THE UTILITY OF THE DATABASE MANAGEMENT OF REAL ESTATE CADASTRAL INFORMATIONAL SYSTEM THROUGH GIS SOFTWARES

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Abstract: *The efficiency of the management and query of cadastral data of an administrative territory grows if the data base of Real Estate Cadastral Informational System is developing through GIS software, because facilitates real time generation of graphical and tabular reports, so necessary in the economic activity. The importance of these data and information, regarding the form, area, use category, owner and others, is due to circulation dynamics of real estate in a society, whose market economy is constantly changing. Rapid consultation, by the decision makers, of cadastral documents, whose data and information have been continuously updated, is only possible if these documents are computerized.*

Keywords*: Real estate cadastre, digital cadastral plan, cadastral data, thematic layers, graphical and tabular reports, informational system.*

1. Introduction

Responding to the need of every modern state, by adoption of the Law no.7/1996, regarding the implementation of a real and efficient system of records of all existing buildings on the national territory, meant to lead to economic development, social and environmental stability, was set up an unified, modern and computerized cadastre, to ensure ownership, through a system of real estate advertising based on the land register. The central element of Cadastre Informational System is the data base of a territory, designed as a structural collection of data and information, accessible to both private and public institutions and citizens. However, the computerized system allows organizing data files independent and describing all information, starting from digital cadastral plan and ending with necessary data cadastral records.

Urban Real-Estate Cadastral Informational System is an essential component of Cadastre Informational System (CIS), because facilitates, on the level of each locality, the activity in decisional plan, by updating and using more efficient the cadastral data, to generate in real time graphical and tabular reports, much needed in economic activity.

Cadastral data updating is necessary for a more accurate management, from administrative and economic point of view, of the Informational Systems by fields of activity, on the level of each administrative territory. Only by management of a system based on daily updated data, it can become a viable and useful support in taking decisions regarding more efficient administration and using of one area.

2. Management and query of Urban Real-Estate Cadastral Informational System database on the level of administrative territory - Case study

For achieving the **data base** of Urban Real-Estate Cadastral Informational System of the City of Podu Iloaiei have been used electronic equipments needed for topo-cadastral measurements, data processing programs and editing digital plans, on which to conduct precise mapping of cadastral territories, registration of buildings and ownership, in a unique Land registry [1, 2]. For a better management and query of the cadastral data of one territory, was chosen to create the database of Urban Real-Estate Cadastral Informational System wit Microsoft Office Access 2007 software (didactic version), to be attached to the AutoCAD Map 3D software (didactic version), because it provides the possibility of correlation of visual information with already existing data in the database of the customer, display and edit digital plans on the level of administrative territorial unit, enables the generation and management of a geo-spatial database and obtain complex and suggestive analysis and scenarios [3]. At the same time, software package comes in support of all those who wish to use a tool with a user-friendly interface and a flexible set of spatial analysis functions for substantiation of decisions in management at various levels of public institutions.

The **digital plan** of queried zone (cadastral sectors 10, 11 and 12), was created in the AutoCAD Map 3D software, using data obtained after processing topographic measurements and saved in a file with the extension .dwg, respectively the name **Podu Iloaiei** (Fig. 1). Graphic information of it was structured in layers.

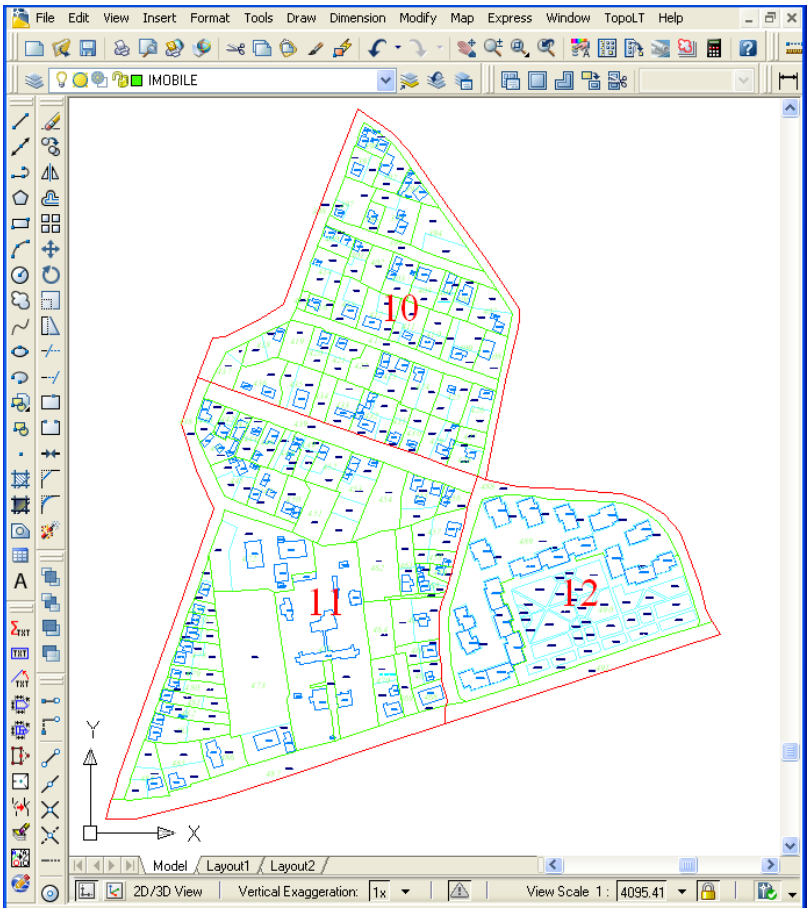

Fig. 1 Digital plan obtained by topographic measurements

Scanning, tracing and digitizing information regarding cadastral data using the cadastral plan of the city of Podu Iloaiei in 1988, at the scale 1: 2 000, and altimetria on the trapezoid sheets since 1985, at the scale 1 : 25 000, (Fig. 2).

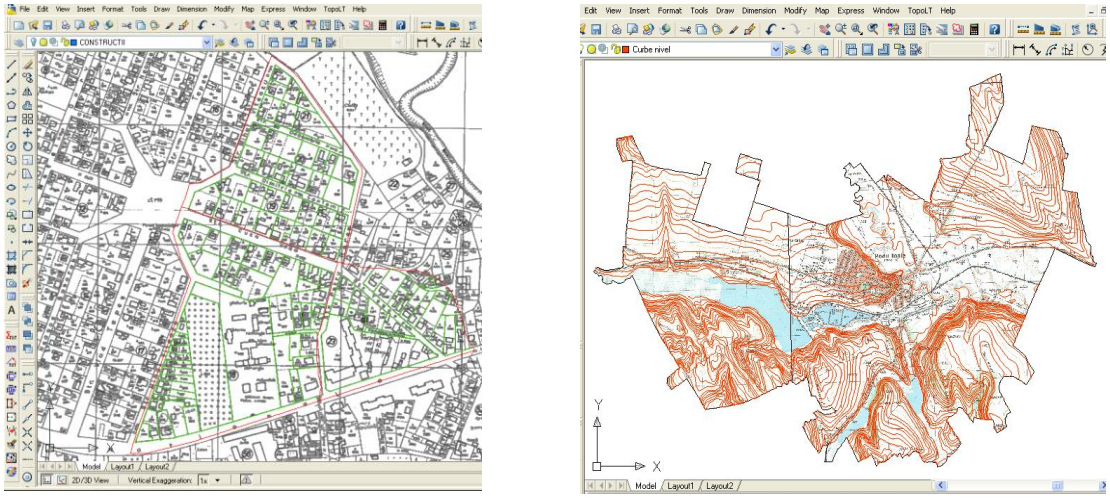

Fig. 2 Scanning, tracing and digitizing information of cartographic documents existing for the study area

After **processing graphic data** was created a **network topology** for each existing network in the area (Table 1), respectively **polygonale topologies** (Table 2), using digital plan derived from measurements and digital plan obtained by scan - tracing and digitizing.

Table 1. Comparative study of urban networks topologies at different times

No.	Topology name	No. of nodes		No. of branches		Network length (m)	
		year 1975	year 2012	year 1975	year 2012	year 1975	year 2012
1	Electrical_network	10	148	13	153	2512,314	4648,858
2	Telephone_network	-	45	-	81	-	2371,639
3	Gas_network	-	129	-	94	-	3877,864
4	Water_network	-	103	-	69	-	3315,724
5	Sewerage_network	-	26	-	23	-	2025,433

Table 2. Comparative study of polygonale topologies at different times

No.	Topology name	Year	No. of nodes	No. of branches	No. of polygons	Maximum area (m^2)	Minimum area (m^2)
1	Plots	1988*	408	618	204	17792	23
		2012**	376	556	219	12867	54
2	Constructions	1988*	159	181	158	803	12
		2012**	152	161	149	821	7

* cadastral plan; ** from measurements.

The analysis of the technical side of Cadastre of the Real Estate (Urban) Informational System for the study area was done by **SQL queries** and **graphs**, after ***use categories*** (Table 3), the ***construction rhythm*** (Fig. 3), the ***mapping index*** and constructions ***municipal equipment*** (Fig. 4).

Table 3. Comparative study of changes regarding use categories in cadastral sectors 10, 11 and 12 of the city Podu Iloaiei in different time periods

No.	The name of the use categories	Year	No. of nodes	No. of branches	No. of plots	Total area (m^2)	Maximum area (m^2)	Minimum area (m^2)
1	Yards and constructions	1988*	235	213	93	73417	89	17380
		2012**	320	389	125	89542	54	12867
2	Arable	1988*	154	163	75	40519	71	2086
		2012**	233	280	69	40486	86	7530
3	Vines	1988*	82	75	39	19940	202	1523
		2012**	74	77	17	9309	90	1309
4	Orchard	1988*	10	16	4	1204	201	448
		2012**	-	-	-	-	-	-
5	Roads	1988*	20	22	4	44947	1245	12680
		2012**	188	203	49	180029	171	69341

* cadastral plan; ** from measurements.

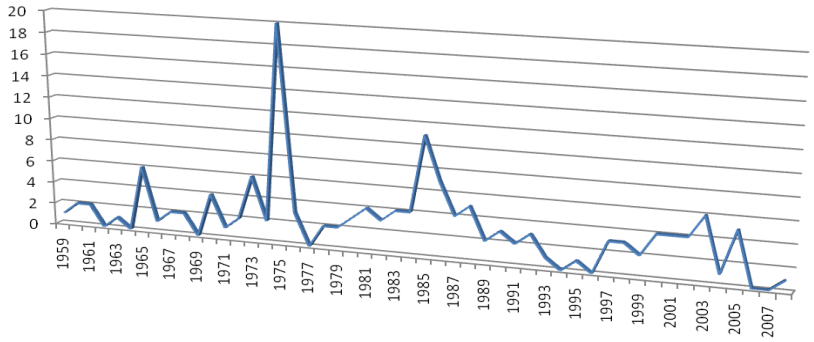

Fig. 3 Query graph regarding the construction rhythm, for a period of 50 years, from queried cadastral sectors

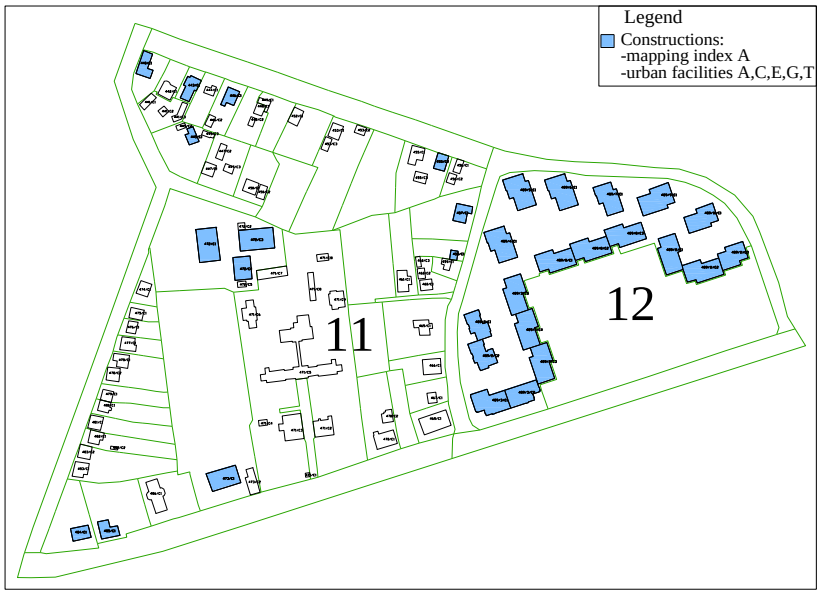

Fig. 4 Query after mapping index and constructions municipal equipment from cadastral sectors 11 and 12

The analysis of the technical side of the Cadastre for the study area can be achieved by **creating thematic maps** (Fig. 5), which represents a process of interrogation that presents the characteristics of the objects mapped by means of graphic elements, which makes the maps understandable, effective and easy to read.

Fig. 5 Thematic map of representation of the division by color of the plots, depending by the size of surfaces and of the constructions, depending by destination, from cadastral sectors queried

The analysis of the economic side of the Cadastre of Real Estate (Urban) Informational System for the study area was done by the software used by public notaries for a real estate transaction pricing (Fig. 6).

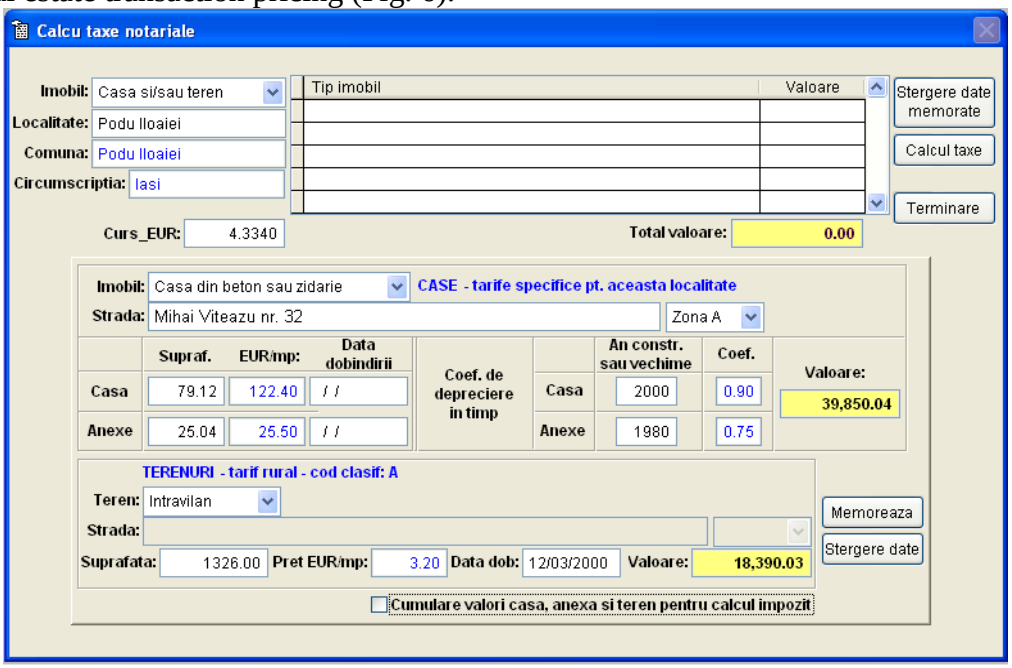

Fig. 6 Calculation of a real estate transaction value in the study area

The analysis of the legal side of Cadastre of the Real Estate (Urban) Informational System for the study area was done through a ***thematic map with representation in computing environment of the types of proprietary*** (Fig. 7).

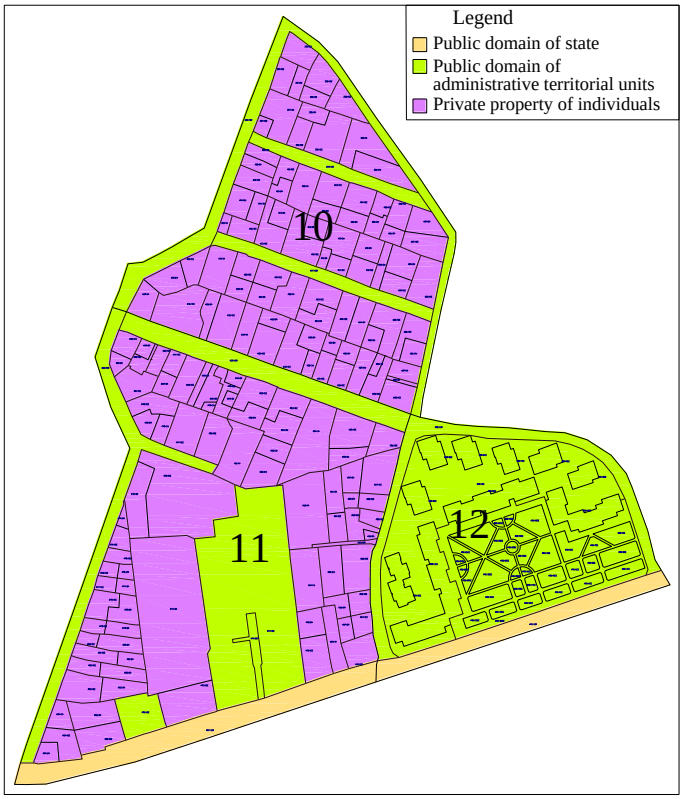

Fig. 7 Thematic map of representation of the division by the colors of the types of property in cadastral areas queried

Also was made a report of the current situation and the **solutions** for resolving the inconsistencies from ownership documents of the total surface of the study area of 180029 m^2, aimed at a number of 102 properties.

The **technical attribute the *real estate*** area recorded in ***ownership documents***.	Real estate area from measurements < 2% than that in the papers.	12 real estates (12%)	The registration in the Land Registry will be based on a statement of the owner regarding the agreement for the surface resulting from the measurements.
	Real estate area from measurements between 2% and 10% than that in the papers.	81 real estates (79%)	Registration in the Land Registry is carried out based on property documents.
	Real estate area from measurements > 10% than that in the papers.	9 real estates (9%)	Registration in the Land Registry is carried out based on changes prior to property documents or under a judicial ruling regarding the right of usucaption.

The **degree of registration of the technical and legal information in Land Registry** from the sectors 10, 11 and 12, the city of Podu Iloaiei.	Real estates that have obtained temporarily cadastral number and was registered in the Land Registry.	27 real estates S=33792 m^2 (19%)	The Urban Real Estate Informational System created for the case study also provides information about the registration at the Land Registry.
	Real estates that were subjected to cadastral operations for detachment and annexation.	4 real estates (resulting 8 new real estates) S=4416 m^2 (2%)	
Mistakes regarding registrations in property documents.	Wrong writing in titles of ownership of the **name** and **surname** of the owner.	6 real estates (6%)	The correction of errors will be based on judicial ruling or based on the decision of Land Fund County Commission with the change of writings from Ownership Titles by Cadastre and Land Registration Office.
	Wrong writing of **cadastral identifiers**: field, plot, neighborhoods.	18 real estates (18%)	

The analysis of the situation of technical-urban networks of Urban Informational System for the study area was conducted through **Property type entities**.

In this query will give as example the distribution of drinking water sightseeing home (18 pcs.) and sanitation (12 pcs.), respectively gas boxes distribution (13 pcs.) and gas vents (12 pcs.), (Fig. 8).

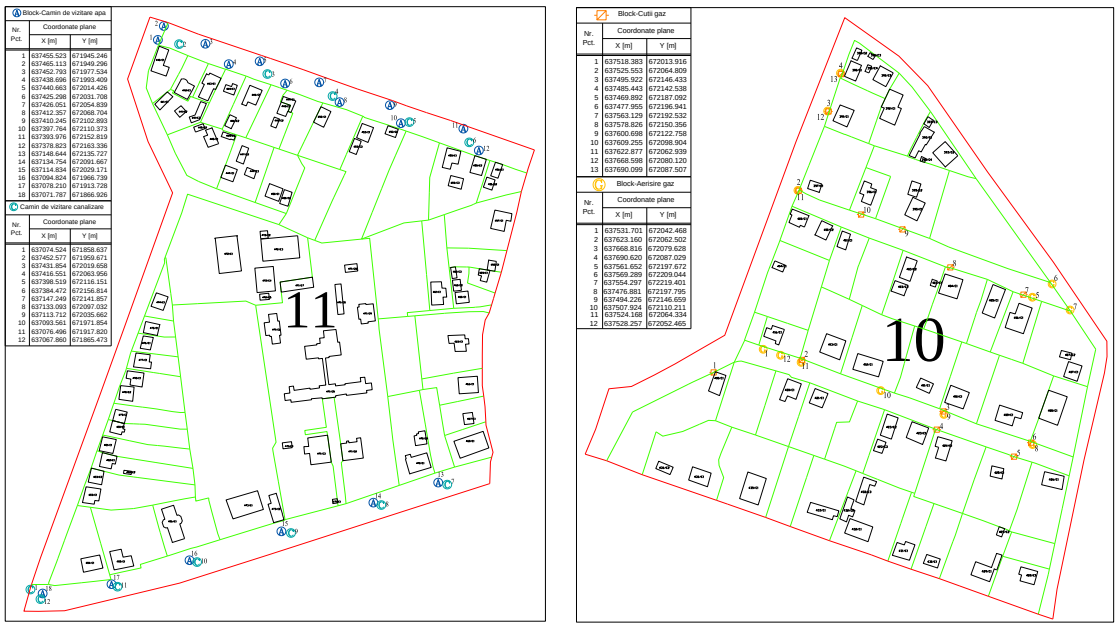

Fig. 8 Query by block WaterSH and SewerSH from cadastral sector 11 and after block GasBox and GasAeration from cadastral sector 10

The digital topographic plan extras with urban networks associated to a public road were obtained from the database of Urban Real Estate Informational System made for

cadastral sectors analyzed. In Fig. 9 are indicated the existing networks routes and also the supply lines branch which links the main route with users of these networks.

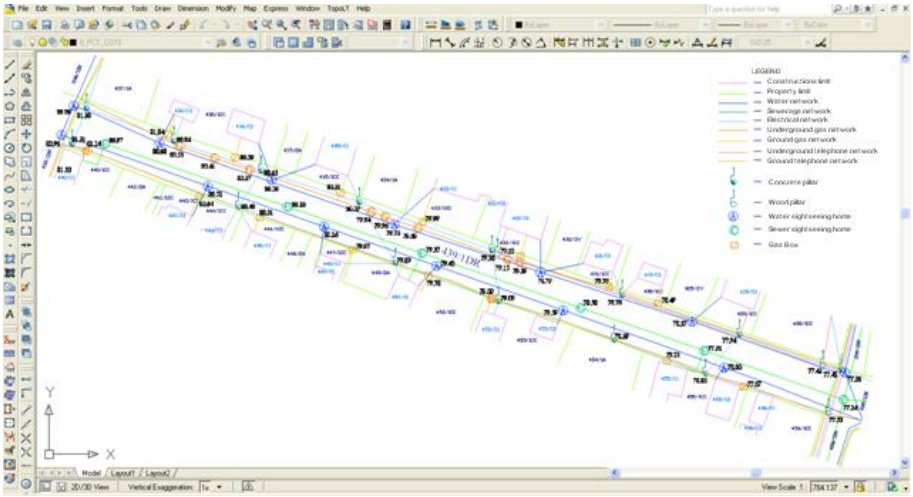

Fig. 9 The digital topographic plan extras with existing urban technical networks

Due to the high volume of changes over time in the administrative territory, regarding the area, form, use category, destination and legal situation of the real estate, resulted from real estate transactions, human activities, but also after actions of nature, it requires a continuous update by highlighting and inventory adjustments.

4. Conclusions

The case study aims to solve problems related to the establishment and implementation of cadastral works on the level administrative territorial unit of Podu Iloaiei, respectively of **Urban Real Estate Cadastral Informational System**, aimed at a study area located in the city limits Podu Iloaiei.

This Urban Real Estate Cadastral Informational System, obtained by combining Microsoft Office Access 2007 for development of CIS database, with AutoCAD Map 3D software, for the development of graphic database, aims to improve the quality of services offered to different users, maximizing efficiency, increasing transparency of activities, creating new channels of access and communication to citizens, companies and institutions, sharing and disseminating information quickly and safely, with lowering the cost of communication.

5. References

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