

CADASTRE AND LAND MONITORING

UDC 332.3: 528.44

YU. HUBAR, L. VINARCHYK

The Department of Cadaster of Territory of National University Lviv Polytechnic, 12, S. Bandera str., Lviv, 79013, Ukraine, tel. +38 (032) 2582631, email: Yurii.P.Hubar@lpnu.ua

METHODS FOR THE DETERMINATION OF EXTERNAL OBSOLESCENCE OF THE COMMERCIAL REAL ESTATE-CASE STUDY

<https://doi.org/10.23939/istcgcap2018.02.047>

The purpose of the study. Solving the problem of the calculation of aggregate obsolescence of a real estate object in general and external obsolescence in particular, as being less investigated and described in scientific papers is a topical issue. A topical issue being investigated and described in scientific papers is the problem of calculating the aggregate obsolescence of a real estate object, particularly its external obsolescence. The drawback of the existing methods of determining the external obsolescence (except a paired comparison method) is the necessity of storing a great amount of selling or renting data, which is rather difficult within Ukrainian market conditions. Current methods used for the investigation of external obsolescence of commercial real estate which require less data are proposed [ISA, 2017; NSA-1, 2003; NSA-2, 2004]. **Methodology.** In the process of real estate valuation obsolescence is considered to be an important factor for the valuation of buildings by the cost approach and is determined as sacrifice of utility or loss in value, due to several possible causes [Kharryson, 1994; Ekkert, 1997]. The subject of the investigation and analysis shows a potential gross revenue received from leasing; revenue losses from rental payments; the possibility of gain contingency; and transaction costs, that comprise net operating income. In this case they should serve as a market proof of the level of the rate of return of the real estate being evaluated. **The results.** Today the value of external obsolescence of the real estate is determined with the use of a large amount of market data. In general, the market comparison is a key position in determining aggregate improvements and depreciation and the aggregate depreciation is the difference between replacement or renewal costs and market improvement value, and depreciated cost of replacement of land improvements is a difference between the selling prices of real estate and market land value. The investigations related to the development of new methods of the estimation of the external obsolescence of real estate have been carried out. In the paper it is proven that for the improvement of the evaluating methodology of real estate and determining its external obsolescence new methods should be applied, which will allow the real estate evaluators to avoid subjectivity in calculations and, subsequently, "legal deficiency" in obtained results. **Scientific innovation.** Existing methods of valuation of the external obsolescence do not always meet modern market demands and it is necessary to develop new methods having certain advantages over the methods being widely used in practice. The introduction of new methods of calculating the external obsolescence of commercial real estate is important for improving the valuation methodology for modern real estate market of Ukraine. **Its practical significance.** The investigations enable obtaining the mathematical dependences for determining the correct and scientifically grounded coefficients of the external obsolescence for the commercial real estate property objects. It is feasible to apply the investigations represented in the paper for determining the external deterioration of commercial real estate with the purpose of the calculation of depreciated costs of replacement or depreciated costs with further calculation of its market value [Hubar, 2014, Perovich & Hubar, 2016].

Key words: aggregate obsolescence, external obsolescence, commercial real estate, valuation of real estate, price of liquidation, improvement, production volume.

Introduction

The application of the cost approach requires taking into account the obsolescence of the property in cases of a decrease in a property value due to the decrease in the parameters of its reliability and service properties. The price of real estate is influenced by some external factors such as changes in market environment, limitations of utility, which lower the value of real estate objects [Kirichek, 2016].

With the lapse of time any improvements lose their existing utility, and this causes the necessity of adjusting the cost of replacement (renewal) by the

value of depreciation for reflecting the influence on any physical deterioration, functional or external obsolescence of the valued object. Therefore, depreciation is a decrease in the price of real estate object during the life span of land improvements due to their obsolescence appearing under the influence of their exploitation and natural forces (physical deterioration); increasing mismatch between the functional characteristics of the object and current requirements (functional obsolescence); and also negative changes in the external social, economic and environmental conditions of its functioning (external obsolescence).

If drawbacks that appeared in the evaluation can be eliminated, the value of depreciation is determined on the basis of the calculation of the costs of the correction of the physical and/or functional state of improvements being valued or on the basis of direct comparison to the cost of improvements being in the same original state. In the case of nonremovable obsolescence this amount can be estimated only on the basis of direct comparison to the market price of similar properties.

For residential property, the value of external obsolescence is, as a rule, calculated on the basis of the comparison of predicted income from the most efficient utility of similar real estate on the date of the valuation with the predicted income from the most efficient utility of valued real estate object taking into account land improvements; predicted occupancy of the object of valuation under the condition of its most efficient utility with its designed capacity; selling prices of similar real estate objects showing the signs of economical obsolescence to the selling prices of similar real estate objects not showing the signs of such obsolescence, but being similar in other essential features [Kirichek, 2016].

While determining aggregate obsolescence of land improvements, it is necessary to bear in mind that market price for the buildings and constructions located in the places with increasing attractiveness will be the result of simultaneous influence of opposite processes of diminishing prices of the object due to the physical deterioration and functional obsolescence (which are considered to be negative) and increase in price due to external factors (which are positive) [Drapikovskiy et al., 2015].

The purpose

Solving the problem of the calculation of aggregate obsolescence of the real estate object and, in particular, external obsolescence has not been extensively investigated and described in scientific publications but is at present quite topical. The drawback of existed methods (despite the paired comparison method) of the determining the external obsolescence is that an valuator must collect vast amounts of data on selling or renting of similar real estate objects, which is rather difficult to accomplish under the modern market conditions in Ukraine. The proposed methods of the investigation of the external obsolescence of commercial real estate require smaller amount of such data. In the work specialized (commercial) real estate is considered as commercial and

production one, the latter not being represented solely on the real estate market.

Methodology

External obsolescence is the diminution in price of real estate due to the effect of social and economical factors or negative influence of environment (changes in the real estate market or legislation, disadvantages of the location) causing the decrease in its potential usefulness. The change in external obsolescence due to certain causes is calculated by the formula:

$$E_o = P_{bas} - P_{eval}, \quad (1)$$

where: E_o is external obsolescence, c.u. (conditional units, US dollars or Euros); P_{bas} is a selling price of similar objects before the change of the situation in the market, c.u.; P_{eval} is a selling price of similar objects after the changes of the situation in the market, c.u.

While physical deterioration and, to a great extent, functional obsolescence can be eliminated by the means of renovation or modernization of the object, the external obsolescence, as usual, is nonremovable.

The valuation of the influence of the close neighbourhood on the value of the object is quite a difficult problem, since it is possible to determine this influence only on the basis of the market data analysis.

One of the methods for the determination of the external obsolescence (the paired comparison method) is the analysis of comparative sale, when one of two objects being sold on the real estate market shows the signs of external obsolescence, but the other does not. The difference in prices allows coming to the conclusion about the value of depreciation caused by the external influence on the object of valuation. Another method for determining the external obsolescence is the comparison of rental income from two objects similar to the object of valuation. One of these objects shows the signs of external obsolescence (for example, office facilities located in the zone of the high level of noise pollution), the other does not. The capitalization of revenue losses due to the existence of this negative factor will characterize the value of external obsolescence [Dehtyarenko et al., 2002; McKenzie & Betts, 1992].

The examples of the external obsolescence include unfavourable changes:

- in demand and supply for the real estate including changes in demand and supply for goods

or services provided by enterprises located in this real estate object which can be general and influence the whole real estate of this kind or special in certain territory and influence only certain kind of real estate;

- its location in relation to transport infrastructure and/or environmental conditions.

Such obsolescence can be temporal or permanent, but cannot be eliminated by the owner or user of the real estate.

Since external obsolescence can change the market attractiveness of the object as a whole, it should be reflected not only in the costs of improvements, but also in the land value. Therefore, during the market data analysis it is important that the influence of external obsolescence on the land value should be isolated from its influence on the value of land improvements, for which it increases the depreciation caused by physical deterioration and functional obsolescence.

Today three methods of valuating the external obsolescent of real estate objects are known, namely, by:

- determining its part in aggregate depreciation;
- analysis of comparative data;
- capitalization of revenue losses.

External obsolescence as a part of aggregate depreciation

If aggregate depreciation of land improvements and coefficients of physical deterioration and functional obsolescence of land improvements have already been calculated, the difference of the values of these factors will show the part (contribution coefficient) in the aggregate depreciation of the external obsolescence.

For example, the industrial commercial property object was sold for 1 million c.u., in which market land value equals 150 thousand c.u. Therefore, market value of the building, that is, residual value (depreciated cost) of land improvements is 850 thousand c.u. At the same time, the costs of renewal of this building on the market on the date of valuation is 1,2 million c.u., general physical deterioration is estimated to be 100 thousand c.u. (removable – 80 thousand c.u., nonremovable – 20 thousand c.u.), and summarized functional obsolescence is to be 40 thousand c.u. (removable – 18 thousand c.u., nonremovable – 22 thousand c.u.). See Table 1 for respective calculations.

Table 1

Calculation of external obsolescence by the method of determining its part in the aggregate depreciation

Order of calculations	Results
Costs of replacement of improvements, c.u.	1,200,000
Depreciated cost of improvements, c.u.	850,000
<i>Aggregate depreciation, c.u.</i>	<i>350,000</i>
Physical deterioration, c.u., including	100,000
removable, c.u.	80,000
nonremovable, c.u.	20,000
Functional obsolescence, c.u., including	40,000
removable, c.u.	18,000
nonremovable, c.u.	22,000
<i>Pooled estimate of physical deterioration and functional obsolescence, c.u.</i>	<i>140,000</i>
Part of external obsolescence in aggregate obsolescence of land improvements, c.u.	210,000

Therefore, the value of the correction caused by the external obsolescence is estimated to be 210 thousand c.u. [Drapikovskiy et al., 2015].

External obsolescence estimated on the basis of comparative data analysis

The value of the correction caused by the external obsolescence can be calculated by the paired comparison of market data on the selling

prices of similar improvements and land sites without development which differentiate only by their environment.

For example, it is necessary to estimate the external obsolescence of land improvements of 54-flat building caused by the nearby location of a new industrial object.

It is known that in general selling prices of flats in buildings of this kind in the influence zone of the

industrial plant decreased to 18 thousand c.u., which is 4 thousand c.u. less than in buildings located outside the industrial zone influence. Such a tendency can be observed in recent selling prices of spare land sites intended for building of this kind of real estate. In particular, the site intended for building of 63-flat residential house in the zone of the negative influence of the industrial enterprise was sold for 56.7 thousand c.u., and site intended for building of the 72-flat residential house outside the zone was sold for 79.2 thousand c.u.

Solving the task:

1. Let us determine the market value of land improvements on the date of valuation:

- in the zone of negative influence of industrial enterprise:

$$(18,000 \text{ c.u.} \times 63 \text{ flats}) - 56,700 \text{ c.u.} = \\ = 1,077,300 \text{ c.u.}, \text{ or } 17,100 \text{ c.u. per one flat};$$

- outside the zone of negative influence of the industrial object:

$$(22,000 \text{ c.u.} \times 72 \text{ flats}) - 79,200 \text{ c.u.} = \\ = 1,504,800 \text{ c.u.}, \text{ or } 20,900 \text{ c.u. per one flat.}$$

2. Then the value of correction for the depreciation of the land improvements caused by the change of attractiveness of the location of the object per one flat is determined:

$$20,900 \text{ c.u.} - 17,100 \text{ c.u.} = 3,800 \text{ c.u.}$$

3. Let us determine the general depreciation of the land improvements caused by the location of residential house being valued, inside the zone of negative influence of the industrial object:

$$3,800 \text{ c.u.} \times 54 \text{ flats} = 205,200 \text{ c.u.}$$

Therefore, the general depreciation of the land improvements of the 54-flat residential house caused by the external obsolescence is 205.2 thousand c.u.

In the given example the change of attractiveness of the location caused the loss of the land value as well as the land improvements. Therefore, for the determination of the depreciation of land improvements from the total external obsolescence of the valued object, which is equal to 216.0 thousand c.u.: $(22,000 \text{ c.u.} - 18,000 \text{ c.u.}) \times 54 \text{ flats} = 216,000 \text{ c.u.}$, it is necessary to separate out the value of the depreciation of the land.

For this let us determine a typical fraction of the site value as a part of a value of the residential houses (blocks of flats) in the neighbourhood of the valued object, which are located inside the zone of negative influence of industrial object and outside such a zone.

- inside the zone of negative influence of the industrial enterprise:

$$56,700 \text{ c.u.} / (18,000 \text{ c.u.} \times 63 \text{ flats}) = 0.05;$$

- outside the zone of negative influence of the industrial enterprise:

$$79,200 \text{ c.u.} / (22,000 \text{ c.u.} \times 72 \text{ flats}) = 0.05.$$

Therefore, the fraction of the land value in the value of the improved real estate in the zone of object location is 5%, which allows us to assume that land will have the same percentage rate in the total external obsolescence:

$$216,000 \text{ c.u.} \times 0.05 = 10,800 \text{ c.u.}$$

Then, the depreciation of land improvements of the 54-flat residential house caused by the external obsolescence will be $216,000 \text{ c.u.} \times (1 - 0.05) = 205,200 \text{ c.u.}$

External obsolescence evaluated on the basis of capitalization of revenue losses

The external obsolescence can cause of diminution of revenue received from leasing. As a rule, it happens as a result of excess supply appearing in the local market and changes the market attractiveness of the whole object, that is, the land and land improvements.

For estimating such obsolescence, it is necessary:

1. on the basis of the market analysis to determine the value of revenue losses;

2. to capitalize the value of revenue losses for obtaining the value of the losses in the price of the real estate as a whole;

3. to distribute the value of the correction for the total depreciation caused by the external obsolescence of the land and land improvements.

For example, it is necessary to evaluate the external obsolescence of land improvements of the office centre caused by excess supply, which appeared due to setting in operation a new office centre in the neighbourhood. It is also known that the total area of the office facilities in the evaluated object is 5,200 m² and monthly market rental payment for them decreased from 15.0 to 12.5 c.u. per m². The analysis of market data shows that a multiplier of the potential gross revenue is 8.0 and the fraction of the land value in the market price of the office real estate makes up 25%.

Solving the task:

1. Let us determine the amount of annual losses of the valued object caused by the reduction in rental payments:

$$(15 \text{ c.u.} - 12.5 \text{ c.u.}) \times 12 \text{ months} \times 5,200 \text{ m}^2 = \\ = 156,000 \text{ c.u.}$$

2. Then the reduction of the cost of the valued object caused by the external obsolescence is determined:

$$156,000 \text{ c.u.} \times 8.0 = 1,248,000 \text{ c.u.}$$

3. The value of correction for the external obsolescence of the land improvements is calculated:

$$1,248,000 \text{ c.u.} \times (1 - 0.25) = 936,000 \text{ c.u.}$$

4. Then the extent of the correction for the external obsolescence of land improvements in percentage terms is determined:

$$\frac{936,000 \text{ c.u.}}{(1,248,000 \text{ c.u.} + 936,000 \text{ c.u.})} \times 100\% = 43\%.$$

Thereby, the external obsolescence of the land improvements of the office centre as a result of excess supply is 936.0 thousand c.u., or 43 %.

Practical importance of considered examples of the distribution of external obsolescence among the physical components of real estate consists in the fact, that while determining the aggregate depreciation of land improvement caused by simultaneous effect of physical deterioration, functional obsolescence and external obsolescence, the price loss of the land did not include the improvement costs. However, external obsolescence can concern exclusively land improvements. As a rule, it appears in the cases, when the real estate is improved more than less than it was necessary [Drapikovskiy et al., 2015; Dehtyarenko et al., 2002].

The results

Proposed methods of valuation of external obsolescence

Calculation of external obsolescence taking into account changes of production volumes of objects of commercial real estate

Commercial real estate includes the estate property which according to its properties is sold very seldom or never, or is leased on the open competitive market for continuing its existing utility, except in cases when it is considered as a part of an operating enterprise. The special character of the estate can be determined by its size, location, construction peculiarities of improvement, or by the combination of these factors. It can be also related to the characteristics of the machines and other equipment installed in the building, or with specific functions or aims which these buildings provide. Typical examples of commercial (specialized) real estate are refineries and chemical plants, power stations, docks, depots, medical service objects etc [Ventolo & Williams, 2005].

Under the current market conditions the application of methods mentioned above is rather

problematic, since the extent of the modern development of the real estate market is not perfect and together with the scarcity of data does not enable us to state that these data are reliable and accurate. The method which provides the connection between the value of the external obsolescence and the level of utilizing the industrial capacity of commercial real estate objects is proposed. The valuation of physical deterioration and functional obsolescence of the real estate objects is usually performed without connection with production volumes. However, the value of the external obsolescence can be approximately estimated as the function of a drop in production volumes of the commercial real estate object.

Let us assume that there exists some mutual dependency of production volumes before the change in the market V_{bas} and under the conditions on the date of valuation V_{eval} (after the change of market situation), as well as the prices of the objects under respective conditions P_{bas} and P_{eval} . While the estimation of the external obsolescence of machines and equipment is being conducted, power dependence of the price on the value of the main parameter of the machine is used, and, in our opinion, this dependency can be used for the estimation of the external obsolescence of real estate taking into account the production volume as the main parameter of the real estate object:

$$\frac{P_{eval}}{P_{bas}} = \left(m \times \frac{V_{bas}}{V_{eval}} \right)^K, \quad (2)$$

where: m is a fraction of the value of a price (production volume) of commercial real estate in the value of the property complex; K is a power coefficient of slowdown describing the correlation between the parameters of power dependency.

For applying this method it is necessary to find the selling prices of similar objects in the real estate market which correspond to their different production volumes. Let us assume that following data on the similar object are known:

$$\frac{P_{eval}}{P_{bas}} = 0.61; \quad m \times \frac{V_{bas}}{V_{eval}} = 0.48,$$

then according to formula (2):

$$0.61 = 0.48^K, \text{ accordingly}$$

$$K = \frac{\ln 0.61}{\ln 0.48} = \frac{-0.4943}{-0.7340} = 0.6734.$$

If for the object of valuation $m \times \frac{V_{bas}}{V_{eval}} = 0.58$, then:

$$P_{eval} = P_{bas} \times \left(m \times \frac{V_{bas}}{V_{eval}} \right)^K =$$

$$= P_{bas} \times 0.58^{0.6734} = 0.693 \times P_{bas}$$

Now with the use of formula (1), the coefficient of taking into account the external obsolescence of the object of valuation can be obtained

$$O_e = P_{bas} - P_{eval} = P_{bas} \times (1 - 0.693) = 0.307 \times P_{bas}$$

Analyzing the result obtained, we can state that the external obsolescence of a given object of valuation is 30.7% from the selling price of the similar objects before the change of market situation.

However, quite often the situations occur when the data on the prices of real estate objects depending on the production volume are absent, and then it is advisable to consider another method of estimating the external obsolescence of

commercial real estate.

Calculation of external obsolescence by taking into account the liquidation value of the real estate object

Let us assume, that the price of the real estate object (integrated property complex) decreases more slowly, than production does, since at the moment of total halt of production ($V_{eval} = 0$) the price of the object tends to its liquidation value P_{liq} ($P_{eval} \rightarrow P_{liq}$).

Let us consider that the price of the object of valuation changes linearly from P_{liq} to P_{eval} at the changes of production values from 0 to V_{bas} (Fig. 1) [Rutgaizer V., 1998].

Using figure 1 and the similarity of triangles, we can write down:

$$\frac{P_{eval} - P_{liq}}{V_{eval}} = \frac{P_{bas} - P_{liq}}{V_{bas}}, \quad (3)$$

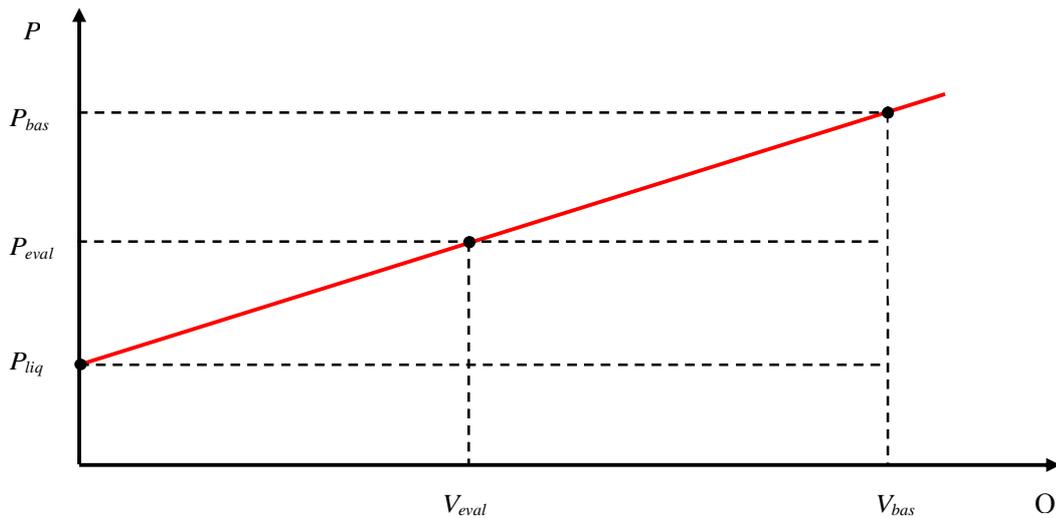


Fig. 1. Graph of the dependence of selling price on production volumes after the change of market situation

From this we will obtain:

$$P_{eval} = P_{liq} + \frac{V_{eval}}{V_{bas}} \times (P_{bas} - P_{liq}), \quad (4)$$

or

$$\frac{P_{eval}}{P_{bas}} = \frac{P_{liq}}{P_{bas}} + \frac{V_{eval}}{V_{bas}} \times \left(1 - \frac{P_{liq}}{P_{bas}} \right). \quad (5)$$

For estimating such values as P_{liq} and P_{liq}/P_{bas} it is possible to use the market data or the data published in specialized periodicals. Therefore, let us assume that for similar object:

$$\frac{P_{liq}}{P_{bas}} = 0.61 \text{ and } \frac{V_{eval}}{V_{bas}} = 0.48,$$

then, applying formula (5), we obtain:

$$\frac{P_{eval}}{P_{bas}} = 0.61 + 0.48 \times (1 - 0.61) = 0.80,$$

that is:

$$P_{eval} = 0.80 \times P_{bas},$$

$$O_e = P_{bas} - P_{eval} = P_{bas} \times (1 - 0.80) = 0.20 \times P_{bas}$$

Therefore, having analysed the obtained results, the authors can state that external obsolescence of the given object of valuation is 20% of the selling price of the similar objects before the change of the market situation.

Today the value of external obsolescence of the real estate is determined with the use of a large amount of market data. In general, the market comparison is a key position in determining the degree of aggregate depreciation of existed improvements in compared to new ones. Per se, the aggregate depreciation is the difference between replacement or renewal costs and market improvement value, and depreciated cost of replacement of land improvements is a difference between the selling prices of real estate and market land value. The investigations related to the development of new methods of the estimation of the external obsolescence of real estate have been carried out. In the paper it is proven that for the improvement of the evaluating methodology of real estate and determining its external obsolescence new methods should be applied, which will assist the real estate valuers avoiding subjectivity in calculations and, accordingly, “legal deficiency” in obtained results.

Scientific innovation

Existed methods of valuation of the external obsolescence do not always meet modern market demands and it is necessary to develop new methods having certain advantages over the methods being widely used in practice. The introduction of new methods of calculating the external obsolescence of commercial real estate is important for improving the valuation methodology for modern real estate market of Ukraine.

Its practical significance

In the work the practical realization of theoretical research is developed. The investigations enable obtaining the mathematical dependences for determining the correct and scientifically grounded coefficients of the external obsolescence for the commercial real estate property objects. It is feasible to apply the investigations represented in the paper for determining the external deterioration of commercial real estate with the purpose of the calculation of depreciated costs of replacement or depreciated costs with further calculation of its market value [Hubar, 2014, Perovich & Hubar, 2016].

Conclusions

1. In formerly known three methods of determining the external obsolescence, the necessary condition for conducting calculations is the high level of the development of the real estate market, that is, the existence of enough amounts of data on selling or renting similar objects of real estate.

2. The proposed fourth method requires a much smaller corpus of such data (one object can be enough for the investigation), but these data should be supplemented by the information about the production volumes. Therefore, the approximate value of the external obsolescence is obtained, which is adjusted and made more precise while analyzing the market of real estate.

3. In the fifth method, the analysis of the most efficient use of the real estate should be conducted before determining the external obsolescence. Only after such an analysis the further calculations may be carried out. Along with the production volumes, it is advisable to use the value of the liquidation costs of commercial real estate, which can reduce the amount of necessary data being difficult to obtain at the undeveloped real estate market.

Further research prospects are the generalization and investigations into strengths and weaknesses of the estimating methods of the external obsolescence of real estate with the aim of improving the valuating techniques for current market of real estate of Ukraine. In further investigations the application of correlation analysis is possible, which will allow determining the form of mathematical dependency of the price of real estate on the pricing factors.

REFERENCES

- Dexyarenko, Yu. F., Lykhohrud, M. H., Mantsevych, Yu. M., Palekha (2002). Methodological basis of monetary valuation of land in Ukraine: tutorial. Kyiv: „Profi”, 256.
- Drapikovskiy, O. I., Ivanova, I. B., Krumelis, Yu. V. (2015). *Real estate valuation: Tutorial*. Kyiv: TOV “Sik Grup Ukrayina”, 424.
- Estimation of the market value of machinery and equipment: teaching practical manual. (1998), edited by V. M. Rutgajzera. Moscow: Delo. 488.
- Hubar, Yu., Hubar, A. (2014). Investigation of the effect of aggregate depreciation on the cadastral cost of real estate of settlements. *Scientific Bulletin of the Uzhgorod University. Series “Geography. Land management”*. Nature use, 3, 178–190.
- International Valuation Standards MSO-1. (2017). The market value as the basis of evaluation. International Committee for Property Valuation Standards (IVSC).

- Jack P., Friedman, Jack C., Harris, J. Bruce, Lindeman (2012). Dictionary of Real Estate Terms Third Edition. Barron's Educational Series, Inc., New York.
- Jack P., Friedman, Nicolas, Ordway. (2013). Income Property Appraisal and Analysis. American Society of Appraisers, Prentice Hall, New Jersey.
- Kharryson, H. S. (1994). *Real estate valuation: tutorial*. [English translation]. Moscow: RYO Mosobluprpol'yhrafyzdata, 231.
- Kirichek, Yu. O. (2016). *Land valuation: tutorial*. Dnipropetrovsk: Litohraf. 454.
- McKenzie, M., Betts, R. (1992). Essentials of Real Estate Economics. 3th ed. New Jersey: Prentice Hall, Englewood Cliffs, 336.
- National Valuation Standards no. 1 (2003). "General principles of valuation of property and property rights", approved by the Resolution of the Cabinet of Ministers of Ukraine dated September 10, 2003, no. 1440.
- National Valuation Standards no. 2 (2004). "Estimation of real estate", approved by the Cabinet of Ministers of Ukraine dated October 28, 2004, no. 1442.
- Organization valuation and taxation of real estate* (1997), edited by Dzhozefa K. Эkkerta. Moscow. Russian Society of Appraisers, Academy of Appraisals, Star Inter, 1, 382, 2, 442.
- Organization of real estate valuation* (1999), edited by Dzh. K. Эkkerta. Moscow, ROO, 325.
- Perovych, L. M., Hubar, Yu. P. (2016). *Real estate valuation: tutorial*. Lviv Polytechnic National University. 303.
- Ventolo, W., Williams, M. (2005). Fundamentals of Real Estate Appraisal, 9th ed. Chicago: Dearborn Real Estate Education. 445.

Ю. ГУБАР, Л. ВИНАРЧИК

Кафедра кадастру територій, Національний університет "Львівська політехніка", вул. С. Бандери, 12, Львів, Україна, 79013, тел. +38(032)2582631, ел. пошта Yuriy.P.Hubar@lpnu.ua

ДОСЛІДЖЕННЯ МЕТОДІВ ВИЗНАЧЕННЯ ЗОВНІШНЬОГО ЗНОСУ СПЕЦІАЛІЗОВАНОЇ НЕРУХОМОСТІ

Мета. Актуальним є вирішення проблеми розрахунку сукупного зносу об'єкта нерухомості, а особливо зовнішнього зносу, як мало дослідженого й описаного у наукових публікаціях. Недоліком існуючих методів (окрім методу парних порівнянь) визначення зовнішнього зносу є необхідність накопичення оцінювачем великої кількості даних продажу або оренди аналогічних об'єктів нерухомості, що у сучасних ринкових умовах України досить складно здійснити. Запропоновано методи дослідження зовнішнього зносу спеціалізованої нерухомості, які вимагають меншого об'єму таких даних [МСО, 2017; НСО-1, 2003; НСО-2, 2004]. **Методика.** В оцінці нерухомості знос розглядають як важливий чинник для визначення вартості будівель і споруд витратним підходом та визначається як втрата корисності, а отже і вартості за будь-яких причин [Kharryson, 1994; Ekkert, 1997]. При цьому предметом дослідження і аналізу є потенційний валовий дохід від здачі в оренду нерухомості; втрати від недоотримання орендних платежів; можливість отримання додаткового прибутку та операційні витрати, тобто чистий операційний дохід. В цьому випадку вони повинні служити ринковим доказом рівня дохідності оцінюваної нерухомості. **Результати.** Сьогодні величина зовнішнього зносу спеціалізованої нерухомості визначається із використанням великої кількості ринкових даних. Загалом ринкове зіставлення є ключовим для визначення ступеню сукупного знецінення існуючих поліпшень в порівнянні з новими. За суттю, сукупне знецінення є різницею між вартістю заміщення або відновною вартістю і ринковою вартістю поліпшень, а залишкова вартість заміщення земельних поліпшень – це різниця між ціною продажу нерухомості і ринковою вартістю землі. Виконано дослідження пов'язані із розробленням нових методів оцінки зовнішнього зносу спеціалізованої нерухомості. В статті доведено, що з метою удосконалення методології оцінки нерухомості та визначення зовнішнього зносу необхідно використовувати нові методи, які дозволять оцінювачам уникнути суб'єктивності у розрахунках та відповідно "юридичної вразливості" отриманих результатів. **Наукова новизна.** Існуючі методи щодо оцінки зовнішнього зносу не завжди відповідають сучасним вимогам ринку нерухомості і необхідно розробляти нові методи, які матимуть переваги над методами, що широко застосовуються на практиці. Впроваджено нові методи розрахунку зовнішнього зносу спеціалізованої нерухомості важливо для удосконалення методології оцінки для сучасного ринку нерухомості України. **Практична значущість.** В роботі виконано практичну реалізацію теоретичних розробок. Дослідження дозволяють отримати математичні залежності для встановлення коректних і обґрунтованих коефіцієнтів зовнішнього зносу на об'єкти спеціалізованої нерухомості. Представлені в роботі дослідження доцільно застосувати для визначення зовнішнього зносу спеціалізованої нерухомості з метою розрахунку залишкової вартості заміщення або залишкової вартості із подальшим розрахунком її ринкової вартості [Губар, 2014, Перович, Губар, 2016].

Ключові слова: сукупний знос, зовнішній знос, спеціалізована нерухомість, оцінка нерухомості, ліквідаційна вартість, поліпшення, об'єм виробництва.

Received 27.02.2018

