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MODEL OF RATIONAL HOUSING IN LITHUANIA

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1. Introduction

Development of housing takes an important place in economic, social and technological activities of a state. At the present moment, among the changes of public, economic, social situation in Lithuania, problems of housing are especially urgent. After the decrease in housing construction and investments in the country, the lack of dwellings has been revealed, problems of homeless people become pressing.

Housing problems are manifold and no complex examinations thereof have been made yet. A lot of variable factors of micro- and macro-level determines the efficiency of housing and trends of its development. Variable factors of macro-level such as a level of economic, social and technological situation of a country, documents regulating construction industry, monetary and fiscal system, inflation, situation on the market, etc, and factors of micro-level such as activities of construction industry companies, financing building organizations, qualification improvement of employees, processes of design, construction and maintenance, etc have a complex influence on the efficiency and development of housing.

The general regularities of these factors affecting the efficiency of housing, trends of their development, mutual dependence are not clear enough. In the present dynamic situation, a question arises how impartially to make prognoses of the future volume of housing. One of possibilities is modelling Lithuanian housing in order to examine the efficient surroundings of housing, ie to determine variable factors of micro- and macro-level that could increase the effectual activities of housing.

The current state of housing and the trends of its development were analyzed from various conceptual and quantitative perspectives by a number of scientists. For instance, P. Balchin [1] studied economic, social and

political problems related to dwelling acquisition. M. Ball [2] considered the problems of reducing state expenditures on dwelling, crediting, long-term loans and their various economic, social and political aspects. R. C. Harvey [3] discussed the way the government can affect the housing market through finances, regulating documentation and contracts. In particular, he studied the UK dwelling subsidies, funding and taxes and their effect on demand and offer. J. Hegedus [4] investigated housing strategy in Central and Eastern Europe while P. H. Hillebrandt [5] considered the ways of saving energy in operating buildings. J. Hills [6] summarized the cases when the government may intervene into housing market and the instruments of this intervention. He also dealt with some social problems related to housing. J. Sillince [7] studied some economic, social and political problems of housing. Conceptual and quantitative study of these problems was also performed by A. von Hoffman [8], P. Malpass [9], C. Zimmermann [10] and others.

Researchers from various countries use conceptual and quantitative forms of analysis while studying the effect of certain factors on the housing efficiency. However, the papers mentioned did not deal with a complex approach to housing without taking into account economic, quality, social, technological, infrastructural, legislative and other factors.

The main objective of this research is to present an analytical model of complex analysis of rational housing, following the variable factors of micro- and macro-level surroundings which determine effective selection of housing, to describe these factors comprehensively taking into consideration the gained experience and knowledge in advanced countries and countries of Central and Eastern Europe (CEE), to apply methods of multiple criteria analysis for solving problems of micro- and macro-level of housing, to prepare comparative

systems of indices comprehensively describing the housing. Implementation of this purpose allows to reach the complex increase in housing effectiveness.

2. Main stages of working out a model of rational housing in Lithuania

This research seeks to explore ways of harmonizing the relationship between the transition Lithuanian housing and its environment. The research includes the stages presented in Fig 1.

A model in the research is being considered as the system of specific rules in presence of which the housing of Lithuania would apply its potential opportunities. Prospects of future Lithuanian housing and the principal trends of development are linked with analysis of experience and knowledge gathered by advanced and CEE countries, and application thereof having evaluated the specific features of Lithuania. Having used expert methods and analysis of scientific literature, the micro- and macro-level factors are being determined as well as the systems and sub-systems of indices describing them, describing housing in the initial stage. In

accordance with the made systems of indices, a situation of housing in Lithuania, CEE and advanced countries is being described conceptually and quantitatively. Following the gathered information, a data-base is made describing variable indices of micro- and macro-level of various countries and their influence on housing. Inviting the information gathered in the database to help, the trends of housing development of advanced, CEE countries, differences of these countries and Lithuania in this field are determined [11].

Having made an analysis of housing differences in Lithuania, CEE and advanced countries on the micro- and macro-level, the tendencies of development of housing of Lithuania are determined.

In order to throw more light on the subject, further follow more detailed description of the some above mentioned stages of analysis.

3. Developing housing indicators

Indicators have been used informally for a very long time, particularly in economics, to evaluate the state of the nation and progress towards national objectives.

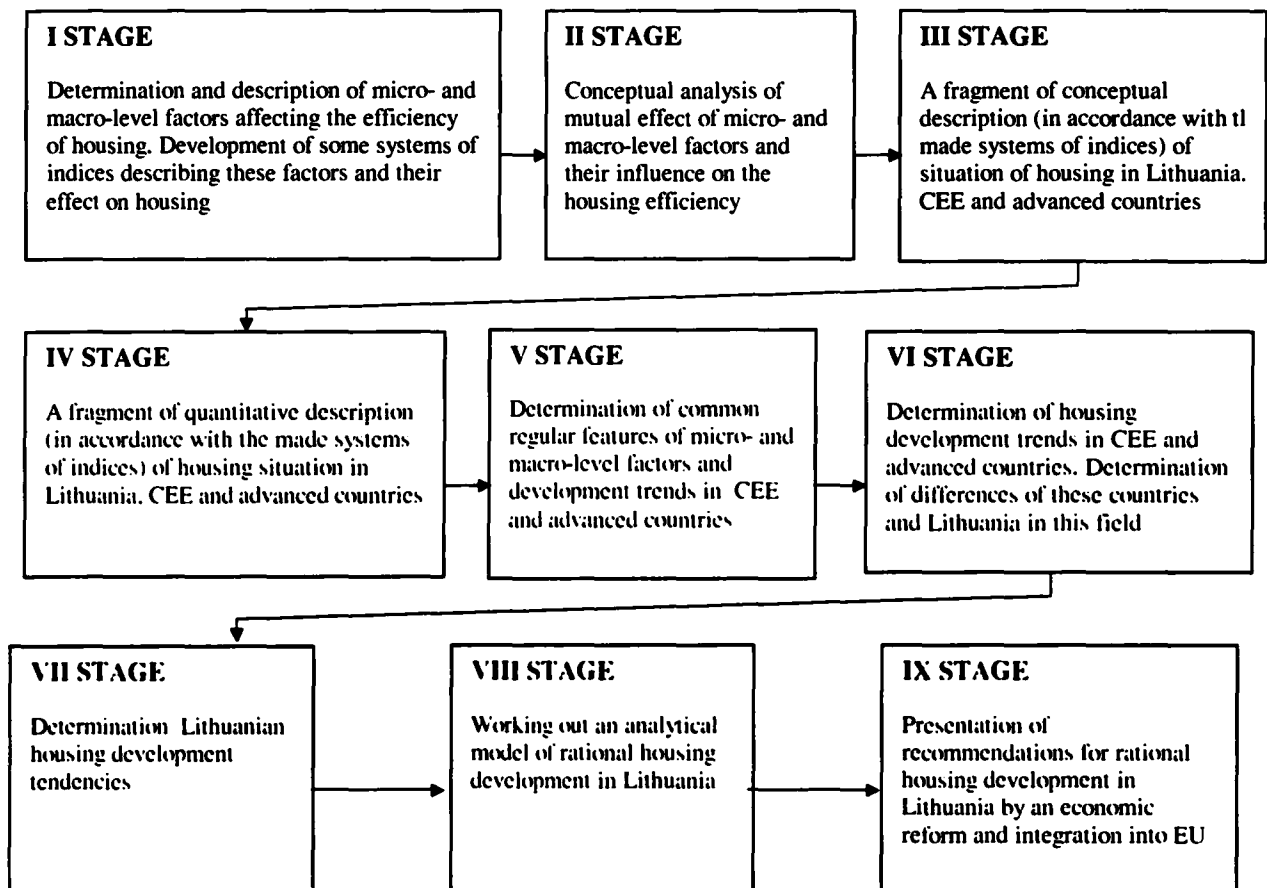


Fig 1. Main stages of working out a model of rational housing

Basically studies on housing indicators have related to particular parts of housing policy, such as housing needs or housing and neighborhood quality rather than to the housing as a whole [12]. Housing Indicators Program was initiated by World Bank and UN Centre for Human Settlement (Habitat) in 1990 and about 150 indicators have been undertaken in several countries. This model is broadly applicable to all policy areas, including housing. However Lithuanian and CEE housing has some unique features that are likely to require special attention.

The performed examinations [11] showed that while solving the problems of housing it is important to create the complex comparative systems of indices describing the housing. Two following systems of indices are suggested in the research:

- Complex system of indices allowing to evaluate the trends of housing policy and activities on a world-scale and allowing to evaluate the housing in countries of different economic development. System of indices allows to determine the problematic fields of housing and contradicting objectives of politics. The system includes indices divided into five groups: *indices describing economics as a whole complex* (GDP, per capita; registered unemployment rate; inflation; rate of interest); *indices describing the housing construction, investments and financing* (construction of dwellings per 1000 inhabitants, average useful floor space per dwelling, housing investments as a share of GDP, house price to income ratio, rent to income ratio, housing expenditure, mortgage to credit ratio, long term loans); *indices describing the countries of transitional period* (price liberalization, competition policy, banking reform and interest rate liberalization, governance and restructuring, securities markets and non-bank financial institutions, extensiveness and effectiveness of legal rules on investment); *indices describing the volume, quantity and density of housing* (dwellings per 1000 population, average useful floor space per person, average household size, occupants per dwelling, dwellings with piped water, dwellings with fixed bath shower, dwellings with flush toilet); *indices describing the housing policy* (dwellings by type of tenure, repair, renovation and energy efficiency, reduction of public expenditure on housing, policy must adequately reflect real situation in country).

- The complex system of housing indices intended to evaluate housing of Lithuania. A system of such

group of indices shows potential problems of Lithuanian housing and assists in finding out methods and means to improve the current situation. The system covers indices divided into six groups: *economic* (investment in housing, potential capacities of housing, public investment instruments, private investment instruments, rental policy, systems of housing subsidy); *social* (policies on social housing, social housing affordability and time of waiting); *qualitative, volume and density* (construction of new dwellings, dwellings by period of construction, classification of dwellings according to equipment, renovation, energy efficiency, land supply for housing); *institutional structures* (Seimas / Parliament, central government, counties, local authorities, private sector, owners associations); *legal bases* (law on local authority, law on housing subsidies, law on housing finance and credits, law on construction and maintenance, law on housing acquisition, law on rental housing, law on owners associations, law on restitution of ownership rights to residential houses, harmonization of the legislation and regulation on construction in conformity with those used in EU); *political priorities* (Seimas / Parliament level, governmental level, county level, local authority level).

Following the made systems of housing indices, a comparative analysis of Lithuania, 16 countries of Western Europe, 11 CEE countries and the USA is made, housing of Lithuania evaluated. Following the analysis, the fields of Lithuanian housing has been determined where the current situation is corresponding, partly corresponding and not corresponding to the practice of advanced countries and CEE countries [11].

4. A complex description of housing in conceptual and quantitative languages

An accuracy degree of quantitative description of the housing largely depends on the availability and accuracy of the data as well as on the form of its quantitative presentation. The role of information accuracy is growing with time. The highest accuracy degree of information is reached when it can be expressed in numbers. Therefore, one of the major tasks in creating a model of a rational housing in Lithuania is adequate quantitative presentation of housing activities.

The essence of the process is accurate presentation of system factors in numerical form and indication of their specific measuring units [13].

The efficiency of the housing in a country is largely affected by its economic, political and social situation as well as by such factors as technological development, environment protection, etc. Also various interested parties are involved in housing. Therefore, the variety of measuring units must correspond to the variety of criteria reflecting life cycle process of housing.

Quantitative presentation of various micro- and macro-level factors may be found in literature [14, 15]. Conceptual presentation of housing may also be found in literature [2, 3, 4, 5, 16].

Under some programmes [17, 18, 19], conceptual as well as quantitative description (based on the former) of the present status of Lithuanian and advanced countries housing were made. This formalized presentation is given in Table 1. Any i factor of j country is given x_{ij} code providing thorough quantitative (system of

factors, measuring units, significances, values, as well as a minimizing or maximizing criterion) and conceptual (text, drawings, graphics, etc) information about the alternative being considered.

The magnitude of significance indicates how much in percentage one factor is more significant than the other in a multiple criteria evaluation of housing efficiency. As an example multiple, criteria evaluation of alternative loans from different Lithuanian financial institutions is given in Table 2 [11].

Basing oneself on quantitative description of the current state of housing in advanced countries, CEE and Lithuania it is possible to roughly evaluate the situation in Lithuanian housing in the transition period of its economic development. The conceptual description of the state of housing in advanced countries, CEE and Lithuania is also far from being exhaustive. There-

Table 1. A fragment of quantitative and conceptual description of the present state of housing in compared countries

Quantitative information pertinent to compared countries									
The factors considered	*	Significance	Measuring units	Numerical values of factors of the compared countries					
				a_1	a_2	...	a_i	...	a_n
Quantitative factors	z_1	q_1	m_1	x_{11}	x_{12}	...	x_{1i}	...	x_{1n}
	z_2	q_2	m_2	x_{21}	x_{22}	...	x_{2i}	...	x_{2n}

	z_i	q_i	m_i	x_{i1}	x_{i2}	...	x_{ij}	...	x_{in}
	z_j	q_j	m_j	x_{j1}	x_{j2}	...	x_{ji}	...	x_{jn}
Qualitative factors	z_{i+1}	q_{i+1}	m_{i+1}	x_{i+11}	x_{i+12}	...	x_{i+1i}	...	x_{i+1n}
	z_{i+2}	q_{i+2}	m_{i+2}	x_{i+21}	x_{i+22}	...	x_{i+2i}	...	x_{i+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_{mi}	...	x_{mn}
Conceptual information pertinent to compared countries									
C_1	C_2	C_i	C_m	C_1	C_2	...	C_i	...	C_n

The information provided by code x_{ij} of i factor (evaluation of alternative loans from different financial institutions) / country (Lithuania)

The factors considered	Measuring units	*	Significance	Numerical values of factors of the compared loans			
				BalAEF	Vilnius Bank	Agricultural Bank	Hansabank
1. Loan repayment and payment of interest	Lt month	-	0,8311	1102	1113	1148	1081
2. Hypothecation bond registration fee	Lt	-	0,0028	450	450	450	450
3. A one-off loan administration fee	Lt	-	0,0025	800	400	80	300
4. Life insurance costs	Lt year	-	0,0115	0	240	240	260
5. Costs of insurance of the real estate to be mortgaged	Lt year	-	0,0146	184	200	320	230
6. A one-off 30% payment (The mortgage loan covers up to 70% of the value of the housing to be purchased)	Lt	-	0,1371	16000	24 000	24 000	24 000
7. Costs of currency exchange transactions	Lt	-	0,0004	100	0	100	40
8. Maturity of the loan	Years	+	0,2417	10	10	10	10
9. General terms and conditions of the loan	Points	+	0,2477	9,47	7,56	7,34	9,25
10. Notification of the Bank's decision to issue the loan	Weeks	-	0,0020	3	1	2	1

* - The sign (+ (-)) indicates that a greater (less) factor value is better

Table 2. Multiple criteria evaluation of alternative loans from different financial institutions

The factors considered	Measuring units	*	Significance	Numerical values of factors of the compared loans			
				BalAIEF	Vilnius Bank	Agricultural Bank	Hansabank
1. Loan repayment and payment of interest	Lt/month	-	0,8311	1102	1113	1148	1081
2. Hypothecation bond registration fee	Lt	-	0,0028	450	450	450	450
3. A one-off loan administration fee	Lt	-	0,0025	800	400	80	300
4. Life insurance costs	Lt/year	-	0,0115	0	240	240	260
5. Costs of insurance of the real estate to be mortgaged	Lt/year	-	0,0146	184	200	320	230
6. A one-off 30% payment (The mortgage loan covers up to 70% of the value of the housing to be purchased)	Lt	-	0,1371	16 000	24 000	24 000	24 000
7. Costs of currency exchange transactions	Lt	-	0,0004	100	0	100	40
8. Maturity of the loan	Years	+	0,2417	10	10	10	10
9. General terms and conditions of the loan	Points	+	0,2477	9,47	7,56	7,34	9,25
10. Notification of the Bank's decision to issue the loan	Weeks	-	0,0020	3	1	2	1
The sums of weighted normalized maximizing indices of the loans S_{+}				0,0856	0,0763	0,0752	0,0846
The sums of weighted normalized minimizing indices of the loans S_{-}				0,1606	0,1627	0,1892	0,1658
Significance of the loans Q_i				0,3152	0,3028	0,2700	0,3069
Priority of the loans				1	3	4	2
Utility degree of the loans N_i				100%	96,06%	85,66%	97,36%

fore, only a combination of two methods can yield a complete picture, demonstrating the actual situation in this field. A quantitative description should be supplemented by detailed conceptual explanation [17, 20]. For more detailed analysis of the housing, with the aim of giving recommendations concerning the possibilities of raising its efficiency, fragmentary description of Lithuanian, advanced industrial countries and CEE housing were made in quantitative and conceptual forms.

The results of this quantitative and conceptual analysis may be widely used for identifying and solving the problems facing Lithuanian housing as far as ways and methods of raising its efficiency are concerned.

5. Conclusions and suggestions

Basing on the research performed it is possible to make the following conclusions and suggestions:

1. The performed examinations showed that it is possible to divide methods and models of construction industry into two groups: quantitative and qualitative ones. Therefore seeking for complex analysis of housing it is necessary to join the qualitative and quantitative evaluations. Only in such a case the complex housing analysis is possible.

2. An analytical complex analysis model of rational Lithuanian housing is developed. The performed

examinations showed that the level of effectiveness of housing depends on a specific number of two level – micro- and macro-level variable factors.

3. The performed examinations showed that while solving the problems of housing it is important to create the complex comparative systems of indices describing the housing. Two following systems of indices are suggested in the work:

- Complex system of indices allowing to evaluate the trends of housing policy and activities on a world-scale, and allowing to evaluate the housing in countries of different economic development. A system of indices allows to determine the problematic fields of housing and contradicting objectives of politics. The system includes indices divided into five groups: indices describing economics as a whole complex; indices describing the housing construction, investments and financing; indices describing the countries of transitional period; indices describing the volume, quantity and density of housing; indices describing the housing policy.
- The complex system of housing indices intended to evaluate housing of Lithuania. A system of such group of indices shows the potential problems of Lithuanian housing and assists in finding out methods and means to improve the current situa-

tion. The system covers indices divided into six groups: 1) economic; 2) social; 3) qualitative, volume and density; 4) institutional structures; 5) legal bases; 6) political priorities.

4. The suggested methodology gives an opportunity to solve a lot of objectives of micro- and macro-level analysis of housing.

5. It is seen out of the examinations performed that application of multiple criteria analysis methods allows, on the base of examination of alternative variants, to select the most efficient decisions, to perform the detailed analysis of decisions made, to adjust decisions.

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RACIONALIAUS BŪSTO STATYBOS LIETUVOJE MODELIS

A. Banaitis

Santrauka

Būsto statyba užima svarbią vietą ekonominėje, socialinėje ir technologinėje valstybės veikloje.

Būsto statybos problemos yra daugialypės ir nepakankamai kompleksiskai tyrinėtoms. Būsto statybos efektyvumą ir plėtros tendencijas lemia daugelis mikro- ir makrolygmens aplinkos kintamųjų veiksnių. Kai yra tokia dinamiška padėtis, kyla klausimas, kaip objektyviai prognozuoti būsto statybos plėtrą. Viena iš galimybių – būsto Lietuvoje modeliavimas siekiant iširti efektyvią statybos aplinką.

Straipsnyje pateiktas racionalaus būsto statybos Lietuvoje teorinis kompleksinės analizės modelis.

Remiantis įvairių pasaulyje taikomų būsto rodiklių sistemų analize, pasiūlytos kompleksinės būsto statybą apibūdinančios lyginamosios rodiklių sistemos. Rodikliai šiose sistemose traktuojami ne kaip paprasti statistiniai duomenys, bet kaip supaprastinti kompleksinių objektų modeliai. Sudarytos rodiklių sistemos rodo įvairių būsto statyboje dalyvaujančių suinteresuotų grupių interesus.

Straipsnyje pateikta būsto statybos aprašymo koncepcinė ir kiekybinė forma galimybių analizė.

Straipsnyje siūloma tyrimų metodika leidžia spręsti įvairius būsto statybos mikro- ir makrolygmens analizės uždavinius. Šiems uždaviniams spręsti pritaikyti daugiakriterinės analizės metodai.

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