

GIS CONCEPT IN PUBLIC ADMINISTRATION

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Abstract – GIS means a working instrument that allows precision, strictness, fastness in any current activity developed by local public administration. Local administrations are confronted with problems of higher complexity than ever before. GIS has important implications in water supply networks but also in waste water where these has to be extended or even completely replaced; in real estate management, tax collection, in road networks and traffic models. Due to the fact that geographic information are one of the most important component of the infrastructure that local administrations are dealing with, GIS has become an essential technology for the local administrations. The purpose of this paper is to develop a better understanding of GIS and its implications. GIS within public administration is an important though socio-economic and technical matter.

Keyword: GIS, public administration, traffic models, water supply networks

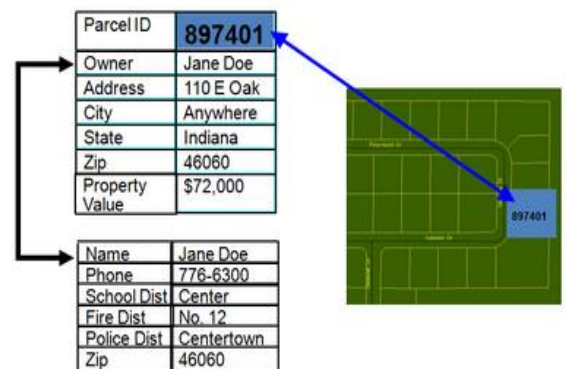


Figure 1. Graphic information correlation – tab information using GIS.
(<http://www.in.gov/gis/gis101.htm>)

1. THE GIS CONCEPT

The GIS concept has been released in 1960 on the North-American Continent (USA and Canada), along with the informatics development and with the numerical possibility to represent the cartographic documents. Primary it was implemented on a IBM 360 in Canada, to serve an application designated for natural resources inventory. In the last years GIS applications has been extended various and very fast in different field of activities such as: natural resources, energy, transports, business, public Safety.

Any GIS has as main support a spatial data base that contain geographic information (coordinates system, the position according to a reference system etc.) but also an alphanumeric database that contains the attributes for the graphic elements (Figure1).

The main purpose of such system is that beside the geographic, environment, demographic information imputing, storing and editing it is also use to analyze and study all these information into a relational context, enabling the development of complex decisions.

2. GIS COMPONENTS AND DEMANDS

In order to make functional a GIS system must have five key components: hardware, software, data, specialists, procedures and methods. The lack of one component can alterate the functionality of a GIS system but the contribution of each component is different [1].

Hardware is the computer on which a GIS operates. Today, GIS software runs on a wide range of hardware types, from centralized computer servers to desktop computers used in stand-alone or networked configurations. GIS software provides the functions and tools needed to store, analyze, and display geographic information. Key software components are:

- Tools for the input and manipulation of geographic information;
- A database management system (DBMS)
- Tools that support geographic query, analysis, and visualization
- A graphical user interface (GUI) for easy access to tools;

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Possibly the most important component of a GIS is the data. Geographic data and related tabular data can be collected in-house or purchased from a commercial data provider. A GIS will integrate spatial data with other data resources and can even use a DBMS, used by most organizations to organize and maintain their data, to manage spatial data [2].

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A successful GIS operates according to a well-designed plan and business rules, which are the models and operating practices unique to each organization.

For a large city, data acquiring can take years due to the fact that GIS assembles data from various sources: topographical plans, thematic maps, cadastral plans and registries, remote sensing data, photogrammetric data, demographical and meteorological data etc. The specialist became himself a GIS component anytime when spatial analyses or models must be done.

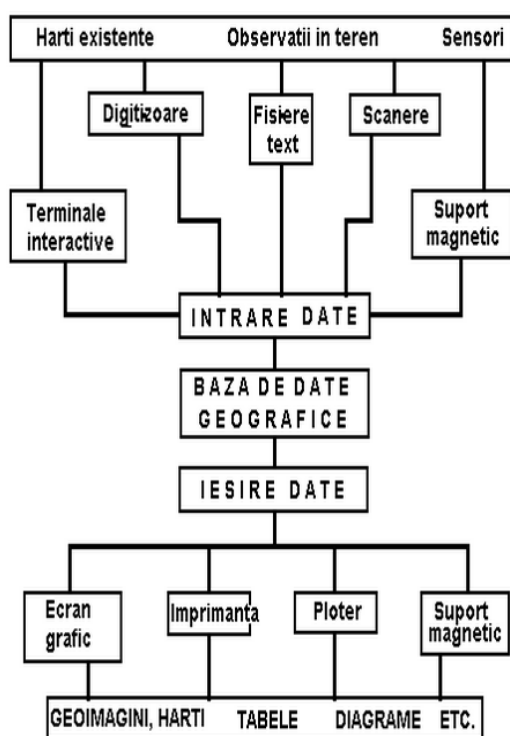


Figure 2. GIS input and output data
(<http://sig.trei.ro/part1.htm>)

Figure 2 show all stages that involves gathering, processing, storage, extraction, representation

and dissemination. Being an informatics system, GIS must satisfy five demands on the same time:

- System efficiency (fast executed functions);
- Economicity (obtaining the desire result with a minimum of information);
- Security (storing only the valid data);
- Data protection;
- Alignment along the country legislation (author rights, cadastre law, state secret law etc.)

Generally the GIS users wish to have a flexible and robust data model, an open system and independent from any hardware, a friendly interface and a complete set of functions used for spatial analysis. The key of success for any GIS consist in its model capacity of data, of the strategy use for the implementation, in the capacity for accepting new functions, in its capacity to be flexible for any new application or new standard imposed mostly by the computer industry and technology and GIS in particularly.

2. GIS IN PUBLIC ADMINISTRATION

Major challenges in public administration today including population density, pollution, land allocation, and response to natural disasters, have a critical geographic dimension. Whether determining the best location for a new business, finding the best soil for growing crops, or figuring out the most efficient route for an emergency vehicle, local problems also have a geographical component. Public agencies are faced with these issues constantly. The effective management of geographic information systems (GIS) can be utilized as a set of strategies and tools that can help public agencies deal effectively with those challenges. The purpose of this paper is to present the reasons why GIS is important for public administration and to discuss key issues that complicate the management of GIS in public administration.

Geographical information and knowledge is a critical asset in public administration. Strategic implementation of GIS is important in order to leverage information and knowledge to produce effective outcomes. GIS is not a merely technological issue but is a socio-economic issue. This is because, the creation of GIS map, and, importantly, the sharing of it are social phenomena that occur within a context of human assumptions, expectations, interactions, and politics.

The reason why GIS is important in public administration is that GIS is a valuable strategic tool in order to leverage critical resources to improve agency and sectoral effectiveness. Public agencies are increasingly being expected to deliver more services with fewer resources. Recent reform movements within public administration and New Public Management have emphasized this by urging the public sector to contract out services where possible. However, at the same time, the demand for public services has not diminished. This situation has been called the paradox of expectations where in public agencies are expected to deliver more even as they are expected to spend fewer resources. At same time, the pressure for improving public agencies' performance has prompted public

agencies to seek for more efficient ways of completing their tasks. That is why public agencies find GIS technology attractive.

On the second hand another reason for the importance of GIS in public administration is for effective emergency management. Even though public agencies are contracting out many services, they are also, at the same time, being relied upon to deliver specialized and critical services like homeland security and emergency relief. Effective organizational performance under emergency situations requires, among other things, a smooth geographic information access and sharing geographic framework. Public agencies operating under extremely challenging circumstances and responding to emergencies can not depend upon the fortuitous availability of geo-information. Key ideas and decision-making talent have to be available to actors in various sites in real time.

As follows, the paper presents some of the current activities of local administrations where GIS has important involvements [3]:

- Water supply and waste water networks that need to be extended and fully replaced in most cases;
- Estate and tax collecting management;
- Road networks and traffic models;

Because geographic information is one of the most essential component of the infrastructure that public administrations is constructing it, GIS has became a crucial technology for public local administrations.

The instruments offered by GIS for the management and creation of geographic database and drawing out the spatial analyses can be use in lot of functions of local administrations such as: urban planning, estate evaluation, tax collecting, public safety, construction authorization, planning and environmental assessment, track of locative space, demographic analysis, recreational planning etc.

In urban activities, GIS technologies are very important when using growth models of a city. Digitized maps associated with demographic information consist very important information for forecasting and evaluating different alternatives. In Figure3 we have a using sample of a GIS application for physical stage of the constructions from a block named Cartierul Jiului. Intense blue color indicates a good condition of the buildings and blue color indicates a very good condition of the buildings in the study area delimited by red dashed lignin.

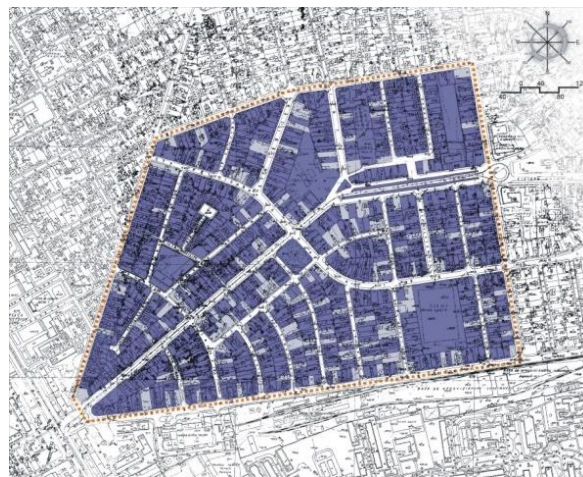


Figure 3. The building stage
(http://urban-plan.ro/images/04-urb-GIS-Stare-cladiri_hi.jpg)

Property valuation and taxes was until recently one of the most difficult and important functions of local government. As the population of a city undergoes changes in number, local authorities must be able to change their situation in real time. Using a GIS can be easily made and easily maintained quality maps and plans parcels, annotated and symbolized.

Concerning the construction authorization, the manufacturer must have access to information such as zoning, parcel size, address, owner, property valuation, development restrictions, public access, availability of utilities, flood defense plans etc. GIS supports spatial analysis and management functions relational database, allowing the manufacturer to access all the information geographical and tabular local government timely and effective authorization during the review process.

In addition GIS can be used to automate construction department work:

- Special tax calculation and verification plans;
- Authorizing constructions behavior;
- Generating reports.

Concerning the environmental protection GIS is an ideal solution for the needs of local governments to identify and preserve the unique and critical environmental resources. Environmental application list for which GIS can be used is very high.

The following are some examples:

- Environmental assessment studies;
- Air and water quality planning;
- Agricultural and public land inventory;
- Mapping the development restrictions;
- Monitoring of complaints;
- Mapping risky areas.

In figure 4 is an example of the map obtained with GIS application, which represents environmental quality of the area zoning Bucharest.

