

## Comparative study of traditional lighting methods in interior design

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### Abstract

In traditional architecture, light and color play an important role in the structure of residential spaces, as well as public spaces, and are the determinants associated with temporal and psychological perception of residents. Indeed, the light is the hallmark of Iranian traditional architecture, arising from the combination of Iranian culture, religion and art, and represents the divine world. In Iranian buildings, the use of light and refraction of light from light in order to create index and beautiful spaces and give special meaning and meaning has been effective. Designers in the traditional buildings, by adding light and controlling the light by certain Germans, such as lighters and controllers, added beautifully to the importance of space. Light affects the quality of space perception, while today, incorrect cues of modern and postmodern interior design, regardless of Iranian culture and tradition, have led to the creation of beautiful but inappropriate effects with Iranian environments and identities; Due to the high speed of the building, lighting quality in interior spaces is less important. And with the advent of new building materials and methods for building intelligent building, new solutions have emerged for the use of light control technologies. The authors of this paper, using an analytical-descriptive method, aiming at the study of various Iranian traditional lighting and its place in interior design, are attempting to create this motivation in interior designers and industrial designers, which combines traditional methods of modern lighting and modern technology while preserving the culture. And traditions, pay more attention to the use and efficiency of light in the buildings.

**Keywords:** Lighting, traditional design , interior design .

## Introduction

light and color play an important role in traditional architecture of Iran . in other words , light and color as two main factors in general combination of internal space lead to creation of an organization and meaning of whole space . in fact , it can be said that light and color interfere with space geometry and create a coherent order in space design (Ziabakhsh and Karimi , 1393) (Ziabakhsh et la Karimi , 1393) . sunlight is one of the most important sources of natural light . before the introduction of lighting technologies to human life , light in the life of the Iranians plays an undeniable role ; the use of floor and smooth walls to absorb and reflect light , use of mirrors to take and break the light , is used in the traditional lighting of lights and shafts , marble , porch , types of arches and arches .

according to the physical characteristics of light , different levels of a building in front of the light can have three different responses which are absorption , reflection and transmission of light . one of the features of Iranian traditional lighting is usage and combination of light and color that is transmitted through colored glass and other woody parts to interior spaces and on the other side of the wall makes shapes and designs . the effective factors in the use of light in the traditional design are considered in three groups : the spatial order of the building , different types of light passing openings and other things that are not transparent but help in entering the light . in the present era , both interior and light architecture are very close to each other and designers are always looking for the correct way to use light , but in most cases attention to the elegance that has been introduced in the past to the category of light and color in traditional architecture . although there are many possibilities in producing a variety of high - quality glass and also the possibility of using electronic equipment in light processing , interest and attention to the details and the elegance that is important in traditional lighting appear to be more attractive . the authors of this article , using descriptive - analytical method with the aim of studying the types of Iranian traditional lighting and its position in interior design , tries to create this motivation in interior designers and industrial designers to observe the use and efficiency of light in buildings by incorporating traditional lighting and modern technology . lighting the development of lighting and design and construction of lighting tools enables us to enter into space by the magic of lighting , which not only makes it possible to see , but to refresh the spaces . with proper lighting , one can make up a typical room , cover its weaknesses and highlight strengths . correct lighting can double the effect of lighting , make room very small and fit the big - sized room . there are several factors involved in the lighting of several factors that can be classified into factors that control or enter the light as well as components and materials used in space , which can be divided into different states in light of light collision with respect to their properties .(Ziabakhsh and Karimi , 1393) (Ziabakhsh et la Karimi , 1393)

## Elements of Lighting in Traditional Iranian Architecture

abstract the light in the design of Iranian buildings follows certain philosophy that this vision has influenced the design of different elements in the monument, which we briefly describe. The philosophy is based on the divine and Islamic view that is a light and light architecture, and this is rooted in the same principle that it is in existence, and that is light. Light is also a means of seeing, both seeing and seeing, and life is everything from light. The Iranian architecture is the architecture of truth, and its truth is perfection, and the essence of perfection is the nature of God, so everything in architecture is a part of it. The light is a sign of motion towards the fact that it does not have physical and matter mode, and it is subject to other factors like the

climate and the location of a structure and how to use light. in miniature painting a halo of halo on the heads of the creatures

In Iranian architecture, it has also emerged as a candlestick, and the manner of placing the skylights in a circle underneath the dome and the manner in which the light enters the lattice windows is a perfectly shaped halo, and much emphasis is on this. In fact, the candle is the manifestation of the same halo or light Yisdie.

Iranian lighting, playing light and shadows, reflection and refraction. Designers conjoined light and guided by the various lightning elements interconnecting the interior and exterior and, together with various materials, created a kind of harmony in the created space. They used a variety of techniques to take advantage of the reflection properties of the surfaces, including polished walls and walls to absorb and reflect light, use Mogharnas to capture, break and absorb light, domes that vary according to different hours of day, and intensity and weakness. It looks like twinkling light, even glittering mirrors and tiles, and polished marbles and woods, all of which are used to convey the meaning of space. Brilliant materials were used to provide part of the desired lighting. In this case, through the reflection of surfaces, more light was created in space. The Iranian architect believed that if the brightness of the material chosen was inversely proportional, it could have a dramatic effect on space. Lighting elements in traditional Iranian architecture are studied in two directions; The first group is light controllers like all kinds of shades and the second group is lighters. The first group has the role of adjusting the incident light and they are divided into two categories; The hands are the ones that are built, such as the porch and the second, the ones that are added to it, and sometimes decorative, like the curtains. The elements that are referred to as the lighters have different names that will be discussed. In addition to lighting, some of these elements also have a light controller, including shaders, windows with colored glass and a Chinese knot.

Light controllers:

An arched space consists of a ceiling and a column that is at least one side blocked and protected from contact with rain and direct sunlight, in which case we will have indirect or indirect lighting. Radiation of the strap are other elements, including blades made using gypsum and straw. Usually they dug in the top of the window and the window, which in fact was the radiation of the horizontally, and by that controlled the entry of light into the space. The shadows prevent shadows on windows from direct sunlight to the window's surface, and may have various effects, such as direct sunlight control and light control. The light control elements that are attached to the space were thick curtains that were used to prevent and adjust sunlight when they entered the building, and were typically installed in front of the porch, window or sash.

Types of Lighters in Iranian Buildings:

In traditional Iranian architecture, light has not been used uniformly, and architects have always introduced natural light into controlled space, through the use of architectural elements such as rustles, lighters, galley, colored glass And arsies; they focused their attention on the way light was introduced directly and indirectly, visible or invisible to the observer, and spotted the importer's apertures to the interior spaces.

Rosen is actually a small window that is usually placed on the top and sometimes on both sides to get light. In the past, architects covered the building with chips of pottery or tile. These networks absorbed the intensity of light and shrunk from the weaker light. The deviations of light rays from the collision with the

dotted edges of the grid caused light to propagate, helping to smooth light distribution. In the Sheikh Lotfollah Mosque and the Hakim Mosque in Isfahan, there are beautiful shaders of glazed pottery with a Slalom design, which is like other details of these beautiful traditional-historical monuments. The window is usually used to absorb light. The designs used to make lattice windows are often such that it regulates the light inside the room. When the light is not exiting, it does not pass through the room, but sometimes also for the window and grille window. Work is done. Orsay is a window sill that rises instead of a round heel and is positioned in the compartment that was considered. From the hillside or the cliff in the fireplaces and patios of the party buildings in the quadrangles of the dome and the intersection of the corridors and porches. In these parts, ceramic rings are arranged side by side, and in the winter round glass cupcasses, such as the bottom of the house, work among the rings, and they take one or all of them in the summer. Hornet holes are often open on the market, Horno is said to be a top-level skylight because it is not possible to run around the domes in the vicinity of the dense grooves so that they will not fill the holes near the holes until they are on top of the vault. Light up.

In buildings where the use of windows in the walls is not possible, such as markets and other public buildings, designers in the solar array have created stanzas that provide the best possible light transmission and are referred to as "woven". Armbands are usually perforated and perpendicular to the solar array. The section of the roses can be in the shape of a circle or a polygon. Freeze and dials for lighting and air came. Designers put gichine into the hangings in their drawings, and then they hung on top of the window and door. The types of windows in Iranian architecture can be seen from the Gulhayesh, Balkhaneh, Baghang, Pachyalaqi, Bojah, Tehrani and Bovine eyes.

Solar window is a semi-circle window on top of which is usually made with a Chinese knot. The small, colorful glass that worked inside the plaster and placed it at the top of the arches to provide lighting to the building, as well as the clay and glass grid system that was used on top of the flower The cup is called. Balkan refers to windows in the porch or the balcony surrounding the window. The lagoon is said to be a window or a doorway closed and not reaching the ground, and is more likely to be positioned in two directions at an appropriate height. A swing-chair combines a window and a window with a part open to the bottom and the rest is in the form of a window. The box is a small window that is embedded in the middle of the wall and is designed to connect individuals to people with outside; and Tehran is meant to have an arched sunny hall, the cavern's eye is a small circular window One axis turns. Works and Mogharnas are used, other than beauty, to make even greater use of sunlight, so that they can divert their paths in different directions and let them into play. One of the important factors of architecture in splitting and breaking the intensity of light is the entrance pins that are rounded or polygonal. At the top of the oven, there is usually a lightning that transmits light centralized light during different hours of the day. The invention of the style of the vault and the tile caused the roof load to act directly on the gates, and the walls and vaults were light and split, and the window was placed therein, and this resulted in a lot of indirect and indirect light; the arches of the song also had side windows Or on top of them there are small domes with a window. In the vault of the four sections, the height of the two peaks and the width of the two arches.

lighting in modern architecture

In the 1990 s , the main personalities of the modern movement had pledged themselves to social reform through the design and tendency of the leading potential in modern society ; they were fascinated by the



spatial patterns in cubism and steel and concrete structures ; they believed in a global and international format and in hopes to separate new teachings without imitation . since the early years of the present century , architecture has always been changed and the principles of modern architecture have been expanded and new combinations have been motivated . in spite of attention to aspects such as human soul and identity in traditional architecture that created a suitable atmosphere for people and needs of people in modern design , we can rarely find signs of human health . modern architecture is created in the spiritual and social times and can not be the answer to the needs of people . on the other hand , existing capacity in modern architecture and age , such as modern technologies and technology , has provided several possibilities for open spaces with more functionality that can be responsive to spiritual needs of individuals and can be influential in other aspects such as environmental protection .

lighting today is not the only means of seeing space and being seen but can also define space . today , other aspects of light are expected to show the light of the environment , transform it , reinforce the sense of place , and change its meaning in proportion to the passage of time . in the modern modern lighting system . in smart buildings , light sources such as ceiling lamp , wall , desktop , decorative colors , fluorescent and leds are all separated or grouped .

types of smart glass technology

today in new constructions , smart glasses are used which are mentioned below .

glass vials are glass that color their color and use for a specific temperature range . these are special polymer materials that can be integrated at low temperature and expand at high temperatures which cause more diffuse scattering . glass - stained glass are dark in contact with uv light and glass vials of glass with at least two layers of glass can be coated with a specific coating on them . in the glass jar by controlling the light through the different layers and refractive index of different light in the layers cause a positive difference in sunlight transmission . intelligent glass is a glass that changes color with electrical current . in some of the applications of space design , the reflection of light from glass is considered as an undesirable factor and can be considered from the aesthetic quality of thermal comfort of space ; these are not suitable for use in solar energy collectors . anti - reflection glass can be used in these cases . one of the other fields that is interesting for the use of nano - glass products is the production of solar energy collectors . in nano - glass nano - glass , all of the spectrum of light waves can pass through glass . thus , the maximum efficiency and efficiency will increase the amount of energy produced . this system has less dependence on direction and angle of solar radiation and can be used in all seasons and daylight hours and in different regions . anti - sun glass can be used to absorb the undesirable heat caused by solar radiation that is important in areas with sunny skies like ran and can be dark manually or automatically when dealing with sunlight at different degrees .

Interior design lighting

in the interior architecture , light is one of the components that beside elements and other concepts such as structure , spatial order , materials and color , can be raised by taking advantage of light and quality of space . ~~~ therefore , it tries to reinforce the sense of life and belonging in the spaces designed , especially residential to the people 's homes , home and space . designers have benefited from the role of light to create harmony and beautify their works . ignoring the important effect of natural light in interior design of buildings and their inhabitants is impossible . so considering daylight is a fundamental starting point . by

capturing light and leading them into the building , Iranian designers would link the outside and inside the building , but while using the shafts and windows , maintenance and honour of the building were preserved .

#### lighting and lighting control methods

the amount of light we need is different in different spaces depending on the type of space and its components . some spaces may be used at night or only at night , so it can be considered when choosing light for the desired space , the amount of incident light can be adjusted by the curtain , types of glass , and the size of the window . natural light is the result of sunshine , but in fact , three different sources penetrate the interior . the sun , the sky , the earth . the direct solar rays of the clock , day , day , year , and position of windows and days may infiltrate into the building for a short time . severe light disturbances due to the movement of the earth can be controlled by shading or curtain types . the dimensions and position of light are determined according to the function of space . importing sunlight into space design is an essential thing , and the designer should consider this parameter in the design and arrangement of space ; however , the control of the incoming light is also necessary .

artificial light indirect lighting is the guidance and regulation of artificial light these factors which include types of lights and lighting systems constitute the main instrument of lighting . to maximize practical and decorative possibilities of light , we need to examine more than anything we expect from the light . essentially , the general - general lighting - - should create security in its light can easily be moved , without getting into room tools or skates . internal lighting is based on three types ; total lighting , ambient lighting , accent light ( focus ) . the general lighting is an indirect lighting that cannot stop the eye , from the walls and ceiling , to create the light in the background . general lighting should flare up everywhere , and there is no room to shine in the shadows . total lighting sources , such as embedded roofs and rail lamps should be tailored to the needs of space . the lighting of the work environment is provided by the light that special activities such as writing , reading , cooking , working with computers , makeup and entertainment are necessary . this light is peculiar to the workplace , not to cast shadows , and get tired of the means of study , the bedside lamp , or the lamp on the kitchen table . accent light has only a decorative aspect and is used in creative design of different light sources such as shaded lamps , wall lamps and flaming torches . this light can be used to emphasize interesting aspects of the room such as artistic works , nafees , motifs , and architectural elements .

#### light sources

light sources are important in the design of the principles of lighting , thus describing some of the lights that we use . fluorescent lamps create very little shade and are suitable for study , work , kitchen and workshop . reflected light bulbs , small and small halogen lamps are used for exhibitions and museums , art works , and art works , and have the ability to create optical stain . light bulbs are used for general lighting .

in lighting , the lighting should be considered to coordinate the lights with the role they have , and the supply of light is safe and easy to create . the living room has several types of light sources because of the location of several different activities . light and soft lighting in the living room is provided through indirect sources such as wall lamps ( wall street lamps ) , common and conventional lights , built - in lights , and hidden posters on the wall ( screens ) , under the false ceiling and behind the screen . low - swinging lamps , spotlight ( spotlight ) , desktop and gallows lights create direct and appropriate light to study . accent light in

the drawing room can be one of the most important elements of design in this particular space . in order to draw attention to the point where the furniture is set , the next wall can be covered with a soft net light , or that the light is focused on a piece of furniture that is more important . to light a set of nafees , fixed and mobile lights are used , and at an angle to which it is difficult to use fluorescent lights and its combination with other elements in space such as pots . the source of the dining light should be adjustable so that space can be created . light sources that can be used in the living room can also be used in this space and significantly lighting the lights in the room in the room . the lighting of the family living room should be like the drawing room . further attention should be given to entertainment and playing spaces and writing tables . if there is a computer in this room , the light should be hung from the ceiling to avoid the reflection of the light , and the lamp is covered with a matte bubble .

lighting is a general lighting and should be versatile . light sources also need to provide light from mild light to provide clean light for cleanliness . light in this space should be adjustable . a room that belongs to more than one person should have separate light sources for each activity , such as the bedside lamp or movable shaded lamp above the bed , for the child 's room lamps or walls that are suitable for shipping and may break time . bathroom lighting should be used to remove darkness and shade and for safety , which can be provided by installing a light bulb .

kitchen lighting should be varied and located in different distances from the ground . at the same time with the sources of public light in the kitchen , including ceiling lamp , rail , and overhanging light , it is necessary to consider resources for certain functions . input lighting and foyer are primarily used to create a sense of security and calm and in the later stages to represent space .

matching traditional lighting methods

persian lighting is the game of light and shadows , reflection and refraction . the game of lights and shadows with appropriate design of interior architecture in designing spaces and using natural lighting with window locations and types of screens can be created in modern design of reflection and refraction architecture . in traditional architecture with the design of domes , tiles , and mirrors and tiles , they attracted and control the light in modern architecture by making use of various types of materials to design false walls , ceilings and floors of buildings and spaces such as types of gypsum , tiling , mirrors , and mirrors . in addition to locating suitable window in buildings , from ceiling beams instead of domes , it can cause aesthetics and optimum use of natural light in modern architecture .

in the interior design using color glass in the design of the separator walls with inspiration from arasi the windows and beautiful interior for spaces . Indeed , by combining natural and artificial lighting and using modern lighting of light in the design of the interior architecture as well as traditional lighting composition , as well as the example examples , it can be a pleasant space for users of that space .



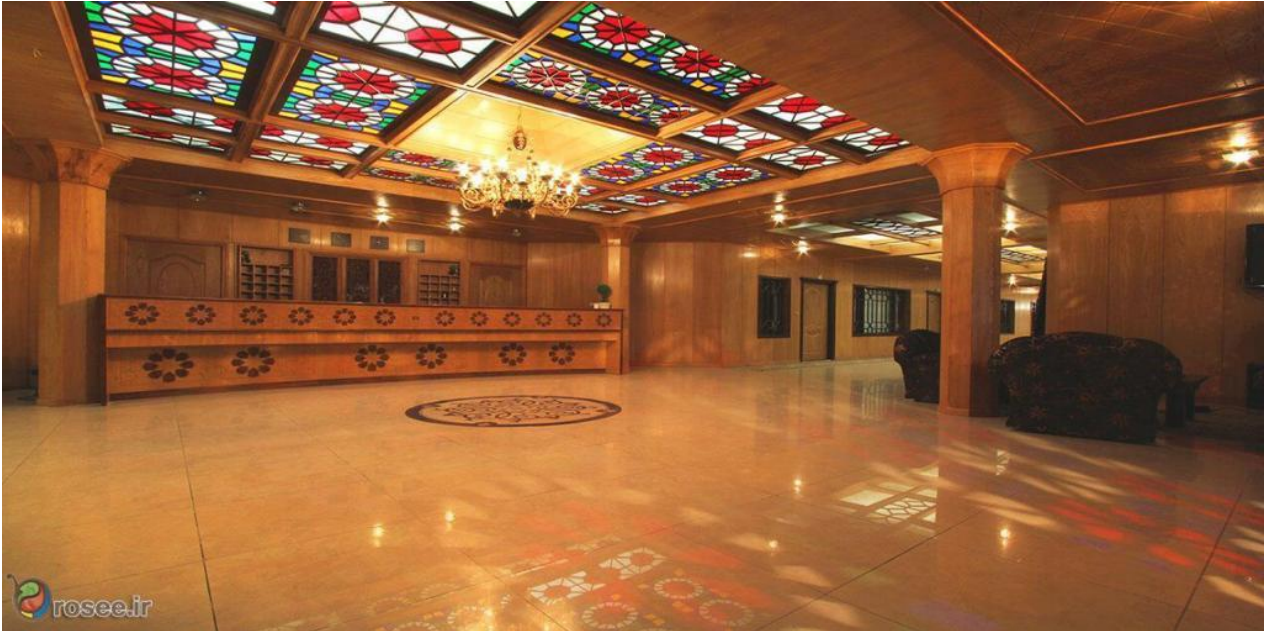


Fig. 1. Use colored glass to enter the light from ceiling



Fig. 2





Fig. 3. Matching traditional lighting methods

## Conclusion

Light as a hallmark of traditional Iranian architecture is due to the combination of culture, religion and art in history, and Iranian designer with the help of light has been able to beautifully decorate a dynamic quality architecture. The light has always been a factor in designing space that was introduced in a particular direction. In designing traditional spaces, light, in addition to the function of lighting up space, is also of particular importance in relation to the spiritual and decorative aspects. In the past, designers used elements such as sash, rust, luminaires, colored glass, arches and balconies to enter and control light, and today, with the use of modern lighting techniques and technologies available, according to The needs and the current structure of the buildings to create a space that meets Iranian taste. The research finds that traditional lighting methods can be replaced by modern lighting techniques with the same performance and quality, and in addition to benefiting from natural light, they also have advantages in terms of energy savings. Iranian designers and architects have always tried to enter the light of day; in fact, the purpose of the traditional design was to create spaces for satisfying the sense of spirituality and aesthetics of the inhabitants of the buildings that man has always sought everywhere, the designer In order to satisfy this need, the Iranian man entralls lightly and artistically into an immortal body to create an atmosphere full of calm and spirituality, giving people the opportunity to experience a profound sense of both pleasure and emotion An exquisite version of the depths of life; he artistically uses the lighting to create this amazing atmosphere.

## References

Brighton., Leila. 1012 "Investigating the role and application of intelligent materials in the application of shells in line with sustainable architecture", *First National Conference on Geography, Urban Development and Sustainable Development, Tehran, Esfand*

Piernia, Mohammad Karim.(2005) "Familiar with Islamic Architecture of Iran", *Tehran: Soroush Danesh.*

Pirnia, Mohammad Karim.(2008). "Persian architecture, Tehran, Soroush Danesh.

Hosseini, Alireza. "All kinds of smart glass technology".

## Rural villages of Iran

*Mehr News*

*Development Articles*

Dibaj, M. (2010). "Light Space and Light Architecture", *Fan Art, No. 21*

Arak, Mohammad Ibrahim.(1383). "Introduction to Architecture".

Smart home company website [www.smarthome.ir](http://www.smarthome.ir)

Khanant Mehrjardi.( 1383). *Negar,145.*

Gelabchi, Mahmoud. And Katayun Taghi. born. 1011 "Nano Technology"

Mohammad Karim Pirnia, "Familiar with the Islamic Architecture of Iran", 354 Worlds, Hamedan, Publisher Fanvaran

"Architecture and Building Engineering", *Tehran University Press.*

Cultural, "CD-ROMs of Kashan's Houses".

Nemat Gorgani. Al-Banin. (1375). "History of Light in Architecture and Lighting Instruments in Islamic Art", *Computer Science Research Center of Islamic Sciences. 316-323*

Mohammad Karim Pirnia. "Iranian Architecture", 574.

Vokilinezhad, Rosa. 1040. "Smart glasses". *Architect Magazine, 57*

Izdani A., Rezaei, P. (2009) "Lighting of Industrial Buildings with Natural Lighting, Case Study: Mazandaran Wood & Paper Industries"

Msawat, H. and Shaterzadeh, A. (1397). "The study of the concept of light in traditional architecture with an aesthetic approach", *The first national conference of the Iranian Islamic city, Institute of Culture and Architecture, Tehran, Tehran*

Abasi, M. and Nowshadi, Z. (2012). "Investigating the Light Concept of Aesthetics in Iranian Traditional Iranian Architecture", *Iranian-Islamic National Architecture and Urban Planning, Khavaran High Educational Institute, Mashhad, Bahman*



*Zaybakhsh, N. and Karimi, A. (1393). "Natural lighting and color in traditional Iranian residential architecture", The first national conference on residential architecture, vocational education and training Sama Malayer Unit, Malayer, Esfand*

*Corr. Jr., William. "Modern Modern from 1900". Ed. Goodarzi, M.*

*Xerayi, F.(2005). "40th Key Interior Architecture", Tehran, Otagunovo Art Cultural Institute.*