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Application of Method of Multicriteria Alternatives for Land Assessment

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Abstract

This article discusses the use of the multicriteria alternatives method for the assessment of a real estate object taking into account the concept of a system of standards, rules and requirements in the field of valuation activities, considering international standards for valuation. The main means for work and costs associated with allotment and development of the built-up area are indicated. In the work, the assessment of four sites is carried out taking into account three parameters: the distance from the construction site to the center by car; cost of 1 ha of land of each of the plots; deterioration of the centralized heat supply networks. The results show that the method of multicriteria alternatives is objective and optimal when comparing land sites on the criteria with different units of measurements. The advantage of this method is the possibility to apply it to evaluation in different areas of the economy.

Keywords: land plot, land assessment, method of multicriteria alternatives, market value of land.

1. Introduction

All real properties are built on land, lots of them characterized by various qualitative and quantitative data (Podinovskaya, 2010). Economic reality requires assessment of the site selected for construction basis of a thorough and objective analysis of all these compound quantities, as investors costs are significantly depend on them (Vatin, Gamayunova, 2010).

Ministry of Economic Development of the Russian Federation has developed a “roadmap” improvement for the valuation activities period, 2014-2017.

The purpose of "Concept of formation of a system of standards, regulations and requirements in the field of valuation activities in accordance with international standards of evaluation" (here in after “the concept”) is "increasing level of consumers satisfaction of valuation activities quality by improving the reliability and comparability evaluation activities results, as well transparency and consistency of assessment procedures "and allow the consumer valuation services to be sure that" the professional opinion of appraiser was worked out in a transparent manner with minimized impact of any subjective factors on the evaluation process there no affiliation" (Mezhuyeva, 2008).

It follows from the above that Institute of valuation activities will be actively developed and improved in the coming years (Vaz et al., 2012).

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Technological structure of construction value products in the territory of the Russian Federation includes expenses associated with the preparation of the construction site (Clapp John, 2004). It is expenses on work, and costs associated with allotment of land under construction and its development. These include (Lukyanchikova, 2008):

- Release of the construction site from existing buildings, plantations, industrial waste and other obstructions, transfer and reorganization of utility networks, communications, facilities, paths and roads, removal and storage of topsoil, etc.;
- Compensation of demolition costs for buildings and plantations, owned by the organizations and (or) individuals;
- Drainage of construction site, and other activities related to stopping or changing water usage situation, as well as environmental protection and the elimination of adverse construction conditions;
- Rent payment for the land provided a designing and construction period;
- Payment for the land in case of seizure (reacquire) of land for construction, as well as payment of land charges (rent payment) at the time of construction.

Analysis of list given above demonstrates that in making an assessment of land sites many factors with different units of measurement and size are arise (De Beurs, Henebry, 2010). They have different influence on the cost of investment project (Tarata, 2010). For objective assessment of investment attractiveness of land sites method of multicriteria alternatives is eligible (Hagen, 2011). It allows appraise correctly investment attractiveness of the lot (Konsul'tant Plyus).

2. Purpose and objectives

Purpose of research is to elicit appropriate construction site with parameters chosen by method of multicriteria alternatives.

Find appropriate land lot.

Show objectivity of method chosen.

Choose criteria with different units of measurement for land lot assessment.

3. Research

Nowadays for real properties assessment many methods are used (Bolotskikh, Bastrykin, 2012). Most popular are sales comparison approach, differentiation method, method of distribution, income capitalization approach (Lazarev, Sinitsyna, 2013).

Analysis of these methods shows that they not fully conform to the concept. In many cases it depends on the opinion and competence of appraiser (Turk, Korthals Altes, 2010). Procedure of assessment and results are not transparent and understandable to consumers of appraisal service in terms of taking into account all influencing object's properties, as well as their objective accounting (Stehman, 2009).

Method of multicriteria alternatives appropriate for assessment of land lots with the parameters characterizing it for construction purposes, with different units of measurement (Smith Brent, 2004). At the same time, the absolute numerical values of each parameters are very different, have different orientations. Figures of attractive parameters are minimized (Poryadina et al., 2014). And these problems could be successfully solved using the proposed method (Carlon et al., 2008).

Another problem will be to establish the numerical values of the parameters of construction site assessment which can be described as different figures (accessibility by road may involve distance, average speed or time in a way) (Urbanavičienė et al., 2014).

Then method of multicriteria alternatives can be used in several stages: the first stage is getting of the integral index of one parameter; the second stage is usage of this index as a parameter value in the overall assessment of the site (Kupriyanov, 2012).

For the construction of a building or a structure relation of the lot of land to the administrative, business and cultural centers, taking into account the existing transport infrastructure and the prospects of its development, the environmental situation of the lot and surrounding area, proximity, capacity and condition of utility networks, presence of water bodies and other settings are very important (Anoshina, 2011).

[Data about land lots listed below obtained from information site of public limited company “Property Fund of St. Petersburg” http://www.property-fund.ru/].

As an example of the method of multicriteria alternatives for assessment of land lots following characteristics of the lots are used (Olofsson et al., 2013).

1. Saint Petersburg, Shushary settlement, Lenin street, land lot № 4 (to the south from the crossroad with Badaevsky proezd) S =25 838.00 m², cadastral number 78:42:1511501:293;

2. Saint Petersburg, Shushary settlement, Lenin street, land lot № 5 (to the south from the crossroad with Badaevsky proezd) S =13 315.00 m², cadastral number 78:42:1511501:292;

3. Saint Petersburg, Gruzovoy proezd, land lot № 1 (to the south-east from the house № 12, building № 1, litera B on Gruzovoy proezd), S=1 020.00 m², cadastral number 78:13:7476A:12;

4. Saint Petersburg, Electropultovtsev street, land lot № 1 (to the north from the house № 9, building № 1, litera A on Electropultovtsev street), S=1 056.00 m², cadastral number 78:11:0612203:1364.

While the assessment of lots next parameters is considered:

1) Distance to the center from the construction site by road (km);
2) The cost of 1 hectare of land for each of the sites ($);
3) Depreciation of centralized heating networks (a year).

Depending on objective assigned estimate figures should have the same orientation in the table, minimized or maximized, according to criterion of optimality chosen (Konsul'tant Plyus). This is done for adding parameters and evaluation of the results (Vatin et al., 2014).

The higher the price per 1 hectare and the farther the distance to the city center, the lower the attractiveness on the market, and the longer the duration of operation of utility networks till overhaul the higher the attractiveness on the market.

With due regard to listed above next provisions are accepted for research:

1) Figures of cost for 1 hectare and the distance to the city center are maximized;
2) Figures for operating networks and heating systems are minimized;
3) As a result figures should aspire to a minimum.

More detailed parameters of land lots are shown in Table 1.

Table 1. Basic data

№ of alternative/ criterion	Distance (km)	The cost of land, thousand/($)	Number of years before overhaul of heating networks
1	20	280765	10
2	21	312142	4
3	16	493900	25
4	13	548622	14

From the table 1 can be seen that almost all figures have different units of measurement.

While using method of multicriteria alternatives term is minimized to duration before overhaul of heating networks, and table 1upgraded to Table 2.

Table 2. Basic data for assessment

№ of alternative	Accessibility by road, (km)	The cost of land, thousand/($)	Number of years before overhaul of water systems	Summarized figures
1	0.875	0	(1-0.28)=0.72	0.903
2	1	0.11	(1-0)=1	1.11
3	0.345	0.79	(1-1)=0	2.135
4	0	1	(1-0.47)=0.53	1.47

After usage method of multicriteria alternatives Table 2 upgraded to Table 3.

Table 3. Results

№ of alternative	Accessibility by road, (km)	The cost ofland, thousand/($)	Number of years before overhaul of water systems	Summarized figures
1	0.875	0	0.72	1.595
2	1	0.11	1	1.11
3	0.875	0.79	0	1.135
4	0	1	0.53	1.53

Results obtained demonstrates the most suitable site under construction. On this example can see that in terms of cost and distance site № 2 is optimal.

4. Conclusion

Based on the performed study of the use of the multicriteria alternatives method in assessing land sites, the following should be emphasized:

- the considered method showed the objectivity of the assessment of the land site which is relevant within the framework of the "road map";
- the use of the multicriteria alternatives method is most optimal in urban construction, where it is necessary to take into account many parameters with different units of measurements;
- the method is transparent and comprehensible to consumers of valuation services, considering all factors influencing the evaluated object;

Thus, the proposed method can be used by different professionals involved in the sphere of evaluation activities. It would be also helpful to employees in the construction industry and specialists in other areas of the economy where the assessment of values with different units of measurements is required.

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