The Integration of Iranian Traditional Architecture in the Contemporary Housing Design: A Case Study

H. Nejadriahi

Abstract—Traditional architecture is a valuable source of inspiration, which needs to be studied and integrated in the contemporary designs for achieving an identifiable contemporary architecture. Traditional architecture of Iran is among the distinguished examples of being contextually responsive, not only by considering the environmental conditions of a region, but also in terms of respecting the socio-cultural values of its context. In order to apply these valuable features to the current designs, they need to be adapted to today's condition, needs and desires. In this paper, the main features of the traditional architecture of Iran are explained to interrogate them in the formation of a contemporary house in Tehran, Iran. Also a table is provided to compare the utilization of the traditional design concepts in the traditional houses and the contemporary example of it. It is believed that such study would increase the awareness of contemporary designers by providing them some clues on maintaining the traditional values in the current design layouts particularly in the residential sector that would ultimately improve the quality of space in the contemporary architecture.

Keywords—Contemporary housing design, Iran, Tehran, traditional architecture.

I. Introduction

CONSIDERING traditional architecture and using its principles does not mean the repetition of it or ignoring today's needs, rather it should be realized as a great source of inspiration for contemporary architects to learn from it. In a country like Iran, which has a remarkable traditional architecture, paying attention to this issue is a crucial subject. In the beginning of the 20th century, the interactions between Iran and Western countries caused notable socio-political changes, which subsequently resulted in a sort of transformation in the Iranian architecture. Following these architectural shifts, the residential sector, faced with significant changes in this period specifically in terms of space quality, plan layouts, façades and the material and construction techniques used in them. The majority of Iranian architects were eager to create a sort of modern style by rejecting the traditional approaches, despite to the fact that, application of modern architecture should be based on consideration of the local culture and climatic restrictions of the context. In other words, understanding the main architectural characteristics of a city as well as its cultural and historical background would definitely be a key element in designing modern, efficient, and sustainable buildings [1].

Consequently, in order to maintain the essential features of traditional Iranian architecture, first of all, it is needed to study

H. Nejadriahi, is with the Faculty of Design, OCAD University, Toronto, ON, Canada (phone: 416-977-6000; e-mail: hnejadriahi@faculty.ocadu.ca).

them properly to realize the main concepts and values behind them, and then applying these concepts in a way, which meets contemporary needs and integrates with current technology.

II. The Main Features of Traditional Iranian Houses

The traditional houses of Iran have been formed as a result of thousands years of evolution by considering the environmental conditions as well as the users' life styles and culture, which are the main factors that affect the form and the spatial configuration of these houses.

The majority of traditional houses in Iran are introverted, or face inwards. In Iran, the most well-known type of house is the courtyard house [2]. One of the most important elements in the design of traditional Iranian houses is the central courtyard. The courtyard is the focal point of the house, which acts as a social hub and is used by household members for a variety of tasks and activities. All the other spaces are usually organized around the courtyard that formed the link between different areas of the house. Courtyards can be flattened or sunken; Sunken courtyards are usually built lower than the street level (about three to four meters down), which contain a passageway (Sharomi) on the upper level to connect all the spaces around the courtyard in that level [3]. Typically, there is a small pool and trees in the courtyard to create shade and help keep the space cool.

The arrangement of spaces in the traditional Iranian houses follows a certain hierarchy, which determines their locations and relationships in accordance with their character and importance. While harmoniously connected to each other in the design, the areas of the house enjoy complete independence and are always separated from the others by intermediary areas [4].

Privacy that originated from Iranian culture is one of the main features of traditionally-designed houses. It has always been an important issue in the design of these houses, in order to respect privacy and make residence feel secure and comfortable. The house controls the social interaction between family members and visitors by separating private and communal spaces, and the courtyard is also a smart mechanism for maintaining privacy in such houses.

Most courtyard houses in Iran's hot and arid climate, which covers a vast area of the country, are divided into summer and winter spaces. In order to avoid the hot summer sun, the summer space is north facing, while winter spaces are built facing south to get the maximum light and heat in the colder months [5], which results in a kind of horizontal migration in the house. Besides that, these houses were usually built with a basement or an underground space, which was permanently

protected from the sun and it was a cool area during the hot summers that appeared to create a sort of vertical migration for the residents.

Flexibility in the traditional Iranian architecture has broad functionality; considering the seasonal movement in the traditional Iranian houses, these houses provide a flexible spatial configuration to allow users to move between spaces. These movements can be performed in two ways: daily and seasonally, and from spatial point of view: vertically and horizontally [6]. Flexibility can be a solution for achieving privacy as well; in the traditional Iranian houses, using some changeable and portable elements has been one of the methods to attain that.

III. CASE STUDY: SHARIFI-HA HOUSE

Sharifi-ha House designed by a contemporary Iranian architect AlirezaTaghaboni (Nextoffice) is located in north of Tehran, the capital city of Iran. It is a seven-storey built house possessing three rooms that can be rotated 90 degrees, which allows its residents to experience various spatial organizations. The following information on this house is based on its architect's explanations [7].

The functional distribution in the house can be explained as: the two basement floors for fitness facilities; the ground floor for parking space and the housekeepers' rooms; the first and second floors for public activities; and the third and fourth floors are for the family's private life.

This house consists of three major parts; the fixed part (rooms at the front and at the back), a central void between them to let the light in when the rooms at the front are closed, and the mobile part. In order to connect the rooms at the front and back, a sort of passageway has been provided all around the central void on all levels. Moreover, to allow visual contact between different rooms and floors, some internal balconies and windows are positioned around the void.
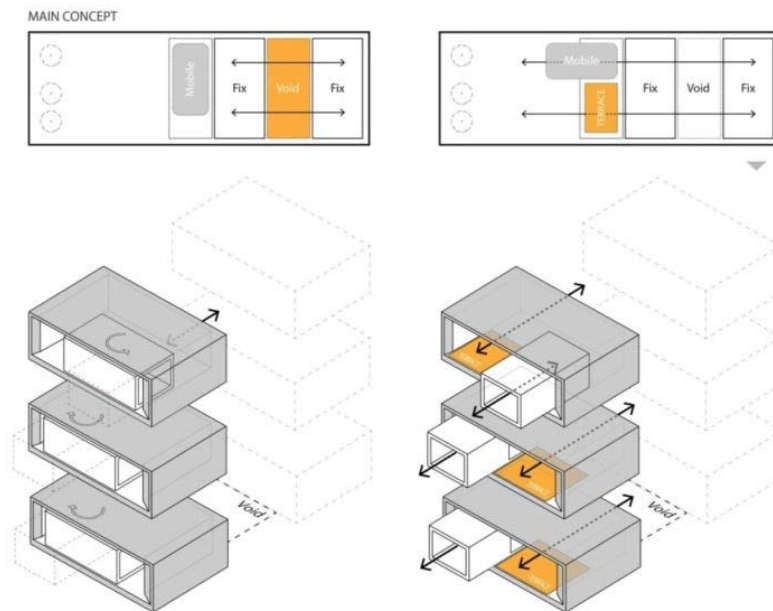

Fig. 1 Conceptual diagrams- Sharifi-ha house [7]

The rotating rooms in this house give the possibility of having an open /transparent volume with wide and large terraces during the summer. While, in the wintertime it is back to its horizontal position with a close volume, minimal openings and a total absence of those wide summer terraces to keep the house warmer. According to this feature, in winter when the volume gets closed, all attention is shifted towards the void inside of the house and in summer, that the rotating rooms are opened to the out, all attention goes towards the outside. Therefore, the house can be both introverted and extroverted, which is as an interesting spatial transformation and makes it as a sort of an ever-changing residential building. Additionally, such transformation in the façade from a two-dimensional to a three-dimensional one creates a sort of dynamic and active façade for this house along with an adaptable, modular living space. Consequently, it can be said that flexibility is one of the main features in this house as always there is a possibility of having different functional, seasonal or lighting scenarios.
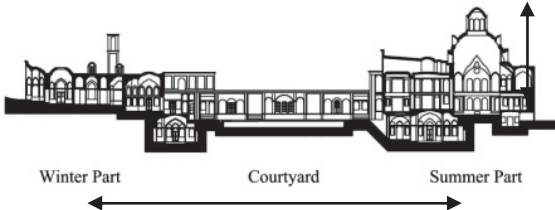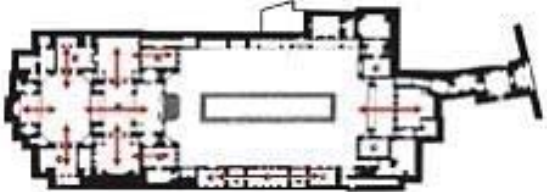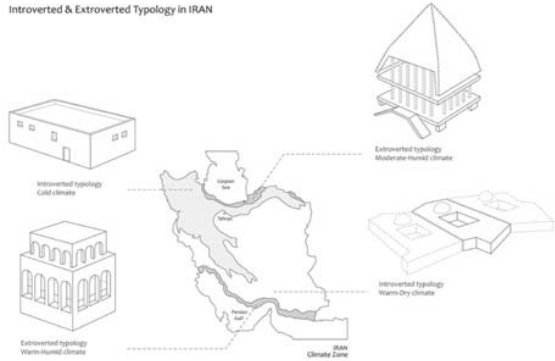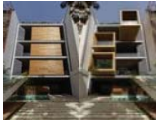

Fig. 2 Rotating rooms- Sharifi-ha house [7]
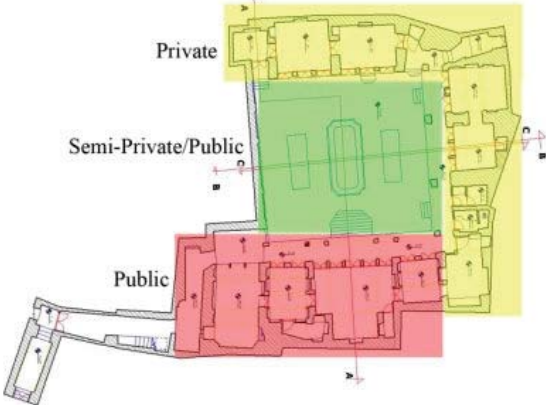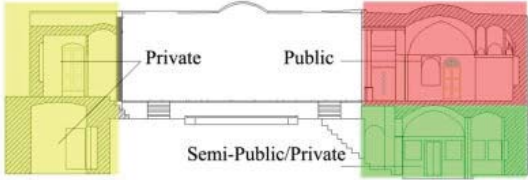
From a structural point of view, being partially moveable is the dominant feature of this house. Therefore, a series of analyses were applied on the digital model of the structure, to examine its static/dynamic performance. The technique used for turning these boxes is the same method as turning theatrical scenes or turning the floor of car exhibitions. Besides, it should be mentioned that the handrails are foldable in order to accommodate the changeable façade.

IV. DISCUSSION

According to the explanations above on the main features of the traditional Iranian houses and introducing Sharifi-ha house as the contemporary example, a table has been provided to compare the utilization of the traditional design concepts in the traditional houses and the contemporary example of it.

TABLE I
COMPARISON OF UTILIZATION OF THE TRADITIONAL DESIGN CONCEPTS

The Concepts	Traditional method	Figure	Contemporary Case	Figure
Seasonal Movement	Both vertically and horizontally	Winter Part — Courtyard — Summer Part	No migration in the house	-
Flexibility/ Functional Adaptation (according to residents' desires)	Mainly achieved by flexible partitions between the rooms		Rotating rooms	
Central void space (Concept of Courtyard)	Main connection point/ Circulation backbone/Social hub/creating Privacy/ and for Climatic purposes		-For having Sunlight/less windows and More Privacy -Using the concept of Sharomi (a passageway all around the central void on all levels)	
Introverted/extroverted	Based on the climatic conditions of a region can be either introverted or extroverted	Introverted & Extroverted Typology in IRAN	According to the seasonal change or functional needs can be both introverted and extroverted	
Facade	Static		2D to 3D Dynamic Approach	
Openings	- Openable toward the courtyard -The area and number of the openings are based on the climatic conditions of a region		Changeable by the seasonal change	

The Concepts	Traditional method	Figure	Contemporary Case	Figure
Hierarchy/Distribution of functions/Privacy Concerns	Both horizontal and vertical (Public/Semi-public or private/Private)		Vertical Distribution Semi-private/Public/Private	
Integration with Nature (Use of Vegetation/Trees)	Trees in the courtyard to create shade and help keeping the space cool.		Pine trees outside are incorporated into the spaces of the interior. In the open mode of the house, the trees are pleasantly captured by the window frames.	
Use of Water Elements	Typically, there is a small pool in the courtyard for climatic purposes.		A shallow pool with a glass bottom, which brings light down into the basement.	

V. CONCLUSION

As it is observed from Table I, Sharifi-ha House, can be considered as one of the successful projects in terms of referring to some of the features and the elements of Iranian traditional architecture by means of updating and integrating them with the current technological advancements in a modern design language as follows: Use of rotating rooms not only provides a highly flexible spatial organization (both in plan and façade of the building), which is adaptable to the user's needs and desires, but also gives the opportunity of having seasonal consideration with no physical migration of the inhabitants within the house; So, despite to its modern appearance, it wisely maintains the traditional concepts. The concept of the courtyard might not be as strong as its traditional version, but still it creates a kind of centrality in the house, which also directs the light into the interior spaces that gives the chance of having less openings and achieving more privacy in the house; besides, the concept of having a passageway all around the courtyard to connect the spaces on each level, is an exact reference to Sharomi in the sunken courtyards of the traditional houses. In addition to that, internal balconies and windows locating around the void allow visual contact between different rooms and floors, which once more presents the similar traditional approach. In terms of the hierarchy of the functions and privacy concerns, this house has also maintained the concept of having private, semi-private and public spaces, by vertically distributing them. Moreover, a variety of other traditional methods such as possessing a

basement, planting and vegetation, water pools, have all been actively integrated into the design of the studied house. Consequently, this house can be a successful model in terms of integration of the traditional values in the current housing designs that would eventually improve the quality of design in the contemporary architecture; as in the recent decades, the contemporary architecture and specifically contemporary housing designs faced with almost complete absence of traditional methods in many parts of Iran, which means the lack of cultural and environmental considerations in them that would result in an inappropriate architecture. Contemporary architects and designers should be aware of new approaches to re-integrate culture, tradition, and climate into their designs, for creating buildings that are more sustainable and compatible with their local needs and contexts.

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