Available online at www.elixirpublishers.com (Elixir International Journal)

Literature

Elixir Literature 36 (2011) 3272-3279

ISSN: 2229-712X

Tajmahal a significant result of Islamic art & architectural experiments of various nations built in India

Mohammadreza Pourjafar[1], Ali pourjafar[2] and Mohammadreza Leylian[1]
[1]Architecture and Planning, Tarbiatmodares University, Tehran, Iran.
[2]Architecture, Payame Noor University, Tehran, Iran.

ARTICLE INFO

Article history:
Received: 5 May 2011;
Received in revised form:
20 June 2011;
Accepted: 29 June 2011;

Keywords
Tajmahal,
Islamic Art & Architecture,
Seljuks ,
Safavid.

ABSTRACT
Islamic architecture, like an old tree, has its roots in the land of Saudi Arabia where the first mosque was built. After that it has branched out in the neighboring countries like Egypt, Iraq, Syria, Turkey, Iran, India, etc. There for Islamic art and architecture has been flourished and flowered in other mentioned countries and have experimented during various schools of thought such as Seljuks ,Safavid , Ottomans**,** and Indo Islamic of India. Architects and artists of various nations throughout the process of developing their art and architecture have created various significant monuments such as Jame Masjed of Isfahan in Iran, Soltan Ahmed mosque of Istanbul in turkey and Delhi's Jame masjed and Taj Mahal in Agra which shall be discussed in this paper. Taj Mahal is the most famous building which was designed by an Iranian architect. In this paper, In general, the impact of Seljuks and Safavid art and architecture on Indian Architecture shall be described.

Introduction

The paper focuses more on the relation and the impacts of Islamic arts and architecture of Iran on India. Therefore it begins with a general introduction about the type and extent of various relations between Iran and India before and after Islam.

The paper then continues with the specific description of similar features of architectural culture between India at Mughals' Period and Iran at Safavid era. On this basis, issues such as friendly bilateral relations between the kings as well as the people of the two countries, migration of Iranian artists and architects to India, and the influence of Iranian art & Arch. on Indian society have been discussed.

A number of famous personalities and famous buildings of the two countries have also been introduced in different parts of the article.

The result of this study also shows that Taj Mahal is the best example of Indo - Islamic Arch. and not the Mughal.

Finally by comparing the design criteria of Taj Mahal and some other similar complexes in Iran and turkey it would be concluded that Taj Mahal is the reflection of essence of Islamic architecture taking most of the important design criteria & construction details of true Arch, Dome and garden design into consideration in the Indian Subcontinent.

The Sub-Continent of India has been affected by Persian & Muslim Turkish culture in various aspects throughout its history until English period. The effects of Persian & Muslim Turkish architecture on Indian architecture both before Islam and during the Islamic period are good examples to prove this claim.

Before Islam due to the migration of Arians from Iran to India particularly at Achaemenid and Parthian(Ashkanian) dynasties, Iranian cultural features were; to a great extent ransmitted to India through close socio – political and economic relations between the two countries. The similarities between the shape, size and design of the pillars of Ashoka (Fig. 1&2).

Fig. 2: The pillars of Ashoka in India(http://en.wikipedia.org/wiki/Pillars_of_Ashoka. ka, 2009).

Fig. 1: The pillars of Persepolis in Iran (http://khadmi.persianblog.ir, 2011).

Those of Achaemenid buildings and palaces, architecture of Bamyan Valley Temple, and the discovered artistic features at Ajanta Cave which represent Parthian (Ashkâniân) and Sassanid art are all obvious reasons for the spreading of Iranian art throughout the Subcontinent of India.

After that Islam came to India, especially by settling Arab Muslims at Send Valley in 711 AD. But Islam came to the countries like Iran and turkey much earlier. Then in the tenth and eleventh centuries during Ghaznavids Era, Iran and India had mutual relations in many socio – cultural and economic fields.

Tele:
E-mail addresses: pourja_m@modares.ac.ir

In the twelfth and thirteenth centuries when Ghourian were ruling in India, Iranian architectural style and construction methods were the favorite features. Qobbat – ol – Islam Mosque and Qotb Minar are examples in this regard. Kings and emperors Loudi, Gogarat, Sour, Malova, and Shir Shah used to build their palaces and buildings in Iranian architectural style from 13th to 17th centuries (Pourjafar, M. R., 1997, pp 31-33). Jame Mosque in Bijapour which was designed and built by one of the famous architect from city of Qazvin, in Iran is a good example of this kind (Pourjafar, M. R., 1997, p 24). In Moghul Dynasty in India (1526-1857) that began from Baber Shah's and then Homayoon, Akbar and Jahangir eras were concomitant to the Safavid and Ottomans Dynasty in Iran & Turkey.

Bilateral relations between Iran and India were reached to the highest level during Mughal and Safavid dynasties in all aspects of life; such that we can call that era as the "Golden Era" of development of socio-cultural and political ties and close relations between the two countries. For instance Shah Jahan's wife and also his first minister were both Iranian. It was at this time that Taj Mahal, one of the most glorious and famous architectural features of the world was created by the Iranian architects and artists in India (Halyd, M., 1997, p 72).

This article is going to talk about the effective factors that had important role in developing and spreading Iranian and other Muslim architecture throughout the Sub-continent of India. Then, design criteria and architectural aspects of famous historical buildings, such as Taj Mahal, in India and some others designed in other countries, will be analytically discussed in this relation.

Period of Flourished Islamic Art & Architecture

Islamic art and architecture developed during various Muslim dynasties among which Seljuk and Safavied are the tow famous responsible era for such development.

Seljuk is a general name given to the Turcoman groups settled in Anatolia at the end of the eleventh century (Fig. 3). The house of Seljuk originated north of the Caspian and Aral Seas in the Oghuz confederacy. In the tenth century the Seljuks migrated from their ancestral homelands into mainland Persia, where they founded the Iran Seljuk Sultanate or Great Seljuk Empire. Between the eleventh and thirteenth centuries (Seljuk Architecture and Urbanism in Anatolia, Uzay Peker, Ali)

Fig. 3: Location of Seljuk Turks´ (www.muslimheritage.com/topics/default.cfm, 2010).

the dominate cultural effectiveness of the Seljuk, which affected different nations and regional races within the borders of their empire that stretched from central Asia to Cairo, has left behind famous civilizations which are today within the borders of various countries (India, Iraq, Iran, Syria, Egypt, Turkey, etc).

Architecture associated with the Turkic Seljuk dynasty, who ruled over most of the Islamic world in the eleventh and twelfth centuries, is largely representative of the patronage of other Turkic dynasties of Iran and the eastern Islamic world at that time. The Seljuks appropriated building types (like the domed square mausoleum, Pointed Arch), and construction and decorative techniques that existed in the Iranian or eastern part of the Islamic world, in the Byzantine areas of Asia Minor, and in the territories between Syria and Anatolia. Accordingly, Seljuk buildings located in these distinct environments differ in their construction materials and ornamental techniques, with brick architecture generally predominating in Iran and stone architecture predominating in Anatolia (Fig. 4).

The most common surviving Seljuk building types are funerary monuments, freestanding towers, mosques, and caravanserai. Two types of funerary monument are hallmarks of Seljuk architecture: the tome towers and the square, domed mausoleum.

Tomb towers, such as the Gunbad-I-Qabus (1006-7 AD), took the form of monumental tapering towers with conical roofs that disguised an interior dome, or as round domed structures that evoke the yurts, or tents, of the Turkish nomadic tribes. Suggesting the continuation of pre-Islamic traditions, the square, domed mausoleum (exemplified by the tenth-century Tomb of the Samanids in Bukhara) was also used widely(Archnet.com, Digital library).

Fig 4:The Seljuk Arch. Way built in stone in Turkey the Seljuk Face of Anatolia: Aspects of the Social and Intellectual History of Seljuk Architecture (Prof. Semra Ogel, 2010)

After Seljuk, Mughals invaded Iran. Among them Timurian could develop Islamic arch. in Samarghand & Bokhara with respect to the arts and architecture of Seljuk period. After them Safavid came to power. This Turkish dynasty also had dominate cultural effectiveness which came to existence after Seljukid era in Iran. During Safavid period construction methods decorative techniques were developed very well. Various mosque and community facilities such as Bazaar, Hamams, Caravanserais and urban spaces, etc… were built during this period in cities like g Ghazvin and Isfahan. Both Seljukid and Safavid had an important direct or indirect role in developing art and architecture of neighboring countries like those in Indian Subcontinent. Many artist and architects migrated from Iran and Turkey to India. They designed and constructed many building in their own style mixed with Indian art & architecture. They have created a kind of school of thought which can be called Indo/Islamic arts & architecture.

The Effects of Iranian Culture on Indian Culture in Mughals Era

Baber the founder of Mughals in India was from Iranian Mughals. (Koch, Ebba, 1991, p.10)He as a person who knows Iranian culture very well, tried to develop it all over the Indian societies when he came to the power. After him, Homayoon continued his efforts as the king of India. Particularly when Homayoon Shah once defeat in a battle against his enemies, he

came to Iran and ask help from Shah Tahmasb, one of the Safavid Emperors, and could overcome the obstacles and returned back to India and continue his ruling there. In his way back to his country, he took a great number of Iranian artists with him to India and wanted them to design and make buildings similar to those in Iran (Soltanzadeh, Hosain,1999, p.64). The design of Chahar Bagh and Hasht Behesht (Four-Gardens and Eight-Heavens) are of those Iranian architectural patterns in India. Architectural features in India had become so familiar that people used to say that Homayoon Shah has changed and substituted Indian architecthre with the Iranain one (Soltanzadeh, Hosain,1999, p.63). At the time of Homanyoon's Son, Akbar Shah, Mirza Ghias-al- din came from Iran to India and was Assignis as the Minister for Interior Affairs. He was Asef khan – e – Etemad – ol – Dowleh's father. Etemad – ol – Dowleh had a prestigious position at Jahangir shah's period and got the position of prime minister at the time of Shah Jahan.

Arjmand Banoo, Shah Jahan's wife was Etemad – ol – Dowleh's daughter who had a great role in encouraging Iranian artists to India and develop Iranian art there. Another Iranian lady who also had such a role was Noor Jahan, the daughter of Ghias – al – din Irani. She maried Jahangir Shah and got a lot of influence as the Queen of India., she also was very interested in developing Iranian art and architecture in India (Pourjafar, M.R. & Taghvaei, A.L. , 2005, p.78). It has been said that the real ruling power was at the hands of this Iranian lady in those days. Generally it can he said that Iranian culture particularly its art a architecture spread all over the Sub-continent of India during Mughal dynasty and specially at the time of akbar Shah, Jahangir Shah and Shah Jahan. Even at the time of Shah Jahan the new Capital City, the City of Shah Jahanabad (Old Delhi) were designed and made by Iranian architects. They used Isfahan plan and architecture of the time of Shah Abbas (Fig. 5) to develop the new Capital City of India (Irving, 1984, p.79).

Fig. 5: Domes and minarets used in Persian Arch. in Safavid dynasty in Isfahan (Imam Mosque) (www.travelblog.org/.../Esfahan/blog-76176.html, 2009).

Iranian Garden's Manifestation in India

Many Iranian and other international researchers and writers such as; Mojtaba Ansari, Hosain Soltanzadeh, R. A. Jairabhoi, S. C. Handa, J. C. Harel, Ebba Kach, B. B. Garg, R. G. Irving and Ernest Kuhnel believe that designing and architecture of gardens in the Sub- continent India at during Islamic period Dynasty had been originated from Iranian gardens.

After the restoration of garden making in Timurid and also in Safavid Periods in Iran. Mughal kings who ruled India; particularly Baber, Homayoon, Akbar Shah, Jahangir and Shah Jahan, had the role of founder of tradition of garden making by the help of Iranian architects and artists (Irving 1984, pp. 2-14).

Designing of Iranian gardens according to the importance of geometry and application of rectangular plan and its division into four parts as a cross or perpendicular streets has been used in designing of Taj Mahal as well.

The Sets of Tomb of Homayoon in Delhi and Taj Mahal in Agra is a kind of tomb garden. This type of designing has been used in Iran long time ago, a good example of which is Kourosh Tomb at Passargad nearby Shiraz. This model has also been used after the appearances of Islam in Iran (Ansari, Mojtaba, 1999, p. 14).

Flowing of water throughout gardens like in Shah Nematollah – e – Vali's Tomb Garden in Mahaan/Kerman has been known as a special important aesthetic feature. This model has afterwards been used vastly in India. Shalimar Gardens, Shahi's spring and Neshat Garden have been designed and executed in Sarinegar the Capitat City of Keshmir based on Iranian Chahar Bagh (Figs. 6 to 10).

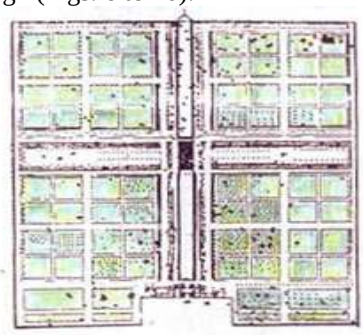


Fig 6: Dolatabad garden in Yazd(Authors, 2010).

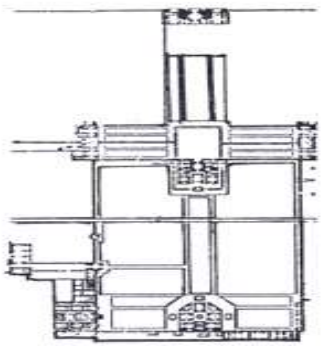


Fig 7: Tabas, Golshan garden (Authors, 2010).

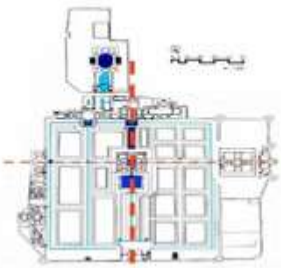


Fig 8: The map of movements of water in Fin garden (www.chtn.ir/.../fa/News/NewsInfo, 2010).

Fig 9: Symmetry & use of water on the main axis (www.chtn.ir/.../fa/News/NewsInfo, 2010). Fin garden- Centrality Zoning,

Similar Architectural Vocabulary among Iranian and Indian Architects

The study of words which are used in architectural culture in Moghuls Era indicates co-relations between the architectural culture of India and Iran. Some of these words have even been used in English literature. Books and articles in English had to use these Persian words in their original forms. Muslims and people who live in places where Moghuls buildings were existed still use these words and phrases. Ebacokh is his book (Glossary of Moghul Architecture) has also referred to these technical words such as; "Aramgah, Bagh, Chaharbagh, Sotoun-e Sarv Andam, Baradari, Berkeh, Abanbar, Chaharsou, Chatri, Jelowkhaneh, Chehel Sotoun, Taqcheh, Daftarkhaneh, Dowlatkhaneh-e Khas va Am, Divan, Divan-e Am, Divan-e Khas, Gaz, Goldasteh, Gonbad, Gombad, Hammam, Hasht Behesht, Pishtaq, Ayvan, Howz, Hodjreh, Eidgah, ezareh, Masjid-e Jaame, Karvansara, Khalvatgah, Khiaban, Madreseh, Mahal, Maqberah, Marqad, Mihmankhaneh, Mohandes, Monabbatkari, Moqarnas, Naqsheh, Namazgah, Neshiman, Shahneshin, Nowbatkhaneh, Naqarkhaneh, Parchinkari, Qalebkari, Qanat, Qarineh, Qaisarieh, Qebleh, Rowzeh, Sahn, Saray, Sheshmahal, Takhtgah, Soufi, Talar, Tanbih Khaneh, Taq, Tarh, Vakil, Vazir (Koch, 1991, pp. 137-143).

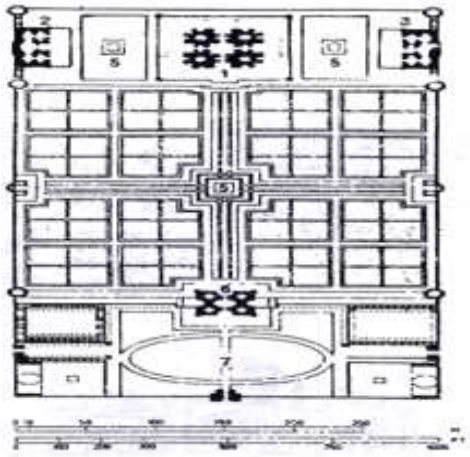


Fig 10 : The plan of Taj Mahal complex (Soltanzadeh, 2000).

Similarities in Civil Engineering and Constructional Decision Making

In Mughals Era Special attention have been paid into public facilities such as bridges, highways and the likes. A good example to prove this claim is Monem Khan Bridg in Pourawar in 1570.

At Safavid Era these sorts of development of public facilities and buildings particularly public water wells, public water reservoirs (Abanbaar) and caravanserai were more common.Minarets not only as a sign but also as a memory of Royal buildings were built according to Iranian samples (Koch, 1991, p. 67). Such as: Hayran Minar in Fathi Pouri Sikri and Churminar in Delhi. Planting trees at the sides of the roads that joined cities together (Agra to Bangal road) is one of Jahangeer's works. Digging water wells beside Agra road to Lahore and many karvanserai also have been built at Jahangeer's reign.

Shah Jahan's Era has generally been named as classical architecture in India. In this period symmetry and harmony in the form of plans and architectural works is very well observed. asking symmetry in designing both small and large buildings around an axes related to the center had been preferred.

Qalebkari (Moulding) was widely practiced as its original term which basically is known as a measure of standardization, of architectural aspects in the period under discussion. The great Iranian architects such as Molla Isa Shirazi who had done the design of important projects like Taj Mahal used Qalbkari as an important element in building construction works (Figs. 10 & 11).

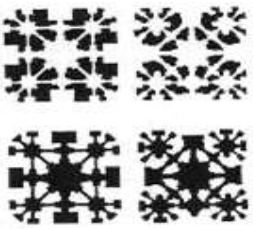


Fig. 11: TajMahal plan (Koch, Eba, 1991).

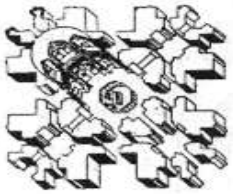


Fig. 12: Homayoon Tomb section & isometric (Koch, Eba, 1991).

Fig. 13: Homayoon Tomb in Delhi. Base on Arch. of Seljuk & Safavid period. The dome structure and its interior are also like Soltanieh Dome in Iran where Homaun and his wife were stainig for sometime (Authors, 2009).

Basic Elements of Iranian Architecture design Used in Tajmahal

The study of Iranian architectural works; especially in Safavid Era, and many of Mughals in Sub-continent India shows the reciprocal effects of architecture in those days. In other words it indicates the evolutionary process of Iranian Islamic architecture in the Sub-continent. Examples of these works are: Bagh-e-Fin in Kashan, Chehel Sotoun Palace in Isfahan, Shah Nematollah-e –Vali's Tomb in Mahan, Bagh-e- Golshan in Tabas, Bagh-e-Eram in Shiraz, Taj Mahal in Agra, Homayoon Tomb in Delhi, Akbar Tomb in Secandara, a number of other gardens in Keshmir and Jaame Mosques in Delhi and Agra are all have the following common basic elements of design (Figs 12 to 24 & Table 1):

Fig 14: Providing more of visual experiment by reflection of building in water (Authors, 2009).

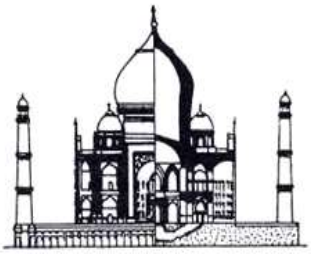


Fig 15: Elevation and section of Taj Mahal tomb(Garg B. B, 1984).

Fig 16: Taj Mahal main entrance with monumental scale(Authors, 2009).

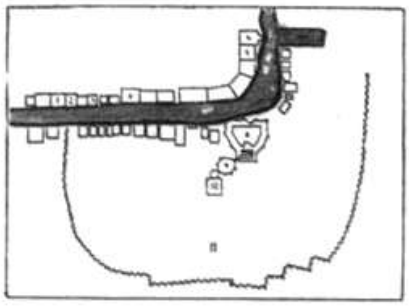


Fig 17: The location of Taj Mahal beside the Yamna river (Soltanzadeh, 2000).

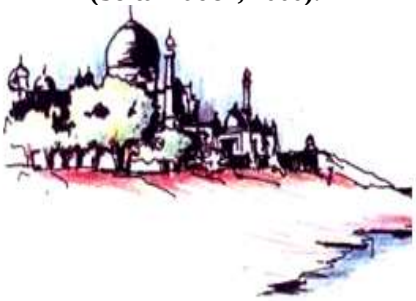


Fig 18: The view of tomb from river(Authors, 1998).

1. Location of the building: the direction of the complex towards greeneries and beautiful environment beside a river or a stream of water.
2. Design of plan:

In the design of garden and its inside's buildings principles such as symmetry, centrality plotting, geometrical networking, and the idea of horizontal designing (Horizontality) had been under specific consideration.

3. Dimensions of urban Design:

In the design of the complexes, they used to put a lot of concern on the hierarchies of landscaping which ended to a glorious perspective and framed views. This plus their concern regarding the attractiveness of the buildings both from inside and out side of the complexes as well as making invisible spaces with the help of minarets around the buildings all can be considered as a kind of improvement in Islamic Architecture in the sub-continent.

4. Landscaping:

Here, the most important point is acquiring Chahar Bagh Design which was mentioned before. Method of plantation and making green spaces along the main axes to bring about more glorious scenes for the main building are of the other points of concern in this regard.

5. Elements of Design in the Buildings of the Complexes:

These elements are designed on the basis of hierarchies of open space, semi open space (Ivan), covered spaces and vice-versa so that the complex can be seen from the gate magnificently.

6. Solidarity and vigor ness of Buildings:

This mechanism has been obtained through establishing cone synthesis models in the buildings. The combination of solid and vacant spaces added to this harmony towards decreasing of the bulk of the buildings.

7. Designing the inside and outside facades of the buildings:

Utilization of bountiful paintings, various forms and shaper of plants, flowers, inscriptions and epitaphs made of precious stones settings on the walls represent steps of improvement in Islamic Art.

8. Technique of structure:

In erecting most of the buildings, the style of making dome, are and retaining walls have been used.

9. Lighting design:

Lighting is performed through beautiful windows and openings made of marble and glasses networks.

10. Utilization of color:

The dominant color in the Sub-continent is red. However, in details various colors of black, white and precious marbles have been used. In Iran the facades of historical buildings are covered by tile and stone settings.

11. Construction Materials:

In the main buildings sand and marble have been used for the outer layer and rocky stores with soil, sand and lime for solid parts of the skeleton of the construction. To decorate hotels, tombs, monuments and gates precious stones and red sand stone have usually been used.

12. Beastliness of the scenes in the different moments of day and night is another aspect which has been considered under the phenomenon of beauty and time. This brings about due to the movement of shadow and light through solid and vacant spaces. This movement causes a kind of dynamism in the environment under discussion.

13. Considering principles of graphics due to the harmony of walls and minarets circumference: this case can be seen in Jaame Mosque of Delhi. particularly the black, white and red lines which have the role of upgrading the altitude of the dome and minarets are very important.

14. Considering to the geometric shapes such as rectangle in the plan of buildings in the majority of the building complexes in those days. A number of pictures related to the s architectural works according to the mentioned topics are attached.

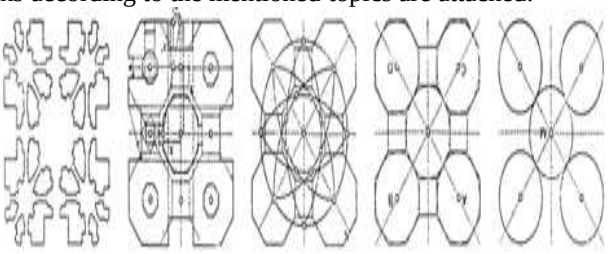


Fig 19: The geometry analysis of Taj Mahal map (Borkhart, T., 1987).

Fig 20: Entrance of Taj Mahal garden (Authors, 1998).

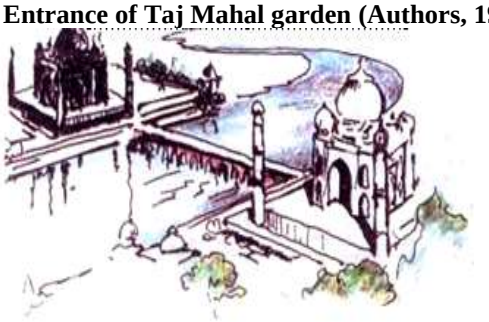


Fig 21: The design of Shahjahan tomb with black stone (in front of existing one) that never was built (Authors, 1998).

Fig 22: Precious stones work in white marble in Taj Mahal walls (Authors, 1998).

Fig. 23 : The main enterance of the tomb of Taj Mahal and Shah Jahan with an arch way of Seljuk style built with fine marbel (Authors, 2009).

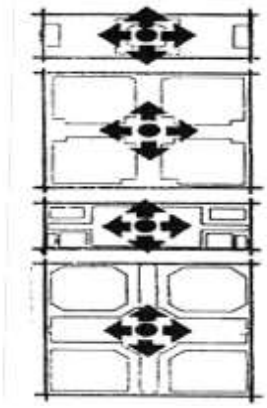


Fig 24: Centrality & zoning principals in TajMahal (Soltanzadeh, 2000).

Various Factors Causing creation of homogeneous Architecture

Indo-Iranian Socio-cultural relations in various filed of economy, sociology, politics and architectural design and construction etc. Form a very strong base to create great architectural monuments such as TajMahal and many others valuable art pieces and buildings in India.

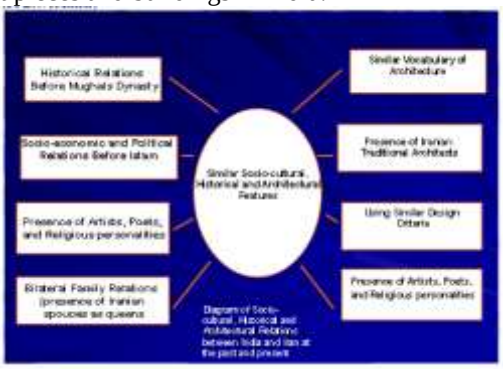


Fig. 25: Figure of the backgrounds of co-relation between Iranians and Indian Mughals (Causes of creating of homogeneity of artistic works)

Conclusion:

Architectural works of Mughals Era has been known as brilliant features over centuries regarding design and structure. These beauties are generally the result of appropriate combination of the various elements of the buildings. The way of decorating of the buildings, creating invisible spaces via minarets, symmetry, harmony and rhythm in one hand and delicacy of working procedures and processes by using precious construction materials on the other hand have been of important factors of enrichment, beauties and glory of architectural works in during Seljuk, Safavid and Mughals Era.

As a whole the architectural works of this era look beautiful both from close and far distances. From near the viewer enjoys from paintings of flowers and plants, inscriptions on the tiles and ceramics and engraved of precious stones used in marble and red stones. From far distances the watcher will enjoy to see a combination of attractive elegant features. All of these works are the valuable products of the hard working and very well experienced Muslim artists, during: Seljuk, Timurid, Ghaznavied, Safavied and Mughals dynasties. Experts and specialists from Iran, Turkey middle East and other parts of the world came to the Sub-Continent of India and all together built such as amazing monuments.

In this regard, it can be claimed that many of architectural works and designs in India of Mughals Era and especially in the design and construction of Taj had somehow been practiced firstly in Iran and other neighboring countries.

These works act as good guidance for researchers in art to appreciate the very high degree of artistic and technical preciseness, deep experience, high skill, competent thought, excellent management, and very rich Islamic Culture at the beginning of the 17^{th} century.

At the end, as the comparative analysis of the architectural works and principles of designing of buildings in India, Iran and other Muslim countries indicates, all these created art works and master pieces are the products of the "School of Islamic - Architecture" which has been called by mistake as Mughal architecture in a number of texts.

Finally we can claim that Taj is the amazing physical product of this school of thought.

References:

Pourjafar, M. Reza. Islamic Architecture in the Sub-Continent (Research project), Tarbiat Modares University, 1997.

Halyd, M. Art of Iran and India. Translated by Yaqoub Azhand. Musa Publication, Tehran, 1997.

Koch, Ebba, Mughal Architecture. Munich, Thames & Hudson, 1991.

Soltanzadeh, Hosain, Continuation of Design of Iranian Garden in Taj Mahal, The Office of Cultural Research Tehran, 2000.

Pourjafar, M.R. & Taghvaei, A.L., Indo-Iranian Sosio-cultural Relations at Past, Present and Future, http://www.webjournal.unior.it, 2005.

Irving, R. G. Indian Summer, Yale University, 1984.

Ansari Mojtaba, Arzesh- hay-e- Bagh-e- Irani (Values of Iranian Garden) A PhD Thesis in Architecture, University of Tehran. Iran, 1999.

Tucker, Jonathan, The Silk Road (Art and History), Philip Wilson Publishers, London, 2003.

Soltanzadeh, Hosain, Continuation of design of Iranian Garden in Taj Mahal, The office of cultural Research Tehran, 1999, P.64.

Borkhart, T., Islamic Art, (translated by Rajabnia, m.), IRIB, Tehran, 1987.

http://en.wikipedia.org/wiki/Pillars_of_Ashoka. ka, 2009, Access Date 14 Jan.

www.muslimheritage.com/topics/default.cfm, 2010, Access Date 14 Jan.

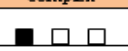
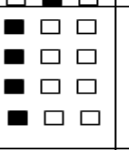
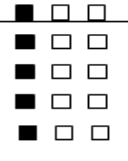
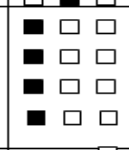
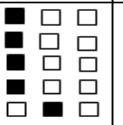
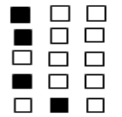
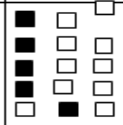
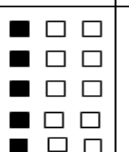
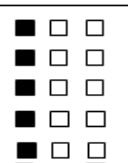
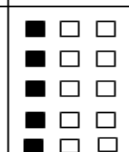
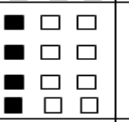
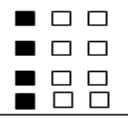
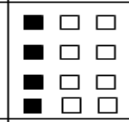
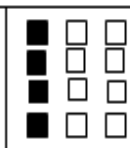
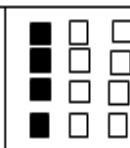
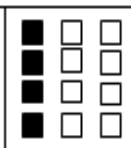
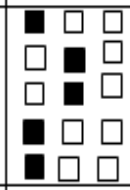
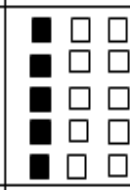
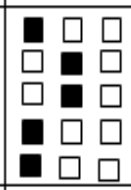
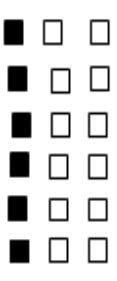
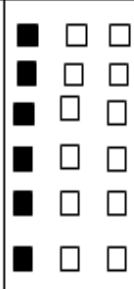
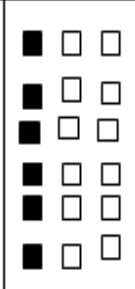
www.allempires.net/seljuk-architecture_topic5, 2010, Access Date 14 Jan.

www.travelblog.org/.../Esfahan/blog-76176.html, 2009, Access Date 14 Jan.

www.chtn.ir/.../fa/News/NewsInfo, 2010, Access Date 14 Jan.

Ali, Uzay Peker, Seljuk Architecture and Urbanism in Anatolia, 2010, pp., 77- 83.

Table 1: Comparative Analyses of Design Principals Used in Iran as well as Tajmahal (Source: Authors)

Number	Subject (Title)	Details of the Subject (Subtitle)		Design principals used in Iran	Design principals used in Taj Mahal complex	Extent of similarity	Notes
1	Location of the building	Location Beside the river					
2	Design of plan	A: Symmetry B: Centrality C: Zoning D: Geometrical net working E: Horizontality					
3	Dimensions of urban Design	A: Framing of views B: Hierarchies of views C: Views from outside & inside D: Creating sense of space					Development in design
4	Landscaping	Soft areas	-"Charbagh" (Garden) -Pimentel -Green spaces -Water -bodies -Reflection				
		Hard areas	-Fountain -Streams -Stone - paving -Stairs -Kerb				
5	Elements of Design of the Complexes	Elements of entrance building	-Entrance space - Entrance -Covered & semi space Cover spaces				
		Elements of main building	-Urban space -Stairs -Avian (semi open spaces) -Cover spaces				
6	Design principals of the main building (Tomb)	-Symmetry -Centrality -Hierarchies -Geometrical design -Sustainability and Statics' -Solid and voids areas					

7	Designing the inside and outside facades of the buildings	-Rectilinear shapes -Curvature forms & curve lines -Spherical -Arabic banners Ornamentation Solid and voids				
8	Parts of building composition	-Pyramid cal -Cubical -Spherical -Cylindrical -Conical				
9	Technique of structure	-Vault -Arch -Dome				
10	Lighting design	-Through window & jallies -From Ceiling -Stone jallies				
11	Utilization of color	-Brick color -White				Development in design
12	Construction Materials	-Red sandstone -White marble -Mortar -Brick -Wood -Precious stones				Development in design
13	Beauty and time	Different colors day time and full moon				Development in design

Legend: (Similarities) ■ High ■ Ave. ■ Low