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The Design of Tube Houses in Vietnam According to The Orientation of Wellness Architecture

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Abstract

In modern architecture, the health factor of users is a matter of concern. Building spaces following the Wellness architectural trend focus on improving users' health, wellness, and comfort. The WELL Building Standard is applied to many housing projects as a criterion for enhancing the quality of the building environment. Tube houses are a typical type of residential architecture in most Vietnamese cities with the need to improve the quality of living space. The research objective of the article is to propose the design orientation of tube houses in Vietnamese cities following the Wellness architectural trend. The article uses the following research methods: data collection, analysis-synthesis, and systematization. The research results provide solutions according to the main elements of tube house architecture such as landscape environment, architectural features, interior conditions, and microclimate. The conclusions will contribute to practical design work and can supplement and perfect the standards and opinions of stakeholders on the development and management of tube houses in Vietnam in the future.

1. Introduction

As defined by the Global Wellness Institute, Wellness architecture is characterized by a harmonious balance between physical, emotional, cognitive and spiritual health through humanistic design solutions [1]. The artistic and technical elements of architecture are harmoniously coordinated according to the criteria of regenerating the natural environment and raising social awareness of health in the building.

The International WELL Building Institute is a public benefit corporation that administers the WELL Building Standard (WELL), applied to many different projects. WELL is the first building standard focused entirely on assessing the ability of buildings to enhance human health. Healthcare solutions commonly used in contemporary architecture in the world include integrated planning solutions, landscape, building shapes, space organization, use of materials... in combination with the discovery of new technologies to improve the health of occupants.

The cities in Vietnam have experienced rapid urbanization in recent years, leading to many challenges such as increased traffic congestion, air pollution, and housing shortages. In this picture, tube houses are considered as one of the important architectural objects with many negative effects on the quality of the living environment of the people. The inadequacy of the landscape environment, architectural characteristic and quality of interior space in tube houses poses problems for their renovation and improvement in Vietnamese cities in the future. The

architectural solution not only meets the design requirements, but also adapts to the new forecast of changing conditions – of architecture - planning, socio-economic and landscape environment in urban areas.

The research objective of the article is to propose the design orientation of tube houses in Vietnamese cities following the Wellness architectural trend. Research methods in the article are appropriate to the topic, subject and scope of the research. The research results provide solutions according to the main elements of tube house architecture such as landscape environment, architectural characteristics, and interior and micro-climate conditions. Within these factors, the issues and elements of townhouse architecture in Vietnamese cities are identified and considered, thus covering the criteria of Wellness architecture.

This trend is still new to Vietnam, so the criteria, opinions, and experiences are suitable tools at the present time and in the near future. In the future, when the actual conditions allow for better integration with architectural identity elements and community cultural values, the recommendations and conclusions of the paper will be upgraded and expanded.

1.1 Wellness Architecture

The concept of health dimensions and their definitions have been developed and popularized by many professionals in the field of health and wellness, however, for architects, it is a new topic. In 2011, Roscoe L.J and Foster L.T. et al. conducted reviews and evaluations from many sources to determine the definition of health with the conclusion of 6 characteristics: (1) physical; (2) mental; (3) social; (4) environmental; (5) spiritual and (6) intellectual [2, 3]. According to Ruff and Mackenzie's research, in addition to conventional medical solutions, it is necessary to enhance human self-healing ability through other solutions such as architectural design [4]. In architectural design to improve the health of users, it is necessary to consider all details of the shape and space to ensure unity and balance [5]. Both health and the environment are vital for human life [6].

According to statistics and our building usage practices, we spend most of our day indoors, so the design of space has a great impact on our health [6]. Many experts and researchers have written about health architecture, emphasizing the role of architectural design in ensuring health and enhancing human happiness.

WELL is a measure of spatial quality for the design and operation of buildings, interior spaces, and communities. In WELL, there are 7 standards with 102 features: (1) air – 29 features; (2) water – 8 features; (3) nourishment – 15 features; (4) light – 11 features; (5) fitness – 8 feature; (6) comfort – 12 features and (7) mind with 19 features [7]. This can influence decisions related to building systems and materials, indoor environmental quality, accessibility, and other aspects of design and operations.

Health care is a crucial factor to consider in any type of building, including tube houses, that can be achieved through reasonable design. With increasingly alarming data on the detrimental effects of many chemicals found nearby, the emerging field of green chemistry and new building technologies offer opportunities to better address how the home environment impacts the health of occupants [8]. The same space can be good in terms of wellness or not, depending on context, culture, time, age, status, and many other changeable variables [6, 9]. The below list is a summary of key factors influencing wellness in a house: (1) sight/mind; (2) light; (3) sound; (4) temperature; (5) air quality; (6) visual biomorphic forms and patterns; (7) water; (8) sense of control; (9) social connection; (10) sustainable material and methods [10].

1.2 Wellness Solutions

Wellness solutions are commonly used in contemporary architecture and design around the world. Common wellness design solutions include renovating interior spaces to be more environmentally friendly in terms of materials and lighting, increasing access to outdoor spaces, and incorporating spaces for exercise, relaxation, and mindfulness practices. Key elements that need to be considered in design include exploiting natural light and quality views, reducing noise, connecting the senses with nature, renovating the landscape in an ecological way, using healing colors, ensuring comfort and privacy, maintaining cleanliness, and being human-centered [11, 12, 13].

Wellness architecture can be applied to a wide range of building types, including residential buildings; healthcare facilities; workplaces; educational facilities; and retail spaces... In terms of housing architecture, there are several types and orientations that are particularly well-suited for promoting health and wellness: (1) Green housing; (2) Biophilic design: (3) Active design; (4) Passive housing; (5) Smart homes; (6) Co-living housing and (7) Universal design.

Based on the World Health Organization's definition of health, there are four factors that designers need to consider to address (Table 1) [14].

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Table 1 *Design requirements for health promotion*

Factors	Design requirements
Physical	Creating comfort and safety in a microclimate that adapts to the surrounding conditions.
Psychological	Creating a positive connection between users and spaces, increasing emotional and mental well-being.
Social - wellbeing	Enhancing relationships in the community through spaces rich in culture, sports and collective activities, promoting interaction, improving work efficiency.
Ecological	Connecting with nature, transforming man-made spaces in a more ecological way.

Studies also point to ways in which happiness can be achieved through architectural design, such as (1) Connecting; (2) Staying Active; (3) Mindfulness; (4) Continuing to Learn; and (5) Giving. Additionally, to create a better design should be designed with psychology in mind and understand how residents are affected by the built environment to reach a surrounding that supports our behavior and experience [15].

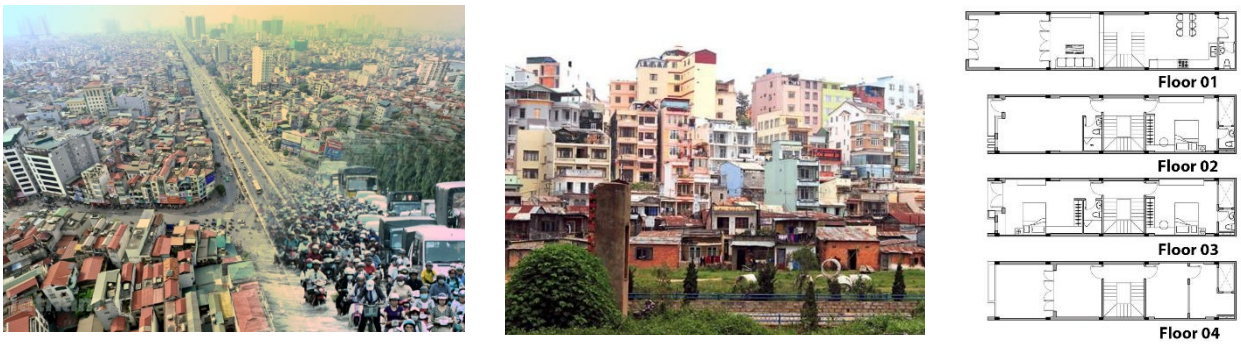
Incorporating sustainable design principles into our built environment can have significant benefits for both the environment and human health. Sustainable design is holistic, with many elements of a building's form and engineering in relation to the natural environment, while healthcare design is human-centered. Integrating wellness and sustainable features into the building can show similarities in Table 2.

Table 2 *Integrating wellness and sustainable features*

Architectural orientation	Wellness	Sustainable
Features	Air quality; comfort; mind; nourishment; fitness; water quality; community	Indoor environment quality; energy; materials; water efficiency; site; innovation

1.3 Tube House in Vietnam

Tube houses are a common form of housing in urban areas in Vietnam, where land is limited and demand for housing is high [16]. Architectural characteristics such as (see Fig. 1):



(a) **(b)** **(c)**

Fig. 1 *Architecture of tube houses in Vietnam (a) Landscape environment - Residential area, https://moc.gov.vn/tl/tin-tuc/73648/do-thi-thong-minh-o-viet-nam--nhin-tu-quoc-gia-co-dac-diem-tuong-dong.aspx; (b) Architectural characteristic - Tube houses in residential area, https://ashui.com/mag/tuongtac/phanbien/2735-do-thi-viet-nam-phat-trien-khong-ben-vung.html; (c) Interior and micro-climate condition - Plans of tube house, https://noithatmanhhe.vn/mat-bang-nha-pho*

1.3.1 Landscape Environment

Tube houses account for a large proportion of the total residential area in Vietnam. High building density (almost 100%) with small-scale constructions creates many disadvantages for climate conditions in the living space. Maximizing the use of land area causes disorder in the facade with limitations on ventilation and lighting. In

addition, conditions for transportation and landscape do not ensure the climate in residential areas and urban areas. Most of the landscape with green spaces is urbanized to serve other purposes such as commerce, transportation access, parking lots, etc. The ability to create gardens with layouts of pathways, seating areas, and water features is limited. The views from inside and around the house are not highly valued.

1.3.2 Architectural Characteristic

Designing, constructing, and using tube houses create a precedent for freedom in planning and construction of works. The typical shape of the floor plan is a long and narrow rectangle, with a length-to-width ratio of 3-5. The typical land plot size is 4-6m width and 15-25m length. The height is usually around 2-5 floors. The function is divided into different categories: residential, residential combined with commercial services, residential combined with offices, conversion of function to commercial services or offices (non-residential), and other functions. Among these, the residential function is the most common, especially in alleyways, while other functions are prioritized for main roads, where the front of the house can be used for commercial, service and office purposes.

1.3.3 Interior and Micro-climate Conditions

Tube houses in Vietnam are often small and cramped, with limited space for storage and activities, limited open spaces, and natural light. This can contribute to poor indoor air quality, insufficient ventilation, and a lack of privacy. The modular construction of tube houses can limit design options and creativity, making it difficult to create unique and aesthetically pleasing spaces.

A major issue is the freedom in design, construction, and large-scale construction in all cities in Vietnam. This affects the identity of Vietnamese architecture. As land values continue to rise and the demand for affordable housing remains high, it's likely that the use of tube houses will continue in Vietnam.

In addition, the current practice of designing tube houses is applying many solutions towards improving the quality of life. The above solutions may not be fully consistent for a typical tube house in the limited conditions of urban areas in Vietnam, but they are contributing to the orientation of tube house architecture towards Wellness architecture. When considering the above design solutions according to the criteria of Wellness architecture, they meet many important factors. The solutions currently in use can be summarized in Table 3.

Table 3 *Architectural design solutions for tube houses improve the quality of living space*

Factors	Landscape environment	Architectural characteristic	Interior and micro-climate condition
Solutions	Landscape improvement in residential areas	Shapes that match architectural identity	Minimal details in space
	Exploiting community spaces to connect with the living environment	Modern, minimalist functionality, optimizing space	Ensure natural ventilation and lighting: use skylights, courtyards, etc.
	Create front and back yards with green areas and water surfaces	Ensure sun protection and heat protection	Prioritize user activities and emotions
	Exploiting the openness of the rooftop	Use the buffer space between the inside and outside of the house	Utilize indigenous and sustainable materials and finishing techniques
		Exploiting traditional architectural experience in building envelope design	Exploiting visual interaction inside and outside space, increasing interaction

Nowadays, many architects have applied similar solutions to real projects. Some typical projects can be summarized as follows in Fig. 2.

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(a) **(b)** **(c)**

Fig. 2 *Tube houses in Vietnam with design solutions to improve the quality of living space (a) Folding garden house, Vo Trong Nghia Architects https://kienviet.net; (b) The longcave, Ngo Viet Khanh Duy, https://kienviet.net; (c) Bird's Nest House, Atelier NgNg, https://kienviet.net*

Traditional Vietnamese architecture has several distinct features and solutions that have been developed over time to suit the country's climate, cultural values and construction techniques. The integration of traditional architectural solutions with modern tube houses design can result in homes that are not only functional and efficient, but also culturally rich and aesthetically pleasing. Cultural characteristics are considered as requirements in shaping the design of buildings and homes, including the incorporation of wellness elements. Different cultures have different values, beliefs and lifestyles, which influence their architecture and living space design, so it is necessary to study and evaluate indigenous cultural values.

There is a growing trend towards designing tube houses with flexible, multi-functional spaces that can adapt to changing lifestyles and needs. The development trend of tube houses in Vietnam has been shifting towards creating more energy-efficient, sustainable, and cost-effective structures. The future of tube houses in Vietnam will be shaped by a complex interplay of economic, social, and political factors, as well as evolving attitudes towards urban development and housing.

2. Research Methods

The results of the paper are based on the scientific basis of the application of healthcare architecture in different buildings, especially in housing projects. The architectural characteristics of tube houses with actual conditions in Vietnamese cities are considered with many problems and disadvantages affecting the quality of the living environment. The criteria, solutions, experiences and trends of wellness architecture are analyzed and synthesized, especially the elements of the architectural spaces that affect the health of residents. All the above factors are similarly considered in the context of the architecture of tube houses in Vietnamese cities in order to provide orientations and solutions for tube houses development in Vietnam.

The paper uses following methods:

• Data collection is used to review existing literature on healthcare architecture, as well as case studies of successful healthcare-focused designs for small or narrow spaces. The paper considers the following: healthcare architecture theory and practice; research, perspectives and standards being applied in the design of buildings to improve spatial quality; the current state of tube houses and solutions to improve spatial conditions in tube houses in Vietnam.

• Analysis-synthesis is used to examine the existing tube house architectural features in terms of promoting Wellness, and identify potential areas for improvement. This could involve looking at factors such as lighting, ventilation, noise reduction, access to green spaces, and other elements that can impact overall well-being. In addition, other relevant features such as the landscape and interior of tube houses in Vietnam are analyzed and synthesized, in order to highlight the issues of tube house architecture in the context of health architecture.

• Systemization is used to explore potential solutions and feasibility of wellness architecture in the context of tube house design. The architecture of tube houses is considered at levels from the general to the detailed, from

the outside to the inside, and from the external architectural elements to the architecture and use of space, such as: architectural landscape; architectural features; and micro-climate and interior conditions.

3. Results and Discussion

3.1 Wellness Solutions in Tube Houses in Vietnam

Improving the well-being and health conditions of tube houses in Vietnam can be achieved by following solutions in Table 4.

Table 4 *Solutions for the architecture of tube houses*

Factors	Landscape environment	Architectural characteristic	Interior and micro-climate conditions
Solutions	Incorporating design elements for physical activity, such as shared green spaces and paths for walking or biking.	Increase the space area by reducing the number of rooms, optimizing space in a minimalist direction, prioritizing flexible solutions in space organization, and enhancing convenience such as individuality, extensibility, and versatility...	Incorporating large windows, skylights, and outdoor spaces that allow natural light and views to penetrate the interior.
	Creating community spaces and promoting community activities.	Incorporating elements of nature into the design, such as green spaces, plants, and natural materials.	Ensure thermal comfort by controlling temperature, humidity, and airflow.
		Using materials that are sustainable and eco-friendly.	Using materials and systems that improve indoor air quality and ventilation.
		Minimize noise levels.	Using materials that are sustainable and eco-friendly.

In the future, should be considered incorporating wellness principles and features into the architectural design of tube houses. Incorporating innovative technologies and materials that support wellness, such as smart home systems, renewable energy systems, and healthy building materials, can further enhance the overall health and well-being of residents. Changes in the needs and lifestyles of Vietnamese society in the future also need to be taken into account in providing comprehensive to detailed solutions for improving the quality of the living environment in the tube house, which contributes to promoting the development and replication of applications of Wellness architecture. However, it is important to evaluate and classify design solutions according to criteria of investment costs and feasibility in the actual conditions of architecture and planning in Vietnamese cities.

Tube houses are commonly found in several countries, with a variety of strategies to improve living conditions. For example, some have focused on incorporating natural light, ventilation, and greenery into the design to create a healthier indoor environment. Others have explored innovative building materials and construction techniques that increase the durability, insulation, and sustainability of these homes. Some architects have explored ways to create functional, flexible living spaces that can be adapted to the changing needs of residents over time.

In addition, for low- and middle-income urban areas, the need for improved living conditions is urgent. For example, in Malaysia, research and practical design studies have shown many advantages of the following solutions, such as:

- Improving the quality of the microclimate inside the residential area and house.
- Optimizing space and area.
- Creating multi-purpose and flexible spaces in balancing privacy and community.
- Use more sustainable techniques and materials, and increase reuse of local resources.
- Increase green space, transitional space, and community connection [17].

There may not be a direct comparison between the wellness solutions used in tube houses in Vietnam and those used in other types of houses around the world, as the specific challenges and limitations of tube houses in Vietnam may require unique and tailored solutions. It's important to note that some of these solutions may not be feasible due to limited space, cost, or other factors, and a multi-faceted approach may be necessary to effectively address the health challenges associated with living in tube houses.

In reality, people living in tube houses in Vietnam often face several challenges in terms of building architecture and space improvement, which negatively affect the quality of life. To address these challenges, it is necessary to assess and identify the actual needs of people at each stage of urban development when designing and developing new houses. Combining design solutions, finishing techniques and stakeholder participation can create more livable, attractive, and sustainable tube houses in Vietnam in the future. In addition, it may be beneficial to provide support and resources to help residents improve their housing and access essential services and amenities.

Using sustainable and responsibly sourced materials is an important aspect of wellness architecture. In the case of decreasing forest resources in Vietnam, it may be necessary to look for alternative materials that meet the same functional and aesthetic requirements. Sustainable and eco-friendly materials often come with a higher price tag compared to traditional building materials. Additionally, the long-term benefits of using these materials, such as lower energy bills and improved indoor air quality, can help make the investment worthwhile in the long term.

3.2 Integrating WELL Building Standards into Tube Houses in Vietnam

To be considered truly suitable for Wellness architecture, tube houses need to meet certain standards, such as those outlined in the WELL standard. Whether these solutions are applicable to tube houses in Vietnam will depend on the specific conditions and regulations in Vietnam, as well as the ability to realize and replicate WELL features in the tube house design context. These issues depend on factors such as the project location, available resources and technology, local building codes and regulations, and the project budget.

The application of the WELL standard features in tube houses in Vietnam could involve the following factors, listed in Table 5.

Table 5 *The application of the WELL standard features in tube houses*

Factors	The application of the WELL standard features in tube houses
Air quality	Ensuring adequate ventilation and air filtration systems to promote healthy indoor air quality
Water quality	Connect the house with clean and cheap water sources, ensuring a safe drainage system.
Nourishment	Providing access to healthy and nutritious food options and promoting healthy eating habits
Light	Maximizing natural light and energy-efficient lighting solutions for a healthy circadian rhythm
Fitness	Incorporating design features that encourage physical activity, such as outdoor spaces for exercise or stairs instead of elevators
Comfort	Designing spaces that are thermally comfortable and acoustically incorporating design elements that promote the stimulation of the five senses and access to nature
Mind	Incorporating design elements that promote mental well-being, such as access to nature and opportunities for social interaction

For the future application or WELL Building Standard, additional attention should be paid to technical issues, investment and operation costs of the project. The technical systems used in tube houses in Vietnam can have a significant impact on the overall wellness of the dwelling. Using renewable energy sources also contributes to increasing the environmental adaptability of the house, helping people get closer to nature. Additionally, careful consideration must be given to the maintenance and upkeep of these systems to ensure they continue to function effectively over time.

The financial condition of people living in tube houses in Vietnam can be a significant challenge for improving their housing conditions. Balancing the cost and health in the context of tube houses in Vietnam can be a challenge. On one hand, people in Vietnam often face financial constraints and may prioritize affordability over health and wellness when it comes to housing. On the other hand, the government and various organizations have been implementing initiatives and programs aimed at improving the living conditions in tube houses and promoting healthy and sustainable housing, such as: (1) implementing policies and regulations; (2) providing financial support; (3) investing in infrastructure: (4) encouraging public-private partnerships; (5) conducting research and evaluations. In general, incorporating wellness features into the design of tube houses can increase the cost of the project compared to traditional building methods, but it can also provide long-term benefits. It's important for the architect and the client to carefully consider the cost-benefit trade-off and make an informed decision based on their priorities and budget.

In addition, the researchers also draw conclusions about general solutions regarding the landscape environment, architectural features, interiors and microclimate conditions of housing projects [17]. Many of these solutions could potentially be adapted and implemented in the context of tube houses in Vietnam. However, it is

important to note that the real architectural features of tube houses can vary significantly between countries and regions, depending on factors such as climate, culture, and economic conditions.

The future of wellness architecture will depend on a variety of factors, including the evolution of building technology, changing societal values, and advances in our understanding of the relationship between buildings and health. Additionally, wellness architecture also considers the impact on the environment and seeks to use sustainable design practices to minimize this impact.

4. Conclusion

Wellness architecture will thrive when living standards are improved and the imbalance between countries, territories, and communities is narrowed. The theoretical background, opinions, and experiences in the application of wellness architecture are considered to be close to architecture in many different conditions, including Vietnam. Tube houses in Vietnamese cities are characterized by indigenous architecture with a long-term history and future. The application of the criteria and practical solutions of wellness architecture to tube houses is a difficult but necessary problem.

The article's proposals cover all aspects of architectural objects in the current and future context of Vietnam. These results will contribute to the improvement of design skills, the requirements of standards, and the awareness of stakeholders about improving the health of residents. The historical and cultural characteristics of tube houses need to be considered through factors of local architectural and cultural identity. In addition, in the current trend of sustainable architectural development in Vietnam, tube houses will be the main subject for research and practice on improving people's health.

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Conflict of Interest

There is no conflict of interest regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: ***Study conception and design:*** *Van Tin Nguyen, Hong Loan Nguyen;* ***Data collection:*** *Van Tin Nguyen, Hong Loan Nguyen;* ***Analysis and interpretation of results:*** *Van Tin Nguyen, Hong Loan Nguyen;* ***Draft manuscript preparation:*** *Van Tin Nguyen, Hong Loan Nguyen. All authors reviewed the results and approved the final version of the manuscript.*

References

[1] Lahra Tatriele, (2024, June 20), Wellness Architecture Terminology & Definitions, *Global Wellness Institute*, https://globalwellnessinstitute.org/global-wellness-institute-blog/2024/06/20/wellness-architecture-terminology-definitions/

[2] Roscoe, L.J. (2011) Wellness: A Review of Theory and Measurement for Counselors, *Journal of Counseling & Development, 87*, 216-226, https://doi.org/10.1002/j.1556-6678.2009.tb00570.x

[3] Foster L.T., Keller P.C., McKee B. & Ostry A. (2011). *British Columbia atlas of wellness 2nd edition*. Western Geographical Press, British Columbia, Canada.

[4] Ruff, K. M., & Mackenzie, E. R. (2009), The role of mindfulness in healthcare reform: A policy paper. *Explore the Journal of Science & Healing, 5(6),* 313–323, https://doi.org/10.1016/j.explore.2009.10.002

[5] Geddes J.K. (2019), *What Is Wellness Architecture? Home Design That Promotes Healthy Living*, [Press release]. https://www.realtor.com/advice/home-improvement/wellness-architecture/.

[6] Ružica B.S., Health and architecture – from serving ideologies to becoming an ideology. *Architecture and ideology.*

[7] McAuliffe S. (2022, Feb 01), Is wellness architecture the future of the industry? *The Blog of Glass Solutions in London & The UK.* https://www.cantifix.co.uk/blog/is-wellness-architecture-the-future/.

[8] Bayer S. and Stinson J., Magnusson Architecture and Planning (2021), Six Ways to Healthier Housing. *American Institute of Architects New York (AIANY) and the Center for Architecture, (Fall 2021 Issue).* https://www.aiany.org/membership/oculus-magazine/article/fall-2021/six-ways-to-healthier-housing/.

[9] Sternberg E.M. (2009), *Healing Spaces: The Science of Place and Wellbeing*. Belknap Press, Harvard University Press, Cambridge, pp. 263, 1-24.

[10] Browning W., Catherine O. Ryan, Joseph Clancy (2014), 14 Patterns of Biophilic Design: Improving Health and Well-Being in the Built Environment. *Environmental Science, Engineering.* https://api.semanticscholar.org/CorpusID:198347522
[11] Iyendo, T.O.; Uwajeh, P.C.; Ikenna, E.S. (2016), The Therapeutic Impacts of Environmental Design Interventions on Wellness in Clinical Settings: A Narrative Review. *Complement. Ther. Clin. Pract. 2016, 24*, 174–188.
[12] Rodiek, S. (2008), "A New Tool for Evaluating Senior Living Environments". Seniors Housing and Care Journal, 16(1), 3-10.
[13] Beggs J.L. (2015), Healing through architecture, [Master's thesis]. University of Waterloo, Waterloo, Canada.
[14] Steemers K. (2015), Architecture for well-being and health (2021 May 07). *Health and Well-being. 6th VELUX Daylight Symposium*, London, 2-3 September 2015.
[15] Cavazos A. (2020), Designing for health and wellness in affordable urban housing, [PhD. thesis], Florida State University, Florida.
[16] P. Hoang (2018), Current Tube House Architecture - Current Status and Recommendations. *Journal Architecture Vietnam, 2018*. https://kientrucvietnam.org.vn/kien-truc-nha-pho-hien-nay-thuc-trang-va-de-xuat/
[17] Ismail A.S., Mohidin H.H.B. & Daud M.M. (2017), A Review on Occupant's Satisfaction and Wellness Level in Low-cost Housing in Malaysia, *Planning Malaysia Journal, 15(3),* https://doi.org/10.21837/pm.v15i3.305.