

# Presentation of the principles of design parameters and regulations of urban facades and body, emphasizing cultural components, case study: Kamyab street, Kerman)

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## Abstract

With the resurgence of interest in public spaces and urban life quality, building facades have become increasingly important. Urban facades, created by various views facing public spaces, can be either homogeneous or heterogeneous. Heterogeneity occurs when each building expresses its own purposes and identity, while ignoring the design of neighboring facades can lead to a monotonous and uniform urban facade. Since street facades form the first impression of a city and remain in the memory of individuals, it is crucial to design facades that reflect the culture of the society and provide a common language for creators. Culture is considered the most influential element in shaping the environment and public perception. This study focuses on Kamyab Street in Kerman as a case study to explore these dynamics. The Analytical Network Process (ANP) method, along with MATLAB coding, is employed for data analysis to identify the key factors influencing urban facade design. The findings reveal that the cultural components index (A3) holds the highest priority in the model for design principles and regulations of urban facades and structures, based on the specified criteria. This indicates that investing in cultural components can yield the greatest benefits for the region, enhancing its aesthetic appeal and cultural resonance according to the defined indices. Furthermore, the study emphasizes the need for a holistic approach to urban facade design, considering both individual building purposes and the collective urban aesthetic. By prioritizing cultural elements, urban planners and architects can create more vibrant, memorable, and cohesive urban environments that resonate with both residents and visitors, thereby improving the overall quality of urban life.

**Keywords:** facade regulations, urban body, cultural components, Kamyab Street, economic factors.

## 1. Introduction

In relation to human activities and culture, the city is a setting where culture is formed through activities and human interactions. Additionally, the city and its urban facades represent this relationship and embody values. At first glance, the cityscape presents itself to the public view. The urban landscape, like the outward appearance and external facade of any city, attracts the attention of citizens and allows individuals to connect with it and be influenced by it. (Hu et al., 2018: 12)

A beautiful urban landscape reflects an appropriate relationship between citizens and the city, while a disordered landscape indicates a lack of organization in planning and urban behavior. Thus, the interaction between citizens and the city arises from the urban landscape, making it crucial in the human-environment relationship. One of the primary places for social interactions among citizens is the street, where the highest level of citizen activity and interaction occurs. The street should meet the needs and desires of citizens in the best possible way. However, with the increase in construction over the past few years and the lack of consideration for citizens' needs, many qualitative principles in design have been overlooked. (Maio et al., 2018: 32)

One of the most important design principles is legibility, which can provide a clear mental image for individuals,

connection with the environment. Unfortunately, this principle is often overlooked in urban development plans (Alp et al., 2019: 19). Streets are the venues for collective activities in urban life, and with proper design and expansion, they can significantly enhance the quality of social and cultural life. They play a crucial role in creating an interconnected network of public and open spaces in the city. The quality perceived from the city largely depends on the quality of its streets. Therefore, the most important expectation from streets is their ease of understanding or legibility, which consequently facilitates comfortable and dynamic presence within them. The most important element in a street that greatly influences better understanding is the facades and the bodies of the buildings (Ghahremanpour et al., 2020: 10)

The façade of a building plays a significant role in enhancing the quality of its surrounding space in terms of personality, landscape, readability, beauty, and other such influential factors, which are directly related to mental stability. The cityscape and urban landscape have a close relationship with identity, culture, and urban characteristics. In the past, although buildings were individually designed, they were aesthetically pleasing and in accordance with visual aesthetics principles, ultimately showing respect for the surroundings and the urban environment. However, today, these matters have become less emphasized and faded. Despite differences in urban

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spaces among different cultures, they share common aspects indicating that urban spaces are an integral part of the urban spatial structure throughout different historical periods (Kim, 2017: 78).

Consequently, like the overall structure of a city, urban spaces manifest differently based on diverse social and economic conditions and cultural backgrounds in each culture (Liu et al., 2022: 112). Moreover, the creation of arts in a civilization has roots and principles derived from shared culture. Nowadays, design is influenced by new schools of thought and migration to cities, resulting in the emergence of dominant cultures in cities. This cultural diversity, values, and traditions not only arise from the presence of subcultures but also represent a new phenomenon in the era of globalization, promoting a new culture without considering all the meaningful roots, times, and places that create the real culture of any society. This culture, which expands through advertising and has unreal roots, leads to identitylessness and intellectual and cultural pluralism. When individuals engage in designing the urban landscape, it results in identitylessness and pluralism in urban structures and facades (Mokhberi, 2018: 10).

Buildings or facades of any structure, on the one hand, represent essential parts of architectural qualities and the performance of that structure, derived from the designer's conceptual and mental concepts. On the other hand, along with the facades of other buildings, they create the urban identity. Facades are designed based on people's needs and, in addition to meeting expectations, can create attractive and desirable facades as part of a harmonious whole (Razaghi Asl et al., 2017: 3). Facades and walls that reflect culture and determine the perceptions of society members should ultimately provide a solution that places their culture in the hands of users and creators. Cultures have various manifestations, each of which is a place for the emergence of culture, and these manifestations, despite their differences in appearance, all tell the same story (Fathi et al., 2018: 39).

It is crucial to consider that the home is not merely a structure but an institution, shaping itself for very important and intricate purposes. The construction of such spaces is a cultural phenomenon, visually and spatially influenced by the culture it belongs to (Liu et al., 2022: 41). However, in recent years, facades and urban landscapes have been neglected by authorities on one hand, while builders, seeking to sell and recover their investments, strive to market and distinguish their buildings, resulting in incongruent building facades in the city.

The design of urban facades, emphasizing cultural components, must incorporate its own specific characteristics and criteria. Today, with the disappearance of the aesthetic cognitive aspect of buildings and the lack of harmony between them, a new approach to design is needed to elevate the quality of streets and building facades based on the identity and culture of the region. Facade design should consider the flow of activities and upstream designs to be homogeneous and balanced, creating an

engaging space that has its own personality and identity when people pass through the streets.

The presentation of principles and guidelines for the design of urban facades and bodies regarding Kamyab Kerman Street should, in material terms, adapt the street environment to contemporary conditions and be in harmony with the central and historical fabric of the city and its surroundings. It should propose activities that are in line with its location and synchronous with the environment, rather than conflicting with neighboring possibilities.

This research endeavors to delve into the principles and values of architecture and urban planning and the ultimate impact they have on urban facades. A proper understanding of patterns can greatly influence the diagnosis and analysis of urban facades, and studying current constructions and qualitative problems of urban facades in various dimensions can lead to more suitable solutions.

This research aims to delve into the principles and values of architecture and urban planning, and the ultimate impact they have on the urban facade. Proper recognition of patterns can greatly influence the diagnosis and analysis of urban facades, and studying current constructions and the qualitative dilemmas of urban facades in various dimensions can lead to more appropriate solutions. Furthermore, as it ultimately needs to culminate in a guideline document regarding facade and urban wall design, analyzing street facades based on urban landscape techniques and architectural forms can have an innovative aspect. Facades can be designed to not only serve the functionality of the building but also reflect the individual behind it. Furthermore, since ultimately there needs to be a guideline document regarding facade and urban wall design, analyzing street facades based on urban landscape techniques and architectural forms can be innovative. Facades can be designed in a way that not only serves the function of the building but also represents the person living behind it.

## **2. Research Background**

Pendar and colleagues (2023) state that the composition of a facade, considering functional needs such as windows, doors, and canopies, fundamentally should aim to create a cohesive whole through good rhythm, vertical and horizontal proportions, materials, colors, and natural elements. The redesign of the Capitol Hill mound in the form of the Campo de' Fiori square in Rome, apart from revising the square, also addressed the rejuvenation of the existing bodies of the Senate Palace and the City Hall, focusing on harmonizing the facade and space of the square with the new facade design. The existing literature sheds light on various aspects of architectural and urban design, emphasizing the importance of cohesive facade compositions tailored to functional needs. Pendar et al. (2023) suggest that the combination of facade elements, such as windows, doors, and canopies, should strive for a harmonious unity through proper alternation and vertical and horizontal weights, materials, colors, and natural

elements. Moreover, the redesign of Capitol Hill as the Campidoglio Square in Rome not only reconsiders the square layout but also addresses the reorganization of the existing structures of the Senatorial Palace and the City Hall, harmonizing them with the square space. Modern Greek cities, characterized by repetitive apartment buildings, strive to break away from uniformity. For instance, the blue apartment building on the coast of Athens aims to draw inspiration from the sea and ships in its architectural design, challenging the rectangular geometry prevalent in surrounding buildings.

Additionally, efforts to preserve, revitalize, and reconstruct the facades of buildings in the economic center of Orangeville involved collaboration between various stakeholders, including the Municipal Facade and Body Organization Committee, city council representatives, the Business Improvement Area (BIA), and the Local Architectural Conservation and Restoration Consultants Association (LACAC). This committee was formed to rejuvenate the historic core of Orangeville, countering individualistic initiatives and highlighting the positive outcomes of collective projects (Hosseini et al., 2019).

the quality of life, which evolves over time and in conjunction with environmental and psychological factors within a society. Culture is a composite, flexible, and heterogeneous phenomenon that is one of the essential elements of any society, shaping and significantly influencing various aspects of life and society, including architecture. Furthermore, cultural development involves creativity and the ability to create an intrinsic culture and embrace other cultures (Fakouhi, 2014).

Architecture, as both an art and a science of designing living spaces, is influenced by the culture and values of each society.

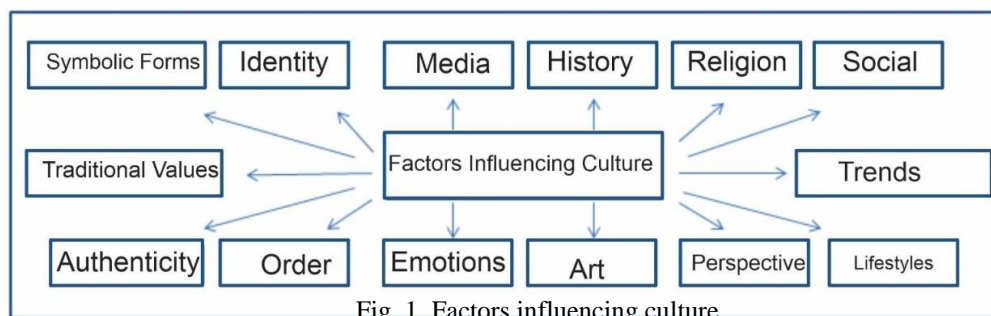


Fig. 1. Factors influencing culture

The central core of Hamberston (Petersburg) requires a strategic plan for organization and improvement as most of its valuable historical buildings have deteriorated, and the original identity of the main street has been compromised. Therefore, a guideline for urban and street landscape design in historic Hamberston has been prepared. This document aims to provide the port city of Cluborn with an effective mechanism to bring about beneficial and impactful changes in relation to the main street, attracting both governmental and private investment in this area and developing a revitalization plan (Zakavat et al., 2019).

### 3. Theoretical Framework

In the present study, the concepts of culture, facade, and urban form are fundamental, thus necessitating explanations of these concepts.

#### 2.1 Culture

In its broadest sense, this term refers to the knowledge, literature, science, education, art, and cognition of a nation or ethnicity.

The root of culture implies nurturing, caring for, supporting, or respecting. Culture is the selected mode for

Cultural authenticity refers to the precedence and priority of culture over other social and political factors. According to this perspective, culture forms the basis of society, and other factors such as politics, economy, and technology are shaped by culture. In this view, culture is defined as a set of values, norms, beliefs, and customs that exist within a society. These factors shape the behaviors and interactions of individuals in society and contribute to the preservation and continuity of the community. Based on cultural authenticity, politics and economics are also influenced by culture. Politicians and economists, in their decision-making processes, adhere to the cultural values and norms of society. For example, in a society where democratic values and freedom prevail, politicians prioritize human rights and individual freedoms. Cultural authenticity is an important concept in cultural studies and social sciences. This concept helps us better understand how culture influences other social and political factors. In Iran, some scholars, such as Dr. Parsania, emphasize cultural authenticity. They believe that culture is the primary factor in national identity and independence. They argue that policymakers and officials should adhere to the cultural values of Iran in their decision-making processes.

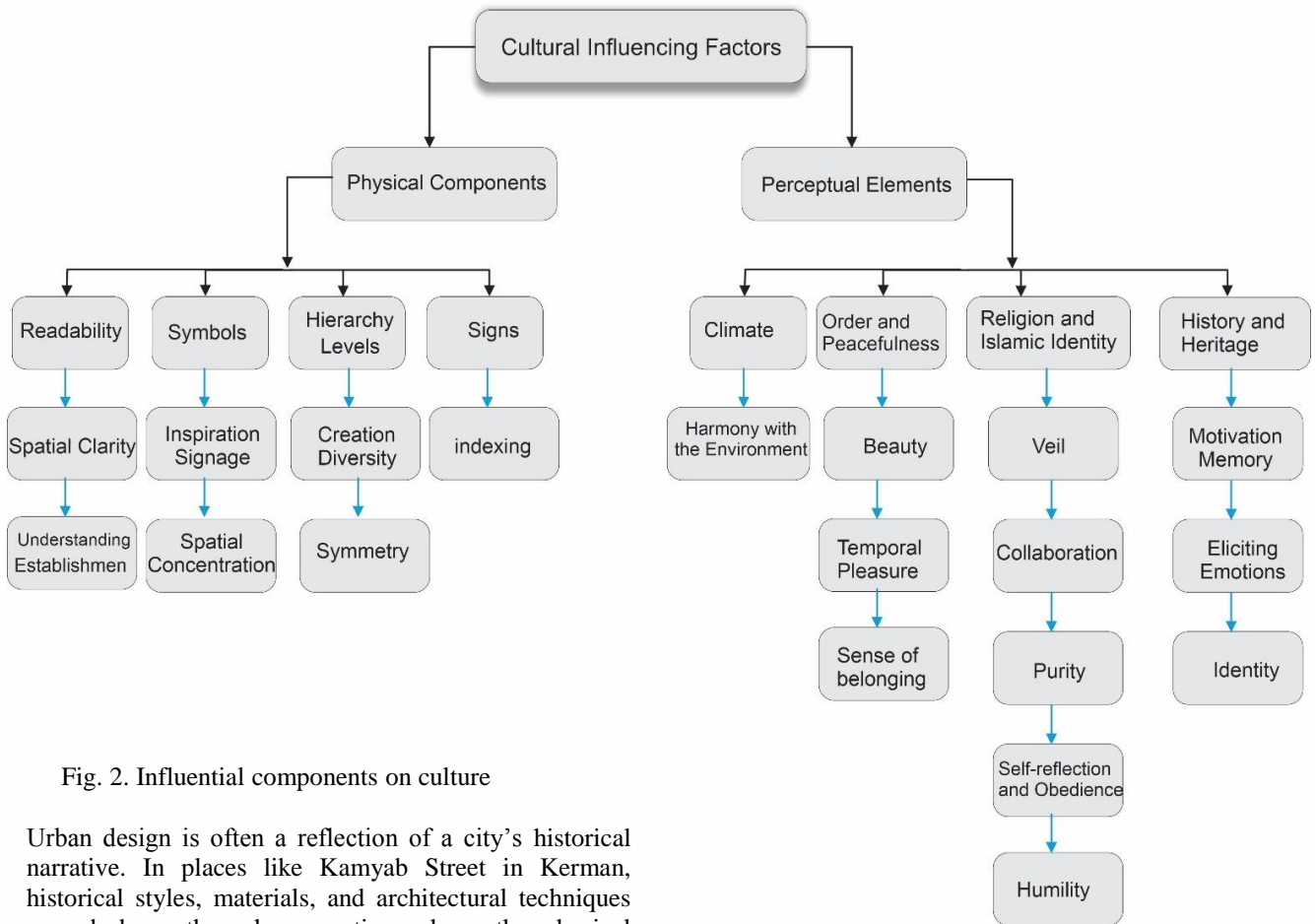


Fig. 2. Influential components on culture

Urban design is often a reflection of a city’s historical narrative. In places like Kamyab Street in Kerman, historical styles, materials, and architectural techniques passed down through generations shape the physical environment. Preserving the historical context ensures continuity and respects the cultural heritage, allowing the identity of a city to be maintained. Cultural traditions influence urban design in terms of functionality and aesthetics. For example, local customs such as public gatherings, religious practices, or social interactions shape how spaces are designed. In Kerman, like in many parts of Iran, Islamic architectural features such as courtyards, arches, and privacy screens (mashrabiya) often influence facade designs to ensure spaces cater to social and cultural expectations.

Thus, it can be stated that all political, social, and economic activities in cities are based on culture, and cities gradually shape the unique identity of that city over time. The components influencing culture are presented in the following figure. Based on the provided information about culture and the mentioned influential factors affecting culture, the following table can be presented:

In Kerman, where Islamic cultural values are prominent, religious components such as modesty, privacy, and symbolism are significant. This is reflected in how buildings are oriented, the use of certain architectural features like domes or minarets, and the inclusion of specific geometric patterns and calligraphy on urban facades. Religion deeply impacts the cultural fabric and consequently, the urban design of many regions. In Kerman, where Islamic cultural values are prominent, religious components such as modesty, privacy, and symbolism are significant. This is reflected in how buildings are oriented, the use of certain architectural features like domes or minarets, and the inclusion of specific geometric patterns and calligraphy on urban facades. All factors are explained in table 1.

#### 4. Climate and Environmental Conditions

Cultural responses to local climate conditions heavily influence urban design. In arid cities like Kerman, climatic adaptation has historically been a key driver of architectural decisions. For example, the use of windcatchers (badgirs), shading elements, and materials that protect against heat are cultural responses to the environment that have been incorporated into the urban design to maintain comfort and sustainability.

Table 1  
Architectural criteria and patterns derived from cultural components

Component	Criteria	Activities (Behavioral Patterns)	Architectural Pattern
Physical Aspect	History and Historical Heritage	Nostalgia, Eliciting Emotions	Presence of old and iconic buildings that evoke emotions and create a sense of belonging in the observer. Considered as a distinct and separate element in design. Consistency in the components of the facade to create an identity. Consideration of the design time, skyline alignment with climate, function, and culture. Observance of skyline alignment in building adjacency.
	Religion, Traditional Values, and Islamic Identity	Cooperation, Purity, Contentment, Self-reflection and Obedience, Humility	Hijab: Adherence to the regulations of modesty in building construction and architectural design related to the sanctity of buildings and the culture of introversion and observance of the principle of privacy. Cooperation: Increasing the quality of facades and improving the urban space status, affecting social interactions and enhancing social interactions. Purity: Cleanliness and hygiene and connection with nature, creating entrance halls and terrace floors accompanied by the presence of flowers and plants, creating reasonable windows and openings for proper light and air utilization. Contentment: Humanitarianism and avoidance of extravagance, attention to the proportions of facade dimensions. Self-reflection and Obedience: Symbolic functions, buildings adorned with abstract decorations. Humility: Abstinence from self-display, harmony of the building with the environment.
	Order and Serenity	Beauty, Sense of Belonging, Temporal Pleasure	To maintain continuity in the facade in places like alleys where the facade is interrupted, one can use setbacks. To prevent uniformity in the facade, setbacks or projections can be created in certain parts. In tall buildings, setbacks can be applied to each floor, and a stepped-back design can be implemented throughout the building. The level of motivation and stimulation of the facade and building should be desirable, leading to enjoyment for the viewer.
	Climate	Harmony with the Environment, Energy Efficiency	Designing facades based on hot and dry climates and using materials with high resistance and thermal capacity, as well as using bright colors on the facade. Optimizing energy consumption and reducing energy consumption in facade aspects.
Perception Aspect	Hierarchy	Creating Volume Diversity in the Facade	In places where the possibility of uniformity in the facade exists, setbacks and projections can be used. In a continuous facade, a suitable stepped-back space can be used as a resting space.
	Symbols and Icons	Creating Signs to Shape Space and Create Focus	Creating prominent, explicit, and organizing symbols in sensitive areas.
	Readability	Spatial Clarity and Better Understanding	The presence of limited signs and readability within the area to facilitate the perception of the spatial structure of the area. Control of the height of physical signs on the street facade to observe human scale while maintaining individuality. The presence of identity-forming and decorative elements such as elements, urban furniture, and green spaces. Appropriate and varied lighting of prominent buildings and physical signs.

These cultural components shape how urban spaces, particularly facades and the body of a city like Kerman, are designed and experienced. They ensure that while the city develops, its cultural identity remains intact, creating a space that is both functional and meaningful to its residents. Culture shapes what is considered aesthetically pleasing or symbolic. In Kerman, as in other Iranian cities, Persian architectural motifs such as tilework, floral patterns, and symbolic use of colours are often used. serves as a symbolic reference to cultural values and beliefs. the influences of globalization also affect traditional cultures. In Kerman, and particularly in Kamyab Street, there may be tension between maintaining cultural authenticity and embracing modern, globalized design

trends. The facades of buildings may reflect a blending of modern materials and traditional cultural elements, signifying a dynamic cultural shift as the city evolves. Urban facades and the layout of city streets often mirror the social fabric of the community.

### 3.1 Facade and urban fabric

The urban facade comprises the city's buildings, so when encountering this term from an architectural perspective, we directly refer to the facades of buildings. In fact, building facades serve as a display screen for architectural compositions. Architectural compositions contain a kind of

meaning and are capable of stimulating the human imagination and establishing a connection with it. In a brief examination of the facade, four functions expected from the facade are discussed.

Based on the explanations provided regarding culture and the mentioned influential factors on culture, the following table can be presented:

Table 2  
Criteria and Architectural Patterns Derived from Cultural Components.

1. Traditional Values and Beliefs
2. Social Norms and Customs
3. Cultural Identity and Heritage
4. Rituals and Ceremonies
5. Language and Communication Patterns
6. Artistic Expressions and Aesthetics
7. Religious Practices and Symbols
8. Historical Narratives and Collective Memory

This table outlines the criteria and architectural patterns that are derived from cultural components.

Table 3  
Four Expected Functions of Facade

Row	Facade Function	
1	Protection	The primary function of the facade is to protect humans from external threats. As long as a house served as a shelter for its occupants, the facade had no specific meaning.
2	Creating Connection	Due to the need for good visibility, ventilation, and light, the facade became a mediator between the inside and outside
3	Presentation	In Western architecture, the facade has a display mode, where it represents the individual living behind it, indicating social status and homeownership.
4	Part of Urban Space	Buildings are part of a larger entity called urban space, and a building must, while maintaining its character and credibility, be an integral part of a cohesive community.

#### 4. Research Methodology

In order to obtain the research indicators in this study, the meta-synthesis method was used in the qualitative section, and then the obtained criteria were formulated into questionnaires after final screening.

In this research, fuzzy Delphi methods were used for screening and identifying factors affecting the principles of design and regulations of urban façade and fabric with an emphasis on the cultural components of Kamyab Street in Kerman. The Analytic Hierarchy Process (AHP) method was utilized to determine the weights, and the Fuzzy

Analytic Network Process (ANP) method was employed to determine optimal indicators. In order to solve the fuzzy ANP method and the multi-objective planning model, MATLAB software was utilized. The process of conducting the current research involves a set of actions that must be taken to answer the research questions. The executive stages of the research will proceed as follows:

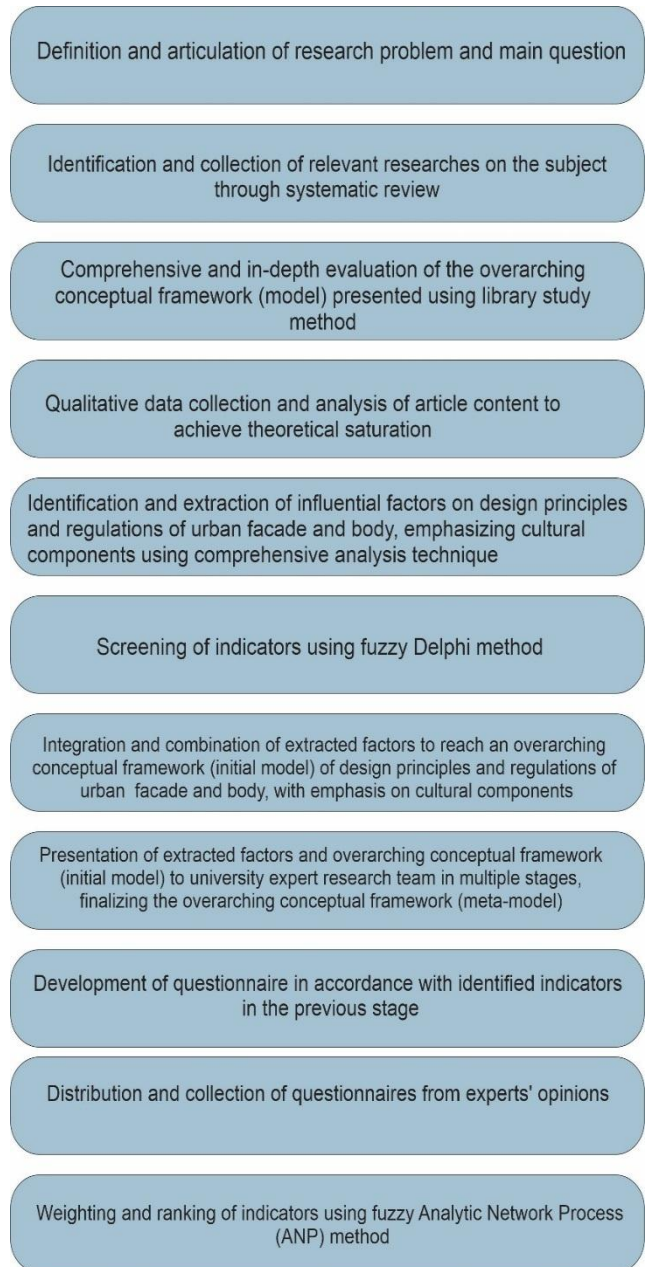


Fig. 3. Research Implementation Phases

#### 5. Results and Discussion

The criteria examined in this study have been finalized according to Table 4.

Table 4

The Criteria for Evaluating the Design Parameters of Urban Facades and Body with Emphasis on Cultural Components

Row	Criteria	Reference
1	Cultural Values	Hu et al., 2018; Maio et al., 2018; Alp et al., 2019; Ganjbarpour et al., 2020.
2	Facade Material	Kim, 2017; Liu et al., 2022; Mokhberi, 2018; Rezai Asl et al., 2017; Fathi et al., 201
3	Skyline	Lei et al., 2022; Pendar et al., 2023; Cucuzzella et al., 2022
4	Prominence	Sadeghi et al., 2022; Khan Mahmoudi et al., 2023; Hassanein, 2021
5	Renovation and revitalization	Pakzad et al., 2018; Sadeghi et al., 2022; Khan Mohammadi et al., 2023; Hassanein, 2021. Fathi et al., 2018; Lei et al., 2022; Pendar et al., 202
6	Grounding	Mokhberi, 2018; Rezai Asl et al., 2017;
7	borrowing	Ghanbarpour et al., 2020; Kim, 2017;
8	Attention to symmetry	Pakzad et al., 2018; Sadeghi et al., 2022; Khan Mohammadi et al., 2023; Hassanein, 2021.
9	Attention to continuity	Mansouri et al., 2023; Andarodi, 2020; Lucchi, 2022; Pakzad et al., 2018; Sadeghi et al., 2022
10	Non-adherence to specific geometry	Hosseini et al., 2019; Zakaout et al., 2019; Poorjavad Asl, 2022; Mansouri et al., 2023
11	Climatic domain	Hosseini et al., 2019; Zakavat et al., 2019; Poorjavadi Asl, 2022; Mansouri et al., 2023.
12	Attention to orientation	Fathi et al., 2018; Lei et al., 2022; Pandar et al., 2023; Cucuzzella et al., 2022; Xu et al., 2021
13	Attention to scale	Maio et al., 2018; Alp et al., 2019; Qanbarpour et al., 2020; Kim, 2017; Liu et al., 2022; Mokhtari, 2018.
14	Attention to diverse forms, drawing inspiration from traditional patterns in different regions of the world	Xu et al., 2021; Hosseini et al., 2019; Zekavat et al., 2019; Poorjavad Asl et al., 2022; Mansouri et al., 2023.

In the following, the definite scores provided by the experts were converted to fuzzy numbers according to the table. In this stage, for the sensitivity of the subject under consideration, trapezoidal fuzzy numbers were used (trapezoidal fuzzy numbers consider a wider range of data for more accurate modeling). The reason for using trapezoidal numbers is their greater precision compared to triangular numbers.

Table 5

Conversion of Definite Scores of Criteria to Fuzzy Values

Score Spectrum of Importance Degree	Corresponding Trapezoidal Number	Fuzzy	Defuzzified Numbers	Fuzzy certain		
	First	Second	Third	Fourth		
Very Low	1	0	0	1	3	1
Low	2	1	3	4	5	3.25
Medium	3	4	5	6	7	5.50
High	4	6	7	8	9	7.50
Very High	5	8	9	10	10	9.25

In Table 6 Spectrum and Scoring of the Questionnaire for Identifying the Principles of Urban Facade and Body Regulations with Emphasis on Cultural Components (Using Fuzzy Delphi) had been showed.

Table 6

Spectrum and Scoring of the Questionnaire for Identifying the Principles of Urban Facade and Body Regulations with Emphasis on Cultural Components

Degree of Importance	Score
Very Low	1
Low	2
Medium	3
High	4
Very High	5

Finally, the fuzzy data were converted to crisp numbers using Equation 1. The defuzzified scores for each spectrum are presented in Table 6.

Table 7

Spectrum, Score, Fuzzy Number, and Defuzzified Value of the Questionnaire

Spectrum of Importance Degree	Score	Corresponding Trapezoidal Fuzzy Number	Defuzzified Value		
		First	Second	Third	Fourth
Very Low	1	0	1	2	3
Low	2	1	3	4	5
Medium	3	4	5	6	7
High	4	6	7	8	9
Very High	5	8	9	10	10

Stage One: Questionnaire Distribution

In this stage, for the first time, the questionnaire was distributed to gather opinions about the effective criteria in the principles of urban design and the regulations of urban facade and body, with an emphasis on cultural components.

The contents of this questionnaire were presented in three main sections. In the first section, sufficient information about the questionnaire was conveyed to the experts. In the second section, the demographic information of the experts was explored, and in the last section, the criteria extracted from the relevant literature were presented in tables. Additionally, blank spaces were provided at the end of the questionnaire for experts to suggest criteria that are important to them but not included in the questionnaire. The results of experts' opinions in the first stage of questionnaire distribution are presented in Table 7.

$$C = (a_1 + a_2 + a_3 + a_4) 1/4 \quad (1)$$

$$\begin{aligned} & (b_{m1} - b_1^{(i)}, b_{m2} - b_2^{(i)}, b_{m3} - b_3^{(i)}, b_{m4} - b_4^{(i)}) \\ &= \left( \frac{1}{n} \sum_{i=1}^n b_1^{(i)} - b_1^{(i)}, \frac{1}{n} \sum_{i=1}^n b_2^{(i)} \right. \\ & \quad \left. - b_2^{(i)}, \frac{1}{n} \sum_{i=1}^n b_3^{(i)} - b_3^{(i)}, \frac{1}{n} \sum_{i=1}^n b_4^{(i)} \right. \\ & \quad \left. - b_4^{(i)} \right) \quad (2) \end{aligned}$$

Table 8  
Results of the First Stage of Expert Survey

Row	Criterion	Average rate				Total
		a <sub>1</sub>	a <sub>2</sub>	a <sub>3</sub>	a <sub>4</sub>	
1	Cultural values	7.82	8.82	9.82	9.91	9.09
2	Facade material	7.82	8.82	9.82	9.91	9.09
3	Skyline	5.09	6.09	7.09	8	6.57
4	Abstract decorations	4.09*	5.18	6.18	7.18	5.66
5	Social classification	6.91	7.91	8.91	9.45	8.3
6	Orientation	4.09	5.09	6.09	9.45	5.61
7	People-oriented design	6.91	7.91	8.91	9.18	8.3
8	Presence of natural elements	6.36	7.36	8.36	8	7.82
9	Contextuality	5.09	6.09	7.09	7.82	6.57
10	Native architectural adaptation	4.91	5.91	6.91	7	6.39
11	Model adaptation from indigenous architecture	3.82	5	6	9.64	5.45
12	Pattern adaptation from indigenous architecture	7.27	8.27	9.27	8.45	8.61
13	Collectivity	5.36	6.45	7.45	8.18	6.93

14	Building function	5.27	6.27	7.27	8.09	5.45
15	Facade harmony	5.09	6.9	7.9	9.27	8.61
16	Signs and symbols	6.55	7.55	8.55	7.55	6.93
17	Non-adherence to specific geometry	4.36	5.55	6.55	9.64	6.75
18	Attention to orientation	7.27	8.27	9.27	6.64	7.98
19	Attention to scale	3.27	6.64	5.64	6.82	6
20	Attention to symmetry	3.78	3.73	5.73	7.18	8.61
21	Attention to continuity	4	4.73	6.18	6.64	5.05
22	Climate zone consideration	3.36	5.18	6.18	6.64	5.25
23	Attention to form sustainability	5.09	4.55	5.55	8	5.64
24	Attention to diverse ancient patterns and inspiration from them in various parts of the world	6.55	7.55	8.55	9.27	7.98
25	Renovation and revitalization	4.09	5.18	6.18	8.18	5.66

The first stage of the expert survey aimed to assess various criteria related to urban facades and body design, with a particular emphasis on cultural components. The criteria were evaluated using an average rating system, with experts providing scores across four categories (a<sub>1</sub>, a<sub>2</sub>, a<sub>3</sub>, a<sub>4</sub>), which were then consolidated into a total average. Cultural Values and Facade Materials: Both cultural values and facade material were rated highly, with total averages of 9.09, reflecting their strong influence in urban design. These elements are central to maintaining the cultural identity and heritage of urban areas, especially in cities with rich historical contexts like Kerman. The skyline and contextuality received moderate scores, with averages of 6.57. This suggests that while they are important, there may be variations in how these elements are integrated into urban designs, depending on the architectural and urban planning goals.

Abstract decorations had the lowest average rating of 5.66, indicating a relatively low prioritization of abstract or ornamental design elements in the context of facade and urban body regulations. The lower score may reflect a preference for more functional and culturally meaningful designs over purely aesthetic considerations. The criteria for people-oriented design and social classification both received strong ratings, with average scores of 8.3. These high ratings highlight the importance of designing urban spaces that cater to social interactions and the needs of



different social groups, emphasizing inclusivity in urban design.

The adaptation of patterns and models from indigenous architecture garnered significant attention, with pattern adaptation scoring 8.61 and model adaptation scoring 5.45. This demonstrates a recognition of the value in integrating local architectural heritage, although the degree of application may vary. Both signs and symbols and the presence of natural elements scored well, with averages of 6.93 and 7.82 respectively. This suggests that these elements play a crucial role in enhancing the cultural and environmental compatibility of urban designs. Criteria related to form sustainability and renovation and revitalization received moderate ratings, with averages around 5.66. This shows a balanced approach towards modernizing while preserving historical elements in urban spaces. The survey revealed varying attention to design principles such as scale, symmetry, and continuity, with averages ranging from 5.05 to 8.61. These principles are essential in maintaining visual harmony and coherence in urban facades, although their relative importance may differ based on specific project goals. Interestingly, the criterion for non-adherence to specific geometry was rated higher than expected, with an average score of 6.75, reflecting an openness to more fluid and organic designs. The focus on ancient patterns from various parts of the world also scored high at 7.98, emphasizing the desire to incorporate global architectural inspirations.

#### Stage Two: Questionnaire Distribution

In the second stage of questionnaire distribution, the goal was to reach a consensus regarding the presented criteria by the researcher. From the second to the fifth round of questionnaire distribution, a questionnaire was designed to illustrate the experts' differing opinions from the average opinion of all experts (which can be calculated according to equation (2)), and the experts were asked to adjust or confirm their previous opinions. The collected data in this stage are summarized in Table 8

Table 9  
Questionnaire Distribution

Row	Criterion	Average rate				Total
		a <sub>1</sub>	a <sub>2</sub>	a <sub>3</sub>	a <sub>4</sub>	
1	Cultural values	8	9	10	10	9/25
2	Facade material	8	9	10	10	9/25
3	Skyline	4/18	/18	/18	/18	5/68
4	Abstract decorations	4	5	6	7	5/5
5	Social classification	8	9	10	10	9/25
6	Orientation	3/73	/82	/82	/82	5/30

7	People-oriented design	7/82	/82	/82	/91	9/09
8	Presence of natural elements	8	9	10	10	9/25
9	Contextuality	4	5	6	7	5/5
10	Native architectural adaptation	4	5	6	7	5/5
11	Model adaptation from indigenous architecture	3/45	/64	/64	/64	5/09
12	Pattern adaptation from indigenous architecture	8	9	10	10	9/25
13	Collectivity	4	5	6	7	5/5
14	Building function	4/18	/18	/18	/18	5/68
15	Facade harmony	4	5	6	7	5/5
16	Signs and symbols	8	9	10	10	9/25
17	Non-adherence to specific geometry	3/73	/82	/82	/82	5/30
18	Attention to orientation	7/82	/82	/82	/91	9/09
19	Attention to scale	2/91	/27	/27	/27	4/68
20	Attention to symmetry	2/36	/91	/91	/91	4/27
21	Attention to continuity	2/36	/91	/91	/91	4/27
22	Climate zone consideration	2	/45	/45	/55	3/86
23	Attention to form sustainability	2/82	/27	/27	/27	4/66
24	Attention to diverse ancient patterns and inspiration from them in various parts of the world	7/09	/09	/09	/55	8/45
25	Renovation and revitalization	3/91	5	6	7	5/48

Table 10  
Calculation of Differences in Opinion in the First and Second Stages of Questionnaire Distribution

Row	Status	Average Difference	Cultural Values
1	*	0/16	Facade Material
2	*	0/16	Skyline
3	x	0/89	Abstract Decorations
4	*	0/16	Social Classification
5	x	0/95	Privacy
6	x	0/32	People-Centered Design
7	x	0/80	Presence of Natural Elements
8	x	1/43	Contextualism
9	x	1/07	Original Source Adoption from Local Architecture
10	x	0/89	Model-Based Adoption from Local Architecture
11	x	0/36	Pattern-Based Adoption from Local Architecture
12	x	0/64	Collectiveness
13	x	1/43	Building Usage
14	x	1/07	Harmony of Facades
15	x	1/09	Signs and Symbols
16	x	1/27	Non-Adherence to a Specific Geometry
17	x	0/70	Attention to Orientation
18	x	0/48	Attention to Scale
19	x	0/36	Attention to Symmetry
20	x	0/98	Attention to Continuity
21	x	1/36	Climatic Zone
22	x	1/16	Attention to Form Sustainability
23	x	1/91	Attention to Diverse Archetypal Forms and Inspiration from Different Regions
25	*	0/48	Renovation and Improvement

$$Nw_k = Nw_i \times Nw_{ip} \quad (3)$$

Based on Table 9, it is observed that there is no significant difference (greater than 0.2) in criteria numbers 1, 3, 5, and 26 (according to the obtained fuzzy Delphi test). Therefore, it can be concluded that a consensus has been reached on these four criteria. The process did not stop here, and for consensus on the remaining criteria (21 remaining criteria), the third round of questionnaire distribution was conducted. The process of distribution and collection of expert opinions continued up to five rounds in this study to finalize the weights of the influencing indicators. However, due to length constraints, the detailed presentation of these steps is omitted from this article.

Selecting Effective Criteria for Evaluating Principles of Urban Design and Facade Regulations with an Emphasis on Cultural Components. The fuzzy Delphi technique, as

previously explained, confirmed the consensus among experts on 25 proposed criteria. Now, a threshold needs to be defined to determine which criteria can proceed to the next stages of the study. Delphi experts generally introduce the criteria that receive 67% of the total score given by experts as the factor for selecting criteria. In this study, the factor for selecting criteria and advancing them to the next stages of analysis (criteria acceptance or rejection conditions) has been set at a minimum of 95% of the total score. The reason for selecting 95% of the score by the researcher is to prevent model misfit (this is done using Equation 4) from the Delphi process.

Table 11  
presents the acceptable threshold for selecting criteria.

Status	Average Difference	Cultural Values	Row
Confirmation	9/25	Facade Material	1
Confirmation	9/25	Skyline	2
Rejection	5/5	Abstract Decorations	3
Rejection	5/5	Social Classification	4
Confirmation	9/25	Privacy	5
Rejection	5/5	People-Centered Design	6
Confirmation	9/25	Presence of Natural Elements	7
Confirmation	9/25	Contextualism	8
Rejection	5/5	Original Source Adoption from Local Architecture	9
Rejection	5/5	Model-Based Adoption from Local Architecture	10
Rejection	5/5	Pattern-Based Adoption from Local Architecture	11
Confirmation	9/25	Collectiveness	12
Rejection	5/5	Building Usage	13
Rejection	5/5	Harmony of Facades	14
Rejection	5/5	Signs and Symbols	15
Confirmation	9/25	Non-Adherence to a Specific Geometry	16
Rejection	3/66	Attention to Orientation	17
Confirmation	9/25	Attention to Scale	18
Rejection	4/66	Attention to Symmetry	19
Rejection	3/25	Attention to Continuity	20
Rejection	5/5	Climatic Zone	21
Rejection	5/5	Attention to Form Sustainability	22
Rejection	3/25	Attention to Diverse Archetypal Forms and Inspiration from Different Regions	23
Confirmation	9/25	Renovation and Improvement	25

Weighting of selected criteria using Fuzzy Analytic Hierarchy Process (FAHP):

To execute the second part, a questionnaire was devised where criteria were pairwise compared. A spectrum from 1 to 9 was provided to respondents for scoring the pairwise comparisons, where 1 indicated equal importance and 9 indicated relatively strong importance of the first criterion over the second. Questionnaires were distributed to the same experts who had been surveyed in the previous stage regarding the consensus on criteria. After multiple follow-ups and expert justifications for responsiveness, the questionnaires were collected and the data were analyzed using Excel software.

Data Analysis:

For fuzzification of the data, triangular fuzzy numbers were utilized. In this manner, the opinions of all experts were aggregated into an overall matrix. In this matrix, the first fuzzy number represents the minimum opinion value, the third fuzzy number represents the maximum opinion value, and the second fuzzy number represents the geometric mean of experts' opinions.

Table 12  
Combined Matrix of Expert Opinions

Row	Cultural Values	first fuzzy number	second fuzzy number	third fuzzy number
1	Cultural values	0/20	1/67	8
2	Façade material	0/13	0/74	5
3	Social classification	0/13	0/59	5
4	Populism	0/11	0/50	7
5	Presence of natural elements	0/13	0/99	7
6	Pattern emulation from indigenous architecture	0/14	1/88	9
7	Symbols and signs	0/20	0/64	3
8	Attention to orientation	1	1/72	5
9	Attention to diverse ancient patterns and inspiration from them in various regions of the world	1	1	1
10	Renovation and revitalization	1	1	1

Following, the matrix of Z values for the criteria was computed using Equation 5 for each criterion, and the output is described in Table 16.

$$Z_i = [\tilde{a}_{i1} \otimes \tilde{a}_{i2} \otimes \dots \otimes \tilde{a}_{in}]^{(1/n)}, \forall_i \quad (4)$$

Table 13  
Matrix of Z Values for the Criteria

Row	Cultural Values	first fuzzy number	second fuzzy number	third fuzzy number
1	Cultural values	0/20	1/67	8
2	Façade material	0/13	0/74	5
3	Social classification	0/13	0/59	5
4	Populism	0/11	0/50	7
5	Presence of natural elements	0/13	0/99	7
6	Pattern emulation from indigenous architecture	0/14	1/88	9
7	Symbols and signs	0/20	0/64	3
8	Attention to orientation	1	1/72	5
9	Attention to diverse ancient patterns and inspiration from them in various regions of the world	1	1	1
10	Renovation and revitalization	1	1	1

Then, the summation of the Z values was calculated using Equation 6, and its inverse was computed using Equation 7, resulting in the following:

$$\tilde{a}_1 \oplus \tilde{a}_2 \cong (\alpha_1 + \alpha_2, \beta_1 + \beta_2, \delta_1 + \delta_2) \quad (5)$$

$$Z_i^{(-1)} = (\delta_i^{(-1)}, \beta_i^{(-1)}, \alpha_i^{(-1)})$$

Table 14  
Calculation of overall Z values for criteria

	first fuzzy number	second fuzzy number	third fuzzy number
Calculation of the sum of Z values in general:	5/29	13/01	58/00
Calculation of the inverse of the Z matrix in general	0/02	0/08	0/19

Subsequently, the final weight of each criterion (which is fuzzy) was calculated using Equation 13, and defuzzification was performed using Equation 14.

$$W_i = Z_i \otimes (Z_1 \oplus Z_2 \oplus \dots \oplus Z_n)^{(-1)} \quad (6)$$

Table 15

Evaluation of factors influencing the principles of urban design and facade regulations with an emphasis on cultural components using the fuzzy Delphi method

Row	Cultural Values	first fuzzy ,number	second fuzzy number
1	Cultural values	0	0/13
2	Façade material	0	0/06
3	Social classification	0	0/04
4	Populism	0	0/04
5	Presence of natural elements	0	0/08
6	Pattern emulation from indigenous architecture	0	0/14
7	Symbols and signs	0	0/05
8	Attention to orientation	0/02	0/13
9	Attention to diverse ancient patterns and inspiration from them in various regions of the world	0/02	0/08
10	Renovation and revitalization	0/02	0/08

Then the defuzzified weights were descaled using Equation 10 and reflected in Table 16.

$$NW_i = \frac{W_i}{\sum_{i=1}^n W_i} \quad (8)$$

Table 16

Evaluation of Cultural Values

Row	Cultural Values	Normalized weight of each criterion
1	Cultural values	0/14
2	Façade material	0/08
3	Social classification	0/08
4	Populism	0/11
5	Presence of natural elements	0/12
6	Pattern emulation from indigenous architecture	0/15
7	Symbols and signs	0/05
8	Attention to orientation	0/09
9	Attention to diverse ancient patterns and inspiration from them in various regions of the world	0/02
10	Renovation and revitalization	0/02

Evaluation of factors influencing the principles of urban design and facade regulations with an emphasis on cultural components using the fuzzy Delphi method

Formation of decision matrix:

In this matrix, the performance measures of the experience of other countries and the time required to test pipelines and repair leaks are certain values, but the performance values of qualitative criteria are determined by experts and using the 7-point spectrum method as shown in Table 17.

Table 17:  
Linguistic assessment spectrum

Degree Spectrum Importance	Score	Score Fuzzy First	Number Fuzzy Second	Equivalent Third
Very Low	1	0	0	0/15
Low	2	0	0/15	0/30
Somewhat Low	3	0/15	0/30	0/50
Medium	4	0/30	0/50	0/65
Somewhat Good	5	0/50	0/65	0/80
Good	6	0/65	0/80	1
Very Good	7	0/80	1	1

In this stage, a questionnaire was designed and distributed among experts, who prioritized the criteria based on the evaluation criteria. The average opinions of the experts are presented in Table 18. It's worth mentioning that in this matrix, 5 indicators are introduced with options A1 to A5. Introduction of components in the matrix.

Table 18

Expert Evaluation Matrix for Prioritizing Urban Facade and Body Design Criteria with Emphasis on Cultural Components (Options A1 to A5)

A1: Economic Components	(Sadeghi et al., 2022), (Khan Mohammadi et al., 2023), (Hassanein, 2021),
A2: Social Components	(Mokhberi, 2018), (Razeghi Asl et al., 2017), (Fathi et al., 2018), (Liu et al., 2022), (Pendar et al., 2023),
A3: Cultural Components	(Fathi et al., 2018), (Lei et al., 2022), (Pendar et al., 2023), (Cucuzzella et al., 2022),
A4: Physical and Environmental	(Hosseini et al., 2019), (Zakavat et al., 2019), (Poorjavadi Asl, 2022), (Mansouri et al., 2023),
A5: Institutional and Managerial Components	(Ghanbarpour et al., 2020), (Kim, 2017), (Liu et al., 2022), (Mokhtari, 2018), (Razeghi Asl et al., 2017)

Before presenting the detailed results, it is essential to highlight the methodology used in gathering expert insights. In this stage, a structured questionnaire was designed and distributed among urban design and cultural heritage experts. The experts were asked to prioritize specific criteria related to urban facade and body design, particularly emphasizing the integration of cultural components. Each criterion was evaluated based on five distinct indicators, labeled A1 to A5, which covered various aspects of urban design principles.

The average ratings derived from expert responses are summarized in Table 19, offering a comprehensive view of the prioritization across different design criteria. These ratings provide a clear understanding of which elements are considered most critical in ensuring that urban designs are culturally responsive and functional.

Table 19  
Average Expert Ratings

Dimension	Dimensi on	Mean Expert Opinion			Integer Numbers
		First Fuzzy Number	Second Fuzzy Number	Third Fuzzy Number	
Cultural Values (C1)	A1	0	0	0/19	1/29
	A2	0	0	0/19	1/29
	A3	0	0	0/19	1/29
	A4	0	0	0/19	1/29
	A5	0	0	0/19	1/29
Facade Material (C2)	A1	0	0/17	0/33	2/15
	A2	0/17	0/33	0/52	3/16
	A3	0	0/17	0/33	2/15
	A4	0/17	0/33	0/52	3/16
	A5	0/33	0/52	0/68	4/17
Social Classification (C3)	A1	0/73	0/9	1	6/53
	A2	0/59	0/74	0/92	5/62
	A3	0/73	0/9	1	6/53
	A4	0/59	0/74	0/92	5/62
	A5	0/42	0/59	0/74	4/61
Populism (C4)	A1	15	15	15	15
	A2	17	17	17	17
	A3	15	15	15	15
	A4	20	20	20	20
	A5	25	25	25	25
Presence of Natural Elements (C5)	A1	0/73	0/9	1	6/53
	A2	0/73	0/9	1	6/53
	A3	0/73	0/9	1	6/53
	A4	0/73	0/9	1	6/53
	A5	0/58	0/73	0/9	5/52
Adoption of Indigenous Architectural Patterns (C6)	A1	0/58	0/73	0/9	5/52
	A2	0/58	0/73	0/9	5/52
	A3	0/58	0/73	0/9	5/52
	A4	0/41	0/59	0/74	4/59
	A5	0/58	0/73	0/9	5/52
A1	0/6	0/76	0/92	5/69	

Symbols and Icons (C7)	A2	0/44	0/61	0/77	4/77
	A3	0/6	0/76	0/92	5/69
	A4	0/27	0/46	0/63	3/85
	A5	0/6	0/76	0/92	5/69
	A1	0/28	0/48	0/63	3/90
Orientation (C8)	A2	0	0/28	0/48	2/89
	A3	0/28	0/48	0/63	3/90
	A4	0/48	0/63	0/79	4/90
	A5	0	0	0/3	1/95
	A1	0/59	0/74	0/92	5/62
Attention to Diverse Historical Patterns and Inspiration from Them in Various Regions of the World (C9)	A2	0/59	0/74	0/92	5/62
	A3	0/74	0/92	1	6/62
	A4	0/59	0/74	0/92	5/62
	A5	0/74	0/92	1	6/62
Renovation and Rehabilitation (C10)	A1	0/23	0/42	0/59	3/60
	A2	0/42	0/59	0/74	4/61
	A3	0/42	0/59	0/74	4/61
	A4	0/23	0/42	0/59	3/60
	A5	0/23	0/42	0/59	3/60

#### Calculation of Preference Function

During the sessions and discussions held with the experts, due to their deeper understanding and logical justification, a linear preference function was chosen. This function adjusts the priority linearly by changing scores from zero to P. If the difference exceeds P, the selected option has complete priority. The value of P, as the superiority threshold, was considered in the calculations according to Table 19. In the next step, each criterion was evaluated using Equation (11), and options were compared accordingly. The preference function value for each criterion was calculated and reflected in Tables 20, 21, 22, 23, and 24.

$$d_j(a, b) = g_j(a) - g_j(b) \quad (9)$$

Table 20  
Preference Function for Option A1 Relative to Other Options

Index	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
weight	0/14	0/08	0/08	0/11	0/12	0/15	0/05	0/09	0/02	0/02
Type of Indicator	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Type of Function	3	3	3	3	3	3	3	3	3	3
Threshold of Superiority	p	0/6	0/6	0/6	0/6	0/6	0/6	0/6	0/6	0/6

c		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
	A2	0.0	0.0	1.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0
	A3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	A4	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0
	A5	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0

Table 21  
Preference Function of Option A2 Compared to Other Options

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
A2	A1	0.0	1.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	1.0
	A3	0.0	1.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
	A4	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	A5	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0

Table 22  
Preference Function of Option A3 Compared to Other Options

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
A3	A1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0
	A2	0.0	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0
	A4	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0
	A5	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0

Table 23  
Preference Function of Option A4 Compared to Other Options

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
A4	A1	0.0	1.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
	A2	0.0	0.0	0.0	0.6	0.0	0.0	0.0	1.0	0.0	0.0
	A3	0.0	1.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
	A5	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0

Table 24  
Preference Function of Option A5 Compared to Other Options

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
A5	A1	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0
	A2	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0
	A3	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
	A4	0.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	0.0

Calculation of Cumulative Preference Index (CPI) for (a,b)  $\pi$  and (b,a) The pr  $\pi$  reference index for options was calculated using Equation (12), and the results are reflected in Table 25.

$$\begin{aligned}
 P_j(a, b) &= F_j[d_j(a, b)] \quad \forall a, b \in A, \\
 d_j(a, b) &= g_j(a) - g_j(b). \\
 0 \leq P_j(a, b) &\leq 1
 \end{aligned}
 \tag{10}$$

Table 25  
Cumulative Preference Index for Options

	A1	A2	A3	A4	1
A1	*	0.32	0.02	0.30	0.39
A2	0.14	*	0.14	0.24	0.31
A3	0.04	0.34	*	0.34	0.41
A4	0.38	0.26	0.38	*	0.39
A5	0.21	0.26	0.21	0.43	*

Calculation of Positive and Negative Ranking Flows:  $+\Phi$  and  $-\Phi$

$$\phi^+(a) = \frac{1}{n-1} \sum_{x \in A} \pi(a, x)
 \tag{11}$$

$$\phi^-(a) = \frac{1}{n-1} \sum_{x \in A} \pi(x, a)$$

Table 26  
Ranking Flows of Positive and Negative Options

	A1	A2	A3	A4	A5
$\Phi^+$	0.26	0.20	0.28	0.33	0.28
$\Phi^-$	0.19	0.26	0.18	0.31	0.36

Evaluation of Design Principles and Urban Facade Regulations with Emphasis on Cultural Components Using Equation 12, the net ranking flow values were calculated and reflected in Table 27.

$$\phi(a) = \phi^+(a) - \phi^-(a) \quad (12)$$

Table 27  
Net Ranking Flow

	A1	A2	A3	A4	A5
$\Phi$	0.07	-0.06	0.10	0.02	-0.08

Evaluation of urban design principles and facade and urban body regulations with an emphasis on cultural components using the Delphi method, which provides a comprehensive ranking, is as follows based on Equation 13:

$$\begin{cases} aP^I b \text{ iff } \phi(a) > \phi(b) \\ aI^I b \text{ iff } \phi(a) = \phi(b) \end{cases} \quad (13)$$

## 6. Conclusion

The research results regarding prioritizing the factors of the urban design principles and facade and urban body regulations model with an emphasis on cultural components using fuzzy techniques are presented in Table 28. In the next step, based on the degree of proximity (similarity index), the options are ranked in a way that options with higher similarity indices are given priority. In the final step, the options are ranked in descending order based on their similarity index.

$$A3 > A1 > A4 > A2 > A5$$

The maximum distance from the ideal solution is negative, indicating that the highest priority for the model of urban design principles and facade and urban body regulations with an emphasis on cultural components is in terms of the desired criteria for the model of urban design principles and facade and urban body regulations with an emphasis on cultural components. This means that investing in cultural component indicators can create the highest desirability for the region in terms of the defined criteria.

The research has presented the prioritization of factors in the model of urban design principles and regulations for facades and urban structures, with a focus on cultural components, using fuzzy techniques. The results are summarized in Table 28. Subsequently, options were ranked based on their degree of similarity, with higher similarity indices indicating greater priority. Finally, options were ranked in descending order according to their similarity index. The negative maximum distance from the ideal solution suggests that the model prioritizes the desired criteria for urban design principles and regulations for facades and urban structures with an emphasis on cultural components. This underscores the importance of investing in

cultural component indicators, as it can significantly enhance the desirability of the region in terms of the defined criteria

Table 28  
Weight of Indicators

Row	Cultural Values	Normalized weight of each criterion
1	Cultural values	0.14
2	Façade material	0.08
3	Social classification	0.08
4	Populism	0.11
5	Presence of natural elements	0.12
6	Pattern emulation from indigenous architecture	0.15
7	Symbols and signs	0.05
8	Attention to orientation	0.09
9	Attention to diverse ancient patterns and inspiration from them in various regions of the world	0.02
10	Renovation and revitalization	0.02

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