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Evaluation of nature-loving (biophilia) on the vitality and vitality of the urban ecosystem; Case study: selected complexes in the 22nd district of Tehran

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Abstract

Purpose and method, therefore, a questionnaire tool was used to collect data and SPSS statistical software was used to analyze data. It should be noted that statistical correlation tests were used to investigate the relationships between variables, t-test samples were used to compare the statistical population with the theoretical mean, and multivariate regression was used to investigate the influence of the components of orientation to nature and residents' vitality. The results show that there is a significant relationship between the architectural biophilic criteria of residential complexes and freshness; as the component of naturalism had the greatest impact on its achievement and the existence of nature had an indirect effect on the sense of vitality of the residents of the complex. Therefore, it is confirmed that the presence of nature in residential complexes as a gathering space causes higher social interactions and subsequently more happiness of residents in residential complexes.

Keywords: *biophilia, biophilic architecture, livability, Tebran metropolis.*

Introduction and statement of the problem

With the industrial revolution, a tremendous transformation took place in the lives of people, with an instrumental view of nature, people tried to improve their lives, even in times like Futurism (in Italy), they demanded the destruction of nature and mechanization by attacking ancient values. Have been life (Bani Massoud, 2014, p. 308). Today, many of the mental disorders of the society come from people's living environments, although the good and bad relationship of people has different causes; but among the most important of these causes is the environmental conditions of their lives. The results of the experiments conducted in the living environments indicate that if the environment consists of natural elements, it has warmth and charm, which makes

the soul fresh and the behavior more sincere, and on the contrary, if the environment is without natural elements, the soul and behavior are cold and cold. Hesse says that when you get close to nature, you can hear God's voice (Serano, 2012, p. 29). For this reason, the relationship between man and the surrounding environment can be very important, and since a significant part of the environment around us is man-made, the relationship between man and the environment and especially the scientific mechanisms of this relationship and ability to be translated into the language of architecture and environment design has always been one of the concerns of designers and researchers in the scientific fields related to architecture and environment design. With the advancement of human knowledge and the quality of life in the 20th century, on the one hand, designers have sought to use the broad platform of human sciences in environmental studies and its application in design, and on the other hand, researchers of human sciences and especially psychologists, transfer and Organizing laboratory studies in the context of everyday and real human life have been considered (Beatley, T., & Newman, P, 2013). Today, a new approach under the name of livability has been proposed to bring the artificial and man-made fields as close as possible to nature, in which traces of nature, looking back, preserving identity, etc. can be seen; But the proposed approach takes place according to the social, cultural and climatic criteria of mainly western countries (Wheeler, 2005). This article examines the role of the nature of residential complexes on the residents' sense of freshness and vitality by examining case examples: residential complexes in the 22nd district of Tehran. In this article, the definition of vitality was examined from two points of view: the first point of view, which is individual, is related to people's vision, culture and perception; And the second point of view is related to urban spaces that these two points of view are mutually related and are influenced by each other, then the factors affecting vitality have been examined, among which the role of nature in creating vitality is a fundamental role and It is undeniable.

Research methodology and background

The current research is descriptive-analytical and survey method in terms of practical purpose and method. In order to collect data, documentary methods (to explain the indicators) and field or survey methods (observation and questionnaire) have been used. Therefore, the data collection tool is a researcher-made questionnaire. The statistical population of the research includes residents and users living in the residential complexes of Tehran metropolis. To determine the sample size, Cochran's formula was used with a confidence level of 95% and an estimation accuracy of 0.01, and the sample size was determined to be 384 people. Sampling method is simple and accessible random method. The reliability level of the research questionnaire was obtained using Cronbach's alpha method for each of the components and indicators. According to the existing assumptions, if Cronbach's alpha coefficient is 0.7 or more, it has good reliability; If the Cronbach's alpha coefficient is between 0.5 and 0.7, the validity of the questions is evaluated as average, and the coefficient less than 0.5 lacks reliability. SPSS statistical software was used to analyze the data. In order to analyze the obtained information, inferential statistics (Spearman's correlation test and multivariate regression) were performed. A look at reliable sources of information such as articles, magazines and books shows that not much research has been done on biophilic architecture. Few researches have been done by Mahmoudinejad, 2017: and Mahmoudinejad and Gulabchi, 2018, and it has been published in the form of a 25-volume book series on related topics.



Research literature

Biophilia

Today's modern life and architecture in residential complexes has diminished the unity between man and nature more than ever before, and man has lost the meaning and concept of peace that he took from his living environment in the past. Peaceful and harmonious coexistence between man and nature has been embodied in the guiding principles of Chinese architecture since the beginning as a premise or background. In sum, today's terms "connection of man and nature" means that human activities, including architecture, should be integrated with natural processes and patterns in order to achieve harmony between man and nature. At the same time, nature must be modified and combined with artificial elements so that it can establish and converge with the cultural, economic and social needs of humans in the natural landscape (Panahi and Karimi, 2014, p. 256). Biophilia hypothesis states that there is an instinctive and natural connection between humans and other living systems. Wilson describes a deeper connection of dependencies by biophilia, which refers to the characteristics of the ecosystem (Stephen Kellert, 2016; Browning, 2014; Zar Pedersen, 2-12; Amjad Al-musead, 1996; Wells, 2011; Torrance, 2013; Söderlund, 2-15; Singh, 2015; Wilson, 1992; Charles; 2000; Ulrich; 1984 Michael, 2011; Kellert, 2015; Kellert, 2018).

Biophilic architecture

In terms of terminology, the term "biophilia" means "loving life or living systems" and was first used by "Eric Fromm" to explain a psychological tendency regarding the "attractiveness of all living things". "Was used. Nature-friendly design is the conscious effort to translate an understanding of the inseparable connection of humans in dependence on natural mechanisms and processes as biophilia or nature-loving in environmental design (Kellert & Wilson, 2008). "Edward Wilson" used this term in a similar sense to describe and justify "mankind's unconscious desire to connect with other elements of life". Regarding the inherent attraction to nature, he says: People flock to parks to experience natural scenery, and for this, they do not have a reason that they can describe in words (Wilson, 1992: 350).

Objectives of biophilic architecture

In other words, he aligned today's architecture with nature culturally, spatially and environmentally. Because nature has been the basis of traditional and indigenous architecture. In this way, instead of blindly and incompletely following western modern architecture (residential complexes) or false and shallow imitation of traditional architecture, we can hope to create a link between today's architecture and the original architecture of the past (Akrami and Zare, 1392, pp. 57-56). . Love of nature and honesty are both strong feelings of human genius. Human nature is such that it loves nature and has absolute faith in it, and it can be said that man limits his ambition to remain loyal to nature (August Rodin, Testament, 1840-1917).

Viability and biophilic city

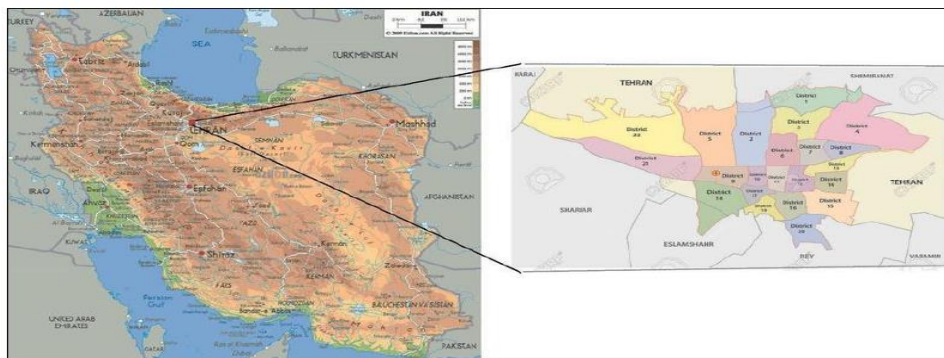
Livability is related to a system in which the social, physical and mental health of all its residents is taken care of. This quality is about desirable spaces that reflect cultural richness. The key principles that strengthen this concept include equality, accessibility, recreation, climate and empowerment (Hahlweg, 1997). A livable place is a place where you can live a healthy life and it is a place where you can easily walk, bike, public transport and even by car when there is no other choice. A livable place is a place for all people. This means that the space should be attractive, valuable, and safe for children



and for the elderly. Not just for those who earn there and then live in the suburbs and surrounding areas (Cities, PLUS, 2003).

Expression of research findings

Geographical location: Tehran is located at 51 degrees 6 minutes to 51 degrees 38 minutes east longitude and 35 degrees 34 minutes to 35 degrees 51 minutes north latitude, and its height from the open water level is between 1800 meters in the north and 1200 meters in the west. The center and 1050 meters in the south is variable. Tehran is spread between the valleys of the mountain and the desert and on the southern slopes of the Alborz mountain range. It is surrounded by the mountains of Ray and Bibi Shahrabano and the flat plains of Shahriar and Varamin from the south and by mountains from the north.



Map 1. Map of Tehran in Iran with a linear scale; source: raziclimate.ir

After compiling the aesthetic indicators and criteria of high-rise buildings in the city landscape, these indicators have been measured in the studied samples (Irfan cluster towers and Artemis single tower in the 22nd district of Tehran). This analysis was done by means of a questionnaire and by asking the opinions of citizens and also experts in the field of architecture and urban planning. A total of 384 questionnaires have been considered for distribution among residents (192 questionnaires for Irfan Towers and 192 questionnaires for Artemis Tower) and 36 questionnaires for distribution among experts. In the continuation of the research, Cronbach's alpha method was used to calculate the internal consistency of the measuring instrument, namely the questionnaire. In this section, the descriptive statistics resulting from the questionnaire will first be reviewed and presented, and then the accuracy and validity of the questionnaire questions will be evaluated using the Cronbach's alpha coefficient method, which is performed on each question. After that, in order to know whether we can use parametric methods for data analysis or not, we test the normality of the data. In this research, the Kolmogorov-Smirnov test method was used, as well as the skewness and skewness of the data. Then, with the one-sample T-test method, the overall status of the livability components and biophilic design components is investigated, and then the one-sample T-test is performed on each index to To be able to have a correct estimate of the society about the indicators of the livable place and the indicators of the biophilic design. Questionnaire to evaluate the level of freshness and vitality caused by nature (biophilia in residential complexes) is as follows.

- **The presence of nature in the residential complex: To what extent do you evaluate your residential complex as lively and energetic with regard to the presence of nature in it?**



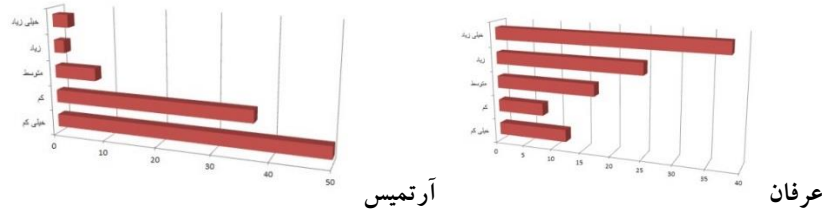


Diagram 1. The presence of nature; Source: research findings.

- The influence of nature on social activities: Does the nature of your place of residence affect the tendency of you and the residents of your residential complex to engage in social activities and exercise?**

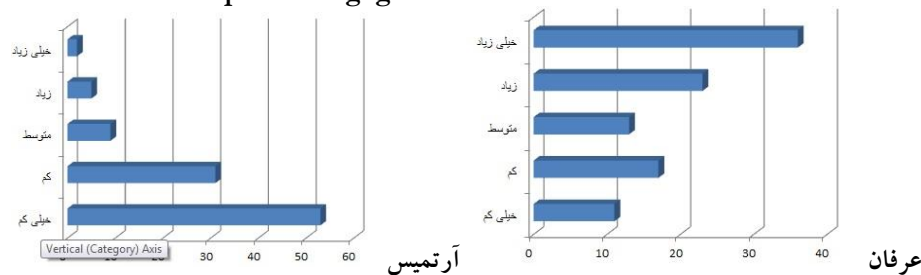


Diagram 2. Nature and social activities; Source: research findings.

Using the regression method, we investigate the effect of nature and its moods on freshness and liveliness in residential complexes and prioritize them according to their effect on the variable of freshness-livability and biophilic design. We show the correlation between the criteria will be examined further and the correlation between the variables will be presented with the Pearson correlation coefficient method. At the end, the hypotheses of the research are tested. The one-sample t-test is used to determine whether the average observed in a sample randomly selected from the population has a value equal to the assumed average of the population or not. The single-sample t-test is used when we have a sample of the population and we want to compare its average with a normal or standard state or even with a hypothetical and expected number. In this test, we compare the average of the sample with the value of 3, which is considered the average value. If the value of each of the variables has a significant difference with the number 3 ($p < 0.05$), we will investigate the direction of this difference. Also, one-sample T-test was used to obtain the viability rate. In the questionnaire, a 5-point Likert scale was used, so 1 is the minimum score, 5 is the maximum score, and 3 is considered the theoretical middle.

Table 1. Inferential statistics and one-sample T-test results; Source: research findings.

95% interval	confidence of the difference	Mean difference	Sig.(2-tailed)	Test value = 3		happiness
				Df	t	
upper	lower					
-0.2796	-0.3768	-0.32822	0.000	381	-13.277	

According to the table above, it can be seen that the significance level is zero, which is smaller than the value of 0.05, so the initial assumption is rejected, and the claim that the average quality of the perceptual environment of the residents is equal to the theoretical mean of 3 can be rejected. And according to the upper and lower limits, both of which are negative, it is concluded that the average is smaller than the test value. The



procedure for biophilic design criteria is similar to the actions taken for livability criteria. That is, the one-sample T-test was used to obtain biophilic criteria. In the questionnaire, a 5-point Likert scale is used, so 1 is the minimum score, 5 is the maximum score, and 3 is considered the theoretical middle. In the following, the livability status and biophilic design in its constituent criteria have been investigated by the one-sample T-test. Pearson's correlation method was used to check the significance between biophilic design components and the concept of livability. As the findings show, there is a significant relationship between the components of livability and biophilic design, which include: mental peace and biophilic (0.613), view and landscape and biophilic (0.712), social relations and biophilic (0.412).

Conclusion and summary

According to the evidence, the universal tendency of human society towards communication with other organisms of the biological system and presence in natural environments as the first and fundamental platform for the flow of life has been documented. The question of whether such attraction with such universality is rooted in the inherent nature of human kind has provoked many theoretical discussions in this field. These theories believe in the instinctive and inherent connection of humans to the environment and natural factors. In other words, such tension is considered common among all human beings regardless of time and place, age, gender and race. Among the debates about the tendency of human nature towards the manifestations of life, is the hypothesis of loving life (basophilic). The results of the survey of questionnaires in Irfan and Artemis complex indicate the indirect effect of nature on the sense of vitality of the residents of the complexes. And as the amount of nature increases in residential complexes, people and residents have more interactions and know more about their neighboring units. On the other hand, it can be said that children release their energy more easily in the green space and its related extensions. And also nature forms a platform for adults to have fun, sit and exercise, all of these factors have been involved in the sense of vitality of the residents. As a result, the Artemis complex has a lot of nature, the residents are more cheerful and lively than the Irfan complex, which has little nature. According to the concept of vitality and the factors affecting it, the role of nature in residential complexes to create a sense of vitality is a fundamental and undeniable role. From the investigations carried out, it was concluded that the presence of nature had an indirect effect on the sense of vitality of the residents of the complex. Therefore, the hypothesis that the presence of nature in residential complexes as a gathering space causes higher social interactions and, subsequently, greater happiness of the residents in residential complexes, can be considered as a confirmation of the validity of the hypothesis test. The results show that the Artemis complex, which has more nature, that this amount of nature had a very significant effect on the sense of vitality of the people in this complex compared to the Irfan complex, that the aspect of positive answers to most of the questions from the residents of the said complex is important. Confirms also, the little nature in the other complex has had a very little effect on the sense of vitality of the residents of this complex.

Declaration of no conflict of interest

The authors declare that there was no conflict of interest for them in conducting this research. (Conflict of interest refers to a situation where the material or non-material personal interests of the author or authors are in conflict with the research results and this affects the research process or the honest announcement of the results).



Sources and references



5. Naibi, Fereshte, 1381, Hayat Dar Hayat, first edition, Nezhat Publishing House, Tehran.
2. Adeli, Samira, 2013, the relationship between nature and architecture from the perspective of Islamic ontology, research on the traditional houses of the Central Plateau of Iran, focusing on four prominent houses in Yazd, Nain and Kashan, Journal of Comparative Art Studies, No. 5, 103-116.
3. Akrami, Gholamreza and Zare, Faezeh, 1392, house design in traditional urban context, case study: design in traditional context of Qom, Fine Arts-Architecture and Urban Planning Magazine, No. 2, pp. 55-68.
4. Amjad Almusaed, Intelligent sustainable strategies upon passive bioclimatic houses, Arkitektsskole in Aarhus, Denmark, 2004, p. 74
5. Amjad Al-musead, Town texture specific for the warm zone, AD Review, issue nr 12-1996, Bucharest.
6. Bani Masoud, Amir, 2014, Western Architecture: Roots and Concepts, 7th edition, Tehran: Century Architecture Publishing House.
7. Beigi Nejad, Mohammad Ali, Ameri Safat, Ali Akbar, 2015, investigation of biophilic architectural features in Iranian native buildings, case example: hot and dry climate, International Conference on Innovation in Science and Technology, Islamic Azad University of Qeshm, and Lakhd International Qeshm, Iran
8. Berkebile, B., & McLennan, J. (2004). The Living Building: Biomimicry in Architecture, Integrating Technology with Nature. BioInspire ,18.
9. Bitraf, Ehsan, Farah Habib, Zabihi, Hossein, 2016, biophilic attitude, an approach to improving the quality of the living environment of residents of residential complexes, Urban Management Quarterly, Winter 2016, No. 49.
10. Browning, W.D., Ryan, C.O., Clancy, J.O. (2014). 14 Patterns of Biophilic Design. New York: Terrapin Bright Green, LLC.
11. Charles, (2000). "Urban Vitality: A New Source of Urban Competitiveness", Prince ClausFund
12. Clark, E., Chatto, CH.F., (2014), Biophilic Design Strategies to generate wellness and productivity, National professional conference, April 22-24, 2014.
13. Hartig, Terry, 2004, Toward Understanding the Restorative Environment as a Health Resource, Open Space: People Space (An International Conference on Inclusive Environments), Edinburgh.
14. Kahn, Peter H. Jr. & Kellert, Stephen, 2002, Children and nature: psychological, sociocultural, and evolutionary investigations, MIT Press.
15. Kahn, Peter H. Jr., 1997, Developmental Psychology and the Biophilia Hypothesis: Children's Affiliation with Nature, DEVELOPMENTAL REVIEW, No.17: 1-61
16. Kahn, Peter H. Jr., 1999, The Human Relationship with Nature: Development and Culture, Cambridge, MA, MIT Press.
17. Kaplan, Rachel & Kaplan, Stephen, 1989, The experience of nature: a psychological perspective, Cambridge University Press.
18. Kaplan, Rachel, Ivancich, J. E., & Young, R., 2007, Nearby nature in the city: Enhancing and preserving livability. School of Natural Resources and Environment, University of Michigan. Retrieval from: <http://hdl.handle.net/2027.42/48784>
19. Kaplan, Rachel, Kaplan, Stephen & Ryan Robert L., 1998, With People in Mind: Design and management of Everyday Nature, Island Press.
20. Kaplan, Stephen, 1995, The restorative benefits of nature: Toward an integrative framework, Journal of Environmental Psychology, Vol.15: 169-182.
21. Kellert S, Calbrese C. The Practice of Biophilic Design, Terrapin Bright Green LLC. 2015.
22. Kellert, 2008, Cities and natural processes: a basis for sustainability, Routledge (Taylor & Francis Group), London.

23. Kellert, S. (2018). *Nature by Design: The Practice of Biophilic Design*. Yale University Press.
24. Kellert, S. & Calabrese, E. (2015). *The Practice of Biophilic Design*. Retrieved from: www.biophilicdesign.com.
25. Kellert, S.F. & B. Finnegan (2011). *Biophilic Design: the Architecture of Life* (Film). Bullfrog Films.
26. Kellert, Stephen R. & [others]. (2008), *Biophilic Design: The theory, Science, and practice of Bringing Building Life*. Hoboken, New Hersey: John Wilcy & Sons, Inc.
27. Mahmoudinejad, Hadi: P, 2017, *Biomimicry Architecture: Imitation of Nature in Design*, Tehran: Tahan Publications.
28. Mahmoudinejad, Hadi: A, 2017, *Biophilic Architecture: Friendship with Nature in Design*, Tahan Publications.
29. Mahmoudinejad, Hadi: B, 2017, *Biological Architecture: Sustainable Architecture*, Tehran: Tahan Publications.
30. Michael, P. (2011). *Biomimicry in Architecture - Mitigation and Adaptation to Climate Change*. RIBA.
31. Panahi, Siamak; Karimi, Arslan, 1374, *Feng Shui*, Tehran: Adiban Publications.
32. Serrano, Miguel, 1362, with Jung and Hesse, translated by Siros Shimsa, Tehran: Ferdowsi Publications.
33. Singh, A. &. (2015). *Biomimicry-an alternative solution to sustainable buildings*. *Journal of Civil and Environmental Technology*, 2(14), 96-101.
34. Söderlund, J., & Newman, P. (2015). *Biophilic architecture: a review of the rationale and outcomes*. *AIMS Environmental Science*, 2(4), 950-969.
35. Stephen robert Kellert, *Dimensions, elements, and attributes of biophilic design*, Yale University, Retrieved on: 12 August 2016
36. Stewart – Pollack , Julie, July/August 2006 , *Biophilic Design For The First*.
37. Torrance, S. B., & McGlade, T. (2013). *City of Toronto guidelines for biodiverse green roofs*. Toronto: Toronto City Planning.
38. Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. 1991, *Stress recovery during exposure to natural and urban environments*, *Journal of Environmental Psychology*, No.11: 201–230.
39. Ulrich, R.S., 1984, *View through a window may influence recovery from surgery*. *Science*, No.224: 420-421.
40. Verderber, S.F., 1986, *Dimensions of person-window transactions in the hospital environment*, *Environmental Behavior*, No.18: 450-466.
41. Wells, M. (2011). *Designing For Biodiversity: Productivity And Profit*, *Environmental Briefing Note*. British Council Of Offices.
42. Wilson, Edward O., 1984, *Biophilia*, Cambridge University Press.
43. Wilson, Edward O., 1984, *Biophilia*, Cambridge University Press.
44. Wilson, Edward O., 1992, *The diversity of life*. Harvard University Press.
45. Wilson, Edward O., 1992, *The diversity of life*. Harvard University Press.
46. Zar Pedersen, M. (2012). *Ecosystem Services Analysis For The Design Of Regenerative Urban Built Environments*. Victoria University of Wellington.

