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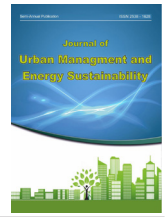

CASE STUDY RESEARCH PAPER

Investigating the effect of physical structure on the behavior of pedestrians (Case Study: Bagh-e-Feyz neighborhood)

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ABSTRACT

Urban environments need to be designed to meet the needs of diverse groups, especially pedestrians. The Bagh-e-Feyz neighborhood faces issues such as narrow sidewalks, limited green spaces, and security concerns, which have progressively disrupted pedestrian behavior patterns. This study aims to explain the impact of the physical-spatial structure on pedestrian behavior patterns in the Bagh-e-Feyz neighborhood and to propose planning principles for improving these patterns. Using a descriptive-analytical approach, this applied research draws on theoretical foundations and relevant case studies to establish a framework for analysis. SPSS software and trained observer methods were employed to test the research question. Findings indicate that several indicators require improvement, including the separation of vehicular and pedestrian routes, the creation of dynamic neighborhood units along urban streets, the preservation of identity elements and historical buildings, attention to local materials, the enhancement of significant neighborhood landmarks, support for group activities, focus on urban walls and symbols, and ensuring perceptible physical diversity for all movement systems. This research provides recommendations for restructuring physical environments to enhance pedestrian experience and offers insights for future studies on the impact of urban design on pedestrian behavior, highlighting the necessity of pedestrian-centered urban planning.

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INTRODUCTION

Cities, as the primary environment for human life, are expected to meet both the material and spiritual needs of their residents, while also ensuring well-being and health standards. However, cities in developing countries face significant challenges in delivering a desirable quality of life and adequate health conditions for their citizens. The rapid pace of urbanization over recent decades has exacerbated these issues, with approximately 55% of the global population currently residing in urban areas a figure projected to reach 70% by 2050 (Bindajam and Mallick, 2013). In Iran, urbanization has also expanded swiftly, bringing consequences such as increased traffic congestion, environmental pollution, the deterioration of historical and social fabric, and a decline in overall quality of urban life. To understand the influence of the physical-spatial structure on citizens' behavior, examining the actions of residents in specific neighborhoods is crucial. Research by Roger Barker and Herbert Wright revealed that physical environments significantly shape human behavior, suggesting a strong relationship between external conditions and behavioral patterns (Carmona, 2021). A major change in contemporary cities is the alteration in physical structure and land use. Historically, urban layouts supported pedestrian access to public spaces for social and cultural interactions, fostering social bonds and urban identity (Fadaiyan Shirazi & Kiani, 2015). However, modern urban planning has prioritized motorized traffic, reduced the safety and attractiveness of pedestrian spaces and negatively affected social interactions, urban identity, and quality of life. The growing awareness of sustainable development principles and environmental issues has highlighted the need for pedestrian-centered urban design. Theories like New Urbanism emphasize prioritizing walking and creating attractive, safe public spaces for pedestrians to enhance social interactions and improve quality of life (Roustaei & Naseri, 2019). Such spaces, including alleys, squares, and markets, provide places for pause and social interaction, reinforcing a sense of belonging and identity in urban environments (Gehrke, 2017). Neighborhoods like Bagh-e-Feyz, with historical and social backgrounds, are prominent examples of the impact of changes in urban physical structure; the reduction of pedestrian-friendly spaces and increased vehicle use in these areas have led to shifts in pedestrian behavior and decreased social interactions. In Bagh-e-Feyz, issues such as limited sidewalks, a lack of green and public spaces, insufficient urban facilities, and reduced pedestrian safety highlight the need for redesigning urban spaces with a focus on walkability. This study examines the impact of physical structure on pedestrian behavior in Bagh-e-Feyz, aiming to identify physical indicators influencing behavioral patterns and improve the quality of public spaces.

Pedestrian movement and pedestrianization

With the rise in urbanization rates, digital advancements, and changes in daily life practices, participation in urban spaces is undergoing transformation and adaptation (Abusaada, 2020). Nevertheless, this participation remains a critical part of daily routines, especially in the face of urban traffic congestion. Pedestrian movement within urban spaces has a distinct rhythm, influenced by the separation of body, time, and space, and offers a combination of physical, aesthetic, creative, and spatial experiences (Yıldırım & Çelik, 2023). Moving through the city is not only a way to explore and transform urban spaces but also involves a mental and perceptual process (Sinclair, 2013; Careri, 2018; Rendell, 2017). Urban design, planning, and spatial organization play an essential role in shaping pedestrian movement behavior (Bezbradica & Ruskin, 2019). Well-designed pedestrian infrastructure should support walking while ensuring both safety and comfort (Riggs & Steiner, 2017; Merom & Korycinski, 2017). Pedestrian behavior can be described as a process involving decision-making and movement between two points, shaped by a variety of factors, including cognitive, perceptual, and personal

attributes, the concept of time, elements of the urban environment, and weather conditions (Lee, 2016). Additionally, the sense of comfort and spatial experience is crucial in developing pedestrian behavior. This behavior not only facilitates movement between locations but also enables engagement and interaction within urban spaces. In summary, pedestrian behavior is a multifaceted and complex phenomenon, influenced by natural, personal, spatial, and perceptual factors. The four core components of this process are: (1) information gathering, (2) destination selection, (3) route selection, and (4) pedestrian movement (Yıldırım & Çelik, 2023).

MATERIALS AND METHODS

As cities evolve and grapple with challenges like urban sprawl, traffic congestion, and sedentary lifestyles, the need to promote walking as a sustainable mode of transportation has become increasingly important. Pedestrian mobility is a fundamental aspect of urban living, influencing public health, environmental sustainability, and social interaction (Baobeid, Koç, & Al-Ghamdi, 2021). Understanding how physical structures impact pedestrian behavior is crucial for creating vibrant urban spaces (Mu, Mu, & Zhang, 2024). The dynamic interplay between physical structures and human behavior has profound implications for urban planning and public health. The physical structure of urban environments has a profound impact on citizens' walking patterns, influencing public health outcomes, social interaction, and overall urban livability (Hillnhütter, 2022). Behavior Setting Theory, developed by Roger Barker (1968), provides a conceptual framework for exploring how specific environments or "behavior settings"shape user interactions and activities (Zhou, et al., 2019). Behavioral studies in public realms have been seriously considered since the early 1960s. For the first time, Marta Mucho (1966) used the methods to improve the conditions of territories and public spaces by using behavioral patterns (Ghalamro, et al., 2022).

Street Layout and Connectivity

Numerous studies have emphasized the role of street layout in shaping pedestrian mobility. Bindajam, & Mallick, (2020) argue that higher street connectivity correlates with increased foot traffic and shorter trips, establishing a strong link between urban form and mobility patterns (Bindajam, & Mallick, 2020). Similarly, Matos Wunderlich, (2008) assert that grid-pattern street layouts foster greater accessibility and encourage walking by reducing travel distances (Wunderlich, 2008). Additionally, research by Gehl (2011) underscores that pedestrian-friendly street designs, such as narrower streets and traffic calming measures, enhance safety and comfort, leading to increased walking (Gehl, 2011).

Land Use Diversity

The relationship between land use diversity and pedestrian behaviors has also garnered significant attention. Gehrke (2017) identify mixed land use as a critical determinant of walking patterns, noting that neighborhoods with a variety of commercial and residential functions promote more walking due to the proximity of essential services. Conversely, single-use zoning, prevalent in many suburban areas, discourages walking by necessitating longer journeys for everyday errands (Ewing & Cervero, 2010).

Access to Amenities

Access to amenities plays a crucial role in shaping walking behaviors. Research by Hino et al. (2018) highlights the importance of proximity to parks, grocery stores, and other key facilities in promoting walking. The findings from current urban studies suggest that neighborhoods designed with easy access to these amenities encourage residents to engage in more walking activities, ultimately fostering healthier lifestyles (Hino, et al., 2018) Moreover, a study by Hunter et al. (2019) illustrates that access to cultural and recreational facilities positively influences pedestrian frequency (Hunter, et al., 2019).

Green Spaces and Walkability

The integration of green spaces within urban environments also significantly impacts walking patterns. A systematic review by Venerandi et al. (2024) shows that neighborhoods with well-designed parks and green areas not only encourage walking but also enhance overall mental well-being (Venerandi et al. 2024). Additionally, research by Ariffin et al. (2017) discovers that green space availability can provide essential corridors for pedestrians, increasing walkability while also facilitating ecological connectivity (Ariffin, Rahman, & Zahari, 2021).

Public Transportation and Walkability

The relationship between public transportation availability and walking is another critical area of study. Studies by Lee (2016) emphasize that neighborhoods with high-quality public transportation systems tend to have increased pedestrian activity (Lee, 2018). This is echoed by research from McAslan (2017), which suggests that a well-integrated transit system encourages walking as individuals navigate to and from transit stations (McAslan, 2017).

Socioeconomic Factors and Walking Patterns

Understanding the demographic context is essential for analyzing walking patterns. A study by Hatamzadeh et al. (2020) explores the variations in walking behaviors across different socio-economic strata, revealing that lower-income populations often face barriers to walking, including a lack of safe infrastructure (Hatamzadeh et al., 2020). Furthermore, demographic factors such as age and gender also play crucial roles in shaping walking patterns, with elderly populations showing a preference for environments that prioritize access and safety (Guzman, et al., 2020).

Cultural Attitudes Towards Walking

Cultural perceptions of walking can significantly impact urban walking behaviors. According to the research by Gehl (2021), cities that prioritize pedestrianism by cultivating a culture of walking through policy, urban design, and local events see an increase in walking activity. These cultural dimensions may vary globally, influencing urban design approaches (Herrmann-Lunecke et al., 2021).

The existing of research underscores the critical role that urban physical structure plays in influencing citizens' walking patterns. Factors such as street layout, land use, accessibility to amenities, green spaces, public transportation frameworks, socioeconomic influences, and cultural attitudes all converge to shape the urban walking experience. As cities continue to evolve, urban planners must integrate these findings into design and policy-making to create environments that promote walking as a sustainable and healthy mode of transportation. (Fig. 1)

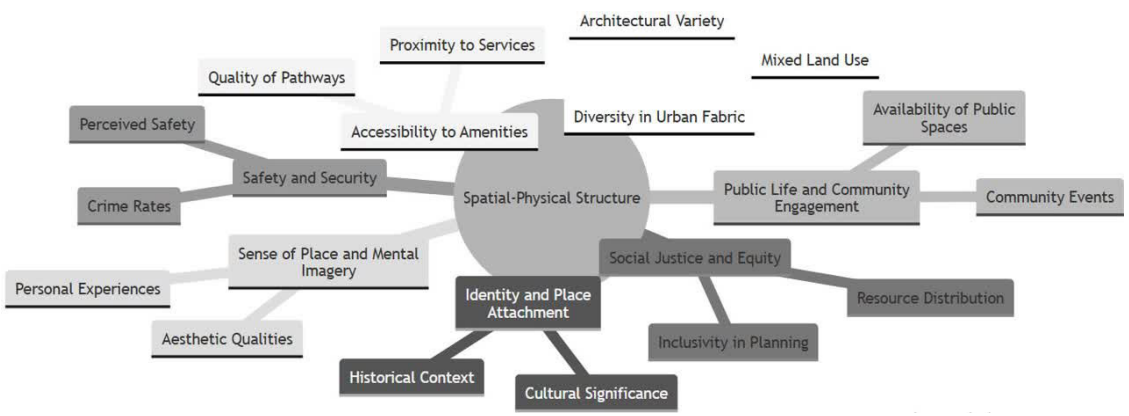

Figure 1: Conceptual model of research

The convergence of behaviorism and the advent of the geographic school of spatial behavior reached its peak in 1952, when William Kirk established the association between geography and the Gestalt school of psychology. To encompass nature and humanity within the realm of scientific study, he argued that embracing Gestalt psychology is necessary to shape our thoughts accordingly. Subsequent to the integration of geography into the Gestalt school of psychology, the spatial perspective within geography came to be identified as the school of spatial behavior.

Examining the behavior pattern observed in the spatial-physical environment

To explore the bidirectional connection between the environment and human behavior, along with the repercussions of these interactions, an in-depth exploration into the types and categorizations of potential and realized behaviors and patterns within urban environments is essential. In an effort to classify behaviors accurately, the study examined behaviors observed in an urban space with a religious emphasis akin to the urban space under investigation. These behaviors were then generalized to the urban setting, categorized, and subsequently presented. The main characteristics considered in the sample selection process were urban spaces playing a role in both religious and commercial activities, a suitable density of space users, and a diverse range of behaviors influenced by the presence of various activities, as indicated in the behavioral observations table. (Tab. 1)

Methodology

The current study is practical in terms of its objectives and is consistent with the nature of goal setting and the methods for achieving these goals, considering the characteristics and features of the study area and the research subject. The descriptive-analytical approach is utilized, involving the collection of data through questionnaires and field observations. The present study employed statistical techniques to ascertain the required sample size, utilizing Cochran's formula. With a study area population of N=26291, the formula yielded a sample size of 317 individuals. The respondents in this research, comprising residents, passersby, and businessmen, were selected through diverse sampling methods. Simple random sampling was utilized for residents and businessmen, while theoretical saturation logic was employed for passersby. In this approach, subjects are selected randomly, providing an equal opportunity for everyone to be chosen. The reliability of the questionnaire was evaluated using Cronbach's alpha coefficient, a commonly employed method for assessing questionnaire reliability. The main focus of this study is to examine the behavioral patterns of pedestrians in relation to the spatial structure, with a specific emphasis on the spatial organization in the Bagh-e-Feyz neighborhood. Theoretical criteria concerning pedestrian behavior patterns and spatial structure were initially identified. Subsequently, an analysis of behavioral patterns was conducted by utilizing pertinent statistics and data in the specified area. Moreover, an assessment of the interconnectedness of the spatial network in Bagh-e-Feyz neighborhood was carried out using the axial map obtained from space layout technique, and the logical relationship between behavioral patterns and spatial network structure was evaluated.

Case Study

Region 5 encompasses over 5287 hectares and is situated in the northwest of Tehran city, renowned for its vast open spaces and dispersed villages. The area spans from the south up to the special Karaj Road, from the north to the Alborz mountains' slopes. It is officially known as the 21st district of Tehran, neighboring Region 2 to the east, region 9 to the south, and districts 21 and 22 to the west. District 5 is comprised of 7 districts and 29 neighborhoods, based on the internal divisions of the municipal action criteria. The 3rd region, which is the largest in terms of area, includes 8 neighborhoods among the seven regions of the area. Located in the eastern

Table 1: Examining types of behavioral patterns

Activity	Behavior pattern	Type of Activity	Active subject	Active component	Behavioral characteristics
Walking	strolling	Elective/Social	individual/ collective	Excursion, wandering	(Depending on whether it is necessary or optional, the speed will be slow or fast) Short steps, slow speed
	traversing	Required		to reach the destination	Passing is done without interruption. Relatively high speed Choose a shorter route
Running		Required/ optional	individual	to reach the destination, to arrive earlier (to reach the prayer)	Fast steps/High speed/Choosing the shortest route
Parley	whisper	Elective/Social	collective	Recreation or pastime	Aram's voice loud voice Depending on the distance between people and the type of behavior, the volume of the voice and the speed of the speech vary.
	talking			Addressing, having questions	
Seeing	watching	Elective/Social	individual/ collective	Getting to know the place, matching the mental image, passing the time	Watching is done with a purpose
	Looking		individual	In search of someone or something	It happens consciously with head movements.
Sitting	sitting squatting	Elective/social/ Required	individual / collective	Resting, chatting, playing, watching, waiting	Sitting down for a long conversation or gathering Temporary sitting while walking, sitting and hanging out
Shopping	giving and receiving	Elective/Social	individual/ collective	Fulfilling a need, spending time	It is done quickly to meet the need. Selective purchase happens with pause and stop, as a result, the duration of the person's presence in the space increases.
Selling	-	Required	individual	earn money	It may involve car parking or congestion Improper parking and interference
Getting off	-	Elective/ Required	individual	Reaching the destination	
Playing	in a sitting position Along with walking, along with running	Elective/Social	individual/ collective	Recreation Spending the time	Playing is accompanied by noise. It may happen by gathering in a part of the space. Choosing a path while playing may not be conscious and may involve avoiding obstacles.
Eating	Eating while sitting Eating while standing Eating while walking	Elective/Social	individual/ collective	Recreation gathering of friends hungry elimination	Considering that eating may be to satisfy hunger or to have fun and spend time, the speed decreases and is combined with other activities.

area of Tehran's 5th district, the Bagh-e-Feyz neighborhood falls within the 3rd district of this region. Its boundaries are defined by Ashrafi-Esfahani highway to the north, Hakim Highway to the south, and Sattari highway to the east. This neighborhood encompasses 260 hectares, with 41 hectares forming part of the historic Bagh-e-Feyz village. Noteworthy attractions within the village include the mausoleums of Emmazadeh-Jaafar and Hamida Khatun, as well as vast gardens that have been transformed into residential areas as the community expanded and developed. It is important to highlight that the primarily residential area of the village was established in the eastern vicinity of the two Emmazadehs. Bagh-e-Feyz neighborhood and Taslian, situated not too far away, were considered ancient villages within Tehran city. (Fig. 2)

DISCUSSION AND FINDINGS

Analysis of experts' questionnaire with the Delphi method

The Delphi technique was utilized to pinpoint and establish the key criteria that effectively elucidate the physical-spatial layout of the Bagh-e-Feyz neighborhood in Tehran and its impact on pedestrian behavior patterns. The Delphi technique was initially created in the 1950s by the RAND Company for a defense project of the Army and has been acknowledged as a significant scientific approach since the mid-1960s. The technique entailed the involvement of a group of six specialists and experts in the relevant field, who possess knowledge, experience, and decision-making capabilities. The process was conducted systematically through rounds of questionnaires using a Likert scale (Mehdizadeh, 2018).

- First stage: determining the topic, decision criteria for prioritizing the research criteria in Bagh-e-Feyz neighborhood of Tehran and sending the questionnaire.
- Second stage: Answer to the initial questionnaire, each person anonymously lists his idea briefly in the initial questionnaire. The ideas should be conveyed in a single sentence without any need for elaboration or justification before submitting the questionnaire.

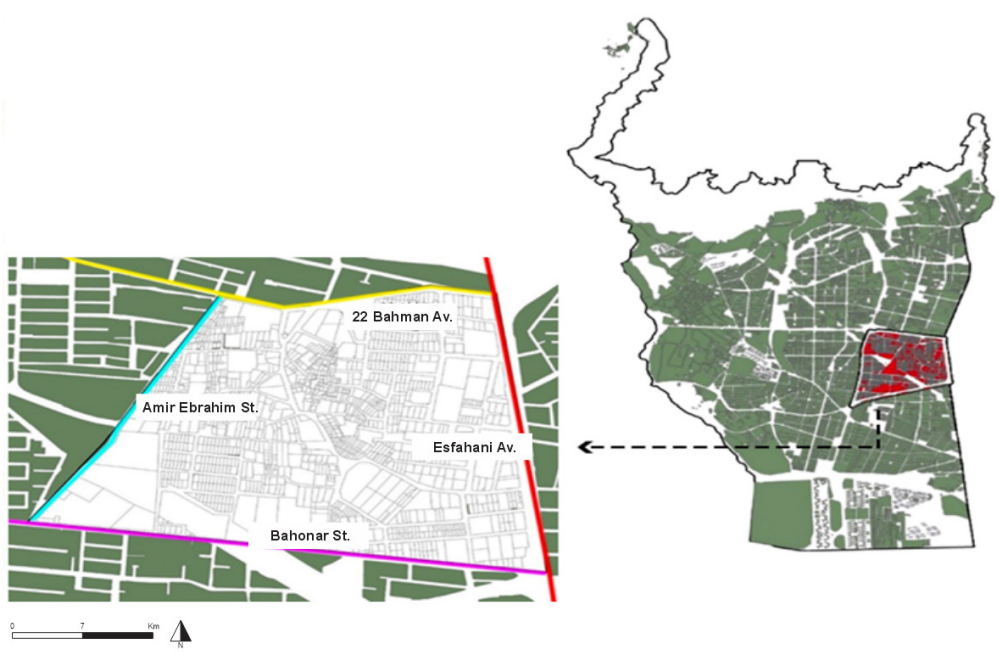

Figure 2: Location map of the studied area

- Third stage: Preparing and sending questionnaire two, following questionnaire, comprising all the thoughts compiled in the initial phase, is dispatched to the members, with a vacant space allocated below each idea for personal examination.
- Fourth stage: Answer to the second questionnaire. Each participant completed the second questionnaire without revealing their identity, and the surveys were collected again. At this stage, individuals are also informed about the perspectives of others in the initial phase, and this is expected to influence their original response.
- Fifth stage: preparing and sending the third questionnaire. The third questionnaire has been prepared and distributed to the members at this point. It includes a recap of the previous information and requests that members fill it out and review the items.
- Sixth stage: preparing the ballot and voting; individuals were asked to rate the top criteria using a Likert scale.
- Seventh stage: the result of voting. Upon completion of the review of the criteria and sub-criteria, the determinants influencing the quality of the study area were conclusively identified and authorized in the format of a structured table. (Tab. 2)

The data obtained by experts and specialists highlights the effectiveness of each criterion in relation to the research topic. Based on the information provided in the table, the decision was made to eliminate the criteria regarding environmental protection, cleanliness, and investment willingness because of the low points and percentages assigned by experts. On the other hand, the criteria concerning the emergence of different behavioral camps, the integration of visible physical diversity in all movement systems, and the facilitation of activities for diverse groups are ranked highly and deemed very effective by experts.

Analysis of citizens' questionnaire

Access to facilities

To what degree do you think having the freedom to select from different modes of transportation contributes to the convenience and comfort of your travel arrangements? The chart indicates that the level of influence differs for each individual living in the neighborhood and is heavily influenced by the impressions they receive. This is determined by the communication, distance, proximity to services, and the needs of the residents. (Fig. 3)

Identity formation

The opinion of the citizens emphasizes the substantial and essential impact of local and traditional materials and forms, inspired by the historical nature of the city, on the identity and sense of significance of the residents. Among the participants, 45% favored the very high option, 36% preferred the high option, and 18% settled on the medium option. (Fig. 4)

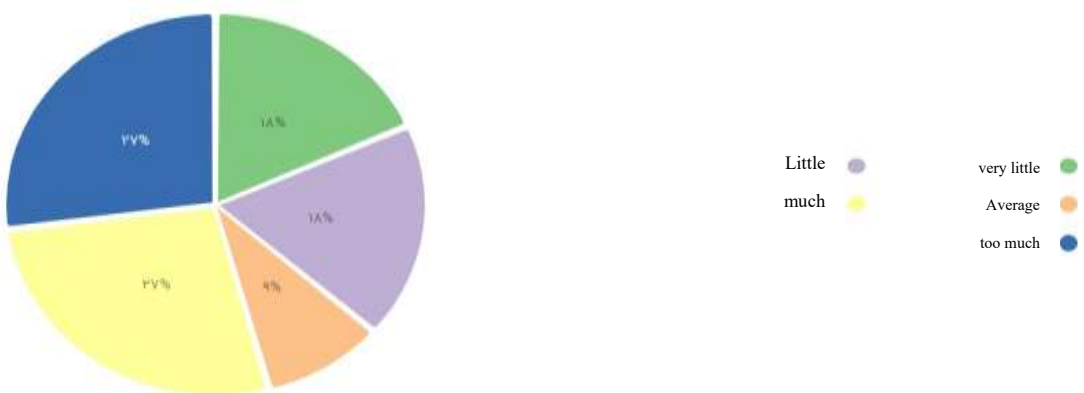

Figure 3: Access to facilities

Table 2: Classification of criteria and sub-criteria

Criteria	Indicator	Absolutely significant	Very significant	significant	Average	insignificant	Very insignificant	Absolutely insignificant	Classification criteria
Access to facilities	Ease of access despite provisions on the right to choose	4%	6%	17%	35%	26%	9%	3%	17
	Separation of riding and walking routes	37%	26%	20%	15%	2%	0	0	12
	Dynamic neighborhood units on an urban street	10%	31%	27%	21%	9%	0	2%	19
	Attention to human activities	29%	21%	15%	17%	8%	5%	5%	7
Identity formation	Elements of buildings with identity and historical value	21%	18%	14%	26%	12%	6%	3%	10
	Attention to the historical context	0	17%	21%	38%	21%	3%	0	20
	Attention to local materials	8%	7%	8%	25%	15%	26%	11%	21
	Attention to the revival of traditional and native architecture	8%	9%	14%	31%	16%	15%	5%	25
	Unique elements related to the character of the context	20%	20%	22%	18%	10%	0	0	11
Public life and local community	Encouraging people to participate in social life	24%	26%	15%	16%	9%	5%	5%	6
	An understandable and meaningful environment	18%	15%	31%	22%	6%	4%	4%	9
	An environment with easy access	11%	22%	26%	27%	10%	4%	0	5
	Attention to the sense of time and place	0	30%	26%	36%	8%	0	0	13
social justice	Appropriate and fair distribution of urban facilities and services	6%	11%	16%	29%	18%	15%	2%	24
	Proper placement of urban furniture and its lighting	9%	20%	16%	17%	19%	8%	4%	18
safety and security	Control of the rider in its interaction with the pedestrian	13%	20%	16%	21%	23%	0	0	16
	Provision of mixed use and active walls	17%	24%	17%	21%	21%	0	0	8
A sense of belonging to a place	Improving the physical quality of buildings	5%	16%	19%	30%	14%	19%	0	26
	Efforts to protect the environment	4%	6%	4%	25%	19%	30%	15%	28
	Trying to keep the environment clean	0	4%	0	25%	23%	34%	17%	29
	Willingness to invest	0	6%	4%	32%	18%	33%	26%	27
Mental image	Designing statues and identity symbols	0	17%	21%	38%	21%	3%	0	22
	Emphasis on showing the important points of the neighborhood	10%	21%	22%	29%	16%	2%	0	15
	Providing a platform for the activities of different groups	2%	21%	28%	23%	8%	0	0	3
	Paying special attention to walls and urban symbols	0	17%	21%	18%	15%	16%	13%	23
Diversity in the structure	Dispersion of various uses	12%	19%	21%	25%	15%	6%	0	14
	Occurrence of various behavioral camps	29%	26%	24%	21%	0	0	0	1
	Employing perceptible physical diversity for all movement systems	24%	23%	22%	31%	0	0	0	2
	Various and appropriate sequences along the way	25%	22%	29%	24%	0	0	0	4

Social Justice

To what degree have the essential amenities been situated within the vicinity in a fair and fitting fashion? In response to the question, 36% of the population selected the lowest option, while another 36% chose the highest option, leading to differing opinions on the fairness of the obligations imposed on the residents. (Fig. 5)

safety and security

To what degree do you feel safe and secure while moving and crossing intersections in the neighborhood? The perception of security differs from person to person, influenced by age, physical health, and mental well-being. Nevertheless, ensuring the safety of citizens is a top priority. With half of the obtained statistics indicating dissatisfaction with the safety of neighborhood intersections, urban planning measures are necessary to address this concern. (Fig. 6)

Mental Image

To what extent are there spaces for holding various ceremonies and rituals in your neighbor-

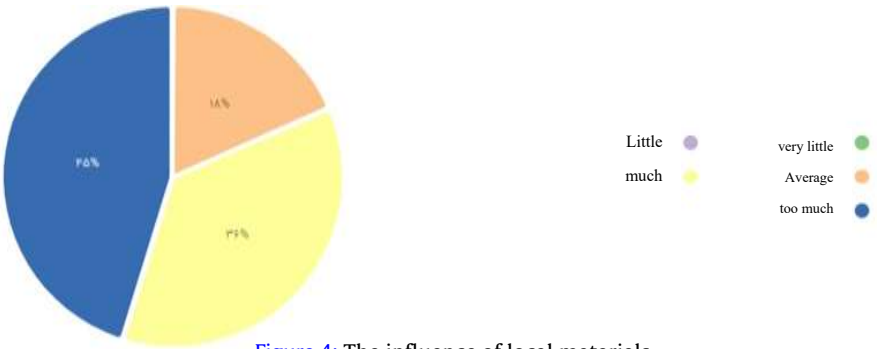

Figure 4: The influence of local materials

Figure 5: The amount of fair placement of uses required by citizens

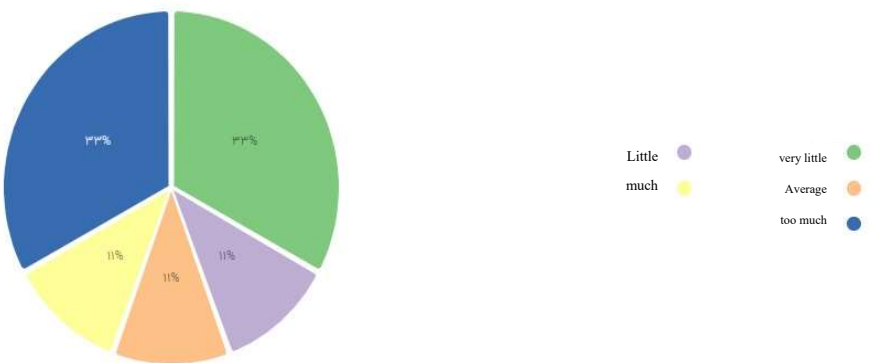

Figure 6: The level of safety and security of pedestrians

hood? The data from the chart indicates that 64% of the populace preferred the very low option, with 22% opting for the low option. Conversely, 11% selected the medium option and 22% chose the very high option. (Fig. 7)

Figure 7: The number of spaces for holding all kinds of traditional and religious ceremonies and rites

Summarizing the quality of the research criteria

Table 3: Summary of the quality of research criteria in Bagh Faiz

Criterion	Indicator	too much	much	Average	little	very little
Access to facilities	Ease of access despite provisions on the right to choose		■			
	Separation of riding and walking routes					■
	Dynamic neighborhood units on an urban street				■	
	Attention to human activities			■		
Identity Formation	Elements of buildings with identity and historical value				■	
	Attention to the historical context					■
	Attention to local materials				■	
	Attention to the revival of traditional and native architecture				■	
	Unique elements related to the character of the context				■	
Public life and local community	Encouraging people to participate in social life			■		
	An understandable and meaningful environment			■		
	An environment with easy access		■			
	Attention to the sense of time and place			■		
Social Justice	Appropriate and fair distribution of urban facilities and services		■			
	Proper placement of urban furniture and its lighting			■		
Safety and Security	Control of the rider in its interaction with the pedestrian			■		
	Provision of mixed use and active walls			■		

Criterion	Indicator	too much	much	Average	little	very little
A sense of belonging to a place	Improving the physical quality of buildings					
	Efforts to protect the environment					
	Trying to keep the environment clean					
	Willingness to invest					
Mental Image	Designing statues and identity symbols					
	Emphasis on showing the important points of the neighborhood					
	Providing a platform for the activities of different groups					
	Paying special attention to walls and urban symbols					
Diversity in the structure	Dispersion of various uses					
	Occurrence of various behavioral camps					
	Employing perceptible physical diversity for all movement systems					
	Various and appropriate sequences along the way					

Analyzing the physical condition of the neighborhood using the space layout method

According to the explanations provided in the theoretical foundations section, the primary idea behind space arrangement is the connection. The connection rate of each line represents the average number of intermediate lines necessary to access all parts of the city. The connection value of a location is a mathematical parameter that signifies the distance of that line from all other lines in the city, known as comprehensive (macro) connection. The thorough integration of an urban area showcases its strong ties to the entire city. When examining each line, it is important to factor in the distance from all lines, rather than just a designated number of lines. By establishing the value of local connectivity through specific depth or radius, the significance of axial lines is highlighted. The analysis was conducted on both comprehensive and local scales to assess the connectivity of routes within the range, a crucial factor influencing wayfinding significantly. The investigation in this study focused on exploring the correlation values at the macro level (Rn) and the local level (R3), as mentioned before. Findings suggest that distant is a suitable option for establishing local connections in large cities such as Tehran. Generally, the color spectrums of red, orange, yellow, green, and blue are utilized to demonstrate the level of linkage, with the highest to lowest linkage order being maintained. The closer the lines are to the red spectrum, the higher the correlation between those lines; conversely, the closer they are to the blue spectrum, the lower the correlation value. These values are usually categorized into 10 equal categories by the software for classification purposes. Based on the assigned values and colors, areas with a higher concentration of blue lines exhibit lower cohesion compared to areas with a higher concentration of red lines, indicating spatial isolation. The map depicts the spatial significance of the mega link in Bagh-e-Feyz neighborhood of Tehran. The substantial difference between the highest and lowest correlation degrees, coupled with the high standard deviation, indicates that the neighborhood exhibits more diverse characteristics. Moreover, it suggests the presence of isolated and separated points (with significant depth) from the city structure, leading to the formation of isolated spaces with increased depth and spatial separation. (Fig. 8)

Figure 8: Development of strategy and policy and research solutions

CONCLUSION AND RESULTS

Bagh-e-Feyz neighborhood in 2021 is a lively and pedestrian-friendly area characterized by its green spaces and safety measures. It is a community known for its diverse range of behavioral patterns, reflecting the variety of activities taking place despite the established regulations. This area is distinguished by its individuality, characterized by a network of green pathways and pedestrian routes that contribute to shaping a strong mental image for those walking through. The range of route choices in this area is extensive, encompassing the dedicated bicycle route, the dedicated blind route, and the dedicated BRT routes, all of which have substantially improved access to the facilities. The strategies and policies, along with specific solutions for Bagh-e-Feyz neighborhood, have been presented by referencing the theoretical framework table and research criteria analysis.

The research findings indicated that pedestrian behavior patterns are impacted by several factors, including access to facilities, neighborhood fabric identification, social interactions, equitable distribution of amenities, safety and security levels, community attachment, and mental perception, all contributing to the diversity within the neighborhood structure. The indicators of accessibility, in conjunction with the provisions for the right to choose, an environment with easy access, fair and appropriate distribution of urban facilities and services, efforts to protect the environment, efforts to preserve environmental cleanliness and diversity, and suitable sequencing along the route are all in a favorable state. Similarly, there is an average level of focus on indicators of human activity, promotion of social engagement, creation of a comprehensible and meaningful environment, consideration of time and place, proper placement of urban amenities, provision of lighting, management of rider interaction with pedestrians, and promotion of mixed uses and vibrancy of the built environment. The indicators that have low quality and require measures to improve and promote them are: The index of separation of riding and walking routes, dynamic neighborhood units in urban

streets, elements of buildings with identity and historical value, attention to native materials, attention to the revival of traditional and native architecture, unique elements, design of statues and identity symbols, emphasis on displaying the important points of the neighborhood, providing a platform for group activities, paying special attention to walls and urban symbols, and using perceptible physical diversity for all movement systems.

Table 4: Development of strategy and policy and research solutions

Aims	Strategy	politics	Approach
Emphasis on pedestrian-centricity and elimination of disturbing rider movements	Emphasis on the presence and active movement of pedestrians	Equipping public space for pedestrian use	Creating sequences and diverse and attractive pedestrian views on the footpaths of Bagh-e-Feyz neighborhood
			Organizing and equipping flooring in all footpaths and main entrances, especially in neighborhood intersections
			Appropriate placement of urban furniture in open public spaces
			Creating a linear green space in barren lands as well as gardens in the neighborhood
		Increasing security in public arenas for the active presence of users	Placement of residential and commercial mixed uses to increase residents' self-monitoring at different hours of the day and night
			Placement of the massing of buildings should be such that the mass is located in the vicinity of accesses and roads.
			Reducing the speed of horse movement by equipping the main entrances in the neighborhood with paving stones
			Appropriate distribution of active and lively uses around the clock in the entire studied area, especially in the vicinity of public spaces
	Reducing the interference of rider and pedestrian movement	Creating restrictions for riding and increasing safety and security of pedestrians	Providing emergency vehicle access and organizing other vehicle requests in the schedule
			Providing public parking for users in wasteland
			Widening the footpaths and equipping them to increase foot traffic
			Using the stem as an input to reduce the movement of the rider
Strengthening attendance and increasing social interactions in behavioral patterns	Strengthening social functions	Definition of settlements and social nodes	Creating cultural and religious behavioral camps in the opening of significant and important uses
			Creating a tourist resort in the green space and gardens
			Strengthening the diversity of activities in the main edges
		Strengthening social functions	Taking advantage of existing buildings in order to define active and lively uses
			Using open and green spaces to create active and lively fields
			Use of mixed uses to increase presence and flexibility of the area
			Using green space to create active and lively linear green paths
			Using users who have product and activity overflow.

Aims	Strategy	politics	Approach
Increasing user utilization	Equilibrium in the distribution of uses	Strengthening diversity and proper distribution of activities	Taking advantage of the existing uses in order to maintain the variety of activities according to the functional scales of each user
			Creating cultural activities in public areas
			The use of mixed uses
		Appropriate distribution of uses	Maintaining and strengthening all existing functions around the main centers
			Spatial distribution suitable for users
	Quantitative and qualitative promotion of sustainable activities	Avoiding creating a rigid and indefensible body	Prohibition of placement of single-purpose and part-time functions (such as office use)
			Placement of commercial use on the ground floor in residential uses
		Creating desirable urban spaces	The establishment of commercial activities similar to restaurants, juice shops, etc., which have an overflow of goods and activities.
			Defining the appropriate urban furniture in order to create different and diverse exploitation capabilities at different times

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