

## **A Conceptual Model for Integrated Management of the Urban Environment in Tehran Metropolis (Based on the Good Governance Guidelines)**

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**ABSTRACT:** Environmental protection is a key element in urban management. In metropolises due to complex relationships between human and environment the importance of environment is ever-increasing. In this paper The current situation of environment in Tehran metropolis including air, water, biodiversity and human habitat along with the most crucial threats, their effect as well as the associated agencies and organizations have been investigated, using the indicators of OECD (Organization for Economic Co-operation and Development), UNEP (United Nation Environmental Program) and GFF (Global Environmental Fund). The current management of Tehran environment is studied based on a conceptual model and using SWOT analysis. Then, an ideal urban environmental management model is proposed for Tehran, with regard to the higher order legal documents of national and international levels and the global models such as: UN Habitat Program, Sustainable Cities Program, Policy and Regulatory Framework for Sustainable Cities Program, Healthy Cities Program, Agenda 21, Strategies of the Environmental European commission and a Good Governance Model, as well as the results of the SWOT analysis. In this model, the authorities in charge of urban management and their responsibilities are determined and classified at three levels of policy-making, decision making and implementation. The target and the relationship between them are clarified.

**Key words:** Integrated management, Urban environment, Legal framework, Sustainable city

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### **INTRODUCTION**

Urban environment consists of circumstances and conditions which should guarantee the quality of life and mental health and physical comfort of citizens. Threats to any of the above mentioned factors and conditions would cause turmoil in urban environment and decline in the residents' quality of life. Therefore, protecting and preserving the environment and observing its sustainable indicators are the most urgent need of an urban society and among the most crucial responsibilities and duties of the urban management. Unsustainable transportation and land use changes are among the greatest problems in most metropolises in South East Asia. Improvement of management depends on coordination of the related organizations and institutes (Miyamoto, et al., 1996). Indicators for sustainable environmental and economic have been tested in provinces Milano, Bergamo, Pavia, and Mantua in the

Lombardi region (Rigamonti et al., 2016). Academic studies are prerequisites for success of integrated management systems (Holm et al., 2015). The role of social organizations in waste management and poverty alleviation has been studied in Kenya, Tanzania and Uganda (Tukahirwa et al., 2013). According to the two reports on "Tehran environment situation", the metropolis is among the leading cities in providing SoE (Tehran State of the Environment, 2015), using the DPSIR (Driving forces, Pressures, States, Impacts and Responses) model. The model is able to correlate various aspects of the environment components and to show their interactions (Zebardast et al., 2015).

In this research, we are going to provide some suggestions on the integrated management of the environment emphasizing on Tehran metropolis. Although urban management in Tehran has had notable

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achievements, such as construction of new highways, underground railway, non-level crossings, green spaces and expansion of public transportation, it face with heavy environment deterioration and the indicators of the human habitat show significant drop in life satisfaction and life quality in Tehran (Tehran state of the Environment, 2001, 2015). A reason for this situation is inter-organizational inconsistencies among those who are in charge of urban environmental management. Political and sporadic attitudes of the organizations and different policies within the geographical neighboring areas are among managerial and structural deficiencies in the metropolis. This research is an attempted to minimize the effects of such urban difficulties and problems.

## MATERIALS & METHODS

Experiences of some world metropolises, principles of urban environmental management, international documents of the world models, urban integrated management system consistent with the model of good governance and favorable outlook on the basis of the higher order legal instruments at the national level have been applied in this research.

In this research experiences of the metropolises New York, Toronto, Amsterdam, Johannesburg, Istanbul and Dubai as the winners of the Environment "Safe City Prize" have been used. These experiences reveal that the cities have established independent departments of urban environment protection under the supervision of the mayors or their deputies. The departments conduct all affairs of the urban environment protection in the form of governance duties under the supervision of governments. Planning the strategies and programs for the urban environment protection is mainly based on the highest body of city management, i.e. city councils (municipality's plan for comprehensive legal system studies in the field of environment, 2012). The important point in environmental performance of mayors is their attention to education, promotion and attraction of people to the environment protection programs participation.

**General Principles of Environment:** The most important, efficient and applicable principles of urban management are: integrity, participation and coordination, informing, law-centrism and supervision principles, which make the framework for planning the comprehensive and integrated system of the urban legal management. The purpose is to realize the general goal of life quality promotion and providing favorable environment. The conceptual model of the urban environment management is prepared based on the above mentioned principles (Barrow, 1999).

**International Documents and Global Models:** The most important international documents and models

emphasizing on integrated urban management which have been scrutinized for the research are: United Nations Human Settlements Program (2015), Sustainable City Program (2015), Policy and Legislative Framework for Sustainable Cities Program (Corburn, 2009), Healthy City Program (WHO, 2015), Agenda 21(1992), EU Environment Commission Strategies (Technical Report, 2007), San Francisco Memorandum (Corburn, 2009).

**Good Governance Guidelines:** a city consists of numerous and interactive elements and components including policy, environment, economy, society, technology, rights, as well as geographical elements such as locations in neighborhood, area, district, town etc. but with a collective morale, which leads to integrity and common fate of the components together as a whole. Sustainability of the urban development and integrity of the urban management depend on integrated and balanced development of all components. In other words, integrated urban management is not the goal, but it is an instrument for urban management system and realization of "a good city"; and a good city as an urban "goal" is a city with higher levels of justice, competitiveness and sustainment, urban governance is a decentralizing, multilateral-power-based solution which integrates the separate elements of urban management. It requires policy making and application of the holistic approaches to urban development (Torkaman, 2011).

General and specific higher order legal documents of Tehran Metropolis : Constitution (1979), Iran Visions of 2025 (2005), General environmental policies of the country (2015), Development strategies for Tehran province (2010), Basic plan for land use (1982), Charter of Tehran (2001), Development plan of Tehran province (2004), National document of Tehran development (2005) which have been studied in the research. Indicators of the international organizations: The components and indicators of the urban environment of Tehran has been based on the international organizations' indicators such as OECD, UNEP and GEF and include air, water, soil, biodiversity and human settlement (Tehran State of Environment, 2001, 2015).

## RESULTS & DISCUSSION

**Current situation of the environment:** Regarding the components and indicators of the urban environment from the viewpoint of the international organizations, the current situation of the Tehran metropolis is as follows:

**Air:** Tehran industrial metropolis is one of the polluted cities of the world, because of centralization and concentration of the resident and nonresident population and some associated factors. Although Tehran has a developed public transportation and metro, the facilities are insufficient because of the suburbs and their

**Table 1. The most important threats, concerning the air**

Threat	Effects	Responsible body
Weakness in implementation of the preparation programs led to immigration	Suburb development, increase of traffic and fuel consumption, cultural, social, economic and environmental problems, increase of false and contaminating jobs	Planning and Management Organization, Tehran municipality
Concentration of the stable and mobile resources and poor monitoring	Immigration attractions, population growth and increase of fuel and energy consumption	Environmental Organization, Industry Ministry
Lack of a plan for reduction of traffic and preventing the contaminating cars from moving in the city	Fuel consumption, high pollution, specifically in old cars	City, Environment Organization, Traffic police

commute to the city. The main threats concerning the air have been shown in the Table 1.

Water: ever-increasing population and immigration is caused water shortage, water transmission from neighboring cities and provinces, necessity of managerial coordination among various administrations (Chidammodzi et al., 2016). This situation in Tehran is at least between two provinces (Tehran and Alborz), water right claim for at least four adjacent provinces (Qazvin, Qom, Semnan and Mazandaran) and various contaminating centers in this basin are challenges of supplying water qualitatively and quantitatively in Tehran metropolis. Tehran's drinking water is supplied from four conserved rivers (Lar, Karaj, Latian, Teleqan) and their dam lakes with the catchment of 625, 843, 695 and 1200 square kilometers, respectively (Pourkarimi et al., 2008). The highest level of water harvesting is related to drinking water for Tehran. Of course a great volume of the

ground water is also harvested for this purpose (Table 2).

Soil: Irregular construction in Tehran, even in mountain slopes and steep terrains during the recent years have increased the soil destruction process and speeded it up. The extent of the built areas in Tehran was 37% in 1988, then it reached to 58% 2000 and 70% in 2015 (Tehran State of Environment, 2015).

In addition to these industrial pollutions infiltration of pollutions from air, sewage and surface water in metropolises led to accumulation of hazardous contaminating materials in soil (Herva et al., 2014) which enter the food cycle and cause serious risks for health (Ebtekar, 2004) (Table 3).

Biodiversity: the geographical position of Tehran metropolis (i.e Alborz Mountains, desert and climate of the area) has provided high potential for biodiversity. Though, irregular construction, severe air

**Table 2. The most important threats, concerning the water**

Threat	Effects	Responsible body
Weakness in controlling the river pollution sources due to the extent of the watershed and disposed polluting sources.	Water resources pollution	Environment protection organization, Ministry of Energy, Ministry of Health, Ministry of State, Ministry of Agriculture
Weakness in monitoring and controlling the city pollution sources (refinery, gas stations, car washes, hospitals etc.).	Water resources pollution	Environment protection organization, Ministry of health, Ministry of Energy, Municipality
Partial implementation of the urban sewage treatment plant and weakness in full operation of the plants.	Water resources pollution	Environment protection organization, Ministry of energy, Ministry of Health, Ministry of Agriculture
Ever-increasing water consumption (suburb development, green spaces, water consuming services such as car washes) and lack of consumption control	Reduced water access	Ministry of Energy, Municipality
Lack of recycled water consumption culture in industry and services	Reduced water access	Ministry of Energy, Environment organization, Ministry of health, Ministry of Industry, Ministry of Agriculture, Municipality.

**Table 3. The most important threats, concerning the soil**

Threat	Effects	Responsible body
Tehran Immigration	Development of suburbs & contaminating illicit jobs	Management and planning Organization
Irregular construction	Reduction of soil & destruction	Municipality, Roads and City Building Ministry
Dispersion and diversity of contaminating sources	Increase of the pollution hazards	Municipality, the Industry, Mine and Trade Ministry
Irregular mine utility	Widespread and deep soil destruction	Industry, Mine and Trade Ministry, DoE
Using row sewage in irrigation	Widespread pollution in deep soil layers	Ministries of Agriculture, Energy
City wastes	Widespread biological & chemical pollutions	Ministries of State, health, Industry, DoE

and water pollution, landscape changes and destruction of old gardens, climate changes and ignorance have endangered them (Majnounian and Pourkarimi, 2012). Lar, Khojir and Sorkhe Hesar National Parks as well as hunting-forbidden areas in Firuzkuh, Sefidkuh and Lar from the natural ecosystems of the metropolis which have been conserved for about Five decades. The preserved rivers of Karaj and Jajrud have been monitored since 1967. The two rivers and seven other seasonal rivers Sorkhe Hesar, Darabad, Maqsd Beik, Darband, Darake, Farahzad and Kan have their head spring in Alborz slopes. Tehran has been between the two rivers during the last four decades, however following construction of Karaj dam, the situation changed. The mentioned seasonal rivers were used to irrigate North Tehran gardens and then the South Tehran Farms. Today, they are in the form of uncovered or covered concrete canals and applied to direct sewage and wastes to South. Of course, they produce proper condition for many troubles (Table 4). Human habitat: human is the most basic element of the urban habitats. Therefore the main purpose of

improving the habitats is satisfying human's needs and requirements for a social life (Ebtakar,2009). Rapid development of urbanization in Tehran during the recent half century, followed no discipline; the fact that can be considered as the root of nearly all environmental problems (Tehran State of Environment, 2001).

Human habitat in Tehran consists of two sections: pollutions and general health. The main causes of pollutions were explained earlier. Concerning the general health, the death rate and health level indicates reveal unfavorable environmental effects on the citizens (Table 5).

Current situation of urban Management: Urban management has different definitions and functions in various countries. Some countries assume it at the level of providing sanitation services, transportation and prettification of the city. Others assume higher functions for urban management, for instance improvement of the citizens' quality of life in all aspects as well as promotion of public welfare and calmness

**Table 4. The most important threats, in the concerning the biodiversity**

Threat	Effects	Responsible body
Land use changes, invasions to nature and making roads, pipeline etc.	Destruction of habitat and reduction of biodiversity	Municipality, Ministries of Roads and City Building, Energy, Oil, DoE
Mine utility, inappropriate rivers management	Natural ecosystem destruction, diminishing rivers' natural functions	Municipality, Ministries of Industry, Energy, DoE
Air, soil, water and noise pollution	Migration and wild life death	DoE, Ministries of Oil, Industry, Municipality
High fossil energy consumption, increase of city spaces' concentration	Climate change, changes in extent and quality of habitat, animal species migration	Ministries of Industry, Roads and city Building, Energy, DoE, Municipality

**Table 5. The most important threats, concerning the human habitat**

Threat	Effects	Responsible body
Increase of Population and immigration-related activities	Imbalanced development and its social, economic, cultural and environmental consequences	Management and Planning Organization, Ministry of Industry
Lack of comprehensive plans and weakness in city building regulations.	Land use changes, uneven expansion of the city	Ministry of State, Ministry of Roads and City Building
Air, water, soil, noise, light waves and visual pollutions and aesthetical inconsistencies	Threats of citizens' physical and mental health	Environment Organization, Ministry of Health, Municipality
Continuous demand of intra-city transportation	Increase of traffic, energy consumption, and transportation system depreciation, mental and spiritual damages.	Management and Planning Organization
Severe reduction of private green spaces, gardens and increase of high buildings in the city	Threat of physical and mental health; city calmness, parking and other troubles	Municipality
Lack of coordination among the urban managers in providing services and development of infrastructures (digging asphalt and streets repeatedly by various construction organizations).	National capital wasting, missing the public calmness and tranquility as well as trust in city managers; threat of mental and spiritual health.	Municipality, Ministry of Energy, Ministry of Roads and City Building

(Technical Report, 2007). The universal concept of urban management was used for the first time in the United Nations development programs, under the title of UN Habitat. The purpose of the program was to help the Third World (developing countries) develop their cities. It contained a set of policies and plans for the cities (Urban policies, economic development and agenda for 2010 decade, 1995).

Complexity of the urban management system is rooted in various active and efficient factors and a variety of sciences (urban planning, architecture, environment, engineering, geography, economics etc). This variety, in turn reveals the complexity of the system (Strategic plans for Tehran Environment, 2001). In Iran, urban management is among duties of the municipalities as a function of city affairs administration. Tehran metropolis consists of 22 districts and 16 municipalities including those in surrounding towns. In addition, various governmental agencies play role in this regard, including environmental preservation Organization, Ministries of State, Energy, Roads and City Building and Health as well as planning and Management Organization.

This variety and their sectorial approach to the problem have prevented the city from a cohort and coordinated plan. Among the most obvious weakness in Tehran's environmental management, one may refer to:

- Non-specified position of the agencies in the environment management hierarchy
- Lack of coordination or relationship among the executive, supervisory and other associated bodies
- Sectorial approach aiming at protecting and extending organizational duties and functions by each responsible body instead of a coordinated, purposeful and centralized managerial approach to the subject
- Lack of coordination or relationship between the urban managers and citizens as the main beneficiaries; the result would be contradiction between tangible and short term needs, and basic and long term ones.
- Lack of a sustainable predicted budget for municipalities; the fact that leads to unreasonable measures to meet the budget such as allowing the structural density (high and multi-story buildings) and construction in forbidden areas (river and mountain sides) for money. Such measures would

result in destruction of green spaces, pollution and high concentration. Moreover, the basic and long term needs of the citizens and some of their civil rights have been ignored, for instance the right of having a calm and satisfactory environment.

According to the situation mentioned earlier, fig. 1 present a conceptual model for urban environment. As you see in the fig. 1, there are two separate identities in urban management: State system and city management. They act independently. The state or government is in charge of policy making, decision making and implementation; at the same time city management involves in those functions at the same level, too.

The challenges of Tehran's environment has seriously affected by such contradictions. Parallel, interfering, neutralizing, cumbersome and disharmonic measures by all parties would lead to mismanagement and the current situation of this metropolis. The important point to note is the fading role of the citizens in city affairs and decisions.

Their role has been restricted to the election of city council members and parliament members in the two above mentioned identities. Table 6 shows the

SWOT analysis of the current urban environment management.

Ideal Model: In this study, the aforementioned materials and methods including the higher order documents of metropolises in general and those of Tehran in particular, have been used to present an ideal model for the city. In all national higher order documents some common strategies have been emphasized, for instance coordinating and integrating macro-management in Tehran metropolis, reversing the migration direction, decentralization processes, sustainable management with a participatory approach, attempt to replace managerial disharmony with an integrated and coordinated management in Tehran metropolis and planning an efficient and integrated managerial structure and formations.

Fig. 2 is the suggested conceptual model for an ideal urban environment management. The urban managers, authorities and their duties at policy making, decision making and implementation and target levels have been classified. The suggested model has considered the following principles:

- Participation of all authorities of the city management including government, parliament,

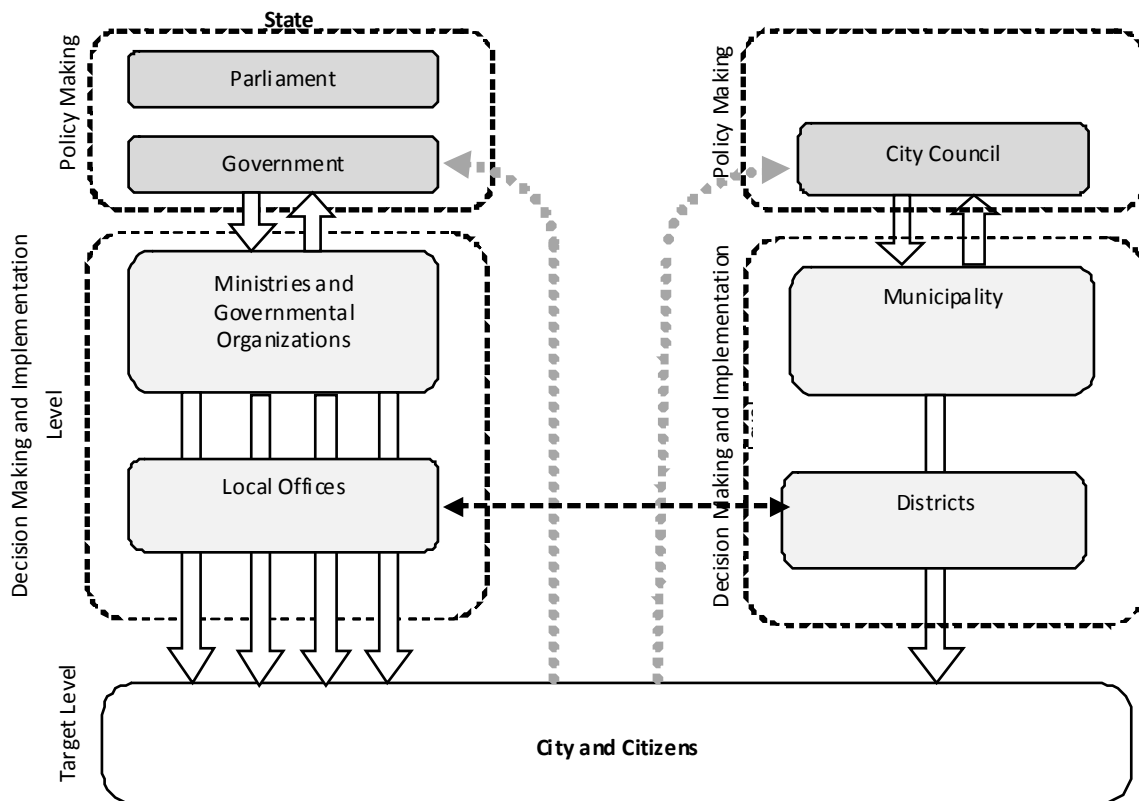


Fig. 1. A conceptual model for the present urban environment management of Tehran

- city council, municipality and citizens
- Attention to the concept of good governance and determining the responsibilities and duties of them including policy making, decision making, implementation and supervision.
- Changing the current approach and positioning an integrated management system

Authorities in policy making consists of legal representatives of the citizens and legislators including the Islamic council parliament, cabinet and City Council. The bodies are in charge of supervision, too. All decisions are made with regard to the citizens' needs, general policies, Constitution, general laws and in perfect and comprehensive coordination. The basic for policy making at this level would be the earlier policies' executive feedback as well as city and citizens' needs and requirements.

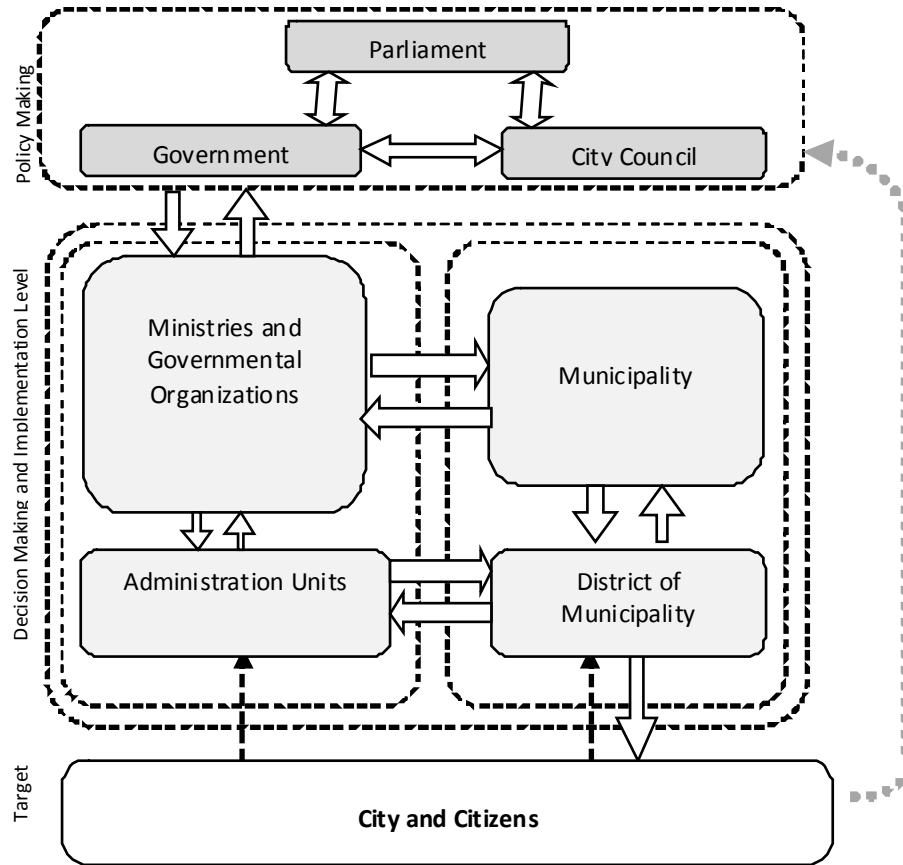
Concerning the decision making and implementation, the related government agencies and municipality are categorized in two groups: 1) determining criteria and local supervision; 2) planning; and providing infrastructures and implementation. The first group of duties is the responsibility of the government bodies (including Environment Preservation Organization, Ministries of Energy, Roads and City Building, State, Industry, Mine and Trade, Health, and the Organization for Management and Planning and the associated executives sectors. The

second group of duties is assigned to municipality and the affiliated institutions (Deputy for city services and environment, Environment and Sustainable Development Staff, Parks and Green Spaces Organizations, Organization for Solid Waste Management, Organizing jobs and Industries Company, Air Quality Control Company, and districts municipalities). Changing the present approach and coordinating and providing efficient relationships among governmental bodies and municipality and other institutions at different levels are very effective in establishment of an integrated management system. Determining criteria, planning, decision making and providing executive infrastructures, reporting and declaration of the executive feedbacks are among the most crucial duties at this level, which would be performed by the two groups. Decision making and implementation level is controlled by supreme supervision and monitoring of the policy making level. Assigning all affairs to municipality at this level makes it to concentrate on more activities, for example economic activities beside expansion of environment acceptance capacity. However, segmentation and separation of these affairs would let the economic activities to be go on, regardless of environmental consequences.

In the suggested idea model, citizens are at the target level and act as the main beneficiaries who are

**Table 6. SWOT analysis of the current urban environment management**

<p>Strengths:</p> <ul style="list-style-type: none"> <li>- Institutionalized sanitation culture among Iranian population</li> <li>- Citizens are able to supply necessary financial resources</li> <li>- Valuable experiences of the state agencies and municipality</li> <li>- Graduated students in the related disciplines</li> </ul>
<p>Weak points:</p> <ul style="list-style-type: none"> <li>- Environment preservation is not a priority in municipality and executive departments</li> <li>- Poor environmental specialty in Tehran municipality relative to other specialties</li> <li>- Weakness in the existing structure of Tehran municipality for environmental issues</li> <li>- Unsustainable budget resources</li> <li>- Dispersed urban management programs and numerous defined and the system dominated over the fields</li> </ul>
<p>Opportunities:</p> <ul style="list-style-type: none"> <li>- Existence of general policies of environmental issues and relatively appropriate regulations.</li> <li>- Promotion of knowledge and public expectations of preventing the hazardous conditions</li> <li>- Formation of various NGOs</li> <li>- Applicable world experiences and appropriate technology</li> </ul>
<p>Threats:</p> <ul style="list-style-type: none"> <li>- Rapid and uncontrollable population growth, and non-official settlement</li> <li>- Lack of coordination among the executive departments in charge of urban environment management</li> <li>- Non-specified positions and roles of executive departments, municipalities and citizens</li> <li>- Indisputable responsibilities of municipality (concurrent responsibility of decision making, execution and supervision)</li> <li>- Legal deficiency in some urban environment issues such as visual and light pollution and perspective</li> <li>- Non-compliance of comprehensive and segmented city plans</li> </ul>



**Fig. 2. The suggested conceptual model for Tehran metropolis urban environment management**

effective in city management. All policy and decision makings at the two previous levels must be performed with regard to the citizens' needs, their participation and determining their position and role.

Supervisory system in this model consists of supreme and local monitoring which is practiced by the supreme and local supervisors, citizens and their legal representatives.

Some activities such as education, informing and attracting public participation are considered as sanctions and complementary measures for all processes and at all levels.

## CONCLUSIONS

In this research, a model has been suggested for integrated urban management based on a survey on the current situation as well as national and international documents and patterns. The current situation of Tehran metropolis was studied concerning its air, water, soil, biodiversity and human habitat and the serious threat, their effects and the responsible bodies to deal the challenges were determined using OECD, UNEP and GET indicators. The present environment management in Tehran was studied

through a conceptual modeling and SWOT analysis applied to recognize strengths, weak points, opportunities and threats. Then, regarding the higher order national documents including constitution, Iran 2025 vision, general policies of environment; as well as legal documents devoted to Tehran metropolis including Development strategies for Tehran Province, Basic Plan for Tehran Land Preparation, Tehran Charter, Development Plan for Tehran Province, Tehran Province National Document, we determined the country's environmental management approach. Ultimately, the suggested conceptual model for ideal management of Tehran metropolis environment was prepared using international experiences in some metropolises, general principles of environment associated to urban environment management, international higher order documents, as well as global models including UN Habitat, Sustainable Cities Program, Policies and Legislative Framework for the Sustainable Cities Program, Health Cities Program, Agenda 21, EU Environment Commission Strategies, and finally using the results of SWOT analysis.

In the suggested model authorities of the urban management and their duties and responsibilities were



classified were classified at three levels of policymaking, decision making and implementation, and goal. At the decision making and implementation level, the governmental agencies and municipality play role in two groups: 1) determining criteria and local monitoring and, 2) planning, providing infrastructures and implementation. Assigning all responsibilities to municipality makes this organization concentrate on various functions, concurrently; for instance expansion of economic activities besides the activities to expand environmental acceptance capacity. Meanwhile, segmentation and separation of the functions would result in concentration on economic activities, regardless of environmental consequences. Non-resistance against approach changes and efficient coordination and relationship among municipality and the related governmental ministries and other agencies are of great importance. Reporting, declaration of policies and regulation' implementation feedbacks are necessary for both groups. Supervision and monitoring of this level are conducted by policy making level. In the idea model, citizens are at the target level and act as the main beneficiaries who are effective in city management. All policy and decision makings at the two previous levels must be performed with regard to the citizens' needs, their participation and determining their position and role. Supervisory system in this model consists of supreme and local monitoring which is practiced by the supreme and local supervisors, citizens and their legal representatives.

Some activities such as education, informing and attracting public participation are considered as sanctions and complementary measures for all processes and at all levels.

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