Problems of Housing Affordability Improvement and Development of Residential Construction in Vladivostok

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Abstract. The present article is dedicated to the problem of residential housing, investigation of factors reducing affordability of housing and impeding further development of residential housing construction in Vladivostok – capital city in the Far Eastern Federal District of the Russian Federation.

The target indicators which are used in federal programs/projects and reflect the ongoing trends in housing affordability for the local population are duly considered herein. The necessity to update and further clarify calculations of housing affordability index is duly substantiated. The special model for evaluation of housing affordability under governmental programs implemented at local municipal level with due consideration for ongoing mortgage credit lending, demand patterns, population income levels and demographic factors is herewith developed. Assessment of possibilities for purchasing apartments of specific space among different groups of population and family types has been duly made. The main factors impeding housing affordability in Vladivostok have been identified and the analysis of their influence on housing affordability index (based on the “sensitivity analysis” method) has been duly carried out.

Analysis of housing availability to the local population and actual rates of commissioning the brand new residential housing in Vladivostok within 2010-2018 has been carried out. The revealed indicators are significantly lower in comparison with the national average in Russia and do not match the levels set forth in the federal and municipal state programs. The necessity to increase new housing construction volumes in almost three times is clearly substantiated. The main problems impeding further development of construction industry and best solutions possible have been identified and described.

1. Introduction

Vladivostok has always been the “Outpost of Russia” within the Far Eastern territory and since December 13th, 2018 the city officially became the capital of the Far Eastern Federal District. The population of the city along with its industrial and scientific potential is the main factor ensuring prosperity and development of the city. Apparently, the current demographic situation in the city is getting worse. Approximately 23 to 25 thousand people leave the city each year; over 80% of which being economically active and well-educated people with high professional skills. This population is substituted with low-skilled migrants and residents of minor neighbor settlements. As forecasted by the Federal State Statistics Service, the overall population of Primorsky krai and Vladivostok will keep decreasing further.
The primary factor which might prevent migration and eventually increase the city’s population is proper development of housing construction for provision of citizens with affordable and comfortable housing.

Within recent years a large number of targeted federal and municipal programs have been developed purposely to provide the population with affordable and comfortable housing. These programs cover various target indicators and indexes viewed as a solution of housing problem. The main purpose of the state program “Provision of the citizens of the Russian Federation with affordable and comfortable housing and utilities” is identified as follows: “Provision of middle-income families with affordable housing and actual possibilities for its purchasing (or individual construction)” [1]. The main target indexes and the respective trends throughout 2018 to 2024 are specified in the passport of the Russian National Project “Housing and Urban Environment” as follows: increase of annual volume of residential house commissioning by 51.5% from 79.2 million square meters in 2017 to 120 million square meters in 2024; increase of housing affordability index from 2.6 to 2.4 years; decrease of interest rate for mortgage credits from 9.5% to 7.9%; application of project financing system subject to co-investment escrow accounts agreements and other indexes [2]. The municipal program “Architecture, Land Management, Housing and Construction in Vladivostok” for 2019-2024 shows the following indexes: increase of housing commissioning from 336.33 thousand square meters in 2018 to 1536.00 thousand square meters by 2025; increase of young families’ ratio (families which have been officially recognized as those in need and which have been provided with proper housing) from 10.5% to 20%, etc. [3]. However, these indexes provide no answer to the main questions such as: “Is the housing affordable for specific categories of population and how can this be assessed?”; “What kind of apartment can families with different income levels purchase and what kind of housing should be actually built?” The purpose of the present article is to identify methodological and practical problems in context of housing affordability improvement and further development of housing construction industry in Vladivostok.

2. Data, methodology and research results

The mere term of “affordable housing” term seems incorrect and too indefinite, which makes proper assessment of current situation and development of housing problem solutions more difficult.

In most general sense, housing affordability means an opportunity to purchase living space of a certain quality in accordance with the needs, value orientations and income level of an individual. In common, housing affordability can be considered "as a socio-economic category and the main index of housing component of the overall quality of life” [4].

In order to evaluate the affordability of housing according to the United Nations Human Settlements Program methodology for cross-country comparisons, the “housing affordability index” is used, defined as the ratio of the median cost of housing to the median annual household income excluding the area of apartments [5]. According to Leonid Waldman, Russian-American economist and business analyst, the historical norm for the ratio between citizens' incomes and value of real estate is 3.2; the ratio equal to 3.5-4 is considered as “historically normal”. [6]. In compliance with the Federal Target Program “Housing”, a target indicator was used as a housing affordability index, defined as a ratio of average market value for standard apartment with total area about 54 square meters and average total family income for 3 persons. By 2024, national average was equal to 2.4.

According to the Russian state news agency RIA Novosti at the beginning of 2018 Primorsky Krai with administrative center in Vladivostok took 74th place with 8.9 index among all 88 regions of the Russian Federation. Khabarovsk krai and Amurskaya oblast, also parts of the Far Eastern Federal District, take 34th and 35th places respectively with 5.1 index, and Magadanskaya oblast takes the 1st place with 1.3 index [7]. Despite the fact that the Far Eastern Federal District is of a considerable geopolitical importance for economic development of Russia, housing affordability here is lowermost in the country. The wide variation of housing affordability index in the constituent entities of the FEFD is a reflection of various living conditions and level population income. The housing
affordability index equal to 1.3 for Magadanskaya oblast does not make it more attractive for long-term settlement in comparison with Primorsky krai (8.9 index) [8].

In order to evaluate affordability of housing on specific regional level, some authors propose to consider not only income, but also living expenses and available sources of borrowed funds [9,10].

In our opinion, the proposed methods for calculation of housing affordability index do not reflect the real situation for all participants of investment and construction projects at municipal entity level: municipal governments, investors, property developers, contractors, credit organizations.

In order to calculate the housing affordability index for certain categories of population and family types, the following formula is proposed:

$$K_{ij} = \frac{C_{ij} \times S_{ij}}{(D_j - P_j)}$$

Where: $K_{ij}$– housing affordability index for the $i$-th group of housing, the $j$-th category of family, years;

$C_{ij}$ - the average cost of 1 sq.m of apartment for the $i$-th group of housing, the $j$-th category of family, rubles;

$S_{ij}$– area of apartment according to the $i$-th group of housing, the $j$-th category of family, sq. m;

$D_j$– annual income of the $j$-th category of family, rubles per year;

$P_j$– minimum family expenses (including expenses on mortgage payments) of $j$-th category of family, rubles / person per year.

Calculation with the above formula enables determination of the period during which a family with a certain income level can purchase a living space of required size and comfort class with due consideration for minimum living expenses and mortgage payments.

An example of calculation of housing affordability index for various size apartments in Vladivostok and for different family types is shown in Table 1 herein. This calculation is based on statistical data for Vladivostok: an average salary assumed per 1 employee is 57,724 rubles; retail price and total area of apartments are assumed on the basis of the primary housing market analysis; the minimum standard of living for Primorsky Krai assumed per 1 employee is 13,310 rubles, per 1 child - 13,782 rubles, mortgage expenses are calculated according to the average loan amount and average interest rate.

Table 1. The housing affordability index against specific types of apartment in Vladivostok (based on statistical data in the 1st quarter of 2019).

| Parameter title                              | Apartment type          |
|----------------------------------------------|-------------------------|
|                                              | one-room apartment      |
|                                              | 2 adults                |
| Average area of apartment, sq.m.             | 41.3                    |
| Average price of apartment, thousand rubles  | 4142                    |
| Average price for 1 sq.m of total apartment area, thousand rubles | 100.3 |
| Housing affordability index, years           | 6                       |
|                                              | two-rooms apartment     |
|                                              | 2 adults and 1 child    |
|                                              | 61.2                    |
|                                              | 6776                    |
|                                              | 110.7                   |
|                                              | 13.5                    |
|                                              | three-rooms apartment   |
|                                              | 2 adults and 2 children |
|                                              | 89.6                    |
|                                              | 9919                    |
|                                              | 104.8                   |
|                                              | 14.9                    |
|                                              | Standard two-rooms      |
|                                              | apartment (area 54 sq.m)|
|                                              | 2 adults and 1 child    |
|                                              | 54                      |
|                                              | 5755                    |
|                                              | 11.4                    |

The calculations made show that affordability of housing for direct purchase in the primary market of Vladivostok is very low: for instance, it takes 6 years for a young family without a child to buy a one-room apartment; 13.5 years for a family with one child to buy a two-rooms apartment; and a family with two children can afford buying a three-rooms apartment only in 15 years.
According to information collected by RosRealt Company, throughout recent years Vladivostok consistently took the 4th place in apartment retail price level after Moscow, St. Petersburg and Sochi, and only 52nd - 74th places as to housing affordability.

In order to develop measures required to somehow solve the housing problem at municipal level, it is necessary to determine which factors affect housing affordability in the first place. A number of authors propose using various multi-factor analysis techniques [10, 11]. However, consideration of a large number of significantly variable factors and overall difficulty of collecting the necessary information make this task quite complicated.

We propose an approach based on the analysis of sensitivity of housing affordability index, which is calculated according to the above formula to the primary factors: the cost of housing, average salary, which determines the family income, and expenses on mortgage loan. An example of calculation for one-room apartments is shown on Figure 1.

![Figure 1. Diagram of sensitivity of housing affordability ratio to primary factors.](image)

The greatest sensitivity observed is the one to “Family income” indicator – increase of this indicator by 30% reduces the period required to buy an apartment in almost 2 times: from 6 to 3.6 years. The next sensitive factor – housing prices – retail price decrease by 30% in turn reduces the same period by 50%: from 6 to 4.1 years. The least sensitivity is shown by the improvement of the mortgage lending terms – decrease of mortgage rate by 30% reduces the above period only by 15%: from 6 to 5 years respectively.

Results obtained this way are typical for all types of apartments and allow correct determination of priorities subject to socio-economic policy, formation of the residential real estate market, and future development of housing construction in Vladivostok.

According to a number of authors, correct and properly calculated concept of housing construction development is critically important for improvement of housing affordability and for eventual solution
of housing problem in Vladivostok [12, 13]. Calculation of housing availability and housing commissioning rates in the Russian Federation in general and in Vladivostok district in particular based on the statistical data is shown in table 2 below [14,15,16].

Table 2. Housing availability and new housing commissioning (sq.m of total area) in 2010-2018.

| Indicators | 2010 | 2015 | 2016 | 2017 | 2018 |
|------------|------|------|------|------|------|
| Total area of residential premises per person, sq.m | | | | | |
| The Russian Federation | 22.6 | 24.4 | 24.9 | 25.2 | 25.8 |
| Vladivostok | 21.47 | 21.53 | 21.75 | 21.95 | 22.08 |
| Commissioning of new residential buildings per person, sq. m per year | | | | | |
| The Russian Federation | 0.41 | 0.58 | 0.54 | 0.54 | 0.51 |
| Vladivostok | 0.39 | 0.21 | 0.33 | 0.16 | 0.44 |

As for Vladivostok, the average availability of housing in 2018 was 22.08 square meters, i.e. by about 12.7% less than the national average, and by 26.5% less than set forth by the International Standard for Housing, developed by the UN and UNESCO, which stipulates that every resident should have at least 30 sq.m of living space.

The average rate of housing commissioning in Vladivostok within the recent 9 years was 210.6 thousand square meters. Considering such rate of construction, it will take 9.7 years to reach the national average, and to achieve the target index set forth in the National Project “Housing and Urban Environment” by 2024 (27.6 sq.m) - 16.3 years. According to the most approximate estimates, in order to achieve the national average indexes, it is necessary to increase the overall volume of housing construction in Vladivostok in 3 times. This situation is also complicated by a large number of worn-out and dilapidated housing. As for Vladivostok, this problem is more acute than in other cities of Russia due to a large number of worn-out and dilapidated building. According to ROSRIEL, the total area of residential premises subject to resettlement is about 290 thousand square meters.

Increased commissioning rate and decrease of overall cost of housing construction are the primary condition for further improvement of housing affordability.

3. Conclusion

As a summary, it seems fair to say that the current housing affordability in Vladivostok is low, and only 12.7% of the population can afford buying an apartment on their own without the need to borrow any funds. The existing methods and indexes seem not to show the necessary results when performing calculations at the municipality level. The proposed method for calculating of housing affordability index makes it possible to assess housing affordability with due consideration for economic and demographic factors, as well as specific price formation features typical for the local estate market.

Practical application of this index allows the Developer to calculate the maximum retail price of an apartment, while the families in need of housing may now determine the type of house they can afford to buy given the current retail price level and terms of mortgage lending.

Overall availability of housing in Vladivostok is lower than the national average, and the rate of commissioning new residential buildings is significantly behind the planned indicators.

Analysis of housing construction in Vladivostok reveals the following problems impeding its further development:

- high demand for housing is not supported by the local population’s level of income;
- certain imbalance in supply and demand in the primary market as for real estate retail prices, comfort level, design solutions;
- there are no sites for complex development, especially within the central areas of the city, therefore, "infill construction" prevails, which leads to increased construction costs;
- operational capacities of the construction organizations are worn out and highly deteriorated (50-70%), domestic building materials are of low competitiveness in the market, and up-to-date construction technologies are not implemented significantly;
- revision of terms & conditions of agreements with shared construction participants and recent implementation of project financing with escrow accounts, which, according to the forecasts by the Ministry of Construction of the Russian Federation, can cause 30% of large developers and about 90% of mid-segment developers to completely withdrawal from the market.

Solution of the above-mentioned problems will enable overall improvement of housing affordability, will facilitate the influx of new human resources, and will ensure further development of Vladivostok as a capital of the Far Eastern Federal District.

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