

SPECIFIC FEATURES OF GIS DATABASE FOR HOSPITAL MANAGEMENT. AN EXAMPLE FOR BIHOR COUNTY.

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ABSTRACT. – DISPOSITIFS SPÉCIFIQUES de G.I.S. BASE DE DONNÉES POUR LA GESTION D'HÔPITAL. UN EXEMPLE POUR LE COMTÉ DE BIHOR. Cet article présente le G.I.S. base de données de modèle réalisée pour la gestion d'hôpital. Nous décrivons l'écoulement informationnel pour un hôpital utilisé pour la base de données et présentons les deux composants de G.I.S. : base de données graphique et base de données d'attributs. G.I.S. l'appui dans la gestion d'hôpital au niveau du comté est prouvé par utilisable dans la gestion courante du modèle présenté.

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1. GENERAL ASPECTS CONCERNING GIS

GIS allows for a unique model of data representation. There are two specific types of data referring to a map namely:

-spatial data which describe the place and the form of the geographical objects and their spatial relations with other objects;

-descriptive data regarding the geographic objects (attributes)

We can use other types of data, namely raster data (digital photos of the objects) digital elevation models etc

The spatial data are rendered graphically through graphic features: points, lines and polygons.

The attributes represent the qualitative or quantitative side of the phenomenon rendered through graphical features on a digital map. Thus for a geographical entity such a terrain form the attribute table can render different parameters numerically as the altitude or textually as the names depicted.

The geographical features are represented with graphical symbols. For instance the roads are drawn with lines of different sizes, models, colours and labels and the hospitals with a special symbol.

The database is defined as an "organized collection of data deposited and managed in a unitary mode allowing thus for the characterization of some objects or measures ". In order to be able to use and dispose of the information the database must be ruled by very precise rules regarding: the depositing and management of the different data files from the memory of the computer, the adding or the entering or the modification of the data, access to the information so that the data can be read, the development of reports and applications.

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The table, the effective depository of the data, can contain the following types of information: numerical, character, date, logical, memo and image.

The standard for the files requires that every field from the table has one of this data types as well as a certain width (the maximum number of letters for the data). Creating a database folder means that the header of the table must be built, namely specifying the types and widths for each field of existing data. The types of possible data and their description are rendered in the following table.

Types of data fields in a table and their characteristics

Table 1

FIELD TYPE	DESCRIPTION
NUMERIC	Used for numerical values, the decimal places must be set in the beginning.
CHARACTER	The set of characters stored by this column can only span over the calculated dimensions declared as length.
DATA	The data type can have as much as 10 or twelve characters of which two stand for the separation symbols.
LOGIC	Record on a line a truth (T - <i>true</i>) or false (F - <i>false</i> , which is also the implicit value.
MEMO	Used for registering longer texts, a reference is often used for an external folder which can store a text (set of characters of any length)
IMAGINE	Associates the table records with images, actually there is a reference which is recorded in the table connected to an image file from the computer's memory.

The steps in constructing a database:

1. The feasibility study, which implies the study of the existent systems, the cost evaluation of the different alternatives.
2. The study of the existent system.
3. The system analyze through determining the causes for different events and the choice of methods and possible alternatives.
4. Designing the system by selecting the best model of rendering and interpreting the data, of assuring the data security and integrity.
5. Developing the system by establishing the associated details to be considered, the relations between them and their physical representation
6. Implementing the system through projecting, writing and program testing, users' cooperation, documentation, creation and loading the folders
7. Revision and maintenance through working tests, setting different modifications, adding of new components and supervising the data manipulation.
8. The design in focused on obtaining a database with the following qualities: correctitude, consistency, distribution, flexibility (Muresan, 2005).

2.THE CHARACTERISTICS OF BUILDING A GIS DATABASE IN THE MANAGEMENT OF HOSPITALS

A database intended for the management of the hospitals is made via the contributions of the institutions and organizations involved in the health system. These are the sources of the data and the poles between which the data exchange takes place in the form of informational fluxes. The scheme of the components for the informational flux in the Bihor Clinical County Hospital (internal and external) is rendered in Figure 1.

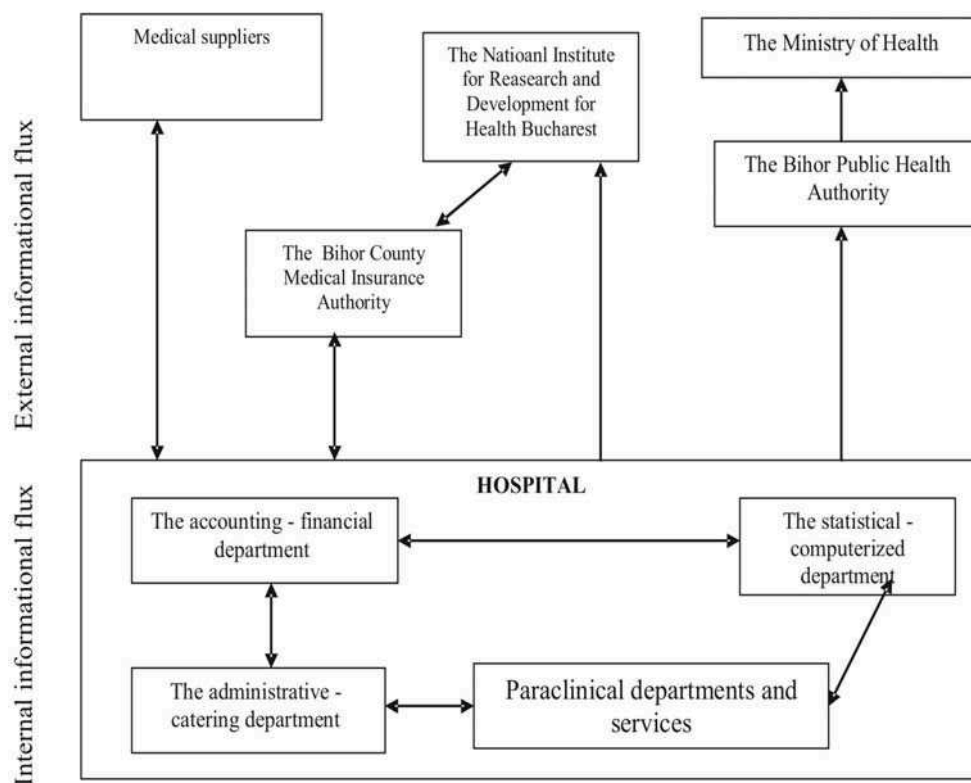


Fig. 1. The informational flux in the Bihor Clinical County Hospital, Oradea

Within the informational flux many different communicational processes take place between the involved parties. In order for a database to be constructed a formal mode of communication is essential – strictly ruled by juridical documents, internal rulings, internal orders and concentrating only necessary information about the daily activities. (Vlădescu, 2000).

3. AN EXAMPLE FOR THE BIHOR COUNTY

In order for a database to be applied in Bihor County a graphical database as well as an attribute database was created. The graphical database is based on a declassified cartographic support which was scanned and georeferenced.

The scale used was one 1:100000. The distance between the digitized topographic curves is 40 m. The topographic map was compiled for the whole Bihor County through digitization, including the township centres, the roads, the railways, and the hydrographical network. For the Oradea Municipality a detailed map with the hospitals was constructed. (Figure 2)

The attribute database was compiled through the construction of a complex table comprising several lines and columns. The lines represent the name of the hospital, and the column the parameters considered to be important for the study of which we enumerate: the total number of beds, the existing highly performance medical apparatus, the hospital financing differentiated on types of sources etc. The next figures are examples of the attribute tables used for the database needed for the maps (Figure 3 and Figure 4).

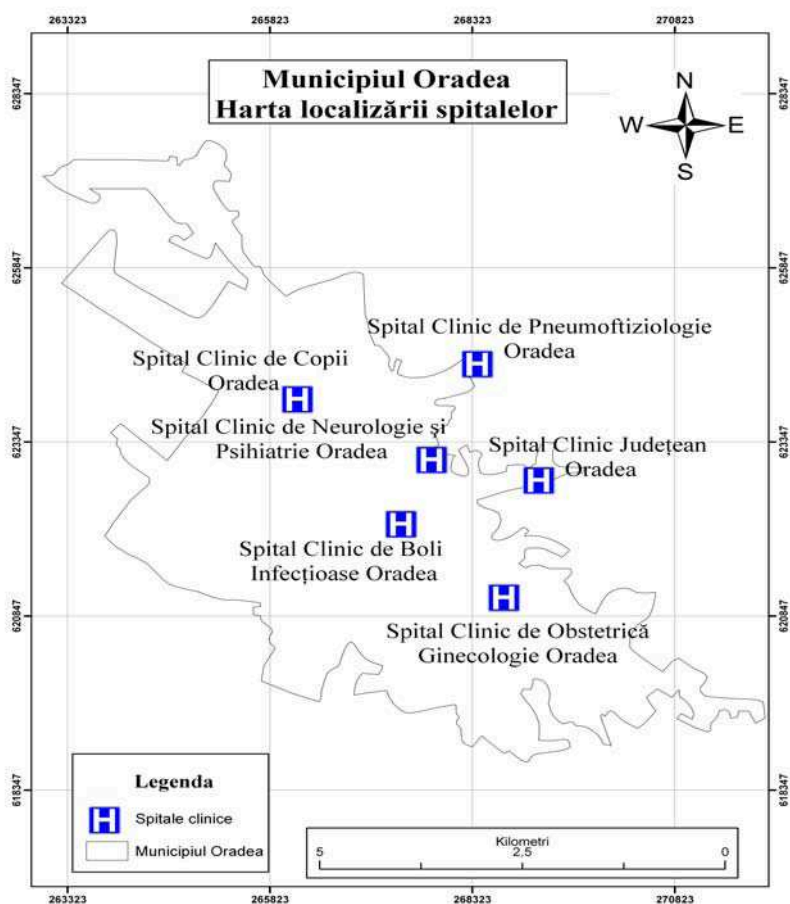


Fig. 2. Hospital units from Oradea Municipality

The A.S.P. Bihor classification for the existing hospitals was used: clinical hospitals, municipal and city hospitals, health centres, and specialized hospitals (non-clinical psychiatry hospitals). Each of the above mentioned types of hospitals is rendered through a different strata.

Property	Value
FID	3
Id	0
Den_spital	Spital Clinic de Copii Oradea
Tot_ch_sal	0
ap_rad_cla	3
ap_rscp_cl	0
ap_rx_mob	3
ap_r_digit	1
mamografie	0
tomogf_com	0
dev_imp_fm	1
ap_el_card	0
fluo_ocul	0
ap_radlogf	0
radioterap	0
cobaltoter	0
scinogf	0
auto_pb_ri	0
RMN	0
echogf_med	2
echogf_sup	0
echogf_spc	0
ter_ultras	4
laser_trp	0
microunde	0
lsr_chirur	0
lsr_ofa	0
lsr_derma	0
ap_dializa	0
stabil_apa	0
p_circ_ext	0
trs_laparo	0
micro_chir	0

Fig. 3. Clinical hospital, attribute table

Property	Value
vid_dig_in	0
rcto_rig	0
bronho_fle	0
bronho_rig	0
endo_uro	0
cito_rig	0
artoscopie	0
laparo_exp	0
ana_bio_um	2
ana_bio_us	0
ana_hem_9	0
ana_hem_22	1
ana_bacteo	0
linii_PCR	0
lini_ELISA	0
hst_pat_ch	0
ap_col_aut	0
micro_opti	1
mcro_imuno	0
lin_imfl	0
autosan	0
Total_fin	107180,79
IUtilizare	277,1
DMS	7,2
fin_cas	89595,59
fin_vp	844,09
med_grat	3833,1
don_spons	0,
transfer	12908,01
Investitii	0,
Bug_local	0,
Extern2004	12576
Nr_tot_pat	323

Fig. 4. Clinical hospital, attribute table

4.CONCLUSIONS

Building a specific database for managing hospitals considers elements of the informational fluxes existing in the sanitary system. A GIS database supports the decision-making process through a more efficient and coherent allocation of resources between different hospitals.

The accomplished model consists of a graphical and an attribute database, which facilitates the rapid identification of the existing resources within Bihor County. The attribute database can be modified in a short time so that more elements can be added in respect to the new necessities identified within the health system.

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