

# Iconographic Study of Geometric Ornaments of Islamic Architecture in Iran

Shakiba Dalir Digehsara<sup>1\*</sup>, Mohammad Taghipour<sup>2</sup>

<sup>1</sup> Department of Art, Ramsar Branch, Islamic Azad University, Ramsar, Iran

<sup>2</sup> Department of Industrial Engineering, Ooj Institute of Higher Education, Qazvin, Iran

## Email Address

Shakibadlr@gmail.com (Shakiba Dalir Digehsara)

\*Correspondence: Shakibadlr@gmail.com

**Received:** 2 October 2021; **Accepted:** 21 March 2022; **Published:** 1 July 2022

## Abstract:

In Iranian art and architecture, motifs and decorations have been important for the transmission of human concepts and communication for a long time, and with the advent of Islam and its rules, they found a special place in the visual and industrial arts, especially architecture. The importance of using motifs in the aesthetics of Islamic works is in the hidden and deep meanings that express the spirit of the works of art. The symbolism of the designs is one of the features that increases the power of interpretation of the work of art in Islamic art. The use of geometric and linear ornaments has been considered by architects in the past.

## Keywords:

Iconography, Geometric Ornaments, Islamic Architecture of Iran

## 1. Introduction

The semiotic approach is one of the important approaches in interpreting the history of Islamic architecture. In each period, according to the common art of that period and according to the cultural background of a land, special decorations and motifs were used. In pre-Islamic and post-Islamic Iranian architecture, the element of decoration has an essential role and the presence of decorations, which are mainly prolific and diverse, is inseparable from architecture. The designs in the works of Islamic art are the gateway to the esoteric knowledge of the true soul and being, which strengthens the view of monotheism as the main pillar of Islam.

The architecture of the Islamic period has many decorative patterns. Some of these designs are not limited to one or a specific place and can not be applied to certain materials. Rather, in different periods and with different materials such roles can be seen on all buildings of the Islamic period. Some are important only aesthetically and are used in the building as a decorative factor; but some, in addition to the aesthetic aspect, have a special religious, philosophical, social or political meaning.

## 2. Research Question and Hypothesis

The question that we are trying to answer in this research is that the motifs and decorations used in this building have special and symbolic meanings or have only an

aesthetic aspect and how can these motifs be analyzed through iconography? The research hypothesis states that Muslim artists have shown their faith in works of art inspired by religious beliefs and the use of symbolic motifs. It seems that the iconography method can be used in the analysis of any kind of classical and modern roles and works of art.

### **3. Research Method**

In the present study, the symbols and signs of Iranian Islamic architecture were introduced in a historical, descriptive and analytical method, using written sources and field observation.

### **4. Research Background**

Golnaz Azizi, Susankhtaei, Mohammad Hossein Halimi have conducted a study entitled “Geometric designs of the mosque”. Examining the patterns used in the decoration of brick balls, it has been determined that the motifs used in these decorations are divided into several categories. These motifs include two main categories of motifs and calligraphy, and the motifs themselves include several categories, namely geometric motifs and plant motifs. Soheila Karimi has conducted a research to analyze and study the decorations of Al-Jaito altar and mosque. In this scientific article, a study has been conducted to examine the proportions used in the altar, the year of construction and the process of decorations used, including bed decorations, beds with Islamic motifs and the inscriptions of those historical periods of that time.

### **5. A Review of Research History**

Taghipour et al.[1], studied Risk analysis in the management of urban construction projects from the perspective of the employer and the contractor.

Taghipour et al.[2], studied The Evaluation of the Relationship between Occupational Accidents and Usage of Personal Protective Equipment in an Auto Making Unit.

Taghipour et al.[3], studied Necessity Analysis and Optimization of Implementing Projects with The Integration Approach of Risk Management and Value Engineering.

Taghipour et al.[4], studied Implementation of Software-Efficient DES Algorithm.

Taghipour et al.[5], studied Risk assessment and analysis of the state DAM construction projects using FMEA technique.

Taghipour et al.[6], studied Assessment of the Relationship Between Knowledge Management Implementation and Managers Skills.

Taghipour et al.[7], studied Evaluation of the effective variables of the value engineering in services(Qazvin Post Center Case Study).

Khalilpour et al.[8], studied The Impact of Accountants Ethical Approaches on the Disclosure Quality of Corporate Social Responsibility Information an Islamic in Iran.

Taghipour et al.[9], studied Evaluating CCPM method versus CPM in multiple petrochemical projects.

Taghipour et al.[10], studied Evaluation of Tourist Attractions in Borujerd County with Emphasis on Development of New Markets by Using Topsis Model.

Taghipour et al.[11], studied A Survey of BPL Technology and Feasibility of Its Application in Iran (Gilan Province).

Khodakhah Jeddi et al.[12], studied The Analysis of Effect Colour Psychology on Environmental Graphic in Childeren Ward at Medical Centers.

Taghipour & Moosavi.[13], studied A look at Gas Turbine Vibration Condition Monitoring in Region 3 of Gas Transmission Operation.

Habibi Machiani et al.[14], studied THE RELATIONSHIP BETWEEN SOCIAL RESPONSIBILITY AND BRAND OF COMPANIES

Taghvaei yazdi et al.[15], studied The Impact of Intellectual Capital on Organizational Entrepreneurship (Case Study: Mazandaran Science and Technology Park).

Azarian et al.[16], studied The Effect of Implementing Total Quality Management on Job Satisfaction (Including Case-Study).

Baghipour sarami et al.[17], studied Modeling of Nurses' shift Work schedules According to Ergonomics: A case study in Imam sajjad (As) Hospital of Ramsar.

Ghadamzan Jalali et al.[18], studied Explain the Relationship Between Intellectual Capital, Organizational Learning and Employee Performance of Parsian Bank Branches in Gilan province.

Taghipour et al.[19], studied Analysing the Effects of Phisical Conditions of the Workplace on Employees Productivity.

Mohammadi et al.[20], studied Investigating the role and impact of using ICT tools on evaluating the performance of service organizations.

Rahmani et al.[21], studied Providing Health, Safety and Environmental Management (HSE) program in Metal Mining Industry (Including Case study).

Taghipour et al.[22], studied Implementation of Software-Efficient DES Algorithm.

Taghipour et al.[23], studied Insurance Performance Evaluation Using Bsc-Ahp Combined Technique.

Taghipour and Azarian.[24], studied The Impact of Extensive Quality Management on Human Relations (Case Study: Education).

Taghipour et al.[25], studied The Impact of Working Capital Management on the Performance of Firms Listed in Tehran Stock Exchange (TSE).

Asadifard et al.[26], studied A Multi-Objective Mathematical Model for Vehicle Routing Problem Considering the Time Window and Economic and Environmental Objectives Using the Metaheuristic Algorithm Based on Pareto Archive.

Torabi et al.[27], studied Implementation of hierarchy production planning model and its theoretical comparison with manufacturing resources planning.

Habibi Machiyani et al.[28], studied Using Business Intelligence to Provide a Model for Smartening the Management of Iranian Chain Stores.

Abbasi & Taghipour,[29], studied An Ant Colony Algorithm for Solving Bi-Criteria Network Flow Problems in Dynamic Networks.

Taghvaei yazdi et al.[30], studied The Relationship between Implementation Principles of Implementation with Organizational Accelerations, Ethical Leadership

and Empowerment of Managers (Case study: Employees of national banks in Sari, District 1).

Jalili et al.[31], studied Utopia is considered to be the physical form of an ideal human society where the goals are met.

Seddigh Marvasti et al.[32], studied Assessing the Effect of FRP System on Compressive and Shear Bending Strength of Concrete Elements.

Rezvani Befrouie A et al. [33], discussed the design of high-rise building with ecological approach in Iran (Alborz Province).

Taghipour et al.[34], studied Investigated the Relationship between Competitive Strategies and Corporates Performance. Seismic Analysis (Non-Linear Static Analysis (Pushover) and Nonlinear Dynamic) on Cable-Stayed Bridge.

Rezvani Befrouei MA et al.[35], discussed Identification and Management of Risks in Construction Projects.

## **6. Theoretical Foundations (Iconography)**

Iconography is a branch of art history studies that deals with the themes or meanings of works of art versus form, and it is rightly among the methods of qualitative research and is even considered one of the pioneers in this field. This method was introduced in 1932 with the publication of an article by Ervin Panofsky entitled “Studies in Iconology: Humanistic Themes in Renaissance Art” in 1932, And soon, with its successful use in the interpretation of Renaissance art and Christian arts, and then Buddhist art, it gained a lot of credit .

## **7. Decorations in Islamic Architecture**

In Islamic architecture, the decoration of a building, which is an integral part of architecture, is prominent in brickwork, tiling, plastering and mirror work, and is the result of the reach of artists who have sacrificed their lives to promote this art by emphasizing their faith and have not spared any effort. By accepting the religion of Islam and the sanctity of human and spiritual motifs in the early Islamic century, the great Iranian painters turned to plant motifs and geometric images, in other words, Islamists, and gradually depicted religious themes and themes in their works.

## **8. Geometric Patterns**

From the beginning, human beings have been dealing with the science of geometry without paying attention to it, and awareness of these issues has taken a long time ). In traditional architecture, geometry, like new engineering, is not limited to more or less quantitative aspects, but has a qualitative aspect that achieves its almost unique unity in the proportion and harmony of a building. The set of patterns that use geometric rules and relationships to create and combine them is called “geometric patterns”. “Islam’s view of art and the promotion of simple art has also been one of the reasons for the importance of Islamic geometry designs” Geometric patterns, whether individually or in combination with other elements, have a set of technical, drawing, construction rules and also have countless stances of forms. Although these motifs seem complicated, if we understand the rules of their order, they will all become very simple”.

## 9. Circle

The circle is considered to be the most complete geometric shape and has been of great importance in technology, art, religion and culture. The history of the study of the circle goes back to before the beginning of history, as the invention of the wheel in the fourth millennium BC in the Mesopotamia indicates the discovery of the basic features of the circle. The circle is considered as one of the most important geometric shapes of Islamic decorations and expresses its legal and symbolic aspects. The key element of Islamic decorations is geometric and the circle has a high position among them. The source of Islamic art is the circle. In Islamic decorations, the shape of a circle has been used as an element for the birth of abstract motifs and the creation of various nested effects, relying on repetition and symmetry. Circular base designs, such as Islamic, Golboteh, Shamseh, Mendel, etc. are used for geometric surfaces in one or more levels. This shape is also a symbol of the sky. The symbol of the universe of meaning, in relation to the earth, the circle is the symbol of the cosmic sky, this is where the circle joins the symbols of divinity, which desires to create and creates life. In the Islamic tradition, the shape of a circle is considered as the most complete shape. The concentrated circle, without end and radiant and perfect beginning, is the sign of absoluteness. (Figure 1)



*Figure 1. Application of the circle symbol, the western and southern walls of the exterior of the northern dome (Galdiri, 1991).*

## 10. Shamse

Respect for the elements of nature (water, wind, earth, fire) and other natural elements and worshipping them has been common for a long time and shows the nature of God-seeking and God-worship. A clear example of this is sun-worship and the tendency to worship light and illumination, which has been a symbol of growth, birth and light. The story of the worship of the sun is beautifully told in the Qur'an. The oldest example of the Aryan sun is found in the works of the fifth and fourth millennium BC in Susa, and the oldest Iranian hand-woven in which the symbol (symbol of the sun) is used is a fabric from the Parthian period that came out of the warm tombs of Azerbaijan. The sun is actually the bergamot that is executed in a circle or polygon and is in fact a symbolic, abstract and decorative role of the sun. Shamse is a symbol of divinity, light and oneness. The symbolic embodiment of the sun (sun) has an important place in Iranian art and has been considered for a long time and has many symbolic meanings.

## 11. Square

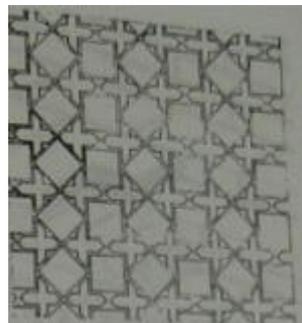
The square is one of the geometric shapes that has been used more than any other shape and as the most universal face in the language of symbols. The square shape is

related to place, just as the circle, and especially the spiral, is the main shape related to time. In fixed and non-desert civilizations, people made their houses and hedges square or triangular, but the farms and tents of nomadic and desert tribes were circular. (It is a reference to the stability of place and the motion of time, whose symbols are square and circle, respectively).

The use of square design is very prominent among the decorations of this building, especially in the decoration of porches, the square design has been used many times (Figure 2 and Figure 3). An example of the use of a square role in this mosque is the roof of the Oljaito altar. The altar known as Oljaito was built in a space on the western side of the courtyard of the mosque, on the north wall of the western porch of the eighth century (fourteenth century AD) in the patriarchal period. An example of the use of a square symbol is on the roof of the Oljaito altar, where 10 repeating squares are placed next to each other, and between them the role of an eight-pointed star is displayed.



*Figure 2. Using a square symbol in a lattice, on the south porch of the mosque.*



*Figure 3. Square symbol of the west and south walls of the exterior Northern Dome (Eugene Galdiri, 1991).*

Imagination 7: Using the symbol of repeating squares next to the eight-pointed star, the roof of the Oljaito altar (sahebnews.ir)

## 12. Triangle

When three circles intersect at their outermost points, the first polygon, the triangle, is formed. The simplest shapes are triangles, so all objects are made of triangles. Fire is in the shape of a pyramid whose base is four triangles and water is a shape of twenty triangular bases and air is a shape of eight triangular bases and soil is a cube made of square surfaces. The triangle symbolizes the triple spirit; spirit of lasciviousness, Lavame, Motmaeneh, and human beings must go through these three basic steps to reach perfection. The triangle represents the three worlds of Alawite, worldly and hellish, and is compatible with the three divisions of man; Soul, spirit and body.

### **13. Khampa Chain**

The khompa chain is one of the most common symbolic motifs found on the works of ancient tribes. The design of the khampa chain is usually designed between two parallel lines that define the boundaries of the design. This array is often used as a decorative border and is available in different types such as single-line, double-line and multi-line. This decorative pattern is one of the most prominent abstract motifs that dates back to the Paleolithic period. The history of this design in Iran dates back to prehistoric times. The role of the kampa chain was first discovered on (Tel Bacon) pottery. There are very common signs in the pottery of Tel Bacon that are found in China too, and it is inferred that these two cultures are related to each other. In the historical period of Iran, the first example of this array is related to the Parthian period. Various patterns of it are painted on the walls and sculptures, individually or in combination with the swastika design.

### **14. Pentagonal, Hexagonal and Octagonal**

Multifaceted geometric shapes are mysterious motifs used in ancient Iranian and Islamic art. These shapes, which are always associated with the symbolic numbers five, six, eight, etc., are based on the divisions of the circle. Geometric patterns are reflections on the supernatural unity and after that, it is an attempt to make visual symbols and think about the original order that originates from oneness. Ernest Cassirer considers the number four as the symbolic interpretation of the four directions of the universe and considers the number five as its evolutionary aspect, ie the center of these four paths. The four-pointed star design is used on the roof of the east porch of the mosque. In this ancient symbolic thinking, the sky has six planets and the sun is in its center, six directions of space have an intermediate or central point that makes it the seventh direction and is a symbol of the whole place and time. The number six is the distance between the origin and its appearance. The universe was formed in six days. Thus six squares can be a sign of creation. The eight-pointed star is one of the motifs that can be seen in abundance on the inscriptions of the fifth and sixth centuries, which later became known as the rosette in Islamic art. The shape of an eight-pointed star is formed by the rotation of two squares. As stated in Islam in different forms, eight heavens, eight doors of paradise, which in mysticism, the eighth door, is considered in repentance and is always open.

### **15. Cross/Rood**

The cross/Rood is a shape with 90 degree branches to the right or left, which in ancient Iran was called the seal wheel or the sun wheel. The cross has long been a universal symbol. It was also the center of the universe and the connection point between earth and sky and the cosmic axis. The broadness and form variety of this code is innumerable and the conceptual richness of its theme is infinite. The cross is a symbol of action, emergence, orbit and permanent regeneration. There is a basic point about this role, the numerical value of the swastika is sixteen, this symbol is a sign of strong progress of reality or the world. It has been considered as a symbol of the sun and concepts such as light, fertility and happiness have been expressed for it. The role of the cross can be seen in several parts of this building, an example of the existence of this design is the decoration of the Darwish porch. The north porch known as Sefeh Darwish, which was added to the mosque in the twelfth century AD (sixth century AH) (Figure 4). Example of the use of the cross symbol in this porch, is above the inscription of the third line of the porch, the swastika (cross) motifs connected to each

other are repeated alternately and go around the porch and the ceiling. This tape in a way covers the ceiling in a beautifully and skillfully and in a way frames the inscriptions on the ceiling. In Oljabeto altar, the role of the cross is also seen as a lattice. (Figure 5)



*Figure 4. Using the symbol of the cross, the north porch of the mosque (sahebnews.ir).*



*Figure 5. Application of the cross symbol to The lattice face of the Oljaito altar.*

## 16. Discussion and Conclusions

What was studied in this research is in fact a ground for more familiarity with geometric patterns in the decorations of Iranian Islamic architecture and understanding the meanings hidden in these patterns. In Islamic architecture, there are many decorative patterns, each of which has been used in most periods of Islamic art in accordance with the place and compatibility with the type of materials. Combining the timelessness and dynamism of a circle with the balance and stillness of a square, along with the semantic trilogy of triangles in works of art, creates a profound and interesting effect with a variety of shapes. The monotheistic foundation of these three forms is one of the most important nature of these designs. These three forms, each of which has a sacred form in Islamic art, contain the eternal truths of monotheism that, with a geometric order, in addition to the creativity of artists, form lasting manifestations of Islamic culture. The basis of works of art based on these three forms in the Islamic attitude to the oneness and divine oneness formed in the thinking of the Muslim artist in different perceptions and the beauty of Islamic works in the meanings of these forms of the charms of Islamic art

## Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

## Funding

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

## References

- [1] Taghipour, M.; Seraj, F.; Amir, H.M.; Farahani, K.S. Risk analysis in the management of urban construction projects from the perspective of the employer and the contractor. *International Journal of organization Leadership*, 2015, 4, 356-373.
- [2] Taghipour, M; Kheirkhahan, H; Mahboobi, M; Mohammadi, M. Evaluation of the Relationship between Occupational Accidents and Usage of Personal Protective Equipment in an Auto Making Unit. *International Journal of Innovative Research in Science, Engineering and Technology*, 2015, 4(9).
- [3] Taghipour, M; Seraj, F; Seraj, M. Necessity Analysis and Optimization of Implementing Projects with The Integration Approach of Risk Management and Value Engineering. *A Journal of Economics and Management*, 2015, 5(1), 330-346.
- [4] Taghipour, M; Moghadam, A; Moghadam, N.; Shekardasht, B. Implementation of Software-Efficient DES Algorithm. *Advances in Networks*, 2015, 3(1), 7-22.
- [5] Taghipour, M.; Sharifzadeh, S.; Seraj, F. Risk assessment and analysis of the state DAM construction projects using FMEA technique. *Trends in Life Sciences An International Peer-reviewed Journal*, 2015, 4(2).
- [6] Taghipour, M.; Saffari, K.; Sadri, N. Assessment of the Relationship Between Knowledge Management Implementation and Managers Skills (Case Study: Reezmoj System Company in Iran). *Science Journal of Business and Management*, 2016, 4(4), 114-120.
- [7] Taghipour, M.; Nokhbefallah, M.; Nosrati, F.; Yaghoubi, J.; Nazemi, S. Evaluation of the effective variables of the value engineering in services(Qazvin post center case study). *Journal of Applied Environmental and Biological Science*, 2015, 5(12), 319-322.
- [8] Khalilpour, M.; Kamyabi, Y.; Nabavi, C.S.A.; Taghipour, M. HE Impact ofAccounts' Ethical Approaches on The Disclosure Quality of Corporate Social Responsibility Information an Islamic Perspective in Iran. *National Academy of Managerial Staff of Culture and Arts Herald*, 2018, 1, 1173-1181.
- [9] Taghipour, M.; Seraj, F.; Amin, M.; Changiz, D.M. Evaluating CCPM method versus CPM in multiple petrochemical projects. *Management*, 2020, 3(3), 1-20.
- [10] Taghipour, M.; Ahmadi, S.J. Evalation of Tourist Attractions in Borujerd County with Emphasis on Development of New Markets by Using Topsis Model. *Science Journal of Business and Management*, 2015, 3(5), 175-189.
- [11] Taghipour, M.; Safari, M.; Bagheri, H. A Survey of BPL Technology and Feasibility of Its Application in Iran (Gilan Province). *Science Journal of Circuities, Systems and Signal Processing*, 2015, 4, 5, 30-40.

- [12] Khodakhah, J.L.; Kasrayee, F.; Khodakhah, J.S.; Taghipouret, M. The Analysis of Effect Colour Psychology on Environmental Graphic in Childeren Ward at Medical Centers. *Psychology and Behavioral Sciences*, 2016, 5(2), 51-61.
- [13] Taghipour, M.; Moosavi, A. A look at Gas Turbine Vibration Condition Monitoring in Region 3 of Gas Transmission Operation. *Journal of Environmental Science, Computer Science and Engineering & Technology*, 2020, 9(3), 423-432.
- [14] Habibi, M.H.; Taghipour, M.; Asadifard, E. The Relationship Between Social Responsibility and Brand Of Companies Listed on the Tehran Stock Exchange. *Journal Of Economics and Administrative Science*, 2020, 3(1), 15-20.
- [15] Taghvae, Y.M.; Taghipour, M; A.J.; Habibi, M.A. The Impact of Intellectual Capital on Organizational Entrepreneurship (Case Study: Mazandaran Science and Technology Park). *Journal of Modern Thoughts in Education*, 2020, 15(3), 44-58.
- [16] Azarian. R.; Gholamreza, T.F.G.; Habibi, M.A.; Taghipour, M. The Effect of Implementing Total Quality Management on Job Satisfaction (Including Case-Study). *Management*, 2020, 3(5), 1-15.
- [17] Baghipour, S.F.; Bozorgi, A.A.; Mououdi, M.A.; Taghipour, M. Modeling of Nurses' shift Work schedules According to Ergonomics: A case study in Imam sajjad (As) Hospital of Ramsar. *Journal of Ergonomics*, 2016, 4(1), 1-12.
- [18] Ghadamzan, J.A.; Habibi, M.H.; Taghipour, M.; Fathi, V.K.; Moshtaghi, S. Explain the Relationship Between Intellectual Capital, Organizational Learning and Employee Performance of Parsian Bank Branches in Gilan province. *Educational Administration Research Quarterly*, 2020, 10(2), 127-142.
- [19] Taghipour, M.; Mahboobi, M.; Nikoeifar, A.; Soofi, M.E. Analysing the Effects of Physical Conditions of the Workplace on Employee' s Productivity (Including Case Study). *International Journal of Environmental Protection and Policy*, 2015, 3(4), 111-119.
- [20] Mohammadi, M.; Taghipour, M.; Mahboobi, M. Investigating the role and impact of using ICT tools on evaluating the performance of service organizations. *Iranian Journal of Information processing and Management*, 2021, 37(1), 1-26.
- [21] Rahmani, M.; Vaziri, S.S.; Abedi, V.; Taghipour, M. Providing Health, Safety and Environmental Management (HSE) program in Metal Mining Industry (Including Case study). *Management*, 2020, 4(3), 14-35.
- [22] Taghipour, M.; Sharifzadeh, S.; Seraj, F. Risk assessment and analysis of the state DAM construction projects using FMEA technique. *Engineering*, 2015, 4(2), 195-203, Corpus ID: 110496771.
- [23] Taghipour, M.; Vosough, A.; Azizi, D.; Abdi, J. Insurance Performance Evaluation Using Bsc-Ahp Combined Technique. *Journal National Academy of Managerial Staff of Culture and Arts Herald*, 2018, 4, 112-120.
- [24] Taghipour, M.; Azarian, R. The Impact of Extensive Quality Management on Human Relations (Case Study: Education). *International Journal of Current Science and Engineering*, 2020, 2(7), 341-347.

- [25] Taghipour, M.; Habibi, M.H.; Amin, M. The Impact of Working Capital Management on the Performance of Firms Listed in Tehran Stock Exchange (TSE). *Journal of Multidisciplinary Engineering Science and Technology (JMEST)*, 2020, 7(6), 12146-12154.
- [26] Elnaz, A.E.; Adlifard, M.; Taghipour, M.; Shamami, N. A Multi-Objective Mathematical Model for Vehicle Routing Problem Considering the Time Window and Economic and Environmental Objectives Using the Metaheuristic Algorithm Based on Pareto Archive. *Logistics & Supply Chain Review*, 2020, 1(1), 58-68.
- [27] Torabi, F.; Taghipour, M.; Madankan, M.; Mahdijoo, R.; Mahdijoo, A. Implementation of hierarchy production planning model and its theoretical comparison with manufacturing resources planning (MRP II) (Case study of Iran Khodro Company). *Journal of Applied Environmental*, 2015, 3(12), 196-202.
- [28] Habibi M.A.; Aghazadeh, M.; Fooladi, T.; Yaser.; Taghipour, M. Using Business Intelligence to Provide a Model for Smartening the Management of Iranian Chain Stores. *Managemet*, 2020, 4(1), 37-55.
- [29] Abbasi, S.; Taghipour, M. An Ant Colony Algorithm for Solving Bi-criteria Network Flow Problems in Dynamic Networks. *International Journal in IT & Engineering*, 2015, 3(5), 48-34.
- [30] Taghvaei, Y.M.; Taghipour, M.; Abdi, J. The Relationship between Implementation Principles of Implementation with Organizational Accelerations, Ethical Leadership and Empowerment of Managers (Case study: Employees of national banks in Sari, District 1). *Quarterly Research on Educational Leadership & Managemet*, 2020, 5(17), 1-24.
- [31] Jalili, L.; Ghafourian, M.; Toopal, T.; Taghipour, M. Comparative Study of Khaje Rashid al-Din Views on Rab-e Rashidi Islamic Utopia and Kevin Lynch Ideas. *International Journal of Archaeology*, 2015, 3(5), 39-47.
- [32] Seddigh, M.B.; Beheshti, S.M.A.; Chegini, H.; Taghipour, M. Studied Assessing the Effect of FRP System on Compressive and Shear Bending Strength of Concrete Elements. *International Journal of Innovative Research in Science. Engineering and Technology*, 2015, 4(11), 11511-11524.
- [33] Rezvani, B.A.; Ghobadian, V.; Taghipour, M. The design of high-rise building with ecological approach in iran(Alborz Province). *International Journal of Modern Trends in Engineering and Research*, 2015, 2(10), 455-464.
- [34] Taghipour, M.; Yazdi, H. Seismic Analysis (Non-Linear Static Analysis (Pushover) and Nonlinear Dynamic) on Cable-Stayed Bridge. *American Journal of Civil Engineering*, 2015, 3(5), 129-139.
- [35] Rezvani, B.M.; Taghipour, M. Identification and Management of Risks in Construction Projects. *American Journal of Civil Engineering*, 2015, 3(5), 170-177.



© 2022 by the author(s); licensee International Technology and Science Publications (ITS), this work for open access publication is under the Creative Commons Attribution International License (CC BY 4.0). (<http://creativecommons.org/licenses/by/4.0/>)