

Automated Valuation System for Real Estate Tax Appeals

**Arvydas BAGDONAVICIUS, Steponas DEVEIKIS and Rimantas RAMANAUSKAS,
Lithuania**

Key words: mass appraisal, appeals, real estate tax, property valuation

SUMMARY

During mass valuation of real estate there is a possibility of various inaccuracies of estimation. Therefore, according to conducted analysis, the opportunity for the real estate taxpayer to appeal for determined real estate taxing value is essential. However it should be noted, that applicable appeal systems of real estate taxing values are effective not in all countries. It should be admitted, that the system of appeals applied in Lithuania is not effective. The opportunity granted by legal acts to submit the report of real estate in a different way (by individual evaluation) as an appeal, does not permit to estimate specific factors, which determine inaccuracies during the evaluation process. The results, achieved during individual evaluation with a narrow scope (a smaller amount of market data), in most cases reflect the interests of taxpayer to reduce taxing value by accentuating only factors, which decrease the value, and ignoring the advantages of real estate.

While evaluating current situation, referring to the experience of other countries, a model “Automated evaluation system of real estate for appeals of taxing values” was created.

The essence of model is that the estimator, who arranges the substantiation of appeal by his chosen criteria, estimates not a new value of real estate, but argues falseness of importance of determined criteria estimated by mass evaluation; also offer the calculations of criteria importance, complement the model of mass evaluation with other factors, which have not been estimated during the mass evaluation but are considered to be important by the estimator. Created model is also significant because criteria, which were calculated during mass evaluation, can be reviewed in a complex way; this means that an estimator can not separate factors, which decreases value from factors, which increases the value. Models of mass evaluation, which has to be refused by estimator, are made by the principle of Ad hoc and are evaluated automatically other factors, when one of these factors have been changed.

During the project of systems of data search of real estate, transactions were designed and introduced so that it would be possible to apply automated evaluation systems. From this system we will start analyzing automated evaluation system of real estate for appeals of taxing values.

Automated Valuation System for Real Estate Tax Appeals

**Arvydas BAGDONAVICIUS, Steponas DEVEIKIS and Rimantas RAMANAUSKAS,
Lithuania**

1. TAXABLE VALUE APPEALING SYSTEM OF REAL ESTATE

Inuring for new law of real estate property tax, real estate taxable value in Lithuania, on which tax of real estate will depend for upcoming five years, is set by State Enterprise Centre of Registers.

Taxpayer can find out commercial real estate value in State Enterprise Centre of Registers website (www.registracentras.lt), indicating unique number of real estate.

If taxable value, which was set, does not satisfy, it can be appealed to State Enterprise Centre of Registers for value and application for use of set value of single valuation for calculations of tax.

It is already analysed first complaints for tax of real estate. It was wildly reacted to the changes of tax of real estate. Taxpayers, politics, media were dissatisfied of innovations, which were established by law of tax of real estate. This law gave a right for local institutions to change tax tariff from 0.3 to 1 percent. From 60 districts, in 18 taxing percent of real estate was minimised.

State Enterprise Centre of Registers, which implement valuer duties for valuation of taxable value, attempt to keep by main principles, which are connected with public or submission of information:

ultimate honesty and clearness;

With certainty defined limits of competence and responsibility.

After analysis of complaints the results can be summarised. During first term of submission of complaints it was 1617 complaints submitted for more than 2000 real estate objects. Just half of them it was submitted reports of single valuation and they were analyzed. Results can be seen in the table 1.

Table 1. Summary analysis of complaints.

All submitted complaints	Rejected for a reason, that it wasn't submitted a report of single valuation	Suspended for application of complaint bearer	Results of complaints and valuations	
			Set value was changed	Rejected for wrong report
1617	811	31	458	317

Main reasons for changing set prices:

Part of premise is founded in basement;

Property is in bad condition and/or is unusable;

Objects, which take a big territory, also objects, which are in private territories;

Commercial objects in expensive zones, but appears in courtyard; they are without window-cases and/or exit to street.

Reasons why reports were not analysed:

Evaluated property of not that purpose, which was indicated in data base of State Enterprise Centre of Registers;

For property, which was evaluated, other valuation method had to be used;

It was taken agrarian market value after valuation of market value;

Mathematical mistakes calculating the value of real estate.

From 317 rejected complaints 3 of them were submitted to analyse for committee of Administrative complaints and 40 appealed to Lithuania administrative court.

2. USE OF BEST PRACTICE WHILE DEVELOPING APPEAL SYSTEM IN LITHUANIA

Although real estate tax in Lithuania is many years ago, but changing calculating method, starting to count taxable value by market value a big wave of dissatisfaction appeared. It was analyzed many complaints. Analyzing other systems of examination of complaints in other countries, some conclusion can be done.

Valuation in our country is made every five years. According to practice of other countries, it can be stated, that the term is too big to determine taxable value. During five years jumping of market value can be very huge, which means an increment of taxable values and also number of complaints.

Other important moment is lack of information. For society, together for taxpayer should be explained more about tax system, its work, also an order of submission of complaints.

Analyzing appellant systems of other countries we can see, that they are similar as in Lithuania. Substantial similarity is a hierarchy of appellant procedure. First instance, in which the examination of complaint is made, usually is an valuer of real estate, the last instance is court. Though in some countries first instance is a committee organized by autonomy, in which to meetings are invited taxpayer and valuer. In this situation maybe the partiality would be evaded if complaint fall into the hands of valuer, but it can be penetrated and some negative causes, like: when complaint fall into the hands of committee of complaints of

autonomy a mistakes of valuation is not corrected, which would be corrected if complaints firstly reached valuer.

2.1 Proposals and implementation program for the appeals system based on single valuation

Real property taxable value in Lithuania means the market value of real property calculated in a way of mass appraisal. When estimating this value in a way of standardised statistical programs, the market data are analysed (information on transactions). Analysis identifies the factors influencing property value and their importance. Single valuation, which is recently applied in Lithuania for appeals of taxable values, is performed basically in the same way: information about property under valuation is collected as well as market data that help to assess the factors influence the property value on the market. On the basis of this analysis a model (equation) is derived in single as well as in mass appraisal that enables calculating the property market value by assessing property characteristics.

Main difference between mass appraisal and single valuation is the depth of analysis of property characteristics (attributes). In case of mass appraisal the basic and common property characteristics typical to the whole group of property that affect the value of property are singled out. In case of single valuation focus is made on singling out the single characteristics of property under valuation and assess their importance. In most cases the characteristics important for the whole group and each single property are the same and there are not so many single attributes identified that may in principle change the property value. This is to mention that when analysing the common characteristics for the entire group singly they may deviate to one or another side. Seeking to improve the appeals system of real property taxable values and provide more grounds and definiteness but not change the appeals system in principle, the following system designing and implementation actions are performed.

It was mentioned that the sequence of valuation works and operations performed in both the single valuation and mass appraisal have many similarities. Therefore this project aims at developing similar information – analytical environment for the appeals system based on single valuation. The system should comprise the following elements:

Property identification system.

System of internal and external factors making up property value.

Market data search system.

Standardized data processing system.

Presentation of results.

2.1.1 Property identification system

When developing the real property appeals system it is very important to define the property under analysis in a precise and unified way. Mass appraisal of property is performed on the basis of real property data registered in the Real Property Register. Therefore when submitting the appeals, property must be defined using the official data registered in the Real Property Register. If the status of property is changed and the indicators identifying real

property do not reflect the actual situation these features must be revised and registered in the real property register before submitting an appeal. The experience gained in the period 2006 - 2007 shows that about 20 % of all appeals were related to the fact that property was reconstructed and used for another purpose of use than registered in the Real Property Register (e.g., previous premises of a shop are now used as the warehouse despite the fact that in the real property register they are registered as commercial property, and similar)

Having specified one source for property identification – the real property register - property identification is unified and the system for searching property description becomes simpler. Besides, the real property registered in the Real Property Register is described following the valid legal acts and the data are properly verified and reliable. All property in Lithuania is registered in the central (single) digital real property cadastre and register database and every interested user, having concluded a contract with the data provider, has the right to make a search for property on the Internet. The search may be done by the location of property as well as by owner of property. Below you will find an example of information search and its results. Property identification system about all legally registered and taxed property may be accessed via the Internet to both the local and foreign users using the European land information system EULIS.

2.1.2 System of internal and external factors affecting property value and standardized data processing system

Real property taxpayers, property valuers, other interested institutions and persons may find the models and procedures for calculation of property value in a way of mass appraisal. Mass appraisal models placed on the Internet indicate the factors that have been selected as being important for developing these models, also the level of importance of these factors is indicated specifying when the importance of a factor is equal to 1.

Currently, this system is static and does not provide an opportunity to change factors and their level of importance and to recalculate the value using the latest parameters. Seeking to adapt this system for appeals of real property taxable values, an active Internet system is under development, which will allow finding a valuation model by unique number of property. The matrix below shows the attributes used in the valuation model, their extent, types and impact on the value. Last column allows entering the values of attributes calculated by the way of single valuation, supplementing the model with the attributes that have not been considered and that are identified during the single valuation and enables to develop a new model and recalculate property value using new indices.

Unique No	109390061020				
	Vilniaus m. sav. Vilniaus m. Ukmergės g. 281				
Model No	1804				
Value, LTL	3.685.447				
Valuation date	2007.01.22				
	Name of attribute	Type attribute	Importance attributes of an object	Importance in mass valuation model	Importance when performing

Unique No	109390061020				
					single valuation
Model attributes using Real Property Register data	Total area	Scalar	1039,19	0,862849273	0,85
	Zone	Scalar	57.52	0,818526896	0,8
	Purpose of use	Scalar	Trade	1	1,02
	Year of construction completion	Scalar	1998	1,064171821	1
	Wall material	Scalar	Metal with framework	0,901922594	0,8
	Heating	Binary	Central heating	1	1,05
	Sewage	Binary	Local sewage	1	0,9
	Object type	Binary	Non-residential building	1,1	1
	Total area	Value	1039,19	5425	5000
	Auxiliary area	Value R	640,63	-1085	-1000
Additional attributes	Pollution		10%		0,9
	Noise		-5%		0,95
Value, LTL:				3.685.447	2.042.283

Fig. 1. Active mass appraisal models internet page

Having developed this application, a property valuer, who prepares property single valuation report for appeals, would receive all the indices that have been assessed in the course of mass appraisal. He would only require comparing the results received during his own calculations (important factors and their level of importance) with the mass valuation model and to supplement the model with newly identified (single) attributes. After the new attributes and their level of importance are entered into the program, property value will be immediately calculated and the difference will be assessed between the single and mass appraisal. The Lithuanian legal acts specify that an appeal may be subject to discussion if the difference exceeds 10 %.

2.1.3 Market data search system

The correctness and reliability of valuation results in mass as well as single valuation depend on the amount and correctness of market data. Centre of Registers performs mass appraisal in Lithuania and collects data about all transactions concluded since 1998. At present the computer transactions databank holds information about 700 000 transactions related to real estate.

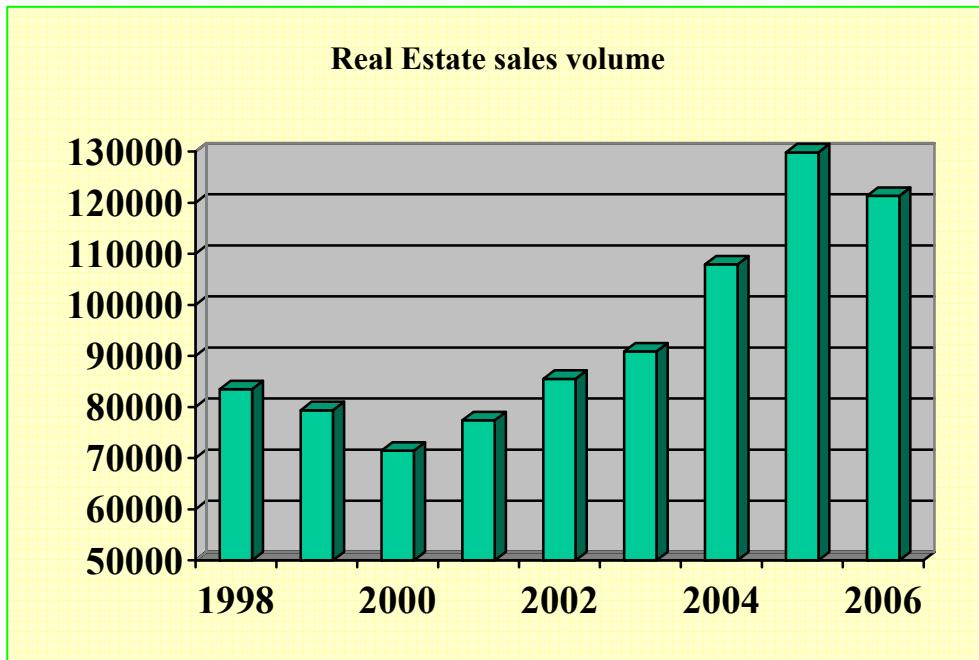


Fig 2. Real Estate sales volume

At present, mass appraisal is made on the basis of these data. External users may also receive information about the values of executed transactions upon request in writing. This process is flexible for work and time therefore it is expensive and the results presented depend on the conditions of formed queries and do not reflect full picture on the market. In order to use this system for formation of real property appeals it is necessary to standardized and computerized the data search system and provide opportunities for valuers themselves to make on-line queries on the Internet. Currently, this system is accessible on the Internet. After the market information sources, used for mass and single valuation, are unified it possible to ground the calculations made during single valuation with actual market data.

The system under development aims at classifying all search parameters and providing an opportunity for a valuer himself to define what parameters should be used for the search of transaction data. At present the search is possible by 10 different parameters or their combinations. Seeking to present reliable market data they are subject to statistical processing. Specified ranges for reliability of statistical data allow ignoring accidental sales data that fall outside the ranges of reliable data.

The system gives an opportunity to a valuer preparing an appeal to verify the correctness of attributes selected during the mass appraisal on the basis of market data and by using statistical data processing packages to recalculate, justify and evaluate the correctness of the importance of attributes or the need for their correction. There are recent discussions going on whether the legal acts should require that the report of single valuation must indicate on what data it is based and how the importance of an attribute was calculated or corrected and why a new factor that was not assessed during the mass valuation was included.

Specialists preparing the market (transactions) data appeals in addition would be supplied other market data too, such as market analysis, property price indices.

Property price index is one of more important factors that must be assessed during the mass appraisal and single valuation. Data of different periods are used for valuation. In Lithuania as well as in other countries with developing real property market significant changes in real property prices are visible, therefore it is very important to aggregate and enter all market data used in the process of valuation on one date. It is necessary to mention that not only valuers show great interest in the price changes of real property and indexes but other real property market participants too banks, real estate agencies).

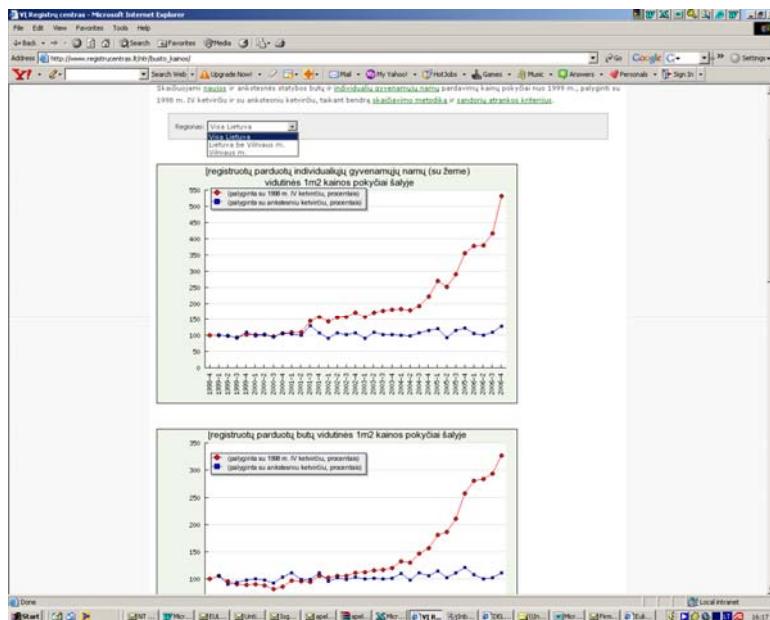


Fig. 3. Real Estate price index

In addition to the analysis of actual transactions, the analysis of the entire real property market also plays an important role when analysing the real property market. The analysis of property groups by type of its use, material, year of construction and other parameters in the subject area as well as on broader scale is performed. In this case the graphical visualisation of property attributes and prices is a useful tool for a valuer. Graphical visualisation is used in mass appraisal too. Within the framework of this project it is envisaged to present these data (maps) to general public and valuers as an additional material for valuation of property.

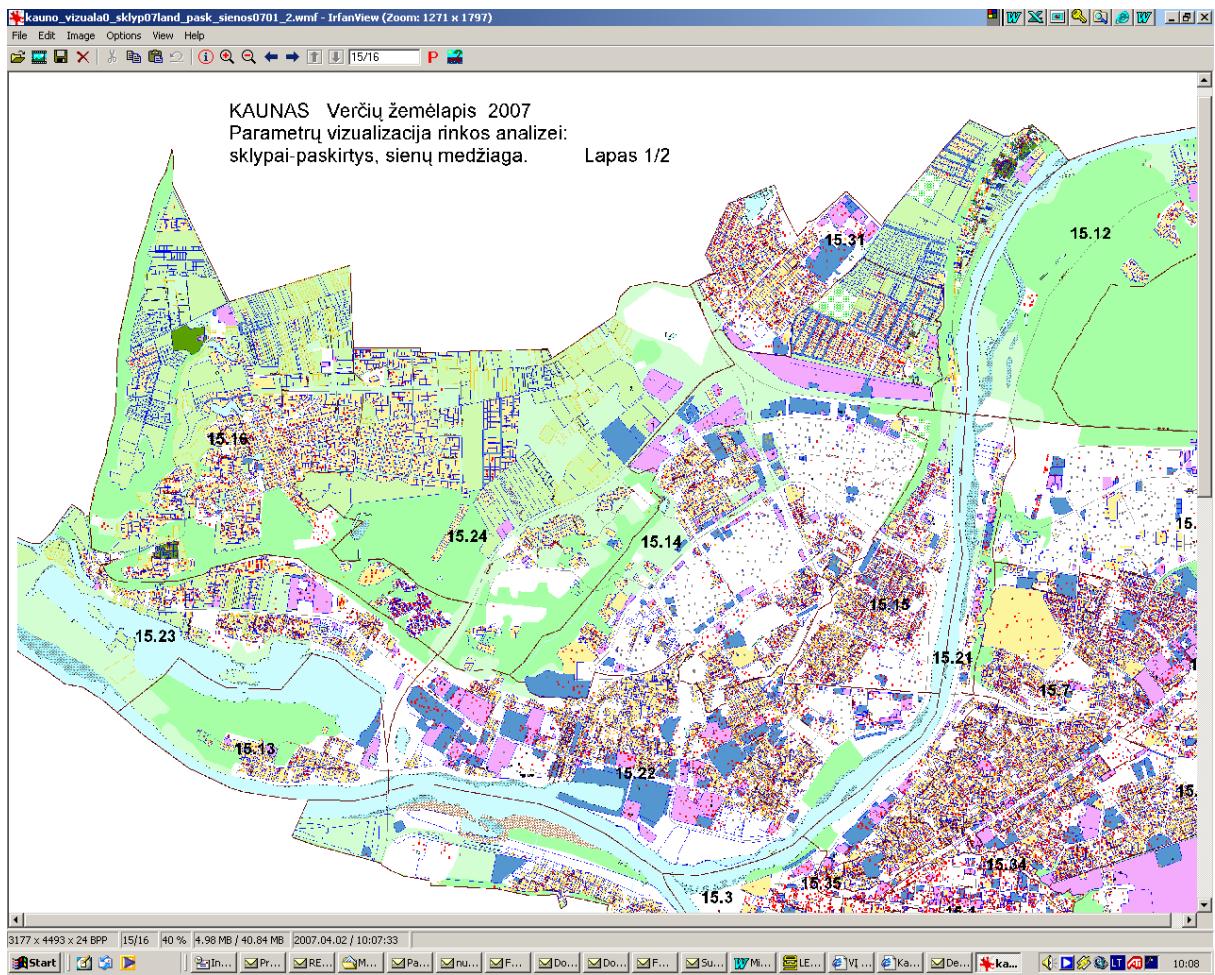


Fig. 4. Real Estate market data visualization

2.1.4 System for presentation of results

Real property taxpayers in Lithuania some months before the approval of new taxable values may have public access and get acquainted with future taxable values and the system for their estimation. Every taxpayer may present his remarks and suggestions on the correction of set up valuation models or the values of specific property. Public consideration of mass valuation project results plays an important role in the process of appeals too, meaning an opportunity to of informal and minimally grounded appeal in advance. After the verification of facts and calculation algorithms there is an opportunity to correct valuation results before their approval. Discussion in public is organized directly during the meetings where valuation results are presented as well as by placing the results and opinion questionnaire on the Internet.

Information about future taxable values provides taxpayers with an opportunity to get familiar with the value in advance and reduces the number of probable inaccuracies that later may cause an appeal. The publication of final (approved) result should not only have an informative nature but should also provide grounds for the estimation of values. Taxpayer

wishes to know not only the value of his own property but also general price level in the subject area as well as on the national scale and assess where the value of his property stands in respect of general trends and what are changes of his value in respect of previous years. Information to a valuer must be presented in an easy understandable and visual way. Possibilities to present results in graphical way are expanded within the framework of this project.

Comprehensive information about the real property object appraised and generalized information about all evaluated objects allows assessing the opportunities and expedience of probable appeals. This information to a valuer serves as an analytical material that may be analyzed in his appeal report.

3. INTERNET SPREADSHEET OF APPEALS AND MASS EVALUATION

In legal acts is written that the taxable value of immovable property may be the value of the immovable property determined by individual valuation of the immovable property in accordance with the Republic of Lithuania Law on Basics of Property and Business Valuation, where the individual valuation, regardless of a valuation instance for which a valuation report has been prepared, has been performed with the help of the methods of determination of value as indicated in paragraph 2 of Article 9 of this Law, and the market value specified in this valuation report corresponds to the average market price of a similar property, this report's terms and conditions permit use thereof for the adjustment of the taxable value, while the date of the valuation falls within a time limit laid down for the submission of applications as indicated in paragraph 1 of Article 10 of this Law. Taxpayers may submit a request to a property valuer to consider as the taxable value of immovable property the value of the immovable property determined by individual valuation of the immovable property, where the average market value of the immovable property as determined with the help of mass valuation of the immovable property or the value of the immovable property specified in subparagraphs 3 and 4 of paragraph 2 of Article 9 of this Law determined by the recoverable value (costs) method is different from the value of the immovable property as determined by the individual valuation by more than 10 per cent, in the concrete two methods were legitimated for taxes – mass and individual as equivalent. But also foreseen that estimator, who does a mass evaluation has also evaluate, accept or reject individual evaluation. . Complaints by payers of the tax in respect of the determined taxable value of immovable property and applications on the use of the value of the immovable property as determined by individual valuation for the calculation of the taxable value shall be submitted to a property valuer within one month of the determination of the taxable value of the immovable property. The property valuer shall examine the complaints and applications within one month of the receipt of a complaint or an application and shall take a decision thereon. The decision may be appealed against in accordance with the procedure set forth the Republic of Lithuania Law on Administrative Proceedings. Such indefinite system raises a lot of questions. First of all, both methods of evaluation are different enough not only of accomplishment technique, but also of achieved results, so even when we get different values we can not state that evaluation is bad or good.

Since the admission of decision is endowed for estimator, who does a mass evaluation, he has a right to determine requirements for submission of appeal. Main condition should be that estimator has to do not new evaluation, but analyzing the model of mass evaluation, also offer arguments, that's why a value should be calculated in different way. This means, that estimator should indicate which factors are not valued, which are valued wrongly and submit reasonable calculations.

There is an internet spreadsheet of mass evaluation and appeals, which does analysis and calculations, in which the information about property, also factors and their importance, is submitted when the unique number of real estate is entered.

Unique No	1094011830150005		Area	111,15 m²
Address	Vilniaus m. sav. Vilniaus m. J. Basanavičiaus g. 19			
Model	1804			
Mass appraisal 2007	548.264			
Appraisal data	2007.01.22			
MA value per unit	4.933			
Sale		Time adjustment	with time adjustment	
Sale price	560.000	1,75	979.000	
Sale data	1999.03.10			
Sale price per unit	5.038		8.808	
Appeal				
Appeal value	470.000			
Appeal value per unit	4.229			
Ratios				
MA/appeal	1,17			
Appeal/sale	0,84	0,48		
MA/sale	0,98	0,56		

Fig 5. Example of statistic table of values.

Estimator can use this system in two ways:

Complement model with factors, which to his mind were not evaluated and are important for market value.

Create a new model and calculate newly the importance of evaluated or not factors and receive alternative (appellant) value.

Since not only the model of mass evaluation, but also other statistic values of real estate market, are important during the evaluation process, the influence of time on the prices and values of real estate (with the spreadsheet) is submitted to the estimator with the statistic analysis of market data associated with mass evaluation model, which reveals the influence of time on the prices and values, the relation between market value, estimated by mass evaluation, and evaluation, which was conducted preparing the appeal.

Nevertheless, the most important factor both to the estimator, who submitted the appeal, and to the estimator, who carried out the mass evaluation and analysis the submitted appeal, is the

relation between the sale-price (if the real estate was sold) and the value, which was determined by mass evaluation during the appeal process including the influence of time to the sale-price.

REFERENCES

1. Valuation problem by taxing real estate, -
<http://www.leidykla.vu.lt/inetleid/teise/52/straipsniai/str11.pdf>.
2. Real estate mass appraisal report, 2005, 2006, 2007.
3. Law of tax of Real estate of the Republic of Lithuania. Vilnius, 2005 06 07, Nr. X-233.
4. Bagdonavicius A., Deveikis S., 2006. Implementation of Building Taxation and Mass Valuation in Lithuania – Outcomes and Lessons Learnt.
http://www.fig.net/pub/fig2006/papers/ts17/ts17_04_bagdonavivius_deveikis_0659.pdf
5. European property tax systems <http://www.agjd.com/EuropeanPropertyTaxSystems.pdf>.
http://www.aptcnet.com/articles/2006/Property_Over_Assessed_Canary.htm.
6. Property Over-Assessed? Either Pay or Appeal
[http://findarticles.com/p/articles/mi_qn4155/is_20060908/ai_n16724451\)\)](http://findarticles.com/p/articles/mi_qn4155/is_20060908/ai_n16724451)
7. Tax politics in context of Europe
<http://www.lsds.lt/documents/A.Sakalas-mokesciu%20politikaRed.doc>
8. Law of tax administration of the Republic of Lithuania. Vilnius, 2004 04 03, Nr. IX-2122.

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 reports, presentations and articles concerning property mass valuation and professional capacity building in these topics, presented in many international conferences. He is a lecturer in Vilnius Technical University and expert in Lithuanian property assessment commission. He is former Vice president of Lithuanian Property Valuers Association.

Steponas Deveikis, Chief of Market research and Data Analysis division, State Enterprise Centre of Registers, President of the Lithuanian association of Property Valuers and a Board member of the Lithuanian Association of Surveyors.

He has 14 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 reports, presentations and articles concerning property valuation, territorial planning and professional capacity building, presented in many international conferences, mainly FIG international meetings.

Rimantas Ramanauskas, Deputy Director at the State Enterprise Centre of Registers, Lithuania, specialist in real property management and administration, register and cadastre, geodesy and mapping. A member of Council and Vice-president of Lithuanian Association of Surveyors since 1997. Since 1998 he is a member of Real Property Sub-Committee of the Geodesy and Land Management Committee of the Council of the Baltic States. 25-year

experience in lecturing at the Vilnius Gediminas Technical University in land cadastre, geodesy, mapping, gravimetry and geographic information systems.

CONTACTS

Arvydas Bagdonavičius
State Enterprise Centre of Registers
V.Kudirkos 18,
Lt- 03105, Vilnius
LITHUANIA
Tel. +370 5 268 82 05
Fax +370 5 268 83 11
e-mail: aba@registrucentras.lt
Web site : www.registrucentras.lt

Steponas Deveikis
Lithuanian Association of Property Valuers
K.Sirvydo 6,
Lt – 01101 Vilnius,
LITHUANIA
Tel/fax + 370 5 261 89 51
e-mail:ltva.lt@post.omnitel.net
stede@registrucentras.lt
Web site: www.ltva.lt

Rimantas Ramanauskas
State Enterprise Centre of Registers
V.Kudirkos 18,
Lt- 03105, Vilnius
LITHUANIA
Tel. +370 5 268 82 03
Fax +370 5 268 83 11
e-mail: rimram@registrucentras.lt
Web site: www.registrucentras.lt