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Analyzing the Role of Urban Management in the Spatial Duality of Tehran (Case Study: District 7 of Tehran Municipality)

Farid Aliyar[1], Shima Dadfar[2]*, Saeideh Mohtasham Amiri [2], Ali Sheikhazami[2], Mohamadreza Farzad Behtash[2]

1. PhD Student in Urban Planning, North Tehran Branch, Islamic Azad University, Tehran, Iran
2. Assistant Professor, Department of Urban Planning, North Tehran Branch, Islamic Azad University, Tehran, Iran

*Correspondence: Dadfar.shi@gmail.com

Abstract

Rapid urbanization and the excessive growth of metropolises have led to numerous consequences, including deficiencies in infrastructure and urban services, social disorders and disarray, housing shortages, and residence in vulnerable and deteriorated urban fabrics. These developments have also placed the environment at risk. Social and economic duality—and consequently, spatial duality—are outcomes of the interactive effects of various factors, which have become evident in Tehran due to rapid urban growth and inefficient urban management. In this context, the management of District 7 of Tehran Municipality, as the spatial focus of this study, has not operated in an integrated or coordinated manner. This has resulted in stark differences in the distribution of land uses between the eastern and western areas of District 7. The aim of this study is to identify the influential factors in the role of urban management in shaping spatial duality within District 7 of Tehran Municipality. This research is applied in purpose, analytical in nature, and employs a mixed-methods approach (qualitative-quantitative). The statistical population consists of 75 urban planning experts. A non-probability stratified sampling method was employed. Research data were collected through library methods, and the instrument for data collection was a structured questionnaire with closed-ended questions. The TOPSIS model was used for data analysis. The results indicate that the integration factor, with a score of 0.967, ranks highest among the evaluated criteria. The spatial factor, with a score of 0.914, holds second place, followed by the security factor in third place. Other factors such as employment, participation, income, infrastructure, and services ranked lower accordingly.

Keywords: Urban management, spatial duality, Tehran, District 7, TOPSIS.

1. Introduction

The expansion of urbanization and population growth in metropolitan areas have led to unbalanced development and spatial fragmentation in urban regions. Under such conditions, numerous urban management organizations, by relying on outdated and traditional regulations and failing to adapt them to urban transformations, continue to reinforce the process of urbanization (Hatami Nejad et al., 2024; Healey, 2004). As a result, despite the concentration of authority in the management of public affairs and the absence of managerial reform, spatial duality and fragmentation are increasingly observed in the neighborhoods of large cities such as Tehran.

Various studies in the field of urban management have focused on optimizing transportation systems and monitoring air quality by emphasizing the use of intelligent methods and predictive models. In the study by Ghayoumi Zadeh et al. (2022), a hybrid model based on Bidirectional Long Short-Term Memory (BiLSTM) neural networks was introduced for short-term prediction of air quality indices in Tehran (Ghayoumi Zadeh et al., 2022). Likewise, Saadi (2023), in another study, applied the Particle Swarm Optimization (PSO) algorithm to address urban routing in supply chains, demonstrating that the use of metaheuristic algorithms under real-world conditions can reduce transportation time and distance, thereby improving the efficiency of urban fleets (Saadi, 2023).

The policy employed for managing public affairs in Tehran's districts is centralized, and there is no participation of citizens in spatial-physical planning programs (Mirzadeh Doostan, 2021). From Arnstein's perspective, citizen participation should be integrated into urban management. Arnstein's ladder of participation frames citizen participation as a form of civic power, classifying levels of involvement into three categories: non-participation, tokenism, and citizen power (Javadi & Parvin, 2015). Moreover, effective urban management requires interaction among environmental, physical, economic, social, and structural-managerial factors, along with considerations such as the competencies and policy goals of political actors and stakeholders in the urban setting. The primary objective of urban management should be to create a livable environment aligned with the economic and social needs of citizens (Zhang, 2025).

This objective is achieved when urban management organizations, as responsible bodies for managing public urban affairs, are capable of administering the entire geographical space and urban functions. Hence, all urban management institutions must have oversight across the entire urban space. Under such a condition, spatial duality does not emerge, and the city functions as an integrated system under efficient and unified management (Healey, 2004).

The emphasis on integrated and holistic spatial planning and management arises from recent developments in governance systems, characterized primarily by multi-level and multi-actor governance (Rezaei, 2014, p. 38). Within the governance model, the hierarchical structure of decision-making, alongside multiple levels of development and construction plans, necessitates coordination across all tiers. This requires a comprehensive and effective managerial system. The governance model and its strategic approach address various issues that cannot be resolved within the confines of a single area of responsibility. The need for alignment among national, regional, and local strategies and policies calls for close coordination among diverse planning authorities and institutions (Hatami Nejad et al., 2024).

Currently, observable challenges in Tehran's urban management system are both structural and functional. Structurally, although the 22 municipal districts of Tehran constitute the main components of the urban management framework, spatial discontinuities among neighborhoods and dependence on the central government for financial resources and legislation prevent these municipalities from uniformly delivering necessary urban services. Functionally, the position of urban management within the broader governance system of Tehran remains unclear. Presently, Tehran's urban management is fragmented, lacking integration, and suffers from the proliferation of decision-making and implementing bodies. Despite the local significance of municipalities and city councils, they lack sufficient autonomy for managing public urban affairs in both policymaking and implementation. Urban neighborhood affairs are controlled, monitored, and guided by multiple overlapping organizations (Sarvar et al., 2017).

These structural and operational issues have led to visible spatial discontinuities in Tehran's urban neighborhoods. In some neighborhoods within a given district, residents have access to all urban services and enjoy favorable physical, economic, and social conditions. In contrast, other neighborhoods within the same district suffer from mismatched land-use distributions relative to population needs, limited access to urban services, and substandard physical, economic, and social conditions (Azar Barghani et al., 2022).

The current study seeks to analyze the role of urban management in the spatial duality observed in District 7 of Tehran Municipality. This district comprises five zones and fourteen neighborhoods, divided into eastern and western areas by Shariati Street. Due to the uneven distribution of land uses and profit-seeking by stakeholders, numerous issues have arisen between these two areas, reducing residents' quality of life. Unfulfilled security needs, environmental pollution, traffic congestion, deteriorated and inefficient urban fabrics, decline in residential land use and growth in commercial use, shortage of green spaces, lack of cultural and recreational services, erosion of residents' sense of place, and reduction of the indigenous population

are among the problems afflicting the eastern and western sections of District 7. As in many other urban districts of Tehran, spatial duality is evident in these neighborhoods. Therefore, this research aims to identify the criteria that contribute to spatial duality in District 7 (Jalili et al., 2021).

Moreover, the present study distinguishes itself from previous research in two key ways: First, it uniquely combines the variables of urban management and spatial duality in the specific context of District 7, marking a novel approach in the field of urban planning studies. Second, it includes a more comprehensive and diverse set of dimensions and indicators compared to similar studies. Third, the study endeavors to understand the causes, processes, and factors that produce spatial duality, while most existing research on urban management and spatial duality has primarily focused on definitions, dimensions, indicators, and measurement methods.

2. Methods and Materials

This research is categorized as an applied study in terms of its objective. The nature of the research is analytical, seeking to analyze the relationships among the variables under study, such as urban management and spatial duality. The methodology employed is mixed-method (a combination of quantitative and qualitative analytical methods). The geographical scope of the study is District 7 of Tehran Municipality.

District 7 of Tehran metropolis covers approximately 2% of the total area of Tehran and ranks fifteenth in size among the 22 municipal districts. This district is bordered to the north by Districts 3 and 4, to the east by District 8, to the west by District 6, and to the south by Districts 12 and 13 of Tehran Municipality. The northern boundary of District 7 is Resalat Expressway, the eastern boundary is Majidieh (Ostad Hassan Bana) and Sabalan Streets, the southern boundary is Enqelab and Damavand Streets, and the western boundary is Modarres Expressway and Dr. Mofatteh Street (Tehran District 7 Municipality, 2019). According to the latest statistics in 2018, District 7 of Tehran is divided into 5 zones and 14 neighborhoods.

The statistical population consists of 75 individuals, including experts from District 7 Municipality, neighborhood development offices, and urban planning scholars. The sampling method used in this study is stratified probabilistic sampling. Accordingly, the expert population was divided into distinct subgroups. After determining the strata, a sample was drawn from each. In this case, organizations such as the urban management unit of District 7, neighborhood development offices, and university professors formed the first strata from which experts and key informants were randomly selected. The data collection method is library-based, used to determine the thematic framework, conceptual understanding, and review of relevant theories. Based on this theoretical insight and initial studies of the region's geographic characteristics and lived experiences, a suitable research theory was selected. The data collection instrument is a closed-ended questionnaire.

To analyze the influential criteria in the role of urban management on spatial duality in District 7 of Tehran Municipality, the TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution) model was used. In the TOPSIS model, the first step is to construct the data matrix. In the second step, data are normalized. In the third step, weights are applied to the normalized data. The fourth step involves calculating the distance of each criterion from the positive and negative ideal solutions, and finally, the criteria are ranked.

Recent studies have shown that the TOPSIS method—particularly its fuzzy version—has proven highly effective in complex decision-making scenarios such as employee performance evaluations and supply chain risk management. In the study by Ramazani et al. (2022), both classical and fuzzy TOPSIS models were used to assess general and specific performance indicators of employees in software development, and the results indicated that the fuzzy version, due to its ability to handle uncertainty and subjective judgments, provided more accurate and reliable outcomes (Ramezani et al., 2022). Additionally, Hajigol Yazdi and Fakhrzad (2020) introduced a novel "Risk Efficiency Index (REI)" in the context of the supply chain and, using fuzzy TOPSIS, fuzzy FMEA, and fuzzy AHP methods, prioritized risk sources. Their findings also confirmed the superiority of fuzzy TOPSIS in risk intensity analysis and resource allocation (Hajigol Yazdi & Fakhrzad, 2020). Collectively, these studies underscore the increasing importance and effectiveness of fuzzy TOPSIS in managerial and operational decision-making environments characterized by qualitative data and uncertainty.

Table 1. Dimensions, Indicators, and Criteria Influencing the Role of Urban Management on Spatial Duality in District 7 of Tehran Municipality

Dimension	Indicator	Criterion
Social	– Security – Participation – Access to services	Adequate street and alley lighting at night, Level of community cooperation and civic participation, Access to sports and recreational centers, Availability of educational, health, and medical services
Economic	– Budget and investment – Infrastructure services – Employment – Income	Low investor interest in the eastern zone due to limited profit potential, Adequate access to utilities (electricity, water, gas, telecommunications), Variety of employment opportunities in the western zone, Disparities in goods and service costs between east and west
Physical-Spatial	– Housing and degradation – Spatial cohesion – Transportation and walkability	Land-use interference in residential areas, Greater physical deterioration in eastern neighborhoods, Continuity and coherence of spatial symbols and areas, Spatial connectivity across national, regional, and local levels, Integration across physical, economic, and social sectors, Quality of public transportation
Environmental	– Green space – Pollution	Differences in green space share between eastern and western neighborhoods, Pollution caused by workshops and warehouses
Managerial	– Laws and policies – Integration – Skilled workforce	Presence of multiple government organizations alongside the municipality, Degree of coordination among management institutions, Level of participation from civil society and community-based organizations, Employment of qualified urban managers with both expertise and political authority

3. Findings and Results

At this stage, 14 indicators and 20 criteria were extracted, which were evaluated using the TOPSIS model based on the scores provided by the respondents. In the first step, a data matrix was constructed from the assigned scores to each indicator. In the second step, data were normalized; in the third, a weighted normalized decision matrix was generated; in the fourth, positive and negative ideal solutions were determined for each criterion; in the fifth, the distance of each option from the ideal solutions was calculated; and in the sixth step, the relative closeness of each criterion to the ideal solution was assessed. The matrix of indicators and criteria affecting the role of urban management in the spatial duality of District 7 of Tehran Municipality is presented in Table 2.

Table 2. Matrix of Indicators and Criteria Affecting the Role of Urban Management in Spatial Duality in District 7 of Tehran Municipality

Indicator / Criterion	Security	Participation	Access to Services	Budget & Investment	Infrastructure Services	Employment	Income	Housing & Deterioration	Green Space & Pollution	Spatial	Transportation & Walkability	Laws & Policies	Integration	Expert Workforce
Proper night lighting in streets/alleys	3.40	3.52	3.37	4.42	4.58	3.37	3.54	3.67	3.23	3.65	3.77	3.64	3.17	3.27
Civic cooperation and participation	3.38	3.41	3.41	3.61	3.87	3.11	3.19	3.24	3.14	3.21	3.19	3.13	3.11	3.08
Access to sports/recreational centers	3.11	3.14	3.24	3.67	3.94	3.27	3.24	3.11	3.25	3.17	3.11	2.68	2.48	2.21
Availability of education/healthcare	3.16	3.14	3.24	3.67	3.94	3.27	3.24	3.16	3.25	3.17	3.11	2.68	2.78	2.13
Investment reluctance in east zone	3.17	3.24	3.24	3.67	3.94	3.27	3.24	3.11	3.15	3.10	3.01	2.68	2.78	2.12
Utility access (electricity, gas, etc.)	3.11	3.14	3.34	3.71	3.91	3.11	3.23	3.18	3.25	3.17	3.11	2.68	2.78	2.23
Job variety in western zone	3.16	3.37	3.37	3.58	3.71	2.87	2.57	2.67	2					

The Weighted Normalized Matrix of Indicators and Criteria Influencing the Role of Urban Management in the Spatial Duality of District 7 of Tehran Municipality is presented in Table 3.

Table 3. Weighted Normalized Matrix of Indicators and Criteria Influencing the Role of Urban Management in the Spatial Duality of District 7

Indicator / Criterion	Security	Participation	Access to Services	Budget & Investment	Infrastructure Services	Employment	Income	Housing & Deterioration	Green Space & Pollution	Spatial	Transport & Walkability	Laws & Policies	Integration	Expert Workforce
Adequate night lighting	0.25	0.26	0.25	0.32	0.34	0.25	0.26	0.27	0.24	0.27	0.28	0.27	0.23	0.24
Civic cooperation	0.27	0.28	0.28	0.29	0.31	0.25	0.26	0.26	0.25	0.26	0.26	0.25	0.25	0.25
Access to recreational centers	0.26	0.27	0.28	0.31	0.33	0.28	0.28	0.26	0.28	0.27	0.26	0.23	0.21	0.19
Access to education and healthcare	0.27	0.27	0.27	0.31	0.33	0.28	0.27	0.27	0.27	0.27	0.26	0.23	0.23	0.18
Low investment in the eastern area	0.27	0.27	0.27	0.31	0.33	0.28	0.27	0.26	0.27	0.26	0.26	0.23	0.24	0.18
Access to utilities	0.26	0.27	0.28	0.31	0.33	0.26	0.27	0.27	0.27	0.27	0.26	0.23	0.23	0.19
Employment diversity in west	0.29	0.31	0.31	0.32	0.34	0.26	0.23	0.24	0.26	0.27	0.25	0.24	0.18	0.20
Cost disparity east vs. west	0.21	0.19	0.25	0.34	0.36	0.30	0.30	0.28	0.24	0.24	0.29	0.25	0.22	0.21
Land-use interference	0.28	0.24	0.24	0.35	0.34	0.27	0.26	0.26	0.31	0.22	0.23	0.21	0.29	0.21
Physical degradation in east	0.27	0.28	0.28	0.36	0.37	0.25	0.24	0.22	0.28	0.21	0.26	0.23	0.21	0.21
Continuity in urban elements	0.26	0.26	0.27	0.38	0.37	0.23	0.25	0.26	0.24	0.22	0.24	0.21	0.25	0.23
Spatial linkage across levels	0.29	0.29	0.29	0.33	0.33	0.25	0.24	0.25	0.24	0.23	0.31	0.22	0.21	0.22
Integration across physical, economic, and social dimensions	0.28	0.28	0.28	0.33	0.33	0.26	0.27	0.26	0.25	0.24	0.26	0.24	0.19	0.20
Quality of public transportation	0.28	0.28	0.29	0.31	0.32	0.21	0.27	0.25	0.29	0.26	0.28	0.24	0.22	0.22
Green space distribution disparity	0.28	0.27	0.27	0.30	0.30	0.26	0.27	0.24	0.26	0.27	0.28	0.24	0.24	0.22
Pollution from workshops/warehouses	0.29	0.29	0.30	0.32	0.33	0.27	0.24	0.21	0.18	0.27	0.27	0.28	0.23	0.20
Presence of multiple state agencies	0.27	0.27	0.27	0.37	0.38	0.26	0.25	0.24	0.22	0.21	0.23	0.23	0.25	0.23
Coordination among agencies	0.27	0.27	0.27	0.34	0.37	0.23	0.23	0.27	0.23	0.25	0.26	0.23	0.25	0.23
Civil society participation	0.26	0.26	0.27	0.33	0.37	0.22	0.25	0.20	0.26	0.25	0.27	0.26	0.26	0.23
Expert managers with political authority	0.23	0.30	0.30	0.32	0.31	0.27	0.28	0.26	0.25	0.25	0.25	0.26	0.22	0.23

Table 4. Distance of Indicators from Ideal and Negative-Ideal Solutions

Indicator	Rank	CLi	Di−	Di+
Budget & Investment	14	0.082	0.003	0.025
Expert Workforce	13	0.220	0.007	0.025
Transport & Walkability	12	0.232	0.007	0.018
Participation	6	0.426	0.014	0.023
Access to Services	11	0.314	0.010	0.019
Income	7	0.418	0.013	0.020
Green Space & Pollution	10	0.389	0.013	0.018
Housing & Deterioration	5	0.433	0.014	0.018
Employment	4	0.445	0.015	0.001
Integration	1	0.967	0.030	0.003
Spatial	2	0.914	0.028	0.016
Security	3	0.487	0.016	0.020
Laws & Policies	9	0.417	0.014	0.019
Infrastructure Services	8	0.417	0.013	0.028

Based on the above results and findings from Table 4, it can be concluded that the Integration indicator, with a score of 0.967, ranks highest among the evaluated criteria and holds the first position. The Spatial indicator, with a score of 0.914, ranks second, while the Security indicator ranks third with a score of 0.487. Other indicators such as Employment, Participation, Income, and Infrastructure Services occupy lower rankings, respectively.

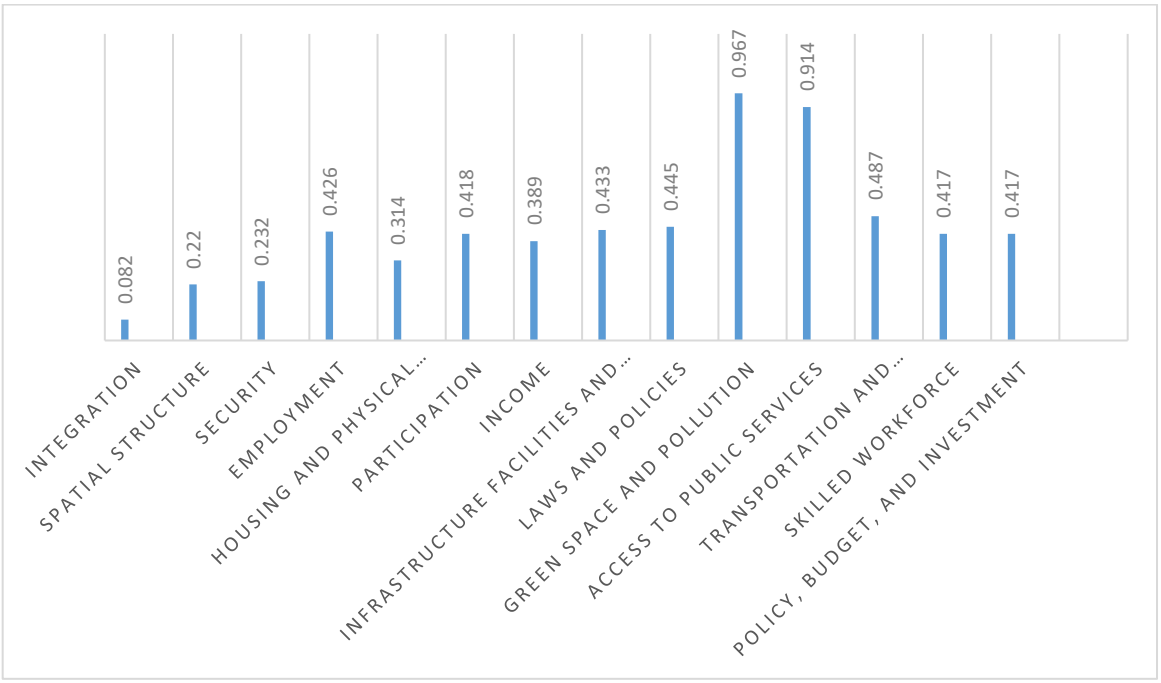

Figure 1. Distance of each indicator from the ideal and negative-ideal solutions regarding the role of urban management in spatial duality in district 7 of tehran municipality

4. Discussion and Conclusion

Urban management, as the organizational framework for governing and developing a city, involves the policies, programs, plans, and operations aimed at ensuring that population growth aligns with access to services, infrastructure, housing, and employment. The expansion of urbanization and the growth of cities and urbanism in recent years have added new dimensions to urban issues, making the guidance of urban development and the structuring of cities and their surrounding areas critically important (Amirzadeh Doostan, 2021). Spatial duality is one of the most significant challenges caused by ineffective urban management. The concept of spatial duality originates from spatial planning and refers to disparities in the distribution of physical, economic, and social resources, as well as opportunities, across urban space. Spatial duality leads to suboptimal use

of space, resulting in the geographical concentration of poverty and the exacerbation of deprivation. Moreover, the formation of the spatial-physical structure of cities reflects and embodies diverse ideologies that have prevailed at different times and places, producing varying spatial arrangements (Qaed Rahmati et al., 2021). Spatial duality in the spatial organization of Tehran manifests in two forms: one, in the relationship between each urban space and its adjacent spaces; and two, in the internal relationship among the components of a single urban space (Pirbabayi & Rahimi, 2015).

Urban management in Tehran, across its physical, environmental, social, economic, and administrative dimensions, can contribute to spatial duality in District 7. According to the findings based on the TOPSIS model, the *integration* indicator, with a score of 0.967, the *spatial* indicator, with a score of 0.914, and the *security* indicator, with a score of 0.487, have the highest impact on the state of urban management and spatial duality in District 7 of Tehran Municipality. The urban management system in District 7 is fragmented, centralized, and top-down, lacking engagement from the private sector, civil society, and the public. The following strategies are proposed to achieve integrated urban management and reduce spatial duality in District 7 of Tehran Municipality:

- Decentralization of the managerial structure, redistribution of power, and delegation of responsibilities among multiple urban management organizations.
- Enhancing coordination and integration among various management institutions.
- Equitable distribution of land uses to mitigate spatial duality between the eastern and western parts of the district.
- Expansion of council activities from neighborhood councils to district councils, improving the infrastructure for citizen participation in different aspects of urban governance.
- Promotion and development of a culture of public participation in the processes of improving the economic, social, cultural, and environmental conditions of neighborhoods.
- Addressing social harms, the negative reputation of certain neighborhoods, and the establishment of social security.
- Reduction of environmental, air, noise, water, and soil pollution across the district.
- Employment of planners who possess the necessary competencies to identify the district's problems, incorporate public opinion, and exercise sufficient initiative in proposing innovative solutions.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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