new residential area within the KSA.

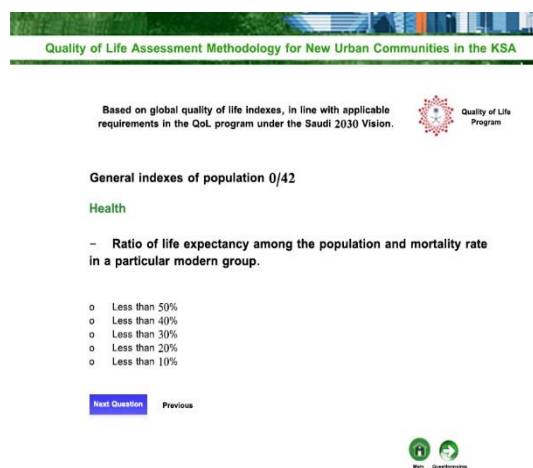


Fig. 6 shows a sample of the general form of general population indexes, with a total of 42 questions

Source: Data collected through intervention by the researcher

6- General population indexes

It contains 10 indexes with a total of 42 questions, as shown in Fig. 6. General population indexes contain sub-indexes (Each index has a set of questions) as

an example of an index of health, while the rest of the indexes have been added in the appendices.

6-1 Health:

The health index includes 8 questions and assessments with special answers that cover the requirements for QoL:

Health						
Life expectancy at birth	- Life expectancy rates among the population, and age-specific death rates	Less than 10%	Less than 20%	Less than 30%	Less than 40%	Less than 50%
		5	4	3	2	1
- Infant deaths.	- Deaths of infants under one year of age	Less than 10%	Less than 20%	Less than 30%	Less than 40%	Less than 50%
		5	4	3	2	1
- Deaths due to diseases.	- Mortality rate due to infectious diseases or chronic diseases and inflammatory diseases.	Less than 10%	Less than 20%	Less than 30%	Less than 40%	Less than 50%
		5	4	3	2	1
- Improving healthcare services and accessibility to healthcare	- Nurse-to-patient ratios compared to patients.	Very good	Good	Sometimes	Weak	N/A
		5	4	3	2	1
- Spreading health awareness	- Support to projects of early detection and control of diseases.	Very good	Good	Sometimes	Weak	N/A
		5	4	3	2	1
- Medical care	- Has access to health services been continuously facilitated for residents of the new residential area?	Yes	No			
		5	0			
	Is there a center for rehabilitation and services for people of determination in the new residential area for meeting their life needs?	Yes	No			
		5	0			
- Health levels	Is there a special center for managing health risks and epidemics for all residents of the new residential area?	Yes	No			
		5	0			

Table 1 shows health index questions and assessments with special answers that cover the requirements for QoL:

Source: Data collected through intervention by the researcher

7. Applied Assessment Methodology - New Urban Communities Projects in the Kingdom of Saudi Arabia

Having listed the methodology for measuring, analyzing and evaluating the QoL in new residential communities, to build on the global quality of life indexes reviewed in Part I and II as an inductive and analytical approach, and in line with the key requirements of the special quality of life program and the Saudi 2030 Vision, three new residential areas that have been selected in three different regions within the KSA will be evaluated and analyzed, including:

(Jeddah - Riyadh - Dammam) to measure the

efficiency of QoL indexes within these regions, using the online application <https://digitalskep.com/saudilifequality/>, by answering all questions expressing four main pillars, namely: (General population indexes, environmental planning and design, technical support for available environmental resources, environmental operation of residential areas) to meet the requirements of QoL in the KSA.

An overview of the following three housing projects in different regions of the KSA will be reviewed:

- Riyadh Project - Riyadh Housing
- Dammam Project - Al-Wajeha Suburb
- Jeddah Airport Housing Project


1	Project 1:	Riyadh Project - Riyadh Housing
<p>It is the first of the flagship projects, which reflects the goals of the partnership between the private sector and the Ministry of Housing (MOH). This Project, Bawabat Al Sharq, provides appropriate housing solutions, ensuring access to a residential community environment with a safe modern lifestyle. The Project offers solutions engineering and financial solutions that are commensurate with the citizen's needs for housing within the urban scope of the city of Riyadh.</p>		
Location		Riyadh
Status		Partially completed 59%
Components		Detached residential villas
Developer		Hamad and Ahmed Mohammed Al-Mozaini Real Estate Co. (Al-Mozaini), in cooperation with the Ministry of Housing
Design and Implementation		Islamic style and modern style
Suburb Total Area		6,544,310 m ²
Total No. of Villas		3,665 Villas
Suburb facilities		
Target population		20,000 people
Commercial facilities		260,000 m ²
Gardens and open spaces		640,000 m ²
Health care facilities		3
Schools		15
Government services		70,000 m ²
Mosque		31
Standard of living		High
Access Roads		Main axes passing through the Project
Elevations		Small, to reduce the effect of sunlight
Windows		Treated with bumps to break the UV rays
Parking		Available for each residential unit, gardens and common areas
Water		Tanks above villas and a ground tank

Fig. 8 shows an aerial view of execution stages of the Riyadh Housing Project - Bawabat Al Sharq, KSA

Fig. 2 shows an aerial view of the execution stages of the Riyadh Housing Project - Bawabat Al Sharq, KSA

<https://sakani.sa/app/offplan-projects/25>


2	Project 2:	Dammam Project - Al-Wajeha Suburb
<p>Al-Wajeha Suburb represents the future of urban and dynamic growth for the eastern region of Dammam. The construction of residential units was planned with high-quality, advanced structural models inspired by the city's antiquity, to represent the suburb as a picturesque image that reflects the beauty of the past in the colors of the future. There are many housing options, among which are villas, townhouses and apartments of various sizes and designs. It aims to create a vibrant community in an integrated residential environment.</p>		
Location		Eastern Region - Dammam
Status		Partially completed 80%
Components		10 Neighborhoods Complex (Naami, Mad, Al-Bayraq Villas, Nesaj Town 2, Mada Oasis, Dammam Oasis, Al Farida, Tilal Al-Ghoroub, Naseej - Nasaj Town 1)
Master Planning		Ministry of Housing
Design and Implementation		Private Sector (Mada Al Sharqiah Development, Arabian Sadeen Real Estate, Retal and others...)
Suburb Total Area		9,835,585 m ²
Total No. of Apartments		11,699 Apartments
Villa + townhouse		7,750 units

Fig. 9 shows an aerial view of the execution stages of the Dammam Project - Al-Wajeha Suburb, KSA

Suburb facilities	1,375,386 m ²	
Target population	100,000 people	
Suburb facilities	No.	Area
Commercial facilities	34	150,231
Gardens and open spaces	241	1,114,635
Security	2	7,034
Health care facilities	2	11,596
Schools	38	578,448
Kindergarten	36	147,569
Mosque	31	350,427
Standard of living	High & Upper-middle	
Access Roads	Main axes passing through the Project	
Elevations	Small, to reduce the effect of sunlight	
Windows	Treated with bumps to break the UV rays	
Parking	Available for each residential unit, gardens and common areas	
Water	Tanks above buildings	

Fig. 3 shows an aerial view of the execution stages of the Dammam Project - Al-Wajeha Suburb, KSA

<https://sakani.housing.sa/mega-project/542511>


3	Project 3:	Jeddah Airport Housing Project
	<p>The site master planning was developed as an urban fabric, a valley linked by pedestrian paths, bicycle paths, and landscaping. The site lacks external car parks which have been moved to the ground floor of all residential buildings so that all external areas are only intended for landscape.</p> <p>The site consists of a total of 50 residential buildings, 7 duplex apartments, 9 apartments of 81m, and 34 apartments of 120m.</p> <p>Landscaping elements, which are designed to withstand harsh weather conditions in the city of Jeddah, are dedicated to pedestrian, and bicycle paths and all parts of the site.</p>	 <p>Fig. 10 shows a horizontal view of the Jeddah Project - Jeddah Airport Housing Project</p>
	Location	Jeddah - Western Region
	Status	Ongoing
	Components	50 residential buildings (ground floor + 7 typical floors)
	Developer	Azhar Holding, in cooperation with the Ministry of Housing
	Design and Implementation	Modern style
	Total building area	247.725 m ²
	Structural coefficient	2.3
	Apartments	917 units
	Duplex apartments	84 units
	Total units	1,001 units
	Target population	5,000 people
	Commercial facilities	3 commercial areas
	Gardens and open spaces	Playgrounds and parks
	Health care facilities	3
	Mosque	1
	Standard of living	Upper-middle
	Access Roads	Main axes next to the Project
	Elevations	Small, to reduce the effect of sunlight
	Windows	Treated with bumps to break the UV rays
	Parking	Available for each residential unit, gardens and common areas
	Water	Tanks above buildings and a ground tank

Fig. 4 shows information about Jeddah Airport Housing Project Developer: Azhar Holding, in cooperation with the Ministry of Housing - 1444 AH

8. Findings:

7. Findings of Applied Assessment Methodology - New Urban Communities Projects in the Kingdom of Saudi Arabia															
Riyadh Project - Riyadh Housing	<table border="1"> <caption>Indexes of quality of life in the KSA - Riyadh Project - Riyadh Housing - Saudi Arabia</caption> <thead> <tr> <th>Category</th> <th>Index Value</th> </tr> </thead> <tbody> <tr> <td>General indexes of the population</td> <td>205</td> </tr> <tr> <td>Indexes of the population</td> <td>160</td> </tr> <tr> <td>Planning and Design</td> <td>530</td> </tr> <tr> <td>Technical support</td> <td>95</td> </tr> <tr> <td>Residential areas</td> <td>45</td> </tr> <tr> <td>Available environmental resources</td> <td>30</td> </tr> </tbody> </table>	Category	Index Value	General indexes of the population	205	Indexes of the population	160	Planning and Design	530	Technical support	95	Residential areas	45	Available environmental resources	30
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Jeddah Airport Housing Project	<table border="1"> <caption>Indexes of quality of life in the KSA- Jeddah Airport Housing Project, KSA</caption> <thead> <tr> <th>Category</th> <th>Index Value</th> </tr> </thead> <tbody> <tr> <td>General indexes of the population</td> <td>205</td> </tr> <tr> <td>Indexes of the population</td> <td>160</td> </tr> <tr> <td>Planning and Design</td> <td>530</td> </tr> <tr> <td>Technical support</td> <td>95</td> </tr> <tr> <td>Residential areas</td> <td>40</td> </tr> <tr> <td>Available environmental resources</td> <td>40</td> </tr> </tbody> </table>	Category	Index Value	General indexes of the population	205	Indexes of the population	160	Planning and Design	530	Technical support	95	Residential areas	40	Available environmental resources	40
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9- Analyzing Findings obtained from the Application:

1- Identification of a reference ecosystem ensuring the comprehensiveness of all

appropriate means of QoL in the different urban and developmental communities, to capture the grounds required to achieve the QoL for these new urban communities. In

this analytical study, we have concluded that there are four aspects under which the efficiency of QoL in the new urban communities can be measured, analyzed and evaluated by four aspects; namely, which are shown in Fig. They are general indexes of population, environmental planning and design, environmental operation of residential areas, technical support for available environmental resources.

2- Project 1: Riyadh Housing Project - Bawabat Al Sharq Project, KSA

In applying the methodology for measuring, analyzing and evaluating the QoL in the new residential areas of KSA, the housing index scored 205/160, at 78%, as it achieved more than half the QoL requirements. The Environmental Planning and Design Index scored 530/280, at 53%, as it achieved more than half the QoL requirements. The Environmental Operation of Urban Communities scored 45/95, at 47%, as it achieved more than half the QoL requirements. The Technical Support for Available Environmental Resources scored 70/30, at 43%, as it achieved less than half the QoL requirements.

3- Project 2: Dammam Project - Al-Wajeha Suburb, KSA

In applying the methodology for measuring, analyzing and evaluating the QoL in the new residential areas of KSA, the housing index scored 205/170, at 83%, as it achieved more than half the QoL requirements. The Environmental Planning and Design Index scored 530/300, at 56%, as it achieved more than half the QoL requirements. The Environmental Operation of Urban Communities scored 65/95, at 68%, as it achieved more than half the QoL requirements. The Technical Support for Available Environmental Resources scored 70/35, at 50%, as it achieved less than half the QoL requirements.

4- Project 3: Jeddah Airport Housing Project, KSA

In applying the methodology for measuring, analyzing and evaluating the QoL in the new residential areas of KSA,

the housing index scored 205/160, at 78%, as it achieved more than half the QoL requirements. The Environmental Planning and Design Index scored 530/160, at 45%, as it achieved less than half the QoL requirements. The Environmental Operation of Urban Communities scored 40/95, at 42%, as it achieved less than half the QoL requirements. The Technical Support for Available Environmental Resources scored 70/40, at 57%, as it achieved less than half the QoL requirements.

5- The application used to measure, analyze and evaluate the QoL in new urban areas consists of four basic indexes, namely, housing, environmental planning and design, environmental operation of residential areas, and technical support for available environmental resources. It allows developers of new housing communities to assess the efficiency and measurement of the QoL by analyzing the statistical data generated by the application.

References

1. Aigbavboa, C., & Thwala, W. (2016). A notional appraisal of the bases of housing satisfaction. *International Journal for Housing Science and Its Applications*, 40(2), 133–145.
2. Aletta, F., Oberman, T., & Kang, J. (2018). Associations between positive health-related effects and soundscapes perceptual constructs: A systematic review. *International Journal of Environmental Research and Public Health*, 15(11). <https://doi.org/10.3390/ijerph15112392>.
3. Capolongo, S. (2020). COVID-19 lockdown: Housing built environment's effects on mental health. *International Journal of Environmental Research and Public Health*, 17 (16). <https://doi.org/10.3390/ijerph17165973>.
4. Anderson, J. (2015). "Living in a communal garden" associated with well-being while reducing urban sprawl by 40%: A mixed-methods cross-sectional study. *Frontiers in Public Health*, 3(173). <https://doi.org/10.3389/fpubh.2015.00173>

5. Anderson, J., Ruggeri, K., Steemers, K., & Huppert, F. (2017). Lively social space, well-being activity, and urban design: Findings from a low-cost community-led public space intervention. *Environment and Behavior*, 49(6), 685–716. <https://doi.org/10.1177/0013916516659108>.
6. Baba, C., Kearns, A., McIntosh, E., Tannahill, C., & Lewsey, J. (2017). Is empowerment a route to improving mental health and wellbeing in an urban regeneration (UR) context? *Urban Studies*, 54(7), 1619–1637. <https://doi.org/10.1177/0042098016632435>.
7. Maas, J. (2015). Health benefits of green spaces in the living environment: A systematic review of epidemiological studies. *Urban Forestry & Urban Greening*, 14 (4), 806–816. <https://doi.org/10.1016/j.ufug.2015.07.008>.
8. Boessen, A., Hipp, J. R., Butts, C. T., Nagle, N. N., & Smith, E. J. (2018). The built environment, spatial scale, and social networks: Do land uses matter for personal network structure? *Environment and Planning B: Urban Analytics and City Science*, 45 (3), 400–416. <https://doi.org/10.1177/2399808317690158>.
9. Cao, X. (2016). How does neighborhood design affect life satisfaction? Evidence from twin cities. *Travel Behavior and Society*, 5, 68–76. <https://doi.org/10.1016/j.tbs.2015.07.001>.
10. Cao, X., Wu, X., & Yuan, Y. (2018). Examining built environmental correlates of neighborhood satisfaction: A focus on analysis approaches. *Journal of Planning Literature*, 33(4), 419–432. <https://doi.org/10.1177/0885412218765443>.
11. Chatterjee, K., Chng, S., Clark, B., Davis, A., De Vos, J., Ettema, D., ... Reardon, L. (2020).
12. Clapham, D., Foye, C., & Christian, J. (2018). The concept of subjective well-being in housing research. *Housing, Theory and Society*, 35(3), 261–280. <https://doi.org/10.1080/14036096.2017.1348391>.
13. Clark, B., Chatterjee, K., Martin, A., & Davis, A. (2019). How commuting affects subjective wellbeing. *Transportation*. <https://doi.org/10.1007/s11116-019-09983-9>.
14. Cloutier, S., Berejnoi, E., Russell, S., Ann Morrison, B., & Ross, A. (2018). Toward a holistic sustainable and happy neighborhood development assessment tool: A critical review of relevant literature. *Ecological Indicators*, 89, 139–149. <https://doi.org/10.1016/j.ecolind.2018.01.055>.
15. Cosby, A. G., McDoom-Echebiri, M. M., James, W., Khandekar, H., Brown, W., & Hanna, H. L. (2019). Growth and persistence of place-based mortality in the United States: The rural mortality penalty. *American Journal of Public Health*, 109(1), 155–162. <https://doi.org/10.2105/AJPH.2018.304787>.
16. De Vos, J., Schwanen, T., & Witlox, F. (2017). The road to happiness: from obtained mood during leisure trips and activities to satisfaction with life. In Paper presented at the 2017 World symposium on Transport and Land Use Research (WSTLUR).
17. De Vos, J., & Witlox, F. (2017). Travel satisfaction revisited. On the pivotal role of travel satisfaction in conceptualising a travel behaviour process. *Transportation Research Part A: Policy and Practice*, 106, 364–373. <https://doi.org/10.1016/j.tra.2017.10.009>.
18. Diener, E., Oishi, S., & Tay, L. (2018). Advances in subjective well-being research. *Nature Human Behaviour*, 2(4), 253–260. <https://doi.org/10.1038/s41562-018-0307-6>. Diener, E., Seligman, M. E. P., Choi, H., & Oishi, S. (2018). Happiest people revisited. *Perspectives on Psychological Science*, 13(2), 176–184. <https://doi.org/10.1177/1745691617697077>.

19. Dong, G., Ma, J., Harris, R., & Pryce, G. (2016). Spatial random slope multilevel modeling using multivariate conditional autoregressive models: A case study of subjective travel satisfaction in Beijing. *Annals of the American Association of Geographers*, 106(1), 19–35. <https://doi.org/10.1080/00045608.2015.1094388>.
20. Douglas, M., Katikireddi, S. V., Taulbut, M., McKee, M., & McCartney, G. (2020). Mitigating the wider health effects of covid-19 pandemic response. *BMJ*, 369.
21. Engemann, K., Pedersen, C. B., Arge, L., Tsirogiannis, C., Mortensen, P. B., & Svenning, J.-C. (2019). Residential green space in childhood is associated with lower risk of psychiatric disorders from adolescence into adulthood. *Proceedings of the National Academy of Sciences*, 116(11), 5188. <https://doi.org/10.1073/pnas.1807504116>.
22. Ettema, D., Friman, M., Gärling, T., & Olsson, L. E. (2016). Travel mode use, travel mode
23. shift and subjective well-being: Overview of theories, empirical findings and policy implications. In D. Wang, & S. He (Eds.), *Mobility, sociability and well-being of urban living* (pp. 129–150). Berlin, Heidelberg: Springer Berlin Heidelberg.
24. Feng, J., Tang, S., & Chuai, X. (2017). The impact of neighbourhood environments on quality of life of elderly people: Evidence from Nanjing, China. *Urban Studies*. <https://doi.org/10.1177/0042098017702827>.
25. Friman, M., Gärling, T., Ettema, D., & Olsson, L. E. (2017). How does travel affect emotional well-being and life satisfaction? *Transportation Research Part A: Policy and Practice*, 106, 170–
26. Gascon, M., Triguero-Mas, M., Martínez, D., Dadvand, P., Forns, J., Plasencia, A., & Nieuwenhuijsen, M. (2015). Mental health benefits of long-term exposure to residential green and blue spaces: A systematic review. *International Journal of Environmental Research and Public Health*, 12(4), 4354. <https://doi.org/10.1016/j.tra.2017.09.024>.
27. Hamidi, S., Ewing, R., Tatalovich, Z., Grace, J. B., & Berrigan, D. (2018). Associations between urban sprawl and life expectancy in the United States. *International Journal of Environmental Research and Public Health*, 15(5). <https://doi.org/10.3390/ijerph15050861>.
28. Hershfield, H. E., Mogilner, C., & Barnea, U. (2016). People who choose time over money are happier. *Social Psychological and Personality Science*, 7(7), 697–706. <https://doi.org/10.1177/1948550616649239>.
29. Ihlebæk, C., Næss, P., & Stefansdottir, H. (2020). Are compact cities a threat to public health? *European Planning Studies*, 1–29. <https://doi.org/10.1080/09654313.2020.1775790>.
30. Jiang, B., Mak, C. N. S., Zhong, H., Larsen, L., & Webster, C. J. (2018). From broken windows to perceived routine activities: examining impacts of environmental interventions on perceived safety of urban alleys. *Frontiers in Psychology*, 9, 2450. <https://doi.org/10.3389/fpsyg.2018.02450>.
31. Johansson, M., Sternudd, C., & Kärholm, M. (2016). Perceived urban design qualities and affective experiences of walking. *Journal of Urban Design*, 21(2), 256–275. <https://doi.org/10.1080/13574809.2015.1133225>.
32. Jokela, M., Bleidorn, W., Lamb, M. E., Gosling, S. D., & Rentfrow, P. J. (2015). Geographically varying associations between personality and life satisfaction in the London metropolitan area. *Proceedings of the National Academy of Sciences*, 112(3), 725–730. <https://doi.org/10.1073/pnas.1415800112>.