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VALUATION OF COMMERCIAL PREMISES BY THE METHOD OF MULTIPLE CRITERIA ANALYSIS

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1. Introduction

A number of problems in the valuation of real property can be eliminated by the methods of multiple criteria analysis, which came into existence only at the second half of the 20th century. Currently, they have become very important in the international practice of the real property valuation. In most cases they are based on market modeling and economic assumptions. Therefore, sometimes they are referred to as separate valuation methods, and classified as modern ones.

This article describes a new method of multiple criteria analysis. This method, based on the market analysis and valuation principle, is in line with the traditional comparative value method, therefore it can be attributed to the group of the indirect comparative value methods. These methods facilitate the universal and more extensive multiple criteria analysis of the property, since they take account of a number of different criteria, ie qualitative, quantitative ones, market conditions [1]. The proposed method can meet the demands and needs of many interested groups since it enables to estimate not only the market value of the property, but also other values, e g investment value, value of use, market value of the current use of the property, etc. This article describes the theoretical model of the method, which was used to estimate the market value of commercial premises.

2. Preparation of the initial data for the multiple criteria analysis

One of the key stages in preparing the initial data is to build a decision-making matrix, which is prepared in the following stages:

- All information about the property to be valued is collected;

- The criteria defining the aims of the multiple criteria analysis are determined;
- Values, significances and units of measurement of criteria of comparable alternatives are defined;
- Criteria, their value and significances make up the grouped decision-making matrix (Table 1).

One of the most important stages in multiple criteria analysis of real property is the determination of the values and significances of the criteria describing the real property objects. Significances of the criteria defining the quality and quantity of the objects to be valued and values of the qualitative criteria for the alternatives are estimated through the application of expert, social, normative, calculation and analogue methods.

When the calculation is performed in accordance with the expert method, the qualitative values of criteria can be expressed in a certain number of points. Criteria can be estimated according to the increasing or decreasing valuation scale.

To estimate the proportional values of the quantitative criteria, the expert valuation is based on comparison. In this case the values of the qualitative criteria are estimated as follows:

- The best suitable value of the criterion $x_{h_{c_{i1}}}$ is selected;
- The value of the best selected criterion is a set equal to the magnitude of one point ($x_{h_{c_{i1}}} = 1$);
- The ratio between the best criterion's value ($x_{h_{c_{i1}}} = 1$) and the rest values (x_i) of the same criterion is estimated and expressed in percentage (p_i);
- The relative values are attributed to the remaining values of the criterion ($x_i = 1 - p_i + 100$);

Relative values of all the criteria are a set equal to the magnitude of one point.

Table 1. The grouped decision-making matrix of the multiple criteria analysis of the objects to be valued

Quantitative information pertinent to objects									
Criteria under consideration		Significance	Measuring units	Real property objects to be valued					
				1	2	...	j	...	n
Quantitative criteria	z_1	q_1	m_1	x_{11}	x_{12}	...	x_{1j}	...	x_{1n}
	z_2	q_2	m_2	x_{21}	x_{22}	...	x_{2j}	...	x_{2n}

	z_i	q_i	m_i	x_{i1}	x_{i2}	...	x_{ij}	...	x_{in}
	z_l	q_l	m_l	x_{l1}	x_{l2}	...	x_{lj}	...	x_{ln}
Qualitative criteria	z_{t+1}	q_{t+1}	m_{t+1}	x_{t+11}	x_{t+12}	...	x_{t+1j}	...	x_{t+1n}
	z_{t+2}	q_{t+2}	m_{t+2}	x_{t+21}	x_{t+22}	...	x_{t+2j}	...	x_{t+2n}

	z_i	q_i	m_i	x_{i1}	x_{i2}	...	x_{ij}	...	x_{in}
	z_m	q_m	m_m	x_{m1}	x_{m2}	...	x_{mj}	...	x_{mn}
Conceptual information pertinent to objects (texts, drawings, graphics, tapes)									
K_f	K_z	K_q	K_m	K_1	K_2	...	K_j	...	K_n

The sign z_i (+(-)) indicates that a greater (less) criterion value corresponds to a higher demand of the interest party.

Initial significance of the criteria is determined in a similar way. The market price of a real property object reflects quality and quantity, supply and demand for the object, therefore, the significance of the market price criterion for the given object is equal to the total sum of significances of all the rest criteria, ie to one point or 100%. The significances of other criteria are determined by the expert method.

The decision-making matrix must be prepared in order to carry out the multiple criteria analysis of real property. The matrix is prepared through the analysis of the quantitative and conceptual information of the objects to be valued, estimation of the criteria values and significances of the objects.

3. The method of multiple criteria analysis in estimating the property value

The value of the property under valuation is determined by means of re-iteration through several repetitive cycles of refinement until the mean deviation k_x of the degree of utility N_j of the property a_x under valuation satisfies the condition $k_{ax} < \pm 1\%$. The initial value of the object under valuation is estimated according to the purchase prices of the comparable objects and is equal to the mean of purchase prices of the comparable objects.

The essence of the method of multiple criteria analysis in estimating real property value is presented in Fig 1. The method is composed of a total of 12 stages, of which two are stages concerned with the preparation of initial data (for formulas, see [2-7]).

4. Estimation of the market value for commercial premises

On the basis of the methods described in this article, valuation of commercial premises was carried out. Two comparable objects were selected for the object under valuation. All of them are located in Vilnius. The object under valuation and the comparable objects contain differences in quality, quantity and market conditions. The description of the object under valuation and the comparable objects is presented further on.

4.1. Description of the property under valuation

The property under valuation (commercial premises) is located in Pylimo Street (Vilnius), 2 km from the city centre, next to the railway and bus stations (1 km). The Pylimo street is one of the city main streets of the and serves as a connection between the city centre and both stations. The premises under valuation are located on the ground floor and in the dwelling

house cellar. Currently, those premises are used as a shop. The total area of the premises accounts for 490 m² including two salerooms of 115 m² each. The area of the auxiliary premises amounts to 160 m². There are two separate entrances to the premises – from Pylimo street, and from the end of the building with a car park. The premises on the ground floor are in good condition, rooms have been renovated, the interior decoration is of high quality, the interior of the premises meet modern standards. Premises in the cellar are not used. The four-story building where the premises are located was erected in 1940 and is used as a dwelling house with commercial premises on the ground floor. The construction elements of the building: the foundation is made of stone-concrete, walls made of bricks, plastered, the roof covered with tiles, joist ceilings are made of reinforced concrete; plastic doors. The physical depreciation of the building stands at 57%. Functional and economic depreciations have been estimated by the expert method and make up 37 and 13%,

respectively. The premises, like the whole building, are equipped with water supply and sewage systems, electricity, gas, district heating and a telephone line. The alarm system is absent. The land plot is not included into valuation as not belonging to the private ownership. There are no restrictions on holding and possessing the property.

There is a great demand for non-dwelling properties in the part of the Vilnius city where the premises under valuation are located. The building is not far from the city centre, next to the busy street with a heavy traffic flow. In the neighbourhood, there is a lot of companies and other commercial offices. The premises under valuation are marketable due to the location of the building and characteristics of the premises. The premises are suitable for commerce, the door and windows face the main street. The premises are in good repair condition. The cellar contains enough space for warehousing.

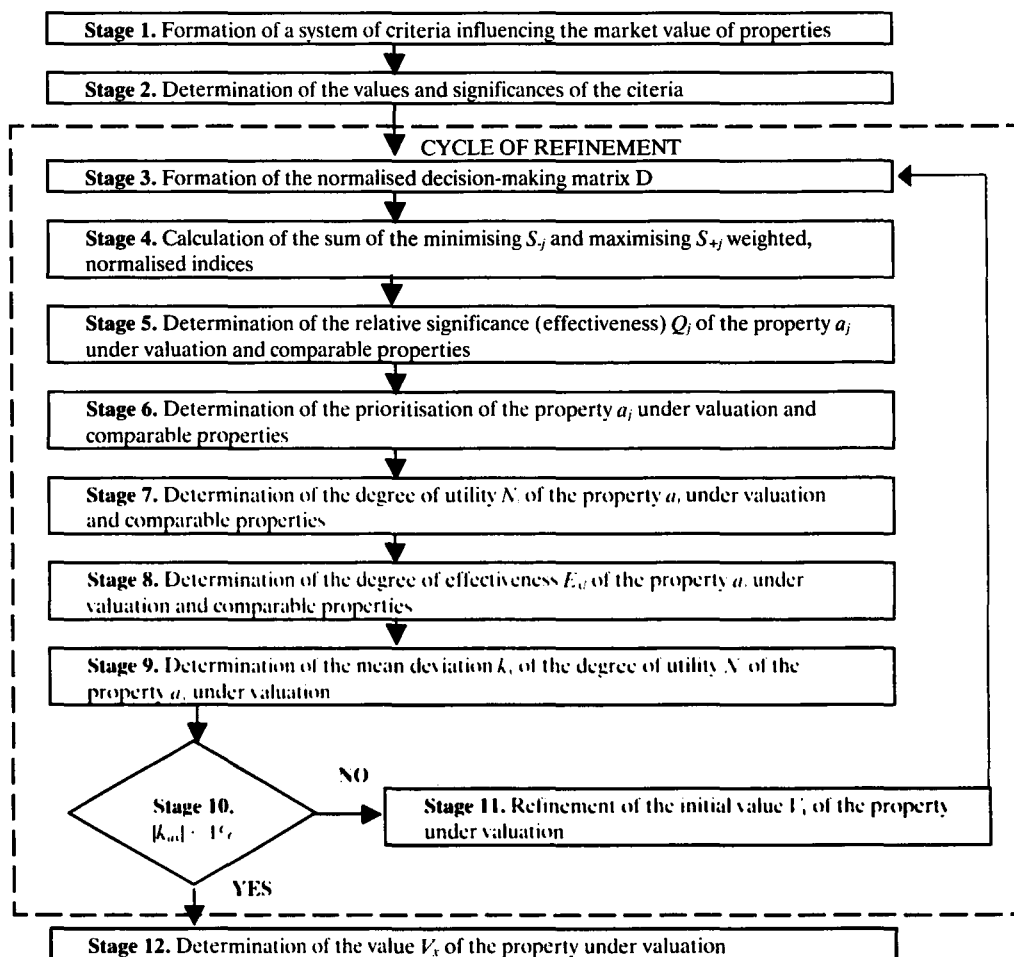


Fig 1. Flow chart of the method of multiple criteria analysis in estimating the real property value

4.2. Description of the first comparable object

The comparable object (commercial premises) is located in Savanoriu Avenue in Vilnius. The premises are located 4 km from the city centre, and 5 km from the railway and bus stations. The comparable object is located in the Naujamiestis district, one of the most prestigious districts of the city, with high prices for the property. New buildings are not frequently built in this part of the city; therefore there is a constant demand for premises. The premises are located on the ground floor and the cellar of the dwelling house with a warehouse in the yard of the building. The total area of the premises accounts for 334 m². There is one saleroom with an area of 155 m².

The area of the auxiliary premises amounts to 179 m². There is a separate entrance to the premises from Savanoriu Avenue. The interior decoration of the premises: the interior is painted, one part of the walls in the saleroom is covered with tiles, the other part is decorated by decorative planks. The premises need to be renovated. The four-story building where the comparable object is located was erected in 1960 and is used as a dwelling house with commercial premises on the ground floor. The construction elements of the building: the foundation is made of concrete, inside walls made of bricks, plastered, partitions made of bricks, the roof covered with metal sheets, joist ceilings are made of reinforced concrete; wooden doors and windows. The physical depreciation of the building stands at 34%. Functional and economic depreciations have been estimated by the expert method and make up 42 and 24%, respectively. There is a warehouse in the yard of the building, which was sold together with the premises. The premises (except the warehouse), like the whole building, are equipped with water supply and sewage systems, electricity, gas, district heating and a telephone line. The alarm system is absent. The land plot was not sold together with the building. There are no restrictions on the use or possession of the property.

The district where this property is located is the conglomeration of many enterprises, offices, and commercial companies. The object is in a busy place next to the basic transport highways with a heavy traffic flow. The premises are marketable due to the location characteristics. The object located on the main street of the district is suitable for commerce and trade with

entrance and windows facing the street, and good advertising conditions. There is an auxiliary building in the yard of the building, which is suitable for warehousing purposes. The premises, however, need renovation and modern interior. The selling price for the premises stands at 186 000 Lt.

4.3. Description of the second comparable object

The comparable object (commercial premises) is located on Goštauto Street, Vilnius, and also belongs to the Naujamiestis district. The location of the premises is especially good, in the city centre, in between the most prestigious districts of Vilnius – Gediminas Avenue and Žvėrynas. The premises occupy the cellar of the Institute and cover the total area of 308 m². There is one saleroom with an area of 216 m², and the auxiliary premises with an area of 92 m². There are two entrances to the premises – an entrance from the Institute and a separate entrance from the yard. There is a big car park outside the premises. The interior decoration of the premises: the floor is covered with linoleum; walls are covered with paint, plaster, in some places with wallpapers. The main room has recently been renovated – repainted, windows furnished with жалюзи. The auxiliary premises have not been repaired. The building, where the object is located, was erected in 1965 and is a four-story building used as an Institute. The construction elements of the building: the foundation made of concrete, outside walls made of bricks, plastered, partitions made of bricks, plaster, joist ceiling made of reinforced concrete, plastered, door is solid-core, double windows. The physical depreciation of the building stands at 29%. Functional and economic depreciations have been estimated by the expert method and make up 52 and 33%, respectively. The premises, like the whole building, are equipped with water supply and sewage systems, electricity, gas, district heating and two telephone lines. There is a local alarm system in the premises. The land plot was not sold together with the building. There are no restrictions on the use or possession of the property.

The site of the object is widely used for commercial activities. Public enterprises, banks, commercial companies, shops are located in this part of the city. The buildings are in a considerably good condition, made of long-lasting building materials, therefore they

are being actively repaired, their interior is being renovated, the ground floor premises are being rearranged into administrative and commercial offices. These premises are in the cellar, entrance and show cases are facing the behind of the building. Besides, the premises need to be renovated. Therefore, as commercial premises, they have lower value. The selling price for the premises is 130 000 Lt.

5. Investigation process and summary of the results

With account to qualitative, quantitative and market description of the property under valuation and comparable objects, the grouped decision making matrix was

formed (Table 2). The market value of the commercial premises was estimated in 6 cycles of refinement until the mean deviation k_x , of the degree of utility of the property under valuation, calculated in stage 9 of the method, satisfies the condition $|k_{ax}| < 1\%$. Table 3 of this article illustrates the change in the mean deviation of the degree of utility of the property under valuation and the refined value of commercial premises throughout all the six cycles of refinement. In the last (sixth) cycle of refinement the afore mentioned condition was satisfied and the market value of the premises was estimated to be 157 000 Lt (Table 3).

Table 2. Initial data for the multiple criteria analysis of commercial premises. Grouped decision-making matrix

Criteria to be considered		Measurement unit	Significance	The object under valuation	Comparable objects	
					Savanoriu Avenue	Goštauto Street
1. Selling price	-	Thousand Lt	100	X	186	130
Evaluation of the building						
2. Construction design	+	Points	3.5	0.85	0.80	1.00
3. Physical depreciation	-	Per cent	3.0	57	34	29
4. Functional depreciation	-	Per cent	2.5	37	42	52
5. Economic depreciation	-	Per cent	3.5	13	24	33
6. Number of auxiliary buildings	+	Units	4.0	0	1	0
Quantitative assessment of premises						
7. Total area	+	m ²	5.5	490	334	308
8. Number of salerooms	+	Units	1.5	2	1	2
9. Area of salerooms	+	m ²	3.5	230	150	216
Qualitative assessment of premises						
10. Interior	+	Points	4.0	1.00	0.60	0.55
11. Exterior	+	Points	2.5	0.75	0.80	1.00
12. The need for renovation	-	Points	3.5	0.15	0.70	0.50
13. Trading equipment	+	Points	4.5	1.00	0.75	0.00
14. Number of entrances	+	Units	1.0	2	1	2
15. Entrances with respect to the street	+	Points	5.5	1.00	0.95	0.60
16. Position of showcases	+	Points	4.5	0.90	1.00	0.50
17. Advertising possibilities	+	Points	4.0	0.90	1.00	1.00
18. Location with respect to the parts of the world	+	Points	0.5	0.60	0.80	1.00
Assessment of communications						
19. Engineering communications	+	Points	3.5	1.00	1.00	1.00
20. Number of telephone lines	+	Units	1.5	1	1	2
21. Assessment of the alarm systems	+	Points	5.0	0.00	0.00	1.00
22. Assessment of the air conditioning	+	Points	2.0	0.75	1.00	0.25
Estimation of the place						
23. Distance from the city centre	-	km	5.5	2	4	1
24. Public transport	+	Points	5.0	0.80	1.00	0.75
25. Distance from the bus stop	-	km	1.5	100	200	50
26. Car park	+	Points	5.0	0.70	0.50	1.00
Other criteria						
27. Prestige of the locality	+	Points	7.5	0.90	0.80	1.00
28. Assessment of market conditions	+	Points	6.5	0.95	0.95	1.00

Table 3. Estimation of the change in the mean deviation of the degree of utility, the refined value and the market value of the property under valuation

Cycle of refinement	Refined value of the object under valuation V_{sp} (thousand Lt)	The mean deviation of the degree of utility of the property under valuation	Market value of the object under valuation V_x (thousand Lt)
1	156.00	8.83 > 1	
2	171.95	3.86 > 1	
3	165.31	2.11 > 1	
4	161.82	1.14 > 1	
5	159.98	1.03 > 1	
6	158.33	0.58 < 1	
			158.33 (1 - 0.58 + 100) = 157.41

6. Conclusions

1. The proposed method of multiple criteria analysis for estimating the property value enables to estimate not only the real property market value but other values as well. Application of this method allows to perform a complex analysis of real property, the utility of the given objects and their prioritization in terms of one another and the significance of criteria affecting the real property value and marketability of the given objects.

2. The method of multiple criteria analysis can be applied not only as a separate method for estimating the value but also as composite method in the traditional valuation methods: in the comparative value method – to evaluate specific criteria influencing the market value (eg local infrastructure, location of a property under valuation, etc), in the value replacement method – to evaluate the depreciation of a building under valuation.

3. The method of multiple criteria analysis is based on the market and real property analysis and on the application and evaluation of the qualitative and quantitative criteria and market conditions influencing the real property value. Therefore, this method allows to carry out a complex analysis of the property with not only qualitative and quantitative differences but also different market conditions.

4. The proposed method is flexible and can be made available to all interested parties (market participants: buyers, sellers, investors, valuers and others) seeking to satisfy their needs and different demands. Besides, in evaluating the property for different purposes,

the criteria influencing the value differ as well. The number and significances of these criteria can be easily changed when applying these methods.

The system of typical criteria for the estimation of the market value of commercial premises has been built on the basis of the analysis of the property market. This system can be used in the property valuation by different interest groups in Lithuania.

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KOMERCINIŲ PATALPŲ VERTINIMAS DAUGIAKRITERINĖS ANALIZĖS VERTĖS NUSTATYMO METODU

V. Malienė

Santrauka

Daugelį problemų, su kuriomis susiduriama vertinant nekilnojamąjį turtą, galima išspręsti daugiakriterinės analizės metodais. Šie metodai pradėti taikyti tik XX a. antrojoje pusėje. Šiuo metu jie užima labai svarbią vietą pasaulinėje nekilnojamojo turto vertinimo praktikoje. Daugeliu atveju tarptautinėje praktikoje jie yra pagrįsti rinkos modeliavimu ir ekonominių vertintojų mąstymu, todėl kartais pateikiami kaip atskiri vertinimo metodai ir vadinami šiuolaikiniais.

Šiame straipsnyje siūlomas naujas daugiakriterinės analizės vertės nustatymo metodas. Jis yra pagrįstas rinkos ana-

lizė bei vertinimo principu ir atitinka klasikinę lyginamosios vertės metodą. Jį galima priskirti netiesioginių lyginamosios vertės metodų grupei. Šie metodai daugiakriterinę nekilnojamojo turto analizę leidžia atlikti plačiau ir universaliau, nes remiasi daugelio skirtingų kriterijų, t. y. kokybinių, kiekybinių bei rinkos konjunkcijos įvertinimu. Siūlomas metodas gali patenkinti daugelio suinteresuotų grupių tikslus bei poreikius, nes juo remiantis galima nustatyti ne tik nekilnojamojo turto rinkos vertę, bet ir kitas vertes, pvz., investicinę, naudojimo, esamo naudojimo rinkos vertę ir t. t. Šiame straipsnyje pateiktas metodo teorinis modelis, kuriuo remiantis buvo nustatyta patalpų, skirtų komercijai, rinkos vertė.

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