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Urban growth Model Based on the Spatial-Functional Structure of Isfahan (Case Study: District 9)

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ABSTRACT

Rapid urbanization and the uneven distribution of services and infrastructure of the District 9 in Isfahan have created challenges such as spatial inequality, reduced quality of life, and environmental degradation. This research aims to develop an optimal model for improving the functional structure of District 9 in Isfahan. Utilizing economic, socio-cultural, physical, urban services, and environmental factors, this study analyzes the current situation from the perspectives of both citizens and experts. To achieve this objective, the research employs citizens and expert's questionnaires. Data was collected through Likert scale and analyzed using SPSS and Amos software. The results indicate that citizens emphasize access to shopping centers and green spaces, while experts prioritize attracting investment and improving sustainable infrastructure. Public transportation and citizen participation were identified as key factors in both groups. However, new technologies and the adaptation of services for the disabled were given lower priority. Citizens perceived urban services and the environment as having the greatest impact, and the economic dimension as the least, whereas experts evaluated economics as the most critical factor in sustainable development. The findings underscore the need for urban planning to integrate the daily needs of citizens with the long-term vision of experts. This research provides a model for balanced development that includes improving the distribution of services, enhancing environmental infrastructure, and strengthening economic factors, which can be applied to other urban areas.

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INTRODUCTION

Recent urbanization trends have reshaped the concepts of urban living, leading to city expansion and population growth, which in turn has exacerbated physical and social problems, such as disarray and instability within urban environments (Khodaei et al., 2025). The spatial-functional structure of cities is a key concept in urban planning (Nazari et al., 2020), addressing how various urban elements such as land use, services, and infrastructure are distributed and function (Sartorius and Eksteen, 2022). This structure represents the coordination and interaction between different parts of the city and their impact on quality of life and urban sustainability (Freidooni et al., 2022; Freidooni et al., 2023). If this structure is not adequately considered, urban development can lead to spatial inequalities, inappropriate distribution of services, and even environmental degradation (Arif and Aldosary, 2023). Therefore, appropriate planning, relying on the spatial-functional structure, not only helps to balance the distribution of facilities and resources but can also improve the quality of the environment and increase social cohesion in cities (Burgess, 2018). Urban development patterns, which refer to strategies and models for the physical and functional expansion of cities, directly affect the city's functional structure (Talen, 2021). These patterns, related to land use, population density, and the distribution of services, can lead to greater efficiency, fairer distribution of resources, and improved quality of life at the urban level (Desouza et al., 2023). On the other hand, the lack of coordination between development patterns and the functional structure can lead to consequences such as social inequalities, the uncontrolled expansion of residential and commercial areas, and increased environmental problems (Loghman et al., 2020; Zarei and Jafari, 2020). The rapid growth of cities worldwide and the projected increase in urbanization by 2050 have led to significant changes in spatial structure. These changes have often led to inconsis-

tencies such as unsustainable development, irregular distribution of services, and spatial inequality. Moreover, the uncontrolled expansion of construction and the destruction of gardens have caused Isfahan to be no exception to this phenomenon.

Consequently, the necessity and importance of addressing the spatial-functional structure in District 9 of Isfahan stem from the fact that this area, due to its unbalanced and unregulated development, faces significant challenges in terms of the distribution of services, infrastructure, and land uses. This spatial-functional imbalance has led to a decline in quality of life and the emergence of social inequalities among the residents of the area. Therefore, reforming the spatial structure, promoting balanced development, increasing investment in sustainable infrastructure and public services, and strengthening citizen participation in urban planning processes in this area, not only enhances social cohesion and justice but can also serve as a model for other urban areas to achieve development and reduce inequalities at the national and international levels.

The primary objective of this research is to provide a pattern for improving the spatial-functional structure of District 9 in Isfahan. Identifying and evaluating the factors influencing the functional structure of District 9, including economic, socio-cultural, and physical variables, and creating a balance in their distribution are important and impactful goals of this research. Analyzing these factors and providing solutions for optimal spatial arrangement can lead to improving quality of life, reducing inequalities, enhancing spatial justice, and providing a suitable pattern for the development of this area. Accordingly, the following research objectives can be mentioned:

- 1.To develop a suitable urban development pattern for improving the functional structure of District 9 in Isfahan.
- 2.To investigate and identify the factors affecting the functional structure of District 9 in

Isfahan.

3. To evaluate the dimensions influencing the functional structure of neighborhoods in District 9 of Isfahan.

4. To achieve above objectives, the following Research Questions should be answered:

5. What is the suitable urban development pattern for improving the functional structure of District 9 in Isfahan?

6. What is the status of the factors affecting the functional structure of District 9 in Isfahan?

7. What is the status of the dimensions influencing the functional structure of neighborhoods in District 9 of Isfahan?

Therefore, the Research Hypotheses are:

The functional structure of neighborhoods in District 9 of Isfahan differs significantly across various dimensions.

Different factors in the functional structure of neighborhoods in District 9 of Isfahan differ significantly from each other.

MATERIALS AND METHODS

Table (1) presents a summary of previous research on spatial-functional structure and urban development patterns. A review of the literature reveals that numerous factors have been considered in the spatial and functional structure of urban areas. In international studies, Bettencourt (2014) examined the scalability of cities and their impact on urban planning, proposing urban simulations to identify principles of sustainable growth (Bettencourt, 2014). Jin and Zhang (2018) addressed the mismatch between land use and urban services, demonstrating that this mismatch can lead to social and economic inequalities (Jin and Zhang, 2018). Furthermore, Kii et al. (2023) analyzed urban structure using remote sensing data and spatial simulation, emphasizing the importance of combining day and night data for more accurate analysis (Kii et al., 2023). Kavazanjian et al. (2022) also highlighted the alignment between urban development patterns and various functional components to

achieve optimal urban development (Kavazanjian et al. 2022). In domestic studies, Dadashpour and Tadayon (2014) analyzed the focus of travel patterns and the need for a multi-centric system design in Tehran (Dadashpour and Tadayon, 2014), while Abdollahzadeh Turkmani (2017) emphasized the need to strengthen sub-centers for spatial balance in Tabriz (Abdollahzadeh Turkmani, 2017). Haghani et al. (2019) examined the clustered and connected structure of central Mazandaran cities (Haghani et al., 2019), and Arvin et al. (2020) identified suitable areas for creating new cores in Ahvaz (Arvin et al., 2020). Wang et al. (2024) examine urban spatial structure dynamics in 36 cities across China's Three Northeast Provinces (Heilongjiang, Jilin, Liaoning) using Points of Interest (POI) and nighttime light (NTL) data from 2010, 2016, and 2022. By applying kernel density estimation, grid-based analysis, and multifactor mapping, the research highlights three key findings. First, POI and NTL data exhibit strong spatial coupling consistency, validating their utility in urban spatial analysis. Second, these datasets reveal a "axis + core-periphery" spatial pattern centered on major cities (Shenyang, Dalian, Changchun, Harbin), with urban structures categorized into centralized agglomeration, decentralized grouping, belt combination, and radial expansion types. Third, trends in coupling relationships vary by city type: resource-mature, resource-regeneration, and non-resource cities show expanding "high/medium" development zones linked to agglomeration and railway networks, while resource-decline cities experience contraction due to economic challenges and resource drainage. The findings underscore the role of POI-NTL integration in diagnosing spatial dynamics, offering actionable insights for optimizing urban planning, infrastructure, and resource allocation in the region (Wang et al., 2024).

The literature gap suggests that while previous studies have addressed various aspects of the spatial and functional structure of cities, there has been no specific focus on systemati-

cally combining and localizing an urban development pattern for particular urban areas, such as District 9 of Isfahan. Our research, aimed at providing a comprehensive and suitable pattern

for the urban development of this area, demonstrates its novelty by adapting functional analysis at the local level to the specific spatial-social dimensions of District 9 of Isfahan.

Table 1: literature review on the Study Topic (Source: Authors)

Author (Year)	Research Method	Objective	Analysis	Findings
Bettencourt, L. M. (2014)	Data analysis and urban performance simulation	Investigating the scalability of cities and its impact on urban planning	Simulation and structural equations	Identified principles for sustainable urban growth based on scalability laws.
Dadashpour and Tadayon (2015)	Quantitative-analytical with network analysis	Analyzing travel patterns and the spatial-functional structure of Tehran	Network analysis and entropy	Tehran's travel patterns are centralized, requiring the design of a polycentric system for spatial balance.
Jin and Zhang (2018)	Analysis of population density and urban services data	Examining land use and its impact on urban functional structure	Statistical models and GIS	Highlighted the misalignment between land uses and urban services, causing social and economic inequalities.
Abdollahi-Torkamani (2018)	Descriptive-correlational	Assessing Tabriz's functional balance based on performance cores	Kernel density analysis and geographically weighted regression	Tabriz has a monocentric structure that needs strengthening of sub-cores.
Haghani et al. (2020)	Descriptive-analytical with network analysis	Examining the functional structure of Central Mazandaran's urban region	Network-based analysis and origin-destination data	Central Mazandaran cities exhibit a polycentric structure with cluster-like and interconnected regional morphology.
Wang and Li (2021)	Satellite imagery and social data analysis	Simulating the functional structure of cities using remote sensing data	Spatial modeling and analysis of functional indices	Combining day and night data provides a more accurate analysis of urban structure and performance.
Arvin et al. (2021)	Applied	Identifying suitable zones for new cores and development patterns in Ahvaz	AHP and COPRAS methods	Newly identified cores can improve spatial-functional balance in Ahvaz's urban structure.
Kavazanjian et al. (2022)	Spatial and social data analysis	Investigating urban development patterns' role in functional structures	Urban simulation models and social network analysis	Optimal urban development requires precise alignment between functional areas and development patterns.

Schiavina et al. (2022)	Spatial and social data analysis	To assess global land use efficiency (LUE) within FUAs and evaluate urbanization sustainability in alignment with Sustainable Development Goals (SDGs).	Comparison of population growth vs. land consumption in FUAs. Temporal trends in LUE (1990–2000 vs. 2000–2015). Spatial compactness of settlements and LUE comparisons	Population growth higher than land consumption. Reduced settlement compactness; no inherent LUE advantage for settlements within FUAs. Highlights tensions between sprawl and resource optimization; questions assumptions about FUAs' efficiency.
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Theoretical Foundations

In urban planning, a model serves as a conceptual or representational framework to analyze and predict urban processes, simplifying complex city systems to support evidence-based decision-making. For instance, agent-based models and simulations forecast infrastructural or demographic impacts, aiding policy design (Batty, 2018; Li and Gong, 2019). Central to this process is urban development, which involves planning and expanding physical, social, and economic infrastructure—such as housing, transportation, and green spaces—to meet evolving urban needs. While this fosters economic growth, unchecked development risks environmental harm and sprawl, necessitating balanced strategies (World Bank, 2023; UN-Habitat, 2020). Guiding this growth are urban development models like "smart cities," "compact cities," and the "15-minute city," which prioritize localized services, reduced commuting, and climate resilience to enhance social, economic, and environmental sustainability (Gehl, 2020; Moreno et al., 2021). Underpinning these frameworks is urban structure—the physical, spatial, and social organization of cities, including street networks, land use, and zoning. A coherent structure optimizes connectivity and efficiency, fostering social interaction and resource sustainability (Alexander, 2019; Lynch, 2020). Functional structure refers to the spatial distribution of elements and the functional interactions between them within an urban environment. This concept emphasizes how different zones, such

as commercial, residential, and recreational areas, are coordinated. A well-organized functional structure can increase efficiency and reduce congestion (Batty, 2018; UN-Habitat, 2020). Performance factors are tools for evaluating the efficiency of urban processes and elements. These factors include factors such as accessibility, density, infrastructure quality, and user satisfaction. For example, factors like "distance to the nearest service center" and "average travel time" are used to assess the performance of transportation systems (Moreno et al., 2021; Alexander, 2019). Additionally, functional dimensions encompass various aspects of urban function, including economic (distribution of employment), social (social interactions), and environmental (resource sustainability). These dimensions are interrelated and have a reciprocal impact on urban sustainability (UN-Habitat, 2020; World Bank, 2023).

Methodology

In this research, data analysis is conducted to assess the validity and reliability of information collected from closed questionnaires from citizens and combination of closed and open close questionnaires from experts using various statistical methods. The sampling methods are snowball sampling and simple random sampling for experts and citizens, respectively. Initially, the demographic characteristics of respondents, including age, gender, education level, and occupational status, are examined. Descriptive statistics are then presented for

economic, socio-cultural, physical, and urban service factors from the perspective of both citizens and experts. Subsequently, data is processed using SPSS version 27 and Amos version 24 software, and appropriate statistical techniques such as correlation tests and structural equation modeling (SEM) are employed to analyze complex relationships among factors and their impact on the urban functional structure. These analyses aim to identify the positive and negative impacts of factors on improving the functional structure of the urban area and to propose a suitable development model for District 9 of Isfahan. Finally, operational strategies are provided for appropriate urban planning and development.

DISCUSSION AND FINDINGS

The demographic information of the respondents, including two groups—citizens (383 individuals) from District 9 and 150 experts in urban planning and design—are analyzed. Subsequently, based on the monitored data, six main dimensions (economic, socio-cultural, physical, urban services, and environmental) comprising various factors are assessed. This assessment is conducted via a Likert-scale questionnaire designed to evaluate their impact on improving the functional urban structure of District 9 in Isfahan, as perceived by the two groups. Finally, using the Amos software, second-order confirmatory factor analysis (CFA), and structural equation modeling (SEM), a suitable framework for the urban development of District 9 in Isfahan is presented.

Case Study

Isfahan, the third largest metropolis in Iran, is located at 32 degrees and 38 minutes north latitude and 51 degrees and 38 minutes east longitude, in the center of the Iranian Plateau and on the banks of the Zayandeh Rud River. With an area of 550 square kilometers, the city extends over a relatively flat plain with a gentle slope

towards the northeast. The average altitude of the city is about 1570 meters above sea level, and it is located in a semi-arid district. In terms of boundaries, Isfahan is bordered by the cities of Khorzuq and Shahinshahr in the north, the railway in the south, the cities of Dorcheh and Khomeini Shahr in the west, and the beginning of the Nayin road in the east (as shown in Fig. 1). Geologically, the city is located in an area that borders the desert in the north and east and the Zagros Mountains in the west and south. The Karkas Mountains in the north and the Zagros Mountains in the southwest of Isfahan are the most important elevations around this city. The climate of Isfahan, due to its geographical location, is dry and semi-arid. Hot and dry summers and cold winters with low rainfall are the prominent features of the climate of this city. The Zayandeh Rud River, which originates from the central mountains of Iran and passes through the city of Isfahan, has played an important role in moderating the district's climate. Urban development in Isfahan has been mainly towards the southwest. The reasons for this can be attributed to the abundance of water in this area and less pollution compared to other parts of the city. However, in recent years, due to population growth and urban expansion, we have witnessed the development of the city in other directions as well.

District 9 of Isfahan Municipality, one of the fifteen urban districts of this metropolis, is located in its western part. Due to its vastness and diversity of land uses, this district is of particular importance. In this section, we will examine the geographical location, boundaries, and characteristics of this district in more detail. District 9 of Isfahan, with a total area of 2025 hectares, is bordered by Ashrafi Esfahani Street (from Shahid Ghaffari to Ashrafi Esfahani Street) in the north, Shahid Khorasani Expressway to Vahid Bridge in the east, Zayandeh Rud River and Atashgah Street in the south, and Luleh Ab Street and Joruqan neighborhood in the west. Of the total area of the district, about 48% is the periphery

and 52% is the legal boundary. The periphery is an area located around the legal boundary of the city and is considered for future urban development. Given the significant area of District 9, it can be considered one of the extensive districts of Isfahan. This vastness has led to a diversity of land uses and population in this district. District 9 is a mix of residential, commercial, industrial, and service land uses. The existence of various

industries, shopping centers, residential complexes, and more has added to the diversity of land uses in this district. The existence of an extensive periphery indicates the high potential for the development of District 9. This potential can be used to improve the quality of life of citizens and the sustainable development of the district.

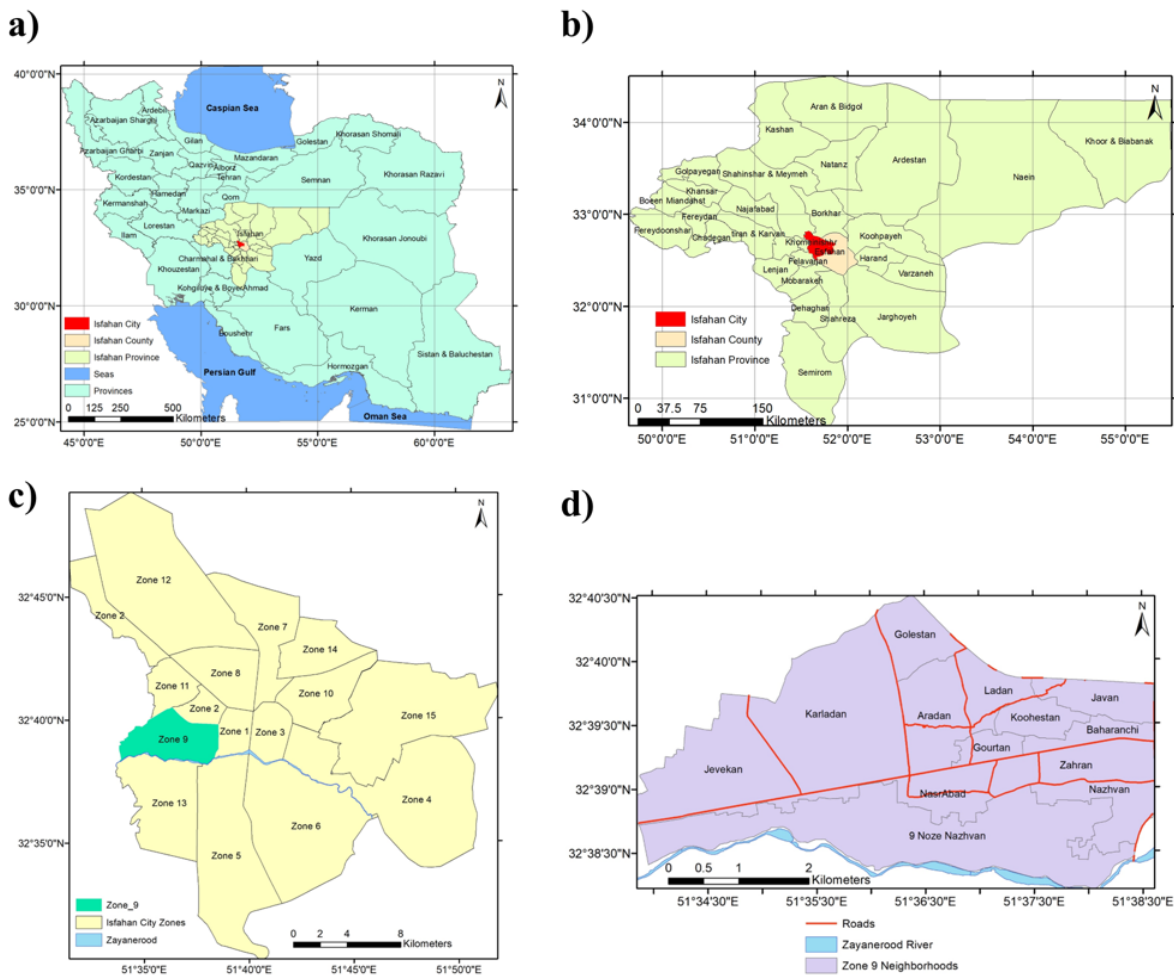


Figure 1: (a) Iran; (b) Isfahan province; (c) Isfahan city zones; (d) District 9.

Analysis of Economic Factors

Based on Table 2, the average accessibility to shopping centers and local markets is 3.78 according to citizens and 4.33 according to experts, indicating the high significance of this factor in

improving the functional structure of urban areas for both groups. Among other factors, access to banking services ranks second, with averages of 3.57 and 4.22 for citizens and experts, respectively. Citizens also highly value factors such as

women's employment (3.08), residents' income (3.15), and the enhancement of the local economy relative to the metropolis of Isfahan (3.02). In contrast, the use of advanced global technologies to enhance the local economy scores the lowest, with averages of 2.82 from citizens and 4.16 from experts. These results reveal that citizens place greater emphasis on access to local markets and economic services, whereas experts prioritize local economic enhancement and job diversity. Nevertheless, differences in evaluations between the two groups are evident.

For all respondents, access to shopping cen-

ters and local markets (3.646) is identified as the most influential factor, with access to banking services (3.599) ranking second. The use of advanced global technologies to enhance the local economy (3.200) holds the least significance in this group. In conclusion, accessibility to shopping centers and local markets emerges as the most effective factor in improving the functional structure of urban areas across all groups, whereas the use of advanced global technologies demonstrates the least impact. These differences highlight the greater focus of citizens on daily needs, while experts adopt a broader perspective on regional development.

Table 2: Descriptive Statistics of Economic Dimension Factors in Urban Functional Structure (Source: Authors)

Social-Cultural Factors	Mean (Citizens)	Mean (Experts)	Overall Mean
Accessibility to local shopping centers and markets	3.378	4.333	3.646
Accessibility to banking services in the area	3.357	4.220	3.599
Women's participation in regional activities	3.081	4.207	3.397
Residents' income levels in the region	3.115	4.240	3.431
Enhancement of local economy compared to Isfahan's metropolis	3.302	4.127	3.534
Creation of occupational diversity in the region	3.081	4.240	3.406
Use of global technologies in enhancing the local economy	2.826	4.160	3.200
Attractiveness of regional economic activities	2.857	4.240	3.245
Affordability of housing for citizens	2.943	4.300	3.324

Analysis of Socio-Cultural Factors

According to Table 3, from the citizens' perspective, citizen participation (average of 3.883) has the highest impact on improving the functional structure of urban areas, while service adaptation for the disabled (average of 3.375) has the least impact. Other significant factors include observance of citizens' rights (3.852) and the impact of health services (3.841).

From the experts' viewpoint, safety and security in the district (average 3.867) is identified as the most influential factor, whereas service adaptation for the disabled (average 3.400) again ranks as the least impactful. Other key factors include the realization of women's ac-

tivities (3.753) and enhancing citizen education (3.727). In the evaluation of all respondents, citizen participation (average 3.869) plays the most significant role, while service adaptation for the disabled (average 3.382) remains the least impactful. Safety and security (3.826) and health services (3.837) are also recognized as key factors. Across all three perspectives, factors such as citizen participation, safety and security, and observance of rights hold high importance. However, service adaptation for the disabled consistently demonstrates the least impact on improving the functional structure of urban areas.

Table 3: Descriptive Statistics for Socio-Cultural Factors of Urban Functional Structure (Source: Authors)

Social-Cultural Factors	Mean (Citizens)	Mean (Experts)	Overall Mean
Level of control and reduction of social harm	3.682	3.627	3.667
Improvement in civic education	3.727	3.727	3.727
Realization of women's activities	3.643	3.753	3.674
Impact of health services	3.841	3.827	3.837
Adequacy of services for people with disabilities in the region	3.375	3.400	3.382
Impact of safety and security in the region	3.810	3.867	3.826
Effect of implementing cultural, national, and religious programs	3.760	3.447	3.672
Citizen participation	3.883	3.833	3.869
Observance of citizens' rights	3.852	3.767	3.828

Analysis of Physical Factors

The survey results highlight the similarities and differences in the perspectives of the three groups (citizens, experts, and all respondents) regarding the evaluation of physical factors, as presented in Table 4.

Citizens' Perspective: The enhancement of public transportation desirability (average 3.849) has the highest impact on improving urban performance, while the availability of public parking (average 3.414) shows the least impact. Additionally, construction quality (3.766) and renovation of deteriorated urban fabric (3.729) are considered highly significant.

Experts' Perspective: From the experts' viewpoint, construction quality (average 4.067) holds the greatest importance, followed by traffic improvement in thoroughfares (3.913) and enhancement of public transportation desirabil-

ity (3.873). Similar to the citizens' perspective, the availability of public parking (3.547) is identified as the least impactful factor.

All Respondents' Perspective: The overall averages indicate that enhancement of public transportation desirability (3.856) and construction quality (3.850) are the most significant factors. Conversely, the availability of public parking (3.451) remains the least impactful factor.

Across all three groups, enhancement of public transportation desirability and construction quality are recognized as top factors. However, the availability of public parking is consistently viewed as having the least role in improving the physical performance of urban areas. These differences underscore the varying priorities of citizens and experts in evaluating urban physical issues.

Table 4: Descriptive Statistics for Physical Factors of Urban Functional Structure (Source: Authors)

Physical Factors	Mean (Citizens)	Mean (Experts)	Overall Mean
Enhancement of public transportation	3.849	3.873	3.856
Improvement of traffic flow in the regional road network	3.737	3.913	3.787
Quality of constructions in the region	3.766	4.067	3.850
Progress of construction projects in the region	3.667	3.913	3.736
Impact of the diversity of functional land uses in the region	3.539	3.680	3.579

Influence of the appearance and façade of buildings	3.659	3.820	3.704
Impact of social gathering spaces and interactive areas in the region	3.646	3.727	3.669
Influence of public parking availability in the region	3.414	3.547	3.451
Impact of renovating deteriorated urban fabrics in the region	3.729	3.873	3.770

Analysis of Urban Services and Environmental Factors

According to Table 5, the evaluation of urban services and environmental factors across the three groups is as follows:

Citizens' Perspective: The performance of beautification in urban spaces (average 4.008) is perceived as having the highest impact on improving the functional structure of urban areas. Other influential factors include waste collection and segregation (4.003) and development and maintenance of green spaces (3.995). Conversely, the organization of disruptive occupations and industries (3.747) is rated as the least impactful.

Experts' Perspective: Experts prioritize the development and maintenance of green spaces (average 4.380) as the most significant factor, followed by the performance of beautification in urban spaces (4.280) and waste collection and segregation (4.220). The improvement and growth of urban service per capita (3.967) is identified as the least impactful factor.

All Respondents' Perspective: The overall

averages show that the development and maintenance of green spaces (4.103) has the highest impact, followed by the performance of beautification in urban spaces (4.084) and waste collection and segregation (4.064). The organization of disruptive occupations and industries (3.816) is considered the least impactful factor.

The top factors identified were the performance of urban beautification for citizens and the development and maintenance of green spaces, as emphasized by both experts and all respondents. Conversely, the least impactful factors included the organization of disruptive occupations and industries, highlighted by citizens and all respondents, while experts prioritized the improvement and growth of urban service per capita as having minimal impact. These differences reflect the diverse priorities of each group, particularly the citizens' emphasis on tangible impacts such as beautification and environmental organization and the experts' focus on green space development and environmental sustainability.

Table 5: Descriptive Statistics for Urban Services and Environmental Factors of Urban Functional Structure (Source: Authors)

Urban Services and Environmental Factors	Mean (Citizens)	Mean (Experts)	Overall Mean
Impact of beautification performance in urban spaces	4.008	4.280	4.084
Impact of green space development and maintenance	3.995	4.380	4.103
Impact of waste collection and segregation in the region	4.003	4.220	4.064
Impact of waterway and stream maintenance and cleanliness	3.927	4.333	4.041
Impact of air cleanliness	3.956	4.053	3.983
Impact of urban environmental management	3.846	3.987	3.886
Organization of nuisance trades and industries	3.747	3.993	3.816
Improvement and growth of urban service per capita	3.789	3.967	3.839
Discipline in urban construction and pathways	3.820	3.973	3.863

Descriptive Analysis of Research Dimensions

This section examines the various dimensions of the research based on respondents' opinions. Describing the variables is significant as the research hypothesis tests are derived from the data and factors of these dimensions. The research data are on an interval scale. Central tendency and dispersion indices were used to describe

the research dimensions. Skewness and kurtosis indices were employed to assess normality; an absolute value of skewness and kurtosis less than 2 indicates a normal distribution of data. Therefore, it can be stated that the statistical distribution of all research dimensions is normal. The maximum data value for all groups is 5.

Table 6: Descriptive Statistics of Influential Dimensions on Improving the Functional Structure of the City from the Perspective of Experts (Source: Authors)

Dimensions	Citizens				0.Experts				Overall Respondents			
	Min	Mean	Skewness	Kurtosis	Min	Mean	Skewness	Kurtosis	Min	Mean	Skewness	Kurtosis
Economic	1.11	3.104	0.118	-0.838	2.00	4.230	-0.785	-0.348	1.110	3.420	-0.085	-1.013
Social-Cultural	1.78	3.730	-0.111	-0.780	1.89	3.694	-0.549	-0.604	1.778	3.720	-0.223	-0.723
Physical	1.56	3.667	-0.227	-0.582	2.22	3.824	-0.322	0.002	1.556	3.711	-0.287	-0.423
Urban Services and Environment	1.67	3.899	-0.606	-0.357	2.22	4.132	-0.646	0.236	1.667	3.964	-0.686	-0.098

Based on the results presented in Table (6) from three perspectives (citizens, experts, and all respondents) following results can be mentioned.

From the citizens' perspective: The "Urban Services and Environment" dimension, with an average of 3.899, has the greatest impact on improving functional urban structure. This is followed by the "Socio-Cultural" dimension with an average of 3.730, and the "Physical" dimension with an average of 3.667. The "Economic" dimension, with an average of 3.104, shows the least impact from the citizens' perspective. Citizens place greater emphasis on tangible and environmental issues such as green space development, waste management, and public transportation. These priorities reflect their practical and everyday concerns.

From the experts' perspective: The "Economic" dimension, with an average of 4.230, ranks highest in impact on improving the functional urban structure. This is followed by the "Urban Services and Environment" dimension with an average of 4.132, the "Physical" dimension with an average of 3.824, and the "Socio-Cultural" di-

mension with an average of 3.694, which shows the least impact. This reflects the experts' strategic and specialized approach to urban management.

From the overall respondents' perspective: The "Urban Services and Environment" dimension, with an average of 3.964, has the highest impact, followed by the "Economic" dimension (3.420), the "Socio-Cultural" dimension (3.720), and the "Physical" dimension (3.711).

The overall results indicate that urban services and environmental factors (such as cleanliness, public transportation, and green spaces) have a significant impact, although the importance of the economic factor cannot be overlooked.

Proposing a Suitable Urban Development Pattern

To propose a suitable urban development pattern, second-order confirmatory factor analysis (CFA) was employed using Amos software. Data normality was confirmed by examining the skewness (distribution symmetry) and kurtosis (distribution peak) indices. If the absolute values of skewness and kurtosis are less than 2, the data is considered normal. According to Ta-

ble (7), all items fall within the range of -2 to 2, indicating the normality of the distribution.

Construct validity was evaluated through confirmatory factor analysis, and all items had significant factor loadings (p-value < 0.05). The

fitted model demonstrates that factor loadings for all items are significant at a 95% confidence level. Therefore, no items need to be removed. These findings indicate the stability of the model and the accuracy of the measurement factors.

Table 7: Results of Confirmatory Factor Analysis of the Citizens-Experts Questionnaire (Source: Authors)

Dimension	Question No.	Citizens				Experts			
		Skewness	Kurtosis	Standardized Loading	T-Statistic	Skewness	Kurtosis	Standardized Loading	T-Statistic
Economic	ec1	-0.244	-0.491	0.689	14.562	-1.486	1.5	0.837	12.125
	ec2	-0.178	-0.723	0.695	14.721	-1.23	1.257	0.802	11.399
	ec3	0.097	-0.842	0.763	16.472	-0.951	0.061	0.584	7.58
	ec4	0.016	-0.901	0.873	19.862	-1.296	0.714	0.838	12.154
	ec5	0.098	-0.844	0.835	18.666	-1.006	-0.004	0.875	12.961
	ec6	0.012	-0.929	0.852	19.192	-1.138	0.259	0.933	14.313
	ec7	0.169	-0.891	0.866	19.551	-0.823	-0.392	0.843	12.259
	ec8	0.146	-1.096	0.861	23.717	-0.747	-0.13	0.721	13.271
	ec9	0.201	-1.082	0.793	---	-0.955	-0.059	0.810	---
Social-Cultural	s1	0.207	-0.967	0.678	13.829	-0.411	-0.275	0.752	9.820
	s2	-0.131	-0.585	0.763	16.020	-0.909	0.369	0.687	8.783
	s3	-0.378	-0.594	0.783	16.432	-0.641	0.122	0.696	8.947
	s4	-0.681	-0.131	0.807	17.163	-0.888	0.74	0.671	8.559
	s5	-0.112	-0.915	0.821	17.536	-0.445	-0.29	0.608	7.628
	s6	-0.514	-0.627	0.812	17.203	-0.636	-0.541	0.894	12.217
	s7	-0.508	-0.315	0.608	12.287	-0.543	0.214	0.563	5.639
	s8	-0.584	-0.314	0.742	20.217	-0.394	-0.864	0.798	10.586
	s9	-0.430	-0.633	0.778	---	-0.467	-0.933	0.785	---
Physical	p1	-0.491	-0.126	0.832	19.685	-0.831	0.668	0.789	10.014
	p2	-0.394	-0.269	0.856	20.610	-0.643	0.088	0.786	9.963
	p3	-0.216	-0.776	0.861	20.784	-0.806	0.274	0.716	8.958
	p4	-0.118	-0.827	0.896	22.214	-0.389	-0.692	0.687	8.542
	p5	-0.014	-0.656	0.824	19.408	0.062	-0.514	0.595	7.272
	p6	-0.174	-0.580	0.736	16.559	-0.369	0.399	0.578	7.052
	p7	-0.460	-0.165	0.594	12.513	-0.518	-0.054	0.573	6.983
	p8	-0.293	-0.849	0.716	15.940	-0.400	-0.318	0.715	8.938
	p9	-0.305	-0.849	0.819	---	0.344	-0.917	0.768	---

Urban Services and Environment	m1	-0.791	0.084	0.759	15.546	-0.466	-0.946	0.751	7.471
	m2	-0.856	0.103	0.773	15.904	-0.378	-0.683	0.856	8.169
	m3	-0.564	-0.494	0.798	16.471	-0.735	-0.109	0.720	7.212
	m4	-0.687	-0.055	0.821	17.007	-1.134	0.765	0.853	8.151
	m5	-0.776	-0.120	0.869	18.295	-0.886	0.259	0.545	5.808
	m6	-0.463	-0.343	0.872	18.376	-0.826	0.737	0.702	7.113
	m7	-0.405	-0.428	0.754	15.405	-0.739	-0.053	0.664	6.819
	m8	-0.618	-0.001	0.786	24.168	-0.336	-0.710	0.532	7.945
	m9	-0.571	-0.461	0.761	---	-0.252	-1.200	0.616	---

Results of Second-Order Factor Analysis of the Ideal Urban Development Pattern

The regression coefficients estimated for the second-order latent variables (urban functional structure), along with their significance levels and other statistical indices, are presented in Table (8). Additionally, for all regression coefficients, the significance level is less than 0.05. Therefore, all coefficients are significant at a 95% confidence level, and all indices fall within the

desirable range. This confirms the suitability of the measurement model in fitting the collected data. As a result, from the perspective of all respondents, the "Urban Services and Environment" dimension will have the highest priority, followed by the "Socio-Cultural" dimension in second, the "Physical" dimension in third, and the "Economic" dimension in fourth in terms of their impact on improving the functional structure of urban areas.

Table 8: Results of Second-Order Factor Analysis of the Ideal Urban Development Pattern from the Citizens-Experts Perspective(Source: Authors)

Respondents	First-Order Latent Variable	Standardized Coefficient	Unstandardized Coefficient	Standard Error (SE)	T-Statistic	Significance Level (p-value)
Citizens	Urban Services and Environment	0.863	1.358	0.070	19.416	0.000
	Social-Cultural	0.792	0.967	0.058	16.621	0.000
	Physical	0.547	0.796	0.076	10.467	0.000
	Economic	0.448	1	---	---	---
Experts	Urban Services and Environment	0.829	1.882	0.146	12.887	0.000
	Social-Cultural	0.363	0.592	0.123	4.813	0.000
	Physical	0.739	0.987	0.083	11.904	0.000
	Economic	0.875	1	---	---	---
Combined	Urban Services and Environment	0.819	1.257	0.068	18.611	0.000
	Social-Cultural	0.779	0.898	0.051	17.675	0.000
	Physical	0.565	0.697	0.080	8.754	0.000
	Economic	0.424	1	---	---	---

Evaluation of Model Fit Dimensions

The model fit dimensions, along with their desirable values, are presented in Table (9) from the perspective of citizens and experts. According to both groups, these indices indicate an adequate fit of the measurement model and

confirm the significance of the factor loadings of each observed variable to its corresponding latent variable. Therefore, the appropriateness of the measurement model in fitting the collected data is confirmed.

Table 9: Model Fit Indices of the Ideal Urban Development Model from the Perspective of Citizens-Experts and All Respondents (Source: Authors)

Test Name	Description	Acceptable Values	Citizens	Experts	Combined
RMSEA	Root Mean Square Error of Approximation	Less than 0.10	0.071	0.084	0.060
GFI	Goodness of Fit Index (Adjusted)	Greater than 0.90	0.916	0.944	0.940
RMR	Root Mean Square Residual	Less than 0.10	0.075	0.085	0.073
NFI	Normed Fit Index	Greater than 0.90	0.920	0.905	0.917
CFI	Comparative Fit Index	Greater than 0.90	0.924	0.937	0.943
χ^2/df	Relative Chi-Square	Less than 3	2.962	2.054	2.925
			df = 574	df = 182	df = 684
			$\chi^2 = 1700.2$	$\chi^2 = 1182.9$	$\chi^2 = 1684.889$

Finally, based on the presented results and conducted analyses, the suitable model for ideal urban development from the perspective of cit-

izens, experts, and all respondents is illustrated in (Fig. 2).

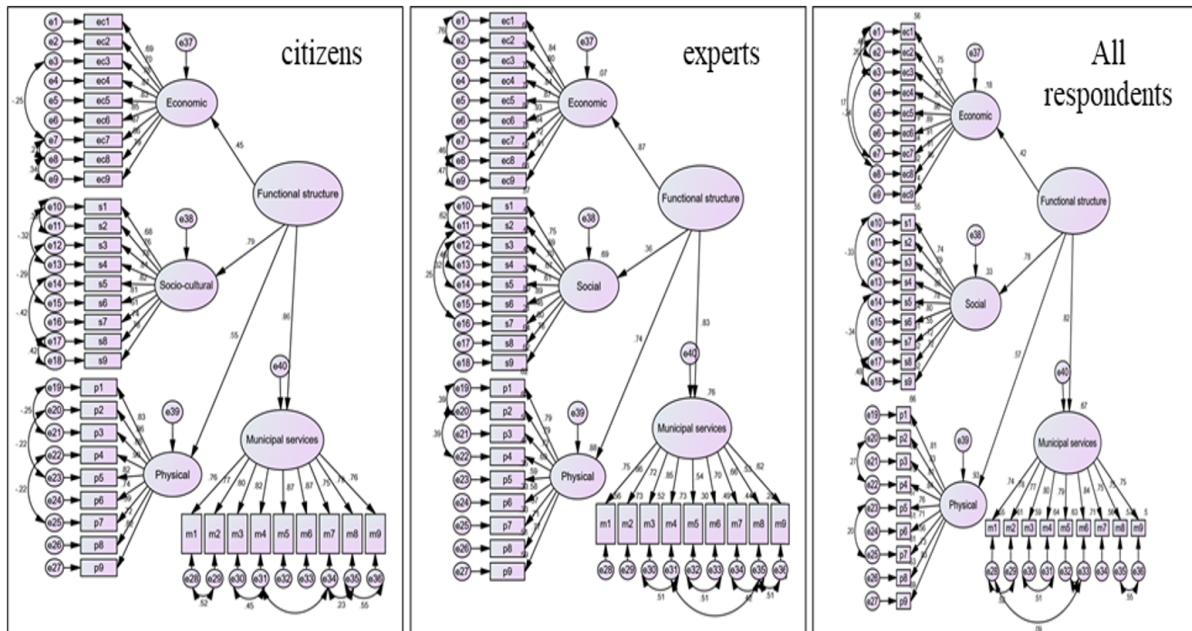


Figure 2: Ideal Urban Development Pattern for District 9 of Isfahan City (Source: Authors)

CONCLUSION AND RESULTS

This study seeks to formulate an effective pattern for enhancing the functional framework of District 9 in Isfahan by integrating economic, socio-cultural, physical, urban service, and environmental considerations. Drawing on insights from both citizens and experts, the research evaluates the district's existing conditions. To this end, data were gathered through questionnaires employing a Likert scale, with subsequent analysis conducted using SPSS and Amos software.

Based on the analysis of economic, social-cultural, structural, and urban service and environmental dimensions in District 9 of Isfahan City, it was found that each of these dimensions is assessed differently from the perspectives of citizens and experts. From the experts' viewpoint, economic dimensions have the most significant impact on improving the functional structure of urban areas, while citizens attribute less importance to them and emphasize daily needs such as access to shopping centers. In the social and cultural domain, citizen participation, safety, and the observance of rights are highly valued, while attention to special services for the disabled is less emphasized. Structurally, enhancing public transportation and the quality of construction are prioritized, but the lack of public parking is identified as a significant weakness by both citizens and experts. Finally, urban services and environmental concerns, especially the development of green spaces and environmental beautification, have the most impact on improving quality of life from the perspective of all respondents. Data analysis using confirmatory factor analysis (CFA) indicates that all variables are highly significant, with urban services and the environment ranked first, social-cultural aspects second, structural aspects third, and economic aspects last in terms of their influence on improving the functional structure of urban areas. These findings suggest that the development of District 9 in Isfahan should focus on balancing immediate and long-term needs,

combining the citizens' emphasis on daily issues with the experts' strategic planning perspective. Based on the findings and analysis of the various factors explored in this study, practical solutions are proposed to enhance the conditions of District 9 in Isfahan. The implementation of these solutions has the potential to strengthen the city's functional framework and provide a pattern for urban development within this area. Collaboration among the municipality, the private sector, and citizens emerges as a pivotal factor in driving positive transformations across the four primary dimensions of this research—namely, economic, socio-cultural, structural, and urban services and environmental aspects. Such cooperation not only fosters improvements in these domains but also enhances community cohesion and a sense of belonging. Accordingly, tailored solutions addressing each of these factors are put forward to lay the groundwork for sustainable and balanced development in the region.

In the economic dimension, emphasis is placed on fostering the growth of small and local businesses through the provision of facilities and incentives for home-based enterprises and local ventures. This approach can generate new employment opportunities while reducing transportation-related costs. Additionally, bolstering commercial and economic infrastructure, such as supporting the development of neighborhood-level markets and small shopping centers, facilitates citizens' access to essential goods and services. Furthermore, leveraging the district's cultural attractions, the establishment of necessary infrastructure to attract domestic and foreign investors—particularly in the cultural and tourism sectors—can invigorate the local economy and maximize the utilization of existing potential.

From a socio-cultural perspective, the expansion of cultural and recreational spaces, such as the construction of cultural centers, libraries, and sports facilities, is recommended as a means to enhance social interactions and

mitigate social challenges at the neighborhood level. Organizing cultural and artistic programs, including local festivals and events, can elevate the district's cultural identity and strengthen social bonds among residents. Moreover, the implementation of educational initiatives focusing on topics such as environmental awareness, sustainable development, and social engagement—particularly targeting the youth—can raise public consciousness and encourage greater citizen participation in the region's development.

In terms of the structural dimension, enhancing public transportation infrastructure through the expansion and improvement of bus stations and related facilities, while adhering to principles of accessibility and sustainability, represents a key step toward increasing public transit usage and reducing air pollution. Upgrading urban infrastructure, including the renovation of sidewalks, streets, and public spaces—especially in high-traffic zones—enhances safety and convenience for residents' mobility. Additionally, the creation of open and green spaces in densely populated areas, achieved by allocating land for parks, can significantly improve the quality of life for inhabitants and contribute to a balanced integration of urban development and human needs.

Finally, within the domain of urban services and the environment, the expansion and enhancement of parks and green spaces—particularly in densely populated neighborhoods with limited access—are proposed to increase per capita green space. Improving waste management through educational programs and cultural campaigns on waste separation, resource efficiency, and recycling, coupled with the introduction of a smart waste management system, can contribute to environmental preservation in the district. Furthermore, establishing optimal infrastructure for renewable energy, such as installing solar systems in public buildings and incentivizing their adoption in residential structures, offers a viable strategy for reducing environmental pollution. Alongside these efforts,

the development of smart urban services, such as technology-equipped bus stations for improved traffic management, can enhance the efficiency of urban services and elevate the overall experience for residents.

REFERENCES

- Abdollahi Turkmani, Z., Yazdani, M. H., Qanbari Haftcheshmeh, A., (2019). Analysis and evaluation of functional cores and their impact on the balance of the urban spatial structure (Case: Tabriz metropolis). *Scientific Journal of Geography and Planning*, 32(7), 33-370, https://geoplanning.tabrizu.ac.ir/article_10338.html.
- Albino, V., Berardi, U., and Dangelico, R. M., (2015). Smart cities: Definitions, dimensions, performance, and initiatives. *Journal of Urban Technology*, 22(1), 3-21, <https://doi.org/10.1080/10630732.2014.942092>.
- Alexander, C., (2019). *A pattern language: Towns, buildings, construction*. Oxford University Press, ISBN 9780195019193.
- Arif, M., and Aldosary, A. S., (2023). Urban Spatial Strategies of the Gulf Cooperation Council: A Comparative Analysis and Lessons Learned. *Sustainability*, 15(18), 13344. <https://doi.org/10.3390/su151813344>.
- Arvin, M., Pour Ahmadi, A., Ziari, K., and Zanganeh Shahraki, S., (2021). Achieving an optimal urban spatial structure through the creation of new cores (Case study: Ahvaz city). *Urban Economics*, 5, 123-145, 10.22108/ue.2021.125334.1163.
- Banister, D., (2005). *Unsustainable transport: City transport in the new century*. Routledge.
- Bettencourt, L. M., (2014). The scale and structure of cities. *Proceedings of the National Academy of Sciences*, 111(52), 18507-18508.
- Burgess, E. W., (2018). *The growth of the city: An introduction to a research project*. In *Urban Sociology: A Reader* (4th ed.). Routledge.
- Calthorpe, P., (2011). *Urbanism in the age of climate change*. Island Press.
- Castells, M., (2010). *The rise of the network society* (2nd ed.). Wiley-Blackwell.
- Dadashpour, H., and Tadayon, S., (2015). Analyzing the role of travel patterns in the spatial structure of the Tehran metropolitan area. *Geographical Space Planning Journal*, 18, 75-94, https://gps.gu.ac.ir/article_13816_af4bb9b1b87bcd-

- 02d2a9d6c5fcdd6517.pdf.
- Dsouza, N., Devadason, A., Senerat, A. M., Watana-tada, P., Rojas-Rueda, D., and Sebag, G., (2023). Sustainability and equity in urban development (SandEUD): A content analysis of "bright spots" from the Accelerating City Equity (ACE) project. *Sustainability*, 15(9), Article 7318 <https://doi.org/10.3390/su15097318>.
- Florida, R., (2020). *The rise of the creative class*. Basic Books.
- Freidooni, F., Gandomkar, A., Freidooni, S., (2023). Assessing residences' climatic compatible comfort approach to low-cost low energy consume strategies (Case study: Qazvin city, Iran). *Sustainable Earth Trends*, 3(3): 45-64, <https://doi.org/10.48308/ser.2023.234143.1032>.
- Freidooni, F., Freidooni, S., Gandomkar, A., (2022). Climatic compatible future cities locating approach to less non-renewable energy consumption. *International Journal of Urban Management and Energy Sustainability*, 3(3): 71-83, DOI: 10.22034/jumes.2022.1982956.1101.
- Fung, A., (2006). Varieties of participation in complex governance. *Public Administration Review*, 66(s1), 66-75.
- Gehl, J., (2020). *Cities for people*. Island Press.
- Gharaati, S., and Rafieian, M., (2019). Spatial planning for urban sustainability: A comparative study of spatial-functional structures. *Sustainability*, 11(5), 1237.
- Glaeser, E., (2011). *Triumph of the city: How our greatest invention makes us richer, smarter, greener, healthier, and happier*. Penguin Press.
- Godschalk, D. R., (2003). Urban hazard mitigation: Creating resilient cities. *Natural Hazards Review*, 4(3), 136-143, DOI: 10.1061/(ASCE)1527-6988(2003)4:3(136).
- Haghani, S., Lotfi, S., Bordi, A. M. Rahim, N., (2020). Examining the spatial structure of the central urban region of Mazandaran with an emphasis on the social network. *Journal of Geography and Urban Space Development*, 7, 112-130, <https://doi.org/10.22067/gusd.v7i1.84164>.
- Hall, P., (1998). *Cities in civilization: Culture, innovation, and urban order*. Pantheon Books.
- Harvey, D., (1973). *Social justice and the city*. Johns Hopkins University Press.
- Harvey, D., (2000). *Spaces of hope*. University of California Press.
- Healey, P., (2006). *Collaborative planning: Shaping places in fragmented societies*. Palgrave Macmillan.
- Hillier, B., (1996). *Space is the machine: A configurational theory of architecture*. Cambridge University Press.
- Holling, C. S., (1973). Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics*, 4(1), 1-23, <http://www.jstor.org/stable/2096802>.
- Jacobs, J., (2019). *The death and life of great American cities*. Vintage, Big data and smart urbanism. *Geo-Journal*, 79(1), 1-14.
- Jin, H., and Zhang, L., (2018). Land use patterns and their effects on urban functional structure. *Journal of Urban Geography*, 45(2), 56-68.
- Kavazanjian, E., Wang, H., and Li, D., (2022). Urban development patterns and their impact on functional structure in cities. *Journal of Urban Planning and Development*, 148(3), 123-135.
- Khodaei, M., Khademolhoseiny, A., Ghaedrahmati, S. and Gandomkar, A., (2025). Presenting the Model of Social Sustainability in New-Foundation Neighborhoods. *International Journal of Urban Management and Energy Sustainability*, 6(1): 1-18.
- Kii, M., Tamaki, T., Suzuki, T., and Nonomura, A., (2023). Estimating urban spatial structure based on remote sensing data. *Sci Rep*, 13, 8804, <https://doi.org/10.1038/s41598-023-36082-8>.
- Landry, C., (2000). *The creative city: A toolkit for urban innovators*. Routledge.
- Lefebvre, H., (1996). *The production of space*. Wiley-Blackwell.
- Li, X., and Gong, P., (2019). Urban modeling and simulation: Recent progress and future challenges. *Journal of Urban Planning and Development*, 145(4), 04019021.
- Lynch, K., (2020). *The image of the city*. MIT Press.
- Marcuse, P., (1985). *Gentrification, abandonment, and displacement: Connections, causes, and policy responses in New York City*. *Urban Law Annual; Journal of Urban and Contemporary Law*, 28, 195-240.
- Marshall, S., (2005). *Streets and patterns*. Routledge.
- Meadows, D. H., Meadows, D. L., Randers, J., and Behrens, W. W., (1972). *The limits to growth*. Universe Books.
- Moreno, C., Zaheer Allam, Z., Chabaud, D., Gall, C., Pratlong, F., (2021). *Introducing the 15-minute*

- city: Sustainability and resilience through urban design. *Environment and Urbanization*, 33(1), 91-109, <https://doi.org/10.3390/smartcities4010006>.
- Mumford, L., (1961). *The city in history: Its origins, its transformations, and its prospects*. Harcourt.
- Nazari, S., Faramarzy Asli, M., Esmailpour Zanjani, N., and Rostami, H., (2020). Evaluation of urban reconstruction management in approach to social sustainability. *International Journal of Urban Management and Energy Sustainability*, 1(3), 36-47, <https://doi.org/10.22034/IJUMES.2017.06.15.013>.
- Newman, P., and Beatley, T., (2017). *Resilient cities: Overcoming fossil fuel dependence*. Island Press.
- Loghman, M., Zarabadi, Z., and Behzad Far, M., (2020). Explaining the indigenous model of urban management in residential neighborhoods. *International Journal of Urban Management and Energy Sustainability*, 1(3), 48-61, <https://doi.org/10.22034/ijumes.2017.18.12.022>.
- Ostrom, E., (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge University Press.
- Porter, M. E., (1995). *The competitive advantage of the inner city*. *Harvard Business Review*, 73(3), 55-71.
- Putnam, R. D., (2000). *Bowling alone: The collapse and revival of American community*. Simon and Schuster.
- Rodrigue, J. P., Comtois, C., and Slack, B., (2020). *The geography of transport systems (5th ed.)*. Routledge.
- Sartorius, T., and Eksteen, S., (2022). *Urban sustainability and the impact of sprawl: Lessons from South African cities*. *Sustainable Cities and Society*, 74, 103283.
- Schiavina, M., Melchiorri, M., Freire, S., Florio, P., Ehrlich, D., Tommasi, P., Pesaresi, M., and Kemper, T., (2022). *Land use efficiency of functional urban areas: Global pattern and evolution of development trajectories*. *Habitat International*, 123, Article 102543 <https://doi.org/10.1016/j.habitatint.2022.102543>.
- Soja, E. W., (2010). *Seeking spatial justice*. University of Minnesota Press.
- Storper, M., (2013). *Keys to the city: How economics, institutions, social interaction, and politics shape development*. Princeton University Press.
- Talen, E., (2019). *Design for diversity: Exploring socially mixed neighborhoods*. Routledge.
- Talen, E., (2021). *Urban design and the spatial-functional city: Conceptualizing a pathway to development*. *Urban Studies*, 58(3), 456-470.
- UNESCO., (2022). *Cultural heritage for sustainable cities*. Paris: UNESCO Press.
- UN-Habitat., (2020). *World cities report 2020: The value of sustainable urbanization*. Nairobi: United Nations Human Settlements Program.
- Vale, L. J., and Campanella, T. J., (2005). *The resilient city: How modern cities recover from disaster*. Oxford University Press.
- Wang, M., Lei, G., and Gao, Y., (2024). Study on the change of urban spatial structure in Three North-east Provinces of China based on the coupling relationship between POI and nighttime light data. *Advances in Space Research*, 74(10), 4543-4560. <https://doi.org/10.1016/j.asr.2024.07.017>
- Wirth, L., (1938). *Urbanism as a way of life*. *American Journal of Sociology*, 44(1), 1-24.
- World Bank., (2023). *Urban development overview*. Retrieved from [URL]
- Zarei, A., and Jafari, M., (2020). *Urban planning and spatial justice: Challenges and solutions for distributive equity in Isfahan*. *Urban Studies and Planning Journal*, 13(2), 45-61.
- Zukin, S., (1995). *The cultures of cities*. Wiley-Blackwell.

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