

Housing Investment Market Development as Quality of Life Improvement Factor

T Y Ovsiannikova¹, O V Rabtsevich¹, I V Yugova¹, M N Nikolaenko¹ and
D I Siritsena¹

¹Federal State Budgetary Educational Institution of Higher Education Tomsk State University of Architecture and Building, Solyanaya sq., 2 Building 2, 634003, Tomsk, Russia

E-mail: saykova86@mail.ru

Abstract. The article is devoted to the results of a research on correlation between quality of life and development of housing investment market, as housing complex functioning sphere. For that purpose the authors considered population's life quality assessment methods, the indicators' system of which includes population housing conditions, and analyzed approaches to housing complex development level assessment, which demonstrated that there is no unified approach to both life quality and housing complex development level assessment among scientists. Therefore, the authors developed a methodological approach to assessing relationship between level of housing complex development and quality of life. Approbation of the developed approach was conducted on the basis of 78 Russian Federation regions' data using correlation analysis. The analysis revealed high correlation between housing investment market development and quality of life of the population according to Chaddock scale with a 0.7 correlation coefficient between the indices.

1. Introduction

Humanization of global socio-economic processes entails an increased researchers' interest in the issues of population's life quality assessment, analysis of human development and human capital growth factors. Interest in life quality issues is also connected with global labor and capital markets' formation and increased population mobility, which leads to a stronger competition for human and investment resources between countries, regions and cities. Creation of decent and favorable living conditions for people, formation of conditions improving quality of life are becoming important factors in global competitiveness of territories.

Population's life quality is largely determined by quality of its living environment. Housing occupies a special place in life quality formation because its main purpose is creation of conditions which meet most important human needs. Thus, it is not by chance that in the hierarchy of human needs dwelling occupies the first (vital) level. Housing provides conditions for reproduction of human capital. Meanwhile, housing reproduction is provided by housing investment market. Therefore, current condition and development of housing investment market play an important role in population's life quality improvement. Housing investment market is a set of socio-economic relations in the field of housing reproduction. Within housing investment market framework, housing facilities' production, distribution, exchange, utilization and renovation relations are implemented. This is due to

the fact that housing becomes the object of market relations at different stages of reproductive cycle in various commodity forms. [1]

That is why the documents that define strategic development of the Russian Federation [2, 3, 4] as strategic goals for the population’s quality of life growth, mention a 1.5 increase in the volume of housing investment and housing construction and, a 30 sq. m per capita or 100 sq. m for a regular family increase of an average level of housing availability; accessibility of mortgages for at least 50 % of the families. These will make it possible to achieve indicators of housing investment market development and quality of life of the population characteristic of the developed countries’ economies.

2. Methodology: analysis of existing approaches to population’s life quality assessment

Quality of life is a complex, multidimensional and multicomponent category. This explains methodological pluralism in assessing population’s quality of life. As the conducted analysis demonstrates, quality of life of the population assessment can be made within the framework of three main approaches: objective, subjective and integrated.

1. *Objective approach* involves assessing population’s life quality on the basis of a system of objective analytical (statistical) indicators characterizing human activity conditions. This is a publicly available and cost-free method of research, due to the fact that most of the statistical information can be found in databases of official statistics. In addition, the comparability of indicators for different regions allows for horizontal (interregional) comparative studies.

However, according to many authors, “quality of life” category should reflect the degree of person’s satisfaction with his life’s conditions, so the comparison of subjective needs of a person with the objective conditions of his life may not present the most reliable estimates.

It is worth noting that different studies assessing life quality within objective approach differ in the set of indicators used. Indicators’ composition variation is associated with both research objectives and methods of formation and processing of the information array.

2. *Subjective approach* involves quality of life assessment through a system of evaluation criteria formed as a result of population sociological surveys. Utilization of this approach in studies allows assessing people’s personal perception of their lives’ quality, awareness of their level of happiness and comfort of living.

With the help of subjective approach it is possible to assess a wide range of factors and conditions affecting population’s life quality formation. In addition, it allows implementing respondents’ feedback on alterations in quality of life. However, it should be kept in mind, that the results of such assessments are conditioned by cultural characteristics and the system of values adopted in society, as well as established living standards of social environment, expectations and goals of an individual. In addition, disadvantages of this approach are a selective nature of the study, presence of a large number of survey results processing methods, which complicates obtaining of comparable data, reluctance of respondents to report certain types of information, for example, about their income, presence of some property, etc.

3. *Integrated approach* that combines elements of objective and subjective approaches of quality of life assessment. This approach includes advantages of the two approaches described above and allows considering quality of life issue comprehensively, from the point of view of both objective conditions of human activity, and opinion an individual.

As the review of the studies on this issue [5] has shown, within the framework of the mentioned methodological approaches different methods and different sets of indicators are used. Systematization of these methods is presented in table 1.

Table 1. Methods and indicators used to assess quality of life of the population.

Indicator, author	Evaluation approach	Specific indicators taken into account
Human Development Index (UNO) [7]	Objective approach	· Life expectancy · Education · Income

Quality of Life Index (UNO) [8]	Objective approach	<ul style="list-style-type: none"> · Income · Health · Stability · Safety · Family well-being · Social ties · Gender equality · Political freedom · Climate · Job prospects
Physical Quality of Life Index, PQLI (scientific community led by Morris D. Morris) [6]	Objective approach	<ul style="list-style-type: none"> · Life expectancy upon the attainment of the age of 1 · Infant mortality rate; · Adult literacy rate
Federal State Statistics Service (Rosstat) Technique Population's life quality [9]	Objective approach	<ul style="list-style-type: none"> · Personal income · Pension and social security · Population's socio-economic differentiation according to income · Population's spending, savings and personal property · Population's housing conditions
V.F. Bezyazychnyi and Y.V. Shilkov [10] Method	Objective approach	<ul style="list-style-type: none"> · Welfare · Health conditions · Education · Housing conditions · Quality of products and services · Observance of constitutional rights of individuals
N.V. Zubarevich method Productive life quality index [8]	Objective approach	<ul style="list-style-type: none"> · Per capita monetary income to the subsistence minimum ratio · Share of population with incomes above the subsistence minimum · Occupational level · Life expectancy · Infant mortality
Integral indicator of population's life quality (S.A. Aivazyan et al.) [6]	Objective approach	<ul style="list-style-type: none"> · Natural and climatic conditions · Population quality · Population wealth · Quality of the environment · Social security
The OECD Better Life Index (Organization for Economic Cooperation and Development) [11]	Objective approach	<ul style="list-style-type: none"> · Housing conditions · Income · Employment · Education · Ecology · Civil rights · Health · Satisfaction · Security · Recreation
Population Crisis Committee non-profit organization's	Objective approach	<ul style="list-style-type: none"> · Food cost · Housing conditions

method [12]	<ul style="list-style-type: none"> · Communication · Education · Healthcare · Noise level · City traffic · Air purity · Social security
Social Weather Station Agency Method (the Philippines) [6]	<p>Subjective approach</p> <p>Answers to questions: by answering the first question, a person is classified either as a “winner” or as a “loser”, and with the help of the second question, respondents are divided into pessimists and optimists.</p> <p>1) if we compare the quality of your life now and 12 months ago, would you say that it has become better, remains the same, worse?</p> <p>2) what do you think will be the quality of life over the next 12 months?</p>
Y.A. Neretina, T.A. Salimova, Subjective approach. M.Sh. Salimov’s Method [13]	<ul style="list-style-type: none"> · Health · Income level · Housing conditions · Education level and quality · Peace of mind · Independence and freedom · Public respect · Employment security · Healthcare quality · Confidence in future · Criminal intrusion safety · Environmental situation · Peace and conciliation in society · Leisure and recreation · Public amenities · Authorities · Religious views
Rogerson’s Model (Rogerson) [14]	<p>Integrated approach</p> <ul style="list-style-type: none"> · Purchasing convenience · Environmental pollution · Educational level · Cost of living · Noise level · Climate · Employment options · Relationships with neighbours · Housing conditions · Vegetation adequacy · Healthcare development level · Leisure and sport opportunities
Netherlands Index of Life Conditions, LCI (Netherlands Social and Cultural Planning Office) [6]	<p>Integrated approach</p> <ul style="list-style-type: none"> · Housing conditions · Health · Purchasing ability · Leisure · Social mobility · Social commitment

	· Sport development
	· Education level
	· Employment and labour conditions
Scientific Research Laboratory Integrated approach on living standards issues method, Belgorod, Russia [15]	· Indicators of people's vital needs
	· Indicators that determine level of needs' fulfillment
	· Indicators of people's satisfaction

As can be seen from the data presented in the table, a significant part of the methods of quality of life assessing involve utilization of a set of indicators of population housing conditions' characteristics. This confirms the assumption that housing conditions affect quality of life of the population. In their turn, housing conditions of the population depend on housing investment market conditions and development. To identify the degree of housing investment market dynamics influence on quality of life indicators, the author's approach to population's quality of life assessment is considered and assessment of housing investment market indicators impact on quality of life of the population is carried out.

3. Development of a methodological approach to housing investment market development impact on quality of life assessment

In order to study the role of housing investment market as one of the most important factors in improving population's quality of life, a methodological approach to assessing the impact of housing investment market development level on quality of life of the population in the regions of Russia (figure 1) has been developed.

Assessment of housing investment market development level impact on quality of life of the population was based on identification and analysis of correlation between quality of life index and housing investment market development index, calculated by the author's methods, on the example of the regions of Russia.

The author's method for quality of life assessment is based on the following conceptual provisions:

- the method is based on an integrated approach, as the calculations utilize both objective statistical data and subjective indicators obtained by the authors on the basis of population surveys' results' generalization;
- quality of life assessment is based on the index approach principles developed in scientific literature and the method of data characterizing various spheres of life grouping;
- the set of indicators is composed in such a way that can fully depict conditions and results of human activity: demographic, social, economic, infrastructure, health and education, labor market development, etc.
- the method reflects peculiarities of functioning of investment, construction and real estate markets, within which functioning of housing investment market happens;
- the set of indicators used to calculate housing investment market development index characterizes the conditions and dynamics of investments volume in housing construction, utilization of credit resources to finance purchasing of residential real estate, level of competition in housing market, volume of renovation (overhaul) of the housing stock.

The database for the indicators' calculation was formed on the basis of 78 regions of Russia (such regions as Murmansk region, Chukotka Autonomous District, the Republic of Crimea and Sevastopol were excluded from the analysis due to lack of values for some parameters).

The indicators used to assess quality of life of the population were grouped according to the described sphere of human activity: "Demography", "Health Care", "Social Development", "Economic Development", "Housing Conditions" and "Infrastructure" (table 2).

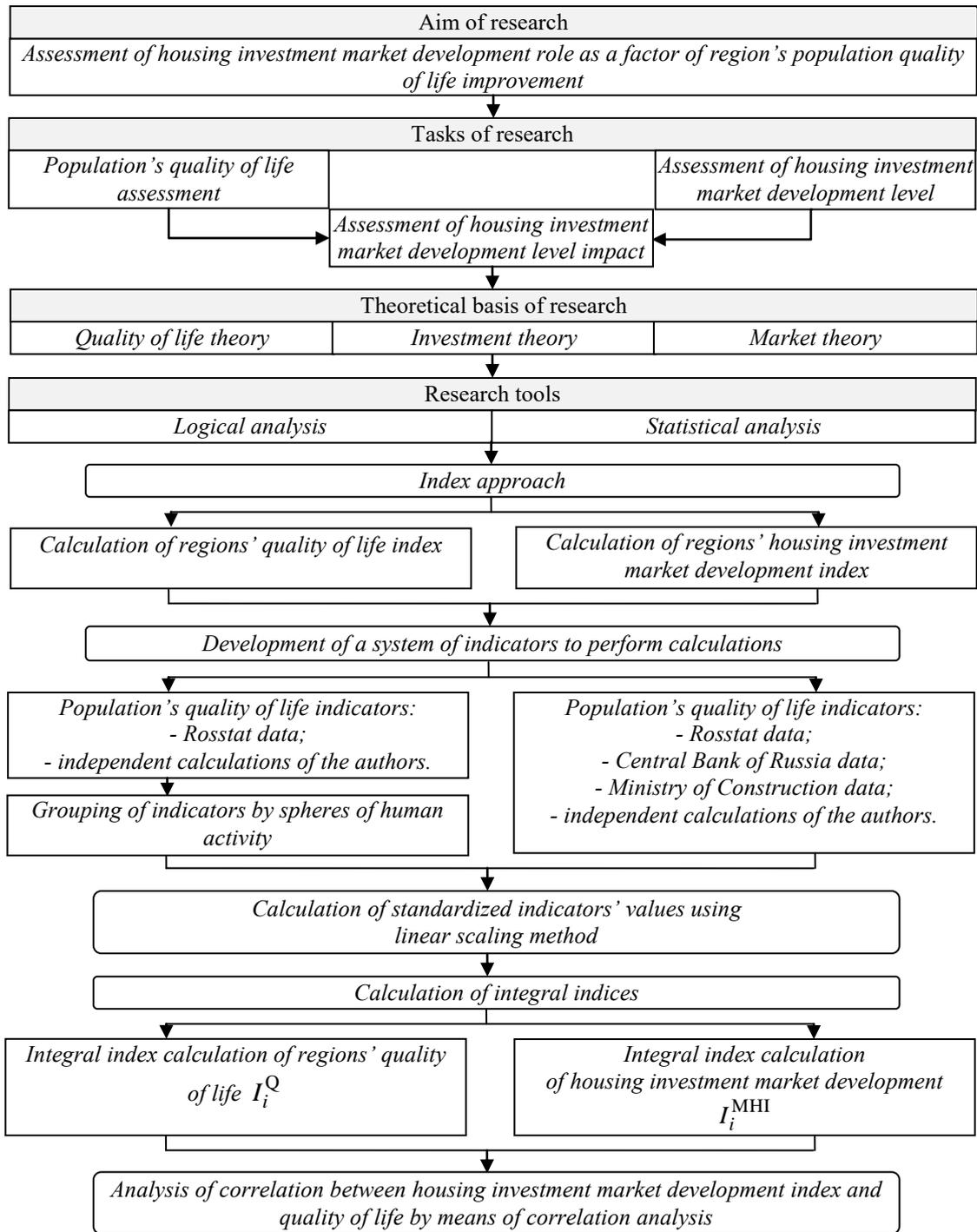


Figure 1. Contents of the author’s methodological approach assessing housing investment market development level impact on life quality.

The indicators characterizing conditions and development of housing investment market were not grouped into thematic groups, since there were only six indicators, which in the authors’ opinion was not enough for division into a separate group, both because of their small number and because of the fact that the same indicator can describe development of different subsystems of housing investment market. For example, the “housing investments” indicator characterizes both housing construction market dynamics, because it is calculated on the basis of housing delivery volume data in Russian

regions, and trends in regional real estate markets, because it reflects territorial differentiation of prices in residential real estate market.

Since indicators used to perform the calculations characterize both positive and negative changes in human living conditions, the type of impact of these indicators was taken into account when assessing quality of life of the population and housing investment market development level (table 2 and table 3).

Table 2. Indicators used to assess quality of life of region's population.

Indicator / Legend	Indicator's calculation method	Impact of indicators on quality of life (+/-)
Indicators of the "Demography" group		
Natural increase, decrease (-) of population per 1000 population, P_i^{1q}	Federal State Statistics Service Database [16]	+
Net migration rate (Migration growth per 10 000 population), P_i^{2q}	Federal State Statistics Service Database [16]	+
Indicators of the "Health Care" group		
Infant mortality rate, P_i^{3q}	Federal State Statistics Service Database [16]	-
Life expectancy at birth, years, P_i^{4q}	Federal State Statistics Service Database [16]	+
Morbidity per 1000 population, P_i^{5q}	Federal State Statistics Service Database [16]	-
Indicators of the "Social Development" group		
Share of population that pursue vocational and higher education after living school, per 10 000 population, P_i^{6q}	Calculated by the authors using data of Federal State Statistics Service Database [16]	+
Number of murder and attempted murder per 1000 population, P_i^{7q}	Calculated by the authors using data of Federal State Statistics Service Database [16]	-
Share of population with money income below the subsistence minimum (percent of the total population of the constituent entity), P_i^{8q}	Federal State Statistics Service Database [16]	-
Indicators of the "Economic Development" group		
Average per capita money income of population, roubles, P_i^{9q}	Federal State Statistics Service Database [16]	+
Ratio between average per capita money income and the subsistence minimum, P_i^{10q}	Federal State Statistics Service Database [16]	+
Unemployment rate (for the population aged 15-72 years), percent, P_i^{11q}	Federal State Statistics Service Database [16]	-
Gross regional product per capita, roubles, P_i^{12q}	Federal State Statistics Service Database [16]	+
Indicators of the "Housing Conditions" group		
Total dwelling area, average per one inhabitant (end of year) – total, sq. m, P_i^{13q}	Federal State Statistics Service Database [16]	+
Share of total area of housing stock equipped with piped water, percent, P_i^{14q}	Federal State Statistics Service Database [16]	+
Share of total area of housing stock equipped with sewage	Federal State Statistics Service Database [16]	+

(canalization), percent, P_i^{15q}		
Share of total area of housing stock equipped with heating, percent, P_i^{16q}	Federal State Statistics Service Database [16]	+
Relative share of region's household utility service expenditure, percent of overall household expenditure, %, P_i^{17q}	Federal State Statistics Service Database [16]	-
Share of region's households considering their housing conditions as very good and excellent, percent of overall number of households participated in the survey, %, P_i^{18q}	Federal State Statistics Service Database [17]	+
Share of region's households not satisfied with their housing conditions, percent of overall number of households participated in the survey, %, P_i^{19q}	Federal State Statistics Service Database [17]	-
Indicators of the "Infrastructure" group		
Provision of region's population with hospital beds (end of year), people per beds, P_i^{20q}	Federal State Statistics Service Database [16]	+
Provision of region's population with outpatient and polyclinic institutions (end of year), visits in a shift per 10 000 people, P_i^{21q}	Federal State Statistics Service Database [16]	+
Share of region's households considering provision with adequately equipped hospitals insufficient, percent of overall number of households participated in the survey, P_i^{22q}	Federal State Statistics Service Database [18]	-
Share of region's households considering provision with adequately equipped polyclinics insufficient, percent of overall number of households participated in the survey, P_i^{23q}	Federal State Statistics Service Database [18]	-
Provision of preschoolers with places in preschool institutions, places per 1000 children, P_i^{24q}	Federal State Statistics Service Database [16]	+
Density of public paved roads, kilometers of roads per 1000 sq. km of territory (end of year), P_i^{25q}	Federal State Statistics Service Database [16]	+

To calculate quality of life index and housing investment market development index, the values of all regional indicators were standardized using linear scaling method. Linear scaling method allows determining the place of any value between its maximum and minimum values.

Individual standardized indices of indicators used to assess quality of life index and housing investment market development index were calculated as:

a) in case of a positive impact of the indicator on evaluation result:

$$I_i^j = \frac{P_i^j - P_{\min}^j}{P_{\max}^j - P_{\min}^j}$$

b) in case of a negative impact of the indicator on evaluation result:

$$I_i^j = 1 - \frac{P_i^j - P_{\min}^j}{P_{\max}^j - P_{\min}^j}$$

where I_i^j – individual index of j indicator in i region;
 P_i^j – value of j indicator in i region;
 P_{\min}^j – minimal value of j indicator among Russian regions;
 P_{\max}^j – maximum value of j indicator among Russian regions.

Table 3. Indicators utilized for housing market development evaluation.

Indicator/ Legend	Means of indicator's calculation	Indicator's impact on housing investment market (+/-)
Delivery of residential buildings, sq. m per 1000 population, $P_i^{1\text{mhi}}$	Federal State Statistics Service Database [16]	+
Region's housing delivery rate growth per year, %, $P_i^{2\text{mhi}}$	Calculated by the authors using data of Federal State Statistics Service Database [16]	+
Housing investment per capita, thousand roubles, $P_i^{3\text{mhi}}$	Calculated by the authors using data of Federal State Statistics Service Database [16]	+
5 biggest property developers' share of region's residential construction market, %, $P_i^{4\text{mhi}}$	Data of Residential Construction Unified Information System of Ministry of Construction of Russia [19]	-
Share of thoroughly repaired apartments in overall housing stock, %, $P_i^{5\text{mhi}}$	Calculated by the authors using data of Federal State Statistics Service Database [16] and data of Housing and Utility Complex Reform Assistance Fund [20]	+
Number of mortgages issued per 10 000 population, mln roubles per 10 000 people, $P_i^{6\text{mhi}}$	Calculated by the authors using data of Federal State Statistics Service Database [16] Central Bank of Russia data [21]	+

Calculation of quality of life of the population index was conducted by means of averaging the values of group indices of previously selected groups of indicators:

$$I_i^Q = \frac{I_i^{\text{dem}} + I_i^{\text{health}} + I_i^{\text{soc}} + I_i^{\text{econ}} + I_i^{\text{house}} + I_i^{\text{inf}}}{6}$$

where I_i^{dem} – “Demography” group index in the region;
 I_i^{health} – “Health Care” group index in the region;
 I_i^{soc} – “Social Development” group index in the region;
 I_i^{econ} – “Economic Development” group index in the region;
 I_i^{house} – “Housing Conditions” group index in the region;
 I_i^{inf} – “Infrastructure” group index in the region.

In their turn, values of group indices were calculated as average values of individual indices of indicators included in the corresponding groups. For example, the index of “Demography” group was calculated as the average of partial indices of “Natural increase, decrease of population per 1000 population” and “Net migration rate (Migration growth per 10 000 population)” indicators.

Calculation of housing investment market development index was made by means of averaging the values of private indices of indicators characterizing its development:

$$I_i^{MHI} = \frac{P_i^{1mhi} + P_i^{2mhi} + P_i^{3mhi} + P_i^{4mhi} + P_i^{5mhi} + P_i^{6mhi}}{6}$$

where P_i^{1mhi} – individual index of “Housing delivery per 1000 population in the region” indicator;

P_i^{2mhi} – individual index of “Region’s housing delivery growth rate per year” indicator;

P_i^{3mhi} – individual index of “Housing investment in the region per capita” indicator;

P_i^{4mhi} – individual index of “5 biggest property developers’ share in region’s residential construction market” indicator;

P_i^{5mhi} – individual index of “Share of thoroughly repaired apartments in overall housing stock” indicator;

P_i^{6mhi} – individual index of “Number of mortgages per 10 000 population in the region” indicator.

4. Conclusion

The methodological approach proposed by the authors allowed calculating integral indicators characterizing quality of life of the population and housing investment market development level. Approbation of the developed methodological approach confirmed the influence of housing investments market development level on quality of life of the population in the regions of Russia. The calculations showed that the correlation coefficient between the housing investment market development index value and quality of life index value in the regions was 0.7, indicating that there is a strong correlation between the analyzed indicators on Chaddock scale. To illustrate the calculations’ results, the data on Siberian Federal District regions (figure 2) has been provided. Data analysis of SFD regions showed existence of a closer correlation between housing investment market development index and quality of life of the population index – the correlation coefficient between these parameters amounted to 0,823.

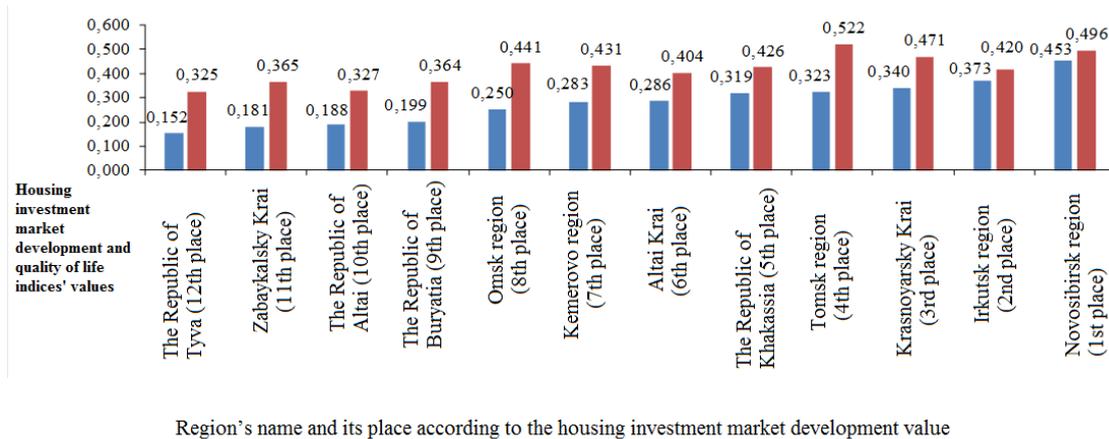


Figure 2. Evaluation results of housing construction market development impact on quality of life of population in Siberian Federal District.

This is primarily due to the less pronounced differences in socio-economic development of the regions of Siberia in comparison with the territory of Russia as a whole. The results of the analysis confirm the link between the level of housing investment market development and quality of life of the population, as well as the existence of territorial differentiation in development of housing market, and in socio-economic situation of the regions.

5. Acknowledgments

The reported research was funded by Russian Foundation for Basic Research and by the Tomsk Region Government, grant № 18-410-700013

6. References

- [1] Ovsyannikova T Y, Rabtsevich O V, Yugova I V 2018 Disparities in housing investment: analysis of the causes and assessment of the consequences *Housing strategies* vol 5 4 doi: 10.18334/zhs.5.4.39694
- [2] The concept of long-term socio-economic development of the Russian Federation for the period up to 2020 URL http://www.consultant.ru/document/cons_doc_LAW_82134/28c7f9e359e8af09d7244d8033c66928fa27e527
- [3] Strategy of housing sphere development of the Russian Federation up to 2025 Ministry of Construction of the Russian Federation URL: <http://www.minstroyrf.ru/docs/15909>
- [4] National security strategy of the Russian Federation URL http://www.consultant.ru/document/cons_doc_LAW_191669/61a97f7ab0f2f3757fe034d11011c763bc2e593f/
- [5] Rabtsevich O V, Siritsyna D I 2019 Quality of life of the population: concept, approaches to definition and results of assessment Proceedings of the IX International scientific and practical conference in 2 vol ed. by T Y Ovsyannikova, I R Salagor (Tomsk: TSUAB Publishing House) pp 51-61
- [6] Aivazyan S A, Stepanov V S, Kozlova M I 2006 Measurement of synthetic categories of region's population quality of life and identification of key directions of social and economic policy improvement *Applied econometrics* pp 18-84
- [7] Human Development Reports United Nations Development Programme <http://hdr.undp.org/en/data>
- [8] Social Atlas of Russian regions Independent Institute of Social Policy URL http://www.socpol.ru/atlas/overviews/social_sphere/kris.shtml
- [9] Russian statistics yearbook 2018 Collected papers Federal State Statistics Service of Russia http://www.gks.ru/bgd/regl/b18_13/Main.htm
- [10] Bobylev S N, Minakov V S, Soloviev S V, Tretyakov V V 2012 Ecological and economic index of Russian regions *Methods and indicators for calculation* (Moscow) 113 p
- [11] OECD Better Life Index OECD <http://www.oecdbetterlifeindex.org>
- [12] Vasiliev A L 2003 Russia in the XXI century Quality of life and standardization (Moscow: RIA "Standards and quality") 440 p
- [13] Neretina E A 2004 Subjective indicators of quality of life in the region *Standards and quality* 11 pp 52-55
- [14] Balamirzoev N L 2018 Development of evaluation criteria composition of a microfinance organization based on analysis of indicators in quality of life models *Bulletin of the Astrakhan State Technical University* pp 133-144
- [15] Alferova M N 2002 On a possible approach to development of a regional program to improve quality of life of the population *Quality of life technologies* vol 2 2 pp 1 – 10
- [16] Regions of Russia. Socio-economic indicators 2018: Collected papers Federal State Statistics Service of Russia URL: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/doc_1138623506156
- [17] Comprehensive monitoring of living conditions of the population Federal State Statistics Service of Russia: URL: http://www.gks.ru/free_doc/new_site/KOUZH16/PublishData/Sav/GKS_KOUZH_2016.rar
- [18] Selective monitoring of quality and availability of services in education, health care, social security and employment promotion Federal State Statistics Service of Russia URL:

- http://www.gks.ru/free_doc/new_site/quality17/PublishData/MiscFiles/GKS_KDU_2017.rar
- [19] Residential Construction Unified Information System of Ministry of Construction of Russia “Our House.RF” URL: <https://наш.дом.рф/аналитика/застройщики/карта>
- [20] Annual report of the “Housing and utility complex reform assistance fund” state corporation for 2017 URL: <http://fondgkh.ru/workresult/godovye-otchetyi-fonda/godovoy-otchet-gosudarstvennoy-korporatsii-fonda-sodeystviya-reformirovaniyu-zhkh-za-2017-god/>
- [21] Indicators of the primary housing (mortgage) loaning market (regional section): Some indicators on loans in rubles issued to individuals-residents Information of Central Bank of the Russian Federation URL: <https://www.cbr.ru/statistics/table/?tableId=4-6&dt=20170601>