Mass Appraisal – the Method and an Experience in Lithuania
Evaluation de masse – la recherche de la méthode et l'expérience en Lituanie

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Key words: CAMA, mass appraisal, mass valuation, Lithuania

SUMMARY

The mass appraisal or mass valuation is very important in the property administration and the real property cadastre and register system. The specialists of the State Enterprise Centre of Registers commenced preparatory activities regarding the implementation of mass valuation system for land and other real property from 1998. OECD and Lincoln Institute of Land Policy (USA) provided much support in this field. Mass land valuation has been performed in Lithuania since 2001, and we have already discussed this issue in previous FIG conferences.

Some years ago Lithuania has started the development of mass valuation system, that was unambiguously associated with the intended introduction of a market value based real property tax. Favourable political decisions, a modern real property cadastre and register system with its adequate institutional structure enabled to develop a mass valuation system of land and constructions. Flexible mass valuation system allows yearly update of value maps at low costs, makes valuation results accessible to the public and use for different needs in the public and private sectors.

The analysis of some years of experience shows that the appearance of mass valuation system of land and construction structures, which was originally associated only with the real property tax reform, stimulated the interest of the society, public and municipal institutions in values estimated by mass valuation approach. Previously they had to use either expensive services offered by independent valuers or to be content with the cadastral values that were far from being actual ones. Mass valuation allows estimating average market values that are cheap to calculate and accurate enough for certain purposes.

RESUMÉ

Un sub-système d'évaluation de masse est très important dans un système du cadastre multilatéral. Et le cadastre bien développé crée des conditions pour l'évaluation de masse et l'expertise individuelle. Comment estimer massivement les valeurs vénales ou d'échanges de propriété foncière ou immobilière, voilà la question. A l'aide d'un système informatique, à l'aide du logiciel en utilisant des outils statistiques et de SIG nous pouvons établir la valeur vénale d'un groupe des objets fonciers et immobiliers.

Il existe à l'heure actuelle deux grandes approches à l'évaluation de masse:

1. L'approche hédonique (modélisation statistique) qui s'appuie sur l'analyse de régression multiple et définit une relation entre prix des propriétés et leurs caractéristiques;
2. Les réseaux neuronaux artificiels (*ANN*).

La Lituanie développe son système dans une approche de la modélisation statistique. La Lituanie développe son système d'évaluation foncière et immobilière de masse à l'aide du logiciel ayant un cadastre moderne, en coopérant avec les organismes internationaux (*Lincoln Institute of Land Policy, IAAO, IIFI-IPTI*) et donnant son expérience aux autres pays de l'Europe orientale et pays ex-soviétiques, ainsi que les autres pays en voie de développement. L'implémentation du système d'évaluation de masse pose les tâches techniques, politiques, éducatives. Il faut calculer la valeur et faire la carte – numériques ou sur le papier – des zones de la valeur basée non seulement sur le porté à connaissances juridiques et techniques mais aussi à connaissances du marché et des coutumes de peuple.

Quelles suggestions sur le sujet de l'expertise foncière ou l'évaluation de masse pour les pays en voie de développement? Il faut obtenir la valeur initiale aussi à l'aide des outils informatiques et statistiques et développer une base de données. Manque de transparence du marché (le marché officiel et *ex-officio*), peu de transactions foncières et immobilières créent toujours des problèmes pour les pays en voie de développement. La valeur approximative acceptable dans le système de la gestion foncière vaut mieux que non pas de valeur du tout (Gelinas, 2004), il faut créer une plate-forme avec un noyau d'information et développer cette plate-forme.

La cartographie numérique, la technologie moderne du cadastre permet de créer un système de l'évaluation de masse en gérant et utilisant des divers registres et les bases de la gestion foncière ainsi que de la planification territoriale. La Lituanie possède l'une des industries d'évaluation de masse les mieux organisées et les plus perfectionnées techniquement dans le monde. On y va présenter l'expérience et conclure les remarques pour les collègues.

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1. INTRODUCTION

In Lithuania, a key element for the establishment of mass appraisal or valuation system and its successful operation is an automated real property formation and registration system, also a fully integrated real property, cadastre, register and GIS database, covering all types of properties, and a system of transaction data created on the basis of such database.
Since 1997, an integrated real property cadastre and register system is in operation in Lithuania. The State Enterprise Centre of Registers stores and updates the real property cadastre and registers data, administers database of the real property cadastre and register, maintains GIS system in Lithuania, and assesses real property for public needs, including taxation. Data about the entire registered real property amounting to over 6,0 million objects is stored in the integrated database. Data on market transactions and involved property stored in a uniform format creates a possibility to standardise and automate mass appraisal process, to identify main appraisal criteria and factors influencing value.

2. MASS APPRAISAL DEVELOPMENT IN LITHUANIA

The Centre of Registers in Lithuania has developed mass valuation models for land and buildings and prepared value maps. ORACLE Discover, NCCS, GIS software were use in this process. In case the specialists failed to adopt standard software for certain works they tried to search for own solutions (GIS, merging valuation results with the Real Property Register data) in order to have full automation of valuation system and implementation of basic AVM and CAMA principles.

The first experimental mass appraisal of constructions and buildings in Lithuania was performed in 2003. When the Law on Real Property Tax was passed, appraisal of real property gained legal status and the results of appraisal became very important; for this reason, this group of property was revaluated anew in 2005. From 2006, mass appraisal of constructions, as well as of land parcels, is performed annually. Increasing use of statistical methods for the selection and processing of data reduces the potential of mistakes and random factors making influence on value.

Annual mass appraisal is performed on the basis of market as of 1 August of each year. The prepared land value maps and reports on mass land appraisal of municipal territories are submitted to the Municipals Administrations and presented for public discussions. It is also possible to find the results of mass land appraisal on the web site http://www.registrucentras.lt

The goal of a valuer is to create the land and constructions value estimation algorithms as precise as possible, without deviations from appraisal rules. These algorithms are used to estimate average market values as similar to the market values as possible. After correction of the noticed inaccuracies, the results of mass land appraisal will be forwarded to the National Land Service under the Ministry of Agriculture (for land) or Ministry of Finance (for construction) that shall approve value maps and appraisal models. Every year appraisal has been performed with more precise and accurate consideration of not only the most important factor to the real property value – location factor – but also of other factors having influence upon value. The number of value zones is higher in the municipalities with big cities, such as Vilnius, Kaunas, Klaipeda, Siauliai, Panevezys. A more precise consideration of location is caused by high land values. In these areas the inaccuracy of zones would result in higher value deviations than in those areas, where land is not marketable, and its value is low.

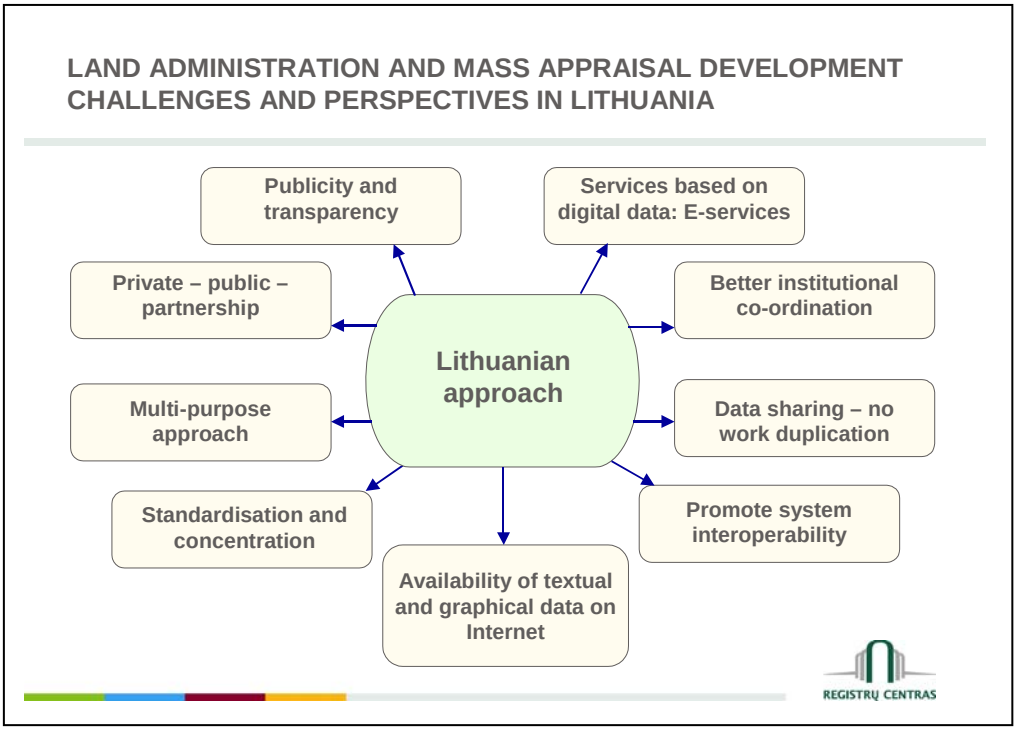

Figure 1. Property administration and mass appraisal development in Lithuania.

During the latest land appraisal more land market data were available, therefore it was possible to estimate the influence of swamps, non-cultivated and damaged land upon value of land parcels. Agricultural lands mentioned in the reports of previous mass land appraisal were not considered; therefore the owners, who had land parcels where land, non-cultivated in agriculture, occupied a major part of the plot, commented on too high value estimated for the land parcel.

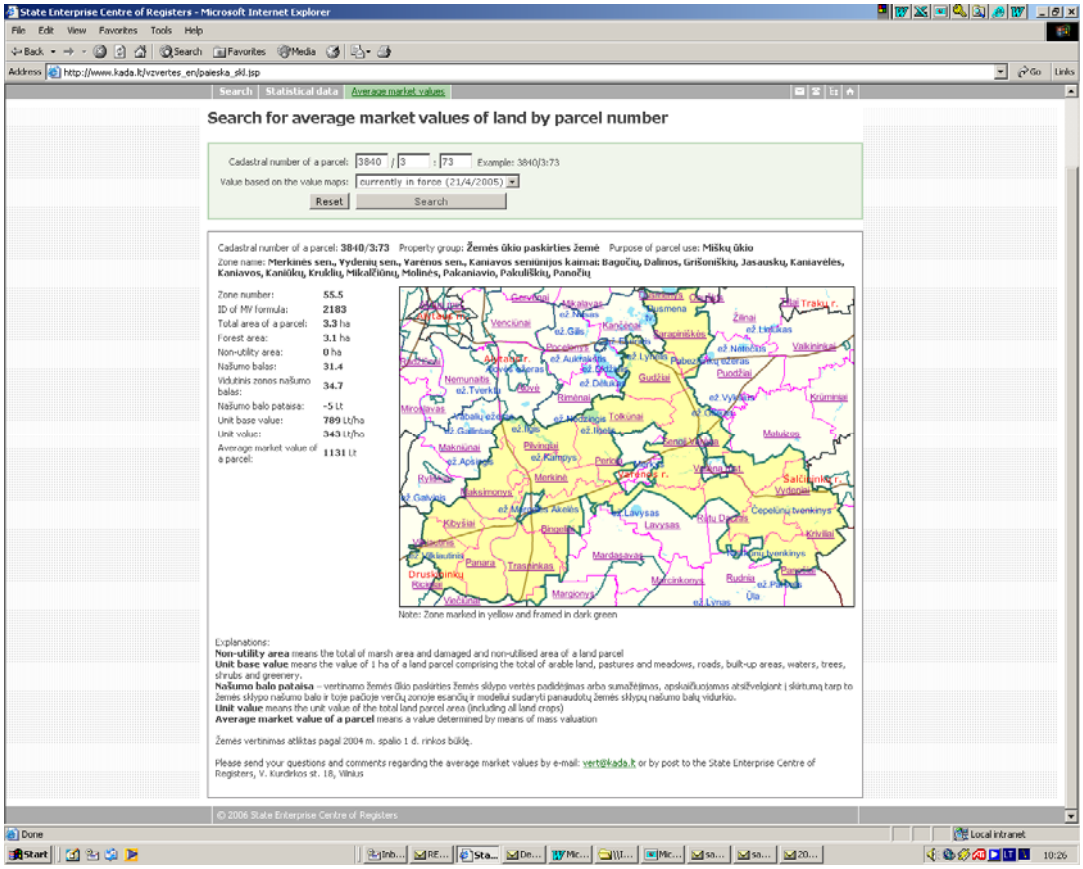

Figure 2. Presentation of mass appraisal results via Internet.

Value maps and real property appraisal models play an important role in the mass appraisal system. The more fairly and reasonably these components are developed with respect to the market, the more accurate results are obtained with regard to the market value. The principle scheme of building land parcel appraisal models and compiling land value maps is illustrated in Figure 3.

Labour expenditure and quality of the results depend very much on the reliability of data. Statistical methods and graphical measures are used for checking and revision. The experience of property valuers as specialists and the knowledge of real property market within the territory being valued are very important. After elimination of the disputed transactions, a specification of the land appraisal model is worked out, i.e. factors and characteristics affecting market prices as well as their relationship shall be determined. The impact of time factor on the transaction prices is being analysed in this phase. Having estimated the influence of the time factor, the adjustment of prices is done. The impact of the location factor results in land value zones, the boundaries thereof are defined, analysing the distribution of sales prices in the area, considering the purpose of land and types of the land use, the development of communications, street (road) network, satisfaction of social needs and other infrastructure

elements, prestige of the site. Appraisal of the impact of the location factor ends in land value mapping. In the phase of model specification, land parcel data are grouped by the characteristics, essential to the land market value: value zones, purpose of use, agricultural land, size of the land parcel, productivity grade and its use for recreation. The mathematical expression of relationship between these factors and prices make up a model. The influence of factors (characteristics describing property) in the model upon the land value is determined by calibration of models.

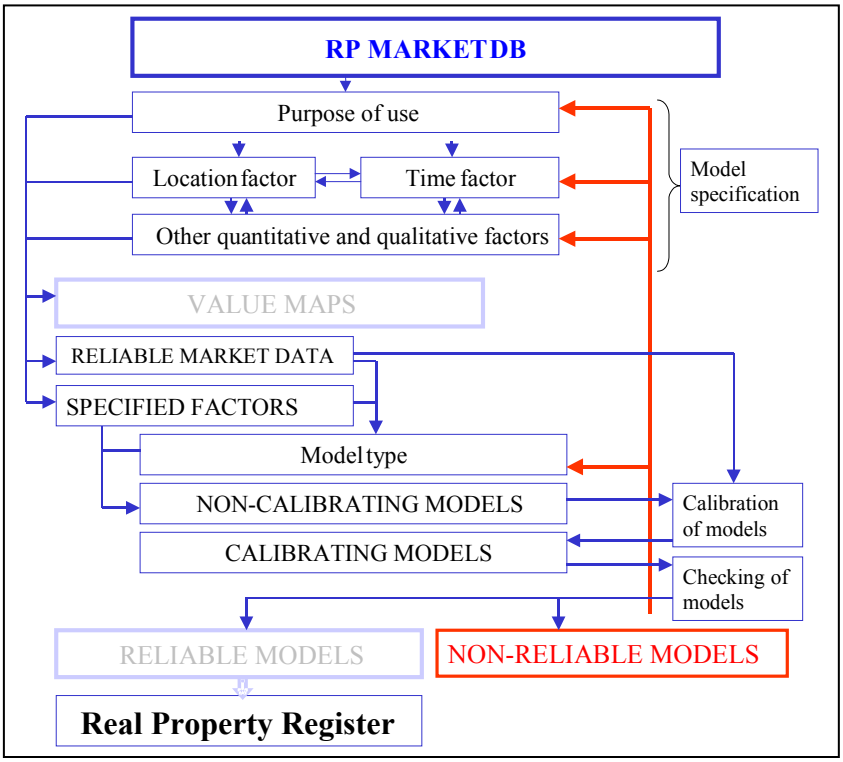

Figure 3. Principle scheme of building appraisal models for land parcels and buildings and compiling land value maps

Calibration of the model is the process of estimating the coefficients in a mass appraisal model. The calibration shall use the multiple regression analysis (the MRA) and other statistical methods. The MRA is statistical approach of estimating the unknown data, using the known and available information. In mass appraisal, the unknown data shall be market value of the real property, and the known and available data – sales prices and characteristics of the objects. The reliability of the estimated coefficients shall be evaluated using the statistical indices estimated in the MRA. Those models, the statistical checking indices thereof match with the ones set or specified in appraisal standards, shall be considered as designed correctly and integrated into the Real Property Register database for estimation of market values. If it turns out that the indices are incorrect, the model shall be analysed anew – the original market data are checked, the zoning and the specification of models is revised. Later, the calibration of models is done once more. This process will be repeated until the

estimated value results are reliable. Works in the transaction database will be completed with the preparation of land value maps covering the territories of municipalities and reliable land appraisal models. The obtained results with explanations are included in the reports on mass land appraisal of municipal territories.

3. INTEGRATION OF THE CAMA AND GIS

An automated property appraisal system is inseparable from the integration of graphical information. Today, the integration of CAMA and GIS is a common and integral process. Article published by German, Robinson and Youngman "Traditional Methods and New Approaches to Land Appraisal" (Land lines, July 2000) says that *"A new approach to location value - the use of GIS tools to develop a response surface that represents the effect of location on land value. The response surface is a fitted three – dimensional surface that represents a percentage adjustment to land and/or improvements based on a parcel's geo-codes location. Included in the analysis are geographical co-ordinates and distances from important features, such as other recent sales, institutions, amenities, or other value influence centres. This analysis results in a three – dimensional representation, with the height of the surface (z) or any specific x, y co-ordinate indicating the approximated location value of that parcel. This variable is evaluated with other, such as land and building size, quality, condition and depreciation, to produce a total estimated value for the parcel*".

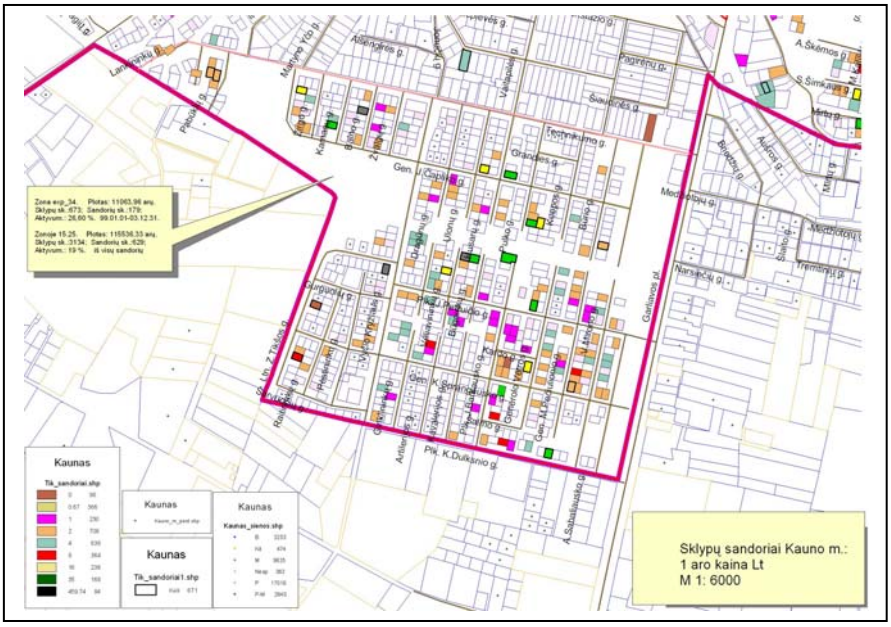

Figure 4. Use of GIS in compiling value maps (marking property sold by sales prices).

As it was mentioned before, the results of mass appraisal in Lithuania are used not only for calculation of real property taxes, but also for other public purposes. The users of data are various institutions and organisations, as well as the residents of Lithuania. It is very

important to offer an opportunity for all interested institutions and persons to receive property values quickly, as well as to ensure a possibility to receive comprehensive data in such a format that is accessible for all, and at the same time to ensure protection of personal data. In supplying mass appraisal data to the users in Lithuania, several ways are applied. The most popular is the supply of data via Internet according to the unique number of the property. Separate applications with appraisal, cadastre and register data set are developed for the institutions, which need specialised information (municipalities, tax inspectorates). There is also an opportunity offered for the owner to order an official (approved) excerpt from the Real Property Register specifying a relevant (up-to-date) value of property. Such excerpts are necessary for concluding transactions, documenting succession or gift.

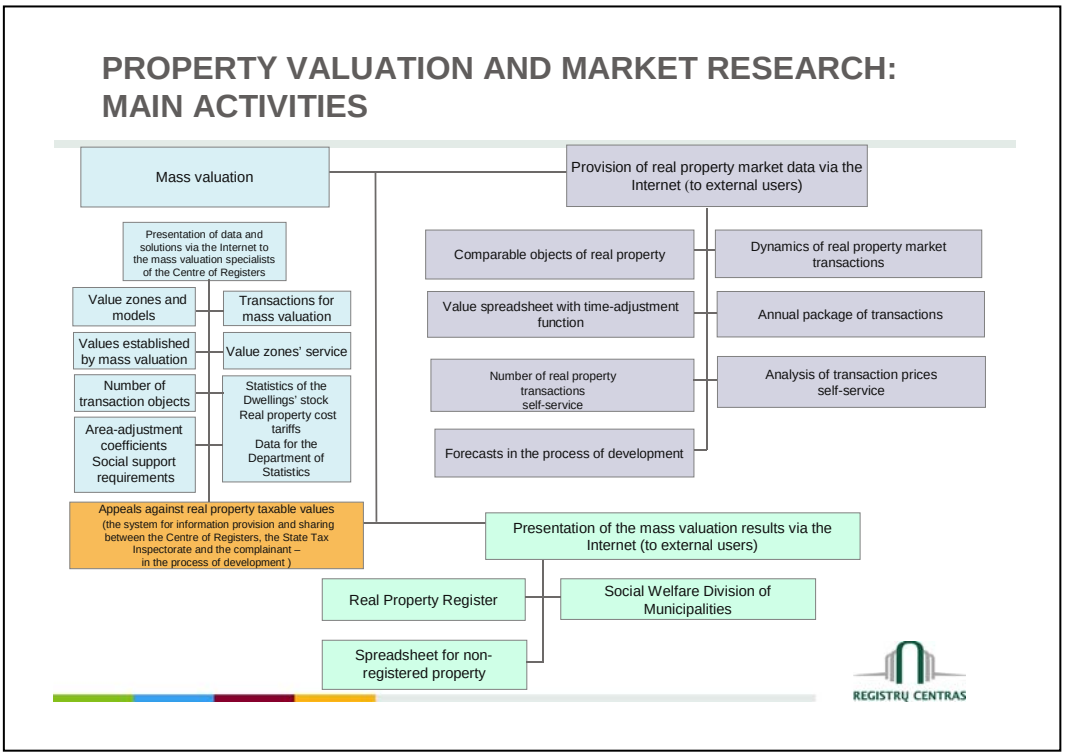

Figure 5. Presentation of mass appraisal and market data.

4. SUMMINGS-UP AND GENERALISATION

The development of a system for mass appraisal of real property in Lithuania where a computerised cadastre and register as well as storage of transaction data in the common database served as a base, also methods taken over from the developed countries, particularly from the USA, was a successive process with applying new technologies, improving appraisal procedure and obtaining more accurate values.

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BIOGRAPHICAL NOTES

Arvydas Bagdonavičius, Deputy Director, State Enterprise Center of Registers (Lithuania), is a specialist in computer-assisted mass appraisal and modeling, real property cadastre and register administration. He is an author of numerous papers, presentations and articles concerning property mass valuation and professional capacity building in this topics, presented in many international conferences. He is a lecturer in Vilnius Gediminas Technical university and Board Member of the Lithuanian association of Property Valuers.

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He has 17 years experience in property and business valuation, project management and the development of property valuation system and professional capacity building. He is an author of numerous rapports, presentations and articles concerning property valuation, territorial planning and professional capacity building, presented in many international conferences, mainly FIG and FGF international meetings.

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