

Evaluating the Development of Tehran's Structural-Strategic Plan Using a Foresight Approach

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ABSTRACT

Tehran's structural-strategic plan adopted in 2007 is the last comprehensive plan in Tehran which was developed based on new paradigms and strategic planning approaches; this plan covers not only traditional subjects of comprehensive plans but also includes such major issues as changing urban structure and functions, reforming revenue system of Tehran's municipality, bolstering urban infrastructures, improving urban transportation system efficiency, providing safety and security for the city against natural disasters, improving urban environmental quality and using modern land use planning approaches. This article aims to evaluate the development process of this plan by considering foresight approach indicators and principles and proposing to reform this existing trend using the foresight approach. The main paradigm of this study is interpretive, which falls under qualitative research. Data are gathered by surveys and semi-structured interviews, and open-ended questionnaires while they are analyzed by Delphi techniques and structured qualitative content analysis. Indicators and principles of the foresight approach are elicited using the Delphi method, which includes regard for stakeholders and beneficiaries (participation), regard for the unknowns, uncertainties, shocks and complexities, regard for trends and megatrends, holism, inclusiveness and universality, regard for plans and low- and high-level document results, a long-term view, regard for values and worldviews, scenario writing and futurism, accurate understanding and analysis of the planning environment and visioning. These principles are categorized using the document content analysis method of Tehran's structural-strategic plan and are measured by the extent to which they are incorporated into the plan. The results suggest that these principles are less regarded by both methods when developing urban development plans.

Keywords: Process, Tehran's Structural-Strategic Plan, Foresight, Indicators.

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1. INTRODUCTION

Today, regional and urban studies, especially on detailed and comprehensive plans, adopt an exploratory approach to predict the future without regard for system uncertainties and complexities. The process of developing traditional plans (comprehensive plans), consistent with the method introduced by Patrick Geddes in the early twentieth century, includes three main stages: understanding the phenomenon under study, analyzing the data gathered, and providing plans or solutions in the end. Comprehensive plans based on this thinking (understanding, analysis and plan) were recognized as a legal urban development methodology in the United States and Europe from 1928 to 1947. However, they were replaced by the Structural plans in the 70s and the Urban Development Strategy in the 80s following criticisms made by Baretta Lenfi, especially after the introduction of the Systems Theory. Thus, the introduced positivist model, which was long applied as a model to develop urban development plans, was replaced by a systemic model (analysis, plan, policy). Unlike traditional plans, strategic plans do not need much time and effort to gather data as they are not static. Later, changes were made to these plans. However, the changes, despite the expansion of process visioning and reliance on providing systemic approaches, were again founded on incomplete visioning and disregard for the political economy of space, science development changes, creation of trends different from the past caused by environmental changes, human's active role in changing the future and the players' failure actually to engage in urban development.

One major advantage of the foresight approach is to reduce the gap between planning and system planning. It appears, however, that the flexible nature of this modern approach, its regard for thinking and

action, reliance on multi-task teams, collective rationalism, and creativity and innovation can remove the shortcomings of the urban plan system. A higher level of confidence leads managers and planners to decide when to use adopted frameworks of the organization, traditions, rules and procedures and when to remove them to provide a responsive plan (Ratcliffe & Krawczk, 2011, p. 642). The most important examples of an unsuccessful urban development plan consist of the failure of the urban development plans to meet the needs of the target groups and citizens, on the one hand, and their lower rate of accomplishment, on the other hand. One of the barriers to the success of urban development plans is the way they are developed, not to mention the way they are administered (Ratcliffe & Krawczk, 2011, p. 644-645). The reality is that the feasibility of strategic planning in the country entails substantial problems in the wake of complex systems, including a highly-changing environment, contradictory needs of the main actors of the system, the multiplicity of the variables affecting the planning setting, the one hand, universal support for the foresight approach in planning complex systems with high uncertainties and the capability of this approach to constantly monitor the changes and direct the system, on the other hand, suggests that the employment of the foresight approach in regional and urban planning is a major step forward to improve the monitoring system of urban plans. The incorporation of the foresight approach to regional and urban planning began in the late twentieth century. This issue was greatly used to debate urban planning in European countries, especially Sweden. Below, Table (1) summarily gives several researches on the foresight approach both inside and outside the country and describes their methodology, goals and findings.

Table 1. Summary of Some Research Done on the Foresight Approach

Researchers	Research Goal	Research Methodology	Research Findings
Ratcliffe & Krawczk (2006)	Foresight thinking in urban planning and its use in Dublin's urban planning system	Ethnographic and document analysis	Providing a proposed process to use the foresight approach in Dublin's urban planning system
Khakee (1988)	Incorporating the foresight approach in urban plan and urban planning	Qualitative research method and a review of document content	Providing a proposed process to use the foresight approach in planning
Goodarzi et al. (2016)	Providing a proposed regional foresight framework as an interdisciplinary research subject	Qualitative research method and a review of document content	Introducing a foresight/futuristic approach by criticizing the existing planning process; concern for a new planning process; investigating the use of the foresight approach based on post-structural paradigms

Researchers	Research Goal	Research Methodology	Research Findings
Saed Moocheshi & Rabbani (2012)	Use of foresight in strategic planning of Iran's urban development	Descriptive-analytical	Despite using combined foresight models in Iran's plans, there are serious shortcomings with the development and domains of foresight plans. At the same time, comprehensive analyses suffer shortcomings regarding future technological factors in the cities, urban environment, regional and global trends, political factors and sustainable energy resources.
Zali (2011)	Strategic foresight in planning and regional development	Use of Delphi method, analysis of cross-impact factors affecting development and use of CIB method to identify possible future scenarios as well as applied MICMAC and Scenario wizard software	Zali proposes 11 stages of desired planning which include 1. Understanding the status quo, 2. Determining the key problem, 3. Foresight, 4. Visioning and determining target areas, 5. Preparing a document of scenarios, 6. Opting for the desired scenario, 7. Qualitative and quantitative goal-setting, 8. Policymaking, 9. Developing executive programs, 10. Executing and monitoring the process, and 11. Feedback
Pourmohammadi & Hosseinzadeh-Dalir (2010)	Reengineering of the planning process with emphasis on the use of foresight	Qualitative research method and a review of document content	Providing a new planning process based on post-structural paradigms

In this connection, the category of planning and urban plan development trends in Tehran as the capital of Iran with high social, economic, and cultural diversity as well as a myriad of natural financial and environmental opportunities warrant further investigation in order to meet the development policies by

taking into account current developments and a high level of uncertainties; thus, in view of the 2007 Tehran's comprehensive strategic-structural plan as the latest plan, the researcher investigates the foresight approach and its relevant indicators and principles to develop urban plans.

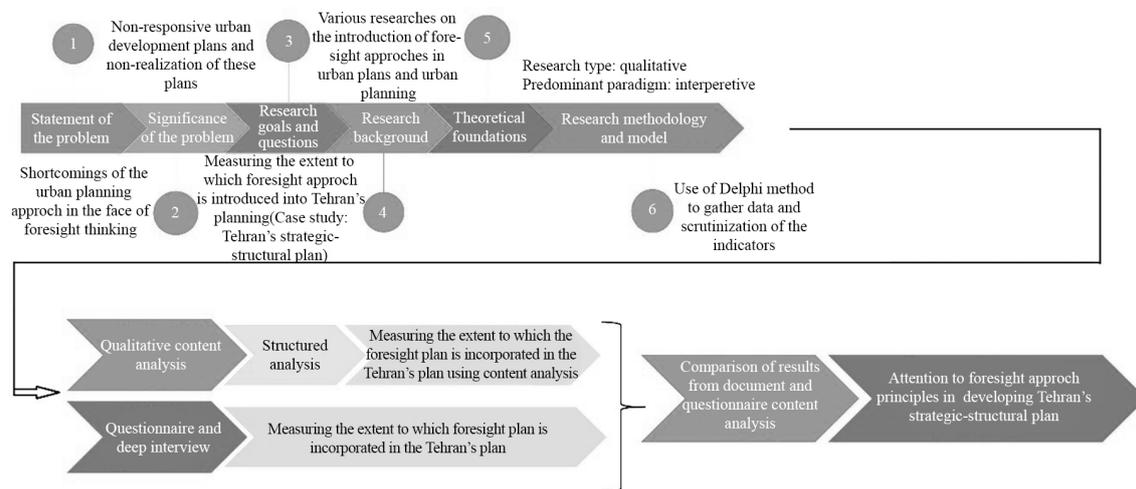


Fig. 1. Research Steps

2. THEORETICAL FOUNDATIONS

For years, the question that may arise when initiating planning activities and future studies at all regional, macro and micro levels are how the regional or national development path can be designed without re-

gard for future guidelines (Mardoukhi, 2013, p. 41). In recent years, the need to perceive complicated issues, hypotheses, and the factors that affect the capacity to think about the future has shaped a diverse spectrum of approaches to deal with the future. Thus, critical,

holistic, universal schools and causal analyses have dominated foresight plans (Krawczyk & Slaughter, 2010, p. 78).

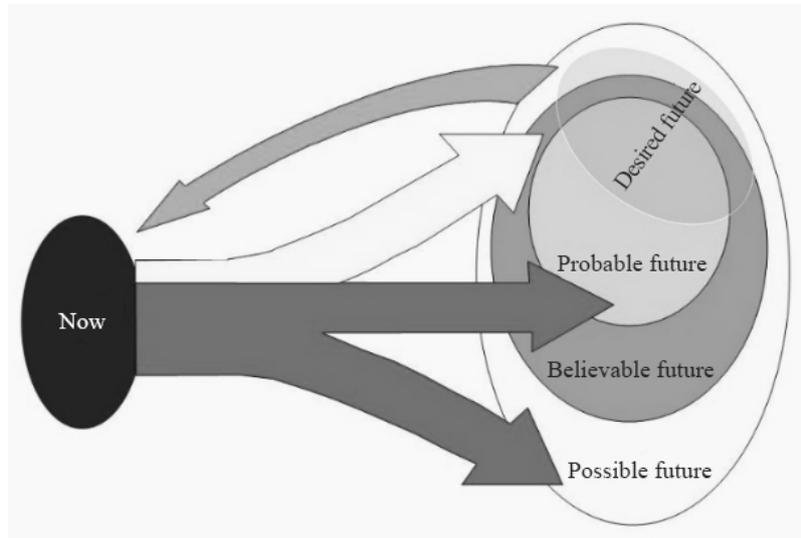


Fig. 2. Numerous Futures in Foresight Approach
(Nazemi & Ghadiri, 2006, p. 41)

The term foresight was first used by visionary H.J. Wells in 1932 (Koassa, 2015, p. 19). Foresight essentially refers to the execution of the operational dimension of the science of foresight. Even though the prediction is still one of the major areas of foresight, the foresight approach has turned into a tradition governing foresight since the 70s. From the 1990s onwards, government organizations gave regional, and national foresight plans special importance. Areas covered by foresight activities included science, technology, culture, environment, etc. Foresight is the

executive and operational stage of foresight knowledge (Zali, 2013, p. 25).

2.1. Foresight Methods

Common foresight methods are generally included in executing the foresight approach. One of these methods is categorization using techniques that consist of: quantitative and numerical methods, quasi-numerical and judgmental methods, and qualitative methods (Reger, UNIDO, 2005; 2001) (Abbasi Shokooh et al. 2008, p. 45).

Table 2. Foresight Methods and Techniques

Method	Qualitative	Quantitative	Normative	Exploratory
Agent Modeling		*		*
Interactive Effects Analysis	*			*
Layered Analysis of Causes		*		*
Decision-Making Models	*			*
Prediction Market	*		*	
Statistical Modeling	*			*
Delphi		*	*	*
Personal Futures		*	*	*
Participatory Methods		*	*	*
Scenarios	*	*	*	*
Text Mining		*	*	*

Method	Qualitative	Quantitative	Normative	Exploratory
Alternative Analysis		*		*
Road Map	*	*	*	*
Analysis of Trend Effects	*			*
Vision		*	*	

(Fateh Rad et al., 2013, p. 145)

Consistent with Roney's studies, foresight methods fall under eight functional categories of exploration, design and analysis of systems, modeling and simulations, prediction, environmental monitoring, effect/probability analysis, scenario writing probability analysis, decision-making, and information systems for facilitation of above methods (Roney, 2010, p. 79). These methods were not used given the re search

nature and urban development plans, though they were used to introduce and use regional and urban foresight plans.

2.2. Knowledge and Art of the Foresight Approach

Foresight results from integrating three closely related categories of concepts in various scientific areas, including 1. Strategic planning; 2. Future thinking, and 3. Networking or development of policies.

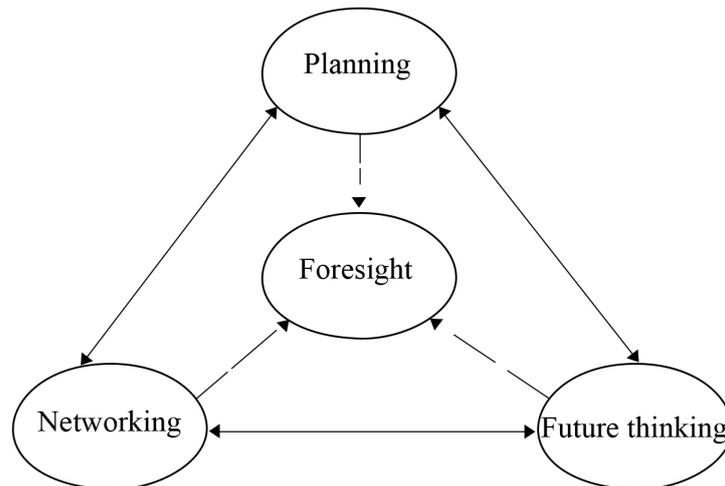


Fig. 3. Position of Foresight from an Interdisciplinary Perspective
(Foren, 2001, p. 12)

This approach involves six main themes, which are: 1. Mapping begins with the perception of the future (Enayatollah, 2010, p. 36); 2. Estimation (Ibid, p. 36); 3. Future scheduling or macro-history: a review of macro-models of change (Ibid, p. 36); 4. Deepening the future through gaining knowledge (Ibid, p. 159); 5. Social alternatives, scenarios and plans (Ibid, p. 259), and 6. Future developments, visioning of desirable futures and in-action learning (Ibid, p. 159).

2.3. Foresight Objectives

Foresight can be defined as part of the strategic management process, especially in analyzing an external environment. It appears, however, that foresight is more of an instrument for policymaking (Nyiri, 2003).

2.4. Major Factors for Future Construction

The future develops from the interaction of four main factors constructed by their interactive effects. These factors are trends, events, views and measures (Maddahi, 2015, pp. 26-27).

2.5. Foresight Framework

Various frameworks have been offered for foresight by theorists. These frameworks describe the different stages of general foresight and how they are executed; hence, they can be used in foresight studies of different subjects. Major foresight framework designs include frameworks by Horton, Voros, Martin, Reger, Saritas, Miles, Popper and developed models. Table (3) summarizes the foresight frameworks and gives their relevant execution stages.

Table 3. Summary of Foresight Frameworks and Their Relevant Stages

Foresight Frameworks	Stages of Execution
Martin framework (Martin, 195)	Pre-foresight stage: Work to be done before foresight, including “decision to begin the foresight process” and “preparation activities.”\ Foresight stage: “Design of the foresight process,” “strategic analysis,” “consensus over possible options,” “publication of results from foresight process.”\ Post-foresight stage: “Implementing foresight results.”
Voros framework (Voros, 2003)	Inputs: Gathering information, survey for strategic information\ Foresight: Three distinct stages of analysis, interpretation and visioning\ Outputs: Two categories of concrete and non-concrete strategic outputs
Saritas framework (Neopolos, Saritas, Taymaz & Turner, Cagnin, 2006-2007)	Perception \ Integration\ Analysis and selection\ Form Change\ Activity
Miles framework (Miles, I. 2003)	Pre-foresight\ Application\ Creation of an image of the future\ Execution
Horton framework (Horton, 1999)	Input stage \ Foresight stage \ Outputs and activity
Reger framework (Reger, 2001)	Determining information needs and selecting the research area\ Determining goals and main questions or research areas \ Selecting information sources, methods and instruments\ Data gathering\ Screening, analysis and interpretation of data to make decisions\ Appraisal and decision\making\ Implementation
Developed foresight framework	Determining the limits\ Scope of subjects under investigation\ Strategy focus and geographical limits covered\ Time horizon\ Personal and organizational skills and expertise\ Selecting methodology \ The target population or intended people \ Establishing cooperating companies or entities \ Strategy promulgation
Popper framework (Popper, 2003)	Pre-foresight stage\ Utilization stage\ Creation stage\ Exploration\ Analysis \ Estimation\ Action stage \ Review stage

A methodological review of these studies suggests that various methods can be provided by considering the planning environment and goal of the study. Although the use of “cross-impact analysis” and “scenario writing” based on uncertainties in the system was greater than other methods, fewer complexities of expert judgments and the feasibility of pairwise comparison of variables under study as well as the

use of MICMAC software which include binary data as inputs are the major reasons of scenario writing based on two-axis techniques. On the other hand, two-dimensional scenario writing increases the number of scenarios and thus diverges strategies in various social, economic, environmental, spatial research areas (Zali, 2013, 25).

Table 4. Thinkers' Definitions of Foresight

Theorist	Definitions
Ben Martin	Foresight refers to a systemic effort process to look at the long-term future of technology, sciences, the environment, economy, and the community, which is aimed at identifying generally-emerging technology and strengthening strategic research areas which could provide the highest social and economic benefits.
Luke Georgio	Foresight is a systematic instrument to evaluate scientific and technological developments that impact industrial competition, wealth generation, and life quality.
Horton	Foresight refers to an expanded development process of viewpoints about possible future methods, which perception of these viewpoints leads to decisions that provide the best possible tomorrow.

Theorist	Definitions
Goygan	Foresight is a systematic, participatory process that gathers perceptions about the future that provides a mid-to-long-term vision to adopt effective decisions and mobilize joint measures.
Webster	Foresight refers to a systematic and purposeful process that gathers the expectations of different actors about technology and develops strategic visions about the future to support economic and social development.
Loveridge	Foresight describes approaches to improve decisions, including analyzing factors affecting changes to develop a strategic vision and smart prediction.
Richard Slaughter	Foresight is considered a general capacity to empower man to think about the future, as this capacity enables him to contemplate the future and investigate, model, and create future possibilities.

(Zali, 2013)

3. RESEARCH METHOD

Considering the research nature, which involves environmental complexities, uncertainties, and changes and does not follow pre-determined fixed rules, this research has adopted a qualitative approach, and the predominant paradigm is interpretive. Data are gathered through the literature, interviews and observations. Data are also gathered through semi-structured interviews and an open-ended questionnaire. Also, the Delphi method is used to gather the views of the experts on foresight and planning. The Delphi method has been used since the half-60s for a large spectrum of complicated and future-oriented questions. This method is regarded as a major foresight method that concerns many future issues (Ahmadi, 2010, p. 100). The number of experts in a Delphi method depends on such factors as the goal or scope of the problem, homogenous and heterogeneous samples, the ability of the research team to manage the study, quality of decision-making, time and internal and external credibility, as the number of participants usually amount to less than 50 people (15-20 people). In the Delphi method, the number of 15 heterogeneous

samples are usually used to elicit an expanded spectrum of views, high-quality responses and acceptable solutions (Ahmadi, 200, p. 100). In the present research, the number of selected samples to obtain the views involves 15 people. The experts include developers of the plan and urban planning process at urban development counseling engineering and architecture companies, plan inspectors at entities that verify and approve the plans, and professors and experts in the area of urban plans and foresight processes. In the first stage, the Delphi method is used in two stages to summarize and categorize the foresight approach indicators and principles in urban plans; then, in the second stage, the extent to which foresight indicators and principles are taken into account in Tehran's strategic-structural plan by experts is measured. In the third stage, the Delphi method and poll of the interviewees are used to consider how foresight indicators and principles are incorporated into the said plan. In the end, the results from the second and third stages (review of the plan documents and views of the experts) are compared to each other. Thus, the order of priority of the foresight indicators and principles in urban planning is determined.

Table 5. Foresight Approach Principles, Indicators and Criteria

Principles	Indicators	Criteria
Regard for Stakeholders and Beneficiaries	Presence of various entities, use of different counselors, use of various government entities, regard for the participation of the private sector and civil society and NGOs, regard for participation by all organizations, managers and decision-makers	Adopted strategies and criteria concerning: Presence of various entities, use of different counselors, use of various government entities, regard for the participation of the private sector and civil society and NGOs, etc. Considering thematic plans in this connection
Regard for Uncertainties, Unknowns, Shocks and Complexities	There is regard for environmental issues, drought, water shortage, natural perils, earthquakes, wars, sanctions, etc.	Adopted strategies and criteria concerning: the needs of all ages, gender, ethnic, groups. Considering thematic plans in this connection

Principles	Indicators	Criteria
Regard for Trends and Megatrends	Regard to the Internet of Things, artificial intelligence, science and technology progress, ICT, expanded international communications, etc.	Adopted strategies and criteria concerning: the Internet of Things, artificial intelligence, science and technology progress, ICT, expanded international communications, etc. Considering thematic plans in this connection
Holism	Concerning all issues, including economic, social, cultural, historical, environmental, tourism, urban landscape, public spaces, etc.	Adopted strategies and criteria concerning: economic, social, cultural, historical, environmental, tourism, urban landscape, public spaces, etc. Considering thematic plans in this connection
Inclusiveness and Universality	Concerning the needs of all age, gender, ethnic, etc. groups.	Adopted strategies and criteria concerning: the needs of all age, gender, ethnic, etc., groups. Considering thematic plans in this connection
Regard for Programs, Results of High- and Low-Level Documents	Regard for planning, urban complex, comprehensive, strategic plans, CDS, etc.	The use of the 2025 Visions Plan, urban complex, The 90s Tehran's strategic plan, etc.
Long-term View	Regard for long-term intervals	Considering a 20–25-year interval and time mid-intervals in this 25-year interval
Regard for Values and Worldviews	Regard for values and worldviews governing different groups of the society	Adopted strategies and criteria concerning considering thematic plans in this connection
Scenario Writing and Foresight	Regard for possible, probable and desirable futures and the creation of alternatives futures	Use of new models and software to discuss types of the future
Visioning	-	-
Accurate Understanding and Analysis of the Planning Environment	Regard for the status quo and planning environment	Considering weaknesses, strengths, opportunities and threats

4. RESEARCH FINDINGS

In this section, consistent with the theoretical foundations on foresight and the results of the first and second stages of the Delphi method, the foresight principles incorporated into urban planning are determined and prioritized. The principles in order of priority include regard for stakeholders and beneficiaries (participation), long-term view, regard for low- and high- level documents, regard for uncertainties, shocks and complexities, unknowns, accurate understanding and analysis of the planning environment, regard for trends and megatrends, scenario writing and futurism, holism, inclusiveness and universality, visioning, and regard for values and worldviews; in the third stage of the Delphi method, the extent to which these principles are measured in the urban development plans is given in Table 6. In this stage, the previously mentioned foresight approach principles and indicators are investigated com-

pared to Tehran's strategic-structural plan to determine whether they comply with the planning model. Hence, using the structured qualitative content analysis method, the foresight approach criteria and indicators are coded and measured as the main and secondary categories, and data are elicited by reference to Tehran's strategic-structural plan documents. In the next stage, each data is scored by considering the number of its repetition and application in goals, strategies, policies and thematic plans. A relevant importance coefficient is given in the main category for each secondary category. Finally, the total score is calculated by multiplying the data scores by the importance coefficient and averaging, as given in Table 6. The scores are comparatively categorized and ranked in the form of such options as very high, high, to some extent, low, very low, never. The ranking is also assigned 1-5 based on the author's evaluation.

Table 6. Assigning Scores to Rank the Data

Never	Very low	Low	to Some Extent	High	Very High
0	1	2	3	4	5

In the following, main categories (principles) and secondary categories (criteria and indicators) and their data scores are investigated:

A) Regard for Stakeholders and Beneficiaries (participation)

This category includes four subcategories of A1: the presence of various entities; A2: the presence of various counselors; A3: the presence of various government entities and A4: regard for the participation of the private sector, civil society and NGOs.

These subcategories have equal importance coefficients, except for the subcategory of “regard for the participation of the private sector, civil society and NGOs,” whose importance coefficient is twice as much. The most important data in this section pertains to the presence of 22 counseling companies to develop a plan for 22 districts of Tehran, which is assigned a score of 5 out of 5 under the subcategory of “presence of various counselors.” Other data elicited from the plan include the participation of the ministries, NGOs, popular participation and broadening of public monitoring over urban measures, which are assigned their scores. This main category is finally assigned a score of 2.4, which oscillates between low and to some extent. This indicates little regard for the stakeholders and beneficiaries and participation.

B) Regard for Uncertainties, Unknowns, Shocks and Complexities

This category includes four subcategories of B1: drought and water shortage; B2: natural perils (earthquakes); B3: wars and B4: sanctions.

In this category, the subcategories of earthquake, drought and water shortage, and war and sanctions are assigned importance coefficients of 3, 2 and 1, respectively. Two subcategories of B1 and B2 are assigned an equal score of 2. However, the plan does not cover wars and sanctions and is thus assigned no score. The final score of this main category is 1.4, which oscillates between low and very low, indicating little regard for it in the plan.

C) Regard for Trends and Megatrends

This main category includes four subcategories of C1: the Internet of things and artificial intelligence; C2: technology and science progress; C3: ICT and C4: expansion of international relations, etc.

These subcategories have equal importance coefficients. Two subcategories of the Internet of things and artificial intelligence and technology and science progress are not practically regarded and thus assigned no score. The next subcategories of C3 and C4 also receive little regard as they are assigned a score of 1. This main category is finally assigned a score of 0.5, which oscillates between very low and never, indicating almost any regard for the trends and

megatrends.

D) Holism

This main category includes seven subcategories of D1: regard for economic issues; D2: regard for cultural issues; D3: regard for social issues; D4: regard for environmental issues; D5: regard for historical issues; D6: regard for urban landscape issues and D7: regard for safety issues.

The entire subcategories have equal importance coefficients. In this main category, the subcategory of “environmental, historical issues and urban landscape” are assigned a score of 4, i.e., high scores; the subcategory of economic issues is assigned 3, i.e., to some extent and safety issues are assigned a score 2 while regard for social and cultural issues is assigned score 1 which indicates a low score. A notable point of this category is the very high regard for environmental issues in the comprehensive plan. The total score of this category is 2.86, i.e., the comprehensive plan is somewhat holistic.

E) Inclusiveness and Universality

This main category includes four subcategories of E1: required for all age groups; E2) required for all gender groups; E3: required for all ethnic groups and E4: required for all groups with physical and financial abilities.

All the subcategories have equal importance coefficients. No mention is made in Tehran's strategic and structural plan of three subcategories of E1, E2 and E3, as they are assigned no score. The E4 subcategory is assigned 2 (low). The total score of this category is 0.5, i.e., almost no regard is made for the inclusiveness and universality in the said plan.

F) Regard for Programs and Low- and High-Level Documents Results

This main category includes five subcategories of F1) planning; F2) urban complex; F3) comprehensive plans; F4) strategic plans; and CDS and F5) HADI plan.

All the subcategories have equal importance coefficients. All volumes of Tehran's strategic and structural plans have considered low- and high-level documents, though data from the urban complex and planning processes could not be cited. The total score of this category is 4, i.e., the low- and high-level documents in Tehran's strategic and structural plan have been highly regarded.

G) Long Term View

This main category includes one subcategory of G1) a 20–25-year interval. Since Tehran's Urban Development Vision is a long-term (20-year) interval, it is assigned a score of 4; thus, one would say that the strategic and structural plan has a long-term view of the city.

H) Regard for Values

This main category includes one subcategory of H1) regard for values, assigned 3. It is thus said that Tehran's strategic plan has regard for it.

I) Scenario Writing and Future

This main category includes four subcategories of I1) review of possible futures, I2) review of probable futures, I3) review of desirable futures, and I4) creation of alternative futures.

All the subcategories have equal importance coefficients. Because the comprehensive plan does not mention scenario writing and review of various futures, this category is assigned no score. This denotes that the plan has no regard for the two.

J) Visioning

This main category includes one subcategory of J1) visioning, assigned score 3. Thus, the strategic and structural plan is somewhat based on visioning.

K) Accurate Understanding and Analysis of the Planning Environment

This main category includes four subcategories of K1) strengths, K2) weaknesses, K3) opportunities, and K4) threats.

All these subcategories have equal importance coefficients. The comprehensive Tehran plan has high regard for the four subcategories, and all are assigned a score of 4. Thus, this category is assigned a total score of 4. Thus, one would say that Tehran's comprehensive plan has high regard for the accurate understanding and analysis of the planning environment

The results are given in Table 7, which summarizes the final result of each principle and relevant indicator as specified by a distinct color and numerical value.

Table 7. Results from Evaluating the Extent to which Principles and Indicators of Foresight Approaches Adapt to Tehran's Strategic and Structural Plan Based on Document Studies

	Regard for Stakeholders (Beneficiaries) (Participation)	Regard for Uncertainties, Unknowns, Shocks and Complexities	Regard for Trends and Megatrends	Holism	Inclusiveness and Universality	Regard for Low- and High-Level Document Results	Long Term View	Regard for Values	Scenario Writing	Visioning	Understanding Planning Setting	Mean
Score from Document Review	2.4	1.43	0.5	2.86	0.5	4	4	3	0	3	4	2.42
	Low	Very low	Very low	To some extent	Very low	High	High	To some extent	Never	To some extent	High	Low

The results suggest that in Tehran's strategic-structural plan, the principle of "participation" is assigned a score of 2.4 (low); the principle of "regard for uncertainties, unknowns, shocks and complexities," 1.43 (very low); the principle of "regard for trends and megatrends," 0.5 (very low); the principle of "holism," 2.86 (to some extent), the principle of "inclusiveness and universality," 0.5 (very low); the principle of "regard for low- and high-level document results," 4 (high), the principle of "long-term view," 4 (high); the principle of "regard for values," 3 (to some extent), the principle of "scenario writing and future," 0 (never), the principle of "visioning," 3 (to some extent), and the principle of "accurate understanding of planning environment," 4 (high).

4.1. The Adaptation of Foresight Approach**Indicators, Principles and Criteria in Tehran's Strategic-Structural Plan (Comprehensive Plan) Using the Delphi Technique and Poll of the Interviewees**

As stated above, the Delphi technique is used to utilize the views of experts and professors. Questionnaire items are designed in open-ended form and via deep interviews based on principles and indicators of the foresight approach. Each principle and indicator are measured by the relevant items, as given in Table 8. A number of 15 experts is selected for the interviews. After the views of the interviewees are obtained (third stage Delphi technique), the responses are assigned scores 0-5 on a "never to very high" spectrum.

Table 8. Results from Evaluating the Adaptation of the Foresight Approach Indicators with Tehran's Strategic Plan Based on Experts' Views

	Regard for Stakeholders (Beneficiaries) (Participation)	Regard for Uncertainties, Unknowns, Shocks and Complexities	Regard for Trends and Megatrends	Holism	Inclusiveness and Universality	Regard for Low- and High-Level Document Results	Long Term View	Regard for Values	Scenario Writing	Visioning	Understanding Planning Setting	Mean
Scores from Questionnaire and Deep Interviews	2.21	0.9	0.81	3.09	1.96	3.09	3.27	2.4	0.45	3.72	3.09	2.27
	Low	Very low	Very low	To some extent	Low	To some extent	To some extent	Low	Never	High	To some extent	Low
Score from Document Review	12		4		17			2	11	21	16	-
	13	3	5	8	18	15	7	9				
	14		6		19							

The results suggest that the interviewees assign scores of 2.41 (low and to some extent) to the principle of "participation"; 0.9 (very low) to the principle of "regard for uncertainties, unknowns, shocks and complexities"; 0.81 (very low) to the principle of "regard for trends and megatrends"; 3.09 (to some extent) to the principle of "holism"; 1.96 (low) to the principle of "inclusiveness and universality"; 3.09 (to some extent) to the principle of "regard for low- and high-level document results"; 3.27 (to some extent) to the principle of "long-term view"; 2.4 (low) to the principle of "regard for values"; 0.45 (never) to the principle of "scenario writing and futurism"; 3.72 (never) to the principle of "visioning" and 3.09 (to some extent) to the principle of "accurate understanding of planning environment."

In other words, one would say that regard for uncertainties, unknowns, trends and scenario writing are assigned the lowest scores, and almost all interviewed experts maintain that these three categories are not regarded in the plan. Participation, including collaboration and cooperation of all organizations, managers, policymakers, stakeholders and beneficiaries and NGOs, universality for all age, gender and physical groups and regard for values are also assigned low scores.

Most interviewees maintain that visioning have been regarded by a high margin in the plan, though the visioning is mostly idealistic. Concerning holism, the interviewees state that psychological, social and

cultural issues are not regarded for or inappropriately dealt with. Concerning the long-term view, the interviewees state that the vision of this plan is highly stereotypical, with time intervals and final returns unaccounted for.

4.2. Comparison of Results from the Questionnaire and Deep Interviews and Scores from a Document Review

Table 9. Comparison of Results from the Questionnaire and Deep Interviews and Scores from a Document Review

	Regard for Stakeholders (Beneficiaries) (Participation)	Regard for Uncertainties, Unknowns, Shocks and Complexities	Regard for Trends and Megatrends	Holism	Inclusiveness and Universality	Regard for Low- and High-Level Document Results	Long Term View	Regard for Values	Scenario Writing	Visioning	Understanding Planning Setting	Mean
Scores from Questionnaire and Deep Interviews	2.21	0.9	0.81	3.09	1.96	3.09	3.27	2.4	0.45	3.72	3.09	2.27
	Low	Very low	Very low	To some extent	Low	To some extent	To some extent	Low	Never	High	To some extent	Low
Score from Document Review	2.4	1.43	0.5	2.86	0.5	4	4	3	0	3	4	2.42
	Low	Very low	Very low	To some extent	Very low	High	High	To some extent	Never	To some extent	High	Low

Interview and document review results of the principle of participation suggest a “low” rate, indicating that regard for the participation of the stakeholders and beneficiaries in Tehran’s strategic plan is low.

Interview and document review results of the principle of regard for uncertainties, unknowns, shocks, etc., suggest a “very low” rate, indicating that regard for these subcategories in Tehran’s strategic plan is very low.

Interview and document review results of the principle of regard for trends and megatrends suggest a “very low” rate, indicating that regard for this subcategory in Tehran’s strategic plan is very low.

Interview and document review results of the principle of holism suggest a “to some extent” rate, indicating that regard for this subcategory in Tehran’s strategic plan is to some extent.

Interview and document review results of the principle of inclusiveness and universality suggest a “very low” rate, indicating that regard for this subcategory in Tehran’s strategic plan is very low.

Interview results of the principle of regard for programs and low- and high-level results suggest a “high” rate, though document review results suggest

that regard for this subcategory in Tehran’s strategic plan ranges from “to some extent” to “high.”

Interview results of the principle of long-term view suggest a “to some extent” rate, though document review results suggest that regard for this subcategory in Tehran’s strategic plan is “high.”

Interview results of the principle of regard for the values suggest a “low” rate, though document review results suggest that regard for this subcategory in Tehran’s strategic plan is “to some extent.” This indicates that the plan assigns “low” to “to some extent” rates.

Interview and document review results of the principle of scenario writing and futurism suggest a “never” rate, indicating that regard for this subcategory in Tehran’s strategic plan is “very low.” Interview results of the principle of visioning suggest a “high” rate, but document results suggest “to some extent” rate, indicating that regard for this subcategory in Tehran’s strategic plan ranges from “to some extent” to “high.” It is, however, noteworthy to suggest that regard for visioning is highly idealistic and unrealistic, thus regarded as unrealizable.

Interview results of the principle of accurate understanding of the planning environment suggest

“to some extent” rate, while document review results suggest a “high” rate, indicating that regard for this subcategory in Tehran's strategic plan ranges from “to some extent” to “high” rates.

Finally, the mean rate of both methods by considering all foresight principles is “low.” Thus, it is concluded that Tehran's strategic-structural plan has been developed without regard for foresight approach principles despite creative and innovative aspects.

5. CONCLUSION

The findings concluded that no definite foresight approach-based methodology was used by developers of the “Tehran's Comprehensive Plan.” It should, however, be pointed out that developers of the plan had sought to include some strategic and structural dimensions such as strategy and vision into the plan. Although this was an innovation, no appropriate and attributable methodology was used when developing the plan. On the other hand, Tehran's comprehensive plan was found to have its strengths which were: innovation of the plan at the time of development,

comprehensiveness of the studies, effective institutionalization), and its weaknesses which were: little regard for foresight and strategic thinking, weak methodology and visioning, dependency on the entities, lack of legal backing, little regard for local conditions and low stakeholders' participation.

The process proposed by the research to develop urban development plans included seven basic steps 1: Understanding, 2. Data gathering, 3. Data analysis, 4. Screening and data interpretation, 5. Foresight, 6. Outputs (evaluation and decision) and 7. Implementation. One would say that using the principles of foresight could resolve the most important problem of developing urban development plans when it came to their content and realization. The use of this approach in urban development plans create more flexible programs in response to uncertainties, attention to strategies in urban development plans, determination of development examples and key axes instead of determination of definite measures in different cases, and foresight studies using elites and experts, instead of analyzing trends, and more public participation and support from NGOs.

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