A look at Iranian architecture and assessing its features and technological aspects

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***Abstract*—Nowadays, given the fact that we are living in the modern world with high-speed access to science and technology, the modern man thinks that technology is his achievement and previous communities have never been equipped with technology. He also thinks that the technological paradigm is a new paradigm in architecture and in the architecture of the past, given the lack of knowledge and improper construction methods, technology was never of importance. The main goal of this research is to investigate and verify whether the apparent contradiction between Iranian architecture and technology has ever truly existed in reality or is the mere product of quantity-oriented mind of the modern man. The present article attempts to find out the nature of the relationship between the two paradigms of Iranian architecture and technology. It is argued that Iranian architect, in the past, has always tried to break through new grounds in terms of technology and innovation utilizing knowledge and bravery and has constructed magnificent landmarks both in terms of concept and structure. This research aims to emphasize the fact that fundamental issues in architecture, such as the structure, coverage methods, and materials, had been among the most pressing issues for Iranian architects. This is practical study which follows a qualitative approach to paradigms. The innovative aspect here is a closer scrutiny of preconceived ideas of modern architectures' minds regarding technology. The method of collecting data about the technology used by Iranian architecture is library and filed research and the research methodology is interpretative-historical. Regarding the contributions of this article, through careful examination of the relationship between the two categories above, it is argued that the Iranian architecture has always attempted to improve and expand through true and accurate understanding of the technology of the time or has been able to create unique structures using many technical principles such as niaresh[1], reducing material and increasing space, compatibility of space and structures, utilizing pre-fabrication and pymoon[2], understanding the science of statics and design based on the contrast between forces, and finally, preloading and seismic design.**

Keywords-Technology; Iranian Architecture; Pre-fabrication; Seismic Design.

I. INTRODUCTION

Nowadays, in the third millennium, the subject of knowledge and technology has been greatly emphasized by different countries, particularly western societies, and it seems that technology has never been of such importance in the history, and mankind has never before been this advanced in terms of technology, intelligence, literacy, and techniques; a mindset which is derived by the technique-based western mentality.

On the other hand, the current mindset shared among many of the architects in our country is also based on the idea that our modern architecture, which is deeply rooted in the west, is full of technological aspects (high-tech). Also, our architecture in the past, for unclear reasons and without research, is being seen as technologically weak (low-tech), and it is assumed that the discussion of using technology in architecture is a paradigm of modern times and upcoming years, and traditional societies generally had primitive architectures in this respect.

However, through research and assessment of great architectural works across the country, one realizes that Iranian architects have always paid great attention to fundamental architectural matters, such as logic, principles of statics, scientific and technical issues, human scale, the proper use of local materials, energy saving, etc., [1].

The present article aims to demonstrate the unity and harmony between Iranian architectural paradigm and technology. To this end, a philosophical view of the meaning of technology is first presented. Then, the inherent conflict within this presentation of Iranian architecture has been questioned.

The standpoints of experts about the role and importance of technology and niaresh in Iranian architecture is then presented. Afterwards, through presenting examples of application of technology in Iranian architecture, such as pre-fabrication, preloading, seismic design, etc., this article aims to show a portion of the height of the knowledge and intelligence of the Iranian architects regarding the use of technology in creating works of architecture.

[1]Niaresh is knowledge of the quality and quantity of building materials and traditional architecture of Iran.
[2]Pymoon is an instrument used in Niaresh, usually for convenience and giving directions and different sizes, something like modulation in modern Architecture.

II. RESEARCH METHODOLOGY

This research, at the level of paradigms, has a qualitative approach to the issue and seeks to assess the quality of relationship between technology and Iranian architecture, both in terms of meaning, skeleton, and existing items. The data collection method in the literature section was based on using library sources and existing documents. In the literature section, through a deep and phenomenological look, we sought to confirm the existence of this philosophical conflict and then, using documents and field studies, assessed the nature of this relationship and present examples of masterful utilization of technology by Iranian architects, using the qualitative content analysis method.

III. RESEARCH LITERATURE REVIEW

A. *Technology Terminology*

The term 'Technology', the Persian equivalent of which is 'Niyaresh', has roots in ancient Greek word 'techne' that is derived from 'tektin', meaning productivity and production. The word 'techne' has been used in two senses of 'art' and 'production capacity' (Auyang, 1999). In the Greek language, 'techne' has mostly been used alongside the word 'episteme', meaning knowledge and understanding. The following table demonstrates the precise relationship between these two terms.

TABLE 1: PRECISE RELATIONSHIP BETWEEN TECHNE AND EPISTEME

Outcome	Activity	Subject	Latin equivalent	Term
Theory	Thinking	Being without change	Knowledge science	techne
Product	Producing	Providing grounds for change	Art, product	episteme

B. *The definition of technology and formation of the conceptual framework of the research*

Many definitions have been presented for technology which generally can be divided into the following four categories: The first category is technology as knowledge, the second one is technology as trend and process, the third one is technology as action, and finally the fourth category is technology as will and intention of doing something.

Consideration of technology as knowledge emerges with a deep bond between science and technology; in these definitions, technology is considered to be a subset of knowledge and as one of its derivatives.Considering technology as a trend and process, focuses on organizing and management aspect of technology, which although emphasizes rational and intellectual part of technology, at the same time shows planning and pre-compiled designs for technology in contrast to the traditional methods [13].

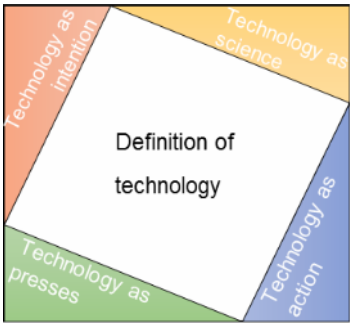

Figure1: The conceptual model of definition of technology, which is the one considered in this research, source: the author

Technology as action generally focuses on practical aspects of technology against theoretical aspects of science and, essentially, considers practical science as technology. The fourth category considers technology as will and intention, which the contemporary philosopher, Mitchum, believes is clearly recognizable. He considered and emphasized the ambiguity of the conflict between knowing and doing which is essentially human will and intention for doing something [6].

By taking into account the four definitions of technology and its Greek root, no philosophical conflict with Iranian architecture can be observed. Since the meaning of techne is essentially the same as art and production, or art along with production. Similarly, in Iranian art and architecture, works of art have been perfectly coordinated with production and, while maintaining their beauty, have had particular roles and purposes.

Also, in all four definitions of technology, where it is used equivalent to knowledge, Iranian architecture has been able to comply with knowledge guidelines. "Iranian architect has always been aware of and focused on positive traits of an architect, namely science of logic, principles of statics, technical and scientific issues on a structure, human scale, using local materials, saving energy, etc. Calculations and geometry in Iranian architecture were so accurate that only senior architects and well-known Moghanians were called engineer [1].

Also, when technology is defined as the practice of science, not only is there no difference between it and the Iranian architecture, but also learning through practice is one of the basic principles of Iranian architecture. "In Iranian architecture, the mason's child has been working as an apprentice alongside his father, and at his youth has practiced masonry under the supervision of the head-mason or master, and only through passing all the previous levels and having right qualifications was able to achieve the title of architecture [1].

In relation to technology and teachings of the Iranian architecture, it can be said that an architect's training period was very long and extensive. Architects were noble and elite members of community and were called Maulana. These architects were equipped with most of science and technology of their time and were masters of Arts related to architecture.

During the training period of an Iranian architect, the following technical capabilities were obtained:

- Sensory knowledge and principal understanding on Jangozar[1] ,
- Determining the dimensions of Tagozar[2] , through drawing and calculation of balance, geometry, and order.
- Selection and implementation of type of coating.
- The technique to draw required curves for Chafds[3], arches, domes, etc.
- Calculation of proportions and sizes of load-bearing parts, type of arch relative to aperture, Jerz thickness relative to the arch on it, sizes of central and lateral Jerz, the size and type of foundation considering the local soil [1].

These are all examples that show Iranian architecture is not only coordinated with this definition of technology, but also is based on it and science and technology have been among important issues of architectural education. Regarding the definition of technology as a systematic trend and process, it must be said that all the above mentioned steps had a precise and set order in the minds of Iranian architects. "The development of Iranian architecture is an extensive process and various factors influence it. Architecture is first developed in the architect's mind (reality), then it is expressed (interface), and finally is physically shaped (abstract)" [1].

The fourth category of definitions, which is about will and intention, is also in line with architecture in Iran, to the extent that the will to adopt the profession and being useful to society has been mentioned in FotowatNameh: "Some of the positive aspects of the culture of fetyan are the value of the work and usefulness for society, knowing a craft and skill, and the intention to practice it. Fetiyan[4]considered being skillful in a business or professional as duty" [10].

Now, after covering the four definitions of technology from four different perspectives and concluding that there is no philosophical conflict between these two paradigms, to indicate the nature of the relationship between technology and Iranian architecture, one can refer to principles which demonstrate the manifestation of technology in Iranian architecture. The following section covers some of them and makes attempts to give examples of experts in that field and structures made with that type of architecture.

IV. Principles of Manifestation of Technology in Iranian Architecture

A. Taking advantage of science of statics, Niaresh, and geometryure:

"Niaresh" is the science of understanding forces applied to a structure, the scientific and technical calculations of the structure, and knowledge of forces and designing based on them in Iranian architecture. Professor Pirnia presents the following definition:

Niaresh, in the sense of factors that hold a structure together, consisted of "a collection of computational and static matters in addition to knowledge of materials and using the most appropriate and least amount of materials" [12].

Professor Latif Abu al-Ghasemi presents another definition: Niaresh, is a wealth of knowledge, the accumulation of successive and continuous experiences of our predecessors, and full of proven order, style, and proportions, which have been always at the disposal of architectures and are always moving toward perfection. Niaresh, using extraordinary scrutiny and in unique way, assesses problems and solves them systematically, and this is only possible through utilization of experiences of the past along with geometry and proportions, and finally, the skill and perspicacity of the architect [1].

Geometry and Niaresh have been two different sciences at the disposal of Iranian architects: geometry and Niaresh, using Pymoon and considering the need, have been the factors determining and controlling dimensions and sizes, and the guideline toward a desired outcome. Iranian and European geometry are inconsistent and different; the same is true about Niaresh and statics. Niaresh simply gives the most accurate answers. Geometry is more about proportions and avoiding calculations as much as possible. In this geometry, dimensions and functions and multiplication of each other, all are derived by the need [1].

A notable instance of the use of Niaresh in buildings is that "one of the features of Niaresh in Iranian architecture has been that our architects have always paid attention to the general structure in the process of building and its effect on the facade of the building" [12].

Architects, with a rich background and using geometry and through realization and spatial visualization of current and inertial forces, were totally aware of the impact of these forces on load-bearing parts of the structure and, with articulated consciousness of its situation and perfect knowledge of it, were able to accurately determine proportions and dimensions of loaded and empty sections and planned the structure. Knowledge and understanding of materials and their use were also of great importance for achieving superior strength and optimum dimensions [2].

B. Reducing material and increasing space

Iranian architects were known for their often consistent and proper principles during their time, both in the pre-Islamic era and after that. This architecture has changed in that some principles have been added and some have been excluded, but it has not been totally transformed throughout history. However, investigating this matter requires a separate in-depth study. One of the constant principles used in Iranian architecture is trying to reduce the mass of pillars and walls and increase the space between them. Before Islam in Achaemenid palaces, specifically, in the ChehelSotoun Palace in TakhteJamshid, the vividness of pillars and the large spans and space between them compared to the columns of the Parthenon temple in Greece, reflects this fact. Late Mr. Mirmiran speaks highly of this principle; he believes that Iranian architecture,

1Principles of statics regarding the correct type and shape of coatings and load-bearing parts and their location and size, which the architect had full knowledge of [1].
2Non-bearing and scattered elements of a structure.
3 The top brick of arch.
4 Chivalric men

since the beginning of its history until the late Qajarid dynasty continued but then experienced a break. He argues that "the most defining characteristic of Iranian architecture which distinguishes it from other works of architecture all over the world in all lands and eras, is transparency" [5].

He considers the following attributes for Iranian architecture: transparency, reduction in material and increase in space, simplicity, humility and being inviting, horizontal presence, being delightful and joyful, partial visualization of concepts, connection with nature, flexibility, moving from material quality toward spiritual quality or from material to the soul (ibid, 18).

One of the clear examples of this in the history of Iranian architecture is the Apadana Palace made by King Xerxes in TakhteJamshid with dimensions of 60m by 60m and 36 pillars. Porches on three sides of it were 20m each [8].

Columns of this palace are logically thinner at top and thicker at bottom in order to reduce the weight imposed on the structure, which in turn creates a sublime and bright environment. It seems that the creators of these columns were not only aware of rules associated with construction and performance of structural system, but also at the same time have carefully considered architectural and cultural factors [15].

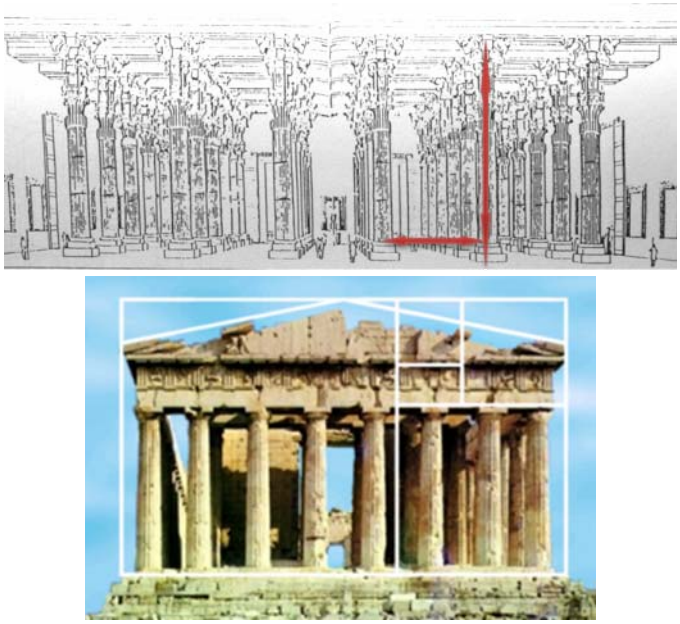

Figure 2:Takht Jamshid, Perspective of Apadana Palace- vividness of columns and the principle of reduction in material and increase in space- column height of 20 meters - column spans of eight meters- column diameter of two metes- compared to the Parthenon temple in Greece[15].

Iranian architects have contentiously done their best to minimize Tangozar and load-bearing masses and their works are superior compared to the architecture of other lands. Iranian architects have always shown great courage in increasing the ratio of span to Tangozar and minimizing coatings which are manifested in most of the cracks and failures that can be seen on facades and entrances. For example, Taj al-Din Ali Shah Guilani, insisted on building the porch span of Ali Shah Mosque in Tabriz with the length of 28 gaz, only for it to be 4 gaz wider than the porch span of Mada'in[2], which ultimately led to its collapse.

Figure 3: Old photo of Ali Shah Mosque in Tabriz, Source: http://iran-bastan.blogfa.com

The trend of reduction in mass and increase in space in Iranian arches was to the extent that Iranian architect were always trying to reduce the thickness of arch and its rise and to increase span. Arched ceilings were moving towards flattening and going from arch and torizeh with full and Roman arrangement to GhomiPoosh or Lapoosh[1] Arch is another testimony to this.

The special elegance and skill that the Iranian architects apply to a structure in order to consider general provisions and issues as well as particular matters concerning a structure, show the insight and awareness of the architects regarding the way forces react and their effects on the structure. A case in point is bladed Lapoosh arch [14].

Figure 4:Lapoosh or Ghomipoosh arch used in the roof of an Iranian house[14].

[1]The lapoosh arch is made of a brick layer lying face down and due to the skill of architects from Ghom, especially Master Hassan Qomi, is also known as GhomiPoosh Arch.

Figure 5:Implementation of Lapoosh arch by a mason and his two apprentices [14].

The way bricks are arranged (extremely thin) does not allow the arch to be sharp and steep. It is not possible to implement the main load-bearing part as Lapoosh, even multi-layer, and this roof is always used as a filler between the main load-bearing surfaces. In some cases, such as the Agha Bozorg mosque in Kashan, bricks from the curved façade are damaged and a layer of bricks is used on them. The mortar used (with bricks and adobe) is pure fast harden plaster which speeds up the process and allows for continuation of the construction (ibid). The author believes that this arch is one of the symbols of the efforts made by Iranian architects to reduce mass and increase span size, to the extent that in the cases observed we can even see spans up to 8 meters with 10 cm arch thickness and 20 cm rise thickness.

C. Harmony of structure and environment

Another principle that has been continuously applied in Iranian architecture is the coordination and harmony of static matters and architectural space requirements which represents the extent of intelligence among Iranian architectures in using structures tailored to each environment.

A perfect example for this case is the abovementioned elegance and distance between columns in the Apadana Palace which created a great and royal atmosphere for religious ceremonies of that time. Several cases can be cited to confirm this fact and a number of them are mentioned below.

Columned Shabestans in mosques are more examples for the compatibility of space and structures in the Iranian architecture and the structure of a mosque. In terms of static considerations, “Columned Shabestan” or verandah, which is a uniform environment for holding mass prayers, includes openings from a small square space and arches of its four parts were placed together in a checkered form. Each arch imposed its thrust on the next opening and finally, the thrust force of arches was neutralized and there was less fear of destruction and collapse. Also, given the need to add the columns later, using a structural system could facilitate future development of the mosque [12]. Also, using wooden latches in this structural system was to offset tensile and lateral forces and to reduce arch thrust.

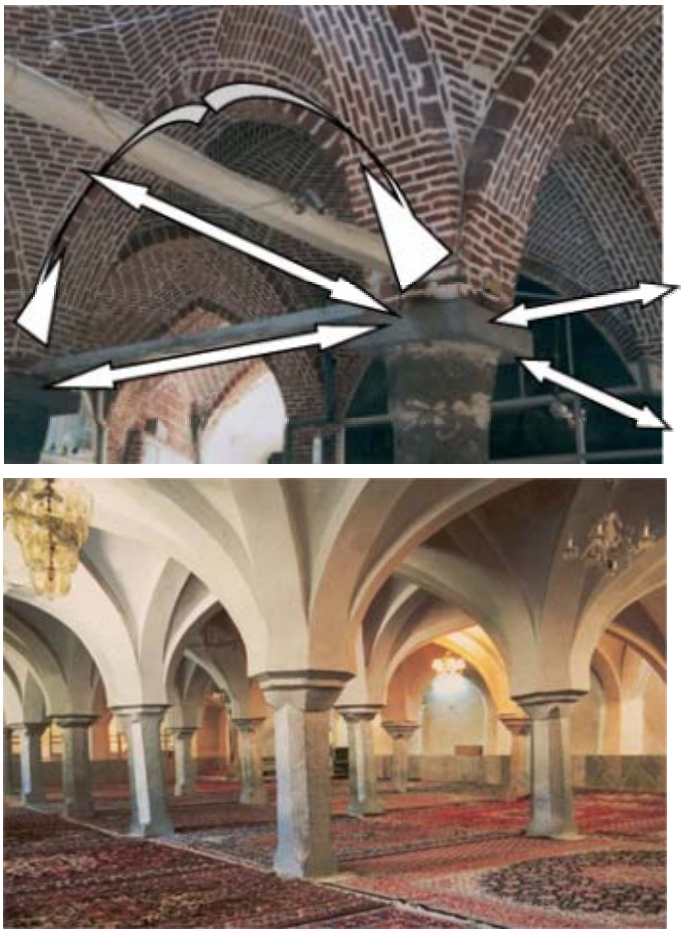

Figure 6:Photos of two different types of columned Shabestan in mosques and transmission of forces in this structural system [14].

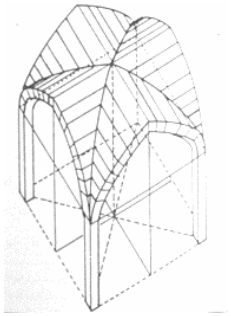

Figure 7:Structure of Kalanbeh srch, [9].

The second noteworthy example of compatibility of space and structures in Iranian architecture is Minaret. The minarets of mosques or religious monuments in some cases, in addition to creating a special atmosphere and emphasis on the entrance and being inviting, have been located adjacent to foundations of big arches to compensate for the thrust that is inevitably generated from the arch. In any case, minarets follow two general ideas; namely making the base larger or using backings to prevent the thrust of big arches. That is why spiral stairs that are only very scarcely found inside Iranian minarets or thick

foundations of some Iranian monuments, were only for movement and transition between the two levels. Also, wood has been used to create flexibility and coping with lateral forces and maintaining uniformity and connecting multiple sides. The created empty space is then properly used to reduce weight and unbalanced forces [7].

Also, designs based on the knowledge of resonance force, choosing whether a minaret should have one corridor or two to avoid vibration, placing the heavier minaret downwind covering the lighter minaret, and also using wood in vibrating minarets or MenarJonban, are other examples of clear and practical understanding of technology and its proper application by Iranian architects.

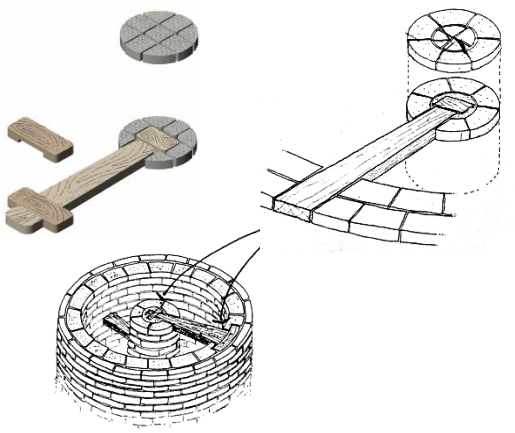

Figure 8: Connection and involvement of tensile elements (wooden beams) with the body of the minaret towers. Source: the author

Another example of compatibility of space and structure in Iranian architecture can be found in double-envelope domes[1]. The need for some kind of coordination between the proportions of the interior space and the use of human scale which aims to prevent worshipers from getting subdued under a very high dome and, on the other hand, the size and shape of the exterior on an urban scale has been felt in domes of Iranian mosques. This means that they maintain both the interior proportions and an elegant outer façade on an urban scale. This need for space in the dome has been met by utilizing structural system features of double-envelope domes in Iranian architecture [15].

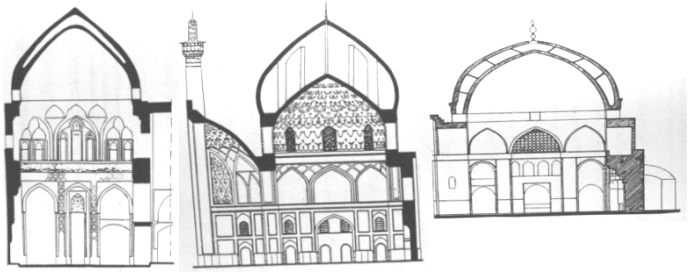

Figure 9:Double-envelope domes in the Grand Mosque of Yazd, Grand Mosque of Ardestan, and Grand Mosque of Isfahan

[1] Double-envelope domes consist of two types of discrete shells which separate the upper dome with Khashkhashi from the lower dome, such as Dome of the Isfahan Jameh Mosque, and continuous shell, such as Dome of the ArdestanJameh Mosque.

Many reasons can be mentioned for the application of double-envelope domes, including architectural and urbanization and even structural reasons, some of which are as follows: compliance with human scale for architecture of the inner dome and urban scale in the outer dome, controlling acoustic issues under the dome by constructing the inner dome, acoustic and thermal insulation, style building in the dome using Khashkhashi and the empty space between domes, lack of adornment and boasting are only small samples of knowledge and genius of Iranian architects in the use of technology in serving the people and architecture.

D. Pre-Fabrication and Taking advantage of Pymoon

Pre-fabrication in Iranian architecture is another proof of precision in the execution and enjoyment of high-tech in architecture. Pre-fabrication worked in this way: a building was being built in Isfahan, its doors and windows were ordered to a craftsman in Kashan, carried to the construction site, and then installed. The precision was so high that there were not the slightest mistake in measurements and that was due to using specific patterns and taking advantage of pymoon in Iranian architecture.

It should be noted that Iranian architecture, at any time in the process of its development, has been viable for the society its time. In Iranian architecture dimensions and sizes played an important role and architects, using pymoon which was considered as an important principle and has always been a criterion in Iranian architecture, designed and implemented structures [4].

Figure 10: Five doors of the Lari House in Yazd, strict modulus compliance can clearly be seen in this architecture. Source: http://mis-architect.persianblog.ir

In order to create coordination and reasonable proportions in the structure, an index or reference was determined and all other dimensions were a function of the index. Pymoon in Iranian architecture and module in European architecture served as that index.

In this architecture, pymoon, considering the Jangozar and the target and the desired space, served as a tool for

determining dimensions and sizes and geometry served as a guideline to ensure fitness of proportions and dimensions. Thus, pymoon, in addition to contributions to determining the desired dimensions and proportions, made the pre-fabrication of doors and windows possible and provided considerable facilities for construction and implementation of structures. Pymoon is the width and was often known in two types; big pymoon and small pymoon [2].

Figure 11:Pre-fabrication of doors in this architecture which was made possible due to accurate dimensions and sizes

E. Understanding the science of statics and design based on the contrast between the forces

Under different conditions, Iranian architects made decisions and provided required arrangements with full knowledge and complete information about science of statics and understanding the forces exerted on the building based on the location and position of the building, including factors such as soil type and material, whether or not the area is earthquake-prone, the loading capacity of that particular area, wind forces on the building, and opposition of forces inside the structure, and other scientific and technical issues. Some of these conditions are covered in the following.

Confrontation of forces, which is implemented using full mastery and awareness, leads to a static balance and equilibrium and, in addition to the brickwork, enables the architect to create the required volumes and shapes. Then, a minimal coating in the form of a pile of certain architectural materials and following the geometrical and Niaresh guidelines, covers the Jangodaz and creates the Tangzar. There are various types of foundations, each of which is appropriate for a certain soil and imposed forces [2].

F. Pre-loading

Pre-loading means that a piece of land, before building anything on it, is loaded in a way that possible subsidence occurs on the soil before construction. Iranian architects were aware of this science and implemented it where needed and, as has been said, when constructing Shah Mosque in Isfahan, architects built the walls and before implementing the dome left the construction site untouched for a while, and after enough subsidence happened in the ground, finished building the structure. Although there is no official document that proves this, it might have taken place in reality.

Another case of application of pre-loading, is the work covered in the book “Seven Cities” by Master Bastani: “In 1982, after constructing foundations and coverings of the mosque with a 10 meter span opening, the Late Master Reza Memarian [9], did not agree with the implementation of Toorizeh immediately. The construction site was shut down for more than five months and this interruption was with the confirmation from Late Haj Ahmed Milani, the experienced chairman of the board of trustees for maintenance of mosques in Azerbaijan” [3].

G. Seismic Design

The seismic design of building means that architects, considering earthquake risk and existence of lateral forces imposed on the structure, designs and builds the building and measures to deal with these forces are reflected in the design and construction. Iranian architects, in cities that were earthquake-prone and had a history of earthquakes, considered the seismic design of buildings and adopted measures to cope with shear and flexural forces applied to the structure. The following measures were often taken by Iranian architects in order to cope with earthquakes.

1) Changing construction and building materials for different floors in order to make the structure lighter,

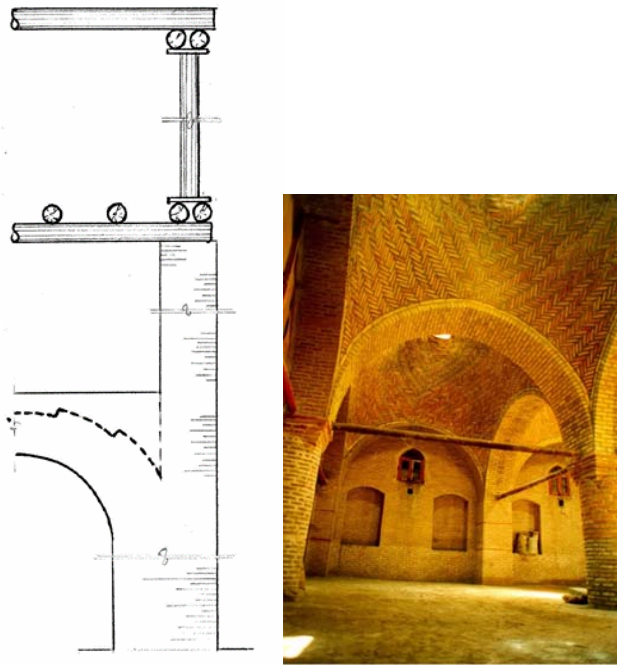

Figure 12: Using lighter material; at the bottom is the stone foundation, at the middle is the brick wall, followed by a wooden and brick roof to cope with bending [14]

2) Using wooden clough

Cloughs are wooden connected parts that make compressive and tensile load distribution homogenous in the components or all of the structure and prevent possible collapse and are a part of the structure, such as post and lintel, column, or beam.

3) Using wooden diagonal bracings

To deal with earthquake lateral force, diagonal bracings were used in two horizontal and vertical plates in the house in Tabriz.

Figure 13: Using diagonal and vertical bracings inside walls. [14]

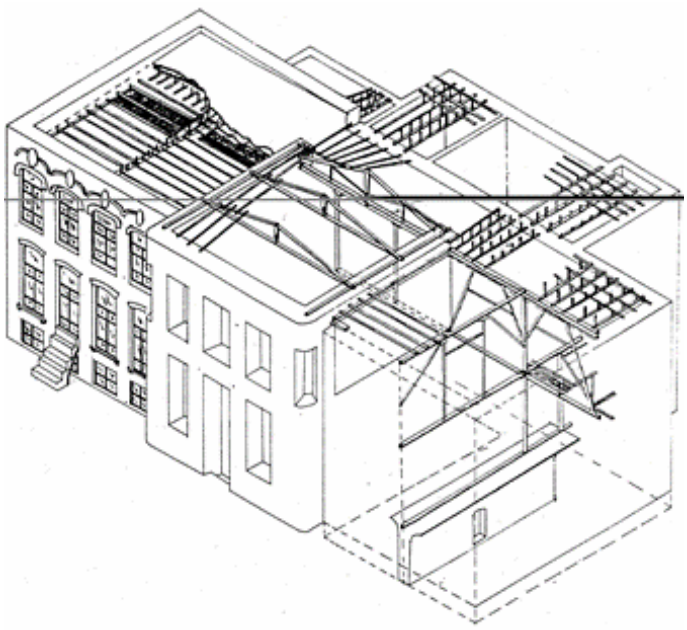

Figure 14: The relationship between architecture and seismic design in the Noubar Charity House[14].

Figure 15: Using sash in the seismic design of a building in Sanjesh Museum in Tabriz[14].

The location of the door and windows and large openings can be a dangerous area at the time of earthquake. Resistant frames can reduce the amount of destruction.

4) • Using wooden frames

In some structures, especially in Tabriz, sash doors have been transformed into wooden frames to cope with earthquake lateral forces.

V. PRESENTING A CONCEPTUAL MODEL FOR THE RELATIONSHIP BETWEEN TECHNOLOGY AND IRANIAN ARCHITECTURE

To conclude, it can be said that Iranian architects have been employing various principles and methods to incorporate technology and ensure quality. To this end, the following bullet-points can be mentioned:

- Using Niaresh and geometry,
- Reducing mass and increasing useable space,
- Harmony between surrounding environment and the structure,
- Pre-fabrication,
- Utilizing Pymoon,
- Understanding the science of statics and design based on the contrast between the forces,
- Pre-loading,
- Seismic design.

The following diagram illustrates the manifestation of technology in Iranian architecture and the relationship between them:

Figure16 :Conceptual model of the process of manifestation of technology in the Iranian architecture and the related and influential concepts. Source: The author

VI. CONCLUSION AND RESULTS

Technologically manifested concepts in Iranian architecture are not limited to the above mentioned ones. The present article merely scratches the surface of the science and art of Iranian architecture and true understanding of each of these items requires separate extensive studies. However, this article was an attempt to show technological manifestations in the Iranian architecture.

To conclude, I quote Master Abu al-Ghasemi: "Structure and stability, climate compatibility and establishment, scientific and technical issues, being logical, dignity and privacy, monotheism, continuity, strong impacts from the philosophy and culture, and intellectual and innate matters, are among the fundamental factors in the development of Iranian architecture [2].

To establish a relation between facilities available to Iranian architects and their work in terms of structural and technological quality, and facilities and materials available to architects today, we can firmly argue that Iranian architects have been as qualified, if not even better, than modern day architects, regarding the optimal and practical use and efficiency in the implementation of technology. However, the difference is that modern architects give originality to technology, but Iranian architects gave originality to its surrounding environment and human values and used technology to further these sublime values and never attempted to boast through technology, as is shown in the modern day exposed structures and buildings.

Iranian architects, through proper understanding of the construction technology, with the limited resources at their disposal at that time and with high efficiency in the use of technology, tried to utilize technology to serve mankind and used it, in coordination with the nature, to create spiritual spaces. They tended to develop innovate methods and make headway in this field and, by combining them with cultural values, create worthy monuments. It is fitting that today's architects try to be aware of his/her architectural past and its cultural values and also be equipped with modern science and technology, and using these facilities, strive toward creating appropriate works of architecture rooted in our beliefs and culture.

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