



Review

Layers of Meaning and Evolution of Cultural Identity: The Case of Wind Towers in Dubai

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Abstract: Place identity is an important constituent of general cultural identity, in that it provides its share of continuity, sustainability, and character to the built environment. The image of cultural heritage is stored knowledge that reflects the identity of a specific culture. In the formation of a place, some features gain identity with the environment. This study aims to explore the evolving image formation of wind towers in Dubai, and how this image is related to the concept of meaning and cultural identity of the place. This study focuses on the process of place identity formation and its relation to the evolving cultural values of society, as well as how it is applied to the changing meaning of cultural heritage objects. Based on the value assessment approach, different examples of wind towers, taken from either traditional houses or contemporary buildings influenced by the local architecture in Dubai, the author attempted to study how the interpretation and meaning of wind towers has evolved through time, thus influencing the cultural identity of Dubai city. This study is based on qualitative research. It concludes that a wind tower, as a cooling device, represents a unique example of an evolving creative process of architectural expression, resulting from the social and cultural complexity of the Persian Gulf in the early twentieth century. They were introduced through commercial exchange, adapted by the mercantile community, and integrated into local cultural systems—thus creating new architectural features and urban character—and reintroduced as a modern symbol of cultural identity for Dubai and the UAE.

Keywords: cultural identity; traditional architecture; adaptation; wind tower meaning of cultural identity



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1. Introduction

In looking at the history of wind towers in the Middle East, the term wind tower is defined broadly to include any vent rising above the roof level which is designed to facilitate air circulation into the room below in order to improve its climatic conditions. There is no exact information about the first application of wind catchers, or when they became common in the Gulf Region, although there are some images of what appear to be wind tower catchers in Egyptian tomb paintings going back as far as the second millennium BC. Large houses in Cairo in the fourteenth century certainly had “malqaf” unidirectional wind catchers, which descend into the summer area of the house. A painting in one of the tombs shows a wind catcher with two openings. Although one can find wind towers in many cities of Iran, such as Yazd, Kerman, Kish, and Bandar Abbas, the most influential is the wind tower in the city of Yazd. Its location on various trade routes allowed it to spread not only throughout Iran, but also to many countries nearby, such as India and Afghanistan [1].

With growth in trading and gradually increasing prosperity over the past two centuries, wind towers became more and more common for the ventilation of houses, passageways, and mosques in Tehran, Yazd, and Kerman. With its key position in the central Iranian Plateau, Yazd benefited from flourishing caravansaries and hospices, along with trading opportunities and superior chances to absorb merchants. Consequently, many cultural and

technical exchanges were conducted. Coastal cities such as Bandar Abbas, and Busheir and, in the early twentieth century, Bahrain and Hyderabad, fell under this architectural influence and developed their own distinctive styles of wind towers [2].

Wind catchers remain present in many countries, and can be found in traditional Arabian-influenced architecture throughout the Middle East. They can also be found in the Arabian Gulf states, mostly Dubai, Sharjah, Ras Al Khaimah, and Um Al Quwain in United Arab Emirates, Bahrain, Doha in Qatar, and Kuwait city [3]. There have been wind towers in the Gulf at least since the thirteenth century, when Marco Polo commented on those in Hormuz. Furthermore, there are several confirmed examples of wind catchers on the Persian Plateau dating from the fourteenth century, mostly located in the city of Yazd [4]. Wind tower houses were also mentioned by John Yarood in a survey of traditional houses in the town of Al Muharraq in Bahrain [5]. He stressed on the importance of these houses in transmitting construction techniques to future generations.

The pearl trade in the Gulf in the second half of the twentieth century was the most profitable activity [6], and with it came rich cultural material. In this period, Dubai played an important role in the initial redistribution of trade. The city rapidly grew from a small fishing settlement into a major trading port thanks to the far-sighted vision of its rulers that have, since the end of the 19th century, attracted the region's leading merchants to settle in the city through a series of formal decisions and acts [7,8].

According Hawker, Hull, and Rohani, Indian Muslim merchants established residential districts all over the Gulf [1]. The merchants from Batakiya in Dubai, who had moved from Bastak in Iran—an area close to Lingeh—formed the largest group. The Bastakiya area is a residential district in Dubai, where merchants who came from Bastak Iran settled close to the commercial suq and shipping docks. They were very well-established merchants.

Wind towers are known by many different names, In Persia, they are known as “Badgir”, and in Eastern Arabia as “Malqaf”. In Dubai, the word “Badgir” has been locally Arabized to become “Barjeel”. Simply, a wind tower is a vertical vent above a building with opening oriented toward the prevailing wind.

In the second half of the twentieth century, interest in traditional architecture increased. The revival of traditional forms, approaches and methods of construction came first through the early work of the Egyptian architect Hassan Fathy in the early 20th century [9]. Fathy's ideas and philosophy opened opportunities and became a source of inspiration for architects to recognize and appreciate traditional architecture. Fathy derived low technology from the use of vernacular forms having environmental functions, such as the courtyards and wind towers in traditional Arabic architecture [10]. There are many other examples exhibiting the use of wind towers, such as the Abdel Rahman Nassif house in Jeddah 1974. Another expressive example is the University of Qatar, representing a new interpretation to the form of the wind tower [11]. The building features a number of wind towers at different levels to catch the prevailing wind. The forms of the wind towers express the spirit of modern times while retaining their original function as an airflow-generating device for buildings. The wind catcher includes four open sides covered with perforated geometrical patterns.

Contemporary architects and engineers have adapted modern wind catchers from the vernacular architecture of the Middle East. Modern wind catchers have been developed to take advantage of traditional wind catcher principles, while eliminating their limitations to adopt them for use within the scope of modern building practices and technologies. The utilization of commercial wind catchers is now widespread, especially for indoor spaces with high occupancies, such as schools and office buildings [5].

This research is an attempt to expand our knowledge on the influence of the evolving meaning of the wind tower.

2. Literature Review

Cultural heritage is the accumulation of tangible and intangible values, stemming from human creativity and interaction between societies, since the beginning of human life [12]. Culture is also the center of the relationships between the environment and humanity.

People create their own place identities, formulated according to their cultural values. A cultural place is an environment in which people construct their collective identity. When a place identity reflects traditional values, it turns into a cultural identity.

Many researchers have talked about the image, meaning, and identity of places, and how they are related to the cultural identity and values of individuals [13–17]. Ayalp has explained that cultural values are essential in every aspect of our life, as they shape our lifestyles. Cultural values not only shape our environment, but also the way that we perceive the environment. According to Matsumoto, culture is dynamic. It involves a system and consists of rules. These rules are expressed through the community as well as the self-unit [18]. The system conveys the sustainability of the community's vitality. This process involves attitudes, values, beliefs, norms, and behaviors shared with groups, interpreted by each member of the community, and transformed through a new generation; as such, they have the potential to change.

Place formation, according to Altman, can be defined as the attitude an individual forms towards a certain environment. The concept of place involves not just a physical element, but also emotional factors, which affect the formation of place concepts [19]. Identity is also described as a biological organization, which develops through adjustment, assimilation and assessing the social world, which moves over time [20]. Collective identity, however, can be the reflection of traditions, beliefs, and attitudes; therefore, it consists of all value systems of a specific culture.

Tavassoli examined through comparative analysis the influential factor of climate, belief and power on different historic urban settings. Tavassoli found out that the utilization of natural energy in old structures is best demonstrated in architecture and urban forms where identity, culture and urban structures remained remarkably constant [21]. Hagan considered the wind-catcher to a very sophisticated piece of low technology and a characteristic element of an architectural style that seamlessly and elegantly combines performance and form, climate and cultural identity [22].

Other studies have focused on the formation process of identity that was reflected in different levels and stages [23]. Arbab et al. used three key levels the stages of place identity formation, including behavioral, empathetic, and existential insideness, which were categorized by immediate, self-conscious, and unselfconscious place experience through looking, seeing, perception and cognition.

Most research and studies have focused on different dimensions or aspects of wind towers in different locations. Some have investigated the socio-cultural and environmental influences that contribute to the significance of wind towers [24–26], while others have discussed how wind towers work from scientific perspectives [27]. More recent studies have focused on the implementation of wind towers as passive natural cooling systems in other similar locations [28]. Other studies have considered them within the global vision of energy-saving tools [29,30]. Numerous studies have investigated the effect of different configurations and components on the performance of wind towers through comprehensive reviews of current and potential wind tower developments [31,32].

Nowadays, cultural identity and tourism are linked. In the globalized world of shared values and economic, political and social changes, tourism primarily becomes as an opportunity for cultural exchange and communication with other cultures. Therefore the concept of culture we use and perceive as a process, includes what people think, do, create, and exchange with others. Culture could be defined also as a “living identity”. Culture and cultural heritage, as an expression of the identity and history of the people they belong to, could serve also as a tool for the establishment of identities and differences, which at the same time localize and globalize the cultural and tourist experience, characterized by contact with and mixing among cultures [33–35]. As a result, cultural tourism has become another form of industry, where cultural heritage involves the physical characteristics of the cultural tourism sector and can include anything from religious sites in the form of pilgrimage tourism to castles or battlefields [36].

3. Materials and Methods

This section includes a literature review, personal observations, and knowledge about traditional architecture in the UAE gained from being involved in management of the historic city of Dubai as a technical adviser for more than ten years.

This paper investigates the process of meaning formation of wind towers in Dubai. It will answer the question of how different values have contributed to the meaning of wind towers. The investigation is based on identifying which cultural values contribute to the meaning and interpretation of wind towers. The paper concludes that Dubai's approach to heritage conservation is intimately connected to the desire for reinforcing the national identity of the Emirati citizens—a particularly relevant issue in Dubai, where only 10% of the population is Emirati, and where the young citizens have never known the world their parents and grandparents used to live in. Furthermore, Dubai's approach to heritage conservation is intimately connected to the desire to reinforce national identity through the reinterpretation of cultural objects. Such reinterpretation is dynamic and changes through time, in order to ensure and sustain Dubai's cultural identity.

This study is based on the analysis of several examples of wind towers in different times and at different locations in Dubai. In order to do so, the author introduces the term "facet", to refer to the different values that wind towers are associated with at different times. The study begins with a historical background on wind towers and how they were introduced in the Gulf and, more specifically, in Dubai. The historical background is followed by deeper analysis and investigation about how the physical, social, aesthetic, and economic facets of wind towers have evolved through time. The study also includes an urban analysis of presentation of wind towers and how they can be interpreted in the related context.

4. Results and Discussion

Due to the similar climate conditions and proximity of the United Arab Emirates to other neighboring countries such as Iran and India, who have been familiar with the use of wind towers as cooling devices for a long time, wind towers were readily adopted in traditional buildings in the UAE. The most concentrated number of wind towers can be found in the residential neighborhood of Dubai called Alfahidi Historic Area. The number reaches around 50 wind towers in less than 0.25 km², with an average of one wind tower per house. This neighborhood was originally designed for merchants who immigrated from Bastak in Iran. Later, wind towers were applied to various different types of buildings, such as shops and stores, as well as other residential neighborhoods of Shindagah and Deira.

Although there are some differences between the wind towers applied in Iran and those in Dubai, in terms of the number of openings, material, and building techniques, they still share the same functional significance, conceptual design, and geometric decoration [37].

In Dubai, wind towers can be divided according to their construction material or their form:

1. Used construction materials. Wind towers were built from either coral stone or sea shells brought from the sea. Heavy-duty canvas is also used by people who cannot afford coral stone.
2. Architectural form. Most wind towers have a square horizontal section divided diagonally into four parts, in order to catch the wind from any direction. In some cases, where the wind tower sits on a rectangular section, a beam is built to divide the space and to make sure the base of the wind tower sits on a square section. One can also find rare example of round-section wind towers, such as one found in Sharjah, which is said to have an Indian influence.

Wind towers later became one of the most important architectural elements characterizing traditional architecture in Dubai until the beginning of 1960s. People during this time, because of their prosperity, left their traditional houses for more modern ones that addressed their contemporary needs. At present, most traditional houses are kept and

protected by the Dubai Government through an adaptive reuse initiative. The wind towers of these traditional houses have been physically restored, but no longer work as cooling devices. The Dubai Municipality, since 1990, has worked hard to document, preserve, and manage historic areas. A total of 315 buildings are listed as protected, most of which feature wind towers. Preserving these houses means naturally preserving their architectural elements, where wind towers are one of the most significant elements characterizing traditional architecture in Dubai. The wind towers were restored according to the international standard with great sensitivity; see Figures 1 and 2.

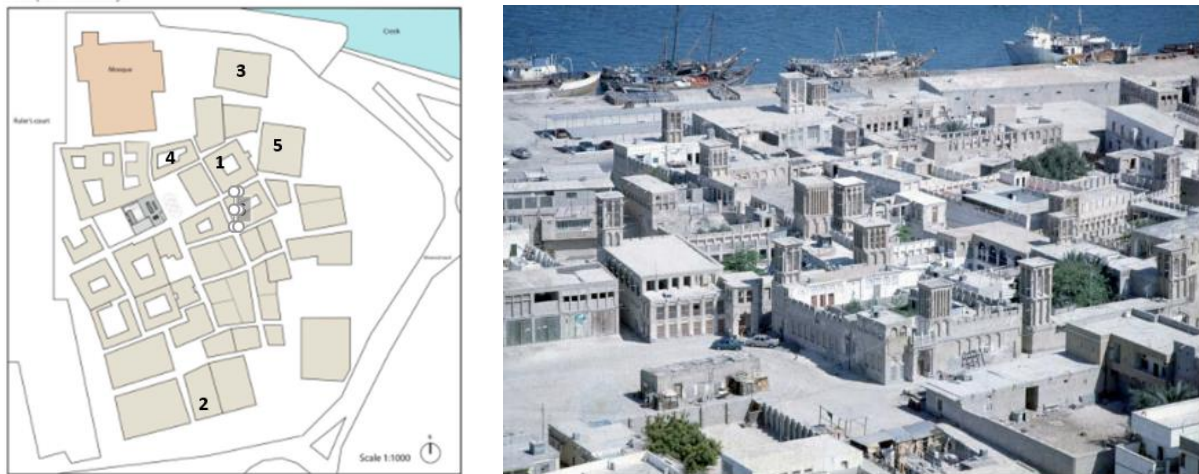


Figure 1. (Left) Site plan of Al Faheidi Historic area in Dubai. (Right) Aerial image of the area in the 1970s. Source: Dubai Municipality.

According to Roland Hawker, courtyard wind tower houses, as an architectural type, are not an ancient indigenous tradition to the Trucial coast [1]; instead, “It is an entirely new form that reflects the tremendous impact of pearling industry on the coastal communities of the Trucial coast”. Wind towers are thus an architectural expression resulting directly from the increasingly international commercial, trade exchange, and social conditions of the late nineteenth century. The popularity of this form of house at the beginning of twentieth century has been mentioned and associated with the pearl industry elsewhere [24].

The documented construction of wind tower houses in Coles and Jackson offered very useful information about Persian merchant families in Alfahidi Historic Area (which used to be called Bastakiya) [30]. The house was constructed in phases, with wings surrounding an open court. This form of the house is typical of the Alfahidi historic district, and was later adopted in the Sheikh Saeed Al Maktoum house in Shindagha, as well as in Sharjah, Um Al Quwain, Jazeerat Al-hamrah, and Ras Al-khaimah.

Wind towers comprise a remarkably practical response to particular physical conditions. What makes wind towers unique in Dubai is their ability to evolve in response to new environmental constraints, which are different from those in the Persia. Wind towers probably originated as a response to the very dry and hot climate of the southern desert margins of the Persian Plateau. This climate condition is not the same in the Gulf region, which is both hot and humid. To be effective in a relatively more humid environment, it is desirable for a wind tower to provide a large volume of strongly flowing air down to the building it serves. Gulf wind towers were designed in such a way to achieve this. To increase the cooling effect of the breeze within the house, wind towers were ideally combined and integrated with already-existing traditional environmental systems to obtain maximum comfort. The tradition of using the terrace at the roof to catch the cool breeze at a higher level, as well as air pullers—which are openings that allow only air to enter the room and avoid the heat caused by direct sunlight—is an indigenous practice that was adopted before the introduction of wind towers.

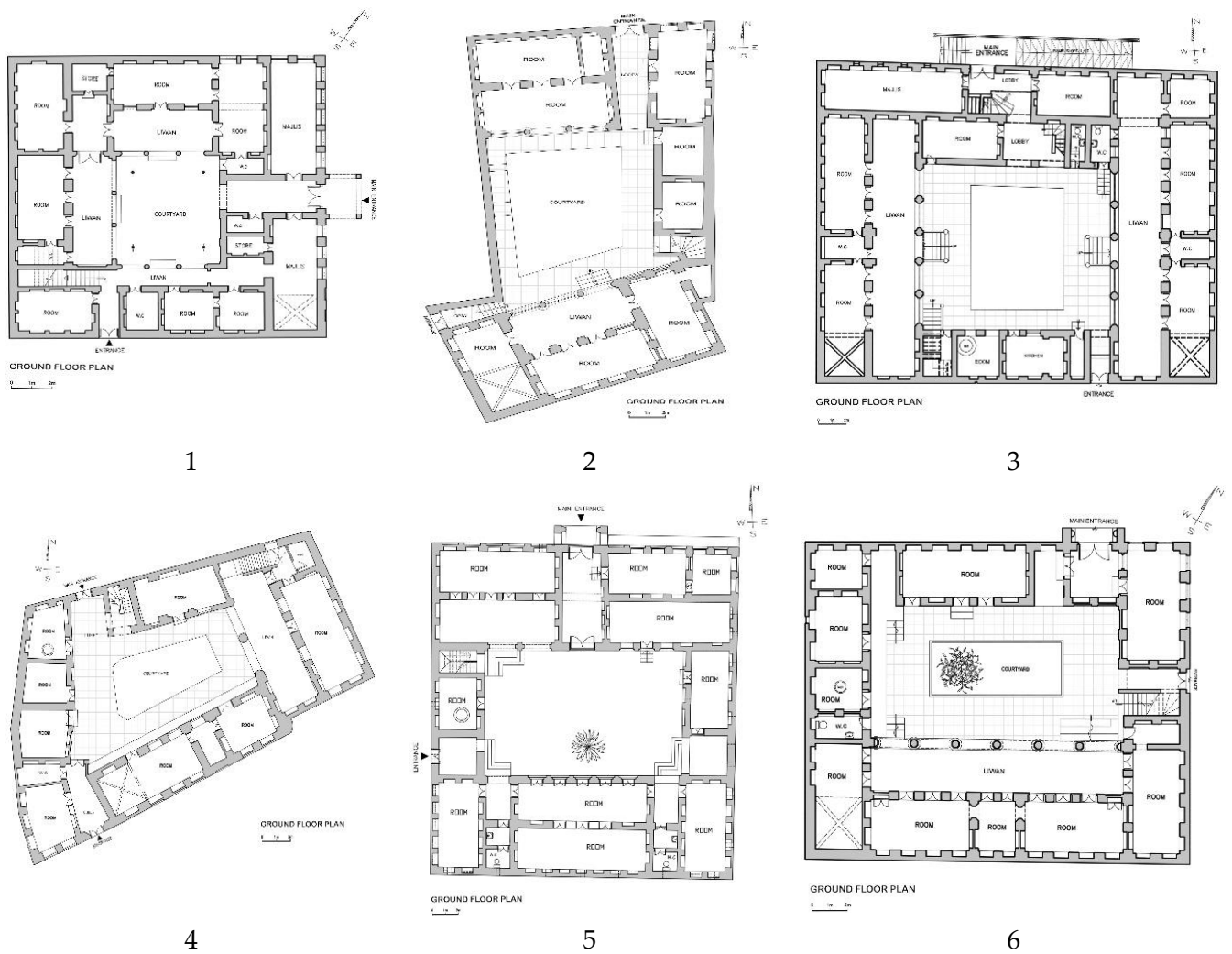


Figure 2. Plans of wind tower houses in Dubai, showing their locations (indicated with cross section). (1)-House of Abdul-Rahman Farouq. (2)-House of Mir Abdel Wahid MIRI. (3)-House of Mohammed Sherif Al-Olama. (4)-House of Mohammed Saleh Fikree. (5)-House of Abdul-Razzaq Al-Bastaki. (6)-House of Abdulla Mohammed Al-Bastaki.

The interpretation of wind towers through time is a result of integrating functional, social, economic, and architectural facets. These facets act with different intensities, allowing the wind tower to become one of the strong physical expressions that identify non-local architecture and the national identity of the Emiratis.

4.1. Functional Facet: Wind Tower as a Cooling Device

Throughout history, wind towers have been introduced as architectural devices for the purpose of achieving thermal comfort inside buildings. A wind tower is a vertical vent that has an opening from the top oriented towards the direction of the wind. The opening could be uni-directional, bi-directional, or multi-directional. It creates good air circulation, as it catches the cold wind from outside and directs it into the space below. Additionally, the wind tower also works as a filter, cleaning the air from sand and dust. The wind tower is also considered an important bio-climate tool in hot, arid climate cities, where air circulation is needed most. It has also an air-cooling effect during the night. In summary, wind towers have the following functions:

1. Provides air circulation and replacement to achieve natural ventilation;
2. Provides convenience and human comfort, working like a fan; and

3. Provides evaporative cooling (the 'felt' temperature under a wind tower is 5–7 degrees less than the exterior temperature).

The wind tower efficiency increases according to its height: the higher, the more efficient. Normally, the height of a wind tower does not exceed 15 m. The height should also not be less than 2 m above the floor. The wind tower is only needed in the summer. In winter, the owner of the house covers the vent with a cloth (or the like), in order to prevent air and dust from entering the interior of the room.

According to Peter Jackson, the wind speed and orientation influence the efficiency of a wind tower. It was concluded that wind towers work more efficiently when the wind speed is high and it enters the wind towers at an angle of 45° [8]. The higher the tower, the longer the time spent by the air in a narrow area (narrower than the area in the exterior atmosphere), the faster the velocity of the air entering the room, and the cooler the residents beneath the tower feel. Closed doors and windows are seen to increase the effectiveness of wind towers. Such an act creates a controlled environment for the wind tower to function. The orientation of the room in relation to the orientation of the tower, affects the efficiency of air movement in the room. If the wind is blowing from the north and the long axis of the room is aligned from north to south, good ventilation can be obtained. In contrast, if the long axis of the room lies east to west, then the air stream collides with the interior wall, reducing its momentum.

4.2. Social Facet

Wind towers also have social facets. The number and location of wind towers in the house define the importance of the rooms beneath them. A room with a wind tower is mainly used by the elderly or the head of the house. Wind towers also offer a space for family members to enjoy their time under the Barjeel, where many sleep and rest below, or even pray. The number of wind towers also indicates the social status of the owner of the house. This is because not many people can afford to have more than one or two in their house.

In Dubai, wind towers carry a particular message about the structure of the society and the social status imported by the pearl trade. Wind towers have been used to particular effect by the ruling classes of Dubai. With their inherited lineage positions, the highest political class was occupied by the sheikhs: a tribally constructed authority allowed the sheikhs to capitalize on the nineteenth century boom economy [38]. They waived customs taxes on imports and collected revenues informally from merchants. The sheikhs and their families monopolized the ferry services across the creek, land taxi services, and all taxi services between Dubai and neighboring Sharjah. In return, the sheikhs maintained security for all of the Emirate's residents. When Sheikh Saeed Al Maktoum built a new house for his family in Shindagha overlooking the creek in 1896 (and when it was expanded later), three wind towers were introduced. The open courthouse with a wind tower, as a type, was also adopted for most houses in Shindagha, especially those originally built from Areesh. The gradual shift in architectural typology can be traced through replacing the watch tower, with the significance of a defensive expression, with wind towers in most houses of the royal family built in the Shindagha historic area.

4.3. Symbolic Facet

The social and the symbolic facets were very significant during the early period of introducing wind towers in Dubai, as they are today. When wind towers were first introduced, they were used not only as a functional cooling device, but also as a tool to identify the social status of both the wealthy immigrating merchants and the royal family who controls commerce and trade in Dubai. At present, wind towers comprise a defining element in contemporary traditional architecture and a strong conceptual representation of the cultural identity of the UAE.

The connotation of wind towers as a symbolic element is commonly expressed in the contemporary architecture of Dubai and in other states of the United Arab Emirates. This

expression covers a wide range of manifestations, consisting of commercial, public, and residential uses. One can find many modern buildings whose elevations mimic traditional ones, having the same design as a wind tower, including the proportion of openings and decorations. The Dubai Municipality has encouraged clients and developers to refer to the design guidelines of traditional style in their architectural design solutions. Although these guidelines are not compulsory, most clients have followed them and were happy to have them decorating their facades. For example, in the luxurious villas in Jumairah residential neighborhood, or in big mixed-use developmental projects such as the cultural village in Jaddaf. Culture Village, as it is commonly referred to, is a waterfront development near Al Jaddaf along the Dubai Creek. The village is spread over 3.7 million square meters, and will include many residential towers. Culture Village was launched in 2006. In their website, they refer to the use of authentic style for promotion and marketing:

“As the name implies, the development aims to preserve and celebrate the traditional art and culture of the United Arab Emirates. Therefore, every project displays the true colors and designs significant of Islamic architecture. To preserve and showcase the rich history and culture of the region many visual and performing art centers, museums and literary societies have been planned.”

One can find many newly constructed villas which were inspired by traditional architecture in other emirates as well. The Yas north residential area in Abu Dhabi, a newly built residential area targeting the local community, is one such example. At present, wind towers have been extensively used in luxurious hotels and resorts. Hotel St. Regis in Abu Dhabi and Mina Asalam hotel in Dubai are fine examples. All this reflects the revival movement of local traditional architecture, which strongly contributes to the physical urban identity and character. Wind towers, as an architectural reference element, have served as an inspiration for many famous architects in their designs. One of the most well-known architects is the famous Italian architect Vittorio Minervini, who is known for designing skyscrapers in Dubai inspired by the design of wind towers. At present, one can find several architectural building facades and conceptual design solution based on integrating traditional knowledge with advanced technology in other Gulf countries; examples include the Ministry of Justice in Kuwait City (1984, designed by Basil Spence), the heritage village in Doha, Novotel hotel in Bahrain, and the mosques of Hassan Fathy in Saudi Arabia.

4.4. *Physical Facet—Architectural and Urban Aspect*

The interpretation of the physical facet of wind tower is as an architectural vertical element, and it is considered one of the main urban components characterizing the historic urban fabric of Dubai. As a result, a new architectural language and urban character have emerged. The design features of this new architectural language include all its architectural and urban aspects, such as form, materials, location, ornament, and orientation.

Physically, wind towers are striking elegant vertical elements, found mainly in two-story residential houses. They have evolved as a result of particular social, technical, and climatic conditions. The existing wind towers of Bastakiya are invariably almost square in cross-section, with an average cross-section of 3.5 m and an area of 12 square meters. Buildings in the traditional souq have comparatively smaller plan areas of wind towers than in Al Faheidi and Shindagha. They rise well above the roof level and typically descend a meter or so into the ground-floor living room. Most wind towers rise to around 12 m above ground level. The higher the wind tower, the more effective it is likely to be in contributing to the comfort of the occupants in the house it serves. Most wind towers have four vents, separated by diagonal vanes, open approximately to the north, south, east, and west, optimally exposing their diagonals to the breeze. However, this orientation may have occurred because the houses were generally aligned to the creek. Vent openings of wind towers range from 2–3 per each story. Structurally, most of the wind towers in these houses were constructed with the support of three walls; whereas, in souq-designated buildings, they were constructed with the support of only 1 or 2 walls.

Typical wind towers in Dubai were constructed from coral stone and sarooj. Hawker describe the walls as porous. The porous coral acts as a pocket of thermal insulation within the internal walls, and the external surface remains cool. A finishing plaster of chalk and water is applied to smooth the surface. The projecting ends of the poles are often left after the tower is completed, to serve as scaffolding when the towers need re-rendering or other maintenance. The style of a builder can easily be distinguished by their choice of decorative details [39]. The masonry walls and floor in most wind tower houses are finished with hardwood beams, palm logs, or chandal wood imported from India or Zanzibar and available with a maximum of 4 m in length, which restricted the width of rooms. As it was expensive to construct a wind tower house, some residents replaced the coral stone and chandal wood with mats and cloth as alternative materials which can serve the same function. This type of wind tower was used in houses built from Areesh, and were often later converted into a more permanent structure upon the availability of financial resources (Table 1).

Table 1. Main characteristics of wind towers in Dubai.

	Item	Description
1	Location	At the corner of the house or a building under the main important space.
2	Numbers	Most of the house usually have one or two wind towers. In rare cases three windtowers in houses, or multiple in commercial buildings.
3	Shape	Rectangular.
4	Design	Divided into three sections: the base, the body and the top. Height range between 9–12 m above the roof.
5	Material	Coral stone and chandal. There are few examples of wind towers that use cloth and areesh.
6	Orientation	All directions, to catch the wind from any side.
7	Decoration	Usually they have at minimum geometric decoration.

Decorations are usually applied at the wind tower entrance. They exist very simply in three main locations: either on the crown (rare), as edged ornaments at the openings, or as ornaments at the recesses. Other rare locations include colored edges, strip ornaments along the roofline, and on the edges of the neck recess. The decorations are inspired by plant origins.

Although a wind tower is an architectural element, its influence on the urban scene of Dubai historic city is strong. Most old photos of Dubai show its unique skyline, with many wind towers breaking the compacted, dense urban fabric. One can say that Dubai has the largest number of wind towers concentrated in an urban area in the southern part of the Gulf. The densest area is the Alfaheidi residential neighborhood, having 95 wind towers. Wind towers were not limited to residential buildings, they also occur in traditional commercial buildings. One good example is the Al Barjeel building in Bur Dubai traditional textile souq, having 10 wind towers in an area of around 500 square meters. The spread of wind towers along the whole urban fabric maximizes the visual experience effect of the urban landscape along Khor Dubai, creating a unique urban image that is inevitably kept in one's memory.

The unique urban form of the historic area of Dubai has been described by many authors who lived in Dubai during the period of 1960s. One of them the architect John Harris, who said:

“The physical character of Old Dubai has been determined by a variety of factors: its setting on the Creek; the relatively flat terrain, the compact intimacy of scale of building with informal organic walkway between; the relatively low roofline broken by the decorated square wind towers thrusting upward to catch each

breath of air movement. From natural response to particular problems of climate and the geographical consideration there has emerged rich appropriate local vernacular building form and details.”

In the United Arab Emirates, there has been a recent tendency to integrate the idea of wind towers in different ways—through either technical applications or architectural design concepts. For example, Masdar, a research energy center, has been working on how to integrate natural ventilation in new buildings. Other attempts have encouraged considering the wind tower concept in modern design solutions. For example, barjeel Museum’s call for papers has encouraged such new ideas. As part of an international call to design the new Barjeel Museum for Modern Arab art in Sharjah, United Arab Emirates, Iranian architect Habibeh Madjdabadi presented her concept, which was awarded an honorable mention in the Rifat Chadirji Prize 2019. Conceived as an architectural and cultural landmark for the area, Madjdabadi’s idea can be described as a contemporary interpretation of the barjeel—the Arabic name for the wind towers that were traditionally used in the gulf region to provide ventilation in the hot desert climate. A schematic section shows how the traditional ventilation system was re-interpreted in the project as an integral part of an artificial ventilation system.

The Burj al-Taqa tower in Dubai is also another example that combines both technical and design aspects representing future-looking energy consciousness. Its design is based on how to utilize a system of wind thermals and solar panels to create comfortable conditions for employees. The Burj al-Taqa, also known as the Dubai Energy Tower, is a skyscraper that was to be built in Dubai in the United Arab Emirates. The Burj al-Taqa energy tower in Dubai, designed by Eckhard Geber, features a futuristic design for a wind tower to provide a fresh and cool air. It has a unique wind tower about 60 m diameter, on its roof, representing a new interpretation of the principles of ancient Persian wind catchers. The idea is based on the same concept of traditional wind towers, employing the building envelope to catch the wind and funnel it to the whole building.

Having a building like this in Dubai will help to raise awareness of the importance of traditional wind towers and open possibilities for improving the performance and the widened applicability of wind towers. This will bring new opportunities for using this heritage passive cooling system in the modern world. The newfound interest in wind towers is related to heritage. However, purely traditional solutions seem rather hard to apply or to gain acceptance by contemporary architects.

5. Conclusions

Adaption, as an intervention, is very common in heritage conservation. We often adapt old buildings to suit new uses. Adaptation can also be applied to objects or elements. The starting point for all of this remains the heritage itself: the buildings generated by events that form part of our heritage are no mere raw material. To quote Thomas Aquinas, ‘they are a *materia signata quantitate*, a substance which bears the traces of those events; traces to be recognized for what they are and thence made available to future generations’.

What makes wind towers unique in Dubai is their creative ability to evolve in response to new environmental constraints and the emerging cultural norms of the Gulf, which are different from those in Persia. Wind towers, although having originated as a cooling device to respond to the very dry and hot climate of the southern desert margins of the Persian Plateau, have evolved in interpretation as a result of the integration of their functional, social, economic, and architectural facets. These facets act with different intensities, allowing wind towers to become a strong form of physical expression (Figure 3).

1. The process of evolution has undergone the following phases (Figure 4):
2. Introduction to the already-existing architecture for its highly significant value and efficiency as a cooling element.
3. Integration and adaptation to become one of the main components of building typology.
4. Dissemination and spread as an architectural element and component of urban morphology.

5. Transformation of its meaning to respond to new conditions, where people seek refuge in the known past.
6. Becoming a highly recognized symbol that sustains cultural identity.

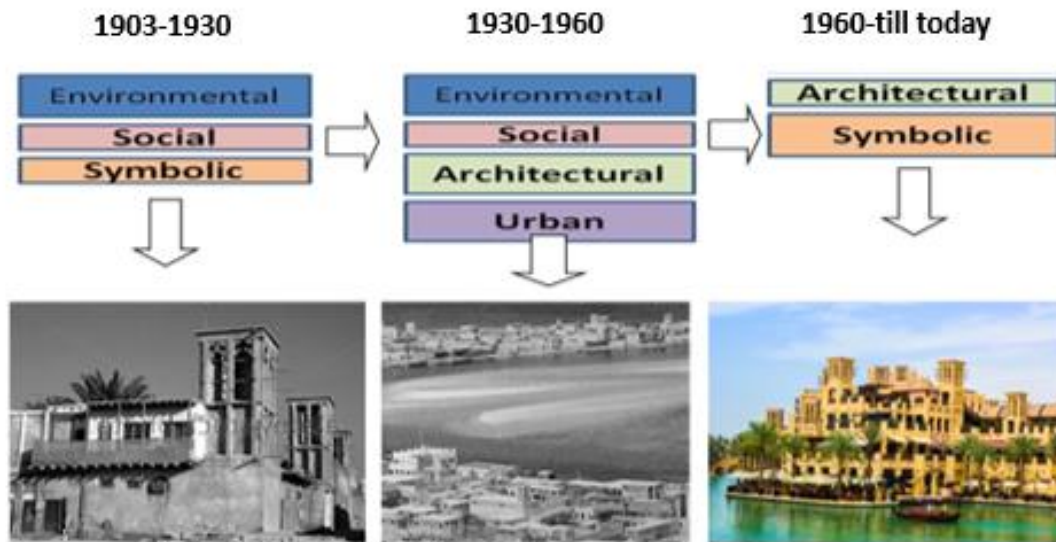


Figure 3. Evolution of interpretations of wind tower from 1930–1960.



Figure 4. Process of evolution in wind tower interpretation.

At present, architects and urban planners are increasingly looking to the past, seeking for local identity as a reaction to the globalization of cultural values. The meaning and value—or identity—of architecture is often conceptualized and portrayed as a historically timeless entity.

In the past fifty years, the Arabian Peninsula has witnessed extraordinary urban development, which has completely modified the landscape of the region [39]. Modern cities have been built, breaking away from the traditional pattern of local settlements that used to be relatively small and which were characterized by passive temperature control methods and traditional natural ventilation systems. The difference between the traditional living practices that characterized the region until the 1960s and the contemporary urbanized Gulf lifestyle is particularly striking.

Modernity and the economic approach driven by a strong private and market-oriented vision underpin the contemporary cityscape of the city. In Dubai, and throughout the Gulf states, the economic and financial implications of heritage-related real estate projects should not be underestimated. According to Simone Rica, a new cultural approach based on appreciation of the heritage was introduced in the 1990s after the establishment of cities. This approach aimed to idealize a return to local values and traditions. The private sector and investors have been searching for cultural heritage objects that can be adopted to promote authenticity in their developmental projects. This reinterpretation and transformation of traditional, locally built heritage becomes more appealing and is encouraged by the availability of enormous financial resources and empty plots of land. This reinterpretation

has permitted these projects into the contemporary image of wealth and power of modern state in the Gulf.

In the field of heritage, interpretation plays a role in redefining global debates regarding the past and present. The key here is the evolving process of attributes of meaning that cultural objects are associated with and their capability to adapt under new situations. The level of adaptation depends on their cultural significance and resilience to transformations in meaning over time. This capability is a strong tool to sustain the cultural identity of the nation. The dynamic adaptation of the wind tower happens after it becomes a key element in defining the urban character of Dubai's historic areas. The wind tower, as an architectural element, shows uniqueness in becoming an essential component in the silhouette and urban morphology of the historic district. Dynamic adaptation, filtration, and evolution are ongoing processes that enable cultural objects, such as wind towers, to have an influence on shaping the future built environment and to integrate old as well as new facets to create meaning for the new environment that has heritage associations.

There is a need to conduct more research and experiment, in order to find new ways to adopt energy saving technologies in our future buildings and integrate the main principle of wind towers with modern technology, to develop devices to improve the quality and efficiency of the provided fresh air.

We can learn from the traditional architecture of the past. It is as important as the ancient history. This history is the era where the traditional architecture was nourished and developed. Reinterpreting tradition is a historical and global issue. Nonetheless, it remains part of a number of issues that architects must address. Buildings of the past or other cultures are not to be copied slavishly but, rather, studied such that their lessons and design devices might be reinterpreted to suit current construction technologies and lifestyles.

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