

Urban Thought In Traditional Houses Architecture In Dubai - United Arab Emirates

Laila Mahmoud Hassan Tony

PhD Researcher in Islamic Archaeology
Faculty of Arts, Minia University

Abstract: *This research deals with the urban thought in the architecture of traditional houses in Dubai in the United Arab Emirates, which includes the environmental, historical, cultural, social, technical and aesthetic components, through two axes: the components of urban thought in architecture, and the components of urban thought in the architecture of traditional houses in Dubai. The study of the architecture of traditional houses in the city of Dubai deals with the study of urban thought in the architecture of heritage buildings, as the urban and architectural thought of any region is formed as a result of environmental, historical, cultural, social, technical, aesthetic and other influences, which contribute to shaping the general character of the local urban environment. These components have affected the urban thought of archaeological and heritage buildings in the city of Dubai. They include: the environmental component, the historical component, the cultural component, the social component, the technical component, and the aesthetic component. As for the principles of sustainability in the construction of traditional houses in Dubai, it is worth noting that the principles of sustainability in the construction of the city of Dubai are based on several foundations, the most important of which is the compatibility of historical and heritage buildings with the environment with all its positives and negatives, as protection was achieved by reducing the impact of harsh natural environmental conditions such as hot climate, relative humidity and intense solar radiation, while adaptation was achieved by exploiting the potential of natural energy sources such as the sun and wind. There are many basic principles on which the architecture of traditional housing is based, which with some modification and development can be indicative indicators for the design of contemporary sustainable housing, including: stone construction, thermal comfort, natural ventilation, natural lighting.*

Keywords: Urban thinking, traditional houses in Dubai, sustainability principles, heritage buildings, urban environment, historical buildings, heritage buildings.

First: Components of urban thought in the architecture of traditional houses in Dubai

The study of the architecture of traditional houses in Dubai deals with the study of urban thought in the architecture of heritage buildings, as the urban and architectural thought of any region is formed as a result of environmental, historical, cultural, social, technical, aesthetic and other influences that contribute to shaping the general character of the local urban environment. These components have affected the urban thought of archaeological and heritage buildings in the city of Dubai.

1. Environmental component

It is the environment or surrounding conditions that affect the life and growth of all creatures from different terrains and what is on it from plants, humans and atmosphere. Nature has necessitated horizontal urban expansion with extreme narrowness in streets and roads and lack of open spaces and spaces. The local climate of each urban area also affects the formation and definition of its character and the appearance of its natural and urban formation.

The environmental component shows how to deal with the environment, how to use the raw materials available in it, in addition to what it provides in terms of understanding material life, lifestyle, and adaptation to the region, its climatic characteristics, topography, geography, and location.

Commitment to the environmental component has led to the adaptation and adjustment of the architectural composition of buildings to climatic conditions while preserving the religious and social values of society, taking into account the elements that work to moderate the temperature of the incoming air and provide appropriate ventilation and natural lighting for the interior spaces and protect them from the force of dazzle and reflected rays, in addition to the catchments that help in bringing in sea air to limit the rise in temperature.

Traditional houses in Dubai are distinguished by the architect's success in overcoming the harsh climate in the region by providing the necessary ventilation for the houses by adopting the planning of houses with open courtyards, and using barjeels or wind towers to provide the necessary ventilation and cooling for the rooms of the houses, especially in the summer.

2. Historical Component

Through the historical background of the city of Dubai, we can identify the important civilizational periods that have planted their strong roots in its components, and then these components can be analyzed and the methods by which the civilizational heritage of this city can be linked to its planning and architecture can be extracted. This historical and civilizational frequency and communication explains to us the diversity of the formative vocabulary in the archaeological and heritage buildings in the city of Dubai and the diversity of their architectural styles.

Traditional architecture in all the countries of the Arabian Gulf is distinguished by its architectural and decorative elements that the local architect at that time placed and exploited in the best way in the construction engineering that he implemented, despite the lack

of abundance of various types of building materials, so traditional architecture in the Arabian Gulf region, with its various types and simplicity, came as an honest expression of the life that people lived in that period, and it was undoubtedly full of hardship¹.

The growing foreign trade activity between the people of the UAE and the countries of the Indian Ocean or the Arabian Gulf resulted in the arrival of many influences and ideas that were implemented in the traditional houses of Dubai. This was represented in the use of some building materials such as sandal wood brought from East Africa, India and others, as well as ready-made columns and doors from India and many materials from Persia².

The location of the United Arab Emirates at the entrance to the Arabian Gulf helped some of the emirates to grow and prosper, especially the Emirate of Dubai, which grew rapidly and turned into a commercial city, and capital increased in it. Craftsmen came to it from neighboring countries, especially from Persia and India, who excelled in building mosques, shops, residences and castles, which left clear imprints on the Emirate of Dubai³.

The Arabian Gulf region in general and the regions of the United Arab Emirates in particular witnessed several periods of mutual migration between the coast of Persia and its southern regions and the emirates of the Arabian coast opposite them, due to several intertwined political and economic circumstances during those periods.

The most important feature of these migrations and population movements was that they contained a considerable number of merchants and businessmen who represented a significant cultural weight by the standards of that era. Consequently, the movement of these groups and their final settlement on the coast of the United Arab Emirates gradually carried with it some noticeable social and cultural influences. Perhaps the Bastakiya neighborhood in Bur Dubai and the clear influences it contained in its architectural and artistic features express what its pioneers brought from the "Bastak" region, which was a place of interaction between the Arab and Persian heritages⁴.

The UAE's contact with many countries also contributed to the ease of obtaining some building materials; teak wood, which is a kind of wide plank that is placed on the girders of the jandal, was brought to support the roof of the house. There were some special types of wood imported from Mombasa in East Africa, and a building material was imported from southern Iraq, which is "baskel" or "basgil".

Some of the materials needed for construction were imported from Italy for some distinguished houses, such as the decorated columns found in some traditional houses in the Bastakiya district in Dubai. Some of the welding materials plaster and paint materials were also imported from areas near the city of Lingeh on the opposite Persian coast⁵.

As for the large doors, some of them were brought complete from India, as were some ready-made thresholds and windows, screens and barriers. In addition, much of the furniture used in traditional houses came from abroad, especially beds made of sesame wood from Pakistan and India⁶.

3. Cultural Component

Ibn Khaldun states in his introduction: "Culture is the creation of man through the effort, thought and activity he has made to fill the gaps in his original nature and his needs in his environment so that he can live a prosperous life with tools and factories. The concept of culture as stated in Webster's Dictionary: "It is the total sum of human behavioral and technical patterns transmitted from one

¹ Al-Khalifi, Mohammed Jassim (2003). *Traditional Architecture in Qatar*, Doha: Department of Museums and Antiquities, p. 213; Abdul Jalil, Mohammed Madhat Jaber (2000). *Traditional Architecture in the United Arab Emirates*, Al Ain: Zayed Centre for Heritage and History, pp. 116-117.

² Al-Kuwaiti, Sheikha Ali (1995). *Old buildings and their use in modern architecture*, Symposium on the Preservation of Architectural Heritage in the Emirates (June 3-5, 1995), p. 321.

³ Al-Abdouli, Khalfan Jassim (1989). *The development of the architectural trend in the United Arab Emirates*, p. 76; Mustafa, Muhammad Hilmi Muhammad (2014). *Gypsum decorations in Qatar*, Proceedings of the 17th Conference of the General Union of Arab Archaeologists: Studies in the Antiquities of the Arab World, pp. 623-625.

⁴ Al-Abdouli, *The Development of the Architectural Trend in the United Arab Emirates*, p. 63.

⁵ Abdullah, Adel Mahgoub (1995). *Revival of Al-Ahmadiyya District*, Symposium on the Preservation of Architectural Heritage in the Emirates (June 3-5, 1995), pp. 117-118; Fouad, Narmin Ahmed Mohamed. *Architectural Elements of Coastal Houses on the Coast of the Emirates in the Eighteenth and Nineteenth Centuries AD*, Master's Thesis, Cairo: Faculty of Archaeology, Cairo University, 2022, p. 129.

⁶ Fuaad, *Architectural Elements in Coastal Houses, UAE Coast*, p. 129.

generation to the next, or it is: the basic or total composition of ideas and material things that a society or group has approved for the continuity of their collective life.

The population structure of the city of Dubai - since ancient times and still is - was not limited to Arabs alone, as it included foreign communities who descended to it with their arts, money and some of their sciences, and it soon expanded to accommodate those who descended to it and made room for them as it does today.

Some of its elements were affected by external influences as a result of continuous contact with the outside world for long periods and as a result of the settlement of many Islamic communities in it, including many craftsmen and skilled workers in construction, whitewashing, carpentry, wood carving, etc., which led to the local architectural elements being grafted with imported work methods. The local culture of the people was not an isolated culture, but rather was grafted and influenced by other cultures.

The traditional environment was a product of cultural needs, so it appeared in a form appropriate to their lives and began to grow according to a governing cultural concept. This explains to us the distinction of its traditional buildings with unique architectural plans and elements.

4. Social Component

The social component plays a major role in shaping the urban thinking of any region, as any impact on the social features will inevitably affect the architectural features of the region. Social transformations in architectural design are most clearly evident in the external facades of buildings and architectural planning. In the traditional environment, the similarity of buildings is evidence of the unity and cohesion of society. The effects of the reflection of religious values also appear on the relationships between individuals as a whole and between neighbors, as no one harms his neighbor, does not reveal his privacy, and does not encroach on the property of others. This is noticeable in the lack of facing the doors of houses. Privacy was a major requirement in human life, as he was keen to provide the principle of privacy in homes from the inside and outside.

Therefore, we notice the similarity of the vocabulary of traditional architecture in the Dubai region, not its identity, and this is evidence of the individual's belonging to society, as the individual is the owner of the building, its designer and its creator, so he was keen to embody the unified culture in the planning and elements of the building.

The impact of religion and customs on the architecture of traditional houses in Dubai; The rooms of the house generally open onto the courtyard, leaving the outer walls with very few if any openings, except for some ventilation holes at the top of the wall, as Islamic teachings promote privacy and modesty. Often, a wall is placed directly behind the entrance gate, meaning that visitors have to take a sharp turn before continuing and ensuring that people outside the gate cannot see in, thus ensuring the privacy of the residents¹.

The harsh environment of the Arab world influenced the design of houses, but other social aspects, such as privacy, were also major reasons for the use of courtyards in Arab houses, bringing spiritual, functional and climatic benefits to the design. With the great influence of Islam, the importance of the courtyard increased because it provided privacy for the family, as the courtyard was used to separate public property from private property².

Courts affect the division of the house and the organization of spaces with their functions, starting with the first transition from heat, noise and glare from the street to the quiet, dark covered entrance to the courtyard. The second transition is the passage through the cool shaded courtyard with daylight, while the last transition is the entrance to the private rooms of the house. Islam influenced the distribution of house divisions beyond family members and space functions, and the courtyard played a major role in this distribution³.

The main purpose of the inner courtyard in residential architecture is to provide privacy for the building's occupants while they engage in daily activities⁴.

The courtyard is where all daily activities take place, and it is the permanent place where women do their daily work. According to

¹ Alnuaimi, Maitha Mohammed (2007). Daylighting Techniques Used in Indigenous Buildings in The United Arab Emirates (UAE), An Investigative Approach, Master, Texas A&M University, p. 12.

² Al-Bass, Abdul Hamid Ahmed; Al-Salafi, Jamil bin Mohammed (1994). Common architectural and planning features and characteristics in the Gulf Cooperation Council countries and ways to preserve them, p. 43.

Ibrahim, Iman, Eco-Traditional Courtyard Houses in UAE: A Case Study of the Sharjah Museums, Eco-Architecture, VII, pp. 17-18.

³ Ibrahim, Eco-Traditional Courtyard Houses in UAE, p. 18.

⁴ Hamoudi, Ahmed Fadel (1994). The importance of documenting architectural heritage and the methods used in that, p. 14. Rashdan, Wael & Mhatre, Vrushali (2019). Impact of Heritage on Contemporary Sustainable Interior Design Solutions, Transactions on Ecology and the Environment, p. 50.

customs and traditions, women are not allowed to leave the house except to visit neighbors and relatives. The courtyard also helped achieve a safety factor for residents in terms of their ability to move and practice social activities away from external dangers, especially for children, as it provides them with an open and safe place to play.

In addition, the courtyard represents an opportunity to increase living space in case of a need for future expansion, and it can also be considered a collective benefit area in the event that there is more than one family living in the house¹. As for the wind towers, the number and location of the wind towers in the house determines the importance of the rooms located underneath them. The room containing the wind tower was mainly used by the elderly or the head of the house. The wind towers also provide a space for family members to enjoy their time under the wind tower, where many sleep and rest below or even pray².

The number of barjeels also indicates the social status of the owner of the house; this is because many people cannot afford more than one or two in their house³; the more barjeels there are, the more spacious the house is, the more its seating area, the wealth of its residents, and the importance of the residents of the house.

Therefore, it is a sign that indicates knowledge of the owner of the house or place, as it is a sign of the strength of the house and its rich features⁴. The houses of the rulers include more than one barjeel, as there are houses that include three and four barjeels, such as the house of Sheikh Saeed Al Maktoum⁵.

At the same time, the distinguished financial ability of some members of society allowed them to import longer-lasting materials and to employ some craftsmen specialized in a more complex style of construction, which had begun to appear in some other Emirati cities⁶.

5. Technical Component

The construction methods followed and used in the construction of buildings, and the extent of their exploitation in order to create an environmentally, culturally and socially compatible architecture, the architecture of archaeological and heritage buildings in the city of Dubai is characterized by the use of suitable materials for building walls and ceilings.

It has been interested in using poor thermal conductivity materials such as bricks and stones in the walls and wood and palm fronds in the ceilings. The malaqaf technique also aims to provide ventilation and lighting in addition to providing privacy for the family at the same time.

It is worth noting that all building materials used in the construction of buildings are local materials from the resources of the local natural environment, which increases the great harmony between architecture and the local natural environment, in addition to the compatibility of technical components with cultural and social components, which led to the creation of functional architecture with a respectable human scale without the material aspects overwhelming it.

Barjeel is considered one of the techniques through which the architect has succeeded in achieving sustainability in homes; Barajeel

¹ Hamoudi, The Importance of Documenting Architectural Heritage and the Methods Followed in That, p. 14; Al-Bass, Al-Salafi, Architectural and Planning Features and Characteristics, p. 43; Al-Qattati, Amal Mahmoud (2021). Architecture without Architects, Doha: Public Institution for Cultural Village, pp. 87-88; Architectural Heritage Management. The Courtyard.

² Assi, Assi, Eman (2022). Layers of Meaning and Evolution of Cultural Identity: The Case of Wind Towers in Dubai, Conservation, p. 44.

³ Assi, Layers of Meaning and Evolution of Cultural Identity, p. 44; Abu Hantash, Tawfiq F. (2016). Building A Zero Energy House for UAE: Traditional Architecture Revisited, 5th International Conference on Zero Energy Mass Customised Housing – Zemch, p. 325.

⁴ Fuaad, Architectural Elements of Coastal Houses on the UAE Coast, p. 231; Saleh, Fatima Mohammed Omar. Traditional Remaining Buildings in the Emirate of Dubai "Residential Houses" from the Eighteenth to the Twentieth Century AD, Master's Thesis, Faculty of Archaeology, Cairo University, 2016, p. 272.

⁵ Darwish, Mahmoud Ahmed (2016). The problem of preserving and sustaining urban heritage (Sheikh Sa'eed House in Dubai as a model), the Fourth International Conference on Preserving Urban Heritage: Sustainable Heritage, a Global Vision, Local Experiences, Dubai. Darwish, Mahmoud Ahmed. Problematic of preserving the architectural heritage and its sustainability (Sheikh Sa'eed house in Dubai for example), International Journal of Innovation and Scientific Research (IJISR), Vol. 27, No. 2, November 2016, pp.354-364

⁶ Al-Abdouli, The Development of the Architectural Trend in the United Arab Emirates, p. 63.

is an opening that rises from the roofs of buildings in hot places, with closed sides except for the side facing the humid air currents. It catches it and descends to the lower floors connected to the catchment, and replaces the hot air that rises upwards, to moderate the temperature in the summer, by pushing¹ the hot air from inside the building to the outside through the openings in the building (windows).

The wind tower creates good air circulation, capturing cold winds from outside and directing them to the space below. In addition, the wind tower also acts as a filter, cleaning the air from sand and dust².

The efficiency of the wind tower increases according to its height, the higher it is, the more efficient it is. The height of the wind tower usually does not exceed 15 meters. The height should not be less than 2 meters above the ground³.

The wind tower is only necessary in the summer, and in the winter the homeowner covers the ventilation opening with a piece of cloth (or similar), to prevent air and dust from entering the room.

The speed and direction of the wind affect the efficiency of the wind tower; it has been found that wind towers work more efficiently when the wind speed is high and enters the wind towers at a 45-degree angle⁴.

The higher the tower, the more time the air spends in a narrow area (narrower than the area in the outer atmosphere), and the faster the air enters the room, the cooler the residents below the tower feel⁵.

6. Aesthetic Component

The facades of traditional houses in Dubai are characterized by the beauty of the architectural formation, and despite the huge size of the building, they are characterized by the simplicity of architectural expression. One of the characteristics of the mass in Dubai buildings is its horizontal orientation, and it is also characterized by rich architectural and decorative vocabulary that is distinct from other cities. We find wooden engravings with complex details, ornaments, and lattice cornices, whether engraved or hollowed out, iron works, whitework, and the distinctive ends of the building and the various arches, in addition to the interlocking wooden screens and fan windows.

The most important feature of these buildings is the woodwork, which includes engraving works rich in details and balconies decorated with wooden curtains engraved with exquisite decorations. This is coupled with the presence of the main door of the building made of wood with round arches and a unique harmony between the plaster ornaments and the art of wood carving in wonderful geometric or decorative plant lines. The sizes of these elements, as well as the quality of the engraving and engraving work in them and in their elements and facades, reflect the economic and social features of their owners.

Second: Sustainability principles in the construction of traditional houses in Dubai

There is no doubt that the principles of sustainability in the construction of the city of Dubai are based on several foundations, the

¹ Al-Abdouli, The Development of the Architectural Trend in the United Arab Emirates, p. 50; Al-Kuwaiti, Old Buildings and Their Use in Modern Architecture, p. 300; Fariduni, Barajeel in Local Architecture, p. 69; Al-Khalifi, The Engineering of the Old Palace, p. 21; Abdul-Hafiz, Wind Catchers and the Genius of Cooling in Islamic Architecture, p. 303; Architectural Heritage Management. Barajeel.

Olroyd – Robinson, The Urban Architecture of Al Bastakiyyah, p. 184; Hawker, Reflections on The Wind Tower House, p. 19; A'zami, Badgir in Traditional Iranian Architecture, p. 1021; Al Sammani, The Sustainable Development of Local Housing Units in UAE, pp. 15-16; Assi, Layers of Meaning and Evolution of Cultural Identity, p. 43.

² Architectural Heritage Management. Barajeel.

Assi, Layers of Meaning and Evolution of Cultural Identity, p. 42; Al Sammani, The Sustainable Development of Local Housing Units in UAE, p. 15-16; Assi, Layers of Meaning and Evolution of Cultural Identity, p. 44; Hejazi M. & Hejazi, B., Cooling Performance of Persian Wind Towers, p. 199; Abu Hantash, Building A Zero Energy House for UAE, p. 325.

³ Architectural Heritage Management. Barajeel.

Al Sammani, The Sustainable Development of Local Housing Units in UAE, pp. 15-16; Assi, Layers of Meaning and Evolution of Cultural Identity, p. 44.

⁴ Assi, Layers of Meaning and Evolution of Cultural Identity, p. 44.

⁵ Assi, Layers of Meaning and Evolution of Cultural Identity, p. 44; Hejazi M. & Hejazi, B., Cooling Performance of Persian Wind Towers, p. 199; Abu Hantash, Building A Zero Energy House for UAE, p. 325.

most important of which is the compatibility of historical and heritage buildings with the environment with all its positives and negatives, as protection was achieved by reducing the impact of harsh natural environmental conditions such as hot climate, relative humidity and intense solar radiation, while adaptation was achieved by exploiting the potential of natural energy sources such as the sun and wind.

There are many basic principles on which the architecture of traditional housing was based, which with some modification and development can be indicative indicators for the design of contemporary sustainable housing:

1. Stone construction

The materials surrounding the building's residents are very important to provide protection from external conditions, and great care must be taken in choosing them, so that this is consistent with their physical properties in terms of thermal conductivity, thermal resistance, thermal penetration, and light reflectivity, and they are also responsible for determining the time period for heat transfer to and from the building.

Initially, clay or mud bricks were the best natural building material, as they can provide thermal insulation for the building, and help reduce the depletion of vital natural resources and carbon emissions. In addition to bricks, which are one of the most important building materials used in these buildings, they are used in building load-bearing walls or as shoulders, and if built with a large thickness, they help provide good thermal insulation for the internal spaces of the building.

The availability of building materials is one of the most important factors affecting the architecture of traditional houses in the United Arab Emirates, due to the association of urban sites with geological formations.

Rock types played their role in traditional construction, as some types, such as coral rocks, encouraged and supported construction because they contain water and the ease of forming limestone in construction, while we find hard volcanic and igneous rocks in the stone Mountains in the eastern region that hindered construction, so the first areas usually had historical sites for human settlement. The availability of materials and the ease of shaping them also played a fundamental role in determining the locations of urban clusters and thus the ability to develop. This is in addition to the use of imported construction elements from abroad during advanced development periods, taking into account their suitability to the local character¹.

2. Thermal comfort

The design concept of traditional houses in Dubai was based on using the central courtyard as a central point to achieve the principle of inward orientation. It was the lung and main outlet for the dwelling, acting as a thermal regulator, taking advantage of the large fluctuations between temperatures between night and day, and creating different pressure areas between the narrow shaded streets and the open central courtyard.

The nature of the climate and environment influenced the architecture of traditional houses in Dubai; the climate of the Arabian Gulf region, which is characterized by little rain in the winter and intense heat and high humidity in the summer, made it unnecessary to make the roofs of buildings sloping, so they appeared horizontal and flat. In traditional houses in Dubai, shaded spaces were taken into account to moderate the temperature. People used to sleep on the roofs to escape the blazing summer heat, and the roofs were usually surrounded by a fence to protect against falling and to prevent vision from the outside².

The Arab residential architecture has always taken measures to protect the inhabitants from the extreme heat of the Gulf summer. This led to the construction of houses with thick walls for thermal insulation³.

The barjeel was the greatest Gulf response to the impact of the climate, which throws cold air downwards to soften the house, especially in the coastal cities of the United Arab Emirates⁴.

Wind towers play a major role in cooling and ventilating traditional houses, thus providing thermal comfort to the inhabitants in a natural way that does not use energy. Consequently, wind towers enjoyed widespread use in the traditional architecture of the Gulf region, especially in Dubai and Bahrain⁵.

Another solution was the inward orientation, which grouped the units of the house around an internal courtyard, in addition to achieving the principle of privacy, which had positive effects from a climatic point of view, especially in hot, dry areas, where the courtyard is considered the medium between all external climatic conditions and the internal spaces of the house, where a heat

¹Fuaad, Architectural Elements of Coastal Houses on the UAE Coast, pp. 110-111.

² Hamoudi, The Importance of Documenting Architectural Heritage and the Methods Followed in That, p. 15; Abdul Jalil, Traditional Architecture in the United Arab Emirates, p. 113.

³ Lnuaimi, Daylighting Techniques, p. 12.

⁴ Al-Kuwaiti, Old Buildings and Their Use in Modern Architecture, p. 320; Abdul Jalil, Traditional Architecture in the United Arab Emirates, p. 113.

⁵ Rashdan & Mhatre, Impact of Heritage on Contemporary Sustainable, p. 48.

exchange process takes place between them throughout the day¹.

The inner courtyard is an important factor in achieving a suitable climate for human life, as it can be viewed as the most important architectural solution to confront climate problems as an architectural and social phenomenon that has achieved real success in building architecture over the past ages². The climate of Arab countries in general, and the United Arab Emirates in particular, is very hot and sunny, especially in the summer³; therefore, there were three main design factors that must be taken into account in the courtyard, which are sun exposure, wind and humidity, as the correct orientation requires the designer to study the movement of the sun in summer and winter in relation to the sectoral plans and arrangements⁴.

Environmentally, the courtyard is a thermostat, providing shade and coolness; the orientation of the courtyards was designed to be parallel to the outside street. The shape of the courtyard is often rectangular⁵, which determines the amount of shade the courtyard⁶ provides throughout the year as well as the amount of light provided to the rooms attached to the courtyard; therefore, it was preferable for the rooms facing the courtyard to be wider along the length of the courtyard than their depth, to ensure that daylight coming from the courtyard can fill the room evenly⁷.

With the correct orientation of the courtyard, as well as the openings of the rooms surrounding the courtyard, the courtyard has a positive effect on the temperature inside the house, and the iwans in the courtyard provide more shade on the facades, which contributes to reducing the effect of heat on the walls⁸.

Traditional houses in the UAE usually take the form of a courtyard with a limited geometric design of rectangular rooms (average dimensions of large rooms = 3 x 8 m²). Therefore, courtyards are essential for cooling buildings by creating a local climate between the internal and external environment that is quieter, cleaner and more private, especially in hot climates where the shape of the building and its environmental performance work together⁹.

In the summer, instead of sleeping on the roof, people would move to the inner courtyard in search of some shade and relative coolness in the morning hours. In the hottest hours of the day, they would migrate to the lower floor until the evening when they would go out to the courtyard and cool it down a bit by pouring water on the roofs which would keep them cool as night approached¹⁰. The covered arcade is an important example of the previous phenomenon. Even on a very hot day, a moderately cool breeze blows into the arcade. This is due to the clever architectural design that employs the principles of thermodynamics. The room or arcade overlooks a windward courtyard on one side, and on the other side, a semi-closed wall with two rows of small openings blocks the prevailing winds. The air flow over and around the building creates a low-pressure area on the windward side of the arcade, ensuring a regular flow of air by drawing in through the small openings.

One of the most important environmental features of the liwan is that it is suitable for use in both summer and winter. In summer, it is a shaded place that protects the rooms from the scorching sun, and it is also a passage for air that attracts a gentle breeze into the rooms. In winter, the liwan on the upper floor is used because it is closer to the warm sun, making the liwan a place with a pleasant

¹ Fuaad, Architectural Elements of Coastal Houses on the UAE Coast, p. 118.

² Al-Qatati, Architecture without Architects, p. 85.

³ Ibrahim, Iman, Eco-Traditional Courtyard Houses in UAE: A Case Study of The Sharjah Museums, Eco-Architecture, VII, p. 17.

⁴ Ibrahim, Eco-Traditional Courtyard Houses in UAE, p. 17.

⁵ Al-Bass, Al-Salafi, Architectural and Planning Features and Characteristics, p. 43. Ibrahim, Eco-Traditional Courtyard Houses in UAE, p. 17.

⁶ Al-Bass, Al-Salafi, Architectural and Planning Features and Characteristics, p. 43. Ibrahim, Eco-Traditional Courtyard Houses in UAE, p. 17.

⁷ Al-Bass, Al-Salafi, Architectural and Planning Features and Characteristics, p. 43. Ibrahim, Eco-Traditional Courtyard Houses in UAE, p. 17; Rashdan & Mhatre, Impact of Heritage on Contemporary Sustainable, p. 50.

⁸ Abu Hantash, Tawfiq F. (2016). Building A Zero Energy House for UAE: Traditional Architecture Revisited, 5th International Conference on Zero Energy Mass Customised Housing – Zemch, p. 321; Rashdan & Mhatre, Impact of Heritage on Contemporary Sustainable, p. 50.

⁹ Rashdan & Mhatre, Impact of Heritage on Contemporary Sustainable, p. 52.

¹⁰ Al Sammani, Amani Mohammed (2021). The Sustainable Development of Local Housing Units In UAE, MSC, The British University in Dubai, p. 15.

and humid atmosphere¹.

3. Natural ventilation

Providing natural ventilation is one of the most important principles of sustainable design in traditional housing, as natural ventilation cools the human body, because the faster the air speed increases, the rate of heat transfer from the body to the surrounding environment increases, and it also helps get rid of humidity and cool the building.

The courtyard is the main element for providing the house with natural ventilation, as it is a private space surrounded by walls and buildings, where all rooms overlook it, and it is a source of lighting and ventilation of the rooms by allowing the wind to enter the house, which provides it with the best possible living environment. The courtyard is surrounded by a garden with trees planted to moderate the atmosphere.

Barjeel is one of the prominent architectural units in traditional houses in Dubai, which is a means of overcoming the difficult climatic conditions and high temperatures. Wind catchers are also the most important means of catching winds and bringing them into the building spaces, as they are considered one of the most important distinctive elements in Islamic buildings. Wind catchers create areas of varying pressure, so the air enters after being purified and humidified and then exits through other openings. The process is reversed at night. Wind catchers also help reduce dust and sand carried by the winds of hot and dry regions.

4. Natural lighting

Natural lighting is the most important strategy for a sustainable building to reduce the heat load, thus providing a comfortable environment for residents, as it was found that natural lighting from windows is three times better in improving vision than equivalent artificial lighting.

The dilemma is that windows are a major source of heat penetration into the building, which has led architecture to develop innovative methods to obtain natural lighting and expel direct sunlight, the most important of which are the courtyard and wide windows with wooden curtains, which are architectural treatments that allow the entry of gentle winds, and do not allow the entry of sunlight, and they work to control the passage of light and air flow, and finally achieve privacy.

There is no doubt that the rich and heritage buildings in Dubai are one of the most successful models in achieving the concepts of green architecture, as they succeeded in achieving a balance between beauty and function, as they found elements of Islamic architectural heritage to work and complement each other, with a combination of different climatic, environmental and social conditions.

It also faces many challenges to prove that it is capable of absorbing the requirements of sustainable development and environmental preservation, due to its distinctive principles of traditional architecture and choosing what is appropriate for the local environment and environmental influences, as this was a development and blending of these principles, and thus using the principles of traditional architecture was easier and more efficient to achieve the principles of sustainable architecture. Due to the intensity of light in the area, the lighting openings were made relatively narrow in comparison to the areas of the external walls².

The presence of the courtyard helps provide a good amount of natural lighting to the interior; as the openings overlooking the courtyard from the surrounding rooms allow reflected light to enter without allowing direct sunlight to enter. The closure of the traditional house and its orientation towards the interior and the gathering of rooms around a courtyard or two or several courtyards led to the reliance on these courtyards as a source of natural lighting during daylight hours. Therefore, the openings overlooked the courtyard to benefit from the light coming from it, as openings on the ground floor on the road are rare, and if they exist, they are at a great height above the ground.

The external facades were devoid of windows and openings except for a few of them; however, they were found in abundance inside around the central courtyard, which led to opening the windows from the inside and framing the inner courtyard with elegant panels with perforated nets, to reduce the light and glare coming from the sun. The area and height of the courtyard affect the amount of light reaching the interior.

The smaller the area of the courtyard and the greater the number of floors surrounding it, the greater the shadows inside the courtyard, which reduces the amount of light reflected into the interior. On the other hand, the larger the area of the courtyard and the lower the height and number of floors around the courtyard, the greater the amount of light reflected into the interior³.

Conclusions

- This research deals with the urban thought in the architecture of traditional houses in Dubai, which includes the environmental, historical, cultural, social, technical and aesthetic components, through two axes: the components of the urban thought in the architecture of traditional houses in Dubai, and the principles of sustainability in the architecture of traditional houses in Dubai.

¹ Architectural Heritage Management. Al Liwan. Olroyd – Robinson, The Urban Architecture of Al Bastakiyyah, p. 185.

² Al-Khalifi, Traditional Architecture in Qatar, pp. 27-29; Fuaad, Architectural Elements in Coastal Houses on the UAE Coast, pp. 116-117.

³ Al-Karabliya, Traditional Lighting Patterns in Islamic Interior Design, pp. 56-57.

- The urban thought in the architecture of traditional houses in Dubai deals with the study of the architecture of traditional houses in the city, the study of the urban thought in the architecture of heritage buildings.
- The urban and architectural thought of any region is formed as a result of environmental, historical, cultural, social, technical, aesthetic and other influences, and it also contributes to shaping the general character of the local urban environment, and these components have affected the urban thought of the archaeological and heritage buildings in the city of Dubai. They include: the environmental component, the historical component, the cultural component, the social component, the technical component, and the aesthetic component.
- The principles of sustainability in the construction of traditional houses in Dubai are based on several foundations, the most important of which is the compatibility of historical and heritage buildings with the environment with all its positives and negatives, where protection was achieved by reducing the impact of harsh natural environmental conditions such as hot climate, relative humidity and intense solar radiation, while adaptation was achieved by exploiting the potential of natural energy sources such as the sun and wind.
- There are many basic principles on which the architecture of traditional housing is based, which with some modification and development can be indicative indicators for the design of contemporary sustainable housing, including: stone construction, thermal comfort, natural ventilation, and natural lighting.

References

- Abdel Hafez, Hosni Abdel Moez Abdo (2009). Wind Catchers and the Genius of Cooling in Islamic Architecture, Education Magazine, Year 38, Issue 170, Doha: Qatar National Commission for Education, Culture and Science.
- Abdul Jalil, Mohammed Madhat Jaber (2000). Traditional architecture in the United Arab Emirates, Al Ain: Zayed Center for Heritage and History.
- Abdullah, Adel Mahgoub (1995). Revival of Al-Ahmadiyya area, Symposium on the preservation of architectural heritage in the Emirates (June 3-5, 1995).
- Abu Hantash, Tawfiq F. (2016). Building A Zero Energy House for UAE: Traditional Architecture Revisited, 5th International Conference on Zero Energy Mass Customised Housing – Zemch.
- Al Sammani, Amani Mohammed (2021). The Sustainable Development of Local Housing Units In UAE, MSC, The British University in Dubai.
- Al-Abdouli, Khalfan Jassim (1989). The Development of the Architectural Trend in the United Arab Emirates.
- Al-Bass, Abdul Hamid Ahmed; Al-Salafi, Jamil bin Mohammed (1994). Common architectural and planning features and characteristics in the Gulf Cooperation Council countries and ways to preserve them.
- Al-Karabliya, Moatasem Azmi Badawi. Traditional Lighting Patterns in Islamic Interior Design, Master's Thesis, Amman: The World Islamic Sciences and Education University, 2011.
- Al-Khalifi, Mohammed Jassim (2003). The architecture of the old palace "Qatar National Museum", Doha.
- Al-Khalifi, Mohammed Jassim (2003). Traditional architecture in Qatar, Doha: Department of Museums and Antiquities.
- Al-Kuwaiti, Sheikhha Ali (1995). Old buildings and their use in modern architecture, Symposium on the Preservation of Architectural Heritage in the Emirates (June 3-5, 1995).
- Mustafa, Mohamed Helmy Mohamed (2014). Gypsum decorations in Qatar, Proceedings of the 17th Conference of the General Union of Arab Archaeologists: Studies in the Antiquities of the Arab World.
- Alnuaimi, Maitha Mohammed (2007). Daylighting Techniques Used in Indigenous Buildings in The United Arab Emirates (UAE), An Investigative Approach, Master, Texas A&M University.
- Al-Qatati, Amal Mahmoud (2021). Architecture Without Architects, Doha: Public Institution for Cultural Village.
- Assi, Eman (2011). Traditional houses of Dubai, Dubai Municipality - United Arab Emirates: Architectural Heritage Department.
- Assi, Eman (2022). Layers of Meaning and Evolution of Cultural Identity: The Case of Wind Towers in Dubai, Conservation.
- A'zami, A. (2005). Badgir In Traditional Iranian Architecture, International Conference "Passive and Low Energy Cooling for The Built Environment", Santorini, Greece.
- Darwish, Mahmoud Ahmed (2016). The problem of preserving and sustaining urban heritage (Sheikh Sa'eed House in Dubai as a model), the Fourth International Conference on Preserving Urban Heritage: Sustainable Heritage, a Global Vision, Local Experiences, Dubai.
- Darwish, Mahmoud Ahmed. Problematic of preserving the architectural heritage and its sustainability (Sheikh Sa'eed house in Dubai for example), International Journal of Innovation and Scientific Research (IJISR), Vol. 27, No. 2, November 2016.
- Fareedoni, Farhan (1995). Barjeel in Local Architecture, Symposium on Preserving Architectural Heritage in the Emirates (June 3-5, 1995).
- Fouad, Narmin Ahmed Mohammed. Architectural Elements in Coastal Houses on the Coast of the Emirates in the Eighteenth and Nineteenth Centuries AD, Master's Thesis, Cairo: Faculty of Archaeology, Cairo University, 2022.
- Hamoudi, Ahmed Fadel (1994). The importance of documenting architectural heritage and the methods used in this regard.
- Hawker, Ronald W. (2001). Reflections on the Wind Tower House: Architectural Style and Historical Context on The Trucial Coast, Tribulus, Vol. 11.

Hejazi M. & Hejazi, B., Cooling Performance of Persian Wind Towers, *Eco-Architecture* IV.

Ibrahim, Iman, Eco-Traditional Courtyard Houses in UAE: A Case Study of The Sharjah Museums, *Eco-Architecture*, VII.

Olroyd-Robinson, Keith. The Urban Architecture of Al Bastakiyyah, Published In “The Architecture of The United Arab Emirates”
By Salma Samar Damluji.

Rashdan, Wael & Mhatre, Vrushali (2019). Impact of Heritage on Contemporary Sustainable Interior Design Solutions, *Transactions on Ecology and the Environment*.

Saleh, Fatima Mohammed Omar. The remaining traditional buildings in the Emirate of Dubai "Residential houses" from the eighteenth to the twentieth century AD, Master's thesis, Faculty of Archaeology, Cairo University, 2016.