

Evaluating the Components Constituting Form and their Effects on Form Features to Achieve a Desirable Architectural Form; Case Study: Cultural Heritage Organization Building

Babak Alemi^{a*} - Morteza Majidi^b

^a Assistant Professor of Architecture, Faculty of Architecture and Art, Kashan University, Kashan, Iran (Corresponding Author).

^b M.A. of Architecture, Faculty of Architecture and Art, Kashan University, Kashan, Iran.

Received 09 February 2021; Revised 06 July 2021; Accepted 07 August 2021; Available Online 21 December 2022

ABSTRACT

Architecture is represented by forms. In architectural forms, factors affecting the apparent and semantic dimensions of forms are highly important. If desirable architecture aims to achieve a desirable form, the questions that arise are: "How is a desirable architectural form achieved?" and "What are the factors affecting the formation of a desirable form?". This study described the concept of form, explained its various features to extract factors that affect its formation, and determined and classified the effects of these factors. For this, this study used the descriptive-analytical method and studied library sources to investigate the concept of form and its various features and to emphasize an architectural form to collect and classify factors that affect its formation. To appropriately prioritize these factors, a questionnaire was given to experts and professionals to determine the effects of each of these factors on various components of the form. Findings were also analyzed by SPSS and AHP statistical methods. After the effects of factors were determined, their correlation and the significant relationship between them and various components were prioritized. To test the study hypotheses, the effect of various factors on the form of the Cultural Heritage Organization Building as a valuable building in contemporary Iranian architecture was measured. The results also confirmed the study findings. Results indicated that the significant factors affecting the formation of desirable architectural forms were attention to a historical environment, a natural environment, proportionate geometry, harmony between components, compliance with values, thoughts, and appropriate materials.

Keywords: Form, Various Features of Form, Desirable Architectural Form, Factors Affecting Form, Cultural Heritage Organization.

* E_mail: alemi@kashanu.ac.ir

1. INTRODUCTION

The concept of form is used differently in various bodies of human knowledge. This concept serves as a fundamental concept in art and architecture. Because this concept is widely used in general and specialized art domains, it is pivotal to deal with its concept and features. Architecture is a branch of art where form plays a key role and helps reveal an architectural space. Because human behaviors, activities, and incidents are formed in space, the formation of space is the goal of an architect. In architecture, form turns spaces into environments and gives structures to them (Tayefeh, Hojjat, and Ansari 2018, 79). An architectural form involves not only appearance but also the semantic features of a building; for this, it is critical to pay attention to various components in creating a form. As stated, form is one of the significant factors affecting architecture formation. Hence, to create a desirable architecture, it is required to create a desirable form. Various factors, including climate, function, design, etc., are involved in creating a form, which affects the various features of form. However, it is not clear which features of form are affected by these factors and how these factors affect those features. The main problems of the study are: "Which features of form are affected by the factors?", "What is the extent of the effect of these factors on various features?" and "What is the priority of using each of the factors in designing form on features considering the effects of the factors?". Therefore, this study first explains the concept of form and its various features, then elaborates on the factors that affect form formation by providing a context for using various factors in designing a desirable form. This issue is significant because the results can be promising for designing an architectural form.

2. STUDY METHOD

This study used the descriptive-analytical method and involved logical reasoning in deriving features that affect the formation of a desirable architectural form using the views of experts. Accordingly, various sources were studied to investigate the lexicology of form and to examine the views of experts and scholars about form, its features, and dimensions. Meanwhile, the study emphasized an architectural form to extract the components of this form and the factors that affected it. Then, to investigate the effects of each factor on the components of form, a questionnaire was given to 50 academic professors with a history of at least ten years in architecture. The findings were then analyzed by SPSS software to determine the effects of each factor. Using the AHP method and Expert Choice software, the coefficient of each factor (criteria) and components (options) and the prioritization of the components were calculated

based on sensitivity analysis. In the end, considering the significant relationship between various factors and components, desirable architectural form features were extracted and provided. In sum, to measure the study results, the form of a valuable building, whose equality was emphasized by experts, was measured by the factors that affected its formation.

3. RESEARCH LITERATURE

A literature review suggests that the concept of form involves a large domain of literature and art, the philosophy of art and architecture. Much research has been conducted on the factors affecting form formation.

In a study, Safdarian and Kosari-Haghighi provide form components and factors affecting it to measure Iranian architectural forms from the Qajar era to the modern times; here, they elaborate on the role of each factor in form formation in each era (Safdarian and Kosari-Haghighi 2017).

Motallebi uses the Ecological Psychology and Humanism perspectives and the content analysis of normative and empirical theories in architecture to investigate the relationship between form and function in architecture (Motallebi 2006).

Alami et al. also emphasize the key role of structure in form formation and introduce force as an influential factor in two aspects of architecture structure and form; they also analyze natural forms to examine the factor of force in materials and synthetic forms and to determine the effects of structural concepts on the form design process (Alami, Pourdeihimi, and Mashayekh-Faridni 2015).

In a study, Silvaye et al. use a questionnaire and the SPSS method to investigate the factors affecting the form of local architecture in a cold mountainous climate, concluding that beliefs, welfare factors, the geography of locality, and the physical principles of construction affect form formation (Silvaye and Asefi 2019).

Each study in the literature has focused on some parts of the features and factors affecting the architectural form. However, none of these concerned the effects of the factors affecting the various features of form and the extent of these effects. This study is now aimed to introduce a desirable architectural form. It also uses various form features and effective factors to investigate their effects.

4. STUDY QUESTIONS

- A) What are the components constituting an architectural form?
- B) What are the factors affecting these components?
- C) What is the priority of the factors that affect a desirable architectural form?

5. CONCEPT OF FORM

The word form has different meanings in different sciences. The form is derived from *Forme* in French and *Forma* in Latin (Turner 2003, 312). In Oxford, form denotes a “manner or method” (Weiner, Simpson, and Profitt 1993, 196). In Webster, form denotes 1. a specific figure of anything, 2. body and configuration of a character or animal, and 3. philosophy and nature proportionate to an inherent character that distinguishes it from others, etc. (Neufeldt and Guralnik 1994, 548). The Persian *Dehkhoda Dictionary* defines form as appearance, figure, format, and sample (Dehkhoda 1952). The *Moein Dictionary* defines form as status, body, and structure (Moein 1992). Its semantic aspects are first

investigated to understand the meaning of form better, and then its architectural form is concerned.

5.1. The Meaning and Philosophy of Form

In each era, form results from the philosophy prevailing over that era. For this, many theorists have produced different definitions of form that can be classified into three semantic, material, and material-semantic groups (Table 1). According to Table 1, form is not simply directed at a material or semantic dimension; instead, it is a system combining the structural relations of a phenomenon that underlies its perceivable character and identity. Form, to scholars, involves subjective features which distinguish it from matter and content.

Table 1. Meaning and Philosophy of Form

Approaches	Theorists	Theories	Sources
Meaning	Plato	All creatures follow real forms which take on meanings in the world of meaning. Form is against matter and is a constant, unrepeatable, reliable, and definable principle. It involves two internal and external features.	(Zafarmand 2002, 17)
	Seyyed Hossein Nasr	To understand the meaning of traditional art, its form meaning should be understood. A form as meaning the truth of an object is already lost. For this, it is necessary to pay attention to the semantic dimension of form.	(Nasr 2010, 216)
	Louis Kahn	Form denotes the meaning of existence, and the real form of everything refers to its nature before its material reality.	(Taghvaei 2010, 80)
Material and Semantic	Aristotle	Each object is made of matter and form, which are complementary. The existence of each phenomenon is a result of four ultimate, agency, nominal, and material causes.	(Safdarian and KOsari-Haghighi 2017, 11)
	Tatarkiewicz	Form has five different meanings: 1) the order of the components of a beautiful object or a work of art, 2) what directly turns into senses, 3) the margins and sidelines of an object, 4) the conceptual substance of an object, and 5) the engagement of mind in the observed object	(Tatarkiewicz 2002, 81).
Material	Kant	A work of art is a rite by itself, and its form denotes the aesthetic aspects of the work. The only way to understand the aesthetics of a phenomenon is through its form, not its senses or concepts	(Zamiran 2006, 38)
	Wucius Wong	Form refers to whatever figure, size, color, or texture is seen, occupies a space, shows a direction, and specifies a locality. Form is an independent, positive, and discernible form of background.	(Wong 2019, 140).

5.2. Form in Architecture

In architecture, the artist’s goal is to create space (Zevi 1957). Space is a quality that is perceived by man under the influence of structure, as the image of a concrete space lies within the mirror of man’s heart and mind (Hojjat 1998, 19). Form turns these spaces into environments and gives them structure. The common effect of structure and space are summarized in the sense of place, a pervasive perception of the appearance and heart of structure and space. For this, space is a main factor in the appearance, structure, abstract, and esoteric sections (Ardalan 1986, 11).

Thus, scholars have provided different definitions of form and space in architecture. These definitions are characterized by a reciprocating relationship between three elements of architecture, form, and space, which helps integrate them. Meanwhile, classifications provided by these theorists are also affected by this relationship, as no definite classification can be provided for the relationship between form and space. According to some perspectives, it is space that defines form, and in others, it is form that defines space, giving it a dependent identity (Omaraei 2014, 31).

Form creates space) Alexander Castello: Space is

Alemi, B. et al.

made of forms arranged along each other and based on a relationship between them¹ (Hannah 2002) . Space creates form) The first components constituting architecture are land and site; thus, the design process starts from analyzing the site² (Baker 2007) . Integration of form and space) Each evokes the other. To properly analyze architectural form and investigate its features, there must be a proper understanding of the components and factors affecting its formation; thus, the present study deals with these issues in the following.

6. ARCHITECTURAL FORM COMPONENTS

Concerning form components. Scholars such as Arnheim, Adontis, and Grutter, among others, have provided perspectives. According to these theories and based on two material and semantic dimensions of forms, form components can be divided into concrete and non-concrete sections. The concrete section that affects the user's status and maintains the visual taste includes the apparent form and color, whereas the non-concrete section includes cultural-social factors and meanings. Table 2 below gives a summary of scholars' views on this connection.

Table 2. Concrete and Non-Concrete Components of Architectural Form

Concrete Components		
Components	Description	Sources
Figure	Figure refers to a visual affair and a visible totality represented by two-dimensional lines; it separates form from the background. It also helps establish a visual relationship between the user and the surrounding environment, which is the first order of the user's perception of form.	(Flamaki 2011, 55)
Scale Appropriateness	Scale appropriateness refers to the form of a proportion and the interrelationship of components that create various feelings in the user. Scale is critical from two aspects: the form's size relative to the user, and the form's size relative to the background	(Pakzad and Bozorg 2017; Bani Massoud 2014)
Color	Color is a quality of form that helps perceive its vision and semantics. Meanings include arbitrary, cultural, and semiotic senses, affecting user feelings.	(Safdarian and Kosari-Haighi 2016, 33)
Texture	Texture is an inherent characteristic of materials experienced or perceived by the senses of touch and vision. Texture includes roughness, softness, pores, cracks of materials, etc.	(Shams Dolatabadi et al. 2018)
Place	It has two meanings: 1. the geographical situation or physical dimensions of place and 2. a container for meaning transfer, which involves a spectrum of social-psychological processes.	(Heydari, Motallebi, and Taji 2013, 76; Stedman 2002, 565)
Direction	Direction shows the location of form relative to environmental factors. It involves climate, balance, adjacency, vision and landscape, ground slope, and religion.	(Heydari Delgarm 2017, 150)
Visual Balance	Visual balance refers to the pleasant and coordinated arrangement or proportions of parts and elements in each design or combination.	(De Ching 1943, 411)
Non-Concrete Components		
Components	Description	Sources
Identity and Meaning	Identity and meaning are products of interaction and actions between a user and an architectural work. They are also classified into four levels primary and formative, applied, symbolic, and sentimental meaning layers.	(Flamaki 2011, 55)
Content	Themes and goals are parts of the form and help reveal values and conventional bodies of knowledge.	(Pakzad and Bozorg 2017; Bani Massoud 2014)
Cultural Components	Cultural components give identity to things and distinguish them from others. They include a set of customs, thoughts, beliefs, and values of a society.	(Safdarian and Kosari-Haighi 2016, 33)
Social Components	Social components are the necessities of human societies aimed at creating interactions between humans to have a better life. These components have two structural and applied aspects.	(Shams Dolatabadi et al. 2018)

7. FACTORS AFFECTING FORM FORMATION

A building form is always influenced by several factors imposed by the environment, society, users,

and employers, among others. These factors should be studied, and their effects on the various features of the form should be determined and classified to achieve a desirable form. To determine the factors that affect form, the factors mentioned above were

extracted from different sources and the views of experts. An analysis of the views reveals that form components comprise two internal and external categories (Table 3). The effect of these factors on form varies depending on the conditions and use of

forms. To understand the extent of the effects, an architect should, prior to the design stage, analyze the conditions and use the form to design and implement the forms³.

Table 3. Factors Affecting Form Formation

External Factors		
Factors	Description	Source
Aesthetic Qualities	Form should be beautiful. Such factors influence form as coordination and harmony, unity, symmetry, balance, desirable color, order, continuation, diversity, rhythm, scale, and proportions	(Rahil Qavami 2007; Lang et al. 1974, 191)
Criteria and Restrictions	Rules and standards include two quantitative (occupancy level factor, built-up area factor, etc.) and qualitative (human scale, mass and space arrangement, wall consistency, vertical and horizontal grading, skylines, etc.) categories	(Hosseinpour and Ghanbari 2017)
Technology	Technology includes various issues of design, construction, structure, materials, facilities, etc., and can be divided into two groups form analysis and construction and implementation.	
Background	Background includes locality and site data, local forms and building styles, the environment, archeology, intellectual roots, doctrinal and ideological issues, etc.	(Alexander 2013; Corbusier 2013; Heidegger 1954)
Climate	Climate includes sunlight, wind direction, temperature, and humidity. Which significantly contributes to creating form.	(Gorji Mahlbani et al. 2010, 31; Anderson 1962)
Function	Before the Industrial Revolution, form and function were considered two main dimensions of the formation of architectural works; however, with the introduction of modern architecture, function received more attention than form in architectural works.	
Economy	The economy, directly and indirectly, affects form formation, as it also affects theoretical basics to influence functional requirements, rules, and laws of forms.	(Safdarian and Kosari-Haghighi 2016)
Internal Factors		
Factors	Description	Sources
Paradigm	The predominant style of each era is based on the thinking styles governing that era and accounts for external realities.	(Safdarian 2017)
Tastes and Perspectives	This component includes apparent characteristics and helps create form linked with modern visions.	Imani and Zafarmandi 2017, 33)
Political Factors	Political powers use the form in architecture to build up their ideology and, thus, legitimize their authority. These forms gradually change society's architectural styles.	
Cultural and Social Factors	Form and space take on different meanings in different cultures based on peoples' living styles. The most important social and cultural factors are norms, symbols, roles, insights, etc.	(Seifian and Mahmoudi 2007, 3).

8. MEASURING THE EFFECTS OF COMPONENTS ON FORM FEATURES

Limited sources about the relationship between factors that create form and its components have led researchers to gather experts' views and use questionnaires to investigate the quality and extent of this relationship. The statistical population of

this population consisted of a 50-people group of academic architecture professors and professional engineers and architects with a history of at least ten years. The number of various components and factors led the present study's authors to integrate the relevant items and reduce them before designing the questionnaire (Fig.s 1 and 2).

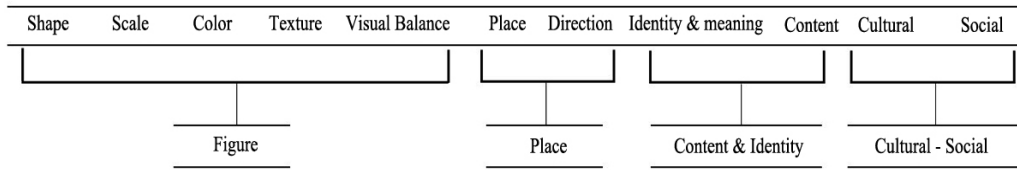


Fig. 1. A Summary of Form Components

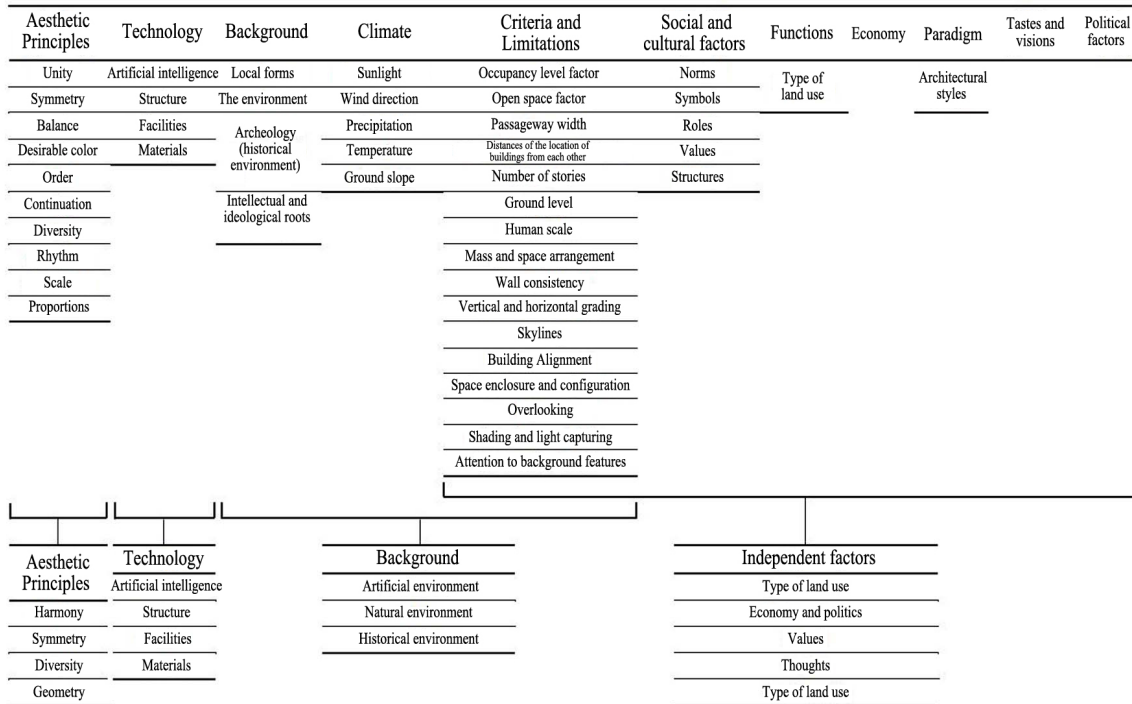


Fig. 2. A Summary of Factors Affecting Form Formation

According to the classification of components and factors affecting form, questionnaire items were adjusted into four categories. According to this evaluation, components are constant forms, and various factors differ to determine their effects. Form components include figure, place, identity, content, cultural and social features, while effective

factors include aesthetics principles, technology, background, and independent factors. After surveys were conducted, SPSS software was used to analyze data. The reliability and validity of the questionnaires were examined by Cronbach's alpha, which was 0.896, suggesting the desirable reliability of the scale (Table 4).

Table 4. Cronbach's Alpha Coefficient

Reliability Statistics		
N of Items	Cronbach's Alpha Based on Standardized Items	Cronbach's Alpha
64	0.897	0.896

Table 5 gives the scores of each factor by component and the average scores for all the components. A review of the scores obtained in each section

indicates that the studied factor affects one of the form components.

Table 5. Evaluating the Relationship between Form Factors and Components based on the Questionnaires

General Criteria	Specific Criteria	Form Components				Average	
		Figure	Place	Identity and Content	Cultural and Social		
Factors Affecting Form	Aesthetics Principles	Harmony	7.00	6.25	6.30	7.00	6.64
		Symmetry	6.00	5.95	4.90	4.90	5.44
		Diversity	5.55	5.55	5.50	5.95	5.64
		Geometry	8.45	7.05	6.65	6.00	7.04
	Technology	Artificial Intelligence	5.60	4.75	3.90	3.70	4.49
		Structure	7.35	5.75	4.45	4.10	5.41
		Facilities	4.80	4.85	3.30	3.10	4.01
		Materials	7.35	7.30	6.50	6.90	7.01
	Background	Artificial Environment	6.75	6.70	6.95	6.40	6.70
		Natural Environment	7.95	8.15	7.70	7.50	7.82
		Historical Environment	7.90	8.10	8.25	9.05	8.32
	Independent Factors	Land Use Type	7.50	7.35	7.35	6.90	7.27
		Economics and Politics	7.10	6.60	6.75	6.70	6.79
		Values	6.95	6.70	7.70	8.05	7.35
		Thoughts	6.95	6.60	7.50	7.75	7.20
		Urban Development Rules	7.05	7.35	6.25	5.95	6.65

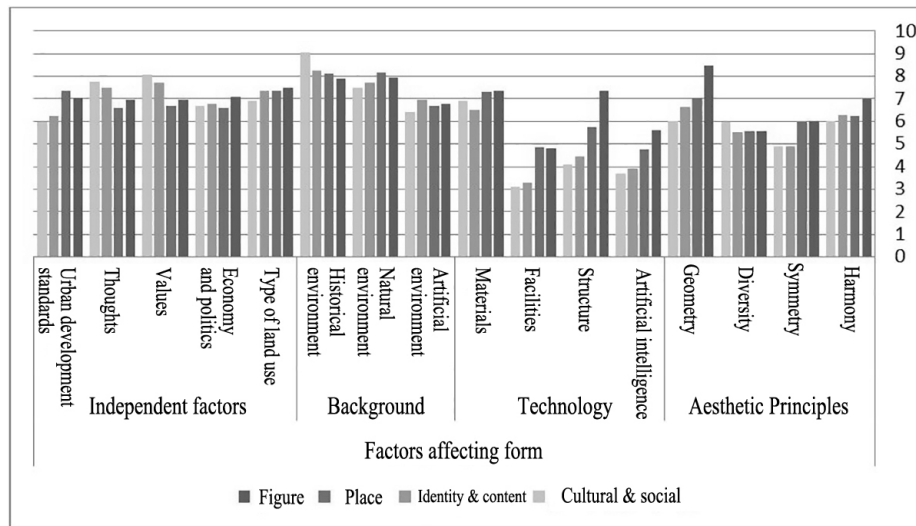


Fig. 3. Effects of Each Factor on Each Form Component

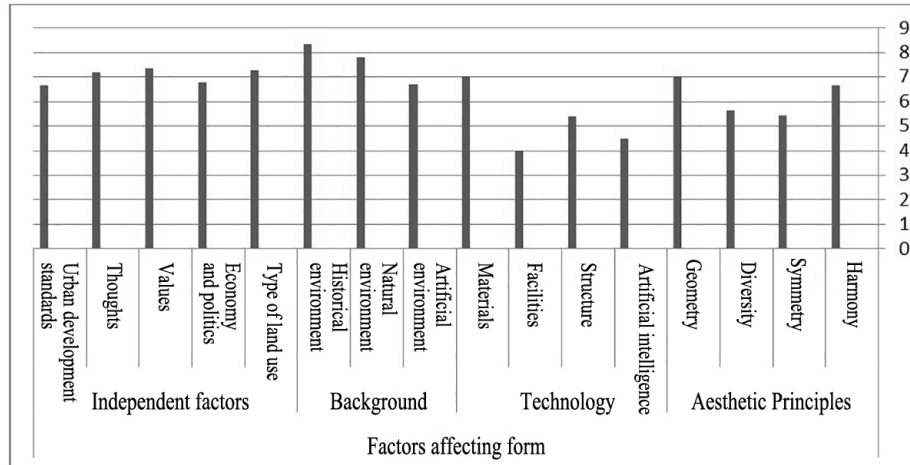


Fig. 4. Average Effects of Each Factor on Form Component

Results indicated that the effect of the factor “historical environment” on the social and cultural component held the highest. In contrast, the effect of the factor “facilities” on the same component held the lowest scores. Also, the average scores indicated that the factor “historical environment” and the factor “facilities” had the highest and lowest effects on form components, respectively. The question, however, is, “Do these average scores indicate the higher effects of the factor “historical environment” on form components?” This question can be answered using the Pearson correlation test and the significance test of each factor. A review of the correlation of form components with each effective factor and the significance relationship between them indicates that the following factors are most correlated in terms of

priority:

1. Historical environment (0.825),
2. Natural environment (0.798),
3. Land use type (0.703),
4. Geometry (0.700),
5. Harmony (0.645),
6. Values (0.642),
7. Thoughts (0.634),
8. Materials (0.631).

The “historical environment” factor was most correlated with form components. This suggests a strong significant relationship between the historical environment and form components. A comparison of the findings from interviews with those of inferential statistics indicated that each factor, emphasized by the statistical population and received a greater score, is significantly correlated with form components; this means that the priority given to the effective factors is also appropriate (Table 6).

Table 6. Correlation between the Scores of Each Factor with a Sum of Scores

	Harmony	Symmetry	Diversity	Geometry	Artificial Intelligence	Structure	Facilities	Materials	Artificial Environment	Natural Environment	Historical Environment	Land Use Type	Economic and Politics	Values	Thoughts	Urban Development Criteria
Pearson Coefficient	0.645**	0.383	0.256	0.700**	0.244	0.260	0.055	0.631*	0.346	0.798**	0.825**	0.703**	0.349	0.642**	0.634**	0.424
Significance Coefficient	0.002	0.096	0.214	0.001	0.301	0.268	0.817	0.006	0.135	0.000	0.000	0.000	0.131	0.002	0.003	0.062
No.	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

9. FINDING ANALYSIS USING AHP

Consistent with the study goal was to investigate the effects of various factors on form components, and considering the AHP method, the first stage in analyzing a hierarchy process is to create a

hierarchical structure consisting of goals, criteria, options, and their correlation. In this regard, the Tree of Decision made of four levels of general goals of decision-making, general criteria, specific criteria, and options was used (Fig. 5).

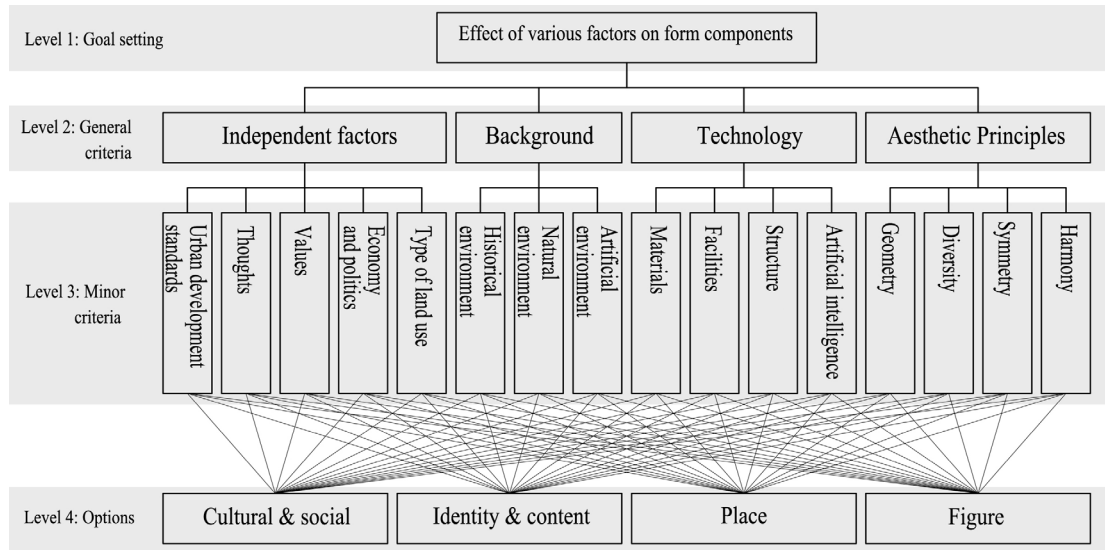


Fig. 5. Hierarchical Structure of the Problem under study

In the next stage, the pairwise matrix was used to compare the criteria to determine their degree of importance (Table 8). When compared, the weight of each criterion was determined. In this study, the pairwise comparison of the criteria was performed based on a field study (questionnaires). The results of

a pairwise comparison of the criteria indicate that out of the determined criteria, the criterion of “historical environment” with an importance coefficient of 0.08 and the criterion of “facilities” with the coefficient of 0.039 held the highest and lowest effects on form components, respectively (Table 7).

Table 7. Pairwise Comparison Matrix of Factors Affecting Form Components

Criteria	Harmony	Symmetry	Diversity	Geometry	Artificial Intelligence	Structure	Facilities	Materials	Artificial Environment	Natural Environment	Historical Environment	Land Use Type	Economic Sand Politics	Values	Thought	Urban Development Criteria
Harmony	1.00	1.22	1.17	0.94	1.46	1.22	1.65	0.95	1.00	0.85	0.80	0.91	0.98	0.90	0.92	1.00
Symmetry		1.00	0.97	0.77	1.21	1.00	1.35	0.78	0.81	0.69	0.65	0.75	0.80	0.74	0.75	0.81
Diversity			1.00	0.80	1.25	1.04	1.40	0.80	0.84	0.72	0.68	0.78	0.83	0.76	0.78	0.85
Geometry				1.00	1.56	1.30	1.75	1.00	1.05	0.90	0.84	0.97	1.03	0.96	0.98	1.05
Artificial Intelligence					1.00	0.83	1.11	0.64	0.67	0.57	0.54	0.62	0.66	0.61	0.62	0.67
Structure						1.00	1.34	0.77	0.81	0.69	0.65	0.74	0.80	0.74	0.75	0.81
Facilities							1.00	0.57	0.59	0.51	0.48	0.55	0.59	0.54	0.55	0.60
Materials								1.00	1.04	0.90	0.84	0.97	1.03	0.96	0.98	1.05
Artificial Environment									1.00	0.86	0.80	0.92	0.99	0.91	0.93	1.00
Natural Environment										1.00	0.93	1.07	1.15	1.06	1.08	1.17
Historical Environment											1.00	1.14	1.22	1.13	1.15	1.25
Land Use Type												1.00	1.07	0.99	1.00	1.09
Economics and Politics													1.00	0.92	0.94	1.00
Values														1.00	1.02	1.10
Thoughts															1.00	1.08
Urban Development Criteria																1.00



Fig. 6. Importance Coefficient of Criteria (Factors Affecting Form Components)

9.1. Relative Weight of Form Components based on Criteria

A review of the effects of each criterion on form components indicates that by considering the criterion of harmony, figure and social-cultural components held the highest weights. Considering the criterion of symmetry, geometry, artificial intelligence, structure materials, economics, and politics, the figure

component held the highest weight. The component of the place was also assigned the highest weight in the criteria of facilities, natural environment, and land use type. According to the artificial environment criterion, identity and content components had the highest weight. The cultural-social component was also assigned the highest weight in the criteria of diversity, historical environment, values, and thoughts.



Fig. 7. Prioritization of Components based on the Effects of Criteria

9.2. Prioritization of Components based on Criteria (Factors Affecting Form)

Components were prioritized by Expert Choice software based on the findings from the pairwise

matrix and the relative weights of each criterion. Thus, the component of the figure with the final weight of 0.264 ranked first, followed by the component of identity and content with a final weight of 0.241, which ranked last (Fig.s 7 and 8).

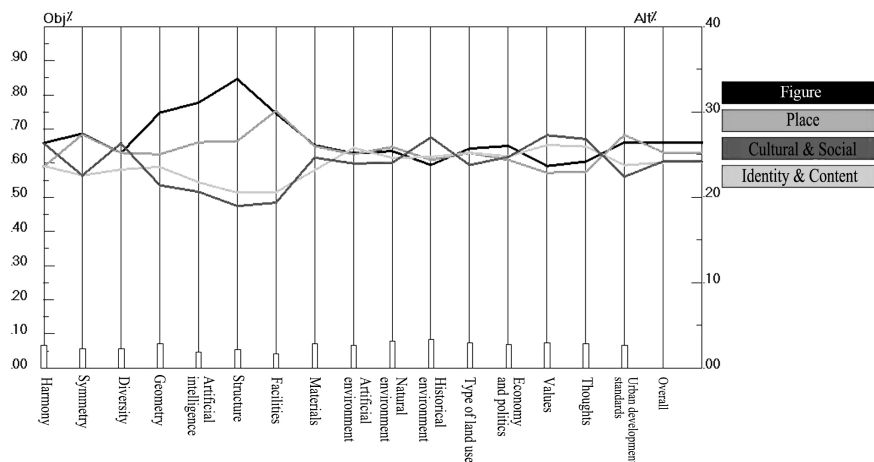


Fig. 8. Sentiment Analysis of Component Prioritization in Ideal Model State

Study findings suggest that out of various factors contributing to form, the factors of historical

environment, natural environment, land use type, geometry, harmony, values, thoughts, and materials significantly contributed to forming formation. This does not mean that other factors had no effects; instead, their effects were lower than others. To test the findings, one of the significant and influential buildings in contemporary architecture was evaluated based on these factors to determine the effect of each factor in form formation.

10. ANALYZING THE EFFECTS OF VARIOUS FACTORS ON THE FORMATION OF CULTURAL HERITAGE

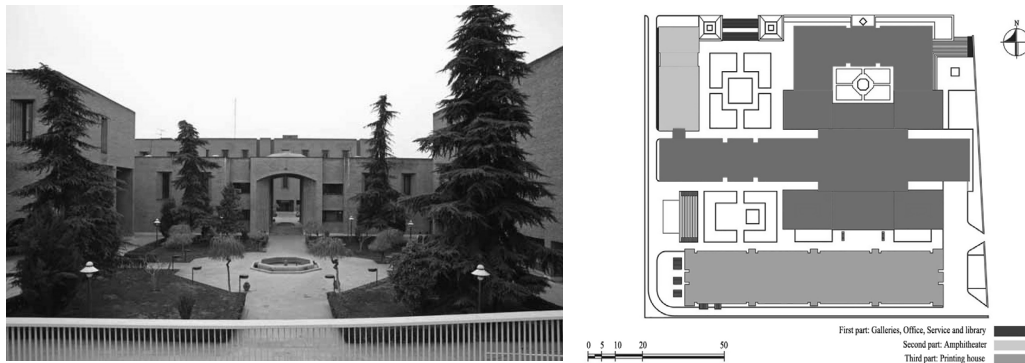


Fig. 9. Three Parts of the Cultural Heritage Organization Building (Right) and a View of the Building (Left)
(www.razzeh.com)

10.1. Aesthetic Principles

- Harmony: A look at the Cultural Heritage Organization complex indicates that the buildings of this complex follow a linear structure. A principle of unity is noted in the façade of this building, which reveals an incremental and layered change of the

façade from the lower transparent surfaces to the full upper surfaces of the façade. The presence of relatively wide brick-made surfaces which have broken lines because of a narrow gap or tall windows on some points has resulted in the view quality on the façade, whose repetition on the complex's buildings has created a kind of integrated volumes⁵ (Fig. 10).

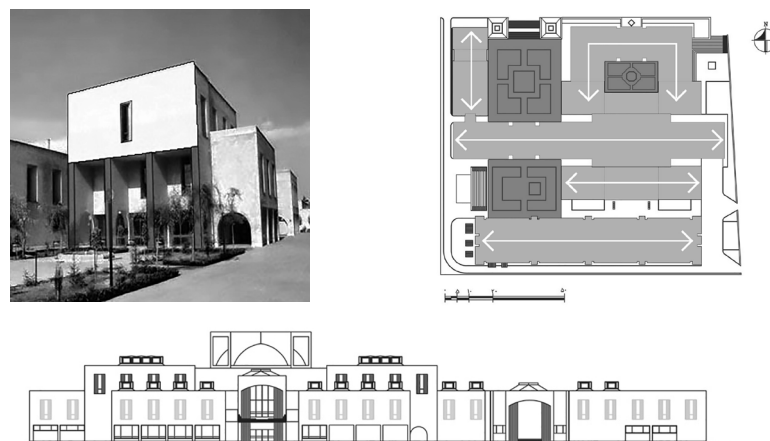


Fig. 10. Linear Structure of the Building Around the Courtyards (Right); Location of Full Surfaces on the Porous Surfaces (Left), and Repetition of Façade-Making Elements (Below)
(www.razzeh.com)

- Symmetry: Symmetry is used for facing facades, court gardens, arches, axes leading to middle Chahar

Sooq areas, etc. In some sections, symmetry is seen in the hidden axis and only in two-dimensional images⁶

(Fig. 11).

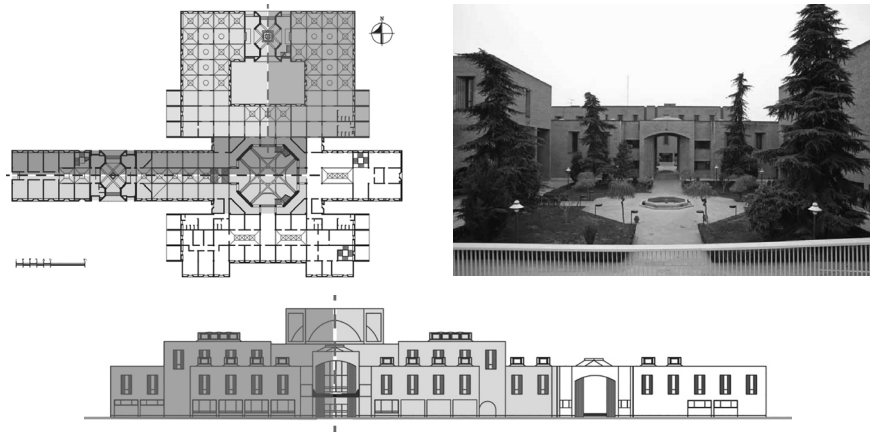


Fig. 11. Asymmetry in the Western and Eastern Parts of the Entrance Courtyard (Right), Symmetry in the Plan (Left), and Symmetry in the Façade (Below)
(www.razzeh.com)

- Diversity: The placement of the volumes of the building in a back-and-forth state creates various surfaces and shading on the façade, which not only helps create visual diversity but also results in spatial diversity. Dividing horizontal and uniform facades by

vertical openings, creating pores in the façade, and creating recesses in the entrances help form a texture over the building body, reducing its monotony (Fig. 12).

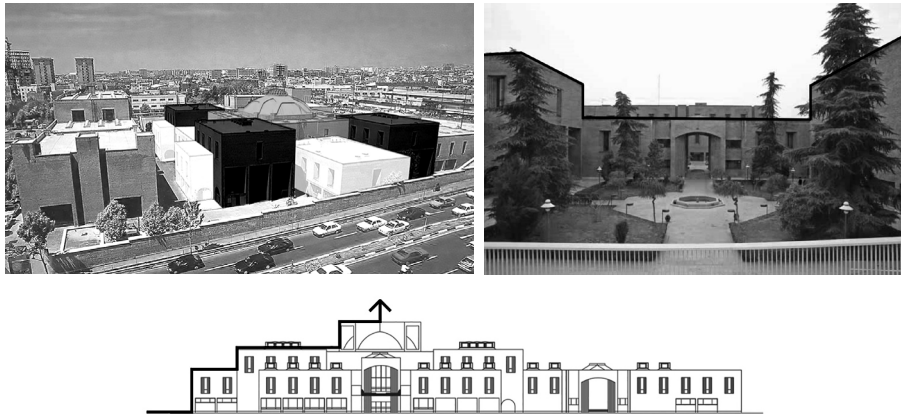


Fig. 12. Difference of Height in the Southern Façade of the Entrance Courtyard with Lateral Facades (Right), Back and Forth of the Volumes (Left), and Incremental Movement of the Volumes in the Entrance Façade (Below)
(www.razzeh.com)

- Geometry: A review of plans, cuts, and facades of the cultural heritage complex indicates that the designer had used geometry, proportions, and scales to design this complex, which are represented in the forms, plan, volume, etc. The use of rectangular and

square volumes in forms and the use of rectangular, square, and octagonal geometry in design plans and facades are the most important representations of using geometry and proportions in the building (Fig. 13).

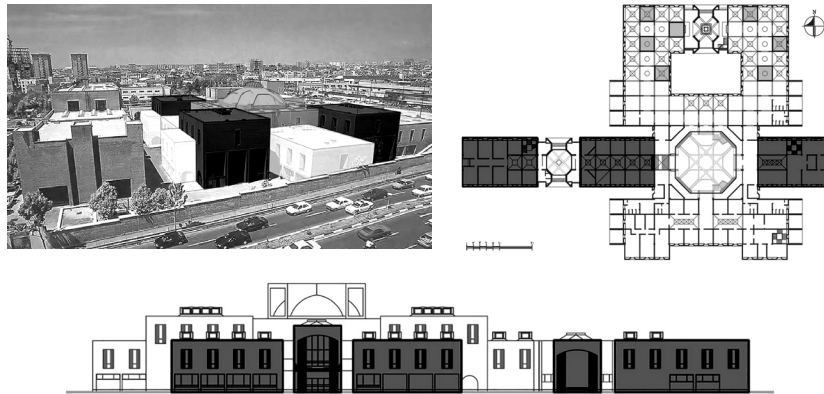


Fig. 13. Using Rectangular and Octagonal Proportions and Square Modules in the Plan (Right), Using Geometric Volumes in the Form (Left), and Using Rectangular Proportions in the Façade (Below)
(www.razzeh.com)

10.2. Technology

- Artificial intelligence: The history of artificial intelligence and relevant technologies in designing and implementing buildings in Iran dates back to the 90s; therefore, this factor has had no effect in designing and building the cultural heritage complex.
- Structure: The structural system of this building is made of a steel frame, which follows a modular form and appropriately conforms to building architectures.
- Facilities: Facilities used in this complex are not manifest, as they are hidden behind the materials

and facing the building. For this, they have no adverse effects on the building, so the functions are maintained.

- Materials: The use of bricks as the dominant material in various blocks of the building has consolidated the overall form of the building. Using decorations, albeit limited, on the walls, especially at the entrance to the building, and ceilings have helped maintain the traditional architectural styles of the complex; for this, the designer has used bricks in designing interior walls to maintain the interior and exterior phases⁷ (Fig. 14).



Fig. 14. The Use of Bricks as a Predominant Material in the Interior and Exterior Facing of the Building
(www.razzeh.com)

10.3. Background

- Artificial environment: The different heights of the building volumes and the back-and-forth arrangement of the volumes relative to each other have resulted in a fragmented building form, thus creating harmony with the urban texture. Rows of skylines on the strip mall's ceiling and circular ceilings that cut across their extension represent harmony with the

surrounding texture of the building. Other factors affecting the relationship between the building and the urban texture are the placement of the building facing the street and the creation of a relative balance in the interior and exterior phases using street-facing windows and the entrances projecting outwards (Fig. 15).



Fig. 15. Back-and-forth Placement of the Volumes (Right), Ceiling Skylines (Middle), and the Urban Location of the Cultural Heritage Organization Building (Left)
(www.razzeh.com)

- Natural environment: In the cultural Heritage Organization building, the designer has used the western-eastern extension in building blocks to increase the south-north light and created courtyards and ceiling skylines to reduce the west-east light. To create desirable light, especially in the southern front, the designer has placed openings and windows in the depth of the walls to create desirable shading on the openings, thus, resulting in the light indirectly radiating over the interior.

- Historical environment: Because the Cultural Heritage Organization building is located in the new texture of Tehran City, and its surrounding buildings are not historically old, the building is not influenced

by its surrounding historic environment. However, a review of the building ideas suggests that the idea behind this complex is taken from Iran's traditional architecture. The spatial structure of this complex is influenced by the introvert pattern and is based on the organization of the spaces that lie around one or several central courtyards. In the main complex of this building, the designer has used the idea of the market architecture and its elements, including Timcheh and Chahar Sooq, to create the hybrid-pattern building form consisting of two volumes in the southern-northern and western-eastern fronts. These fronts evoke strip malls, as the juncture of these two evokes the Chahar Sooq market (Fig. 16).



Fig. 16. Using the Chahar Sooq Pattern of the Iranian Market (Right), and Iranian Strip Mall (Left) in Designing the Cultural Heritage Organization Complex
(www.mehnavaz.com)

10.4. Independent Factors

- Land use type: The complex comprises the main building, an amphitheater, and a printing office. Considering the function of the main building, a cultural department, and the influence of the Iranian bazaar, the building form is characterized by two perpendicular axes and the juncture of these axes in a Chaharsooq form. Considering the importance of this section of the complex, entrances are stationed in the northern section, one of which directly leads to the central space of the building, and the other finds its way into the building by passing through the courtyard. The other two sections of the complex, i.e., the amphitheater and the printing office, which are less important than the central section, are positioned in a cubic volume on the western and southern angles.

A vehicle-specific entrance lies in the western and eastern directions, while the amphitheater entrance lies in its adjacency.

- Economics and politics: After holding the Azadi Square building design competition and the success of the design, the then Ministry of Culture and Art entrusted the design and construction of this complex to the bureau of Hossein Amanat. The policies of that time affected the design and construction of this government building. Following the revolution, the continuation of the work on the building was entrusted to the Cultural Heritage Organization, which itself applied its intended changes to the construction trend through its executive team.

- Values: An evaluation of the architect's thinking behind this complex suggests that he was fully aware of Iran's traditional architectural concepts as

an unparalleled value. For this, he sought to employ them in a new form commensurate with the building's

conditions and use (Fig. 17).

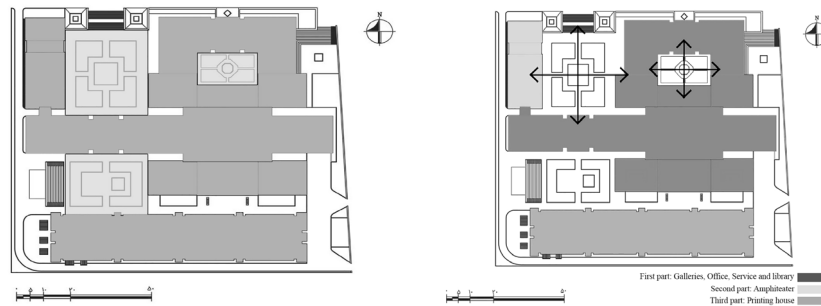


Fig. 17. Using Perpendicular Axes and Four-Sided Garden Patterns (Right) and Using Space Organization Patterns Around the Central Courtyards (Left) in Designing the Cultural Heritage Organization Complex

- Thoughts: The architect's main idea in this project was to provide a solution to link the fabric and the semantic aspects of traditional Iranian architecture with modern architecture. In this regard, the architect has used traditional concepts, including introversion, central courtyard, bazaar, etc., to constitute the building form. The ideas the architects have introduced include combining museum and fair functions and the spatial pattern of old bazaars, which serves as a new combination for fair (exhibition), handicraft, and art spaces.
- Urban development criteria: Cultural heritage

organization buildings extend to a lower level relative to the streets, as they are distinct from the site's edges. The designer's goal was to apply such issues as vision, overlooking, and shading.

Evaluating the effect of various factors on forming the cultural heritage complex suggests that they have affected form components differently and helped form this complex. Undoubtedly, not all the factors had the same effect on the form of the complex, with the architect not involving different factors in designing this building. Table 8 gives the effects of the factors on the components of the cultural heritage complex.

Table 8. Effects of Various Factors on Form Components in the Cultural Heritage Organization Building

General Criteria	Description	Specific Criteria	Components			
			Figure	Place	Identity and Content	Cultural and social
Aesthetics Principles	Linear structure of volumes; Gradual change of the facade and creation of plate quality in it; Using geometric proportions in the plan, facade, and cutting; Using repetition in facing (facade making); Creating symmetry in the plan, view, and cutting; Back-and-forth arrangement to create diversity	Harmony	*	*	*	-
		Symmetry	*	-	*	-
		Diversity	*	-	-	-
		Geometry	*	-	*	-
Technology	Consistency in form by using brick as the dominant material in the facade; Interior and exterior consistency in the building by using bricks in the design of interior walls; Matching the structure with architecture; Conformity of facilities with architecture	Artificial Intelligence	-	-	-	-
		Structure	*	-	-	-
		Facility	*	-	-	-
		Materials	*	*	*	-
Figure	Volume fragmentation for harmony with the urban texture; Creating volumes in the east-west direction for the maximum use of north and south light; Using traditional Iranian architectural patterns such as introvert patterns, central courtyard, strip mall, etc	Artificial Environment	*	-	-	-
		Natural Environment	*	*	-	*
		Historical Environment	*	*	*	*

General Criteria	Description	Specific Criteria	Components			
			Figure	Place	Identity and Content	Cultural and Social
Independent Factors	Determining the type of accessibility to each space and priority there according to land use; Constructing a complex at the order of the Ministry of Culture and Arts; Using Iranian architectural patterns in creating spaces; Linking traditional Iranian architecture with modern architecture; Focusing on such issues as vision, overlooking, and shading	Land Use Type	*	*	*	-
		Economics and Politics	*	-	-	-
		Values	*	-	*	*
		Thoughts	*	-	*	*
		Urban Development Criteria	*	-	-	-

According to the table above, the formation of the Cultural Heritage building had been affected by various factors: historical environment, values, thoughts, land use type, natural environment, harmony, and materials, with the latter having the highest effects on its form. The factor “historical environment” affected the four components of figure, place, identity, and content, and cultural and social; the factor “values and thoughts” affected the three components of the figure, identity and content, and cultural and social; the factors “harmony, materials and land use type” affected the components of the figure, identity, and content, and the factor “natural environment” affected the comments of figure, place and social and cultural. Also, an evaluation of the form components in this building revealed that the figure component was most affected by various factors. A comparison of the study findings and analysis results indicated that the category of factors that had higher effects also significantly contributed to the formation of the cultural heritage building form.

11. CONCLUSION

Consistent with sources, an architectural form involves four components: figure, place, identity, content, and social and cultural issues. On the other hand, four

categories of aesthetics, technology, background, and independent factors affect its formation. Considering the diversity of sources and uncertainty of weighting of each factor over various components, the views of architecture experts (collected from questionnaires) were used. Accordingly, the four factors of background, independent factors, aesthetics principles, and technology held the highest effects. The four components of figure, place, identity, content and social and cultural issues were most affected. Study results indicated that the said factors, historical environment, natural environment, land use type, geometry, harmony, values, thoughts, and materials effectively created a desirable form. In the meantime, other factors, including symmetry, diversity, artificial intelligence, structure, facilities, economics and politics, and urban development criteria, were found to be not significantly related to residents’ interests; however, there is no reason for ignoring it, as they should be balanced with the effective factors. Thus, it is concluded that the factors significantly related with form components should be focused on in design. It appears that appropriate and desirable form result from considering this hierarchy. The priority of various factors affecting the form design is given in Table 9.

Table 9. Factors Affecting Form Design

Effective Factors		Description
1	Attention to the Historical Environment	Maintaining historical works and buildings, harmony with the form and texture of the historical region, historical modeling architecture
2	Attention to the Natural Environment	Protecting the environment and attention to climatic components, including temperature, precipitation, wind, sunlight, etc.
3	Consistency with Functions	Consistency and harmony between form and function
4	Proportionate Geometry	Observing apparent proportions, human scale, and urban scale
5	Parts Harmony	Unity, balance, desirable color, order, attention to weights, and rhythm of various form components

Effective Factors	Description
6 Compliance with Values	Attention to norms, symbols, values, and structures of society
7 Thoughts	Using various paradigms, tastes, and views
8 Appropriate Materials	Local materials, desirable genus, good implementation, etc

ENDNOTE

1. Most industrial designers welcome this perspective
2. Most architects welcome this perspective
3. For example, in one condition, climate is prioritized, while in another, performance is key.
4. This analysis is based on the in-person visit of the researchers to the collection and also by using the information provided in the book "Contemporary Iranian architecture", volume II (Hadi Mirmiran, Iraj E'tesam, and Hamid Mirmiran 2018) and the book "Reviews of works of contemporary Iranian architecture" (Moshaver Nghsh engineers 2016).
5. For example, we can mention the repetition of windows in the facade, which move on its surfaces and even go around it and continue in the view of the courtyards.
6. In some facades of the building, such as the eastern and western sides of the entrance yard, as if the designer has intentionally removed the symmetry and made the facade asymmetric; an example of which is seen in the northern part and in workshops.
7. The predominant use of brick in the building was influenced by the architect's thinking concerning Iran's traditional architecture, however, unlike the traditional architecture, brick walls do not have a structural role as they are only used for facing.

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HOW TO CITE THIS ARTICLE

Alemi, Babak, and Morteza Majidi. 2022. Evaluating the Components Constituting Form and their Effects on Form Features to Achieve a Desirable Architectural Form; Case Study: Cultural Heritage Organization Building. *Armanshahr Architecture & Urban Development Journal* 15(40): 127-145.

DOI: 10.22034/AAUD.2021.272595.2420

URL: http://www.armanshahrjournal.com/article_163861.html



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