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Research Article

Optimizing Space Effeciency in Small Dwellings: A Study of Interior Design Strategies and Solutions

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ABSTRACT

This research focuses on the challenges faced by residents of small homes in Baghdad, Iraq, and what they need to maximize space, protect cultural heritage, and advance sustainability. Through an examination of international interior design approaches, culturally sensitive solutions, efficacy, and practical advice, the study seeks to solve challenges. The concept, literature review, questionnaire creation and distribution, data analysis and discussion, and integration of a case study are the six steps of the quantitative methodology that will be used in this study. We'll look at the subject of tiny homes and the social and psychological effects of living in a small place. The trend of smaller homes in Iraq will be discussed in this essay, along with a case study that offers an engineering solution to optimize space in a compact house. The results of the case study and questionnaire, along with the participant perspectives and the applied design interventions, will be shared. In order to wrap up the study, recommendations will be made for more research in the following areas: comparative studies, public awareness and education, interdisciplinary collaboration, long-term impact assessment, cultural preservation, sustainable materials and practices, accessibility and inclusivity, and policy recommendations.

1. INTRODUCTION

Since 2003, land uses in Baghdad and other Iraqi cities have been converted into residential areas, resulting in lower property sizes and urban subdivisions. Contemporary design approaches emphasize specialist expertise for interior design and space planning, which improve people's lives by fusing utility, exclusivity, comfort, and beauty. High-end materials, modular furnishings, multifunctional equipment, lighting schemes, and unique textile elements should all be considered while designing an interior. [1] Effective solutions for compact dwellings must consider specific challenges including accessibility, aesthetics, sustainability, and cultural preferences. The use of small spaces is maximized, and simplicity is emphasized in minimalist design. [2] To create accessible living spaces that include people with disabilities, inclusive living environments are necessary. Iraq's rich cultural history informs home layout and design, highlighting the significance of preserving cultural identity in modern living spaces.

1.1 Small Dwelling Definition

Small dwellings are small residential units with basic amenities such as a kitchen, bathroom, and bedroom. They are becoming popular due to high real estate costs and the need for affordable housing. These units can be separate units or shared, with shared areas like kitchens and bathrooms. Originating from the German concept of Owning für das Existent minimum, they aim to create affordable homes that efficiently use space while meeting minimum quality standards. The rise of micro-apartments in the West was accelerated by social initiatives like the "Tiny House Movement" in the US and inclusion of small houses in international building standards. In the East, particularly Japan, micro-apartments focus on creating a spacious environment by incorporating natural light and furniture, allowing for flexibility in space and furniture.[3]

1.2 The Need for Small Dwellings, Potentials, and Challenges

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Small dwellings can address social and environmental issues by being more environmentally friendly, affordable, and affordable. They can reduce greenhouse gas emissions by 70% per person compared to a normal Australian home and use fewer resources and energies. However, careful planning and construction using eco-friendly materials and methods are necessary for them to be as environmentally friendly as possible.

People living in small dwellings often desire freedom, mobility, fewer belongings, a simpler, more environmentally friendly life, cost savings, community, design interest, curiosity, breaking through institutional barriers, retirement, health issues, owning a home, and additional space for family. However, these reasons are not among the highest ranked. Affordability, location, and lifestyle are the three main factors affecting the acceptance and growth of micro-flats. People who live in micro-flats believe that building smaller homes can add more apartments, lowering the price of each apartment. The COVID-19 pandemic has also impacted on people's interest in small dwellings, as strong and adaptable buildings are important for health and well-being. New ideas for building resilience, such as terraces, are being explored, but some challenges remain.

1.3 Typology, Interior Designs, and Spatial Configurations of Small Dwellings

Research on micro-apartments aims to find better and more environmentally friendly ways for people to live in smaller areas. Researchers Jessica Adorno and others have examined small homes as places to live for young workers, considering tiny houses, micro-units, co-housing communities, and micro-communities. The British Property Federation defines sharing, co-living, and compact living as examples of this type of small living space. Different types of micro-apartments can be categorized by surface area, functionality, and structure.

Simon Richmond's research focuses on ways to make a small living space look bigger and more comfortable. Examples include internal sight lines and views, increasing the height of spaces and rooms, external sight lines and views, vertically stacked rooms and spaces, vertical circulation, split-level rooms, rooms as circulation space, vooids, natural lighting, multi-use furniture and spaces, and custom furniture and built-ins [4].

Open plan, transitional outdoor spaces, large windows, and other factors can create the impression of more room by combining several functional units into one complete space without any internal walls. Storage space, reflective surfaces, circular connections, perceptive potential of color, and dematerialization of surfaces can also help make a small dwelling more comfortable.[5]

In summary, micro-apartments offer a more environmentally friendly and comfortable way for people to live in smaller areas. By incorporating various elements such as interior sight lines, views, vertical circulation, and multi-use furniture, small dwellings can be made more comfortable and environmentally friendly.

2. HISTORY OF SMALL DWELLINGS

Compact dwellings have been a popular housing option in Western nations, including the United States, for centuries. Before zoning regulations and modern banking practices, individuals constructed buildings within their financial capabilities, providing cost-effective housing options and considering locally sourced materials, climate, and natural environment. Traditional small home designs include the frontier log cabin, bungalow, cottage, shotgun house, and camp.The Architect's Small House Bureau was established in 1919 to help returning veterans acquire their own homes, offering architectural blueprints for compact residences. The industrial assembly line revolutionized affordable housing packages, leading to the rise of mobile homes. However, mobile homes faced opposition from community members who believed they brought issues associated with poverty, such as crime and declining property values. In 1976, federal regulations were implemented to establish manufacturing standards for these types of homes, leading to the term "mobile home" being replaced with "manufactured housing."

The historical notion of the "American dream" significantly influences the development of small house living. Historically, popular housing types in America included standardized company housing, intricate Victorian homes, and suburban homes with expansive lawns. However, current economic and cultural conditions make owning a large home on a spacious lot unpractical for many people. The desire to own a detached dwelling on a separate piece of land remains a significant cultural motivation. The tiny house movement has gained popularity as a counterculture movement and a feasible homeownership option. Many argue that the current economic system is leading to suboptimal socioeconomic outcomes, and the appeal of tiny and small living is growing as it allows individuals to live comfortably on lower incomes and prioritize non-monetary values.[6]

3. TINY HOUSES BEFORE AND AFTER THE TWENTIETH CENTURY

The Tiny House Movement, originating in the late 19th century, has its roots in the 1970s when artists like Allan Wexler explored the idea of living in small living spaces. Jay Shafer, a prominent figure in the movement, built a 90 square foot mobile dwelling in 1997 and published "The Small House Book," which gained acclaim and became a bestseller on Amazon. The movement gained momentum in the early 2000s, with various concepts for miniature dwellings emerging, including repurposed shipping containers and tiny mobile houses. The younger demographic sees small houses as a cost-effective housing alternative, with a Global Tiny Homes Market report forecasting a nearly $4 billion increase from 2022 to 2023. The movement is expected to persist as a prevailing trend in the coming years.

4. SMALL DWELLINGS IN BAGHDAD

The traditional Iraqi courtyard house is a significant aspect of the Iraqi culture, reflecting the country's ideals, customs, and way of life. It is a place where people can live privately in community, supporting family events, religious practices, and social contacts. The study by [7] highlights the importance of space in the Iraqi setting, with segregation of guest areas and respect for privacy. The lack of traditional courtyard houses in modern Iraqi architecture has made the built environment disconnected from people's social and cultural needs. Retaining these concepts in modern Iraqi architecture can maintain social cohesiveness and cultural identity.[7]

Iraqi society has experienced a housing crisis since 2003, leading to the fragmentation of large housing units into smaller ones. This is due to economic and social factors, as well as increased household size due to population growth. Over 36% of urban households have been divided due to this, causing a humanitarian crisis. Governments have neglected the housing needs of the population, leading to cramped living quarters lacking essential human decency. 2020 research in Baghdad focuses on the impact of urban environment changes and social and economic elements on this fragmentation process, aiming to create sustainable housing policies.[8]

The housing crisis in Baghdad is largely due to demographic changes and economic factors, leading to fragmentation of housing units. The growing economic gap between the rich and poor has led to residents dividing larger, costlier homes into smaller, affordable apartments. This fragmentation has resulted in spatial separation and burdening on infrastructure and public services. A study reveals a 25% demographic increase from 2010-2018 and a trend of smaller nuclear homes. Economic differences have also contributed to the fragmentation, with the rich able to afford big homes, while lower-income residents divide their homes to provide more affordable housing. This fragmentation has overstretched the city's infrastructure and public services, which were not designed for this density and housing diversity.[9]

5. CASE STUDIES OF SMALL DWELLINGS IN DIFFERENT COUNTRIES

5.1 Nabeel AL KURY'S house

A distinctive characteristic of Nabeel AL KURY's home is its 7-meter-smaller façade, which makes the interior areas longer and narrower. At the side door is a private passageway as well. This house has three levels: the roof, the first floor, and the bottom floor. The bottom floor has a corridor, a hall, a bedroom, a kitchen, parking, a garden, and a bathroom. The first story has three bedrooms, a hall, a bathroom, and balconies. The second floor has a store and roofs. [10].

5.2 Hussein ALKHAYAD'S house in Baghdad

This house is distinguished by its smaller size and side entry without a hallway, which lessens the family's privacy. The ground floor, first floor, and roof are the three levels of this house. The first floor has three bedrooms, a hall, a bathroom, and balconies; the ground floor has a guest room, a hallway, a hall, a bedroom, a kitchen, parking, a garden, a W.C., and a private bathroom for the main room [11]

5.3 The Lifehaus project in Lebanon

An ongoing housing revolution is taking place in the heart of Lebanon. The Lifehaus initiative revolutionises conventional ideas of modest living by combining ecology with technology, agriculture, and self-reliance in the creation of inventive homes. Lifehaus is the inaugural 100-percent, self-sustaining residence in the Middle East, employing recycled and repurposed construction materials and traditional building techniques. Lifehaus residences will have on-site water collection and recycling, self-generation of electricity and power, and a greenhouse installed in each home. By employing Passive Annual Heat Storage technology, Lifehauses will autonomously regulate their temperature, eliminating the need for fossil fuels.Passive Annual Heat Storage is the retention of solar heat by soil. The soil around a partially submerged residence is seen as an integral component of the building's thermal infrastructure. Several feet above the top of a subterranean facility, an insulation/watershed umbrella is erected to shield the soil directly surrounding the structure from

typical temperature changes. This procedure maintains a consistent thermal mass of the building, therefore guaranteeing both lower temperatures during the summer and higher temperatures during the winter [12]

5.4 Zahraa ALBUNDI'S house in Baghdad

This house has a smaller façade than the last house example in Baghdad. It also lacks a corridor at the side door, which lessens the family's privacy. This home, like the previous residences in the upper phase of Baghdad, is composed of three floors: the ground level, the first floor, and the roof. The first floor has three bedrooms, a hall, a bathroom, and balconies; the ground floor has a guest room, a hallway, a hall, a bedroom, a kitchen, parking, a garden, a W.C., and a private bathroom for the main room [13]

5.5 Mubarak Housing, Egypt

The example is in Kafr Sheikh City, next to the School of Agriculture and between the neighbourhoods of engineers and doctors. A house with five floors above the ground floor is used as an example. There are eight rooms on each floor. Styles come in only two different types.[14] The first and second types each have two rooms: a living room, a patio, a kitchen and a bathroom. Figure 30 shows that the first type has a net area of 46 m^2 and the second type has a net area of 55 m^2..The researchers offered some optimization steps for achieving design flexibility in this case study. The living room or the extra bedroom can be used to practice or load the receiving activity. The study of exclusion and exploitation shows that the living room should not be included because it is very likely that the living room and reception area will be used at the same time. [15]The extra bedroom could be used instead. In times of high occupancy, the sitting room can also be used as an extra space for the front desk. The master bedroom got a terrace that was used for "sitting in the open air" activities. It became impossible to do things like "sitting in the open air." [16] Using big folding windows like the ones in Figure 2.32 can add to the bedroom space if the design is flexible enough. The living room or bedrooms are both good places to study. Based on the exclusion/exploitation analysis, using a foldable table in the sitting room is better for better air flow and natural light The dining action can be done in the kitchen or living room. Two different methods can be used by using an open plan as a flexible building method. 1) an easy-to-fold eating table 2) A eating table that stays in place

A big problem is that the units don't have enough space for all the different sizes of families. Instead, the brand-new units can be planned with different types of areas [17,18].

6. CONCLUSION

This study is conducted to explain the principles of tiny houses and how their application in small dwellings may increase living comfort for the residents of Baghdad, who are suffering badly under the pressure of tight spaces. The research will focus on adopting those principles in a way that enhances functionality, comfort, and sustainability in such homes to upgrade the lifestyles of occupants.By carrying out such a study, the immediate beneficiaries would be people who are forced to reside in cluttered apartments of Baghdad, suffering from disorganisation and lost privacy, along with emotional anguish due to their living situation. The findings can also enlighten architects, city planners, and lawmakers concerning various design tactics that contribute to effective design and greener practices that can be carried out in the building of urban housing.

Tiny house design is crucial in the maximization of living conditions in small houses. Tiny house design can create the most out of the small space if the layout, storage solutions, and furniture for multifunction’s are carefully planned. Other strategies, such as the use of natural lighting, inclusion of outdoor living areas, and maximization of vertical space, can help improve the functionality and comfort of a tiny house.

The concept of tiny house design in architecture, on the other hand, is viewed as a technique aimed at maximizing space and functionality in a compact dwelling. It strives for creative use of space, multifunctional furniture, and design strategies that enhance the notion of space and comfort. Designing a tiny house is a challenge to traditional architectural concepts of form; it challenges an architect to think creatively about utilizing every square foot. Tiny house design should include innovative ways of storing things and using vertical space to create a more efficient use of space without sacrificing aesthetics. This shifts towards smaller living. In this regard, sustainable materials and energy-efficient systems should be integrated into the tiny house design. The other way these houses achieve sustainability is through natural light and ventilation, making the interior of the house much healthier for those occupants. Tiny house design reveals a growing urge to live more simply, efficiently, and environmentally.

This study comes at a time when there is a gap in the studies of applying tiny house design principles to already existing small dwellings in culturally specific contexts like Baghdad. Therefore, the research is aimed at looking into the challenges confronted by residents living in small Baghdad dwellings and how tiny house design principles might be adapted to improve their quality of life.

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Conflicts Of Interest

The author's affiliations, financial relationships, or personal interests do not present any conflicts in the research

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