# Age-Friendliness of Residential Complexes in Erbil: The Case of Gunjan City, Iraq

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## Abstract

*It is known that the aged population in the world will double by 2050. Healthy older people are a resource for their families, and their communities. Cities as centers of cultural and social activities must provide services that support the safety and productivity of their residents including the elderly. They require supportive living environments to facilitate the social and physical changes of aging. Age-friendly cities should support the elderly, and encourage their participation in the community.*

*This paper is aimed at measuring the age-friendliness of residential complexes in the Erbil city in Iraq using the Gunjan city residential project as a case study. The methodology involves a survey of literature related to age-friendly built environments to produce the measurement tools, the indicators and design criteria followed by on-site observations and a questionnaire targeting families that include elderly living in Gunjan.*

*The criteria produced were categorized and used as a checklist to measure the age-friendliness of contemporary residential complexes in Erbil. The research indicates that, for a residential complex to be age-friendly, it should satisfy certain socio-spatial design criteria at two levels: urban design, and interior design of the residential units.*

*The study notes that the percentage of age-friendliness in the Gunjan city was 66.6 % at the urban level, and 60.4 % at the interior level. The questionnaire produced similar results; 62.2 % and 68.9 %. Nonetheless, not all available criteria were efficient according to the elderly residents. Dissatisfaction rates were the lowest regarding transportation, connectivity, and circulation network design, at the level of urban design, and technological systems, and soundproofing at the level of interior design.*

*The paper concludes that additional design criteria from the age-friendly design checklist should be included, and some of the criteria in Gunjan should be activated to become more accessible and efficient to the elderly.*

**Keywords:** Age-friendly architecture, residential complexes, active aging, Gunjan city, Erbil.

## Introduction

The proportion of people in their 60s and over, in the world's total population will double from 11% in 2006 to 22% by 2050 (Population Ageing, New York, 2006). Healthy older persons are a resource for their families, their communities, and the economy in general (world health, 1997). Cities are the centers of cultural and social activities and they must provide structures and services that support the safety and productivity of their residents. In particular, old people require supportive living environments to compensate them for the social and physical changes associated with aging (United Nations, 2002).

Age-friendly cities should therefore support policies, services, facilities, and infrastructure that recognize the abilities of the elderly people, provide their needs, and encourage their integration into, and participation in the community (WHO, 2007).

Wongsala et. al. have defined age-friendly cities as cities designed to ensure that people can age safely while providing supportive policies, services, and infrastructure to enhance the quality of life (Wongsala, Anbäcken, and Rosendahl, 2021). Older persons are not a homogeneous group with the same needs; since with age, individual differences increase according to several factors such as history of health status, educational background, culture, lifestyle .... etc. The functional capacity of the people begins to decline with age, and this regression can be controlled by individual actions and public policies such as promoting an age-friendly environment (WHO, 2007). WHO has identified eight criteria for achieving an age-friendly environment: outdoor and building spaces, transport and road network, housing, civic engagement, employment, respect and social inclusion, community participation, information and communication, community support, and health services (WHO, 2007).

Many scholars have pointed out the applicability of those criteria through several strategies such as the application of active aging (Justin keen, 1989, WHO, 2007; Dellamora and Zecevic, 2013). Many have also focused on the application of friendly architecture through smart design and technologies, where technology is one of the most important ways to support older people suffering from general health deterioration and help them live independently (Alarifi et al, 2016 ; Çiçek, 2015).

The use of technology and its impact on the elderly has become a broad field of research among marketeers, designers, and the professionals due to the growing number of elderly in the population. Technology has begun to be used in all areas of life, especially in interior design, where it is possible to use assistive devices that allow the elderly greater independence and adaptation, by enabling them to perform tasks that they were not able to perform previously. Assistive technology is one of the branches of health technology, which was developed to enable people with performance difficulties to live productive lives in which they enjoy health, independence and dignity (WHO, 2007). These standards are applied to many western countries: Himeji, Japan-Udine, Italy-Rio de Janeiro, Brazil, and others, but the idea has reached the Arab world only recently. Indeed, some scholars have addressed the importance of age-friendliness in the Arab countries, such as Ali (2005) and Al-Amiri (2016), who wrote about age-friendliness in Amman, Jordan.

Notably, it has become necessary to apply this idea in Iraq as well, especially in the provinces where the elderly are most present. In Iraq, it was noted that the highest three percentages of the elderly male population over 60 were 24.1, 8.4, & 8.1 % in Baghdad, Erbil, and Nineveh, respectively, while the lowest three percentages were present in Muthanna, Maysan, and Karbala in successive proportions of 2.1, 2.7, & 2.8 %, as a result of poor health and living conditions, especially in the southern governorates of Iraq. In the city of Erbil,

15% percent of the population is over 55 according to the recent demographic data by the central statistical organization of Iraq (https://cosit.gov.iq/ar/).

Due to the importance of social ties as well as the predominant value of home-ownership in Erbil, the concept of aging in place has become necessary and desired among the homeowners. Therefore, applying the strategies of age-friendly design in residential architecture seems to be a possible solution for such issues.

Hence, this research aims at measuring the age-friendliness of contemporary residential complexes in Erbil city in Iraq using the Gunjan city residential project as a case study. The hypothesis suggests that an age-friendly residential environment that provides security, stability, and psychological, social, and emotional well-being for the older persons can be created by adding certain design components that focus on the daily needs of the elderly inside and outside their residential units to ensure their independent living and effective participation in the society.

**Active Aging and Aging in Place: A Definition**

The concept of active aging is defined by the World Health Organization as the process of improving opportunities for health, participation, and safety; to improve the quality of life as people age (WHO, 2007). This allows older persons to realize their potential to achieve physical, social, and mental well-being throughout their lives and to participate in the society according to their needs, desires, and abilities. However, they need to be provided with appropriate protection, safety, and care when they need help (José, 2017).

The concept of active aging dates back to the fifties and sixties of the twentieth century. The word active refers to the continued participation in social, economic, cultural, and religious affairs and activities of the community, not just the ability to participate in work or maintain physical activities (Ballesteros, 2008). One of the most important principles of active aging is the preservation of subjectivity and independence. Active aging depends on a variety of influences and determinants that surround the individuals, families, and communities. They include physical conditions as well as social factors that influence the types of individual behaviors and feelings. It also includes several other services and aspects of an age-friendly city (WHO, 2002). In fact, WHO highlights five aspects of active aging as follows (WHO, 2007).

- Respect the decisions of the elderly and their choices for their lifestyles.
- Anticipate and respond flexibly to aging needs.
- Recognize the wide range of capabilities and resources they possess.
- Encourage their integration into and participation in all areas of community life.
- Protect the weakest of them.

Active aging can thus be defined as the active social participation of older persons aged 60 years and over at the family and community levels, with a good state of health, supported by the availability of economic security that guarantees material independence. While aging in place can be defined as continuing to live in one's own home, rather than moving with family members or moving to an assisted living facility or a nursing home.

The majority of people prefer to stay in their homes as they get older. Many seniors do not want to leave the comforts of the house where they had lived for decades (Iecovich, 2014). Although deteriorating body functions create various inconveniences, these problems can be overcome by redesigning and renovating their living environments to meet their needs and enhance their ability to age in place (Vanleerbergh, 2017; Lewis, 2020).

## Research Methodology

This research relied mostly on-site analysis of the Gunjan city in terms of the availability of age-friendliness design checklist derived from literature. To obtain a deeper insight into the level of satisfaction among the elderly residents, the methodology also included a printed questionnaire administered to the residents of the Gunjan city aged 55 and over and their family members. The questions addressed the socio-spatial design criteria required for creating an age-friendly residential environment. Results of 34 questionnaire forms were collected and analyzed using Excel software.

## Age-Friendliness Checklist

After a thorough survey of the existing literature on age-friendly architecture and residential design, this research identified several design criteria (Table 1). These criteria were divided into two levels. The first level encompasses a checklist of socio-spatial criteria that can be applied to the external built environment as shown in the Table 2. The second level emphasized the components of the interior design of residential units as shown in the Table 3.

**Table 1:** Literature survey of aging in place design: indicators
Source: Author

| | Age-friendly cities | | | | | | | | | Smart Sustainable Cities | | | | | | | | Active Aging | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Literature title** | **Outdoor spaces and buildings** | **Transportation** | **Housing** | **Pedestrian-friendly** | **Community Engagement** | **Respect and social inclusion** | **Civic Engagement and Employment** | **Communication & Information** | **Community Support and Health Services** | **Smart Housing** | **Digital Technologies** | **Smart Technology Means** | **Share** | **Parks** | **Designing a Healthy Residential Environment** | **Safety** | **Luxury** | **Aging in place** | **Active Aging** | **Education of the elderly** | **Intergenerational integration** | **Healthy Aging** |
| (keen, 1989) | | | | | | | | √ | √ | | | | | √ | | √ | | | √ | | | |
| (Demirbilek, 1998) | √ | | | | | | | √ | | | | | | | | | | | √ | | | |
| (Nuha, 2003) | | | | | | | | √ | | √ | | | | √ | | | | | √ | | | |
| (Bernard Isaacs, 2006) | | | | | | √ | | √ | | √ | | | | | | √ | √ | | √ | | | |
| (Janes, 2007) | | | √ | | | | | | | | | | | | | | | √ | | | | |
| (WHO, 2007) | | | | | | | | | | | | | | √ | √ | √ | | √ | √ | √ | √ | √ |
| (Wiles, 2012) | | | | | | | | √ | √ | | √ | √ | √ | | | | | | | | | |
| (Leibing et al., 2012) | | | √ | | | | | | | | | | | | | | | √ | | | | |
| (Dellamora and Zecevic, 2013) | | | | | | | | √ | | | | | | √ | | | | | √ | | | √ |
| (Mccallion, 2014) | | | √ | | | | | | | | | | | | | | | √ | | | | |
| (Iecovich, 2014b) | | | | √ | | | | | | | | | | | | | | √ | | | | |
| (InterNACHI, 2015) | | | | | | | | | | | | | | | | | | √ | | | | |
| (DULGER, 2015) | √ | √ | | | | √ | | √ | | | | | | √ | √ | √ | √ | √ | | | | √ |
| (Mary Margaret, 2016) | | | | | | | √ | √ | | √ | | | | √ | | | | | | | | |
| (Howell, 2016) | | | | | | | | √ | | | | | √ | | | | | | √ | | | √ |
| (Wong, 2017) | | | | | | | | √ | √ | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (Vanleerbergh, 2017) | √ | | | | | | | √ | | | | | | | | | | √ | | | | √ |
| (Strom, 2017) | | | | √ | | √ | | | | | | | | | | | | | √ | | | |
| (T.M.Peek, 2018) | | | | | | √ | | √ | | | √ | √ | √ | | | | | | | √ | √ | |
| Gómez, 2020 | | √ | | | | | | | | | | | | | | | | √ | | | | √ |
| (Gradisek, 2020) | | | | | | | | √ | | | | | | | | | | | | √ | | √ |

## The Case of Gunjan City

## 1. Project description

### 1.1. Location:

Gunjan City Complex is one of the distinguished residential complexes in the Iraqi city of Erbil, as it is located on the perimeter of the new 150-meter street, which connects the Bhakra Street with the Massif Street. The area of the complex is called New Ankawa. The project is built on 4,046,900 m². It consists of 2400 houses and villas of different sizes that meet various choices and tastes. The current occupancy rate is 1500 housing units.

### 1.2. Reasons for choosing the study area:

This project offers a variety of amenities, which include residential, commercial, industrial, recreational, and religious amenities which attract people of various ages to purchase a residential unit in Gunjan. In addition, there are many parks and green spaces in the area. The site is also important because it is close to the center of the Erbil city.

## 2. Socio-spatial Checklist

As mentioned above, the mechanisms that achieve an age-friendly residential environment were divided into two levels. The urban design level comprises nine aspects and the interior design level comprises 6 aspects. The percentages obtained from on-site analysis as well as the questionnaire were calculated using Excel software and SPSS software. 56forms were distributed to the residents of Gunjan, where 56/2 = 28, is the proportion which may prove satisfactory. Above 28 is considered an effective mechanism.

### 2.1. Age-friendly design checklist in Gunjan city: The level of urban design

The Table 2 below lists the available facilities the urban design level and their evaluated age-friendliness. The results below were obtained from an on-site observation and a site analysis.

**Table 2:** Availability of facilities as per indicators at the level of urban design
Source: Author

| **Outdoor spaces** | | | | |
|---|---|---|---|---|
| **Code** | **Indicators** | Available | N.A. | |
| **A-1** | Keeping the city clean, reducing noise and annoying odors. | √ | |  |

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|---|---|---|---|---|
| **A-2** | The presence of green and safe spaces, and facilities for public restrooms. | √ | |  |
| **A-3** | The presence of outdoor seats. These seats should be well-maintained, monitored, and checked periodically to ensure that they are available to everyone. | √ | |  |
| **A-4** | Well-maintained sidewalks that are non-slippery and barrier-free. | √ | | |
| **A-5** | The presence of roads equipped with non-slippery pedestrian crossings. | √ | | |
| **A-6** | Roads contain elevated or below-street-level pedestrian paths for pedestrians crossing on busy roads. | | √ |  |
| **A-7** | Availability of light signals with visual and audio signals for pedestrians crossing. | √ | |  |
| **A-8** | Availability of special safety measures such as road lighting, and strict local laws such as stopping drivers before pedestrians cross the lines. | √ | | |
| **A-9** | Availability of bicycle lanes. | √ | |  |
| **Public Buildings** | | | | |
| **Code** | **Indicators** | **available** | N.A. | |
| **B-1** | Availability of elevators | √ | |  |
| **B-2** | Buildings have sloping sidewalks | √ | | |
| **B-3** | Buildings contain enough signs to move inside the building | √ | | |
| **B-4** | Stairs include side railing and non-raised barriers. | | √ |  |
| **B-5** | The floors of buildings are non-slippery. | √ | | |

| | | | | |
|---|---|---|---|---|
| **B-6** | The buildings have a sufficient number of toilets with some of them reserved for people with special needs. The signs on them are clear. | √ | | |
| **Transport and road network design** | | | | |
| **Code** | **Indicators** | **available** | N.A. | |
| **C-1** | The presence of community transport with low stairs, comfortable seats, and clear signage. | | √ |  |
| **C-2** | The presence of affordable taxis. | √ | | |
| **C-3** | Availability of stations located near the dwellings, equipped with seats and sheds, and are well lit. | | √ | |
| **C-4** | Availability of stations with sloping sidewalks, escalators, public toilets, and easy-to-read signs. | | √ |  |
| **C-5** | The existence of public transportation for the elderly to reach hospitals, health centers, parks, and other amenities at a reduced cost. | | √ | |
| **C-6** | Availability of transportation services for people with special needs. | | √ |  |
| **C-7** | The roads are well-marked and illuminated and have very clear signage. | √ | | |
| **Housing** | | | | |
| **Code** | **Indicators** | **available** | N.A. | |
| **D-1** | There is a range of convenient and affordable housing options. | √ | |  |
| **D-2** | There is a high percentage of housing with an interior design that suits the needs of the elderly. | | √ | |
| **D-3** | There are affordable maintenance services. | √ | |  |
| **D-4** | The housing is equipped with air conditioning and adjustable heating. | √ | | |
| **D-5** | The residences are close to public services and facilities. | √ | | |

| | | | | |
|---|---|---|---|---|
| **D-6** | Homes for the elderly are integrated with the rest of the residential complex and not isolated. | √ | |  |
| **Community Engagement** | | | | |
| **Code** | **Indicators** | **available** | N.A. | |
| **E-1** | Community facilities promote multi-purpose use. | √ | |  |
| **E-2** | There are spaces for local gatherings and interaction between the inhabitants such as entertainment centers, libraries, and public squares. | | √ | |
| **E-3** | Events and activities are affordable for the elderly and supported by volunteer organizations. | | √ | |
| **E-4** | Information about activities is easily accessible to the elderly through bulletin boards or communication tools of the complex. | √ | |  |
| **E-5** | Activity sites are suitable for the elderly and are close to their homes. | √ | | |
| **E-6** | There are community activities that include different ages and cultural backgrounds. | √ | | |
| **Respect and social inclusion** | | | | |
| **Code** | **Indicators** | **available** | N.A. | |
| **F-1** | Integrates the elderly as active partners in community decision-making such as being included in the advisory bodies and boards of directors of the complex. | √ | |  |
| **F-2** | Public and commercial services adapted to the needs of the elderly. | | √ | |
| **Civic Engagement** | | | | |
| **Code** | **Indicators** | **available** | N.A. |  |

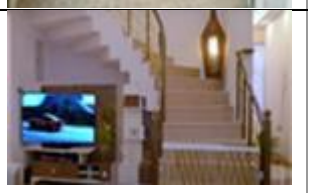
| | | | | |
|---|---|---|---|---|
| **G-1** | There is a wide range of employment opportunities for the elderly. | √ | |  |
| **G-2** | There are flexible options for part-time working hours for the elderly. | | √ | |
| **G-3** | Adapting workplaces to suit the needs of the elderly. | | √ | |
| **G-4** | Having appreciative and encouraging initiatives for the elderly in the workplace. | | √ | |
| **G-5** | There is support for elderly self-employed people and the promotion of self-employment opportunities. | √ | |  |
| **G-6** | Support of small businesses that can be managed from home in a framework convenient for the working elderly. | √ | | |
| **G-7** | Appropriate wages for older workers. | √ | | |
| **Communication & Informatics** | | | | |
| **Code** | **Indicators** | **available** | N.A. | |
| **H-1** | There is a basic and comprehensive communication system accessible to the residents. | √ | |  |
| **H-2** | Official forms use clear language and large letters. | | √ | |
| **H-3** | Automated Help-answering services speak slowly. | | √ | |
| **H-4** | Provide the caller with the option to talk to a real person or leave a message to contact them later. | | √ |  |
| **H-5** | Available electronic devices and screens with large buttons and large letters. | √ | | |
| **H-6** | There is good lighting for screens, mail outlets, and other services. | √ | | |
| **H-7** | Availability of computers and Internet services in public places. | √ | | |
| **Community Support and Health Services** | | | | |
| **Code** | **Indicators** | **available** | N.A. | |
| **I-1** | There are health and social services within the city, accessible by all means of transport. | √ | | |

| | | | | |
|---|---|---|---|---|
| **I-2** | There are facilities for services that are safe to build and fully available to people with disabilities. | | √ |  |
| **I-3** | There is clear information about health and social services for the elderly. | √ | |  |
| **I-4** | Sufficient availability and designation of burial sites. | √ | | |
| **I-5** | Availability of health services. | √ | | |
| **I-6** | There are home care services, including health, personal, and housekeeping services. | √ | |  |
| **I-7** | Taking into account the needs and abilities of the elderly in emergency schemes | | √ | |

## 2.2. Age-friendly design checklist in Gunjan city: The level of interior design

The Table 3 below lists the available design criteria for the interior design level. The results were obtained from on-site observations and the site analysis.

**Table 3:** Responses to age-friendly interior design checklist.
Source: Author

| **Smart housing and interior design suitable for the elderly** | | | | |
|---|---|---|---|---|
| **Smart Design** | | | | |
| **Code** | **Indicators** | **available** | N.A. | |
| **X-1** | The presence of modern technological solutions in terms of devices used inside homes. | √ | |  |
| **X-2** | Having an artificial intelligence programmed with the interior design. | | √ | |
| **Stairs and elevators** | | | | |
| **X-3** | No steps at the entrance of the house. | √ | |  |
| **X-4** | The presence of railings for stairs that the elderly can lean on. | √ | |  |
| **X-5** | All staircase steps are equal and regular to avoid the risk of falling. | √ | | |
| **X-6** | There are ramps for people with special needs. | √ | | |

| | | | | |
|---|---|---|---|---|
| **X-7** | The presence of an elevator instead of stairs. | | √ | |
| **Flooring** | | | | |
| **X-8** | Non-slip flooring surfaces. | √ | |  |
| **X-9** | Bathroom and kitchen floors are made of coarse materials to resist severe slippage when wet. | √ | |  |
| **X-10** | Availability of carpets with a cohesive fabric to avoid the risk of falling. | √ | | |
| **X-11** | Rigid and non-directional floor surfaces for easy wheelchair use. | | √ |  |
| **X-12** | The connection between the different floors has been taken care of to avoid the risk of stumbling on people or chairs. | √ | | |
| **X-13** | The presence of corridors without furniture or carpets for easy movement of the wheelchair. | √ | | |

| | | | | |
|---|---|---|---|---|
| **Walls and furniture** | | | | |
| **X-14** | There are safety rods in the walls of the bathroom. | √ | |  |
| **X-15** | There are easily operable door handles. | | √ |  |
| **X-16** | Kitchens and tables at a height that a person with a wheelchair can easily reach. | √ | |  |
| **X-17** | The presence of a shower compartment with a seat and safety rods. Floors have a rough texture. | | √ | |
| **Doors and technological systems** | | | | |
| **X-21** | Lack of thresholds for doors. | √ | | |

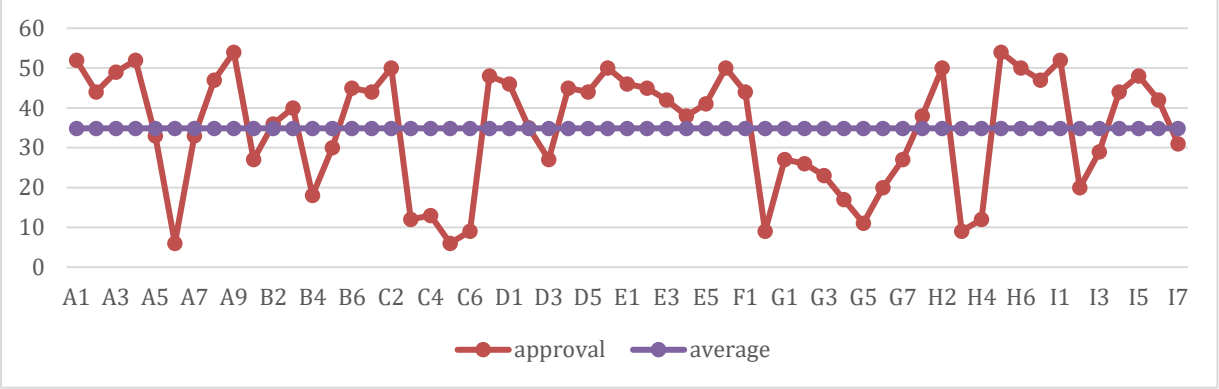
| | | | | |
|---|---|---|---|---|
| **X-22** | The presence of video doorbells, where family members can receive notifications and communicate with anyone at the door via their smartphones. | | √ |  |
| **X-23** | There are door locks and smart security systems. | | √ | |
| **X-24** | There are video cameras to recognize visitors and communicate with them without having to get up. | | √ | |
| **X-25** | The height of tables and furniture can be adjusted. | √ | |  |
| **X-26** | Availability of motion detection system that automatically turns on the lights. | √ | | |
| **X-27** | Availability of control systems connecting electrical appliances to the Internet to control them using smartphones. | | √ |  |
| **X-28** | Availability of automatic window curtains. | √ | |  |
| **X-29** | Smart doorbells integrated with smartphone applications that cause phone vibration or turn to flash light alarm on. | | √ | |

| | | | | |
|---|---|---|---|---|
| **Lighting and colors** | | | | |
| **X-30** | There is adjustable lighting such as the use of lighting for the work surfaces or the bottom of the cabinets, or stairs lighting. | | √ |  |
| **X-31** | There is a suitable energy-saving lighting. | | √ | |
| **X-32** | Rooms, corridors, and stairs are well-lit without glare. | √ | | |
| **X-33** | Using neutral color tones for lights | √ | |  |
| **X-34** | Floors are free of patterns and do not cause a feeling of instability. | √ | | |

| | | | | |
|---|---|---|---|---|
| **X-35** | Visual contrast in colors used in door frames, handles, stairs leading to the house, and main circulation paths. | √ | |  |
| **Sound** | | | | |
| **X-36** | The presence of smart technologies that respond to voice commands. | | √ |  |
| **X-37** | The walls are soundproof. | √ | | |
| **X-38** | Interior surfaces and furnishings are made of materials that do not reflect or amplify sound waves. | √ | | |
| **X-39** | Carpets are available in rooms that need tranquility such as bedrooms. | √ | |  |
| **X-40** | The presence of visual and auditory security and alarm systems, these systems works with smoke alarms, flood sensors, and temperature sensors. | √ | |  |
| **X-41** | Dubbed walls where the wall turns into a touchpad where it can detect and track electronic and electrical devices, where it monitors activity in the room. | | √ | |
| **X-42** | Refrigerator with Wi-Fi technology that allows knowing what is inside without opening the door. | | √ | |
| **X-43** | The presence of surveillance cameras inside the house to take the necessary measures when an accident occurs. | | √ | |

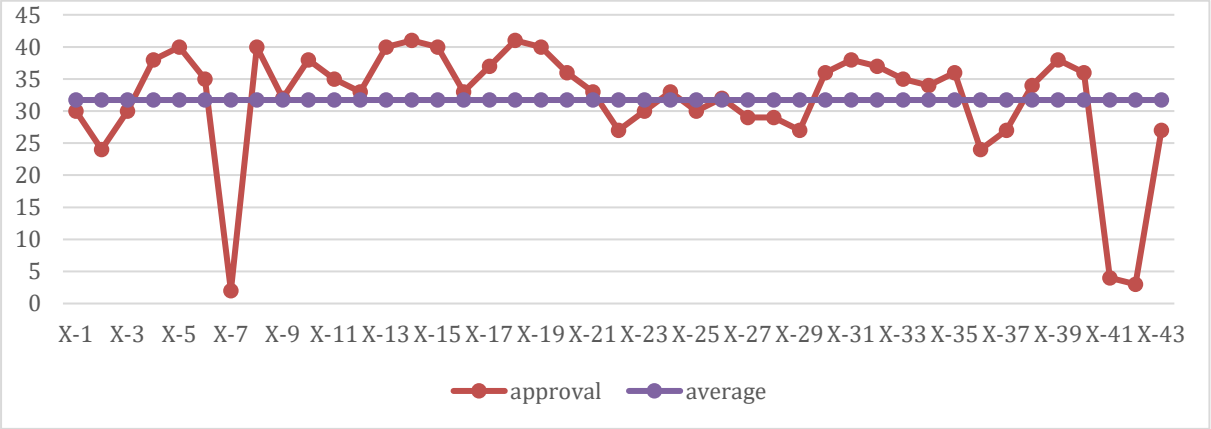
**Results of the Questionnaire**

The results of the questionnaire (Graph 1) shows that the rate for those who approved the age-friendly urban design facilities available in Gunjan was a mean of 34.85, which represents 62.23%. By comparing this result with the percentage acquired from the site analysis, it can be stated that the residents were dissatisfied with some of the available facilities, especially, public transportation, and road network design (Graph 3).




**Graph 1:** Questionnaire results regarding age-friendly urban design facilities available in Gunjan.
Source: Author

The results of the questionnaire Graph 2 shows that the rate for those who approved the age-friendly interior design criteria available in Gunjan was a mean of 31.72, or 68.95%. By comparing this result with the percentage acquired from on-site analysis of residential units, it can be stated that the residents were relatively satisfied with the interior design of their residential units. However, they expressed dissatisfaction regarding certain design characteristics related to soundproofing, door design, and the lack of some necessary technological systems (Graph 4).




**Graph 2:** Questionnaire results regarding age-friendly interior design facilities available in Gunjan.


**Graph 3**: Questionnaire results regarding the nine age-friendly urban design facilities available in Gunjan.
Source: Author


**Graph 4:** Questionnaire results regarding the six age-friendly interior design facilities available in Gunjan.

## Conclusions

By examining the results of the questionnaire for the elderly, and the results of the on-site observations, it can be argued that the contemporary residential complexes in Erbil such as Gunjan city, are relatively age-friendly. All results were above 60% in terms of the availability of the facilities for active aging, and age-friendly design criteria in both the outdoor spaces and the interior design of residential units. However, those complexes can be further age-friendly by activating and adding more facilities from the design checklist, especially dealing with the aspects that show low rates of satisfaction amongst the residents of Gunjan.

For instance, there is a lack of necessary features for the elderly in public buildings. There is a need to establish a network of roads that enable the elderly to walk around all parts of the city with ease, and there is also a need to provide options for suitable housing for the elderly from various socio-economic levels. In addition, the elderly residents require further integration into civil life, and contribute to big decisions to reduce and avoid their isolation from the society, and benefit from their long experiences. Moreover, special attention must be given to interior design by adopting technologies of smart residential design. Most of these improvements regarding the socio-spatial age-friendly facilities and services can be done through initiatives taken by the local authorities as well as the management of Gunjan while ensuring public participation in decision-making, especially the elderly.

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