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The Connection Between the Lighting of Urban Elements and Sculptures, the Attractiveness of Spaces and Structures, and an Increase in Shopping Time

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ABSTRACT

As a representation of human civilization, the city has always served as a platform for advancing diverse sciences for the benefit of the public. The improvement of urban spaces has been the focus of urban science philosophers for a long time. Light and lighting are the fundamental factors in enhancing urban areas. This study examines the effect of lighting on urban elements and sculptures, the attractiveness of urban spaces and structures, and the time spent purchasing in the city. This cross-sectional study's results will influence urban management's development and enhancement; therefore, its purpose is applied. The data collection and analysis method is a descriptive survey and hypothesis analysis. About 400 experts, mayors, and municipal administrators from Tehran's sixth district make up the statistical population of this study. Using the Cochran formula, it was estimated that 196 individuals comprised this study's statistical sample. According to the findings, a significant relationship exists between the lighting of urban elements and sculptures and the allure of urban spaces and structures. In addition, there is a strong correlation between the lighting of urban features and sculptures and the increase in nighttime commerce and pedestrian traffic. Therefore, according to the specialists, mayors, and urban administrators of Tehran's 6th district, there is a significant correlation between the lighting of urban elements and sculptures and the increase in nighttime shopping and pedestrian traffic.

Keywords: *Lighting of the elements, Urban sculptures, Metropolitan identity, Increasing peace and security, 6th district municipality*

INTRODUCTION

Cities no longer slumber when it gets dark and awaken when the sun rises, as they did in the past. The communities and spaces of the modern era have become day and night places. The city's nightlife and the quality of its spaces will inevitably improve with the tempo of social movements at night. Light, as one of the urban landscape's non-physical elements, significantly impacts the space's quality. Despite its visual and psychological effects, however, light is frequently used. Additionally, it should be discussed in greater detail in the design regulations. This aspect of city beautification is based on the managers' preferences or is guided and chosen randomly. Factors such as spatial identity, sense of place, security, legibility, memory creation at different times of day and night, and the result of a special mode that is possible from the variety of lighting have made lighting design one of the most critical issues in urban aesthetics (Samimi & Ghaneie, 2010). By distinguishing the space, illumination can give it a unique identity that people will remember, and by adopting a unique trait, it can infuse the environment with vitality

and dynamism. Nonetheless, this element's uncoordinated and random presence in space results in deteriorating spatial qualities, a problem we face in several cities (Taheri et al., 2011).

In today's world, lighting is a technique, a science, and an art. Its application is undeniably necessary for recreating urban identity, facilitating economic, social, cultural, and recreational development, and enhancing civic life and nightlife. The fundamental design of lighting and its definition for various spaces is crucial, as each room has distinct characteristics that the lighting design should strive to accentuate. In this study, different methods of lighting urban spaces are presented for promoting social and cultural life, enhancing physical appearance, facilitating the reading of landmarks and routes in densely populated areas, promoting more excellent environmental safety, and encouraging citizens to travel at night, taking into account the characteristics of each space and the techniques and knowledge of lighting.

There is more to lighting than casting light on objects to reveal them. Other than the previously observed hues, lighting is based on creativity. Lighting permits lighting designers, architects, and engineers to redefine environments, make contentious alterations to objects, and boost their appeal and wonder (Meshkini, 2010). Urban lighting comprises street lighting, buildings, urban furnishings, traffic lights, urban screens, and seasonal lighting. In addition to facilitating the continuation of urban activities and functions at night, urban lighting systems play a crucial role in fostering safety, comfort, and aesthetic appeal.

Because citizens now spend their leisure time in urban spaces at night, the lighting of urban elements has become an integral part of their lives. The importance of analyzing and influencing lighting elements, sculptures, and volumetric spaces in Tehran and District 6 of this metropolis on the attractiveness of urban areas and structures and the increase of shopping time in the city is significant, as is the necessity of conducting research.

The Roles and Functions of Urban Elements

Strengthen the sense of place: Creating a distinct sense of place and inducing or enhancing a space's unique character is one of the essential functions of the element. A site is a part of space occupied by a person or object with a significant meaning. If the element harmonizes with the environment and enhances the visual coherence of the adjacent territory, citizens feel more content and calm, creating a stronger sense of place.

Defining and identifying urban spaces: An identity is a place where a person can distinguish or discern a site from other locations so that it has a specific, unique, or special character. Sculptures with a creative and aesthetic design can contribute to a sense of identity (Shokrgozar, 2010).

Improving quality and creating vitality in urban spaces: A space without art is not attractive; it reduces its quality and prevents creating a sense of vitality in the urban space. Elements can provide all these things if there are other conditions.

Increasing public awareness and introducing cultural symbols and values: Elements, statues, and associated explanations can enhance citizens' knowledge and awareness of cultural events and other fields. For instance, they can introduce the people of a region to the characters or historical events of that region, as well as its cultural symbols.

Representing the historical or cultural function: Numerous squares have been the site of singular historical events; the elements that have been the focus of these events may continue to symbolize them for years. The current function of the field can also be expressed through features, statues,

or statues; for instance, the installation of a "climber" statue in the field, which is the origin of climbers' departure to the mountains, conveys the athletics spirit of the area surrounding the field (Inskeep, 1991).

Definition of the center of gravity and the focus point: The element can represent the field's center because it is perceived and comprehended from both sides as an element in the field's center. For this reason, even in squares devoid of automobiles, many designers position the statue in the center of the square's center of gravity to reinforce the sense of centrality and establish visual order (Klich, 2012).

Creating an urban landmark: The sign is one of the primary architectural elements of the city. Symptoms, according to Kevin Lynch, distinguish the various areas of the city. In addition to other factors, the sign's characteristics must be identifiable. If the characters have a distinct form, contrast with their background, and are dominant in their surroundings, they are easier to recognize and more likely to have a meaning. In many instances, elements and statues, mainly if they are large, can serve as signs for a neighborhood, region, or city.

Urban Lighting

Successful lighting combines science and art, and it requires a precise comprehension of the subject's characteristics being illuminated in any field (urban, architectural). It is the most crucial stage of the lighting process. One of the essential considerations for a lighting designer is answering questions such as what lighting is necessary for people to perform their tasks effectively and what type provides the most comfort. Because the amount of light reflected from various surfaces affects what the eye sees from the surrounding environment and what the brain perceives, properly comprehending people and their requirements is necessary for any successful lighting design. Consequently, understanding the properties of materials and their surfaces and paying attention to the quantity of light reflected from them is another principle of adequate lighting (Taghvaei et al., 2011).

Light and its issues are adequate design elements for all types of urban spaces (Kheiri & Rezvan, 2010). There are two uses for light in urban areas: lighting and illumination. The fundamental reason for lighting spaces at night is to create safety and a feeling of security. By enhancing people's vision and illuminating blind, concealed, and crime-prone areas, optimal lighting simplifies living in urban spaces. Lighting elements are also used as design elements and provide light and safety to the environment (Hessam et al., 2012). Therefore, lighting is a component of the design for the night, which should be incorporated into the design and follow the space's character and personality.

If properly designed, lighting elements may be used as architectural elements during the day; otherwise, they should be in harmony with their surroundings or concealed. Every space has distinct characteristics that lighting should seek to accentuate. Using lighting techniques and understanding light elements helps to design a suitable night scene. In addition to scattering light upwards, proper lighting illuminates the space, whereas improper lighting reduces the usable space's illumination and the likelihood of being in the environment. Therefore, the appropriate light source design is crucial to effectively applying light (Akbarpour, 2010).

Research Methods

This cross-sectional study's results will influence urban management's development and enhancement; therefore, its purpose is applied. The data collection and analysis method is a descriptive survey and hypothesis analysis. About 400 experts, mayors, and municipal

administrators from Tehran's sixth district make up the statistical population of this study. Simple random sampling was used in this research. The required sample for the research was determined based on Morgan's table and using Cochran's formula; the sample size was 196. A closed questionnaire collects data to evaluate research hypotheses and relationships between variables.

To ensure the validity of the content of the measurement instrument, research literature and theoretical foundations served as the basis for the development of the queries. Due to the absence of a standard questionnaire, questionnaire indicators were derived from management professors' and experts' opinions and perspectives and the available materials and literature in this field. After drafting the questions, multiple copies of the questionnaire were distributed to 20 individuals as a review of the questions and their format. The final questionnaire was created after modifications, revisions, and evaluations by supervisors and advisors.

Cronbach's alpha was used to determine the reliability coefficient in this study, and its value was 0.86. Using SPSS software, the data obtained from the questionnaire was analyzed.

District 6 of Tehran metropolis

District 6 is one of the central districts of Tehran that is relatively old. This district encompasses approximately 3.3% of the city, totaling 2138.45 hectares. District 6 is situated in the center of Tehran and is bordered by Districts 10, 11, and 12 to the south, District 3 to the north, District 7 to the east, and District 2 to the west. One of the most prominent physical characteristics of Tehran's District 6 is its central location and the establishment of the most effective transregional, urban, and national service-administrative uses. This region is bounded on the south by the greatest east-west axis of the city, Enghelab Street, and is accessible from the west, east, and north. Chamran, Modarres, and Hemmat are Tehran's three primary east-west highways. This district is divided into six districts and 18 neighborhoods.

The student dormitories in Tehran's District 6 have profoundly affected this neighborhood's demographics and social fabric. Yousef Abad's Kalantari Square is the location of the principal municipal facility for District 6. Nosrat, Keshavarz, Amir Abad, Yousef Abad, Behjat Abad, Karim Khan, Saei, and Arjantin are among the most important localities in this district. This district consists primarily of administrative and commercial sectors, and as a result, it has been one of Tehran's revenue-generating areas for many years. Laleh Park, Saei Park, Nezami Ganjavi Park, Church Of St. Mary, Tehran Museum of Contemporary Art, Asr-e Jadid, Felestin, Sepideh, Bahman, Esteghlal, and Africa cinemas, as well as the Amirkabir University of Technology and the University of Tehran, are among the most important parks in this district. According to the 2011 Iranian census, this district's population is 22,9980 (73,212 households), with 110,751 men and 119,221 women (Fig. 1).

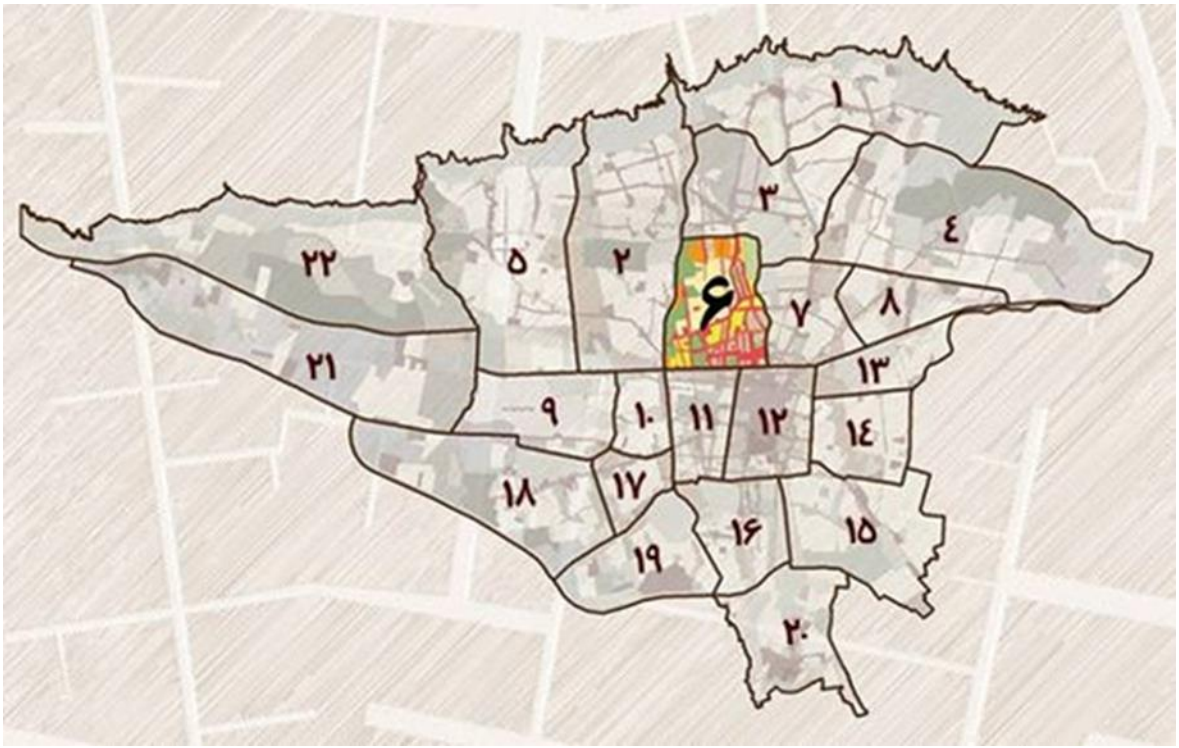

Fig. 1: Location of District 6 in Tehran

Table 1: Criteria and sub-criteria for calculating the level of development of Tehran districts

Criteria	Sub-criteria
Housing	The age of the building, the type of building materials, the size of the residential units, the number of rooms at the disposal of the household, the way of owning the residential unit
Education	Literate percentage of the population aged six and over, percentage of literates with higher education, per capita of users in the education sector
Population	Population density, percentage of population growth, size of household, percentage of population up to 14 years old
Smployment	The percentage of unemployment, the number of professionals to the total number of employees, the percentage of employment in the service sector, the percentage of employment in the education sector
Access to information	Percentage of families with computers and internet
Environment	Disposal of kitchen sewage in the side sewer, disposal of kitchen sewage in the surrounding environment, disposal of toilet sewage in the side sewer
Infrastructures	Having electricity, landline phone, piped water, piped gas, central heating, and cooling device, having bathroom and kitchen

Findings

The majority of the sample population is male, according to the study's findings (77%). Marital status is the most prevalent (66%) marital status. In addition, the sample has the most significant proportion of individuals with a bachelor's degree (52%). Most of this test's respondents have less than ten years of work experience (53.5%). Finally, most respondents (50%) were between 20 and 30.

Table 2: Descriptive statistics of the relationship between lighting elements and urban sculptures

	Q5	Q6	Q7	Q8
N Valid	196	196	196	196
Missing	0	0	0	0
Mean	3.8878	3.5714	3.7551	3.8061
Median	4.0000	4.0000	4.0000	4.0000
Mode	4.00	4.00	4.00	4.00
Std. Deviation	0.87568	0.96609	0.86007	0.98354
Variance	0.767	0.933	0.740	0.967
Range	3.00	4.00	4.00	4.00
Minimum	2.00	1.00	1.00	1.00
Maximum	5.00	5.00	5.00	5.00
Sum	762.00	700.00	736.00	746.00

Table 3: Binomial Test result

	Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
Group 1 Attractiveness	<=3	30	0.15	0.50	*0.000
Group 2	>3	166	0.85		
Total		196	1.00		

*: based on Z Approximation

According to Table 2, the mean of all four queries is greater than 3, resulting in an overall standard of 3.75. On the continuum of scoring, it is between 3 and 4. According to the respondents, a significant relationship exists between lighting elements and urban sculptures in the attractiveness of urban spaces and buildings.

Table 3 displays the Binomial Test results, which were also used to improve the investigation. Considering that each factor is calculated based on multivariate mining and is continuous in the Binomial Test, the ratio of the test was deemed to be 0.5, and the cut point was set at 3. Because the significance level is 0.000 and less than 5%, the software output rejects the equality assumption of about 0.5. In addition, because the observed ratio is more significant than 0.5, many respondents selected answers above the mean. Consequently, according to the people of the studied society, illumination elements and urban sculptures have a significant relationship concerning the attractiveness of urban spaces and buildings.

Table 5: Descriptive statistics of the relationship between lighting elements and urban sculptures and increasing shopping time and people's traffic

	Q9	Q10	Q11	Q12

N Valid	196	196	196	196
Missing	0	0	0	0
Mean	3.7602	3.7755	3.7704	3.4337
Median	4.0000	4.0000	4.0000	3.0000
Mode	4.00	4.00	4.00	3.00
Std. Deviation	0.88789	0.93404	0.80597	1.15944
Variance	0.788	0.872	0.650	1.344
Range	4.00	4.00	4.00	4.00
Minimum	1.00	1.00	1.00	1.00
Maximum	5.00	5.00	5.00	5.00
Sum	737.00	740.00	739.00	673.00

Table 6: Binomial Test result

	Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
Group 1 Fun time	<=3	41	0.21	0.50	*0.000
Group 2	>3	155	0.79		
Total		196	1.00		

*: based on Z Approximation

According to Table 5, the mean score of all four questions is more than 3, in which case the total value obtained is 3.68. It is between 3 and 4 in the scoring continuum. According to the respondents, there is a significant relationship between the lighting of urban elements and sculptures, the increase in shopping time, and people's entertainment at night.

According to Table 6, considering that in Binomial Test, each factor is calculated based on the mean of several variables and is continuous, in the Binomial Test, the test ratio is considered 0.5, and the cut point is defined as 3. According to the software output, because the significance level is 0.000 and less than 5%, the assumption of equality concerning 0.5 is rejected. Also, because the observed ratio is more significant than 0.5, many chose answers above the average. As a result, according to the people of the studied society, There is a significant relationship between the lighting of urban elements and sculptures and the increase in shopping time and people's traffic at night.

Conclusion

This study examines the relationship between lighting elements and urban sculptures, the attractiveness of urban spaces and structures, and increasing shopping time. According to the results, there is a significant correlation between the illumination of urban elements and sculptures and the attractiveness of urban spaces and buildings. Examining the respondents' responses and the Binomial Test result at a confidence level of 95% confirmed this result. Therefore, the researcher's 95%-confident hypothesis that there is a correlation between the illumination of urban elements and sculptures and the attractiveness of urban spaces and buildings is confirmed. According to specialists, mayors, and city administrators of Tehran's District 6, a significant relationship exists between the lighting of urban elements and sculptures and the attractiveness of urban spaces and structures. There is a correlation between the

illumination of urban features and sculptures and the increase in nighttime commerce and pedestrian traffic. By analyzing respondents' comments and the Binomial Test outcome, this hypothesis was confirmed with 95% assurance. Therefore, according to the experts of the mayors, managers, and relevant city officials of Tehran's District 6, there is a significant correlation between the lighting of urban elements and sculptures and the increase in nighttime retail and pedestrian traffic.

The proper lighting should enhance social and cultural life by increasing the quality of social life and enriching cultural activities, including the development of social relations, providing peace and comfort for older people and children, increasing the safety of pedestrians, and capitalizing on the city's historical, commercial, and cultural attractions. It should also enhance the city's physical appearance by making the exterior more aesthetically pleasing and beautifying the urban landscape, street equipment, the availability of recreational facilities, and urban furniture.

In addition, it should facilitate the ability to discern landmarks, signs, transit routes, and densely populated areas. Promote environmental safety by easing the movement of pedestrians and automobiles. To aid in highlighting the park's landmarks and to stimulate nighttime use. Outdoor illumination creates security and tranquility, and if the lamps are used correctly, without spending a great deal of money, it can significantly impact the environment's attractiveness and safety. As a result of aesthetic and technical considerations, fluorescent lanterns are preferable for use in hallways and public areas. Combining these two has the benefits of producing elegance and maximizing the use of modern technologies.

Research time limitations were one of the obstacles we encountered. In 2017, the present study was conducted. Given that employees' attitudes may alter over time, we cannot anticipate that the results will be stable over the long term.

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