Available online at www.ijapas.org

IJAPAS

International Journal of Applied Arts Studies

IJAPAS 5(4) (2020) 21–40

Screening the Criteria of Tradition and Modernism in Iranian Academic Buildings using Fuzzy Delphi Technique

Afsaneh ModaresiRafat[a], Hossein Soltanzadeh[b]*, Mehrdad Matin[c]

[a]*Department of Architecture, Central Tehran Branch, Islamic Azad University, Tehran, Iran*
[b]*Department of Architecture, Central Tehran Branch, Islamic Azad University, Tehran, Iran*
[c]*Department of Architecture, Central Tehran Branch, Islamic Azad University, Tehran, Iran*

Received 05 February 2021; revised 15 March 2021; accepted 20 April 2021

Abstract

Fundamental changes in Iranian architecture from the middle of the Qajar era contracted Iranian architecture flow in a different direction from the past and affected the building. One of the influential currents in contemporary Iranian architecture is the formation of modern architectural currents and, consequently, the combination of modern architecture and traditional architecture. Traditional fusion and modernism are clearly reflected in the body of several buildings, including academic buildings. This study aims to extract and screen the criteria for tradition and modernism in academic buildings, especially “faculties”. This study uses a mixed methodology. Criteria are explored using semi-structured interviews using grounded theory methodology. The strategy used in the quantitative step is screening using the fuzzy Delphi technique. For this purpose, the criteria governing tradition and modernism are extracted through attributional analysis and desk research. Accordingly, the text of the interview was edited. The results of the interviews were imported into ATLAS.ti, yielding the criteria for tradition and modernism in the faculties. A questionnaire was then developed to assess each criterion's contribution from the perspective of students and faculty. They were purposefully distributed to screen and evoke tradition and modernism in faculty buildings using the fuzzy Delphi and MATLAB techniques. According to the results, for modern criteria, “Free plan”, “segregation of spatial realms” and “avoiding ornaments and excessive simplicity”, belong to the rank of VL membership degree. On the other hand, for traditional criteria, “confinement hierarchy”, and “yard arrangement using natural elements”, Belong to the membership degrees VL, and VL, respectively.

Keywords: Screening; Tradition; Modernism; Academic Buildings

* Corresponding author. Tel: +98-9122093203.
E-mail address: h72soltanzadeh@gmail.com

1. Introduction

During the formation of “New Iran” in the first Pahlavi period and the initiation of reforms in various administrative, economic, and social fields, domestic higher education and the growth and development of educational centers and institutions were put on the agenda as one of the main pillars of this transformation. "The Iranian university system was established in 1934 with the establishment of the University of Tehran, as an important stage in the contemporary history of Iran and the starting point for the development of new sciences and the process of modernization of Iranian society, and social, economic, and cultural necessity. In the second Pahlavi period, planning policies for the growth and development of universities and higher education centers were pursued with considerable intensity and speed" (Behnam, 1994: 102). The quantitative growth of universities continued in the post-Islamic period.

Emerging modernity in Pahlavi, Iran had significant achievements in various fields, including science and education. However, it led to a kind of rupture in the process of changes in the cultural sphere and a rupture with traditional Iranian architecture, and the formation of new currents in architecture. "Although they began in the Qajar period, these changes in Iranian architecture and urban planning appeared comprehensively in the first Pahlavi period. This period witnessed the acceleration of developments so that the first Pahlavi period can be considered as the foundation of modern architecture in Iran" (Bemanian, 2006: 1).

In general, it can be said that several factors were involved in fundamental changes in contemporary Iranian architecture, including political, cultural, social, economic, and so on. Architectural developments along the plain have undergone a number of external and sometimes structural changes in the formation of public buildings, including universities, reflecting the cultural conditions of their time. Reflection on academic buildings Since the establishment of the first university in Iran shows no uniform and clear pattern and orientation regarding the approach of architects/consultants to the design of academic buildings. Architects/consultants have used different methods for various reasons, including prevailing cultural conditions and the spirit of the time, attitudes, experiences, working methods of each architect, or motivations and goals, and so on. Tradition and modernism play a decisive role in the architecture of academic buildings. Architects have taken several approaches to refer to the past and combining tradition and modernism. Some architects/consultants have turned to the use of Iranian architectural elements, materials, and ornaments, and others to the concepts and patterns of Iranian architecture and their implementation in the design of academic buildings. An architect sometimes had a different approach to the design of different universities.

To extract and screen the concepts of tradition and modernism in the faculty buildings of Iranian universities, this study seeks to answer two questions:

1. What are the criteria for tradition and modernism used in faculty buildings?
2. Which of these criteria can be excluded in the association of these two approaches?

2. Literature Review

Few studies have specifically addressed the role of tradition and modernism in Iranian academic buildings' architecture, requiring careful consideration. Nevertheless, tradition and modernism have been studied in the contemporary era from various aspects. This section summarizes domestic and foreign studies in architecture and urban planning related to the above two areas.

In an article entitled “Identity of «Iranian Architecture» and «Modernism»,” Mohammad Naghizadeh addresses issues related to the above concepts to introduce defining boundaries and the impact of different thoughts and opinions on past and contemporary Iranian architecture. Using a descriptive-analytical method, he concluded that the Iranian architectural tradition, based on Iranian cultural values (inspired by the Islamic worldview), does not disturb and antagonize modernity, more desirable expression of truths and beauties, and the satisfaction of human needs. Instead, the contradiction between Iranian tradition and architecture must be sought in modernism foundations that deny society's cultural and religious identity (Naghizadeh, 2000: 79).

In an article entitled “The Effect of Modernism on the Space-Physical Development of Iranian-Islamic Cities (A Case Study of Tehran),” Pourahmad et al. Analyzed the formation and spatial-physical developments of Iranian-Islamic cities with an emphasis on Tehran and its organization. And the susceptibility of urban elements to various factors, especially modernism. For this purpose, the process of formation and emergence of Tehran and the influence of various economic, political, social, and cultural factors before modernism and after modernism were studied using a descriptive-analytical method. It was concluded that Iranian cities have evolved over the centuries. Inherent in the physical criteria for these cities were some prudent architectural and urban planning values, shaped according to the daily needs of city residents in response to the transformation and evolution of urban society (Pourahmad et al., 2012: 54 and 57).

In an article entitled “The relation between tradition and modernism in formation of urban fabric with emphasis on cultural dimensions; case study: Birjand city,” Basiti et al. Examined the relationship between tradition and modernity in shaping the Qajar period's architecture in 1875-1922. The culmination of the values and traditions of the West during the Qajar period made it necessary to conduct this study. This study used descriptive-analytical methodology to study the interaction of tradition and modernism in the form of architectural identity of this period. The results showed that society had faced many problems and challenges, especially in the field of culture, in understanding the principles of modernity, which have not yet been overcome, a visible solution in society (Basiti et al., 2018: 55).

In an article entitled “An investigation into the former consulate of Britain as one of the first samples of Modern architecture in Iran,” Parsaee et al. first introduced the British Consulate Hall (Sabzabad building). They explained the features of early modern architecture. Subsequently, they made a comparative comparison of the Sabzabad building, using the historical-interpretive methodology. It was concluded that Bushehr faced a series of developments in various fields, including political, economic, and architectural, especially during the Qajar period. Sabzabad building is the result of these changes, whose architecture does not follow the traditions of Bushehr. It uses a modern approach and has very few similarities with the local architectural features. This building can be considered one of Iran's first modern buildings (Parsaee et al., 2017: 61 - 64).

In an article entitled “Modernity in tradition: Reflection on building design and technology in the Asian vernacular,” Rashid and Rahat Ara explored some modern design solutions and the currents and concepts inherent in tradition and modernism. They concluded that tradition and modernism use different construction methods and could not be used in utopias. Both can be used to the best of their ability, provided they use modern structures regardless of objectivity and at the same time use the exterior of the building for tradition (Rashid & Rahat Ara, 2015: 46).

In an article entitled “from 'neo-vernacular' to 'semi-vernacular': a case study of vernacular architecture representation and adaptation in rural Chinese village revitalization,” Xiaoxin and Kelly stated that vernacular architecture is considered a heritage that should be protected. And be developed because it is changing day by day due to the tendency of the villagers to live a modern

life. This study attempted to define the terms “neo-vernacular” (seemingly vernacular buildings but constructed using contemporary methods and materials) and “semi-vernacular” (reuse or renovation of vernacular buildings in combination with modern and traditional construction methods). Cleaning up the approaches to the transformation of vernacular villages. They proposed a new approach to new terms (Xiaoxin and Kelly, 2019: 1128).

In an article entitled “Perceptions of the Courtyard in Kuwait: Between Tradition and Modernity,” Yousef A.M. Al Haroun pointed out that at one time, all Kuwaiti houses had courtyards. It was a multi-purpose open space in which families would gather and interact. In the 1950s, Kuwait was affected by rapid and unprecedented urbanization and became a modern metropolis for over a decade. In this study, the yard has been used as a tool to examine several socio-cultural, economic, political aspects of moving towards modernity in residential environments built beyond the sense of indigenousness and sustainability. This study aimed to increase the knowledge of people's harmony with the intersection of traditional and modern concepts. In the findings, a significant mismatch was found between the old facts and the current perception, even regarding the current nature of the yard (Al Haroun, 2019: 182).

3. Theoretical Literature

3.1. Tradition

In the Webster Dictionary, “tradition” is defined as the unwritten transmission of beliefs and customs from one generation to another (merriam-webster: 2020; Hojjat, 2014: 19). In the semantic scope of tradition, the concepts of knowledge transfer, etiquette, techniques, laws, forms, and many other elements are placed with a nature of both spoken and written (Nasr, 2001: 135). According to Williams, the root of the word in Latin, tradition, is derived from “trader”, meaning “hand over and deliver”. He believes that this is a French loanword, basically meaning “handing over, handing over knowledge, transferring ideas, etc.” (Inna Zayats, 2015: 697; Sadeghi Pey, 2009: 10). As defined by Shils, tradition is the acquisition of all the assets of a community in a given period, the assets of the community before they are now owned by the current owners (Shils, 1981: 12; Sadeghi Pey, 2009: 10). Daffner also defines tradition as the oral and non-verbal transmission of information among people with a common culture (Dries-Daffner, 1992: 25). Tradition is inherently a kind of regeneration or revival of tradition in the present. Hence, we see that the verb tradition (or transmission) requires it to be done in the present (Ashouri, 2013: 9 - 10).

3.2. Traditional Architecture and its Criteria

Traditional architecture is also referred to as historical architecture, old architecture, original architecture, identity architecture, local architecture, meaningful architecture, vernacular architecture, and local architecture as the most important terms. Examining common synonyms reveals that traditional architecture has four loads: time, place, culture, and meaning. (Sadeghi Pey, 2009: 8 - 9).

In Iranian architecture, tradition refers to the forms, combinations, procedures, and ornaments accepted as Iranian architecture criteria, always used in important, large, and designed buildings, especially ritual and religious buildings. In addition to climatic, material, environmental, or functional reasons, it has also had cultural aspects. It has been considered as a feature, symbol, and in some cases, symbol (Soltanzadeh, 2004: 141). Table 1 lists the criteria for traditional Iranian architecture from the point of view of Iranian thinkers:

Table 1 Criteria for traditional Iranian architecture

Experts	Criteria for Iranian architecture
Mohammad Karim Pirnia	People-centeredness, self-sufficiency, avoidance of futility, Niaresh and introversion (Hashemi, 1995: 3)
Latif Abolghasemi	The climate agreement, build orientation, sanctity and privacy, interior and exterior, introversion, spatial hierarchy, the primacy of the divine sense over the sense of beauty and goodness (Ibid)
Nader Ardalan	Symbolic insight, environmental adaptation, An example of the paradise garden, positive spatial systems, complementarity, human scale, and social participation, innovation (Ibid)
Darab Diba	Geometric diversity and richness, spatial and temporal hierarchy, human scale, harmony with the environment, empathy with nature, unity and multiplicity (Ibid)
Hossein Sheikh Zain al-Din	Induction of a sense of unity using rhythm, repetition, order and geometry, completeness of the component while playing a role as the whole, Introversion and the difference between interior and exterior due to climate and confinement, lack of redundant beauty in function, the transcendence of function (Ibid)
Mahmoud Tavassoli	Simplicity and clarity, balanced, proportionate, the reciprocal composition of mass and space (Ibid)
Ali Akbar Saremi	Application of coatings (Ibid)
Hadi Mirmiran	Transparency (the constant movement from material quality to spiritual quality and thereby the reduction of matter and the increase of space), Magnificent humility through the horizontal elongation of the building, being happy due to a positive worldview (Ibid)
Mohammad Reza Haeri	Definition of space, whether single or multiple, by the degree of enclosure or confinement, or explicit realization of the floor, ceiling and wall, in the form of open, covered and closed spaces, Establishment of closed and covered space groups and walls around the open space by connection, expansion, hierarchy, sequence, interference, continuity, fluidity, and floating of space, Multi-valued spaces, the interaction between structure and spatial organization; Architectural response to nature and climate, Space follows the human movements and behaviors; light, landscape, and orientation (Ibid)
Hossein Soltanzadeh	Inventing space component models such as porches and domes, Inventing the *Chahar-Ivan* (four-porch) plan as an evolution of the use of porches and domes, Inventing and evolving *Chahar-Taqi* (four-arch), *Chahar- Soffa* (four-vault), *Hasht Behesht* (eight paradises) patterns, invention of ornaments with brickwork, tiling, plastering, karbandi, and muqarnas (Ibid)
Abdolhamid Noqhrehkar	Centralism, spatial orientation, symmetry in centralist architecture, spatial classification, organization of movement within space, the fluidity of space (Noghrehkar, 2008: 604-612)
Kambiz Haji-Qassemi and Kambiz Navai	Inward orientation, the connection between inside and outside, purity and perfection of forms, Central organization, emphasis on the axis and direction, symmetry, repetition, the geometry of Karbandis, the hidden geometry of Islamic buildings, the materials of traditional Iranian architecture, Geometric and plant motifs, color in Islamic architecture, presence of calligraphy in Islamic architecture, design of open spaces (Navai & Haji Qassemi, 2011)

3.3. Modern, Modernity, and Modernism

Modern originates from Middle French moderne, from Late Latin modernus, equivalent to Latin mod(o), mod(ō), “lately, just now.” (Dictionary,2020) The word “modern” dates back to the Romans. According to him, the word “modern” meant “new,” while its opposite, “old,” meant “what belongs to the past.” The word Modernus was coined by the Romans in the sixth century AD from Modo, meaning “recently.” The word “modernity” was also coined by Charles Baudelaire in

1863 in an article about Constantin Guys entitled “The painter of modern life” (Jahanbegloo, 1995: 49 and 50). Zygmunt Bauman described modernity as an age known primarily for its constant evolution - but an age aware of this distinctive feature, an age that sees legal forms, material and spiritual creation, its knowledge and beliefs as fluid, transient, variable currents. Unstable and irrational, currents must be believed and applied only “until further notice,” which will eventually lose their value and credibility and be replaced by new and better currents (Bauman, 2013: 27). Anthony Giddens emphasizes that "opposition to tradition is inherent to the concept of modernity" (Giddens, 1998: 24).

Modernism is A style and movement in art, architecture, and literature were popular in the early 20th century in which modern ideas, methods, and materials were used rather than traditional ones (Oxford Dictionary online). In his article “An Introduction to the Definition of Modernism,” Tony Pinkney describes the initiation of modernism in cultural history as a very diverse and extensive set of aesthetic discontinuities in the tradition of European realism, specifically from the mid-nineteenth century (Pinkney, 2013: 49-50).

3.4. Modern Architecture and its Criteria

Modern architecture is based on innovation, time-dependent, and pattern-breaking. Philosophically, it is a function of the thought and philosophy of modernity, benefiting from advanced techniques and materials, and constantly evolving. By relying on new technologies, this architecture does not consider itself required to adapt to the conditions and application of environmental resources and can be established in different environmental conditions. Modern architecture in the West is presented as an original phenomenon and in other areas as an imported and alternative one (Hojjat, 2014: 104 - 105). According to Peter Collins, modern architecture was born with a change in the definition of architectural beauty (Collins, 1996: 13). According to Ernest Burden, modern architecture is the architecture of breaking previous forms and frameworks. Refusal of the past as a source of inspiration for works of art and the use of technology in a sincere manner is one of the topics of interest to modern architects. According to him, using industry with an aesthetic approach and expanding its facilities, functionalism, machine aesthetics, urban issues, production, and manufacturing, disposing of pure functional constraints, expanding formalist features, and dealing with symbolic analogies are considered current architectural topics (Burden, 2002: 210).

In defining the criteria for modern architecture, Bruno Zevi considers the language of modern architecture to include a list of functions, asymmetry, anti-perspective, box breaking, cantilever, membrane, and sheath structure, space in time, and building in the city (Kamel Nia, 2014: 83)., Kate Nesbitt addresses formalism and functionalist thinking (i.e., the form is a function of performance), “radically breaking away” from history, “honest” expression of materials and structure (Nesbitt, 2015: 21). Table 2 lists the criteria for modern architecture and the causes of their emergence.

Table 2 Criteria for modern architecture, Source: (Yaran and Mehranfar, 2015: 176)

Criteria for modern western architecture	Causes of emergence
Extraversion	The desire for honesty in architecture, nudity, the use of glass, the relationship between inside and outside
Communication with nature	The relationship between inside and outside in architecture, organic thinking, use of glass
Transparency	The relationship between inside and outside in architecture, the fluidity of space, use of glass
Lack of ornaments	The futility and worthlessness of ornaments, new criteria for aesthetics, functionalism
Statue like building	Emphasizing volume instead of mass, use of basic Platonic solids, aesthetics of the structure
Lightness	Refinement and lightening thinking, spatial transparency, application of glass, removal of ornaments, pilot space
Element-like components	Stairs as a beautiful element, structural and functional aesthetics of components and architecture
Brutalism	Aesthetics of natural materials and the removal of ornaments
Free plan	Freeing walls from the structure by new structural technology
Honesty	Lack of ornaments, extraversion, nudity, structural and functional aesthetics
Simplicity	Lack of ornaments, functionalism, minimalist thinking
Functionalism	Thinking derived from the Industrial Revolution, the devaluation of luxury

4. Methodology

The study is developmental-applied research performed using a combined nest-to-nest method. The nest-to-nest research method (qualitative in quantitative type) was used to answer the research questions.

4.1. Qualitative Step

The qualitative part is done using grounded theory and open/axial coding. This step initially included a documentary review of the research topic, extraction of various variables, and the development of a series of questions for interviewing experts based on the definitions and interpretations of tradition and modernism. The results of interviews with experts were imported into ATLAS.ti in the form of text and live open coding. This was followed by axial coding to refine and align the code.

Axial coding was performed according to the paradigmatic model; thus, the subcategories were related to the main classification according to the paradigmatic model. The main purpose of this work was to enable the researcher to think about data and relate it systematically. This process, communication in axial coding, is based on the expansion of categories. The approach used here is to extract and axially segregate data based on the contrast between tradition and modernism. Grounded theory-based coding processes achieve the following: constructing main categories based on subcategories and linking them; This means that the primary codes become secondary codes due

to their high number. Several secondary codes become a concept code. Then, the relationship between them is classified and explained.

4.2. Qualitative Sampling

Qualitative sampling was used to select university buildings. Among Iranian universities, 11 were selected using the Delphi method. First, 20 experts who had a good command of the subject and Iranian universities were selected using snowball sampling. They were asked to rate all Iranian universities in terms of the degree to which they benefit from the criteria for tradition and modernism from 1 to 10. Then, universities with an average score above 5 were selected and referred back to specialists for approval. The same process applies to the selection of faculties of selected universities. From 11 selected universities, 45 faculties were selected for review. Fifty experts were then interviewed (Table 3). Experts were interviewed to reach theoretical saturation. A pattern of repetition was observed in the information received from the 39th interview onwards. "Data were collected and analyzed after the first interview as per the principles of grounded theory." (Rose, 2007: 184).

Table 3 Frequency distribution for the specialty status of the interviewees

Interviewees	No. of books	No. of articles	No.	Frequency
Professors of architecture	14	43	19	38
Professors of landscape architecture	11	45	12	24
Professors of urban design	12	47	12	24
Professors of urban planning	6	11	7	14
Total	43	146	50	100

Table 4 lists the selected universities and the scores for each and a list of selected faculties from 11 selected universities. Table 5 illustrates a series of images from each of these faculties.

Table 4 Selected universities and Faculties

Selected university	Score	Selected faculties
Imam Sadiq University	9.2	Imam Sadiq University
University of Tehran	9.1	Faculty of Medicine, Faculty of Law and Political Science, Faculty of Engineering, Faculty of Science, Faculty of Fine Arts, Faculty of Administrative Sciences and Business Management, Faculty of Theology.
Iran University of Science and Technology	8.3	Faculty of Physics (No. 2), Faculty of Electrical Engineering, Faculty of Computer Engineering (Faculty of Advanced Technologies), Faculty of Architecture (Faculty of Industrial Design), Faculty of Architecture, Civil Engineering and Mechanics, Faculty of Metallurgy and Materials Engineering, Chemical, Petroleum and Gas Engineering, Institute of Applied Physics.
Trabiat Modares University	8.4	Faculty of Humanities, Management, and Economics, Faculty of Art.
Shahid Beheshti University	8.8	Faculty of Architecture and Urban Planning, Faculty of Literature and Humanities, Faculty of Economics and Political Science, Faculty of

		Law, Faculty of Earth Sciences, Faculty of Biological Sciences, Faculty of Electrical and Computer Engineering, Faculty of Mathematical Sciences.
Sharif University of Technology	7.6	Ibn Sina Building, Faculty of Electrical Engineering **A**[†], Faculty of Industrial Engineering and Mathematical Sciences, Faculty of Mechanical Engineering **A**, Faculty of Chemistry **A**, Faculty of Metallurgical Engineering, Faculty of Chemical and Petroleum Engineering.
Bu Ali Sina University	6.4	Faculty of Basic Sciences
Yazd Shahid Sadoughi University of Medical Sciences	8.9	Faculty of Pharmacy
Shahid Bahonar University of Kerman	6.1	Faculty of Science (Blocks E, G, F)[‡], Faculty of Engineering (Block I), Large Classroom Block (Block J), Faculty of Humanities Literature (Block D).
Yazd University	6.1	Faculty of Engineering No. 3 and 4, Academic of Sciences.
Shahid Chamran University of Ahvaz	7.5	Faculty of Agriculture, Faculty of Science, and Faculty of Physical Education and Sport Sciences

Table 5 Images of selected faculties from 11 selected universities, source: Authors

[†]According to the information received from the archive of Sharif University of Technology construction and facilities management, A denotes a primary building constructed for these faculties. Over the last few years, some new buildings have been added to the complex of these faculties at the university site.

[‡] Block classification in accordance with the Master Plan, prepared by Pirraz consulting engineers, available at www.pirraz.com.

Selected Faculties of Tehran University

Selected Faculties of Shahid Beheshti University

Selected Faculties of Tehran University

Selected Faculties of Shahid Beheshti University

Selected Faculties of Sharif University of Technology

Selected Faculties of Sharif University of Technology

Imam Sadiq University

Iran University of Science and Technology Selected Faculties of

Bu Ali Sina University

Selected Faculties of Trabiat Modares University

Yazd Shahid Sadoughi University of Medical Sciences

Selected Faculties of Shahid Bahonar University of Kerman

Selected Faculties of Shahid Chamran University of Ahvaz

Selected Faculties of Yazd university

4.3. Quantitative Step: Fuzzy Delphi Method

Fuzzy logic is a conventional mathematical theory for expressing the complexity of nonstructural problems. A fuzzy set is a function that can represent the possible numerical value of a set in the range [0, 1] as a degree of membership. In general, the process of evaluating fuzzy inference consists of three stages: 1) fuzzification, 2) inference, and 3) defuzzification (Amini Faskhoudi, 2005, 52). The purpose of this study is to provide access to the most secure group agreement of experts on a particular topic. This is often done using a questionnaire and expert opinion polls according to the feedback received. This method involves a thorough examination of experts' opinions with three main criteria, namely, impartial answers to questions, receiving their feedback, and statistical analysis.

Regarding the answers to the questions, the experts' mental data are transformed into almost objective data using statistical analysis in the Delphi method. This approach led to consensus-based decision-making. The Delphi method has been used in various forecasting, decision making, and screening, including technology foresight, service analysis, factor screening, and more. Subjects in the world around us cannot be divided into two or more categories, white or black; Instead, each topic should be included in a range. Using crisp numbers to solve problems such as prediction and categorization will lead to unrealistic results. Applying this method to decision-making and consensus on issues with almost unclear goals and parameters has yielded valuable results. According to this method, thinkers present their theories in the least possible, the most probable value, and the most effective (triangular fuzzification) (Ibid, 39-45).

1. Fuzzification

Designing a fuzzy system requires selecting membership functions for linguistic variables. The importance of the work was defined based on linguistic values (very low: VL, low: L, medium: M, high: H, and very high: VH) (Shahbazi et al., 2019: 154). In screening the criteria for tradition and modernism in academic buildings, items in the low and very low categories will be excluded from the list of effective criteria in tradition and modernism.

Table 6 Membership functions of the criterion and the importance of the work to achieve the degree of membership

Membership function	Type
$\mu_{VL} = \begin{cases} 1 & 0 \le x \le 0.2 \\ -6.25x + 2.25 & 0.2 < x < 0.36 \end{cases}$	VL
$\mu_{L} = \begin{cases} 6.25x - 1.25 & 0.2 \le x \le 0.36 \\ -6.25x + 2.25 & 0.36 < x < 0.52 \end{cases}$	L
$\mu_{M} = \begin{cases} 6.25x - 2.25 & 0.36 \le x \le 0.52 \\ -6.25x + 4.25 & 0.52 < x < 0.68 \end{cases}$	M
$\mu_{H} = \begin{cases} 6.25x - 3.25 & 0.52 \le x \le 0.68 \\ -6.25x + 5.25 & 0.68 < x < 0.84 \end{cases}$	H
$\mu_{VH} = \begin{cases} 6.25x - 4.25 & 0.68 \le x \le 0.84 \\ 1 & 0.84 < x < 1 \end{cases}$	VH

2. Inference

The most important part of the fuzzy inference method is to build a legal base. The purpose of writing these rules is to define various propositions, obtained by combining different states defined for each criterion (i.e., base and complement) (Amini Faskhoudi, 2005: 47; Shahbazi et al., 2019: 154; Shakibaie, 2009: 163).

3. Defuzzification

Defuzzification is a unit that acts as a function of a fuzzy set to a crisp value. In this study, the area under the curve (AUC) in the final fuzzy sets was obtained as the final crisp value (Amini Faskhoudi, 2005: 56; Shahbazi et al., 2019: 154). The crisp output value can be calculated using the following equation, where y, $\mu(y)$, and $\bar{Y}$ are the output value, the output membership degree y, and the actual output value, respectively.

$$\bar{Y} = \frac{\int y\mu(y)dy}{\mu(y)dy}$$

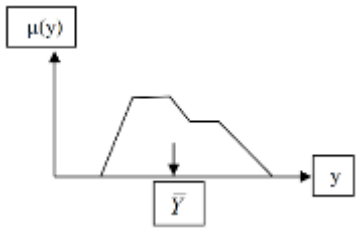

Fig 1 Center of gravity defuzzification method (Source: Monem et al., 2007: 34)

Fig 2 shows the general research process.

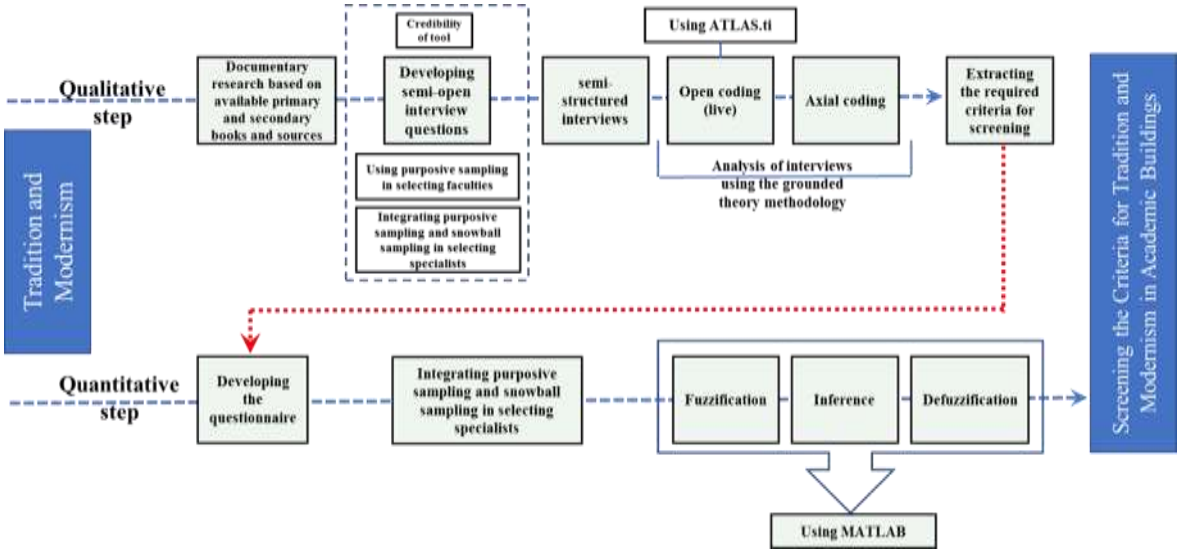

Fig 2 General research process

5. Results

5.1. Qualitative Results

In the qualitative section, the extracted codes were categorized, and the prominence of each code was determined according to repetition, according to Table 7. Also, the codes were categorized, refined, and in some cases, deleted. Nineteen codes were removed because they did not comply with theoretical foundations. The categorized codes were based on the interpretation, description, and conformity with the concepts found in the theoretical literature of traditional and modern

architecture. As a result, the greatest prominence in the use of traditional criteria is related to the "using details and brick ornaments" (prominence: 33), followed by "using bricks as the predominant wall materials" (prominence: 31). However, in modern criteria, the greatest prominence is related to "playing with simple volumes" (prominence: 29), followed by "the connection between inside and outside using wide transparent surfaces" (prominence: 20). Also, the lowest prominence in traditional architecture is related to "axial segregation", "scaling", "segregation of spatial realms and spatial regulation" (prominence: 1). In modern criteria, the lowest protrusions are related to "statue like building", "element-like architectural components", "brutalism", "protruded volumes" (protrusion: 1), followed by and "integrated space syntax" (protrusion: 2).

Table 7 Summary of codes extracted from interviews with thinkers, source: authors

Code name	Prominence	Code type	Extracted code
Predominant materials of bricks - using bricks - using bricks on a large scale, etc.	31	Traditional	**Using bricks as the predominant wall materials**
Combined simple volumes - contracted and protruded volumes - pre- and post-tensioned volumes, etc.	29	Modern	**Playing with simple volumes**
Using Fakhr-Ö-Madin - using perforated bricks, etc.	33	Traditional	**Using details and brick ornaments**
Curved terraces - curved form without hip - curved shape, etc.	3	Traditional	**Using traditional forms and shapes**
Shapes E and U in the combination of a volume - shape L - shape U, plan, etc.	8	Traditional	**Using traditional and climatic architectural forms in the building scheme**
Using pure volumes - pure volumes without ornaments, etc.	7	Modern	**Purity of volumes**
Market pattern - Traditional school pattern - Past architectural patterns, etc.	22	Traditional	**Using traditional architectural patterns**
Horizontal windows - glass awning windows - horizontal windows, etc.	20	Modern	**The connection between inside and outside using wide transparent surfaces**
Vertical windows - all-round windows between floors, etc.	8	Traditional	**Play shapes with visual connecting elements**
Windows with traditional and identical shapes, etc.	6	Traditional	**Using similar patterns in the windows**
11 - Windows a little deep - clear retreat of windows, etc.	6	Modern	**Play shapes with the placement form of windows**
East-west axis extension - axial extension parallel to the axis, etc.	6	Traditional	**Positioning in the direction of the climatic axis**
Possibility of direct light for everyone, etc.	4	Traditional	**Using maximum natural light in the building**
Importance of open space - Attention to landscaping - Creating a middle open space - Main yard, etc.	11	Modern, traditional	**Association of open and closed spaces**
Importance of semi-open space - porches and the like - transverse porches, etc.	20	Traditional	**Using the physical elements of traditional architecture**
Diversification of views (facades) - visual diversity and dynamics of views, etc.	2	Traditional	**Diversity of visual facade shapes**
Creating a cozy and secluded atmosphere	1	Modern and traditional	**The emergence of spatial seclusion in the building**
Creating rectangles with proportions - rectangular buildings, etc.	15	Modern	**Using rectangular volumes**
Constructing a statue like building	1	Modern	**Statue like building**
Fountain - fountain and vegetation in the central courtyard, etc.	7	Traditional	**Yard arrangement using natural elements**
Mainly concrete cover - concrete horizontal lines of cement facade - cement facade with stone platform	4	Modern	**Using new materials and technological achievements**
Dimensions and sizes of spaces in proportion to function - Form follows function - emphasizes functionalism, etc.	16	Modern	**Form follows function**
Light and shadow play - light and shadow play - creating light and shadow, etc.	5	Modern	**Light and shadow play**
Internal regulation - regulation of the main elements around a center, etc.	13	Traditional	**Central regulation**
Centralized organization -- Attention to centralism and introversion - introversion - introvert volume	4	Traditional	**Introversion**
Extroverted - Extroverted building - Completely extroverted building - Completely extroverted, etc.	7	Modern	**Extroverted**
Linear organization - Linear spatial organization - Linear internal spatial organization, etc.	9	Modern	**Linear plan relations**
Organizing a plan similar to traditional schools - organizing volumes around the central space, etc.	4	Traditional	**Central organization**
Radial organization - organizing spaces as clusters	3	Modern	**Modern organization**
Symmetry - building with symmetry (symmetrical building) - building with axial symmetry - building with symmetry, etc.	20	Traditional	**Symmetry and axial segregation**
Unadorned building - unadorned facade, etc.	16	Modern	**Avoiding ornaments and excessive simplicity**
Building without symmetry - asymmetry - asymmetry of the facade, etc.	7	Modern	**Non-adherence to classical geometry**
Two- and three-story blocks - Three-story buildings - Two-story buildings, etc.	9	Traditional	**Elongation**
Solid volumetric building - masonry volumes – solid and lightweight walls, etc.	5	Traditional	**Hardness of the volumes used**
Applying special details - Apply new and accurate implementation (executive) details, etc.	4	Modern and traditional	**Paying attention to implementation details**
Suspension corridors - communication with bridges indoors, etc.	3	Modern	**Lightweights in internal spaces**
The dominance of rectangular and square shapes, etc.	8	Modern	**Using pure forms and shapes**

Plan free from structural constraints – liberating architecture from structural constraints - free plan	3	Modern	**Free plan**
Modern stairs	1	Modern	**Element-like architectural components**
The continuity of spaces - Continuity and extent (breadth) of movement in space	2	Modern	**Integrated space syntax**
Louver - good shading - high horizontal canopy at the entrance, etc.	8	Traditional	**Emphasizing climate in building form**
Emphasizing horizontal lines - Emphasizing horizontal lines - Emphasizing horizontal facade lines, etc.	5	Modern and traditional	**Emphasizing horizontal lines**
Emphasizing vertical lines - Emphasizing vertical proportions, vertical protrusion, etc.	18	Modern	**Emphasizing building height**
Emphasizing horizontal and vertical lines - Emphasizing horizontal and vertical elements, etc.	6	Modern and traditional	**Emphasizing vertical and horizontal lines simultaneously**
Emphasizing edges and corners - rounding the volumetric corners of the building	2	Modern and traditional	**Cornering building**
Combination of bricks and structural elements	1	Modern and traditional	**Synchronized brick and structural technology**
Using repetition - similarity and repetition of elements - repetition in walls, etc.	13	Modern and traditional	**Using the visual emphasis principles**
Visual diversity of building bodies - specific form diversity, etc.	6	Traditional	**Diversity of visual elements used**
Vertical exposed beams - vertical brick columns	4	Modern	**The honest expression of materials and structures in the facade**
Exterior spaces with exposed and unpolished concrete	1	Modern	**Brutalism**
Hierarchical - hierarchical – access hierarchy, etc.	5	Traditional	**Spatial hierarchy**
Upper suspension corridor, visual connection between floors, presence of void	3	Modern	**Visual communication between floors in internal spaces**
Free plan structure - geometric and modular structure of plans, etc.	4	Modern	**The modular structure of plans**
Concrete structure - building structure, concrete skeleton - vertical columns, etc.	12	Modern	**Adherence to new technologies in building structures**
Load-bearing wall structure - masonry structure	2	Traditional	**Traditional technology**
Indicating the entrance - the entrance of the building from the middle of the building, etc.	7	Traditional	**Spatial joint entry**
Pilot, pilot, etc.	3	Modern	**Pilot and liberating the building from the ground**
Full and empty spaces - full and empty spaces and volumes, etc.	3	Modern	**Segregation of spatial realms**
Strong axes of motion	1	Traditional	**Axial segregation**
Ejection console	1	Modern	**Protruded volumes**
Rigid, semi-transparent and transparent concepts, diversification of spaces	3	Traditional	**Confinement hierarchy**
Human Scale	1	Traditional	**Scaling**
Spatial elements in a regular structure	1	Traditional	**Segregation of spatial realms and spatial regulation**
Classical building geometry, using proportions, orthogonal geometry of the building, etc.	5	Modern and traditional	**Using geometric proportions**

Some of the extracted criteria belong to both traditional and modern. These criteria are referred to as “concurrency” criteria in this study. The majority of criteria are related to “using the visual emphasis principles” (prominence: 13). The least number of criteria are related to “synchronized brick and structural technology” and “the emergence of spatial seclusion in the building” (prominence: 1). Fig 3 and 4 show the axial coding results separately for traditional and modern. Twenty-eight axial codes were extracted for modern criteria, of which nine criteria can be used for both. Twenty-seven codes were also extracted for traditional criteria. This was followed by compiling a questionnaire based on the extracted codes that were provided to space users. The results extracted in the quantitative step are as follows.

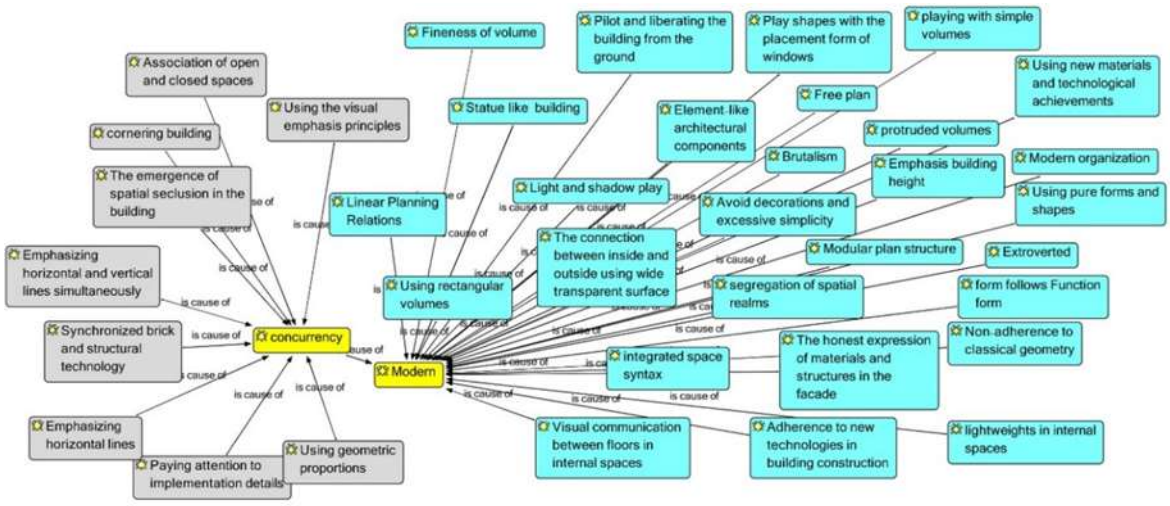

Fig 3 Modern criteria extracted from axial coding in ATLAS.ti

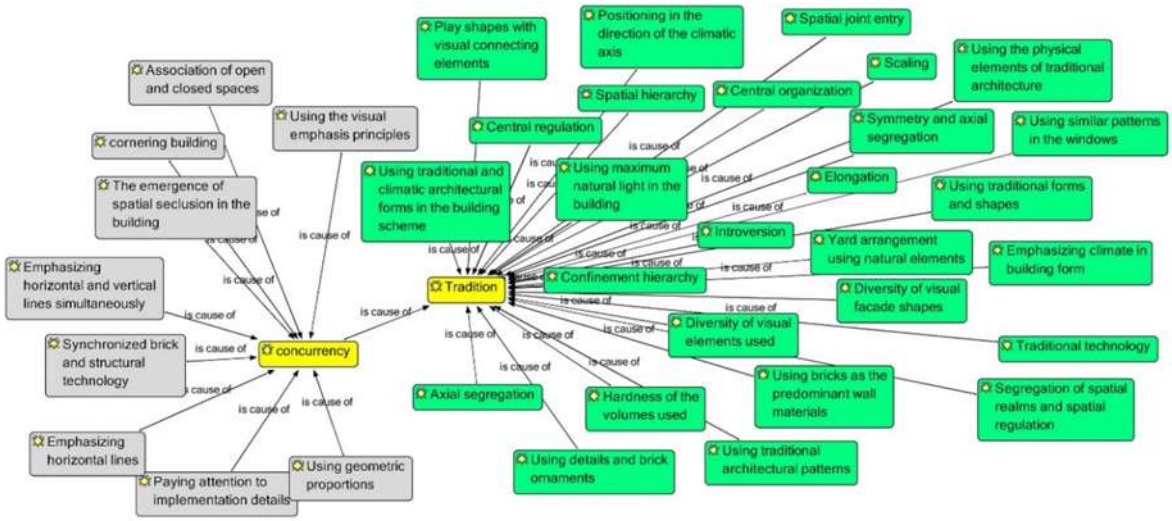

Fig 4 Traditional criteria extracted from axial coding in ATLAS.ti

5.2. Quantitative Results

In this study, the degree of importance of the components of tradition and modernism was calculated using Matlab and classified according to the degree of membership (Table 8). Fig 5 shows the findings of the above method.

The Table 8 shows the degree of importance of the effect of each language variable. To evaluate the fuzzy model, the criteria for tradition and modernism and the criteria whose quality was determined by experts were calculated based on the quality criterion using the software. It was used as the output of the fuzzy model. In fuzzy logic, an effect belongs to two membership functions with different membership degrees. Finally, the importance of the effect of the language variable is

determined by the maximum degree of membership. As the variable x increases, the value of the effect also changes and increases from “very low (language variable too low)” to “very high” as shown in the table below. This means that as we increase x, the value of the language variable in each class increases. This can be seen as a class at the output of the matrix. For example, if x = 0.53, x belongs to the middle class. If x=0.67, x still belongs to the middle class despite a large numerical increase. Fuzzy logic This problem can be solved using the fuzzy Delphi method, with its output meaningful based on the degree of membership. For example, if the output of fuzzy logic is $\hat{Y}$ = 0.67, then fuzzy logic sets a membership degree for the two membership functions and reduces uncertainty.

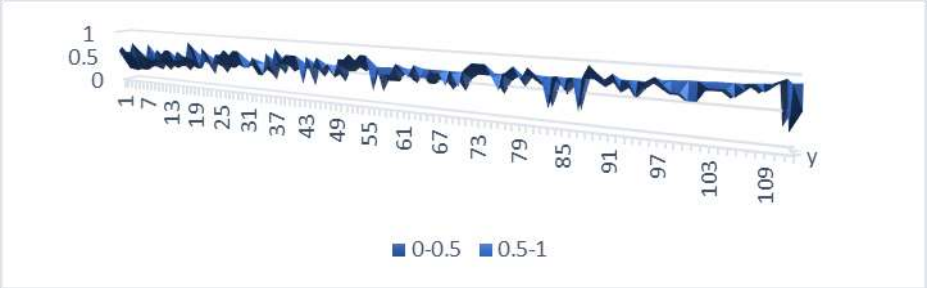

Fig 5 Classification of the degree of importance of each language variable

According to the table below, there are 64 criteria, consisting of 28 modern criteria, 27 traditional criteria, and 9 concurrency criteria. Regarding modern criteria, “using rectangular volumes”, “element-like architectural components”, “integrated space syntax”, “linear plan relations”, “play shapes with the placement form of windows”, “brutalism”, with values of 0.47, 0.44, 0.44, 0.31, 0.39, and 0.46, respectively, belong to the ranks of membership L. Also, “free Plan”, “segregation of spatial relms”, and “avoiding ornaments and excessive simplicity”, with values of 0.19, 0.21, and 0.25, respectively, belong to the VL membership grades. “The honest expression of materials and structures in the façade” and “playing with simple volumes”, with values of 0.89 and 0.88, respectively, belong to the VH and VH membership degrees, respectively. On the other hand, for traditional criteria, “play shapes with visual connecting elements”, “central regulation”, “confinement hierarchy”, and “yard arrangement using natural elements”, with values of 0.37, 0.51, 0.24, and 0.27, respectively., Belong to the membership grades L, L, VL, and VL, respectively. Also, “using the physical elements of traditional architecture”, “using maximum natural light in the building”, “introversion” and “segregation of spatial realms and spatial regulation” with values of 0.87, 0.88, 0.86, and 0.89, respectively, belong to the VH, VH, VH, and VH membership grades, respectively. On the other hand, in terms of concurrency criteria, “association of open and closed spaces”, “emphasizing horizontal lines” and “synchronized brick and structural technology” with values of 0.24, 0.21, and 0.51, respectively, belong to the VL membership grades., VL, and L, respectively.

Table 8 Degree of membership and final class of criteria in tradition and modernism

Fuzzy logic					
Criterion	**Degree of membership**	**Final class**	**Criterion**	**Degree of membership**	**Final class**
Light and shadow play	0.53	M	Play shapes with visual connecting elements	0.37	L
Adherence to new technologies in building	0.57	M	Positioning in the direction of the climatic	0.55	M

structures			axis		
Purity of volumes	0.76	M	Spatial hierarchy	0.53	M
Using rectangular volumes	0.47	L	Spatial joint entry	0.71	H
Visual communication between floors in internal spaces	0.61	M	Scaling	0.69	H
The honest expression of materials and structures in the façade	0.89	VH	Central organization	0.49	M
Element-like architectural components	0.44	L	Symmetry and axial segregation	0.68	M
Free plan	0.19	VL	Using the physical elements of traditional architecture	0.87	VH
Integrated space syntax	0.44	L	Using similar patterns in the windows	0.49	M
Statue like building	0.76	H	Elongation	0.79	H
Using pure forms and shapes	0.69	H	Using traditional forms and shapes	081	H
Modern organization	0.58	M	Central regulation	0.51	L
Protruded volumes	0.68	H	Using traditional and climatic architectural forms in the building scheme	0.60	M
Linear plan relations	0.31	L	Using maximum natural light in the building	0.88	VH
Non-adherence to classical geometry	0.55	M	Introversion	0.86	VH
Playing with simple volumes	0.88	VH	Confinement hierarchy	0.24	VL
Extroverted	0.85	H	Yard arrangement using natural elements	0.27	VL
lightweights in internal spaces	0.87	H	Emphasizing climate in building form	0.65	H
Play shapes with the placement form of windows	0.39	L	Diversity of visual façade shapes	0.62	H
Brutalism	0.46	L	Diversity of visual elements used	0.59	M
Segregation of spatial realms	0.21	VL	Traditional technology	0.74	H
Pilot and liberating the building from the ground	0.59	M	Hardness of the volumes used	0.84	H
The connection between inside and outside using wide transparent surfaces	0.59	M	Using bricks as the predominant wall materials	0.64	M
Using new materials and technological achievements	0.79	H	Axial segregation	0.74	H
The modular structure of plans	0.68	H	Using details and brick ornaments	0.78	H
Avoiding ornaments and excessive simplicity	0.25	VL	Segregation of spatial realms and spatial regulation	0.89	VH
Emphasizing building height	0.56	M	Using traditional architectural patterns	0.65	M
Form follows function	0.48	M	Using the visual emphasis principles	0.59	M
Cornering building	0.53	M	Emphasizing horizontal and vertical lines simultaneously	0.65	M
Using geometric proportions	0.68	M	Synchronized brick and structural technology	0.51	L
The emergence of spatial seclusion in the building	0.74	H	Emphasizing horizontal lines	0.21	VL
Association of open and closed spaces	0.24	VL	Paying attention to implementation details	0.65	M
Modern criteria			**traditional criteria**		**concurrency criteria**

Fig 6 provides an example of a surface observer of a fuzzy model considering the effect of 64 variables on different dimensions as input variables. This diagram shows how different input values affect the two output values (i.e., tradition and modernism). That is, a view can reflect the reaction. As shown in the diagram below, the hallmarks of tradition and modernism experience an almost irregular trend in the degree of quality recorded in the observer.

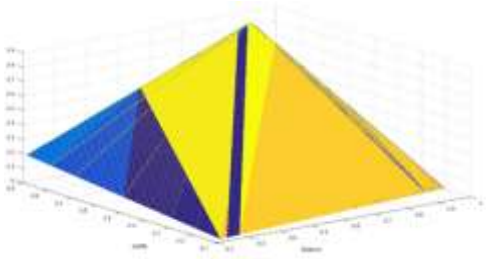

Fig 6 Criteria in the fields of tradition and modernism in Matlab

Due to the direct effect of the criteria for tradition, modernism, and concurrency on the mentioned academic buildings, a large distribution can be displayed based on the score (Fig 6). This was a field visit based on the researcher's survey, as shown in Fig 7, with a relative agreement with the results of numerical quantities of each output variable in Matlab.

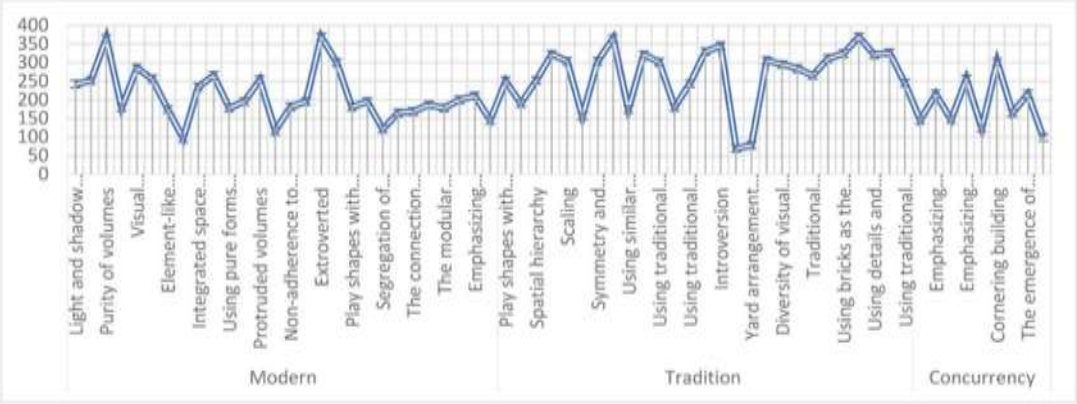

Fig 7 Distribution of variables of tradition, modernism, and concurrency

6. Conclusion

This study aimed to identify and explore the criteria for tradition and modernism in Iranian university buildings and screen and eliminate the least effective and ineffective criteria in the association of tradition and modernism in such buildings. In response to the first question, ATLAS.ti interviews and output were summarized, yielding 64 criteria. Of these 64 criteria extracted in selected academic buildings, 27 are related to tradition, 28 to modernism, and 9 to both (known as concurrency). In response to the second question, the possibility of removing the extracted criteria in the association of tradition and modernism, the results of the quantitative section showed that among the modern criteria, the excludable variables include the following (the authors explain the reasons for each):

"Using rectangular volumes": Due to the special viewing angle and distance of the spatial audience close to the faculty, most faculties may not be able to understand the volumes well.

"Element-like architectural components": Reasons to eliminate this factor include abstract design and construction elements, the inability of space users to fully understand, and the lack of connection with the historical period.

"Free plan": This design in space placement prevents the space audience from understanding space demarcation.

"Brutalism": Rough concrete facades and the integrity of these surfaces prevent the audience from paying attention to this building.

Among the criteria for tradition, the following can be excluded:

"Play shapes with visual connecting elements": Because the ornaments are placed on the window sills, and this part is empty, the space audience does not consider windows and their forms as part of the form and body of the building.

"Central regulation": Due to the vastness of spaces in faculties and scattered classrooms, this criterion can be understood only through architectural drawings.

"Confinement hierarchy": Due to the different spaces and the very low resolution of the order of spaces in the faculties, it can be considered one of the least influential criteria in the association of tradition by space audiences.

"Yard arrangement using natural elements": In universities, other courtyards are connected to open university spaces, except for the central courtyards, and their separation is incomprehensible.

Also, the following can be excluded from the concurrency criteria:

"Association of open and closed spaces": Due to the diverse order and juxtaposition of such spaces, space audiences are not understood. No connection may be found between such spaces and the tradition of modernism in faculties.

"Synchronized brick and structural technology": There is no clear connection between this criteria and the association of tradition and modernism by space audiences and no precise connection can be found between them.

References

Al Haroun, Y. (2019). Perceptions of the Courtyard in Kuwait: Between Tradition and Modernity. *Journal of Arabian Studies, 9*(2), 182-208, https://doi.org/10.1080/21534764.2019.1770422.

Amini Faskhoudi, A. (2005). The application of Fuzzy Logic inference in regional development and planning studies. *Knowledge and Development*, (17), 39-61.

Ashouri, D. (2013). We and Modernity. (5th ed.). Tehran: Serat Cultural Institute.

Basiti, Sh., Ameri, M., & Lashgari, O. L. (2018). The relation between tradition and modernism in formation of urban fabric with emphasis on cultural dimensions; case study: Birjand city. *Urban Management, 17*(51), 55-73.

Bauman, Z. (2013). *Modernity and Modernism: A Collection of Essays in Politics, Culture, and Social Theory*. (3d ed.) (H. Ali Nozari, Trans.). Tehran: Naghsh-e Jahan.

Behnam, J. (1994). Negahi be Shast Sal Nezam-e-Amouzeshi dar Iran [A Look at Sixty Years of the Educational System in Iran]. *Goftogu*, (5), 99-109.

Bemanian, M. R. (2006), Avamel-e-moaser bar sheklgiri-e-memari va shahrsazi dar dore-ie Pahlavi-e aval [Factors Influencing Architecture and Urban Development in the First Pahlavi Period], *Modares Honar*, *1*(1),1-8.

Burden, E. (2002). Burden Illustrated Dictionary of Architecture. (2ed.).

Collins, P. (1996). *The Transformation of Ideas in Modern Architecture* (H. Hassanpour, Trans.). Tehran: Qatreh Publishing.

Dries-Daffner, J. (1992). The many faces of tradition: Naxi courtyard compounds. *Traditional Dwellings and Settlements Review*, *4*(1), 25-25. Retrieved December 12, 2020, from http://www.jstor.org/stable/23565621.

Giddens, A. (1998). *Consequences of Modernity* (M. Salasi, Trans.). Tehran: Markaz Publishing.

Hashemi, S. R. (1995). Architecture and Culture. *Abadi Magazine, 5*(19), 2-3.

Hojjat, E. (2014). Tradition and Innovation in Architectural Education. (2d ed.). Tehran: University of Tehran Press.

Inna Zayats. (2015). The History of Mills in Russia in the Context of Architectural Traditions. *Procedia Engineering, 117*, 696-705.

Jahanbegloo, R. (1995). Modernity, from concept to reality. *Goftogu, 10*, 49-55.

Kamel Nia, H., & Mahdavi Nejad, M. J. (2014). *Explanation of Contemporary Architecture from East to West*, Introducing Principles, Meaning and Roots. Tehran: Elm-e-Memar.

Monem, M. J., Khorrami, J., & Heydarian, S. A. (2007). Performance Evaluation of Irrigation networks using Fuzzy Logic (Case Study: Maroon Network). *Journal of Modares Technical and Engineering, 27*, 31-42.

Naghizadeh, M. (2000). Identity of «Iranian Architecture» and «Modernism». *Honar-ha-ye-Ziba Journal*, (7), 79-91.

Nasr, S. H. (2001). *Knowledge and spirituality* (E. Rahmati, Trans.). Tehran: Islamic Culture Publishing Office.

Navai, K., & Haji Qassemi, K. (2011). *Khesht-o Khial: An Interpretation of Iranian Islamic Architecture*. Tehran: Soroush Press.

Nesbitt, K. (2015). *Postmodern Theories in Architecture* (M. R. Shirazi, Trans.). (7th ed.). Tehran: Ney Publishing.

Noghrehkar, A. H. (2008). *Introduction to Islamic Identity in Architecture and Urbanism*. Tehran: Payam Sima Design and Publishing Company.

Parsaee, M., Motealleh, P., & Parva, M. (2017). An investigation into the former consulate of Britain as one of the first samples of Modern architecture in Iran. *Hbrc journal, 13*(1), 61-71. https://doi.org/10.1016/j.hbrcj.2015.01.002.

Pinkney, T. (2013). *An Introduction to the Definition of Modernism: A Collection of Articles on Politics, Culture, and Social Theory*. (3d ed.) (H. Ali Nozari, Trans.). Tehran: Naghsh-e Jahan.

Pourahmad, A., Faraji Molayee, A., Manouchehri, A., & Azimi, A. (2012). The Effect of Modernism on the Space-Physical Development of Iranian-Islamic Cities (A Case Study of Tehran). *Journal of Studies on Iranian - Islamic City, 2*(6), 47-61.

Rashid, M., & RahatAra, D. (2015). Modernity in tradition: Reflection on building design and technology in the Asian vernacular. *Frontiers of Architectural Research*, (4), 46-55. https://doi.org/10.1016/j.foar.2014.11.001.

Rose, G. (2007). *Visual Methodologies (An Introduction to Researching with Visual Materials)*. SAGE Publications Ltd.

Sadeghi Pey, N. (2009). Reflection on Traditional Architecture. *Soffeh Journal,18*(48), 7-16.

Shahbazi, M., Yeganeh, M., & Bemanian, M. R. (2019). Screening of environmental vitality factors in open spaces of residential complexes in Tehran city using fuzzy technique. *Urban Management, 18*(54), 147-168.

Shakibaie, A. R. (2009). The Estimating of price elasticity for the supply of services in medical sector with fuzzy logic Naghi. *Journal of Development and Capital, 1*(2), 149-181. Doi: 10.22103/JDC.2008.1896.

Shils, E. (1981). *Tradition. London*: Faber and Faber.

Soltanzadeh, H. (2004). Reflection of Tradition in the Architecture of Contemporary Mosques (Case Study: Tehran). *Quarterly Journal of Architecture and Culture*, 6(20).

Xiaoxin, Zh., & Kelly, G. (2019). From 'neo-vernacular' to 'semi-vernacular': a case study of vernacular architecture representation and adaptation in rural Chinese village revitalization. *International Journal of Heritage Studies, 25*(11), 1128-1147, https://doi.org/10.1080/13527258.2019.1570544.

Yaran, A., & Mehranfar, A. (2016). Investigation the Relationship between the Attributes of Vernacular Residential Architecture of Gilan and the Attributes of Modern Architecture, *Armanshahr Architecture & Urban Development Journal, 8*(15), 169-179.

https://www.dictionary.com/

Oxford Dictionary online, 2020.

Merriam-Webster. 2020. online dictionary, https://www.merriam-webster.com/dictionary/tradition.