

# Geospatial Strategic Planning for Isfahan Municipality

Morteza Sadeghi<sup>1</sup>, Homayoon Yazdan Panah<sup>1</sup>, Ali Hosseini<sup>1</sup>, Mahmood Sabagh<sup>2</sup>,  
Abbas Rajabifard<sup>3</sup>

<sup>1</sup> Department of information and communication technology, Isfahan municipality, Iran

<sup>2</sup> Deputy of Urbanism and Architecture, Isfahan municipality, Iran

<sup>3</sup> Centre for SDIs and Land Administration, Department of Geomatics, The University of Melbourne, Australia

E-mails: [Sadeghi\\_m313@yahoo.com](mailto:Sadeghi_m313@yahoo.com), [HOMYyaz2006@yahoo.com](mailto:HOMYyaz2006@yahoo.com),  
[a.hosseini@live.com](mailto:a.hosseini@live.com), [M\\_sabagh@yahoo.com](mailto:M_sabagh@yahoo.com), [abbas.r@unimelb.edu.au](mailto:abbas.r@unimelb.edu.au)

## Abstract

Nowadays, globalization and rapid changes in developing countries affect the behavior and culture of people. Adapting to these changes is the vital means to remain in the competition of being a developed society. One of the most important changes is the relationship between humans and land which have evolved by way of many parameters such as globalization, urbanization, technological and economic reforms. In order to be able to adapt this changing relationship it is required to enable societies by developing new infrastructures and tools. Strategic planning is a key concept for effective and successful development of these infrastructures and tools which have to be considered by the governments and decision makers.

The municipality of Isfahan, a metropolitan city in the central part of the Iran, in 2006 established a strategic plan for spatial data and services infrastructure and its first revision and evaluation has been done in 2009. This paper describing the principals of spatial strategic planning in multi-unit organizations, such as municipalities, the results of establishing this strategic plan in Isfahan municipality is also presented. The geospatial strategic plan in this project had four stages including comparative studies, investigating high level related documents, developing visions and missions and designing GIS strategic plan using SWOT analysis.

In this study, major strategies and policies are proposed in the domains of Geospatial Businesses (GB), Geospatial Systems and Services (GSS), Geospatial Data (GD) and Geospatial Information Technology (GIT). In order to achieve the high level performance, different infrastructure components for enabling geospatial businesses, projects for geospatial enabling systems and services, projects for enabling geospatial data acquisition and different projects for enabling geospatial information technology are proposed.

Concentrating on spatial data and service infrastructures and capacity building, an evaluation of an ongoing plan has also been done to check the compliance of that with the new changes and conditions. The evaluation illustrates that the plan leads to better realizing spatially enabling Isfahan municipality to deliver better services to its citizens.

**Keywords:** Spatially Enabling, GIS, SDI, strategic planning, SWOT analysis, Isfahan Municipality

## 1. Introduction

In many developing countries, the increased use of GIS-Based systems and their needs for spatial data infrastructures and the inconsistency between these new systems and existing traditional systems leads to the appearance of independent and incompatible and even conflicting systems which increase the maintenance cost. To avoid this problem, a strategic plan followed by an operational plan which indicates the framework for developing geospatial information systems considering their interconnection and interoperability with other existing systems is inevitable. This can be viewed as the first step in sustainable geo-enabling societies.

In this paper we present a SWOT<sup>1</sup>-based model for developing strategic plans in multi-unit organizations such as municipalities. The proposed model makes it possible to propose and design compatible systems in the context of short-term, mid-term and long-term plans. In this work, the SWOT for strategic planning is used as a dynamic method to identify the critical issues and finding the proper solutions regarding the organization's missions, needs, strengths, weaknesses and also internal and external opportunities and threats. The model is employed to develop strategic and operational plan in the municipality of Isfahan, a major city located in central Iran. As an early result of this strategic plan, the basic framework for LSDI<sup>2</sup> is achieved. This strategic plan has have been done in 2006 with the aim of determining the road map of employing GI-based systems in Isfahan municipality and its organizations and in 2009 the first revision of the 2006 strategic plan was done which will be described in this paper. This strategic plan was developed in Isfahan municipality in three phases including need assessment, investigating and analyzing the needs to Geospatial data and developing the SWOT model and representing the strategic plan and general guide lines towards efficient use of spatial information and GI-based systems.

The rest of the paper is organized as follows. In section 2, SWOT and its usage for GIS strategic planning is described. In section 3 the use of SWOT in three phases of need assessment, investigating and analyzing the needs to Geospatial data, and representing the strategic plan and general guide lines towards the efficient use of spatial information is illustrated. Section 4 describes some examples of the guidelines and proposed operational systems. In section 5 some results of the recent revision of the strategic plan is described and finally in section 6 the conclusion and future recommendations are included.

## 2. Principals and application of SWOT analysis in GIS strategic planning

As illustrated in Table 1, SWOT is a method for analyzing strengths, weaknesses, opportunities, and threats of an organization and extracts four categories of strategies. The first category is related to the use of opportunities for highlighting strengths and is named as aggressive strategies. These strategies enable more efficient exploitation for optimal results. The second category is related to the use of strengths for resolving threats. These threats prevent the efficient usage of available opportunities. These strategies enable long-term opportunities and are named continual improving strategies. The third category is related to the use of opportunities to gradually overcome weaknesses which are named gradual changing strategies. The fourth category is related to the strategies for overcoming weaknesses through postponing threats and is named defensive strategies.

Table1. SWOT analysis

Qualitative and Quantitative goals	Strengths (S)	Weaknesses (W)
Opportunities (O)	Aggressive Strategies	Gradual Changing Strategies
Threats (T)	Continual Improving Strategies	Defensive Strategies
GIS Domain (Businesses , Services, Application Systems, Data and Technology)		

## 3. Isfahan municipality GIS strategic plan using SWOT method

In this section we present the usage of the presented model in section 2 for developing a GIS strategic plan in Isfahan municipality. This planning is done in three

<sup>1</sup> Strengths, Weaknesses, Opportunities and Threats

<sup>2</sup> Local spatial data infrastructure

phases of 1) GIS needs assessment and systems evaluation, 2) GIS needs analysis, and 3) developing the SWOT model and proposing GIS strategic and operational plans.

### 3.1. GIS needs assessment and systems evaluation phase

This phase is a fundamental step. In this phase, the municipality of Isfahan has been investigated from two aspects: 1) generic structural and organizational investigation and 2) GIS needs identification and assessment. The outputs of this phase are vital for other two phases.

In this phase, we interviewed key persons (experts and managers) within each unit of the municipality and formalized the current situation in the following items:

- i) Available strategies, visions, missions, duties and field of activities, of each unit
- ii) Available software, hardware and network capabilities,
- iii) Spatial and attributes data usages and the percent of Geospatial based activity of each unit,
- iv) Data and process flow and the input and output data of each process in each unit
- v) Personnel potential of each unit

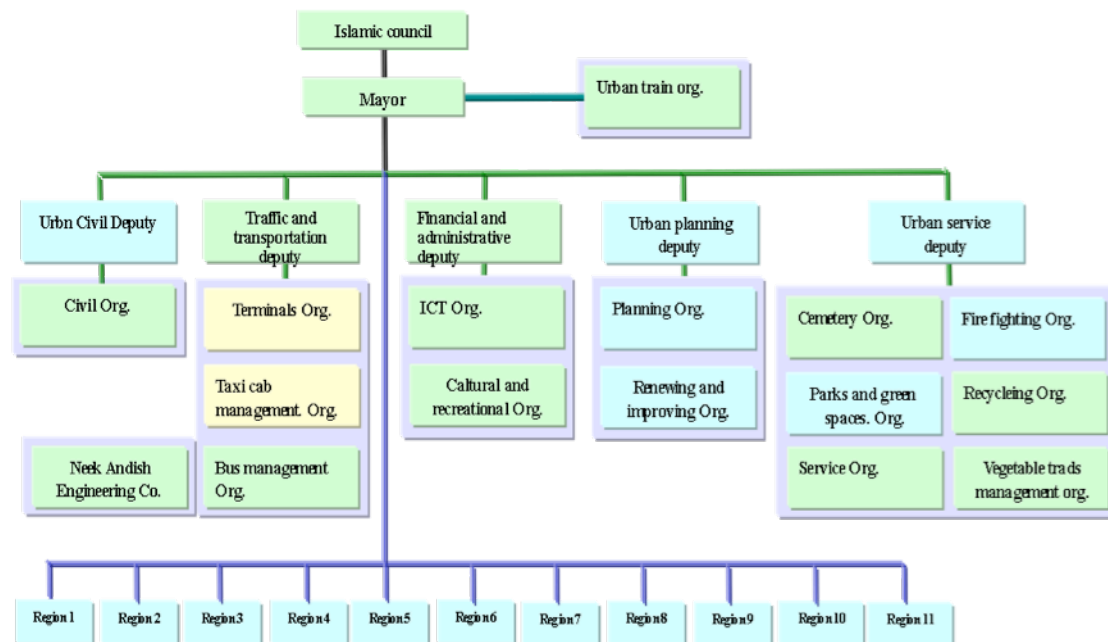


Figure 1. Organizational structure of Isfahan municipality

#### 3.1.1. Generic structural and organizational investigation

Spatially related duties of each unit, internal and external spatial communications of different units and recognizing managers' visions are the extracted documents in this section. The current situation of GIS in Isfahan metropolis has been investigated through four domains of architectural organization of its municipality which are Business Domain (BD), Application Systems and Services (ASS), Data Domain (DD) and Technology Domain (TD).

These domain based categorization of activities in Isfahan municipality aim to facilitate the efficient identification and recognition of its spatial data and processes flows. These domains are illustrated in Table 2.

Table 2. Different domains of Isfahan municipality organizational architecture

Personnel and training	Business Domain	Architectural Domains
Plans, budget and instructions		
Spatial processes		
Spatially related projects and services	Application Systems and Services Domain	
Applied geospatial systems and software		
Geospatial web sites and portals		
Spatial and non spatial data and their standardization	Data domain	
Production, security, access control and information exposition		
Internet, intranet and network infrastructure	Technology Domain	
GIS hardware		

### 3.2. GIS needs investigation and analysis phase in Isfahan municipality

In this phase using the results of the previous phase we investigate the needs of GIS systems, and the strengths and improvable weaknesses. This has been done through a comprehensive investigation of the four domains (Business, Application Systems and Services, Data, and Technology Domains) and provides a detailed list of required GIS based applications in each domain.

### 3.3. Developing the SWOT model and proposing GIS strategic and operational plans.

In order to improve municipal services to the desired level, based on the results from the previous phases we first developed a conceptual model and then, using SWOT analysis, which is described in section 2, we extracted a GIS strategic plan for Isfahan municipality. Furthermore, an efficient GIS organizational structure is proposed to effectively guarantee the implementation of the plan in the municipality.

#### 3.3.1. Conceptual modeling

The master application list which was extracted in previous phases was formalized and the objects, their semantics and their relationships, flow diagrams and required analysis were determined. An example is illustrated in Figure 2.

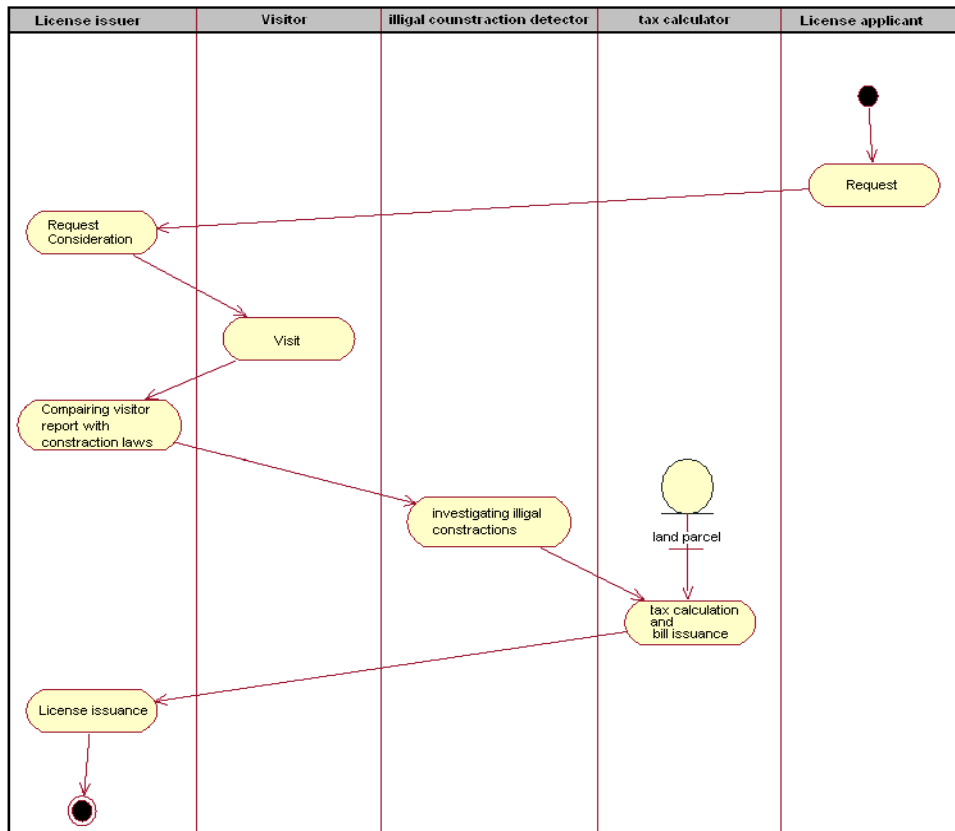


Figure 2. License issuance process

### 3.3.2. Developing the GIS strategic plan of Isfahan municipality

In this stage, using the provided knowledge about the current situation, the missions, visions, operational goals and GIS strategic plans are determined. These strategic guidelines for geo-enabling Isfahan municipality are structured in short-term and long-term plans.

#### 3.3.2.1. Extracting geospatial strategic guidelines using SWOT analysis

Regarding the provided knowledge in the previous phases and using the questionnaires and filled forms, the current opportunities, threats, weaknesses and strengths of the Isfahan municipality were determined and used to construct the SWOT analysis which leads to geospatial strategic guidelines.

#### 3.3.2.2. Operational plan of practical projects

In this stage the priorities of different projects was determined and projects descriptions and requests for proposal (RFP) for each was prepared. These RFPs can be used to practically implement the projects.

#### 3.3.2.3. GIS organizational structure in Isfahan municipality

Regarding the current structure, there are two GIS units in the Isfahan municipality. The first unit is related to planning and is located in the Department of the Deputy for planning, research and information technology, and the second one is related to practical project management and implementation which is located in the information and communication technology organization. This structure is showed in Figure 3.

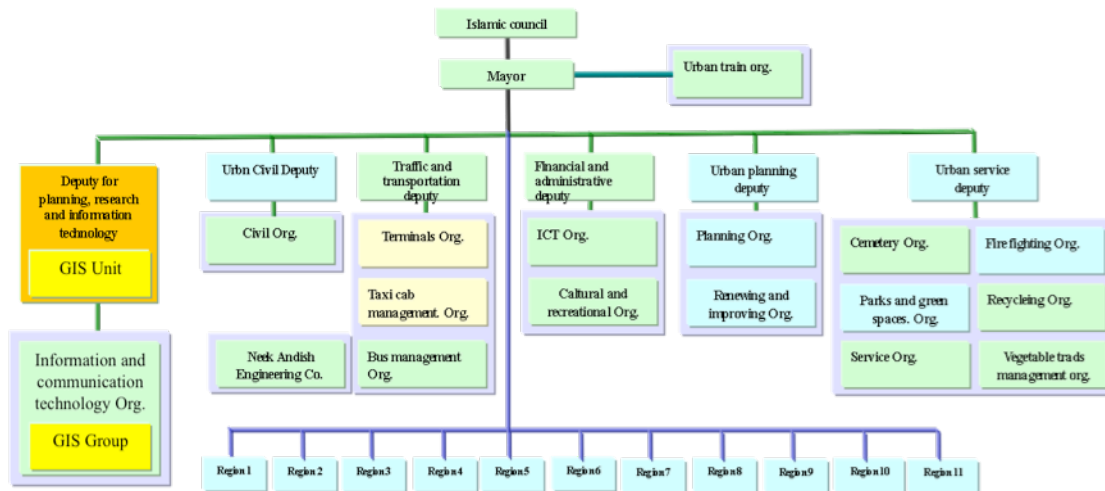


Figure 3. GIS organizational structure

#### 4. First revision of the strategic plan

Because of the changing situation of the municipality, sometimes it is not possible to completely follow the strategic guidelines. Furthermore, some changes in the opportunities, threats, weaknesses and strengths demand some new strategies. These changing situations require a three-year revision period of which the first was done in 2009 by consultation with the Centre for Spatial Data Infrastructures and Land Administration (CSDILA) of the University of Melbourne. In this revision, new strategic guidelines, such as data catalogue, data ware house and so on, and projects were proposed.

#### 5. Conclusions and future works

Strategy is a comprehensive, integrated, consistent and coordinated program which aims to use the advantages of an organization more effectively. In this paper different steps of using SWOT analysis for developing GIS strategies in Isfahan municipality were described. Also it was highlighted that in developing strategic guideline for an organization there are two types of plan: short-term and long-term. Furthermore, GIS organizational structure has to be defined to guarantee the effective implementation of the guidelines.

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**Author/s:**

Sadeghi, Morteza; Panah, Homayoon Yazdan; Hosseini, Ali; Sabagh, Mahmood;  
RAJABIFARD, ABBAS

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