A System of Indicators for Financial
Analysis of the Municipal Real Property

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Abstract: The paper presents a system of financial indicators for the efficiency of use of municipal real property. Such a system must provide for meeting the information needs of a number of internal and external consumers and is of primary significance in the analysis of municipalities' overall financial condition. The following may be pointed out as the major aspects of the practical analysis: i) the analysis of the municipality's provision with immoveable property; ii) the analysis of the efficient use of certain categories of municipal real property. The paper aims at clarifying the major moments in the analysis of the structure, composition, and effective use of municipal real property, and the determination of definite indicators to be applied to this analysis oriented towards its implementation. The wide variety of parameters is reduced to a system of 16 indicators: reporting value, depreciation, ratio of replacement, ratio of cost efficiency, ratio of revenue efficiency, return on total assets, return on revenues, return on expenses, ratio of the fitness, ratio of the repair, ratio of real energy provision, ratio of workload, present value of a series of regular cash flows, equivalent yield model, return on investment, return on investment. The paper presents the structure and content of the indicators of the analysis of the municipal real property, as well as the input of these indicators. The estimation (values) necessary to determine the indicators, the indicators themselves and their meaning make it possible to study the effectiveness of the operations (functioning) of the municipal real property in terms of description of its physical condition, structure, content, purpose and functions, which generates revenues or brings expenditures to the municipality. The system of indicators provides for decision making with a view to boosting the efficiency of public sector management and more specifically – the management of municipal real property.

Keywords: financial analysis; financial indicators; municipal real property

JEL Classification: G0; M41; H82

The financial analysis of the municipal real property is important element of the management in the public sector. In operates through a system of indicators, which are interrelated and therefore should be applied as a system.

The following main indicators have been selected: The reporting value of the fixed tangible assets /FTA/ at the end of the year (RVe); Depreciation of the FTA at the

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end of the year (De); Depreciation of the FTA at the end of the year (De); Ratio of replacement of FTA (Rr); Ratio of cost efficiency (Rce); Ratio of revenue efficiency (Rre); Return on total assets (ROTA); Return on revenues (ROR); Return on expenses (ROEX); Ratio of the fitness of FTA (Rf); Ratio of the repair of FTA (Rr); Ratio of real energy provision (Rrep); Ratio of workload (Rw); Present value of a series of regular cash flows (PV); Equivalent yield model (V); Return on investment (RI1); Return on investment (RI2).

They are considered as being the most representative among the great variety of indicators, and as giving much information for the economic performance of the property.

Reporting value of fixed tangible assets (FTA) at the end of the year

$$RVe = RVb + RVay - RVdy,$$

where: RVe is the reporting value of the FTA at the end of the year, RVb is the reporting value of the FTA at the beginning of the year, RVay is the reporting value of the FTA acquired during the year, RVdy is the reporting value of the FTA disposed of during the year.

The analysis of the municipality's provision with fixed tangible assets belonging to public-law MRP is made with the purpose to establish, to asses and to analyze their price values, their composition and structure, as well as to trace the trends in their dynamics, physical and technical state, movement, etc.

As an information source this analysis draws upon the balance sheet and the note about the fixed tangible assets, which is an annex to the municipality's annual financial statement, as is the case with all enterprises in the EU member states. This note provides good information opportunities to establish the carrying value of the municipality's fixed tangible assets (property) at the end of the reporting period, and to trace its dynamics during this period, and to establish the increase or decrease of assets (their dynamics) and to trace their movement. This indicator may be used in the municipal real property management by tracking its dynamics in time to arrive at the sustainable trends – the growth of the indicators shows the increase in the municipal real property, which is an indicator of the municipality's wealth and of its high balance figure and financial stability. However, it must be taken into account that it is not always the case that the increased value of this indicator is related to the increased quantity of municipal real property. Such an increase may be due to a revaluation of the immoveable property toward a over-valuation. Hence the analysis and assessment on the basis of reporting value of fixed tangible assets at the end of the year must always be accompanied by the tracing of the municipal real property. An increase in the assets acquired during the period will be established by RVay – reporting value of the FTA acquired during the year. If such an increase is established, it shows that the increased indicator is the result not of revaluation but of the renovation of the asset portfolio (real estate).

The increased indicator may be due to the reduced value of RVdy – reporting value of the FTA disposed of during the year. In general – this indicator rises with the renovation of the asset portfolio, and with the reduction of the disposed of assets or with an over-valuation of the available assets.

"The reporting value of FTA at the end of the year" indicator is specifically relevant because it gives an idea about the absolute value of the assets comprising the municipal real property's portfolio within a certain period. To serve management purposes, it is possible to estimate this indicator by homogeneous types and groups of municipal real property. What attaches even greater significance to this indicator is its use in the estimation of a number of indicators which characterize some aspect of the municipality's provision with immoveable assets and their effective utilization. For instance, "The reporting value of FTA at the end of the year' indicator" is applied to the assessment of economic profitability from the asset utilization.

"The reporting value of fixed tangible assets at the end of the year" indicator may be estimated according to the periods adopted in the municipality's accounting policy on the assessment and analysis of the asset portfolio in the form of municipal real property.

Depreciation of the fixed tangible assets (FTA) at the end of the year

$$De = Db + DCy - DCdy,$$

where: De is the depreciation of the FTA at the end of the year, Db is the depreciation of the FTA at the beginning of the year, DCy is the depreciation charges on FTA throughout the year; DCdy is the depreciation charges on the FTA disposed of during the year.

This indicator is used in the assessment and analysis of the asset values, which is also part of the municipality's provision with fixed tangible assets within the category of public-law MRP. The objective is to assess the depreciation of municipal real property by the end of the reporting period – month, quarter, half a year, year, etc. This facilitates the formation of the property's carrying value. The carrying value of the immoveable municipal real property portfolio is determined as the difference between the reporting value of FTA and the depreciation of FTA.

The increasing values of this indicator reveal an increase in the depreciation charges with accumulation (from the start of the depreciation period up to the analyzed period). The increased depreciation leads to the reduction of the carrying value of the municipal real property, which in turn suggests an out-dated municipal property portfolio. When the sustainable trends in this respect are traced in time decisions can be made with regard to the renovation of municipal real property, the writing off of some groups of assets, their liquidation, etc. It must be taken into account that the increase in the "Depreciation of the FTA" indicator may be due to

the changed depreciation method. As a result this will have a dynamic effect on Db – depreciation of the FTA at the beginning of the year, when this change is not due to the acquisition of many depreciable assets in the period, but to the change in the depreciation method (for instance, if a linear method has been applied, which has later been replaced by a digressive method with a higher depreciation rate for the period).

Such changes are admissible, if they result in the more frequent and complete presentation of the municipal real property in the municipality's financial statements. Such changes, as well as their effects must be disclosed in the annexes attached to the municipality's financial statements. The effects of such changes are namely with regard to the "Depreciation of the FTA" indicator and hence to the carrying value of the immoveable municipal property portfolio formed as the difference between "The reporting value of FTA" and "Depreciation of the FTA". Hence in the assessment and analysis of this indicator it is essential to reveal the reasons which have determined its change, and, in case the reason is the wear-and-tear of the asset portfolio, ways and means for its renewal must be sought or a revaluation of the available municipal real property must be undertaken.

Ratio of replacement of fixed tangible assets

This indicator shows to what an extent the municipality renovates and has the opportunity to acquire new property. Its tracking in time reveals the municipality's ability to renovate its portfolio of assets. This is an indicator of financial stability and management expertise.

$$Rr = FTAa / FTAb,$$

where: Rr is the ratio of renovation, FTAa is the price value of FTA acquired throughout the year, FTAb is the price value of FTA at the beginning of the year;

This ratio may be calculated by groups of FTA and by specific types of FTA of municipal real property. The increase in the "Ratio of replacement of FTA" is a good sign of the renewal of municipal real property. The higher the values of this indicator are, the better the renewal of the municipal real asset portfolio is. The tracing of the dynamics of the "Ratio of replacement of FTA" in time will reveal the trends in the renewal of the municipal real property by groups and by specific types. Low values of the "Ratio of replacement of FTA", their declining trend in time or by groups or by specific assets is a sign of the need to assess and analyze the "Depreciation of the FTA", as well as the carrying value of the municipal real assets portfolio formed as the difference between "The reporting value of Fixed Tangible Assets" and "Depreciation of the FTA". The tracing of their dynamics in time could reveal the need for a revaluation of immoveable municipal real property because of the low "Ratio of replacement of FTA".

Cost efficiency ratio

$$Rce. = OSc / Osr,$$

where: Rce is the ratio of cost efficiency; OSc is the overall value (sum) of costs by specific properties or elements, OSr is the overall value (sum) of revenues by specific properties or elements.

This indicator is determined in two stages: classification of maintenance costs per private-law MRP; analysis of expenditures (overall evaluation of expenditures in the municipality's income statement). The purpose of classification of maintenance costs per private-law MRP this classification is to establish the major categories of the economic gains that have been reduced during the accounting period generated by the maintenance and management of this municipal real property. The analysis of the expenditures related to this property's maintenance and functioning requires that the composition and structure of these expenditures are tracked. The analysis must include the analysis of the dynamics and structure of costs by economic elements. The changes in the costs during the current period compared to those during the base (previous) period provide information of the dynamics of costs. On the basis of such information the analyst can reveal the reasons behind the existing negative trends in the dynamics of costs. The changes in the share of costs in the current period compared to those during the base /previous/ period provides information of effective management effects with a view to optimizing the structure of costs on the maintenance of private-law MRP.

Subsequently, the "Cost efficiency ratio" by specific properties (fixed assets) may be estimated, or by elements of expenditures. The high values of this indicator reveal an excess of revenues over expenditures на and indicate losses incurred by the utilization of the municipal real property. In such a case action may be taken with a view to revealing the expenditures which largely determine the high values of this indicator and therefore bring most losses. Their dynamics in time may be traced, in order to reveal the reasons underlying these trends and undertake action to reduce the expenditures in question, which will in turn reduce the losses incurred by the utilization of the municipal real property. The high values of this indicator may possibly be due not to increased expenditures, but to decreased revenues. In such a case action is taken to estimate and analyze the next indicator.

Ratio of revenue efficiency

$$Rre = OSr / OSc,$$

where: Rre is the ratio of revenue efficiency, OSr is the overall value (sum) of revenues by specific properties or elements, OSc is the overall value (sum) of costs by specific properties or elements;

This indicator is determined in two stages: classification of revenues generated from rent, sales and transactions with private-law MRP; analysis of revenues (overall assessment of the revenues from the municipality's income statement). The purpose of the classification revenues from rent, sales and transactions with the property of the category of private ownership is to study, establish or assess the major sources of the increase of economic gains from the transactions with private-law MRP. The analysis of the revenues from the transactions with this property helps trace the changes in the composition and structure of these revenues.

The changes in the value of revenues in the current period compared to the base (previous) period provide information about revenues' dynamics. On the basis of this information the analyst may reveal the factors determining the negative trends in the revenues' dynamics. The changes in the share of revenues in the current period to the base (previous) period provides information to make effective management decisions with a view to optimizing the structure of revenues generated by private-law MRP.

On this basis the "Ratio of revenue efficiency" may be determined. The high values of this indicator reveal a higher growth rate of revenues compared to the growth rate of expenditures. A detailed structural analysis of revenues could possibly facilitate the optimization of the structure of revenues, their relative share and their dynamics. This indicator aims at helping analysts find the ways and means to increase the growth rate of revenues as a factor of profit, compared to the other factor – expenditures.

Model of analysis of profitability

The profitability indicators reflect the yield (return on) revenues, expenditures, assets, capital, etc. Usually profitability is calculated by relating the financial result (profit or loss) to some base.

- Return on total assets (ROTA) - Indicators that reveal the economic profitability (Profitability based on assets):

ROTA = Reporting value of property / Financial result from property;

- Return on revenue (ROR) - Indicators that reveal the commercial profitability (profitability based on revenues):

ROR = Revenues from property / Financial result from property;

- Return on expenses (ROEX) - Indicators that reveal the cost-related profitability (cost-based profitability):

ROEX = Expenses related to property / Financial result from property.

In the estimation of indicators it must be taken into account that the financial result is the profit or loss – it is formed as the difference between revenues and expenditures. Hence if these indicators are negative values or show a negative growth in the course of time, this reveals losses or negative trends in the use of private-law MRP.

ROTA shows how many Euros of the asset's accounting value have contributed to making a euro of profit. Thus if there is an immoveable property with a reporting value worth 1000 Euros, which has brought a profit 10 Euros, the ROTA will be 100 Euros, that is every 100 Euros of the property's value has brought a profit worth 1 euro. This indicator decreases in value with every increase in profit. It reaches the value of 1 at the point where the asset's reporting value is equal to the profit it brings. As it was mentioned above, the negative values of this indicator are the result of incurred losses. In the financial statements the loss is presented as a negative result with a minus (indicated in brackets). This indicator reveals the return on property. The goal is to achieve a higher return through the more effective utilization of the property – the increase in revenues and the decrease in expenditures on the assets' maintenance.

ROR shows how many Euros in revenues have contributed to 1 euro in profit. This indicator increases in value in the cases when revenues rise given an unchanged level of profit. This is not a good sign, as it shows that increased revenues have been achieved by increased expenditures, without raising the profit level. The same effect may be achieved at an unchanged level of revenues, but a decreased profit. Such a case again shows increased expenditures, or increased ratios of tax deduction or incurring contingent losses and writing off of assets, which reduce the financial result despite the retained level of revenues. Because of the relation and dependence between revenues, expenditures and the financial result, this indicator must always be compared to indicator ROEX. The rising value of the last indicator in time reveal increasing expenditures given an unchanged profit compared to the base period. The purpose of this complex assessment and analysis of the two indicators is to reach a situation in which revenues grow at a higher rate than expenditures, while the latter are reduced to reasonable levels or maintained within certain limits, which would raise the financial results and the effective utilization of municipal real property. The negative values of the indicators expose a loss (a negative financial result) incurred during the analyzed period.

Ratio of fitness of the assets

This ratio complements the previous indicator, as the decrease of the assets' reporting value as a result of the accumulated wear and tear. In this sense their "fitness" shows whether they could be used:

$$Rf = CV / RV,$$

where: Rf is the ratio of fitness of FTA, CV is the carrying value of FTA, RV is the reporting value of FTA.

This indicator represents the relation between the carrying value of municipal real property (by groups or by specific types of assets and its reporting value). As it has already been mentioned, the carrying value is formed as the difference between the assets' reporting value and the depreciation charges accumulated as of the moment. In this sense the carrying value reflects the "underutilized", "non-depreciated" or "fit" part municipal real property. The lower this value is, the lower the indicator's values are. This exposes a reduction of MRP's fitness. The tracing of this indicator's dynamics in time, by groups and specific types of assets, and determining persistently declining trends reveals the need to renovate or repair the municipal real property.

Ratio of the repair of fixed tangible assets

This ratio provides the opportunity to track in time and within the asset groups their maintenance costs:

$$Rra = Cr / FTAav.,$$

where: Rra is the ratio of the repair of FTA, Cr is the value of repair costs of FTA, FTAav is the average residual value of FTA.

This indicator is used for the analysis of the costs for the repair of assets. In its estimation we should pay attention to the methods of determining FTAav. The determination of FTAav is an element of the analysis of the municipality's provision with assets (properties from the category of public-law MRP). We must point out that the average value of FTA may be determined also as an ordinary average chronological value and as a weighted average chronological value. The determination of the average value as an ordinary average chronological value is estimated in the cases when the acquisition of FTA during the year is constant. Then this is how the average value of FTA is determined:

$$FTAave = \frac{(\dfrac{FTAb}{2} + FTA1 + FTA2 + ... + \dfrac{FTAe}{2})}{D - 1}$$

where: FTAav is average remain of FTA during the year, FTAb is the price value of FTA at the beginning of the year, FTAe is the price value of FTA at the end of the year;

FTA1+ FTA2+... is the price value of FTA at the end of each month, and N is the number of periods.

In the cases where the FTA dynamics is characterized by irregularity during the accounting period, it is appropriate for the average value of FTA to be determined as a weighted average chronological value:

$$FTAav = \frac{FTAb + FTAay \times Ta}{12} - \frac{FTAdy \times Td}{12}$$

where: FTav is the average remain of FTA throughout the year, FTAb is the price value of FTA at the beginning of the year, FTAay is the price value of FTA acquired during the year, FTAdy is the price value of FTA disposed of during the year, Ta is the time (in months), during which the acquired assets have been used throughout the year, Td is the time (in months) in which the disposed of assets have not been used.

The indicators of the average amount of FTA are of a central importance in determining the absolute price value of the FTA, the provision with FTA and the efficiency of their use.

Once the FTAav is estimated, we may move on to estimating the ratio of the repair of FTA. The higher the repair costs, the higher the indicator's values (given the level of FTAav is retained). When the dynamics of municipal real assets by groups and specific types is traced in time, the municipal leadership may assess whether the further utilization of these assets is effective and whether they do not bring too many repair costs so that it would be better to make a decision for their sale, replacement, writing off, etc, rather than continue to utilize them by purpose.

Ratio of actual energy provision of operation of assets /property/

Raer = E / Avwop or *E / Wmh,*

where: Raer is the ratio of actual energy provision of operation of assets; E is the consumed electricity /in kilowatts/ as a condition for operation of the asset, Avwop is the average number by payroll of workers and officials serving the activity, Wmh is the working man-hours ratio of real energy provision of the activity.

This indicator provides for the assessment and analysis of the consumed electricity in relation to the average number by payroll of workers in relation to the worked man-hours. It helps asses, analyze and optimize one of the expenditure items which have the highest relative share in municipalities – electricity consumption. The high provision of power supply (this indicator's high values) suggests high electricity expenditures. It is necessary to find the optimal ratio between the number of employees and their working hours and the consumed electricity (in kilowatt hours). This indicator helps establish the negative trends and single out measures to raise working discipline with regard to electricity consumption, which would impact the rising effectiveness of the utilization of municipal real property.

Ratio of workload

$$Rw = Vs / Arv,$$

where Vs is the value of the rendered social services and their public effect, and Arv is the average residual value of municipal real property;

This indicator helps asses and analyze the dynamics of the ratio between the value of the rendered social services and their public effect and the average residual value of municipal real property. Its high values reveal good opportunities to utilize of municipal real property for the rendering of social services. It must be borne in mind that the assessment of the value of the rendered social services and their public effect may be based on expenditures, which is an approximate estimation.

Present value of a series of regular cash flows

The economic analysis of municipal real property in terms of its utilization and management is connected with the comparison of indicators, which are related to different time periods. However, money changes its values in the course of time, which requires that these indicators should be estimated with regard to the same period, and this is usually the present period. Such is the case with determining the present value of the expected flow of future income (for instance, rent-generated income), which a property is expected to yield. This may be determined by applying the formula about the present value of the inflow of future revenues in the following form:

$$PV = \frac{FV}{(1+r)^n},$$

where PV is the present value, FV is the future value, r is the interest rate, and n is the length of the time period.

The above formula clearly shows that the net value of the inflow of future income falls when the period is extended in length or the interest rate goes up.

The very procedure of estimating the present value is referred to as discounting. It is applied to establishing the possible price at which the municipality will be inclined to dispose of a given property, for instance. It is also used in the estimation of the net present value, which represents the difference between the present value of the expected future revenues and the present value of the expenditures on the property throughout its entire life span and utilization.

The above-mentioned formula on applies in determining the present value of future income which will flow in at a specific future moment. In the majority of the

cases, however, municipal real properties yield regular cash flows and then the present value could be calculated in the following way[1]:

$$PV = \frac{a\left[1-(1+r)^{-n}\right]}{r},$$

where: a is the annuity (for instance, rent); r is the interest rate; and n is the length of the time period.

What is the explanatory power of the above described indicator? For example, let assume that the municipality owns a building for economic usage, which could be sold on the free market. If the municipal authorities want to take decision for the municipal real property disposal, they have to compare the above indicator and the market price. Under the ceteris paribus assumption the building will be sold if the market price exceeds the present value of the regular rent payments.

Equivalent yield model

The equivalent yield model is also based on the usage of the present value approach. It is usually applied for a valuation of the municipal real property for economic (investment) usage. The equivalent yield model assumes that there is a change in the rental income over time. So, the time period would be divided into two main subperiods – the period up to the next review and the period at the review. The second fundamental assumption is that there is an equal yield applied to both municipal real property and a similar property that has been sold recently. This model can be presented by the next equation[2]:

$$V = \frac{a}{y} + \frac{R-a}{y(1+y)^n},$$

where: a - is the current annuity (rent) up to its next review; R - is the value of rental income occurs at the review; n - is number of years to the next review; y - is the equivalent yield, derived from a similar recently sold property.

The model comprises a fixed term, representing a ratio of current income to the equivalent yield, and a present value of a rental income after the change.

The estimation of this indicator requires the access to reliable and updated information about the level of yield derived from a similar recently sold property. Another specific feature is related to the access to relevant information about the length of the period before the rent is to be changed, and to the rate of this rent in the present and subsequent sub-period. Part of this information may be contained in

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[1] See (Brown & Matysiak, 1999, pp. 13-28).
[2] See (Brown & Matysiak, 1999, pp. 13-28)

the rent agreement – for instance, the period and validity of this agreement and of the current rent, whereas another part of this information may be obtained through special expert

statements. In this respect it is logical to assume that this indicator should be estimated periodically by an expert in the valuation of property who, however, must be secured access to the entire information concerning the property in question.

Return on investment (1)

Return on investment is one of the most commonly used indicators for the assessment of the profitability of real estate investments. It concerns both the investment in the acquisition of a new MRP and the investment in the improvement of existent MRP which impact its valuation. The broadest definition of the return on investments is that it measures the annual percentage yield (profit) on the initial amount of investments. Profit is defined as a difference between an income that would be received from renting out or leasing the property, and total expenses on real estate. The indicator itself is estimated according to the following formula:

$$RI(1) = \frac{Profit}{Investment}.100$$

The obtained value RI(1) is compared to some target, which should be set by decision makers with regard to municipal real property management on the basis of expert assessments of the expected investment-generated profit. This target should take account of the processes taking place in the real estate market as well as agents' expectations with regard the future investment-generated revenues and the possible macroeconomic environment. The investment is considered to be acceptable if the return on investment RI(1) is greater than set target.

Return on investment (2)

The second version return on investment indicator is based on the level of rental income and takes the following form:

$$RI(2) = \frac{Rental\ income}{Investment}.100$$

As rent-generated revenues exceed profit, the indicator RI(2) is greater than RI(1).

The value of the second indicator for the return on investment should also be compared with its target value. In this case the target value is the rate of yield used for income capitalization, determined entirely on the basis of expert assessment. It is assumed that the investment will be acceptable if the return on investment RI(2) is higher than the yield used for income capitalization.

The indicators majority of their components do not contain, and could not be estimated on the basis of the information contained in the municipal real estate registry and in the municipal accounting systems. They are obtained only on the basis of special expert statement about the properties' economic assessment which is drafted by internal experts, and most often by external ones. Their statements, however, bring extra expenditures related to property management and are therefore made less frequently compared to remaining indicators. Their inclusion in the software product is founded on their relevance in the assessment of property management and on the assumption that, even though the fields are filled in relatively less often, the fields in question will add to the information base needed for strategic management decision making.

Conclusions

The paper presented the structure and content of the indicators of economic and financial analysis of the municipal real property. The estimation (values) necessary to determine the indicators, the indicators themselves and their meaning make it possible to study the effectiveness of the operations (functioning) of the municipal real property in terms of description of its physical condition, structure, content, purpose and functions, which generates revenues or brings expenditures to the municipality. The system of indicators provides for decision making with a view to boosting the efficiency of public sector management and more specifically– the management of municipal real property.

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