

Modern Methods of Assessing Housing Affordability, Issues and Improvement Paths

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Abstract—Housing affordability is a comprehensive assessment of the housing market social orientation. The article deals with methodological problems of the housing affordability assessment. The latter becomes relevant in connection with the introduction of project financing in Russia. In the current environment, there is a necessity to centralize the management of project implementation processes and its support, as well as state support for credit and financial institutions. The subject of the research is the housing affordability for the population. The object of the research is the residential real estate market of the Krasnoyarsk territory. Special attention is given to the consideration of modern methodologies for assessing the affordability of residential real estate described in domestic and foreign literature, in official documents. The strategic approach to the increase of residential real estate affordability for the population of the Krasnoyarsk territory is considered. The main target indicators of the strategic directions implementation are defined. The strategic directions implementation will facilitate the development of federal and regional housing strategies, taking into account the desired structure of the housing stock for different population groups.

Keywords—housing affordability, residential real estate object, stakeholders, development strategy, housing affordability index.

I. INTRODUCTION

At the moment, residential, commercial and industrial real estate objects are presented in the real estate market of the Krasnoyarsk territory. The construction industry in Krasnoyarsk got its intensive development due to Federal funding for the construction of the World Universiade objects and, as a consequence, the development of urban infrastructure. The large market share is occupied by the residential real estate objects.

Since July 1, 2019, a new scheme for the acquisition of housing under construction – “project financing” – has entered into force – replacing shared construction with bank lending, i.e. the construction of residential real estate is carried out at the expense of bank loans – project support. Citizens’ funds are stored in escrow accounts at authorized banks, and the developer is able to get access to them only after the object commissioning.

One of the main factors of the regional successful socio-economic development is the creation of conditions to meet the housing needs of the population, including the creation

of housing that is affordable to young people and families with incomes below average.

Housing affordability can become an economic and social indicator that will demonstrate the level of the regional development, determine the ability of citizens to realize their potential in the labor market, assess the balance of supply and demand in the residential real estate market, as well as determine the ratio of household spending and income and mortgage lending conditions [1].

The main volume of theoretical and scientific research in the field of housing affordability is aimed at the study of economic affordability.

The relevance of the research subject is due to the current situation in the housing market: the lack of effective demand, low housing affordability. At the same time, problems of building and zoning of territories are noted. In cities, housing estates of poor quality are growing, due not only to the low quality of construction products, but also to the low level of organization of the urban environment.

The purpose of the research is to substantiate the improvement of methodological approaches to assessing housing affordability as an indicator of the housing market social orientation.

II. LITERATURE REVIEW

The theoretical basis of the research is formed by the works on the housing affordability study and the calculation of the housing affordability index of such authors as O.V. Grushina [2], G.M. Sternik, A.N. Krasnopol'skaya [3], T.Yu. Ovsyannikova, D.K. Prazukin, A.T. Allen, E.M. Worzala [4], and others. The existing methods take into account many factors that affect the value of the housing affordability index, and their presence is due to the discrepancy between the generally accepted methodology for assessing housing affordability, approved by the United Nations urban development organization UN-Habitat, and the real possibility of obtaining an average standard apartment [5].

Currently, the concept of “affordable housing” is in the process of formation and is not regulated by any legislative act of the Russian Federation. To a large extent, this concept is related to the value of residential real estate and household income.

From the above-mentioned, it follows that affordable housing is housing of typical consumer qualities, which is

available for purchase to people with average and below average incomes.

The assessment of housing affordability is based on two indicators:

- Purchasing power of wages in the residential real estate market. The aim of this indicator is to compare the ratio of wages and the average price of 1 m² of middle-class residential real estate.
- Housing affordability index (hereinafter – HAI). The value of this indicator is the number of years during which a family is able to save for the purchase of residential real estate.

Housing affordability is directly related to the availability of mortgage lending. State programs provide budget support to various categories of citizens, as well as to young families. The volume of mortgage lending of citizens grow, the number of commercial banks intending to participate in the national project “Affordable and comfortable housing – to Russian citizens” is increasing. Financial development institutions play a special role in the implementation of this project. In the Russian Federation, there are already similar organizations operating in the housing sector: the Agency for mortgage and housing lending (AMHL), the Fund for assistance in reforming housing and communal services (FHCS), etc.

To date, there is a need to centralize management of all project implementation processes and its support, as well as state support for credit and financial institutions.

At present, when housing is constructed mainly at the expense of extra-budgetary funds and a significant part of it goes into private ownership, the requirements for residential houses are more determined by its consumers and investors. Consumer qualities, functional amenities and comfort of living, consideration of natural and climatic and other specific features of the area and the specific location of housing, aesthetic and environmental requirements become indispensable.

In modern conditions, the comfort of housing is determined by two components: the improvement of residential premises and the comfort of the living environment.

At the same time, it is necessary to determine the minimum standards of the housing comfort – the level of improvement, provided undoubtedly for all groups of the population, all types of housing in all settlements of the country. The housing construction should not be carried out without compliance with such standards.

For comparison, in Europe, residential real estate objects are divided into a system of classes “A”, “B”, “C” and “D”. The main qualitative evaluation indicators are given below:

- construction area;
- year of construction;
- constructive scheme;

- finishing materials (internal and external);
- level of engineering equipment;
- parking spaces;
- improvement of the local area;
- number of apartments in the house;
- project proposals: availability of terraces, balconies, loggias; number of bedrooms, bathrooms; kitchen configuration.

It is the use of different classifications of real estate objects that increases the efficiency of the real estate market research process. With the help of such classifications, the development of real estate valuation methods is simplified. This approach contributes to an objective assessment of real estate.

According to Eurostat, the building is considered overcrowded if there is less than one room per family or each person over 18 years of age or two under age children. About 50% of the population of Poland and Hungary live in such conditions, while in the Netherlands this figure is less than 2 %. In Canada, Belgium, Ireland, there are about two rooms per person [6].

With regard to housing satisfaction, according to the organization for economic cooperation and development, about 87 per cent of the inhabitants of the European countries are satisfied with their housing conditions. In Belgium, Spain, Germany and Finland, this figure reaches 90 %. When in Russia more than 60 % of the population is dissatisfied with their housing conditions. However, in Turkey, Korea, Indonesia, satisfaction is also low.

Indicators of each of the listed standards should be established by local governments taking into account density of building, number of living citizens and other features of the settlement.

It is also worth noting that most authors tend to consider regional development strategies from the point of view of the region-society, rather than the region-market. At the regional level, there is an imbalance between the target characteristics of strategies to improve the quality of life of the population and the increase in financial revenues to local budgets. Therefore, there is a need to improve the priority state mortgage programs with an emphasis on the needs of certain segments of the population [7].

III. METHODS

A. *SWOT-analysis of methods for assessing the residential real estate affordability.*

For further analysis the following methods of HAI calculation are taken: universally recognized methodology UN HABITAT (Table I); methodology by D. K. Prazukin, T. Yu.Ovsyannikova, A.T. Allen, E.M. Worzala (Table II). The assessment of these methods by SWOT-analysis was carried out.

TABLE I. SWOT-ANALYSIS OF UN HABITAT METHODOLOGY

Strengths	Opportunities
International methodology.	Obtaining indicators close to the normative.
Adapted for the Russian Federation taking into account the housing standard.	
The ability to purchase housing is directly proportional to the median household income.	
Weaknesses	Threats
In Russia, there are no data on median household incomes and median prices for residential real estate.	Discrepancy of data of state statistics bodies and real estate agencies.
Consumer spending of households; change in prices for residential real estate; method of storage of savings; dynamics and structure of income of the population; there is no differentiation of housing by area/comfort classes are not taken into account.	

TABLE II. SWOT-ANALYSIS OF METHODOLOGY BY D. K. PRAZUKIN, T. YU. OVSYANNIKOVA, A.T. ALLEN, E.M. WORZALA

Strengths	Opportunities
The calculating of the accumulation period of the original payment; method of savings, the ownership of housing; rising housing prices are taken into account.	This system allows to get a "real picture" of housing affordability.
The difference in the cost of residential real estate depending on the average area and belonging to the market (primary/secondary) is taken into account.	The methodology allows to make more accurate strategic forecasting of housing affordability.
To account for consumer spending, per capita income is reduced by the subsistence level.	
Weaknesses	Threats
Consumer spending is expressed only in terms of the subsistence minimum.	Complication of statistical data collection.
There is no differentiation of residential real estate by comfort classes.	The threat of untimely updating of statistical information.

B. PEST-analysis of calculation methods and their impact on HAI (Table III)

TABLE III. PEST-ANALYSIS OF HAI CALCULATION METHODS

№	Factors	Influence on the methodology implementation
<i>Political</i>		
1	Changes in the legislative framework: Resolution of the Russian Federation government as of December 30, 2017 N 1710 "On approval of the state program of the Russian Federation "Providing affordable and comfortable housing and communal services to citizens of the Russian Federation".	Reducing the cost of 1 m ² of the total area of housing. Providing affordable housing for middle-income families, creating opportunities for the acquisition, construction of housing using a mortgage loan. Reduction of the mortgage lending rate to 8%. Improving the living conditions of Russian citizens by ensuring high rates of housing commissioning.
2	The Federal law as of December 30, 2004 N 214-FL "About participation in share construction of multi-apartment houses and other real estate objects and about modification of some legislative acts of the Russian Federation".	The transition to escrow accounts will result in an increase in the cost of 1 m ² , which in turn will lead to an increase in the value of HAI calculated by this method.
<i>Economic</i>		
3	At the end of 2018, inflation in Russia according to Rosstat increased to 4,3 %. In February 2019, it was 5,2 %.	As a result of the meeting of the Board of Directors of the Russian Federation Central Bank on the key rate of 14.06.2019, the key rate was lowered by 0,25 % from 7,75 to 7,5 %. The new level of the key rate will be effective from 17.06.2019. according to the Central Bank, the mortgage rate is 9,6 %. These indicators will allow to obtain a lower calculated value of HAI in comparison with the previous calculation periods.
4	Mortgage is a reliable source of profit for the bank.	Banks are actively entering the mortgage market, because the mortgage product has one of the lowest risks. The share of mortgage delinquency does not exceed 1-3 %. Strengthening of bank control over the developers' accounts and the ability to block any transaction that, in the opinion of the bank, may be suspicious. During the introduction of escrow accounts, an increase in the interest rate is predicted, which, in turn, will have a negative impact on the calculation of the HAI value.
<i>Social</i>		
5	Stimulation of birth rate in the Russian Federation (payment of maternity capital, state programs to subsidize mortgage loans to families with 2 or more children)	Growth of demand for large-size housing.
6	Socio-economic state of the population	The average per capita income of the population in 2018 of the Krasnoyarsk territory decreased by 3,9 % compared to 2017 from 21,320 rubles to 20,483 rubles.
		Real disposable income, as a percentage of the previous year decreased from 98,3 to 95,1 % in 2018 [8].
		The population with monetary incomes below the subsistence minimum in 2018 increased by 1,6 % compared to 2017 from 529,2 to 537,7 thousand people [9].
This socio-economic situation of the population allows to draw conclusions about the increase in the calculated HAI value.		
<i>Technological</i>		
7	Modern innovative construction technologies, "smart house" technologies	Environmentally friendly materials, energy-efficient buildings and structures, technologies for optimizing the construction process, strengthening the safety and reliability of buildings

		and premises, renovation of housing stock. Given the high cost of these solutions, it is expected to increase the calculated HAI value.
8	Electronic document management in the mortgage market	It will reduce mortgage rates by reducing the costs of issuance and refinancing, reduce the time costs of participants, as well as accelerate the turnover of funds for mortgage lending. The introduction of electronic document management will reduce calculated HAI values.

C. Stakeholder analysis

Stakeholders should be understood as entities interested and able to influence the formation of approaches to assessing

housing affordability and, as a consequence, the methods used to calculate the housing affordability index [10]. Stakeholder groups and their interests are presented in table IV.

TABLE IV. STAKEHOLDER GROUPS AND THEIR INTERESTS

Stakeholders	Methodology	Interests
The government of the Russian Federation: Ministry of regional development of the Russian Federation and Ministry of construction and housing and communal services of the Russian Federation The government of the Krasnoyarsk territory	UN HABITAT [5]	Achievement of target indicators and indicators of approved housing priority national projects and programs [11]. Providing housing for the population. Implementation of programs to increase the residential real estate affordability.
Federal and regional banks	D. K. Prazukin, T. Yu. Ovsyannikova, A.T. Allen, E.M. Worzala [4]	Additional sources of income [11].
Federal and regional state statistics service	UN HABITAT	The data are limited by the indicator of housing security in square meters per inhabitant and the proportion of dilapidated housing [11].
Population	D. K. Prazukin, T. Yu. Ovsyannikova, A.T. Allen, E.M. Worzala	Ensuring the availability of quality and comfortable housing for all categories of the population [11].
Developers of methodologies for assessing housing affordability	UN HABITAT D. K. Prazukin, T. Yu. Ovsyannikova, A.T. Allen, E.M. Worzala and others	Development of a methodology for assessing housing affordability that meets the real living conditions of the population.

Having identified stakeholder groups, it is advisable to determine the extent of their influence. The assessment will

be based on an impact mechanism to implement the strategy of interaction with internal stakeholders (table V).

TABLE V. MECHANISM OF INTERACTION WITH STAKEHOLDERS

Stakeholder type	Strategy type	Categories of internal stakeholders	The key points of influence
Russian government and regulatory authorities	Protective	Developers. Population. Banks.	Implementation of programs of integrated assessments of efficiency and effectiveness of activities. Achievement of target indicators. Improvement of the legislative framework. The state together with participants of the market of mortgage housing crediting will promote increase of the population financial literacy.
Banking services	Manoeuvres	Population. Developers.	The contract of participation with the use of escrow accounts. Loan agreement on specific terms established by the Bank.
State statistics service	Expectant	Developers of methodologies.	Timely provision of relevant statistics.
Developers of methodologies.	Manoeuvres	Population.	Analysis of the population living standards for further development of methodologies for assessing housing affordability.

According to the results of the stakeholder analysis we can conclude: the group of the definite stakeholders: namely the government and regulators has the greatest impact on the housing market and the assessment of the residential real estate affordability, the federal and regional banks also exert great influence. The population is the demanding stakeholder. In order to implement the planned strategy and achieve the set goals, the cooperation of the above-mentioned market participants is necessary.

IV. RESULTS

The most common, practice-verified and well-publicized development strategies are usually referred to as basic or reference: the strategy of concentrated growth, integrated growth, diversification growth and contraction.

To increase the economic affordability of the residential real estate, it is necessary to develop a strategy of concentrated

growth, improving the methodology for calculating the HAI value.

A brief summary of the problems emerging in the housing sector of the Krasnoyarsk territory is as follows:

- the market affordability of housing is determined by the UN (HABITAT) basic methodology and the HAI calculated by this methodology is 3,3 years.
- social affordability of housing for certain population groups is ensured through the implementation of state programs at the federal and regional levels. Goals of such programs are usually achieved, sometimes exceeded.
- however, despite the achievement of the goals, it is difficult to objectively talk about a high degree of housing affordability, as the results of the programs are compared with the planned indicators set by the state,

and not with the actual volume, for example, dilapidated housing stock.

- the construction of housing is mainly of economic class, while there is an underdevelopment of social, engineering and transport infrastructure.
- at the same time, the population’s perception of the housing quality and the urban environment comfort is changing. The supply on the emerging demand for luxury housing with developed infrastructure and a high level of comfort is limited.
- the mortgage rate fell to an average of 10% per annum, there is a tendency to reduce it.
- the process of transition to project financing of housing construction with elimination of reduction of risks of shared construction participants is started.

The goals to be achieved as a result of the strategy implementation for the increase of the residential real estate affordability for the population of the Krasnoyarsk territory are as follows:

- to develop a methodology for assessing housing affordability, reflecting the real conditions of acquisition of real estate by the population and taking into account the main factors that have a greater impact on housing affordability.
- to objectively assess the degree of the housing affordability for the population in order to identify and solve problems in the residential real estate market.

- to ensure the value of the “real” housing affordability index equal to 3-4 years for groups of the population not falling under the action of state programs.
- to ensure the development of alternative ways to meet the housing needs of the population.

The purpose of the process of meeting housing needs in the market system is to coordinate and harmonize the interests of the population (subjects of demand) through the mechanism of competition and prices in the residential real estate market, as well as state regulation, providing the opportunity for individual categories of citizens to address issues of improving housing conditions.

An important aspect of the development strategy is the formation of the desired structure of the housing stock. There is need to have a qualitative change in the approach to the development of territories and the creation of residential, social and transport infrastructures in order to ensure, first of all, a comfortable, safe, energy-efficient urban environment. The process can contribute to the integrated development of territories according to the developed documents regulating the construction of urban areas, an integral part of which should be a focus on human interests.

The main target of the development strategy of the residential real estate affordability is to bring the values of the coefficient of obtaining housing to the appropriate performance standards of affordability.

The implementation of the targets may be hampered by risks arising under the influence of negative factors and socio-economic problems in society [12], which are presented in table VI.

TABLE VI. RISKS OF THE STRATEGY IMPLEMENTATION

Risks		Possible consequences	Impact measures
Macroeconomic risks	The possibility of deterioration of the internal and external market conditions, the decline in economic growth, the level of investment activity, high inflation.	- Decrease in real incomes of the population. - Reduction of investment in housing construction. - Low rates of housing commissioning. - Increase in housing affordability index	- Formation of a reliable mechanism for attracting citizens' funds.
	Differences in economic growth rates in regions	- Lack of investment for the development of housing in small towns. - Low rates of housing commissioning.	- Development of regional housing renovation programs. - Attraction of large companies with a developed network of units to finance construction
Urban planning risks	Risks of preparation of territories occupied by private real estate for repurposing	- Delay in terms of reaching the target trajectory of construction, financial costs for the purchase of private real estate and its release by former owners	- Creation of an effective mechanism for the development of built-up areas: overpopulation with compensation for market value or the provision of new housing
	Risks of current urban planning restrictions and their timely change	- Financial costs for the development of the necessary urban planning documents, amendments to the existing documents of urban design.	- Development of standards for integrated development of the territory. - Comprehensive inventory of the legal-regulatory framework.
Legislative risks	Imperfection of the legislative framework in terms of housing construction and housing affordability	- Decrease in HAI. - Reduction of housing commissioning rates.	- State regulation of housing affordability. - Development of programs of the population state support

Based on the data obtained, the following conclusions can be drawn:

1. The category of managed risks includes urban planning and legislative risks.
2. To minimize urban planning risks, the following measures should be taken:

- The government and regulators should create the effective mechanism of development of built-up areas (compensation of the housing cost, or the provision of new housing), as well as develop standards for the comprehensive development of territories and improvement of normative legal base.
- 3. To minimize legislative risks:

- The government of the Russian Federation should develop programs of the population state support, and also carry out actions for improvement of methodical approaches of the assessment for the residential real estate objects affordability.

V. CONCLUSION

Assessment of housing affordability using an improved methodology that takes into account the real conditions of the housing market, will allow to identify areas that require development and to implement the strategy taking into account the population interests.

Implementation of the increase strategy for the residential real estate affordability will help to achieve the following results:

- adaptation of the HAI calculation methodology to the real situation taking into account all indicators;
- reduction of the funds accumulation period for the purchase of housing in the property-3-4 years;
- increase in the number of households by 1000 people per year;
- increase in the housing stock;
- improvement of housing conditions during the strategy implementation;
- development of the mortgage lending market by increasing the availability of mortgage housing loans;
- formation of effective demand for housing;
- outstripping dynamics of population income growth in comparison with housing prices;
- creation of social prospects for improving housing conditions for all population groups;
- effective urban planning policy in order to create a comfortable living environment that allows to meet housing needs and ensure a high quality of life in general.

REFERENCES

- [1] V. Koretskaia-Garmash, "Mortgage Affordability for Young People in Russia," pp. 691-703, 2017 [30th International Business Information Management Association Conference – vision 2020: sustainable economic development, innovation management, and global growth, IBIMA, 2017]
- [2] O. V. Grushina, "Housing affordability as feature of state's economic system," *Izvestiya Irkutskoj GEA (Bulletin of Baikal State University)*, No. 6, pp.140-146, 2011. (in russ.)
- [3] G. M. Sternik and A. N. Krasnopolskaya, "Development of a methodology for multifactorial assessment of residential real estate affordability," *Imushchestvennye otnosheniya v Rossijskoj federatsii (Property relations in the Russian Federation)*, No. 1(88), pp. 26-38, 2009. (in russ.)
- [4] T. Yu. Ovsyannikova and D. K. Prazukin, "Investment potential of the population in the regional housing market," *Voprosy ekonomiki (Economic issues)*, No. 5, pp. 107-112, 2001. (in russ.)
- [5] United Nations human settlements programme. UN HABITAT methodology. <http://unhabitat.ru/ru/index>
- [6] "Living conditions and social protection," in *Europe in figures — Eurostat yearbook 2012*, U. Wieland, Eds. Luxembourg: Publications Office of the European Union, 2012, pp. 268-301.
- [7] E. V. Savoskina, I. V. Horina, M. A. Brazhnikov, and E. A. Alontseva, "Evaluation of state mortgage programs for improving life quality of the population," *The European Proceedings of Social and Behavioural Sciences*, 2018. <https://doi.org/10.15405/epsbs.2019.03.161>
- [8] "Real disposable income of the population," Federal state statistics service (Rosstat). <https://www.gks.ru/folder/13397> .
- [9] "Socio-economic situation of the Krasnoyarsk territory in 2018," Federal state statistics service (Rosstat). http://www.krasstat.gks.ru/wps/wcm/connect/rosstat_ts/krasstat/ru/publications/pubKras/official_publications/electronic_versions
- [10] O. B. Zil'bersteyn, K. V. Nevstruev, D. D. Semenyuk, T. L. Shklyar, and A. V. Yurkovskiy, "Analysis of stakeholders on the example of Russian enterprises," *Naukovedenie*, Vol. 8, No. 3(34), p. 30, 2016. (in russ.)
- [11] K. V. Chepeleva, V. V. Pukhova, and E. V. Kachina, "Socio-economic aspects of the formation of the affordability of residential real estate," *MATEC Web Conf.*, Vol. 212, pp. 6, 2018. [International Scientific Conference "Investment, Construction, Real Estate: New Technologies and Special-Purpose Development Priorities" (ICRE 2018), October 2018] <https://doi.org/10.1051/mateconf/201821203003>
- [12] V. A. Mau, K. Yu. Rogov, and E. G. Yasin "The new model of economic growth" in *Strategy 2020: The new growth model – a new social policy* V. A. Mau and Ya. I. Kuzminov, Eds. Moscow: Publishing house Delo RANEPА, 2013, pp. 15-50. (in russ.)