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Chapter

Assessing the Urban Design Quality of Turkish Cities

Umut Doğan

Abstract

The common characteristic of qualified urban spaces is that they offer an environment enriched with livability criteria, protecting and maintaining the elements of identity and offering flexibility and diversity compatible with the current conditions. Nowadays, the first condition of creating such qualified/successful urban spaces is to reflect the "urban design" processes on the urban spaces. Therefore, the present study aims to discuss the "urban design" quality (the level of success) of the Turkish cities shaped within the scope of urban plans. This discussion was performed using the urban design criteria determining and assessing the actors, which play an effective and relevant role in urban design and planning processes. The fuzzy multi-criteria decision-making (MCDM) method was used. By making use of the results of the present study, the conditions influencing the urban design aspect were re-discussed via current state analysis, and the foundation for a general assessment about the urban design quality of Turkish cities was established.

Keywords: urban design, urban design actors, fuzzy logic, multi-criteria decision-making

1. Introduction

Urban design is the only multidimensional and multidisciplinary approach aiming to establish functional, esthetic, and safe urban public spaces for the societies. It is one of the planning strategies such as spatial planning, strategic planning, cultural planning, regional development, and economic strategies. Rather than replacing the other planning approaches and implementations, it can be seen to move together with them and consider the subjects from the third dimension [1]. It can be stated that the planning decisions must incorporate the "design" aspect because of this step, in which the spatial theme of the planning decisions at the upper scale comes to the forefront [2]. From this aspect, the design aspect has been defined as making 3D designs or design policies at the local and city scale when putting the planning decisions into practice [3, 4]. Hence, it is necessary to focus on the urban design criteria in order to discuss the quality of urban space. The criterion here refers to the criteria determining the success of the design reflecting on the urban space. The main condition for constructing livable and sustainable urban spaces is for the urban design processes to play an active role in planning processes. The main subjects of urban design are to revive social and economic life, using natural sources, esthetic sensitivity, and the pleasure derived from the space. Qualified urban design implementations might contribute to creating livable places with

a rich and different character. The integration of urban design and urban planning is very important from this aspect. Considering the case of Turkey, there are very important problems in this integration. The main starting point of this study is to discuss the formation of urban space, which is caused by these problems, in terms of specific criteria.

The main objective in the present study is to evaluate the "urban design" quality (the level of success) of the Turkish cities which have been shaped within the scope of urban plans since the proclamation of the republic, over the relevant and effective actors playing a role in the urban design and planning processes. This assessment was performed using a fuzzy multi-criteria decision-making (MCDM) method incorporating the processes emphasized in the flowchart (**Figure 1**). The results of the present study allow a general discussion about the urban design quality of Turkish cities. The insufficient and negative conditions influencing the

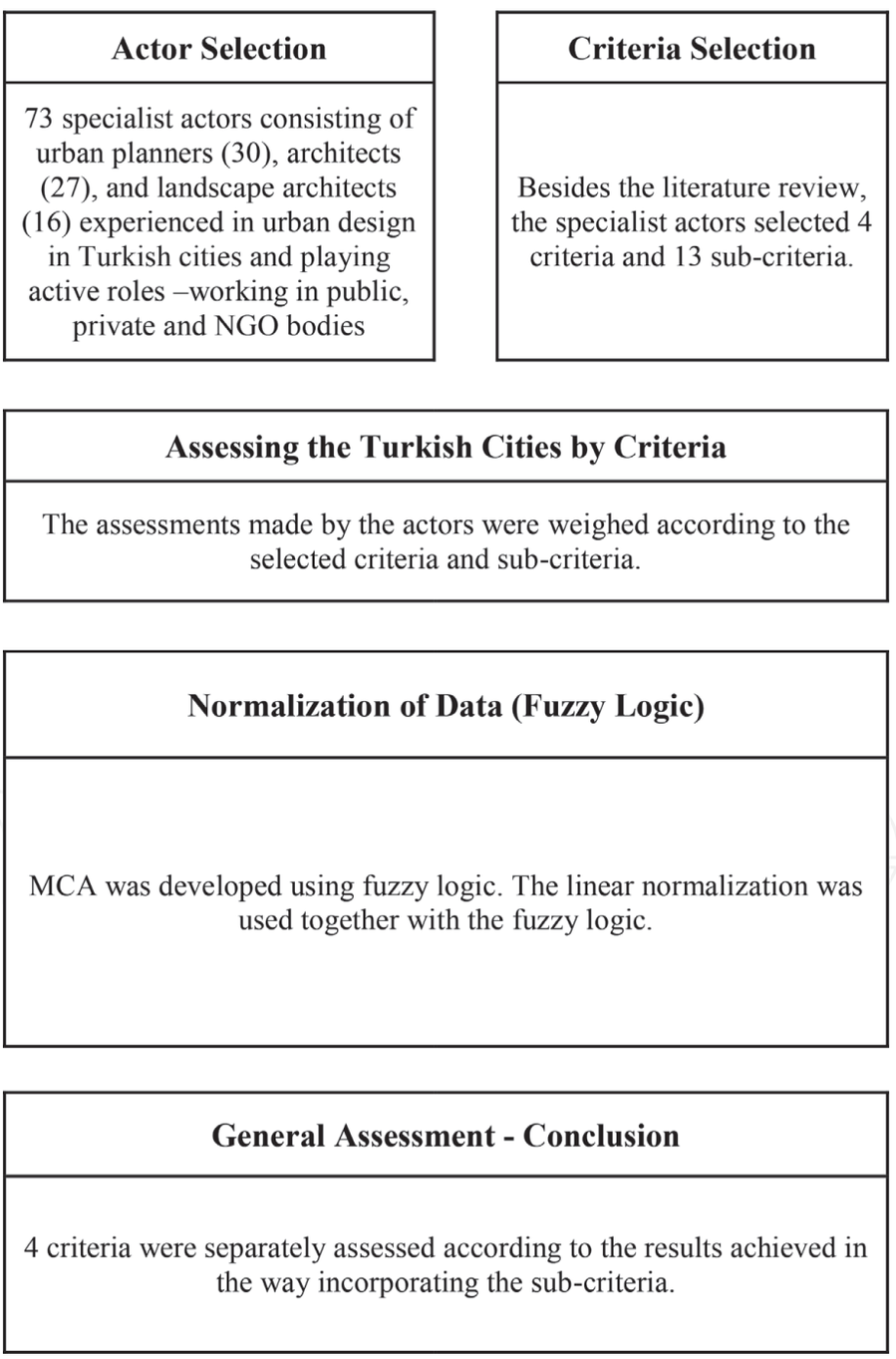


Figure 1.
Methodological diagram of the study.

urban design aspect were re-discussed over the current state analysis, and infrastructure to guide all the relevant actors was established.

2. Urban design in the Turkish planning system

The planning can be described as the process of preparing systematic action plans in order to achieve the desired goals. The plan is defined over two components constituting it. These components are:

- The target to be achieved, which refers to the project.
- The regulations needed for achieving this target, which refer to the instruments.

In planning, which refers to systematically implementing the theoretical knowledge, it is necessary to determine both the target of the plan and the ways to follow in order to achieve the target. Within its widest meaning, the planning has three characteristics:

- It should be a design for the future.
- It should be made for achieving specific targets/objectives.
- It should be a systematic action series.

The planning is to systematically implement theoretical knowledge. It is a process extending from the current time to the future. The main sub-processes are as follows: preparing the research, planning, implementing, monitoring, and assessing [5, 6].

Urban planning is defined as a science, art, and discipline aiming to shape the physical development of the cities by considering the social and economic necessities. Besides that, it is also considered to be a way of directing the change of urban areas [7].

The construction and design of the urban built environment are performed with a systematic approach in countries having a national planning system. The urban design should be a part of this system. The core of the planning system is the urban plans prepared at specific levels. Accordingly, the urban plans offer a framework for directing all the construction activities in the cities. The success of the framework offered by these plans depends on their relationship with the urban design in terms of the spatial dimension of the plans. The position of urban design in the planning system of Turkey is controversial. Urban design could not be positioned in Turkey's planning system in the form specified in the literature, being nothing but a technical implementation carried out because of the legal obligations. For this reason, it would be very useful to discuss the concept of planning.

Urban design is a comprehensive and multidimensional concept. In general, it reveals the ways of creating ideas and putting them into practice. All the long-run social, economic, administrative, and spatial change factors related to the use of sources in the habitat are considered within the scope of planning.

In urban science, planning is discussed at four levels: the city, the environmental, the regional, and the national. As for the topic of urban spaces, it can be defined as the process of determining the land use, transportation, and physical structure within a mutual interaction with the social relationship, including the investigation

of the positions of cities in the region [8]. Urban planning is a comprehensive process with economic, social, and esthetical dimensions, as well as the directing of the physical formation developments. The steps of this complex process are as follows:

- Defining the problem
- Determining the objectives ad targets
- Collecting and constructing the knowledge
- Assessment, synthesis
- Designing the options (suitable plans)
- Assessment
- Feedback and control
- Projecting
- Implementing [9, 10].

Since the outcomes of the urban planning processes were different, various assessments were developed. Especially in keeping with the understanding that the city is a multidimensional and complex case, urban planning has shown advancement towards becoming an interdisciplinary and inter-specialty field of implementation. Urban design has an important role in urban planning's process of gaining an identity, and, as one of the peoples' activities of organizing the environment in which they live, it cannot be separated from the planning [10–12]. From this aspect, different actors also play a role together with the components of the planning system in this process. The urban spaces, which are constructed by the sociopolitical dimension, are the spaces in which the discussions and reconciliations between the actors having different interests and expectations occur. The area in which the process occurs defines the participation styles, effects, and activity forms of the actors.

From the aspect of planning and urban design, the main reason for the problems observed in Turkey is the "zoning approach and practice" [13]. Being the main guideline of the legal foundation of the Turkish planning system, Zoning Law Nr.3194 can be summarized as follows: the zoning plans can be defined as the "master plan" and the "implementary development plan"; the "master plan" is the plans prepared in order to lay the foundation of the preparation of the implementary development plans and to show subjects such as general usage types, main region types, future population densities, building density (when necessary), size and principles of the development of various residential areas, transportation systems, and solutions for the problems on the existing maps prepared in accordance with the regional or environmental plans. The "implementary development plan" is, however, drawn up based on the principles of the master plan drawn on the existing maps showing the cadastral statuses, and these plans show the building blocks, the intensity and order of these blocks and roads, and all the implementation steps and information to form the basis of the development implementation programs in detail.

As can be seen here, the zoning planning aiming to achieve a legal document generally defines how a building can be constructed on a parcel, but it falls short as

a regulation instrument shaping the physical environment. Even though the land-use plan (physical plan) is an important input for managing the quality of the environment, the land-use plan alone without comprehensive urban design plan/project may not ensure and maintain a high-quality environment [10, 14].

From this aspect, the framework offered by the zoning approach and practice is a regulatory system based on high-level accuracy and offering uniformity at the national level. The zoning plan, which is the expression of this framework, is to create and audit the urban built environment qualitatively. In this process, the main auditing subject of the zoning plans is the parcel [15]. This structure, not including the urban design processes but offering a strict frame, may fall short in providing a qualified urban space. Urban planning and urban design are two important phenomena complementing each other. For this reason, excluding the urban design from the planning process prevents the plans from achieving their targets. Hence, urban design should be involved in the entire planning process.

3. Urban planning and urban design approaches and relations

The spatial quality of urban spaces in developed countries is better than other countries. The main reason for this is thought to be that the planning system starting from the upper scales moves together with the urban design approaches to the lower scales. Thus, everything in the city that people have contact with is provided using various instruments developed together with the plans. These instruments, playing an important role in shaping the urban space, also show similarity from the aspect of urban design.

For instance, in England, the *design codes*, *design briefs*, *design guidelines*, and *development briefs* named as *supplementary planning guidance* are prepared for this purpose. In the USA, however, this process is generally named as *design review*, and the design auditing instruments such as *urban design guideline* are prepared. In France, the urban plans (*Schéma Directeur* master plan) and the "land-use plans" (*Plan d'occupationdessols-POS*) are not alone considered sufficient for managing the change in the urban space, and therefore the instruments such as "planning zone" (*ZAC-Zoned'AménagementConcerte*) and "zoning plan" (*PAZ-Plan d'Aménagement de Zone*) are used [15].

In the different planning approaches and legal regulations worldwide, both the central and local administrations use urban planning and urban design together in ensuring urban quality. Even though the framework offered by the zoning plans in Turkey seems enough from the quantitative aspect, the plans are not sufficient in the process controlling and directing the urban design in different countries, and the urban design instruments are used together with the plans. This is the hint for creating high-quality spaces and a successful outcome [16–18].

Since the nineteenth century, the concept of urban design has been considered in different contexts and scopes within urban planning. In this process, practitioners and theoreticians such as Kevin Lynch, David Mackay, Francis Tibbalds, etc. have offered different definitions. In parallel with the works and discussions of the theoreticians and practitioners, urban design has been conceptualized in an organized fashion (**Figure 2**).

In this conceptualization, urban design is close to urban planning at a high scale. Besides that, considering urban design as the design of small urban spaces at a low scale, it is close to the esthetic and spatial points of interest of the architecture and arts. Moreover, urban design is interested in the interaction between public and private development and its effect on the form of the city, the relationships between people and locations, movement and urban form, nature, building structure, and the processes providing successful cities and towns [1, 2, 19].

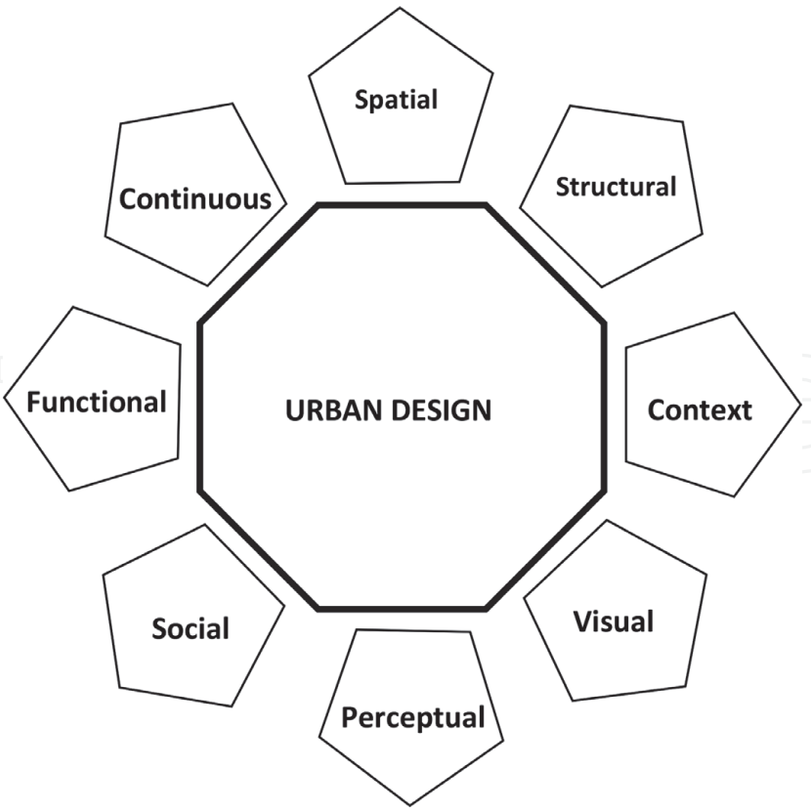


Figure 2.
Conceptualization of the idea of urban design [18].

In this form, one of the most important objectives of urban design is to ensure and maintain quality and character, to integrate the old and new; to protect the natural characteristics of the city, providing new and multidimensional areas; to improve the security, health, and comfort of the city, etc. The environmental quality includes many components such as "esthetic," identity, assessing the vista and natural exposition points and corridors, human scale, comfort in pedestrian transportation, ability of keeping away from the traffic noise, providing public spaces to rest-commune, developing the consciousness of heritage, and re-evaluating culture and historical heritage [19].

Summarizing the theoretical frame might significantly contribute to the urban design approach and the organization of the city. In the cities that are in the development process, many of the human scales disappear, the memories of the cities weaken or disappear, and the connections between the city and people rupture. The process of reconciling humans and the city in which they live incorporates a series of tasks starting with planning works, continuing with urban design practices, taking place in the third dimension. From this aspect, the best way of constructing successful and sustainable cities is to think about urban design from the very beginning of the planning and development process.

4. The actors in urban design processes: authorities and experts

The physical environment is formed as a result of urban planning and the urban design process. The components of this formation are the appearance of buildings, the relationships between these structures, their locations, densities, spatial sense, landscapes, and pedestrian and vehicle movements. The components of the physical environment are gathered under nine groups: spatial, morphologic, contextual, visual, perceptual, functionality, sustainability, and the design/planning process [8, 20].

This process, designed as multidimensional, is constructed by the actors having different expectations and objectives. In order to understand or perceive the built environment, it is necessary to define key actors, the objectives and targets of these actors, the expectations of them in designing the built environment, and the relationships between the actors [21]. The roles and positions of the actors in urban design may always vary depending on the progression of the process. Although the actors may vary between the parts of the built environment, they continue existing.

It is difficult to define and to clearly describe the actors of urban design. Despite this difficulty arising from diversity and multidimensionality, there also is a consensus on some of the main actors. From this aspect, the actors deciding in the formation of built environment in urban design are divided into four groups: private sector, public sector, public-private cooperation, and society [22]. In other words, they can be described as professionals (urban designers, planners, architects, landscaping architects, etc.), politicians, municipalities (those working at local administration), non-governmental organizations (NGOs), universities, users-society-urbanites, sponsors, and entrepreneurs/investors. These actors have different specialties and financial and political effects depending on their professional, administrative, capacities, etc. The professional identities in these fields have an interdisciplinary character related to planning, architecture, and landscape architecture. The specific character and professional capabilities of each of the relevant design professions are reflected in the urban design [23]. Besides these professional characters, the other professional groups supporting the process and playing a binding role are the social scientists, lawyers, economists, environmental scientists, and engineers [1].

Within the scope of this study, the evaluations of the most effective actors directly influencing the urban places in the design and implementation phases are discussed. In other words, an analysis was made of the actors having a fundamental

Number of Actors	Institution	Professional Title
9	Municipality	Urban planner
3	Non Governmental Organization (NGO)	Urban planner
7	Private	Urban planner
11	University	Urban planner
7	Municipality	Architect
3	Non Governmental Organization (NGO)	Architect
9	Private	Architect
8	University	Architect
4	Municipality	Landscape architect
2	Non Governmental Organization (NGO)	Landscape architect
5	Private	Landscape architect
5	University	Landscape architect
Total:73		

Table 1.
Actors selected for the analysis.

professional identity in the urban design. These are the professionals working in the private sector, public sector, and NGOs. The common character of these professionals is that they have an effective and specialized structure in the field of urban design. From this aspect, the professional titles of these actors were selected to be an urban planner, architect, and landscape architect. Seventy-three professionals following the urban design processes in Turkey and involved in many processes were involved in the analyses. Among these actors, there are 30 urban planners, 27 architects, and 16 landscape architects (**Table 1**).

Among the selected actors related to the field of urban design, the urban planners are interested in the quality of the built and visual environment, examine the design-related subjects from theoretical and political aspects, and ensure that they are reflected in the practice. They prepare the projects, which will meet the necessities of future objectives and provide solutions for the problems at different scales. Within the scope of plans, the architects make use of their creativity and implement their original and independent designs. They play a role in the entire project design and implementation process. The landscape architects, however, integrate the physical content, nature, and nature's components with the design by making use of their experience in using the dependence to location/ground and time as an important design element [24]. The decision-makers in this process may significantly vary in terms of person and institution. The effects of powers such as politicians, entrepreneurs, financial institutions, investors, etc. have always been effective on the actors. However, the present study does not involve these powers. It focuses on the evaluations of the main actors about the reflection of design processes on the space.

5. Assessing the quality of Turkish urban design (level of success) by using a fuzzy logic method

Determining the "urban design" quality of the Turkish cities which have been designed using urban plans is very important for future urban design approaches. In the following sections of this study, the success level will be determined by making use of the evaluations of the relevant and effective actors. In this analysis to be performed using the fuzzy logic method, the urban design criteria specified in the literature will be taken as a basis. The results of the evaluations will be used in analyzing the Turkish cities which come to the forefront with their planned development, in terms of the urban design criteria, and a general evaluation will be made.

Developed by Zadeh in 1965, fuzzy logic is a method for defining and solving the problems having no exact limits [25]. Besides that, it is generally accepted as a way of thinking and deciding in the way closest to the human's way of thinking. In the study of Yager, McNeill and Thro [26], this method was reported to have various positive characteristics such as simplicity, easiness, robustness, and the use of linguistic variables similar to the human's way of thinking. The multi-criteria decision-making methods are used for defining and solving decision-making problems with multiple criteria and repetitive decision-making processes.

The criteria involved in assessing urban design have different complex relationships. Since the urban design criteria are multifactorial and have various sizes and the criteria could not be expressed in a common way, the analysis of the cities in the present study can be formulated as multi-criteria decision-making [27]. In MCDM methods, the opinions of the main actors are requested, and these opinions are directly utilized. Since the specialists make net evaluations while making a decision, useful results may sometimes not be achieved when comparing complex criteria. For this reason, the fuzzy MCDM allowing an analysis of an interval and presenting the evaluations of the specialists within a range was used in the present study.

6. Selection of the evaluation criteria within the scope of urban design

The common characteristics of qualified/successful urban spaces are to offer livable, dynamic, and different spaces having character and (most importantly) satisfying the people living there. Nowadays, the first step of constructing these qualified/successful urban spaces is to determine and implement the principles of urban design. The urban design criteria are abstract on their own. However, when they are concretized within the process of development, they have significant effects on the city and consequently on the people because they gain an environment for contacting all the senses of people after the concretization.

The most effective part of these urban spaces is the urban public spaces. Urban public spaces cover all the built or natural environments easily accessed by the public and used free of charge. It covers all the streets, squares, roads, residential areas, parks incorporating commercial or public usage areas for the citizens, open areas, and the public or private properties where the society can freely visit at least in the daytime. The urban spaces should be freely accessible for every person and provide the highest urban quality to the urbanites. The most important necessities in public spaces are comfort, relaxation, active/passive participation, exploration, and human needs [28].

Certain urban design criteria are utilized in order to keep the urban space quality at the highest level. These criteria cannot become clear because of the different perspectives of researches and the spatial conditions in different periods. However, there are also certain common points.

According to the analyses made in the literature by various researchers, the criteria constituting the components of high-quality urban spaces are classified in different ways. The physical needs and the need for security, belonging, respect, and existing in a space are the fundamental needs [24, 29]. Another perspective is about the relationship and continuity of the patterns. The integrity and continuity of spatial relationships are crucial. From this aspect, many principles influencing the quality of urban life have been determined [30]. Another approach is that of Kevin Lynch. The criteria he put forward as design criteria are vitality, identity, adaptation, access, diversity, freedom, and domination [31]. In the criteria discussed by Nasar [32], there are common points besides the differences from the other theoreticians. These criteria were classified as compliance with nature, order, definitiveness, identity, and cleanliness. Similarly, discussing the importance of human scale and the pedestrian- and cyclist-oriented urban design for ensuring the urban quality and the destructive effect of vehicles, Gehl designed the criteria for the livability of urban spaces. These criteria are security, vitality, density, perceptibility, accessibility, and control [33]. From the same perspective, considering that the importance of the urban design criteria arises from livable cities, Llewelyn Davies Yeang also designed certain criteria. These criteria are noise, sound, crowdedness, the material quality of space, presence, function of open and public area, presence of pedestrians, accessibility, service diversity and quality, mass transportation, and security [34].

The criteria selected here are based on the literature review and the participation of a specialist group, which consists of actors playing an effective role in urban design decisions, in Turkey. This group consists of 73 specialist actors (urban planners, architects, and landscape architects). In this approach, the quantitative weight method is used in defining the relative importance of the criteria following the vision of specialists.

Considering the specific conditions of Turkish cities in terms of urban design, the specialists defined the criteria. In the next phase, these criteria were weighted and prioritized.

The "urban design success criteria," which were defined using the literature review, were asked to every specialist separately in the form of survey. Four main criteria and 13 sub-criteria accepted by all the specialists were accepted in the present study. In the next step, the specialists were asked to prioritize the criteria, and the weights of selected criteria representing their importance in the success level of urban design were determined. In the third step, the design and current status of Turkish cities were analyzed in terms of the selected criteria.

Four main criteria and 13 sub-criteria presented in **Tables 2** and **3** were used in analyzing the success level of urban design in Turkey within the scope of this manuscript.

In this parallel, the urban design assessment criteria were defined based on the relevant literature. These criteria are as follows:

1. Urban design quality
    a. Character and identity
    b. Diversity
    c. Readability and definitiveness
    d. Continuity, closeness, coverage, and guidance
    e. Flexibility
2. Environmental quality
    a. Urban built environment's compliance with nature
    b. Level of noise
    c. Appearance and level of cleanliness
3. Functional quality
    a. Pedestrian and non-motorized vehicle access
    b. Mass transportation opportunities
    c. Urban services
4. Security
    a. Pedestrian security
    b. Balance of daytime-nighttime usage

6.1 Character and identity

This can be defined as the "location" and its identity. The character is the quality consisting of the combination of topography, building type, geology, traditional structures, urban texture, and borders. In other words, it can be defined as

	Main criteria		Pairs of sub-criteria	Specialist evaluations (%)
1st Main criterion	**Quality of Urban Design**	a	Character, identity	58.7
		b	Diversity	41.3
		a	Character, identity	56.7
		c	Readability, definitiveness	43.3
		a	Character, identity	42.2
		d	Continuity, closeness, coverage, guidance	57.8
		a	Character, identity	40.8
		e	Flexibility	59.2
		b	Diversity	56.6
		c	Readability, definitiveness	43.4
		b	Diversity	57.5
		d	Continuity, closeness, coverage, guidance	42.5
		b	Diversity	51.2
		e	Flexibility	48.8
		c	Readability, definitiveness	38.8
		d	Continuity, closeness, coverage, guidance	61.2
		c	Readability, definitiveness	46.2
		e	Flexibility	53.8
		d	Continuity, closeness, coverage, guidance	46.1
		e	Flexibility	53.9
2nd Main criterion	**Environmental Quality**	a	Compliance of urban built environment with the natural environment	87.2
		b	Noise level	12.8
		a	Compliance of urban built environment with the natural environment	85.1
		c	Appearance, cleanness level	14.9
		b	Noise level	42.7
		c	Appearance, cleanness level	57.3
3rd Main criterion	**Functional Quality**	a	Pedestrian and non-motored vehicle access	80.4
		b	Mass transportation options	19.6
		a	Pedestrian and non-motored vehicle access	72.5
		c	Urban services	27.5
		b	Mass transportation options	41.2
		c	Urban services	58.8
4th Main criterion	**Security**	a	Pedestrian security	46.6
		b	Balance between daytime and nighttime usages	53.4

Table 2.
Evaluation percentages of assessment criteria and sub-criteria pairs.

Main criteria	Sub-criteria	Weights
Urban Design Quality	Character, identity	0.198
	Diversity	0.207
	Readability definitiveness	0.172
	Continuity, closeness, coverage, guidance	0.208
	Flexibility	0.216
Environmental Quality	Compliance of urban built environment with the natural environment	0.574
	Noise level	0.185
	Appearance, cleanness level	0.241
Functional Quality	Pedestrian and non-motored vehicle access	0.510
	Mass transportation opportunities	0.203
	Urban services	0.288
Security	Pedestrian security	0.466
	Balance between daytime and nighttime usages	0.534

Table 3.
Weights of the sub-criteria.

improving the townscape and landscape character by supporting and answering the distinguishing/featured texture of the development and culture locally. The positive characteristics and habitats of a location are important for gaining that place a character and a meaningful identity. The landscaping, building types and materials, the structure of local life, and the other characteristics distinguishing the place from the others are the components of that place's character.

6.2 Diversity

It can be defined as the mixture of appropriate developments and development of options and differences between the usages in order to create livable places answering local needs. The usages offering diversity indicate how well a place is used, and it supports the economic and social activities in that place. The urban design criteria specified above are meaningful only when concretized. From this aspect, the design policy is an intermediary design instrument between the urban design criteria and the design instruments allowing the implementation of these criteria. The effective design policies do/should focus on how the urban design criteria can be achieved within a specific scope/context.

6.3 Readability and definitiveness

It can be defined as assisting the people in finding their way by making use of the definable roads and crossroads. The readability is always neglected; thus, it is very important to strengthen it because, in the design process, it is necessary to consider that not all the people are literate, and they do not get pleasure out of a place in the same way. Women and men, children and adults, visitors and inhabitants, old and young persons, and persons from different cultures perceive and interpret the same location in different ways. For this reason, a frame addressing all the perception styles is important.

6.4 Continuity, closeness, coverage, and guidance

It can be defined as improving the continuity of the street fronts and closeness of "places" via the advancements clearly defining the public and private places. The successful urban space is a field closed and defined by structures, buildings, and landscape components. Both relationships between the structures on a street and between street and structures are an indicator of it. The buildings following the general structure lines define the street and strengthen the effect of the street. The advancements following the borders of street fronts might contribute to clearly distinguishing the public and private spaces.

6.5 Flexibility

It can be defined as creating advancements answering to the social, technologic, and economic conditions changing in the course of time. The urban spaces should be adaptable for usage at different scales. The most successful spaces are those capable of changing under different conditions. From this aspect, the cities should be able to adapt themselves to the rise and collapse of industries and the change from residential to commercial areas, and the structures and infrastructures should show the same adaptation. Moreover, the spaces should allow diversity in usage under different conditions and in different seasons.

6.6 Compliance of urban built environment with the natural environment

The compliance and integrity of built physical environment with the natural environment are very important for the value added to the quality of life. Rather than ignoring the natural formations, it is necessary to move together with them if possible, and the urban spaces should be created with this integrity. It is the basic objective of sustainability. The quality of the public space depends on its compliance with the local climatic conditions, material, vegetation, lighting, instructions, signs, street furniture, functions, and esthetic qualities.

6.7 Noise level

It is one of the important factors of environmental quality in urban spaces. Motor vehicles are among the parameters determining the quality of space because of the production activities of various intensities (such as pedestrian or vehicle).

6.8 Appearance and cleanliness level

From the aspect of cleanliness, the rate of use of the urban spaces compatible with the health conditions will always be high. From this aspect, it is a necessity to take measures preventing the dirtiness of urban spaces. It is important to adapt the design processes to space in this context.

6.9 Access of pedestrian and non-motorized vehicles

Given the physical environment and the relationship with others, the easiest and most appropriate way of movement is seen to be moving as a "pedestrian." For this reason, the pedestrian movement should be well-organized in order to maintain the urban space life based on the healthy human-human relationship. It is a fundamental necessity to gather the pedestrian movements and flows in an appropriate and meaningful manner and to canalize it to the activities.

6.10 Mass transportation opportunities

Walking is the most frequently used method for accessing to the mass transportation vehicles and is one of the traveling modes used by the people between a departure and a destination. In the present study, the walking distance to mass transportation vehicles (busses, taxis, rail-system stops, etc.) was a maximum of 800 m, which is recommended for such studies.

6.11 Urban services

One of the most important reasons for the existence of humans in the cities is the services. The presence and quality of administrative, social, educative, recreational, access, etc. services indicate the success level of that city in terms of urban services.

6.12 Pedestrian security

It can be defined as developing attractive, safe, non-complex, and effectively functioning roads and public spaces by considering elderly people, children, pregnant women, etc. Besides that, the crime factors are also evaluated within the security. This parameter, which is very important from this aspect, indicates that the presence of a pedestrian in the city depends on the elements of security.

6.13 Balance of daytime-nighttime usage

The cities and especially the city centers should not be designed only for daytime usage. In light of the safety factors, the balance should be established between the daytime and nighttime usages. Especially the city centers isolated from the residential areas turn into desolate and insecure spaces at night. From this aspect, it is important to establish the conditions of safe nighttime usage.

7. Weighting and method

The criteria and sub-criteria were selected by the specialists, and then the experienced actors evaluated Turkey before and after the urban planning-implementation processes. The relevant assessment data were obtained. These data include all the information related to the selected criteria and spatial physical environment.

In the next step, fuzzy logic was used, and MCA was developed for preparing and analyzing all the criteria and sub-criteria by using the fuzzy logic method. Since the values obtained from the criteria are expressed in different qualitative and quantitative scales, it was necessary to normalize the data in order to be able to make a comparison. The linear normalization, which is a common approach used in process, MCA, and decision-making problems, was used together with fuzzy logic. The fuzzy theory is based on a fuzziness level (probability) varying between 0.0 and 1.0 and showing a constant increase. The calculation was made using the sigmoidal function specified below:

$$f(x_i) = \begin{cases} x = x_{min} = 0 \rightarrow f(x_{i)=0} \\ \quad . \\ \quad . \\ x = x_{max} \rightarrow f(x_{i)=1} \end{cases} \qquad x_{min} < x_i < x_{max} \rightarrow f(x_i) = \frac{x - x_{min}}{x_{max} - x_{min}} \qquad (1)$$

X_i—network element (i = 1, 2, …, n); X − X_i—between the network elements.

The next step was to determine the importance of the urban design criteria and sub-criteria. The analytical hierarchy process was used for assigning the weights given by 73 specialists (**Tables 2–4**). The pairwise comparison matrix was used in translating the opinions of specialists into values. As shown in **Tables 2–4**, the weights of criteria and sub-criteria were calculated using different combination pairs.

The last step of this process is the involvement of weights given by the specialist actors to the sub-criteria and criteria. The method used here was the weighted linear combination (WLC) because it is an analytical approach that can be used in multi-featured decision-making. In the WLC, the combination enabled the application of the weights obtained from the binary combination to the conditions provided by Turkey's urban design approach. The conditions provided by the country were ordered based on the priority number and calculated by summing up the results of every criterion. The higher the score is, the better the relevant criterion is reflected in the urban spaces. The WLC enables an exact balance between various criteria. In other words, even though a criterion has a very bad score, a balance can be established by a higher score from another criterion. WLC was used with GIS and calculated using Eqs. (2) and (3):

Paired Main Criteria	Partial Weights (%)		Main Criteria	Final Weights
Urban Design Quality	77.2		Urban Design Quality	0.379
Environmental Quality	22.8			
Functional Quality	31.1		Environmental Quality	0.222
Urban Design Quality	68.9			
Urban Design Quality	81.2		Functional Quality	0.257
Security	18.8			
Environmental Quality	69.2		Security	0.142
Security	30.8			
Functional Quality	58.7			
Environmental Quality	41.3			
Security	35.8			
Functional Quality	64.2		Total	1.000

Table 4.
Weights of the main criteria.

$$S_k(x_i) = \sum_j^n f_j^k(x_i) w_{kj} \quad (2)$$

where j = 1,2, … ,9; $S_k(X_i)$ is the element evaluation X_I and j criteria for all sub-criteria k.

$$T(x_i) = \sum_j^n S_k(x_i) w_k \quad (3)$$

$T(x_i)$ is the evaluation of all criteria for the element k.

8. Discussing the results by the criteria

The results obtained for Turkey in terms of the criteria examined for the urban planning and design approach by considering 4 main criteria and 13 sub-criteria are

	Main criteria		Sub-criteria	Sub-criteria scores	Main criteria scores
1st Main criterion	Urban Design Quality	a	Character, identity	0.20	0.19
		b	Diversity	0.35	
		c	Readability definitiveness	0.15	
		d	Continuity, closeness, coverage, guidance	0.15	
		e	Flexibility	0.20	
2nd Main criterion	Environmental Quality	a	Compliance of urban built environment with the natural environment	0.15	0.27
		b	Noise level	0.25	
		c	Appearance, cleanness level	0.30	
3rd Main criterion	Functional Quality	a	Pedestrian and non-motored vehicle access	0.10	0.25
		b	Mass transportation opportunities	0.25	
		c	Urban services	0.20	
4th Main criterion	Security	a	Pedestrian security	0.15	0.29
		b	Balance between daytime and nighttime usages	0.10	

Table 5.
Scores by the main criteria and sub-criteria.

presented in **Table 5**. All the criteria were scored between 0.000 and 1.000. For all the criteria, the scores closer to 1.000 indicate the high level of success for the criterion, whereas the scores closer to 0.000 indicate failure. In this section, the evaluations are made based on the scores of criteria.

8.1 First main criterion

In this criterion aiming to measure the urban design quality of Turkish cities in terms of the physical design, there are five sub-criteria. Constituting the main principles of the physical design in general, the highest score among the five criteria was 0.35, whereas the lowest one was 0.15. Since it has a score of 0.35, "diversity" is the criterion with the highest score, but it is much lower than the intermediate level (0.50). Moreover, the mean score of these five criteria was found to be 0.21. From this aspect, the score of the main criteria is 0.19. Given these values, it can be understood that urban design quality is not at a good level in Turkey. All the scores were found to be below 0.35. There are many problems to solve before Turkish cities can come to the forefront with their planned development. It is an inevitable necessity to reconsider the integrity of planning and design in both planning and designing processes. It is understood from these results that, without considering the identities and characters of the cities, they were either damaged or neglected and not included in the planning and design processes. Rather than emphasizing or enhancing the diversity, an inclination towards stereotyping and monotony has been exhibited. Rather than making the cities more readable and defined, the complexity and irregularity have become the dominant approach. The physical and functional continuity has been destructed by the point regulations. There are many undefined areas. The effects of guidance, coverage, and closeness have decreased. Rather than flexible regulations meeting the current necessities, strict and old-school implementations have become prominent.

8.2 Second main criterion

In this criterion, taking the environmental quality as a basis, there are three sub-criteria. None of these sub-criteria could exceed the score of 0.30 (appearance and

cleanliness). The lowest score was that of "the compliance of the urban built environment with the natural environment" (0.15). Thus, the score of the main criteria is 0.27. These results indicate that the compliance between Turkish cities' physical environment with their natural environment is at very low levels. Nature has been neglected and deteriorated via urban interventions. But, the results of planning and design procedures integrated with nature are more successful and more important for sustainability. Besides that, as a result of the urban spaces left to the production of motorized vehicles and industrial production, noise pollution is one of the most negative situations. Although it has a higher score than the other sub-criteria, the level of appearance and cleanliness in Turkish cities is much lower than the intermediate level.

8.3 Third main criterion

Examining the functional quality of Turkish cities, this criterion has three sub-criteria. The highest score belongs to the mass transportation opportunity (0.25), whereas the lowest score belongs to pedestrian and non-motorized vehicle access (0.10). The score of the main criterion is 0.25. Hence as in the other criteria, the level of success is very low in this criterion. In particular, the score of the criterion "pedestrian and non-motorized vehicle access" is a result of a desperate situation. Turkish cities have been designed for the motorized vehicles, and all the planning-designing processes strengthen this resignation. The pedestrians and non-motorized vehicles are given second priority in the cities. The priority is given to motorized vehicles. It is gradually becoming more difficult to be a pedestrian in the cities. In this parallel, the mass transportation opportunities are limited, and there is a lack of alternatives. In some of the cities, the buses are used only at specific hours. The alternatives (metro, light rail system, sea transportation, train, etc.) do not seem to be a dominant approach yet. The urban services start to fall apart from the city centers. They are relegated to the borders, access to which is difficult. This is one of the reasons why the functional quality of the city centers has decreased.

8.4 Fourth main criterion

This criterion examining the security in the cities has two sub-criteria. The scores of these two sub-criteria are very low (0.10 and 0.15). The security here is not limited to the statistical values related to crime. The secure presence of pedestrians in the cities was especially taken into consideration. If all the pedestrian groups such as elderly people, children, patients, pregnant women, etc. can securely reach the locations they want, then that city is a secure city. At this point, the other risk factors such as continuity of the road and confliction with the motorized vehicles were evaluated. Besides that, the transformation of cities into insecure and unsafe places after certain hours was considered within the scope of this main criterion. For this reason, the balance between daytime-nighttime usages is important. The urban services supporting the cities and the planning-designing approach separating the housing from city centers disrupt the balance between daytime-nighttime usages. The cities become deserted and unsafe at night.

9. Conclusion

Analyzing the "urban design quality" of countries in terms of various criteria is very difficult because of the depth and multidimensionality of the subject. Within

the scope of fuzzy logic used in the present study, a multi-criteria method was used. Thirteen sub-criteria and four main criteria were selected, and they were weighted according to the opinions of 73 specialists. All the values were normalized in order to obtain the final order.

The results showed that the urban design quality of the Turkish cities is very low. In these cities coming to the forefront with their planned development from past to present, the negative results have various reasons. However, one of the most important reasons is the lack of an urban design approach that will guide spatial decisions. The urban design approaches do not comply with urban plans. For this reason, the upper scale plans fall short in shaping the spaces or shape them in an unqualified manner.

Within the scope of this study, a general evaluation was made on the urban design approach of Turkey. However, it is believed that similar results would be achieved even if the cities are separately examined. These results indicate that the "urban design" approach shaping the spatial decisions has not been integrated into the planning approach of Turkey. The upper-scale plan approach that does not deal with the urban space has served only for the motorized vehicles, taken the design aspect away from the cities, and reduced the design to a mechanical process.

The present study is important for an understanding of the urban design approach of Turkish cities. The results obtained here can be used in order to define the current problems and to suggest solutions. After determining the problematic criteria, it might contribute to supporting the urban planning decisions aiming to improve the urban design approaches. The problems detected have arisen from the fact that the planning policies giving low importance to the design and implementation processes are still in effect. However, the urban design has become more important from various aspects in the modern planning approaches, and it becomes active together with the planning processes.

In any field, quality is related to a product's ability to solve the targeted problems and meeting the physical, social, and other needs. The quality of the urban design is directly proportional to its ability to meet the vital needs in urban spaces and ensuring urban comfort. Since the concept of quality is a multidimensional concept, the urban design quality should be considered together not only with the functional characteristics of the urban spaces but also with their descriptive characteristics. Urban quality can be achieved with the right urban space design. Increasing, ensuring, or maintaining the quality of spaces, in which humans live and their lives are shaped, affect all the life segments including the culture, economic status, and physical aspects as the components of urban quality. The more perceptible and readable the urban space is and the more complementary the urban components are, the more satisfactory it is for the spatial quality of life and urban quality. In order to increase urban quality, the actors related to urban design should support all the interventions to be made on the urban space with social and economic sustainability. Urban design quality can be achieved with the cooperation of all the actors who play a role in urban design in creating urban space focusing on the targeted design objectives.

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