

Original Research Article

Applying an Integrated Foresight Framework to Urban Visual Management in Tehran

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Abstract**Problem statement:** The visual management of the Tehran metropolis faces complex structural challenges, overlapping institutional duties, conflicting interests among actors, and a dominance of reactive approaches, which have rendered linear and project-based planning ineffective.**Research objective:** To shift from this linear perspective to a systemic approach, this study aims to explain the dynamics governing the future of Tehran's urban aesthetics and to formulate resilient strategies against underlying uncertainties.**Research method:** The study employed the integrated framework of the French school of foresight. Tools, including structural analysis, actor analysis, scenario building, and multi-criteria evaluation, were sequentially applied. This was conducted relying on the continuous input of an expert panel comprising 13 senior managers and experts from the Tehran Beautification Organization. The analytical tools utilized included MICMAC, MACTOR, Scenario Wizard, and MULTIPOL software.**Conclusion:** Findings revealed that the system is in severe instability, and key drivers (such as sustainable financial resources and organizational reforms) are fundamentally institutional rather than physical. A multi-centric distribution of power and hidden divergence among actors pushes the city toward a probable scenario of everyday stagnation. Conversely, knowledge-based strategies and standardization demonstrated greater resilience in critical scenarios compared to strictly project-based actions. Consequently, achieving a sustainable urban landscape requires a paradigm shift from pure physical design to network governance, elevating the responsible organization from a direct executor to a regulator and facilitator.**Keywords:** *Futures Studies, Urban Visual Management, Scenario Planning, Structural Analysis, Urban Policy-Making.***Introduction and Problem Statement**

Visual quality and urban aesthetics in contemporary metropolises are no longer regarded merely as artistic or decorative concerns; rather, they have become fundamental components of enhancing quality of life, vitality of public

spaces, place identity, and urban competitiveness (Ewing & Handy, 2009; Carmona, 2019). At the same time, managing this domain in developing metropolises, particularly in a city such as Tehran, faces complex and wicked challenges. These include institutional fragmentation, instability of financial resources, the dominance of revenue-driven logics over

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quality considerations, and conflicts of interest among stakeholders. Such conditions have significantly limited the effectiveness of traditional linear and project-based approaches (Madanipour, 2006b). From this perspective, urban visual management should be understood not merely as a physical or design-related issue, but as a matter of governance, policymaking, and institutional coordination.

Previous studies have demonstrated that visual pollution and disorder can negatively affect citizens' perceptions, sense of belonging, perceived safety, spatial behaviors, and urban identity (Nasar, 1998; Ewing & Handy, 2009; Portella, 2016). In Tehran, unbalanced development, weak inter-sectoral coordination, and the absence of integrated planning have been identified as key factors influencing the quality of the urban visual environment (Habibi & Hourcade, 2005; Madanipour, 2006). Despite this significance, a considerable portion of existing studies has either focused on physical dimensions and design regulations or has examined citizens' preferences and urban management issues in isolation. A comprehensive understanding of the future of visual management in Tehran, however, requires simultaneous attention to causal structures, key driving forces, and the network of actors and their conflicting interests.

Under such conditions, strategic foresight provides an appropriate framework for moving beyond reactive and short-term decision-making. Futures studies, by focusing on uncertainties, driving forces, and alternative scenarios, enable the formulation of robust and flexible policies in complex urban contexts (Bradfield et al., 2005; Godet & Durance, 2011). Among various foresight approaches, the French school has been identified as particularly suitable for this research due to its systemic and action-oriented nature. Rather than relying on linear prediction, this approach emphasizes a coherent analytical chain consisting of structural analysis, actor analysis, scenario building, and multi-criteria evaluation (Godet, 1987, 1994; Godet & Roubelat, 1996). This characteristic is especially relevant for the issue of visual management in Tehran, where complexity arises not only from the multiplicity of influencing variables but also from

institutional fragmentation and polycentric power structures (Bryson, 2004; Healey, 2009).

Despite the importance of the subject, a significant research gap exists in this field. First, previous studies on visual management in Tehran have predominantly focused on describing physical conditions or providing general problem diagnoses, while paying limited attention to the political economy of space and power relations among actors (Madanipour, 2006b; Portella, 2016). Second, within the urban foresight literature, although tools such as scenario planning and structural analysis have been applied in various contexts, the integrated use of structural analysis, actor analysis, scenario development, and multi-criteria evaluation in the context of visual management in Tehran remains underexplored (Chakraborty & McMillan, 2015). Therefore, the main gap addressed by this research lies in the absence of an integrated framework for the simultaneous analysis of structural drivers and institutional actors shaping the future of Tehran's visual management.

Accordingly, the primary objective of this study is to conceptualize the future of visual management in Tehran and to identify robust strategies under conditions of uncertainty using an integrated strategic foresight framework. The main research question is formulated as follows: How can an integrated foresight framework be employed to identify key driving forces, patterns of actor behavior, and robust strategies influencing the future of visual management in Tehran?

To address this question, the study adopts a mixed-method approach grounded in the French school of foresight. Within this framework, key variables are first identified through structural analysis using MICMAC; subsequently, plausible scenarios are developed using Scenario Wizard; in the next step, the power structure and patterns of convergence and divergence among actors are analyzed using MACTOR; and finally, robust policy options and strategic alternatives are prioritized through multi-criteria evaluation using MULTIPOL (Godet, 1994; Godet, 1997; Godet et al., 2007). The structure of the paper is organized as follows: after the introduction, the theoretical framework and literature

review are presented; this is followed by a description of the research methodology; the findings of structural analysis, scenario development, and actor analysis are then reported; and finally, the discussion, conclusions, and policy and research recommendations are provided.

Literature Review

A review of previous studies indicates that the theoretical foundations of this research are grounded in two main clusters: strategic foresight and visual management/urban governance. In the field of foresight, Godet & Durand (2011), by proposing a comprehensive framework for strategic foresight, emphasize the identification of key driving forces, structural analysis, scenario building, and actor analysis as complementary components of strategic decision-making. This framework constitutes the principal theoretical basis of the French school of foresight and serves as one of the methodological pillars of the present study. In this regard, Chakraborty & McMillan (2015) also highlight the necessity of integrating scenarios into real-world decision-making processes, particularly within urban planning contexts.

With respect to actor analysis and governance, Bryson (2004) demonstrates that understanding power structures, stakeholder interests, and their interrelationships is a prerequisite for the success of public and urban policies. This perspective is particularly relevant to the present study, as visual management in Tehran is not solely influenced by physical variables but is strongly shaped by the configuration of forces and interactions among institutional actors. This dimension is further reinforced by Madanipour's (2006b) institutional approach, which identifies complex governance structures, overlapping responsibilities, and weak institutional coordination as major barriers to urban development in Tehran.

Within the cluster of studies related to visual management and urban environmental quality, Carmona (2019) argues that the management of urban aesthetics requires a multidimensional approach based on inter-organizational coordination, citizen participation, and socio-spatial considerations. Similarly, Portella (2016) demonstrates

that visual pollution, particularly that generated by advertisements and signage, has a direct negative impact on the quality of life and citizens' perceptual experience, thus necessitating integrated policy interventions. Furthermore, Ewing & Handy (2009) identify a significant relationship between the visual quality of urban spaces and pedestrian behavior, showing that environmental design quality plays a crucial role in enhancing urban vitality.

More recent studies have reinforced these insights from both data-driven and policy-oriented perspectives. Ito et al. (2024), in a systematic review of visual-based urban perception, argue that understanding urban environmental quality remains incomplete without considering citizens' visual perception. Fang et al. (2024), focusing on the assessment of street aesthetic quality, emphasize the link between landscape perception and overall environmental quality. Zhou et al. (2023) demonstrate that mobility experience and mental imagery of urban spaces play a key role in shaping aesthetic judgments. In the domain of visual pollution, Gao et al. (2024) conceptualize it as a multidimensional issue encompassing physical, perceptual, and managerial aspects. Wakil et al. (2021), through the development of a multi-stakeholder decision support system for billboard management, show that addressing visual pollution is not feasible without accounting for stakeholder roles and interests. Similarly, AlElaiwi et al. (2023), by introducing an image-based dataset of public roads, highlight the importance of data-driven tools for analyzing and monitoring visual pollution.

Studies focusing specifically on Tehran also provide important insights. Zebardast (2009) identifies visual quality and access to green spaces as key determinants of citizens' satisfaction, while Habibi & Hourcad (2005) point to uneven development and weak integrated planning as major challenges facing the Tehran metropolitan area. Purmousavi et al. (2014) have pointed to the importance of middleware development, & Kheiroddin (2010) has addressed the role of urban management in shaping space. In recent years, domestic research has increasingly addressed various dimensions

of façades, visual perception, and urban governance. Mahanfar et al. (2021) highlight the gap between designers' preferences and public perception in their evaluation of the aesthetic components of prominent administrative façades in Tehran. Rostami (2022) examines the relationship between beauty, beautification, and becoming aesthetic in urban spaces, emphasizing the need for a more culturally informed approach to urban aesthetic management. Shahriari et al. (2024) investigate the effects of environmental conditions on color perception in Tehran, demonstrating that visual components are influenced by both environmental and perceptual variables. Meanwhile, Aminzadeh et al. (2024), through a critical analysis of façade regulations in the Hakimiyeh neighborhood, underline the lack of regulatory coherence in Tehran's urban landscape governance. Najafi et al. (2024), in a semiotic analysis of Tehran's murals, reveal that the city's visual layers convey diverse cultural and social meanings. Additionally, Zarei & Hagh Lesan (2024) emphasize the need for integrating urban management, technology, and sustainability through environmentally adaptive smartification approaches in Tehran. In the field of urban foresight, Rezaei et al. (2023), in their study on urban development plans, underscore the importance of identifying future uncertainties and employing scenario planning for strategic decision-making.

In summary, although previous studies have highlighted the importance of structural drivers, actor analysis, visual quality, and governance challenges, the integration of these dimensions within a comprehensive foresight framework for analyzing the future of visual management in Tehran has received limited attention. The existing gap lies precisely at this intersection, and the present research seeks to address it by combining structural analysis, actor analysis, scenario development, and multi-criteria evaluation within an integrated analytical framework.

Theoretical Foundations

• Visual environment and urban aesthetics

Urban aesthetics constitutes a fundamental pillar of urban design, encompassing visual quality, physical

coherence, and a sense of place within public spaces (Nasar, 1998). This concept extends beyond purely aesthetic dimensions, exerting profound effects on mental health, social well-being, and collective identity (Carmona et al., 2010). Empirical studies have demonstrated that the visual quality of urban environments is associated with citizens' happiness, increased sense of safety, enhanced social interactions, and the attraction of economic investment (Ewing & Handy, 2009; Portella, 2016). Furthermore, urban aesthetics plays a significant role in promoting sustainable tourism, urban regeneration, and the preservation of cultural heritage (Gospodini, 2004).

The management of urban aesthetics, particularly in developing metropolises such as Tehran, faces numerous challenges. These include overlapping institutional responsibilities, the absence of unified aesthetic standards, conflicts of interest among stakeholders, limitations in financial and human resources, and rapidly evolving public preferences (Madanipour, 2006a; Carmona, 2019). Such complexities underscore the necessity of adopting innovative management approaches.

• Dimensions of urban visual management

Urban visual management, as an emerging pillar in urban design and governance, has become a necessity due to the increasing complexity of physical environments and the overflow of visual messages (Carmona et al., 2021). It can be interpreted through multiple lenses: as a regulatory process involving the planning and control of visual elements through legal mechanisms (Cantell, 2021); as a psychological process aimed at harmonizing visual stimuli to reduce cognitive overload (Nasar et al., 2020); as a strategic approach guiding urban morphological transformations (Zekavat, 2006); and as a physical-regulatory framework ensuring coherence in the application of form, color, texture, and materials (Shahabian, 2018). Contemporary perspectives further emphasize the role of smart technologies in quantitatively and qualitatively assessing visual disturbances to restore urban harmony (Kesowa, 2025). These perspectives collectively reinforce the four-dimensional framework identified in the literature: physical-design, perceptual-

psychological, institutional-governance, and socio-cultural (Kwon et al., 2021).

• Historical evolution and theoretical approaches in visual planning

The origins of visual management can be traced to early efforts to impose order in industrial cities. The nineteenth-century sanitary movement in Britain indirectly established the foundations of infrastructural visual order, while concepts such as the Garden City with its green belts and the Linear City with its clear visual corridors sought to achieve visual balance and social sustainability.

In the mid-twentieth century, Kevin Lynch (1960) laid the theoretical foundations of visual management through the concepts of legibility and imageability, introducing five key elements: paths, edges, districts, nodes, and landmarks. Concurrently, Jane Jacobs (1961) critiqued modernist urbanism and advocated for visual diversity and complexity in urban streets, while Gordon Cullen (1961) conceptualized the city as a sequential visual experience through the notion of serial vision.

Subsequently, semiotic approaches, particularly those associated with Umberto Eco, interpreted the built environment as a system of signs representing societal values (Bellentani et al., 2024). Meanwhile, Kaplan & Kaplan (1989), through Attention Restoration Theory, demonstrated that visual environments characterized by extent and fascination can reduce mental fatigue.

In recent decades, visual management has shifted from technocratic models toward communicative and participatory approaches. Functional approaches emphasize optimization and smart technologies; design-oriented approaches focus on visual guidelines; participatory approaches promote bottom-up processes for addressing local visual issues; and smart approaches utilize tools such as augmented reality and urban information modeling to predict the visual impacts of interventions (Biljecki et al., 2015).

• Structural components of visual management

Operationalizing visual management requires the regulation of key elements shaping the visual atmosphere

of cities. Color management frameworks translate objectives into coordinated palettes and utilize virtual reality for testing visual impacts. Lighting engineering has evolved from a purely functional tool into a means of creating visual harmony by balancing light and shadow, ensuring color rendering stability, and minimizing light pollution (Khorsand et al., 2021). Urban furniture, as physical points of interaction, requires a balance between aesthetics and functionality.

Visual complexity and physical identity are increasingly evaluated using fractal theory, with studies indicating that historic environments with higher fractal dimensions exhibit greater visual quality and identity compared to newly developed areas (Marzi et al., 2023). In the digital era, artificial intelligence and computer vision have transformed the assessment of visual quality. Visual pollution indices derived from image analysis generate heatmaps (Kesowa, 2025); multimodal large language models evaluate visual attractiveness using street-view imagery (Liang et al., 2024); and the integration of multidimensional indicators such as eye-tracking and semantic segmentation provides deeper insights into human perception (Ma et al., 2025).

Conversely, visual pollution refers to the degradation of aesthetic value due to undesirable and incoherent elements (Singh & Madhav, 2025). It often results from the accumulation of unauthorized signage, inappropriate façades, infrastructural clutter, tangled cables, and the absence of regulatory coherence (Portella, 2016; Fahiminia et al., 2022), ultimately diminishing visual enjoyment and hindering environmental perception (Nawaz & Wakil, 2022). Advertising billboards present a paradox between economic necessity and visual disruption; thus, contemporary strategies emphasize architectural integration through interactive displays, respect for visual corridors, and contextual relevance of content (Jin et al., 2025).

• Conceptualization and the importance of global experiences in visual management

In recent decades, urban visual management has evolved from an aesthetic concern into a global necessity for mental well-being and urban planning. Visual pollution is defined as the presence of dense and undesirable

elements that disrupt the perception of both natural and built environments (Hassan & Khalil, 2024). The visual bombardment of citizens through excessive advertising and incoherent signage not only obscures architectural identity but also leads to information overload, cognitive fatigue, and stress (ibid.).

Different countries have adopted diverse approaches to visual management through regulatory frameworks, coding systems, and physical interventions. Successful global experiences demonstrate that effective visual management is grounded in strategic frameworks prioritizing visual coherence over short-term economic gains (Zekavat, 2016). Studying these experiences is essential for extracting transferable principles rather than replicating models directly. Successful cities share common characteristics, including political commitment to consistent visual policies, active social participation, and effective legal institutions (Hall, 2014). Importantly, meaningful learning from global experiences requires a deep understanding of each context's cultural, economic, and social conditions, as uncritical policy transfer can lead to adverse outcomes (Madanipour, 2006a). Table 1 reviews the governing approaches, key executive actions, and environmental and visual achievements of different cities such as New York, Seoul, and Paris through a comparative study of global experiences.

Global experiences can be broadly categorized into several approaches: radical and zero-tolerance (e.g., South American cases), regulatory and heritage-preserving (developed countries), rapid corrective approaches (developing contexts), and, more recently, participatory and technology-driven approaches. The literature indicates a shift from purely restrictive models toward integrated frameworks combining regulation, design, participation, and technological tools. Evidence-based policymaking can simultaneously enhance business environments and visual quality (Wakil et al., 2021; Gao et al., 2024). Comparative analyses highlight key principles such as contextualization, institutional integration within clear legal frameworks, the use of advanced technologies for proactive management, stakeholder participation, and flexible regulations favoring performance-based

guidelines over prescriptive rules (Watson, 2014). In Iran, the primary gap lies not in technical design knowledge but in governance structures, institutional fragmentation, and implementation capacity.

• Indicators and uncertainties of visual management derived from research and practice

The theoretical foundation of this study integrates urban aesthetics, network governance, and strategic foresight. From an aesthetic perspective, urban visual quality is shaped by legibility and imageability (Lynch, 1960), sequential visual experience (Cullen, 1961), the relationship between form and movement (Bacon, 1967), genius loci and identity (Norberg-Schulz, 1980), spatial continuity versus lost spaces (Trancik, 1986), and human scale and everyday life (Gehl, 2010).

At the governance level, visual management in Tehran is characterized by overlapping responsibilities, weak coordination, and limited participation. Stakeholder analysis (Bryson, 2004) and collaborative governance (Healey, 2009) suggest that successful strategies require institutional convergence around the regulatory role of the Beautification Organization.

The foresight framework drawing on structural analysis, actor analysis, scenario building, and multi-criteria evaluation (Godet, 1987, 1994; Godet & Durance, 2011) identifies 26 key uncertainties grouped into four theoretical clusters:

- **Institutional-governance cluster:** including roles, influence, stability, transparency, and organizational interactions, linked to network governance and institutional regulation literature (Bryson, 2004; Madanipour, 2006a; Healey, 2009).
- **Physical-aesthetic cluster:** including master plan implementation, priorities, quality monitoring, spatial disparities, and maintenance, grounded in theories of legibility, spatial continuity, and human scale (Lynch, 1960; Cullen, 1961; Bacon, 1967; Trancik, 1986; Gehl, 2010).
- **Socio-cultural and participatory cluster:** including public and expert participation, stakeholder interactions, and cultural expectations, reflecting participatory

Table 1. Global experiences in urban visual management. Source: Authors.

Case/ Location	Approach Type	Actions and Key Features	Outcomes/ Impacts	References
São Paulo	Radical Removal	Implementation of the Clean City Law (2007); near-total ban on advertising; removal of billboards and signage	Revelation of hidden architecture; improvement of urban landscape quality; increased civic participation	Borsi (2024), Princi (2025)
New York	Smart Management	Regulation of Times Square; control of lighting, color, and visual density	Preservation of visual identity alongside control of visual chaos	Carmona et al. (2010), Stone (2012)
United States (National)	Visual Assessment	Mandatory visual impact assessments by landscape architecture associations	Improvement in project quality	Tetherow & McCarty (2023)
Vancouver	Gradual Regulation	Sign bylaws based on location, size, and design principles	Preservation of visual coherence with business flexibility	City of Vancouver (2017)
Toronto	Incremental Reform	Revision of sign regulations; reduction of light pollution	Improvement in street quality	City of Toronto (2008)
France	Heritage Protection + Restriction	Grenelle Law; prohibition in small towns; environmental control measures	Reduction of advertising and calming of the visual environment	Connexion France (2017), Local regulations ... (2019)
Nantes	Sudden Removal	Overnight removal of 110 digital billboards	Elimination of large-scale advertising	Connexion France (2017)
Paris	Restrictive Regulation	Reduction in billboard size; prohibition near schools	Enhancement of urban environmental quality	Local regulations ... (2019)
United Kingdom (London)	Visual Protection	London View Management Framework (LVMF); designation of view corridors and height restrictions	Preservation of views toward key urban landmarks	LVMF (2012), Walker (2026)
Barcelona	Regeneration + Pedestrianization	Superblock model; traffic reduction; expansion of public space	Improved visual quality and livability	Bohigas (1999), Mueller et al. (2018)
Bilbao	Iconic Project	Construction of the Guggenheim Museum	Transformation of urban image	(Plaza, 2008)
Copenhagen	Green Policy	Green factor tools; expansion of tree coverage	Enhancement of urban landscape	Gehl (2010), Copenhagen Municipality (2015)
Vienna	Theoretical Framework	Vienna Memorandum; emphasis on visual impact assessment	Preservation of historical landscape integrity	UNESCO (2005)
Warsaw	Participatory Regulation	Adoption of landscape regulations with public support	Integration of urban furniture	Czajkowski et al. (2022)
Japan (Kyoto)	Participatory Approach	Landscape law; local councils; financial incentives	Coexistence of tradition and modernity	Brumann (2025)
Tokyo	Hybrid Approach	Local regulations combined with social education	Visual order in high-density environments	Zheng (2014)
Seoul	Environmental Regeneration	River restoration; highway removal	Creation of natural visual corridors	Seoul Metropolitan Government (2005)
Shanghai	Engineering Control	Lighting management, zoning, and lux limitations	Control of light pollution	Wu (2015)
Thailand	Zoning-Based	Identification of visual disturbances in a national park	Need for zoning-based policies	Phumsathan et al. (2025)
Global	Technology-Driven	Deep learning, visual pollution heat mapping	Data-driven decision-making	Kesowa (2025), Masudur Rahman et al. (2026)
Global	GIS-Based	Modeling of signage density	Optimal placement of advertisements	Wakil et al. (2021)
Singapore	Digital Twin	3D simulation of projects	Prediction of visual impacts	OECD (2024)
Iran	Scientific Research	Study of location, structural design, and graphic factors	Identification of visual pollution drivers	Ahmadi et al. (2021)

planning approaches (Bryson, 2004; Healey, 2009; Gehl, 2010). resources, monitoring, and maintenance systems, emphasizing integrated management mechanisms.

- **Financial-operational cluster:** including sustainable Global experiences such as those in

Vancouver (City of Vancouver, n.d.), Toronto (City of Toronto, 2008), France (Local regulations ..., 2019; Paris cracks ..., 2017), and technology-driven approaches (Wakil et al., 2021; Gao et al., 2024), as well as digital twin applications (OECD, 2024), demonstrate the effectiveness of continuous monitoring and optimal resource allocation. In contrast, the absence of such mechanisms leads to persistent visual disorder (Meshkini et al., 2019).

In conclusion, the future of visual management in Tehran emerges from the interaction of four interrelated layers: perceptual-physical, institutional-governance, socio-cultural, and financial-operational. The 26 identified uncertainties represent the operational indicators of these theoretical dynamics and have been incorporated into the applied foresight models of this research. Table 2 introduces the variables used in the study's structural analysis across four main clusters: institutional-governance, physical-aesthetic, socio-cultural, and financial-operational- along with their supporting academic literature.

• Future research in the visual management of Tehran city

Foresight, as a systematic methodology for exploring possible, probable, and preferable futures, emphasizes the identification of driving forces, uncertainties, and the design of robust policies. It is particularly suitable for analyzing complex, multi-actor urban issues such as visual management (Godet, 1994; Bell, 2003; Healey, 2009; Godet & Durance, 2011).

Unlike forecasting approaches based on extrapolating past trends, foresight acknowledges the plurality of futures and the active role of human agency (Inayatullah, 2008; Yaraghi Fard & Shokouhbidhendi, 2025). The French school of foresight, led by Godet, emphasizes structural analysis and the identification of key variables in complex systems, grounded in three core principles: systemic thinking, recognition of uncertainty, and stakeholder participation (Godet, 2000; Godet & Durance, 2010). Cities, as open and non-linear systems, require such approaches, and foresight tools enable the evaluation of alternative scenarios and the design of flexible policies (Batty & Marshall, 2012; Amer et al., 2013). Foresight

approaches are generally categorized into exploratory (analyzing possible futures), normative (designing pathways from a desirable future), and integrative approaches (Börjeson et al., 2006). Common methods include Delphi, scenario planning, trend analysis, backcasting, and cross-impact analysis (Schwartz, 1996; Van der Heijden, 2005). Recent literature indicates that the field of foresight is not homogeneous and encompasses diverse strands such as prediction, future imaginaries, pursuit of desirable futures, and epistemological critiques (Minkinen, 2019). Scenario planning methodologies have also evolved into distinct schools with specific methodological logics and choices (Cordova-Pozo & Rouwette, 2023).

Embracing a strategic foresight approach in this study directly addresses Tehran's complex urban governance and policymaking landscape (Madanipour, 2006b), entrenched organizational bottlenecks such as limited mandates and conflicts of interest (Habibi & Hourcade, 2005), and policy instability induced by frequent managerial turnover. Alongside these systemic challenges, emerging opportunities -including cutting-edge technologies and global best practices (Zebardast, 2009)- converge with a consensus in domestic scholarship advocating for a strategic, sustainable, and identity-driven paradigm shift in visual management (Zekavat, 2006; Golkar, 2008; Hosseinzadeh Dalir, 2011; Shahabian, 2018). Ultimately, deciphering the interplay between key drivers, diverse actors, and structural uncertainties is only feasible through such an integrated futures framework. Table 3 compares different schools of futures studies, such as forecasting-based, scenario-based, and the French school, in terms of their theoretical foundations, main features, applications, and methodological limitations.

Given the structural complexity of visual management in Tehran, the multiplicity of stakeholders, and the high level of uncertainty, scenario planning was selected as the core method of this study. This approach does not aim at deterministic prediction but rather at identifying plausible futures and designing flexible policies (Bradfield et al., 2005; Chakraborty & McMillan, 2015), and has been widely applied in complex urban contexts (Healey, 2009).

Table 2. Variables for structural analysis. Source: Authors.

No.	Variable Title	Variable Title	Sources
1	Future role of the Beautification Organization	Institutional-Governance	Bryson (2004), Madanipour (2006a), Healey (2009), City of Vancouver (2017), Borsi (2024)
2	Future adherence to the organizational statute	Institutional-Governance	UNESCO (2005), Madanipour (2006a), City of Toronto (2008), Carmona (2019)
3	Intra-organizational influence	Institutional-Governance	Bryson (2004), Godat & Durance (2011)
4	Extra-organizational influence	Institutional-Governance	Bryson (2004), Healey (2009), Mueller et al. (2018)
5	Strategic stability of the organization	Institutional-Governance	Madanipour (2006a), City of Vancouver (2017), Carmona (2019)
6	Future success of organizational reforms	Institutional-Governance	Bryson (2004), Madanipour (2006a), City of Toronto (2008), Czajkowski et al. (2022)
7	Resolution of upcoming structural challenges	Institutional-Governance	Habibi & Hourcade (2005), Madanipour (2006a)
8	Implementation of the comprehensive beautification plan	Physical-Aesthetic	Lynch (1960), Cullen (1961), Bacon (1967), Trancik (1986), LVMF (2012)
9	Future project prioritization (quantity vs. quality)	Physical-Aesthetic	Plaza (2008), Gehl (2010), Carmona et al. (2010), OECD (2024)
10	Future monitoring of project quality	Physical-Aesthetic	Carmona (2019), Kesowa (2025), Wakil et al. (2021), Masudur Rahman et al. (2026)
11	Future realization of beautification principles	Physical-Aesthetic	Lynch (1960), Cullen (1961), Norberg-Schulz (1980), Nasar (1998), Bohigas (1999), Local regulations ... (2019)
12	Resolution of content-related issues	Physical-Aesthetic	Stone (2012), Portella (2016), Gao et al. (2024)
13	Future sustainable financial resources	Financial-Operational	Madanipour (2006a), City of Vancouver (2017), Connexion France, (2017), Wakil et al. (2021)
14	Future regional disparity in beautification	Physical-Aesthetic	Trancik (1986), Habibi & Hourcade (2005), Phumsathan et al. (2025)
15	Future transparency of responsibilities and overlaps within the municipality	Institutional-Governance	Bryson (2004), Madanipour (2006a), City of Vancouver (2017)
16	Future interaction with external (non-municipal) institutions	Institutional-Governance	Bryson (2004), UNESCO (2005), Healey (2009), Brumann (2025)
17	Outlook for the implementation of regulations and organizational authority	Institutional-Governance	Godat & Durance (2011), LVMF (2012), Wu (2015), Carmona (2019)
18	Level of public and expert participation	Socio-Cultural & Participatory	Gehl (2010), Healey (2009), Bryson (2004), Czajkowski et al. (2022), Brumann (2025)
19	Strategies for fostering participation	Socio-Cultural & Participatory	Bryson (2004), Healey (2009), Zheng (2014), Czajkowski et al. (2022)
20	Future interaction with contractors and artists	Socio-Cultural & Participatory	Bryson (2004), Plaza (2008), Sandrow (2012), Carmona (2019)
21	Resolution of legal challenges	Institutional-Governance	Madanipour (2006a), Carmona (2019), Local regulations ... (2019), Borsi (2024)
22	Likelihood of vandalism	Physical-Aesthetic	Oh (2007), Carmona et al. (2010), Portella (2016)
23	Cultural outlooks and public expectations	Socio-Cultural & Participatory	Lynch (1960), Norberg-Schulz (1980), Kaplan & Kaplan (1989), Plaza (2008), Brumann (2025)
24	Future challenging procedural damages	Institutional-Governance	Bryson (2004), Madanipour (2006a), City of Toronto (2008)
25	Future management of off-plan projects	Financial-Operational	Madanipour (2006a), City of Vancouver (2017), Carmona (2019), OECD (2024)
26	Future challenges in maintenance and monitoring	Financial-Operational	Portella (2016), Carmona (2019), Wakil et al. (2021), Kesowa (2025), Masudur Rahman et al. (2026)

Among foresight traditions, the French school was selected because it provides a coherent analytical framework for examining structures, actors, scenarios,

and policy evaluation through tools such as MICMAC, MACTOR, and MULTIPOL ([Godet, 1987, 1994; Arcade et al., 1999; Godet et al., 2008](#)). This choice

Table 3. Schools/approaches of futures studies. Source: Authors.

School / Approach	Theoretical Basis and Logic	Key Characteristics	Application	Limitations
Forecast-Oriented School	Based on extrapolation of past trends and quantitative data; focuses on the most probable future (Minkkinen, 2019)	Reliance on trends, linear forecasting, and analysis of probable futures	Suitable for contexts with low uncertainty and relative stability	Weak in addressing structural changes, institutional conflicts, and complex multi-actor systems
Exploratory / Scenario-Based School	Based on identifying and analyzing multiple possible and internally consistent futures (Bradfield et al., 2005; Van der Heijden, 2005; Cordova-Pozo & Rouwette, 2023)	Scenario building, uncertainty analysis, and preparation for alternative pathways	Suitable for highly uncertain and dynamic environments	Lacks explicit normative direction; emphasizes preparedness rather than preferred outcomes
Normative / Backcasting School	Starts from a desirable future and works backward to reconstruct pathways toward it (Bibri, 2020)	Goal-setting, backcasting, pathway design toward desired futures	Suitable for policymaking, sustainable development, and long-term planning	Highly dependent on a clear definition of the desired future; may involve subjective assumptions
French School	A sequential approach including structural analysis, actor analysis, scenario building, and policy evaluation (Godet, 1987, 1994; Godat & Durance, 2011)	Use of tools such as MICMAC, MACTOR, and MULTIPOL; analysis of structure, power, and strategy	Suitable for structured, institutional, and multi-level issues with conflicting interests	More complex to implement; requires expert data and multi-stage analysis
Critical and Emancipatory Approaches	Critique of dominant assumptions about the future, power, and knowledge (Minkkinen, 2019)	Focus on bias, power relations, epistemology, and the right to define the future	Suitable for analyzing political and discursive dimensions of futures studies	Limited direct applicability in decision-making processes
Participatory and Transformative Approaches	Based on dialogue, co-production, and collective learning (Neuhoff et al., 2023)	Stakeholder participation, public foresight, participatory scenario building	Suitable for issues requiring social acceptance and institutional coordination	Time-consuming; challenges in achieving consensus; potential stakeholder conflicts

Table 4. Research process. Source: Authors.

Step	Method / Tool	Objective	Input Data	Execution Process	Main Output	References
1	Structural Analysis (MICMAC)	Identification of key drivers and leverage points in the system	Policy documents, theoretical background, expert opinions, and cross-impact questionnaire	Extraction of uncertainties and influential variables, determination of direct and indirect relationships, construction of a cross-impact matrix, and structural analysis	Identification of main drivers, key variables, relay variables, and dependent variables	Godet (1994), Arcade et al. (1999), Asan & Asan (2007), Godet et al. (2008)
2	Actor Analysis (MACTOR)	Analysis of actors' power, interests, conflicts, and alliances	Actor questionnaires, influence data, stakeholder conflict, and convergence information	Analysis of actor positions, examination of cooperation and conflict relations, processing alliance patterns, and veto power structures	Identification of facilitating and constraining actors, power mapping, convergence/divergence patterns	Godet et al. (1997), Freeman & McVea (2001), Kangas et al. (2003), Bryson (2004)
3	Scenario Building (Scenario Wizard)	Development of alternative futures and identification of logical decision pathways	Outputs of MICMAC and MACTOR, key variable states, and actor positions	Construction of internally consistent scenarios based on combinations of drivers and actor behaviors, and development of future narratives	Extraction of desirable, probable, and critical scenarios	Schwartz (1996), Godet & Roubelat (1996), Bradfield et al. (2005), Van der Heijden (2005), Chakraborty & McMillan (2015)
4	Multi-Criteria Evaluation (MULTIPOL)	Evaluation and prioritization of robust strategies	Extracted strategies, effectiveness criteria, political friction, consistency, and adaptability	Comparison and ranking of strategies across different scenarios	Selection of priority strategies, no-regret actions, and robust policy options	Godet (1987), Janssen (2001), Belton & Stewart (2002), Lempert et al. (2003), Kangas et al. (2005)

represents not merely a methodological preference but a response to the governance-oriented, multi-level, and uncertainty-driven nature of the research problem. Visual management in Tehran is not solely a physical issue; rather, it requires an approach capable of analyzing key drivers, patterns of conflict and convergence, and robust strategies within an integrated analytical chain (Godet & Roubelat, 1996; Bryson, 2004). Table 4 outlines the analytical chain of the four research steps based on specialized tools, objectives, input data, implementation processes, main outputs, and reference sources for each stage.

Study Area

Tehran, the capital of Iran, with a population exceeding 8.7 million within its municipal boundaries and over 13 million in its metropolitan area, is the country's largest and most densely populated city (Statistical Centre of Iran, 2016). Spanning an area of approximately 730 square kilometers, the city is divided into 22 municipal districts that exhibit significant variations in their physical and social characteristics (Zebardast, 2009). As the nation's political and administrative capital, Tehran faces complex governance challenges, including a fragmented institutional structure, overlapping organizational mandates, weak inter-sectoral coordination, and uneven urban development (Madanipour, 2006b; Habibi & Hourcade, 2005). Nevertheless, opportunities such as rising civic awareness, the growth of non-governmental organizations (NGOs), and the emergence of novel technologies provide a potential foundation for transforming urban management (Zebardast, 2009).

Research Method

This applied study adopts a mixed-method strategic foresight approach. The statistical population consisted of experts and managers involved in Tehran's visual management, selected through purposive sampling followed by snowball sampling to achieve theoretical saturation. In this study, the quality of expertise was prioritized over quantity; thus, participants were selected based on relevant academic backgrounds, executive

experience, and direct involvement in decision-making and implementation processes.

Methodologically, Delphi studies do not prescribe a fixed number of experts; rather, adequacy depends on expertise, diversity of perspectives, and the achievement of consensus (Hsu & Sandford, 2007; Nasa et al., 2021). Accordingly, the expert panel consisted of 14 individuals, including deputy heads, department managers, and organizational experts representing the main divisions related to visual management in Tehran. Table 5 displays the demographic characteristics, organizational roles, level of education, selection criteria, and professional experience of the 13-member panel of experts and senior managers of the Tehran Beautification Organization.

The panel was conducted in September 2025 in Tehran. To minimize bias, the design of questionnaires and the interpretation of results were supervised by an academic expert, and findings were iteratively validated with participants. Content validity was strengthened through multi-stage reviews and confirmation by two academic members and managers from the Tehran Beautification Organization and the Municipality's Research Center.

The Kendall's coefficient of concordance was calculated at 0.75, indicating an acceptable level of agreement among experts (Schmidt, 1997), while Cronbach's alpha of 0.⁸⁷ confirmed the internal consistency and reliability of the research instrument (Tavakol & Dennick, 2011; Taber, 2018).

The novelty of this study lies in the integrated application of four French foresight methods (MICMAC, MACTOR, Scenario Wizard, and MULTIPOL) for the first time in the context of visual management in Tehran, establishing a comprehensive analytical chain from the identification of variables and actors to scenario development and policy evaluation (Godet, 1987, 1994; Godet & Durance, 2011).

Findings

• Structural analysis

In this stage, the 26 variables identified by experts were incorporated into the structural analysis matrix. The analysis of the influence-dependence map revealed that the urban visual management system is in an unstable

Table 5. Profile of the expert panel. Source: Authors.

Deputy Office	Role	Education	Reason for Selection
Planning and Development Deputy	Planning and Development	PhD in Urban Planning	Coverage of the planning and development domain
Technical and Urban Design Deputy	Deputy Head of Technical and Urban Design	MSc in Civil Engineering	Coverage of the technical and urban design domain
Technical and Urban Design Deputy	Director of the Technical Department	MSc in Civil Engineering	Coverage of the technical and urban design domain
Technical and Urban Design Deputy	Urban Furniture Manager	MSc in Industrial Design	Coverage of the technical and urban design domain
Technical and Urban Design Deputy	Lighting Department Manager	MSc in Electrical Engineering	Coverage of the technical and urban design domain
Technical and Urban Design Deputy	Lighting Department Expert	BSc in Industrial Design	Coverage of the technical and urban design domain
Advertising and Revenue Deputy	Deputy Head of Advertising and Revenue	MSc in Financial Management	Coverage of advertising and the revenue domain
Advertising and Revenue Deputy	Contracts Department Manager	MSc in Economics	Coverage of advertising and the revenue domain
Advertising and Revenue Deputy	Advertising Structures Manager	BSc (unspecified field)	Coverage of advertising and the revenue domain
Advertising and Revenue Deputy	Revenue Department Manager	BSc in Architecture	Coverage of advertising and the revenue domain
Cultural and Urban Arts Deputy	Deputy Head of Cultural and Urban Arts	MSc in Public Administration	Coverage of the cultural and artistic domain
Cultural and Urban Arts Deputy	Cultural Department Expert	BA in Theology	Coverage of the cultural and artistic domain
District Affairs Deputy	Monitoring and Supervision Manager	MSc in Architecture	Coverage of district-level implementation
District Affairs Deputy	Legal and Urban Discipline Affairs Officer	BSc (unspecified field)	Coverage of district-level implementation

condition. The variables were categorized into four groups.

The influential variables (key drivers) include: realization of beautification principles in the future, sustainable financial resources, success of organizational reforms, and future project prioritization (quantity versus quality). These four variables were identified as the backbone of the system's future. Notably, most of the key drivers are managerial and institutional in nature rather than physical. This indicates that the challenges of urban aesthetics in Tehran are rooted in budgeting, organizational structures, and management strategies, rather than being solvable solely through artistic or physical interventions.

Furthermore, the direct and indirect influence graphs demonstrate that hidden and indirect relationships are significantly stronger than direct ones, reinforcing the necessity of adopting a systemic perspective. Table 6 classifies the key and influential variables of the system into driver variables (such as sustainable financial resources), relay variables, and dependent variables based on software-driven indirect effect analysis.

The selection of these four key drivers was based on their position within the influential zone of the influence–dependence matrix, indicating their high leverage in shaping other system variables. The analysis confirms that the root causes of Tehran's visual challenges lie primarily in institutional and managerial dynamics rather than purely physical or artistic dimensions.

Fig. 1 classifies the research variables based on their level of influence on the vertical axis and their level of dependence on the horizontal axis (Potential direct influence/dependence map) to identify key and leverage variables. Fig. 2 displays the graph of direct relationships between variables (Potential direct influence graph), in which the colored lines of the figure's legend distinguish the strength of relationships from the weakest links (Weakest influences) in blue to the strongest influences (Strongest influences) in red.

• Scenario development

In the next phase, cross-impact analysis was employed to construct consistent scenarios. The process began with selecting the four key drivers as scenario descriptors. For

Table 6. Classification of key variables in indirect impact analysis. Source: Authors.

Category	Variable Name(s)	Description and Position
Key Drivers	Sustainable financial resources (V13), Success of organizational reforms (V6), Project prioritization (V9)	These three variables are established as the main system drivers; strategic focus on them is essential.
Strong Linkage Variable	Realization of beautification principles (V11)	This variable acts as the heart of the system; all policies must pass through this channel.
Key Dependent Variables	Strategic stability (V5) • Level of public participation (V18)	These variables are located in the dependency zone, meaning that stability and participation are outcomes achieved after improving the key drivers.

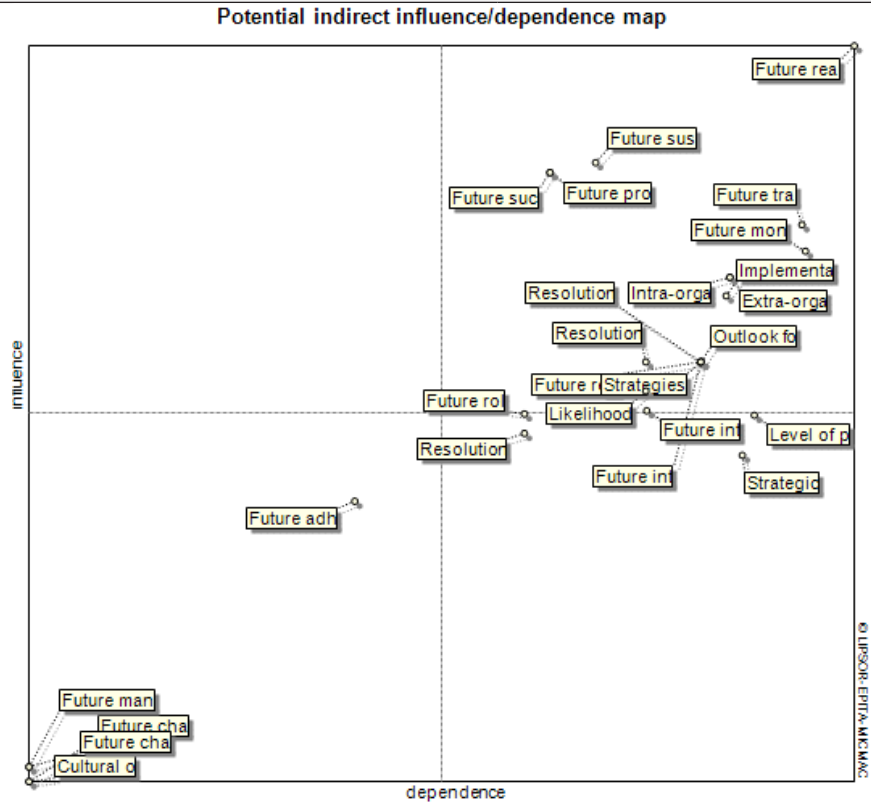


Fig. 1 . Map of potential direct dependency -influence. Source: Authors.

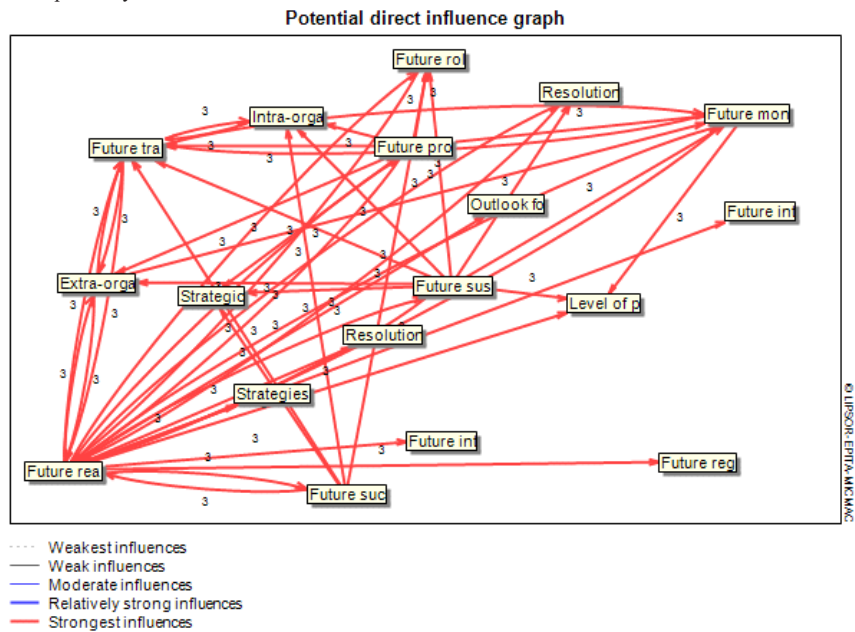


Fig. 2. Graph of potential direct influence. Source: Authors.

each descriptor, three possible future states (optimistic, intermediate, and pessimistic) were defined in consultation with experts.

A 12×12 cross-impact matrix was then developed, in which experts evaluated the influence of each state on the likelihood of others. The data were processed using Scenario Wizard software to identify and rank internally consistent scenarios.

The results led to the identification of several key scenarios representing alternative futures (desirable, probable, and critical). For instance, the Growth and Excellence scenario, representing an ideal future, achieved a consistency score of 3 with no inconsistencies and was identified as a fully optimistic scenario. In this scenario, the organization evolves into a model, efficient institution in managing urban visual environments, where all four key drivers of organizational reform, quality-oriented project prioritization, realization of beautification principles, and sustainable financing are realized in their optimal states. Table 7 presents detailed narratives of three plausible scenarios for the future of Tehran's visual management, namely Tehran,

Life Gallery (optimistic), Tehran, Patchwork City (intermediate), and Tehran, Visual Jungle (pessimistic).

Table 8 shows the quantitative outputs of the Scenario Wizard model based on the internal consistency of the scenarios, cumulative impact scores, and the favorable or unfavorable status of the drivers.

• Actor analysis

For analyzing the dynamics among stakeholders, the MACTOR method of actor analysis was employed. This process began with the identification of 22 key actors and 4 strategic objectives (including urban signage, urban landscape, urban furniture, and urban infrastructure) through expert interviews and document review. The identified actors represented a broad range of institutions, including intra-organizational units, different municipal departments, governmental bodies, the private sector, and civil society.

In the next stage, two main input matrices were completed by the expert panel: the Direct Influence Matrix (MDI), in which the level of influence of each actor over others was assessed, and the Actor–Objective Position Matrix (2MAO), which specified each actor's

Table 7. Extracted scenarios. Source: Authors.

Scenario Name	Description
Tehran, the Gallery of Life	Tehran is no longer a grey city buried under layers of advertising banners. In this future, the Beautification Organization has transformed from a large-scale implementation contractor into an intelligent regulator. Walking along Vali-Asr Street offers a different experience; tree lighting is neither overly bright nor dark, but precisely calibrated according to a master lighting plan. Commercial signage is organized, and the visual battle among shops has disappeared. Main city squares have become interactive public hubs, where art is no longer a luxury commodity but part of urban furniture. Citizens report damages through the Tehran Man application, and repairs are completed within 48 hours. The organization's budget is no longer dependent on advertising density sales; instead, joint investment funds finance long-lasting artistic projects. In this future, Tehran is a city that respects its identity.
Tehran, a Patchwork Husband	The city remains the same as it was a decade ago, only more deteriorated. Managers of the organization are still engaged in long, repetitive meetings to solve recurring problems. One day, it is decided that all street curbs should be painted blue and white; the next month, the decision changes. Mural painting projects are implemented, but due to low-quality materials, they begin to peel within six months. Advertising revenues barely cover salaries and emergency maintenance costs. Citizens have become accustomed to visual disorder and accept it as the reality of Tehran. Occasionally, a good project is implemented, but because it is not part of a comprehensive plan, it fades into the background. The organization remains alive, but its pulse is weak; neither progress nor decline dominates -it is stuck in suspension.
Tehran, Visual Jungle	Public space has turned into a battlefield. The Beautification Organization is effectively bankrupt and has lost its capacity to supervise the 22 districts. Each district acts independently: one is filled with strange metallic installations, while another is in complete darkness. Powerful advertising companies have engulfed the city's skyline with massive billboards, and no institution can resist them. Vandalism has peaked; statues are broken, and monuments defaced. Public trust has completely eroded, and citizens perceive the organization not as a beautifier but as a costly and obstructive entity that hinders business. Tehran's identity is buried under layers of chaos, profiteering, and mismanagement.

Table 8. Output of the Scenario Wizard Model. Source: Authors.

Scenario Number	Compatibility Level	Total Impact Score	Success of Organizational Reforms	Future Priority of Projects	Realization of Beautification Principles	Future Sustainable Financial Resources
1	3	27	Optimistic	Optimistic	Optimistic	Optimistic
2	5	34	Intermediate	Intermediate	Intermediate	Intermediate
3	5	27	Pessimistic	Pessimistic	Pessimistic	Pessimistic

position (support/opposition) and the intensity of importance assigned to each objective.

Finally, the input data were processed using MACTOR software, producing outputs such as influence–dependence maps, competitiveness diagrams, and convergence/divergence maps, which form the core analytical basis of this study.

The network analysis of actors revealed several important findings. First, the power structure shows a polycentric distribution within Tehran’s urban beautification ecosystem. No single actor (including the mayor or city council) holds dominant control, and achieving objectives requires coalition-building. Second, the convergence analysis indicates that the main challenge is not explicit conflict of interests, as most actors are generally aligned with overarching goals such as improving the urban landscape. Instead, the core issue lies in misalignment of priorities and latent divergence in implementation approaches.

Third, key actors were identified: the Urban Services Deputy and design consultancy firms as strategic actors; the Beautification Organization and contractors as central power-holders; and NGOs and the Ministry of Culture as peripheral yet potentially influential actors. The results suggest that the Beautification Organization should not function merely as an executor, but rather as a network orchestrator or regulator capable of managing tensions and coordinating conflicting interests across the system.

Table 9 divides the main actors in Tehran’s beautification network into three categories -strategic actors, the core central network, and peripheral actors- based on their position, influence, and mutual dependence.

Table 10 defines potential coalitions in Tehran’s visual management across three levels -powerful central coalitions, peripheral coalitions, and isolated actors- along with their common interests and members.

Fig. 3 displays the assessment map of actors’ power and level of control on the vertical axis and their level of dependence on other decision-makers in the beautification network on the horizontal axis (Map of influences and dependences between actors) to determine the position of institutions. Fig. 4 illustrates the net distances between the perspectives of actors (Graph of net distances between actors), where the color-coded line legend specifies the alignment of positions from the closest opinions and highest consensus (Shortest net distances) in blue lines to the furthest and most conflicting perspectives (Longest net distances) in red lines.

The findings of the MACTOR analysis in this study reveal a profound gap between the legal-institutional structure and the political reality of urban beautification governance in Tehran. While the administrative framework of Tehran Municipality is still designed based on a hierarchical model, assigning the Beautification Organization as the sole authority responsible for

Table 9. Classification of key actors in Tehran’s urban beautification network. Source: Authors.

Category	Sample Actors	Role in the Network
Strategic Actors	Municipal Urban Services Deputy, Design consultancy firms, NGOs, Ministry of Roads and Urban Development	These actors have both high influence and high dependence, acting as the core of the network; they can function as either key allies or strong opponents.
Dominant Actors	Beautification Organization, Municipal Urban Planning Deputy, Specialized contractors, Electricity Authority	These actors are concentrated in the upper part of the influence map, possessing high influence and low dependence; power is distributed among them.
Follower Actors	District Beautification Offices (22 municipal districts), Waste Management Organization	These actors have low influence and high dependence; they mainly act as policy implementers rather than decision-makers.

Table 10. Mapping of coalitions and potential convergences. Source: Authors.

Coalition Type	Member Actors	Description
Strong Central Coalition	Four deputies of the Beautification Organization, Urban Planning and Urban Services Deputies, Contractors, consultants, and Electricity Authority	These actors have deeply intertwined interests and form the core of the urban beautification project implementation.
Peripheral Coalitions	Urban artists, Cultural and Social Affairs Deputy, NGOs, Supreme Council of Urban Planning and Architecture	Smaller clusters formed around the central core, showing natural convergence among themselves.
Isolated Actors	Waste Management Organization, Ministry of Culture and Islamic Guidance	Positioned at the periphery of the network with limited shared objectives with the central core.

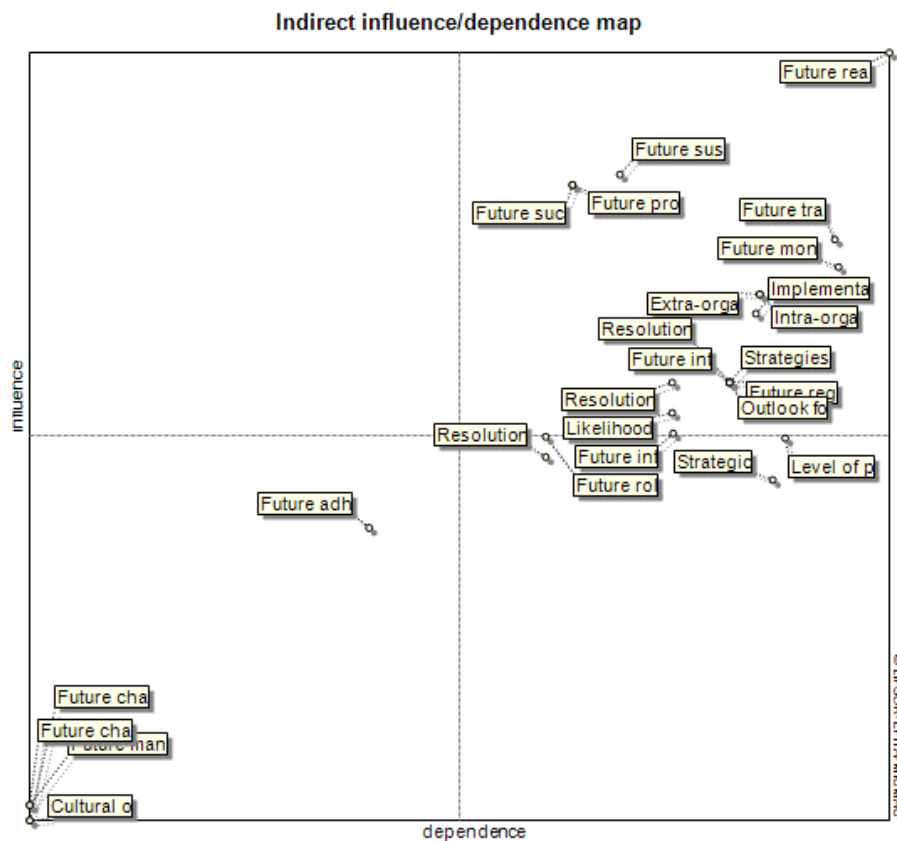


Fig. 4. Map of influence and dependency between actors. Source: Authors.

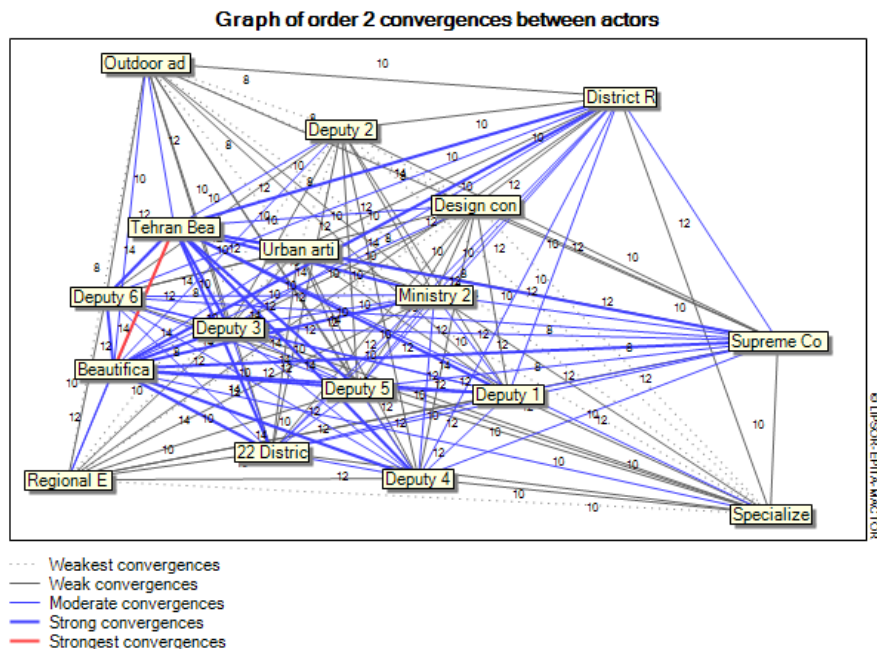


Fig. 5. Graph of net distances between actors. Source: Authors.

urban image and landscape, the power distribution map indicates that actual governance in this domain is fundamentally polycentric.

Why is power dispersed? The answer lies in the concept of the political economy of space. In a megacity such as Tehran, the visual environment (ranging from advertising

billboards to building façades) is not merely a physical element; rather, it functions both as a capital asset (for advertising companies) and as an ideological medium (for cultural institutions). The MACTOR analysis demonstrated that actors such as cultural deputies, the Electricity Authority, and advertising companies possess veto power

or the ability to distort decision-making processes due to their economic or political interests in urban space.

This polycentric structure can play two contrasting roles depending on how the Beautification Organization is managed:

In the obstructive role (in scenarios of stagnation and crisis), if the organization continues to insist on its traditional role as a direct executor and contractor, this multi-centered structure becomes a quagmire of institutional friction. As evidenced in the divergence maps, conflicts between revenue-oriented and quality-oriented approaches constitute the main barrier.

In the facilitating role (in scenarios of growth and development), achieving the desired future is only possible if the Beautification Organization accepts the reality of network governance. In this paradigm, the organization must shift from the role of a rower (direct implementer of projects) to a helmsman (regulator and facilitator of the network).

Therefore, success in managing urban beautification in Tehran does not depend on increasing budgets or expanding legal authority (a classical approach), but rather on the organization's capacity to manage interdependencies and build strategic coalitions with powerful actors (such as municipal districts and infrastructure institutions). Without this fundamental shift in governance logic, any physical intervention will be absorbed and neutralized within the labyrinth of stakeholder conflicts.

• Development of strategic policies

In the final stage, 22 operational actions and 10 macro-level policies were evaluated against future scenarios. The results indicated that soft and knowledge-based interventions (such as the development of design guidelines, support for applied research, and standardization of processes) achieved higher scores in both effectiveness and resilience compared to purely hard infrastructure and project-based interventions. These measures were identified as robust or no-regret actions, as they remain effective across all three future scenarios, including crisis conditions. In contrast, actions such as full outsourcing or large-scale symbolic mega-projects exhibited high levels of risk and limited

effectiveness under pessimistic scenarios. Accordingly, the proposed roadmap prioritizes institutional capacity-building and the development of knowledge-based infrastructure.

To illustrate the logic of the MULTIPOL method, the policy of smart citizen platforms was examined as a case example. The performance of this policy was assessed across three different contexts: in the growth scenario, it demonstrated high effectiveness (18); in the stagnation scenario, moderate effectiveness accompanied by resistance (12); and in the crisis scenario, high risk (8). Ultimately, the software computed a weighted average based on the probability of scenario occurrence and ranked this policy at a medium level, despite its apparent attractiveness, due to its weak performance in likely and adverse conditions. This mechanism highlights the model's preference for robust policies over purely idealistic or aspirational interventions. [Table 11](#) prioritizes the strategic policies of the Beautification Organization based on their effectiveness, flexibility, and stability across different favorable and critical scenarios.

[Table 12](#) organizes the proposed strategic portfolio across three main axes -knowledge foundation, structural-financial empowerment, and qualitative-innovative orientation- along with the key actions for each axis. [Fig. 5](#) analyzes the stability of policy classification (Classification sensitivity map), measuring the mean evaluation score of each policy on the vertical axis (Mean score of classifications) and the standard deviation of that policy's evaluation on the horizontal axis (Standard deviation of classifications) across different scenarios. [Fig. 6](#) displays the map of alignment between actions and policies (Action policy closeness map) to identify which operational actions, by clustering near the macro-policies, have the highest convergence in achieving the goals of the Beautification Organization. [Fig. 7](#) displays the proposed conceptual model and the step-by-step research process, mapping the analysis path in a coherent manner from the stage of defining the problem and examining variables to scenario building and final policy evaluation.

Discussion

The findings derived from the application of an

integrated strategic foresight framework to the visual management of Tehran reveal a fundamental reality: visual disorder in the metropolis is not primarily a physical, architectural, or aesthetic issue, but rather a deep-rooted crisis in governance, policy-making, and institutional regulation. Structural analysis demonstrates that the urban visual system operates in a highly unstable and chaotic state, where the key drivers shaping its future are not hard, physical variables, but soft, process-oriented factors such as financial sustainability, the success of organizational reforms, qualitative prioritization of projects, and adherence to standardized beautification principles. The positioning of physical variables within the dependent zone of the system carries an important analytical implication: any physical intervention in the urban environment is merely a consequence of higher-level institutional decisions. Without reforming decision-making structures, budgeting mechanisms, and reducing institutional overlaps, even the most sophisticated urban design projects will ultimately reproduce the same conditions of disorder.

The analysis of power networks and actor relationships significantly deepens this institutional interpretation. While the formal administrative structure of Tehran Municipality appears hierarchical and centralized on

paper, the actual distribution of power in practice is highly polycentric and fragmented. No single actor, including the Beautification Organization or the City Council, possesses absolute authority to unilaterally implement policies. In this context, the core challenge is not necessarily overt conflict of interests, but rather latent divergence among actors. Although most stakeholders, including cultural departments, district municipalities, advertising companies, and utility agencies nominally agree on improving the visual quality of the city, they diverge substantially in implementation approaches, priority-setting, and resource allocation. Within such a complex network, hierarchical governance has lost its effectiveness, and policy success depends on transitioning from a project-based executor role toward that of a network regulator and facilitator.

The consequences of this institutional lock-in and actor misalignment are clearly reflected in the future scenarios. The dominance of the stagnation scenario over the growth scenario indicates strong path dependency and organizational inertia. The visual management system tends to preserve the status quo, as reactive and project-oriented approaches consume institutional capacity in addressing day-to-day crises, thereby hindering transformative change. Nevertheless,

Table 11. Evaluation and prioritization of strategic policies. Source: Authors.

Category	Policies	Analysis and Implementation Strategy
Highly effective and robust policies	Targeted support for technology and creativity, Development of new financial models, Formulation and enforcement of comprehensive guidelines and standards	These policies represent the strategic anchors of the organization. They demonstrate high effectiveness across all future scenarios and should be prioritized for immediate implementation.
Effective but challenging policies	Revision of the organizational statute and internal restructuring, Prioritization of quality-based and identity-oriented projects	These policies are essential for organizational success; however, their implementation is associated with resistance and institutional challenges and therefore requires strong change management and consensus-building.
Lower effectiveness policies (secondary priority)	Establishment of a structured framework for citizen participation, Activation of the Supreme Urban Beautification Council	These policies will not achieve sufficient effectiveness until more fundamental issues, such as internal structure and financial systems, are addressed.

Table 12. Proposed Strategic Portfolio for the Future of the Urban Beautification Organization. Source: Authors.

Strategic Axis	Key Actions and Policies	Main Objective of the Axis
1. Knowledge and Standards (Foundation)	Development of design guidelines for specific urban spaces, Support for applied research initiatives, Development of qualitative evaluation checklists	Emphasis on foundational and soft infrastructure measures to prevent subjective decision-making and operational routine.
2. Structural and Financial Transformation (Empowerment)	Revision of organizational statute and internal restructuring, Development of innovative financial models	Implementation of fundamental and challenging reforms to enhance organizational capacity; these actions require managerial courage and institutional commitment.
3. Innovation and Quality (Strategic Orientation)	Targeted support for technology and creativity, Prioritization of high-quality and identity-based projects	Ensuring that capacities developed under the previous two axes are directed toward meaningful and value-creating outcomes.

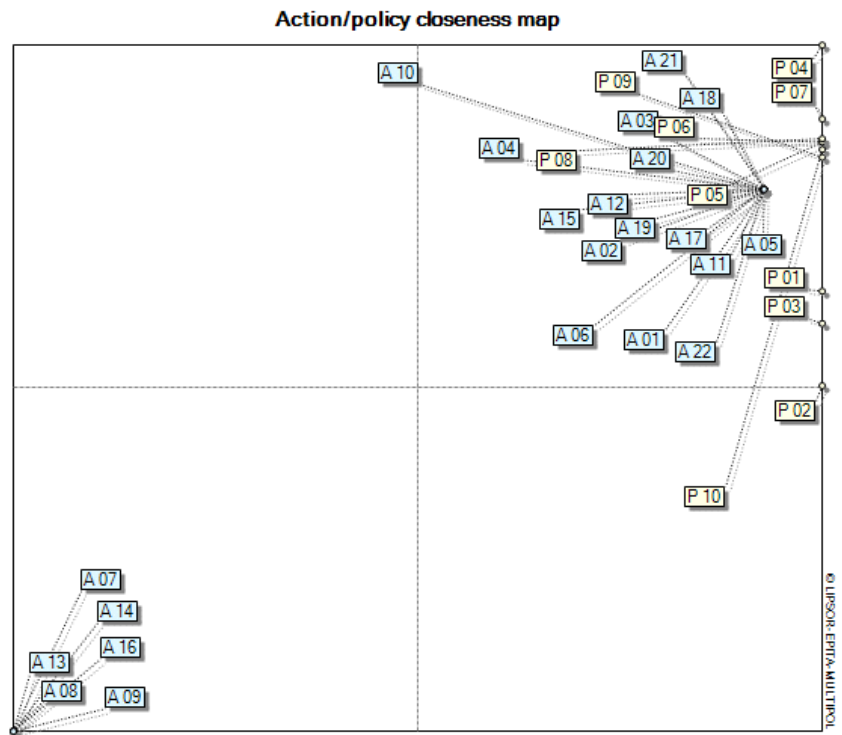


Fig. 5. Graph of net distances between actors. Source: Authors.

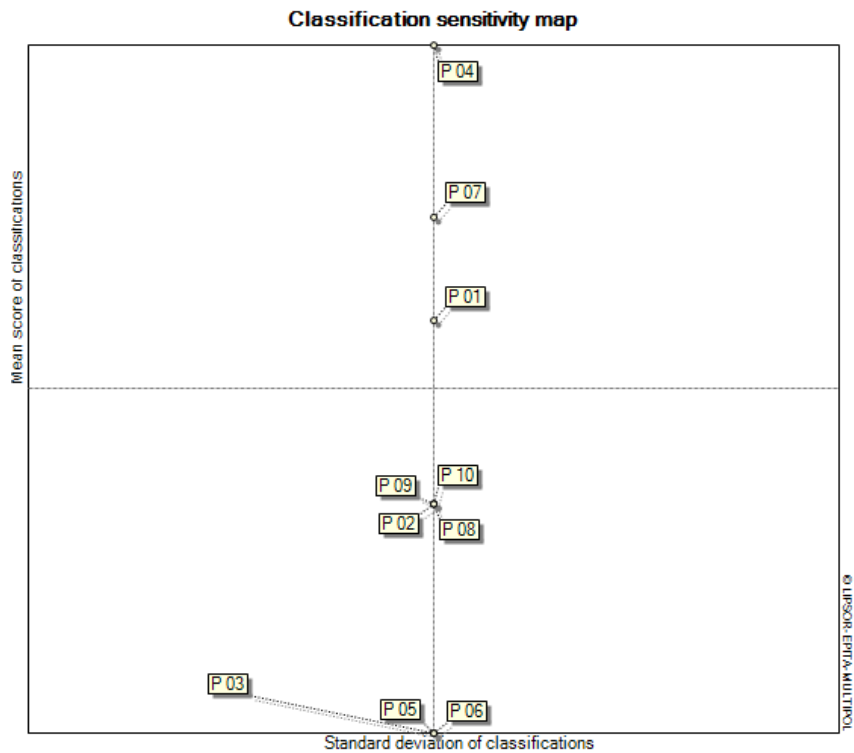


Fig. 6 . Classification sensitivity map. Source: Authors.

policy evaluation under uncertainty demonstrates that soft, knowledge-based strategies such as developing binding design guidelines, standardizing processes, and implementing smart monitoring infrastructures exhibit the highest levels of resilience and effectiveness across all scenarios, including crisis conditions, compared to purely hardware-based interventions.

A comparison with theoretical foundations and empirical studies further validates these findings. The results align closely with complexity theory in urban systems and with the perspectives of scholars such as Bryson, Healey, and Carmona, who emphasize the importance of power networks, collaborative governance, and the primacy of processes over financial inputs. While

classical theorists such as Lynch and Cullen focused on principles like legibility and human scale, the case of Tehran demonstrates that in the absence of effective network governance, even these fundamental design principles are undermined by conflicting stakeholder interests. At the global level, the key distinction between Tehran and successful cities such as Vancouver, Paris, and São Paulo lies in institutional readiness: successful cities have first established coherent legal frameworks, implemented gradual regulatory systems, and reduced financial dependence on advertising revenues, whereas Tehran often imitates physical interventions without addressing their institutional prerequisites.

The root causes of this systemic instability can be understood through the political economy of urban space. In a metropolis like Tehran, visual space and urban façades are not merely physical elements, but function simultaneously as capital assets for private advertising firms and as ideological media for governmental institutions. This commodification generates powerful vested interests that resist integrated regulation. Furthermore, the heavy dependence of governing bodies on unstable advertising revenues reinforces short-term economic logic over long-term considerations of quality, identity, and aesthetics. This financial dependency, combined with the absence of knowledge infrastructures and binding standards, leads to decision-making driven by individual managerial preferences, which are further destabilized by frequent leadership changes.

From both theoretical and practical perspectives, this study expands the boundaries of visual management from a design-oriented discipline to one deeply embedded in public policy and governance. Practically, overcoming this institutional deadlock requires a threefold policy package. First, diversification of financial resources through the creation of project reserve funds and reducing reliance on advertising revenues is essential for decision-making autonomy. Second, the responsible organization must revise its institutional framework and transition from direct project execution to a network orchestrator and regulator, facilitating dialogue among conflicting stakeholders. Third, replacing subjective decision-making with standardized design codes, qualitative evaluation

checklists, and data-driven monitoring systems is critical. Ultimately, the key contribution of this study lies in demonstrating that urban visual resilience in developing megacities is not achieved through large-scale physical projects, but through governance reform, conflict management, and the institutionalization of knowledge-based standards. [Table 13](#) demonstrates how key structural drivers are translated and converted into macro-orientations and corresponding executive actions within the Beautification Organization to mitigate potential risks.

Conclusion

The findings of this study demonstrate that the fundamental bottleneck in the visual management of Tehran does not stem from physical deficiencies, lack of infrastructure, or technological limitations, but rather from a dysfunctional institutional and procedural system. The application of an integrated foresight framework reveals that the urban visual ecosystem of Tehran is highly unstable, with its key drivers such as financial sustainability, organizational reform, project prioritization, and adherence to standards being predominantly governance-related rather than physical in nature. Moreover, actor-network analysis shows that power is distributed in a polycentric and fragmented manner, where no single institution can exert full control. The presence of latent divergences among actors, despite apparent consensus on qualitative goals, continuously pushes the system toward stagnation and inertia.

In response to the central research question, it is evident that envisioning desirable futures and formulating robust strategies is only possible through a paradigm shift from linear, project-based planning toward networked and regulatory governance. The significance of these findings lies in promoting a fundamental shift in how visual disorder is addressed. The study demonstrates that allocating large budgets to physical and symbolic projects, without resolving the political economy of urban space and managing stakeholder conflicts, leads to inefficient resource use and, at best, temporary improvements.

From a policy perspective, overcoming this crisis requires coordinated action along three main axes: (1) structural and financial transformation through

reducing dependence on volatile advertising revenues and establishing sustainable financing models; (2) institutional reform by redefining the role of the responsible organization as a network regulator and facilitator; and (3) standardization and transparency through the development of context-sensitive design codes, mandatory quality assessment frameworks, and intelligent monitoring systems. The simultaneous implementation of these measures can reduce reliance on individual preferences and enable a transition from reactive to proactive urban management.

Despite its contributions, this study has limitations. Its reliance on expert judgment and foresight-based methodologies limits the direct incorporation of citizens' lived experiences at the micro scale. Additionally, limited access to transparent data on hidden financial and political relationships constrained a full assessment of the political economy of urban advertising. Future research is therefore encouraged to integrate big data analytics and social media sentiment analysis to align scenarios with citizen preferences, as well as to explore innovative legal mechanisms such as smart contracts for managing conflicts of interest

and conduct comparative studies across developing megacities.

The primary innovation of this study lies in the integrated and sequential application of four major tools of the French foresight school (MICMAC, MACTOR, Scenario Wizard, and MULTIPOL) within the domain of urban visual management. This methodological architecture transforms a highly qualitative and subjective concept into a structured system of measurable variables, power dynamics, and actionable policy packages. Ultimately, the study demonstrates that the future of visual quality in megacities depends not on physical interventions alone, but on institutional convergence, knowledge-based governance, and the establishment of resilient, network-oriented systems. Table 14 defines specific goals and practical policy measures for the five areas of visual management, including urban art, street furniture, advertising, lighting, and urban events. Fig. 7 displays the proposed conceptual model and the step-by-step research process, mapping the analysis path in a coherent manner from the stage

Table 13. Translating structural drivers into executive actions in the beautification organization. Source: Authors.

Key Driver	Identified Risk in Scenarios	Strategic Orientation	Corresponding Executive Action
Sustainable financial resources	Strong dependence on municipal budget fluctuations and unstable advertising revenues	Diversification of financing models	Development of innovative financing mechanisms (e.g., project reserve funds and reduced reliance on advertising)
Success of organizational reforms	Overlapping responsibilities between headquarters and district offices	Transition from execution to regulation	Revision of statutes and internal restructuring (institutional capacity-building for an orchestrator role)
Project prioritization	Dominance of quantitative approaches over quality and identity-based projects	Development of knowledge and quality infrastructures	Targeted support for innovation and creativity (prioritizing qualitative, identity-driven projects)
Implementation of beautification principles	Influence of managerial subjectivity and lack of procedural consistency	Process standardization	Development of design guidelines and quality evaluation checklists (replacing subjective decisions with design codes)

Table 14. Policy framework for urban beautification management. Source: Authors.

Domain	Objective	Actions
Urban Art	Enhancing artistic quality and supporting artists	Annual neighborhood-scale art events; creation of an artist submission platform; dedicated budget for maintenance and restoration
Urban Furniture	Standardization and equitable distribution	Context-sensitive design; use of durable materials; smart maintenance reporting systems
Urban Advertising and Clutter Management	Visual organization and removal of physical clutter	New regulations for signage, removal of excess overhead cables, and regulation of kiosks
Lighting and Green Spaces	Improving nighttime lighting and functional green spaces	Thematic lighting projects; urban agriculture and vertical gardens; climate-adapted vegetation
Urban Events	Enhancing vibrancy and social interaction	Support for community-led events; annual event calendar; temporary pedestrianization on weekends

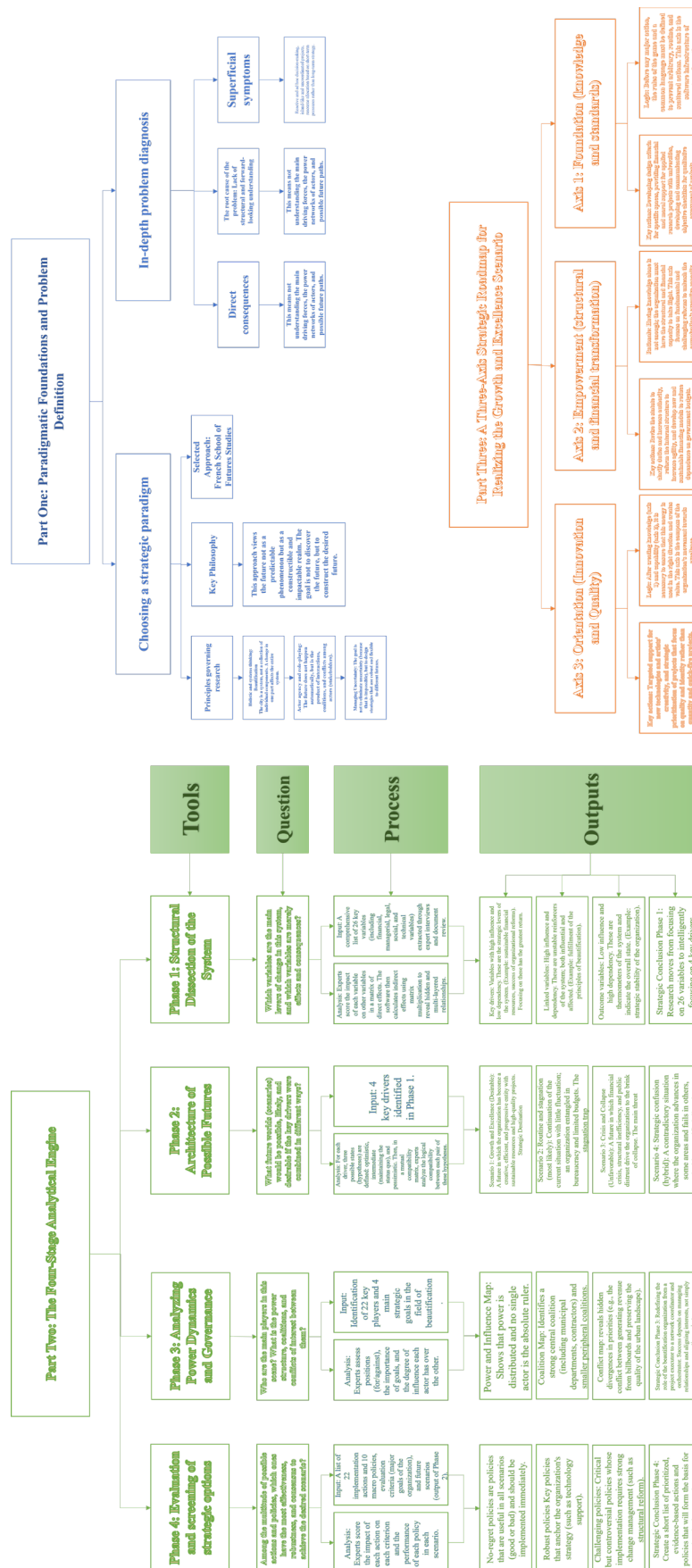


Fig. 7. proposed conceptual model of the research. Source: Authors.

of defining the problem and examining variables to scenario building and final policy evaluation.

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Data Availability

The data and materials used in this study are available from the authors upon reasonable request.

Author Contributions

All authors contributed equally to the research design, data collection, analysis of results, and manuscript preparation. All authors have read and approved the final version of the manuscript.

Declaration of No Conflict of Interest

The authors declare that they have no conflict of interest in conducting this research.

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