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Original Article

From Tradition to Modernity: The Utilization of Traditional Components of Historical Buildings in Contemporary Modern Architecture of Iran

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Abstract

As time passes, the ways of designs change and technology grows more and more, but surely this technology which costs a lot for some countries, such as Iran, which is full of natural energies, is not a logical way to manage the correct solutions and the way of management in architecture of the buildings. In another hand, as tradition is changing to modernity, still living in traditional buildings is not suitable for whom are searching new windows to see. So, we need a solution which can save both benefits of traditional sustainable ways and also the new form and lines of modern architecture. It means that we are searching for a mixed method of new modern technologies and traditional ones and keep both functional and aesthetical factors be side each other. In this paper, first we will have a quick review of sustainability and sustainable development descriptions and then we will focus on the doctrines of Iranian traditional architecture and its sustainable elements and then by choosing some case studies both in traditional and contemporary modern architecture of Iran, we will analysis how and which of sustainability components of traditional architecture have been used in contemporary modern architecture of this country.

Key words: Tradition, Modernity, Contemporary Architecture, Sustainability, Iran

INTRODUCTION

Sustainable design is a design that meets the needs of present without compromising the ability of future generation to meet their own needs. During the energy crises in seventies of last century people became aware of the necessity to protect the environment and to find alternatives for fossil fuels.

In recent years there has been a surge of interest in *energy* issues. These trends can be encapsulated by three notable reports. WCED, UN and IEA which all alert about the finishing the non-renewable energies and encourage the world to use natural energies. It became more serious after vice-president Al Gore went over the world showing the spectacular movie *"An Inconvenient Truth"*, that people became aware of global warming, the ozone hole, widespread land degradation and declining biodiversity. Also standards were developed to express how well design and buildings perform energetically. The United States Green Buildings Councils (USGBC) was founded in 1993. The LEED standards began in 2000 and many other standards like BRBEAM (NL,UK), ITACA (IT) etc. These caused an urgent need for the incorporation of energy efficiency issues to be included in design and construction. Therefore action plan for energy efficiency can be one of the possible through more energy efficient planning, managing, and construction.

As it is clear in these solutions, all of them need technology and energy to produce energy, but it should mentioned that *buildings should not use more energy than they produce* and this is the main problem which seems significant and important to be studied and find the solution for it.

In fact, the main problem of this research is how to use sustainability patterns of Iranian traditional architecture in

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contemporary modern architecture of today. As Iran has four different climatic zones, the traditional designers had to use different solutions and systems for different regions. These systems were presented separately by research candidate in GBSC2011 (Green Buildings and Sustainable Cities) International conference held in Bologna, Italy in September 2011, but the main aim of this research is to combine these systems and introduce a new model which is unique and uses completely natural energies with high efficiency and even produces energy for buildings more than their needs. But we also should mention that the sustainability and sustainable design does not just cover the build methods. The design thinking in all aspects such as environmental design, cultural treatments and teaching sustainability via a correct design process are some other aspects of this model.

Significance of the Study

According to the economic aspects of new energies producing ways, sometimes the mentioned solutions uses more energy than they produce and because of this it seems necessary and significant to study and introduce a new model which decreases or equals the amount of usage and increase the producing natural energies. In this model we are searching for sustainability methods and elements and studying how to use them in today architecture. This model contributes a new improved solution for this aim and tries to produce and use natural energies in a correct way of design solution.

This model is a new and unique one which contains all buildings and design thinking techniques.

Research Questions

Therefore the main research questions comprise the following:

- How can decrease or equal the energy usage of a building and increase its producing energy by a new design model?
- What are the sustainability factors of Iranian traditional architecture?
- How can use the sustainability factors of traditional architecture in contemporary modern architecture of Iran?

Aims and Objectives

Sustainable design, framed by the larger discussion of sustainability having to do with the pressing economic and political issues of our world, seeks to minimize the negative environmental impact of buildings by enhancing efficiency and moderation in the use of materials, energy, and development space but incomes and outcomes should be equal. We need a correct design program and model to equal the energy that we use and the energy we produce. We have different systems in Iranian traditional sustainable design systems which have different sustainable functions and are close to our goal, but the main aim in this research is to have a combinational model of these systems and modern architecture to maximize the natural energy efficiency in design.

The objectives of this research are as follows:

(a) To review relevant international guidelines, descriptions, regulations, etc regarding energy efficiency in design methods and design thinking; design systems, their traits and their ways of usage in today`s design process.

(b) To identify and study the possibilities of combination ways of Iranian sustainable design systems and modern architecture of Iran.

Review of the Literature

The related researches which are done in this field of study:

MATERIALS AND METHODS

The methodology of this research will be based on qualitative data collection and analysis. As this research

Reference	Title	Author (s)	Date of publication
Eksistics, Vol348-9, pp. 216-224	Sustainable urban development: Strategic consideration	Leman, Edward, Cox, John	1991
Rocky Mountain Institute, John Wiley and Sous Inc, New York	Green development integrating ecology and real estate	Rauf S, M Hancook	1992
Halaitat International, Vol. 17, No. 3, pp. 1-12	Sustainable cities: Urban policies for future	Chaguill, Charles	1993
Journal of the American Planning Association, Vol. 62, N.3, pp. 296-310	Green cities, Growing cities, Just cities?, Urban planning and contradiction of sustainable development	Camberly, Scott	1996
The City Reader,(London: Routledge).p. 438	Planning sustainable and livable cities	S. Wheeler	1998
John Wiley and Sous Inc, New York	Green development	Wilson, Alex	1998
20th PLEA International Conference Proceeding	Toward environmentally responsive architecture	Yannas, S.	2003
USA : UNDD, pp. 21-22	Indicators of sustainable development guidelines and methodologies	Disano, Jo Anne	2002

would mainly review the administrative documents, charters, instructions, etc., a sort of comprehensive data collection will be employed to provide the exact points of each document and to explain the meanings of collected data through extraction of each document. For a comprehensive and inclusive data collection progress, related national, local, and internal charters, regulations, and guidelines regarding energy efficiency in design thinking and energy efficiency issue will be reviewed.

The first step of the research consists of a comprehensive literature review and document analysis of the basic concepts of energy efficiency, of the most common barriers to energy efficiency improvements, and of the policy instruments and strategies that encourage energy efficiency improvements. The concept of barriers and potentials to the improvement of energy efficiency will be examined and, later, discussed in relation to the functions of Iranian sustainable design systems will be studied. The next step will be introducing the examples of contemporary modern architecture which have used these traditional factors.

Observation

Sustainable architecture had its own meaning up to the 19th century. It means that, up to that time, the buildings were trying to create a balance between nature and construction. This needed a powerful management and this management surely costs a lot. But according to sustainable traditional designs of Iranian architects, this managements were done by some creative solutions. Using natural resources and also the way of design planning and modeling helped Iranian architects to do their best to reach this aim. Before coming to studying the sustainable solutions of Iranian traditional architecture and comparing with the contemporary architecture of Iran, we will have a quick review of sustainability and sustainable development descriptions.

Sustainability and Sustainable Development

The word of "sustain" has been used to describe the meaning of staying on, continuing and supporting in recent decades but nowadays its meaning has gotten more importance and developed and global sciences focus on human and his future life more and more. According to final report of world commission on environment and development in 1987, "Our Common Future", a sustainable development is a development which meets the needs of present without compromising the ability of future generation to meet their own needs [1], but there are so many other descriptions for this meaning too, but the main meaning of sustainable development is a development which can sustain [2]. In fact, this is a movement or kind of revolution which tries to direct the life and increase its quality for today and future generations [3]. Human, his life and his future are the main words which creates the real meaning of this development and it can be described as the human health and its related system too [4] (Table 1).

The Doctrines of Iranian Traditional Architecture

Sustainable architecture is a way to reduce the energy costs of a building. The buildings which are designed according to sustainability theory, should reduce the mechanical systems usages and use natural energies [5]. The doctrines of Iranian traditional architecture are a combination of factors and values which are based on Iranian spiritual and cultural believes and also in this kind of architecture, it has been tried to create the buildings which not only they do not hurt the nature, but also be concurrent with it [6]. In fact, Iranian traditional architecture tries to have some special elements which all create sustainable patterns for an architectural design. Before comparing the traditional and contemporary architecture of Iran and studying the sustainable factors in each of them, it seems it is better to probe the sustainable elements of traditional architecture and then see how and which of them has been used in contemporary modern architecture of Iran.

The Sustainability Component of Iranian Traditional Architecture

Central courtyard

Courtyard is the main sustainability element in Iranian traditional architecture which has a symbiosis with nature. Courtyard is a micro-clime space and is called little heaven in Iranian traditional architecture [7]. This space not only organize the relationship between other spaces, but also it arranges the environmental heat of the building [8]. It also operates as the ventilator of building and by creating interior shadow, it causes fresh cool air inside (Figure 1).

Green space

Using suitable plants and trees in each climatic zones of Iran and paying attention to green spaces is one of the most important factors of Iranian traditional architecture which in today contemporary architecture it has been used too. This factor be side creating shadow and beauty of space, develops the humidity of atmosphere [9]. These green

Figure 1: Central Courtyard in Tradition and Modern Architecture of Iran

spaces can also act as a dam against bothering winds of environment (Figure 2).

Waterfront

In traditional buildings of Iran, usually because of hot climatic conditions that most parts of country have, using waterfront in the middle of the courtyard and even inside the building helps the evaporation conditions works better and by this way it helps developing the green spaces and fresh air [10]. In recent architecture, also this pattern has been used in some cultural and public buildings (Figure 3).

Fosse-garden

As it was mentioned, paying attention to natural water, natural green spaces and natural energy is the main aim of Iranian traditional architecture. Toward this aim, one the other spaces is called Fosse-Garden or "Godal-Baghceh". This space is designed some meters underground and by this way be side reaching to underground waters to their green spaces, they also make the cooling systems easier. In today architecture of Iran, we also have the same case in some contemporary projects such as Isfahan Farshchian Centre (Figure 4).

The utilization of thermal capacity of soil

As after the depth of six meters, the thermal degree of ground is being sustainable, the traditional architects had used this fact to build some underground buildings and by this way they use the thermal capacity of soil to control the hot and cold climatic conditions. Contemporary architect Farhad Ahmadi also has been used this technic in his recent project "Tehran University of Science and Technology Library" (Figure 5).

Wind-catcher

One of the other traditional and natural sustainability factors which was used in Iranian traditional architecture was wind-catcher. This factor catches the wind in hot and dry regions and directs it to the inside of the building and make the interior atmosphere cooler [11]. Iranian contemporary architects have used this in many recent buildings but some of them just have used it as a sign of

Figure 2: Green Spaces in Tradition and Modern Architecture of Iran

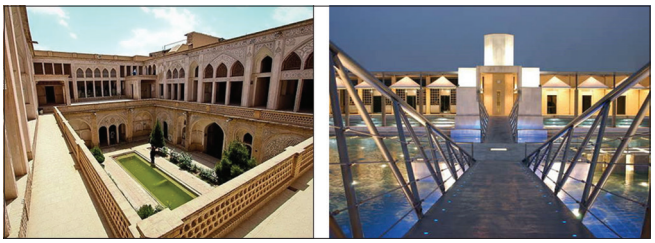

Figure 4: Fosse-Garden Modeling in Traditional and Modern Architecture

Figure 3: Waterfront in Heydarzadeh House (Traditional) and Iran Embassy in Korea (Modern)

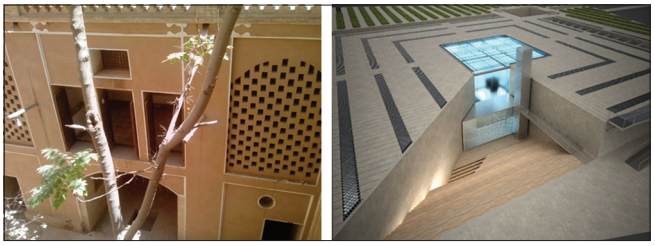

Figure 5: The Utilization of Thermal Capacity of Soil in Traditional and Modern Architecture of Iran

Table 1: Sustainability components in traditional and modern architecture of Iran

Strategy	Sustainability component	Traditional architecture example	Contemporary modern architecture example
Natural Energy Utilization in Building	Wind-Catcher	Dolat-Abad, Yazd	Contemporary Arts Museum, Tehran
	Central Courtyard	Tabatabaiha House, Kashan	Vanak Complex, Tehran
	Thermal Capacity of Soil	Nushabad Underground City, Nushabad	Tehran University of Science and Technology Library, Tehran
Compatible Architecture with Nature	Green Space	Eram Garden, Shiraz	The Art University, Isfahan
	Waterfront	Heydarzadeh House, Tabriz	Iran Embassy in South Korea, Seoul
	Fosse-Garden	Aghabozorg School, Kashan	Farshchian Complex, Isfahan

Figure 6: Wind-Catchers in Tradition and Modern Architecture of Iran

traditional architecture and some others have used with the same functional usage (Figure 6).

CONCLUSION

In this research, we studied the sustainability components of traditional architecture of Iran and we compared them with contemporary modern buildings that recent architects have tried to use them in different cases. This comparison shows that in both traditional and modern architecture there are two important strategies to reach sustainability aims in architectural design: First natural energy utilization in building and second compatible architecture with nature. In both strategies the mentioned sustainability components such as central courtyard, green space, waterfront, fosse-garden, thermal capacity of soil and wind-catcher have been used in both traditional and modern architecture and it shows that by a correct management and planning the natural components of sustainability can be used in t contemporary modern architecture of today.

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