

Non-price competition in the regional high-rise construction market

Elena Ganebnykh^{1,} Tatyana Burtseva¹ Ekaterina Gurova¹ and Irina Polyakova²*

¹Vyatka State University, Moskovskaya str., 36, Kirov, 610000, Russia

²Moscow State University of Civil Engineering, Yaroslavskoye Shosse, 26, Moscow, 129337, Russia

Abstract. The article analyzes the market of high-rise residential construction in the city of Kirov (Russia). A minimal significance of price factors has been revealed in the process of the market analysis. This suggests that a lower price does not guarantee an increase in consumer demand. Thus, factors of non-price competition are of great importance in the market in question. The expert survey has identified the factors of non-price competition which influence consumer perceptions. A perceptual map has been constructed on the basis of the identified factors by means of the factor analysis to determine the positioning of each high-rise building relative to the consumer requirements. None of the high-rise residential buildings in the market in question meets the consumers' expectations of an "ideal facility".

1 Introduction

In Russia, a high-rise building is traditionally considered to be a structure of 75 meters high or having more than 25 floors [1]. In foreign countries, structures between 35-100 meters high or having 12-39 floors are referred to as high buildings according to Emporis Standards [2]. Buildings of over 100 meters high are classified by Emporis as skyscrapers.

The history of high-rise construction in Russia has a long history, but it was mainly applied in the construction of churches and other religious buildings (such as bell towers, monasteries). Mass construction of high-rise civil structures began in Russia in the middle of XX century, and it later spread to industrial and engineering construction [3]. Most high-rise buildings were erected mainly in Moscow and St. Petersburg for many years without being built in other regions of Russia. This trend is partly explained by urbanization processes, population growth and built-up density. Since the 90s of XX century, the fashion coming from abroad after "opening the borders" after the collapse of the USSR has become an additional factor in the rapid growth of high-rise construction. So construction of high-rise buildings in cities with relatively small population is mainly determined by fashion. Although, urban density of such cities also often results in infill construction of high-rise buildings in the city center, which is explained by an increased demand for housing in these parts of a city.

The city of Kirov is the center of the Kirov region; its population is 500 000 people. Since the city has a history of 640 years, its central part has low-rise buildings, which is typical of

* Corresponding author: ganebnykh@mail.ru

old Russian and European cities. Urban construction, constrained from the east by the Vyatka River, has gradually developed into the south and south-west, but the business center is still the old part of the city (Figure 1).

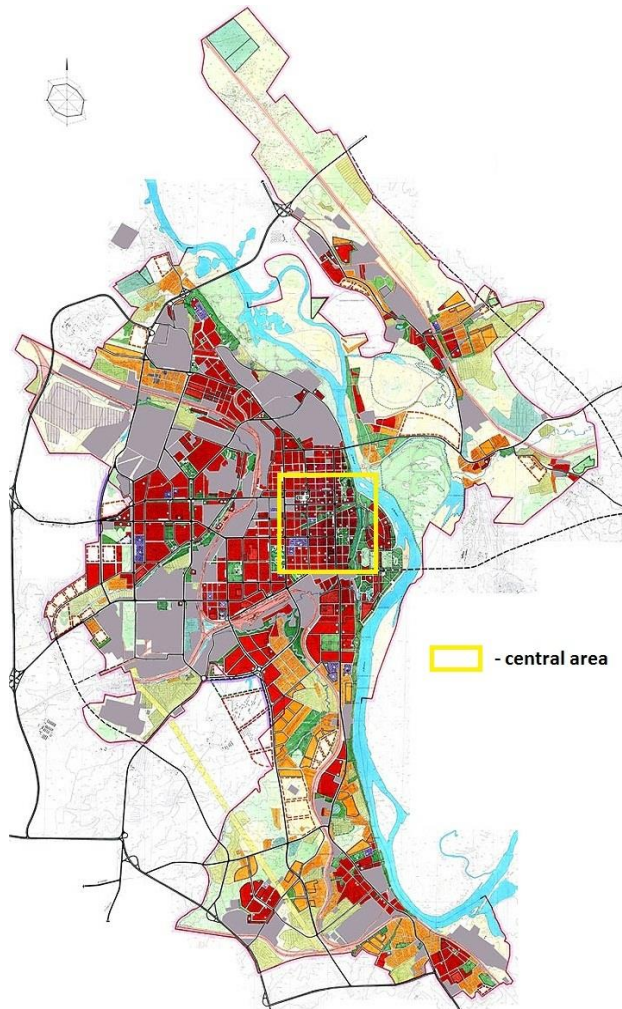


Fig. 1. Map of Kirov districts.

The following restrictions were in force in high-rise construction in Kirov in 2017:

- land plot area between 0.5-1.6 ha;
- the maximum number of above ground floors is 17;
- building factor not exceeding 1.6.

At the same time, it is allowed to increase the built-up density by 30% when reconstruction of the existing buildings takes place [4].

In 2014, the residential real estate market in Russia entered the hypersupply phase [5], characterized by an increase in the number of unoccupied buildings and also an increase in the number of new facilities non-demanded by the consumer. In fact, this kind of market is the buyer's market. Developers should make a lot of effort in terms of marketing and seeking financial support to implement the ongoing projects. In such conditions of development of the regional market of high-rise residential real estate, competition factors become of special

importance as they allow developers to improve their position in their struggle for scarce resources (the consumer).

A set of instruments of competition between the entrepreneurial businesses constitutes competition methods [6]. Any marketing strategy takes advantage of both price and/or non-price factors of the selling proposition.

Price competition, as the name implies, is associated with strategies aimed at reducing prices. Such competition is acceptable when the goods or services offered are similar so that the price is their only difference [7]. However, a characteristic feature of the real estate market is a close link to the geographical location (location of the building), which is of very important, almost crucial, significance for the consumer. Therefore, developers also have to resort to factors of non-price competition in their struggle for the consumer. Non-price competition is based on offering a more reliable product or service; which is of a higher quality, having a longer service life and having other improved consumer properties [8].

2 Methods

At first, it is necessary to make a strategic analysis of the target market to assess the factors of price and non-price competition in the market for high-rise construction (Figure 2).

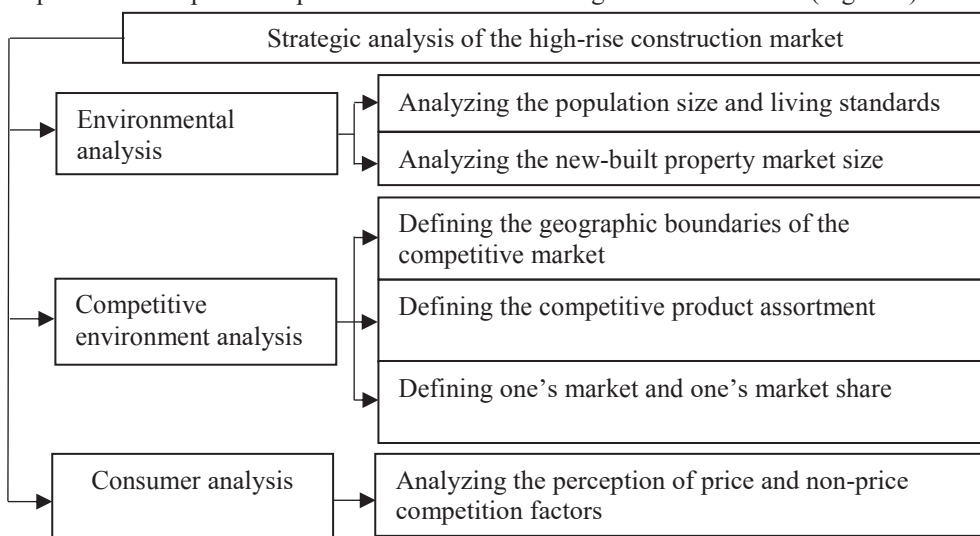


Fig. 2. Scheme of the high rise construction market analysis.

First of all, it is necessary to describe target consumers in terms of perceiving these factors to make a comprehensive assessment of the real level of price and non-price competition. It is necessary to determine the main characteristics of those buyers who are perceptive to price competition methods, as well as those who are perceptive to non-price competition methods. So it will be possible to define the target segment and the number of the target segment consumers to assess their perceptions.

Thus, a strategic analysis of the high-rise construction market will be carried out. This analysis can become the basis for developing the marketing strategy of the participants of this market.

3 Results

Marketing agencies, as well as real estate agencies of Kirov regularly publish the results of their market research, based on the statistical data concerning the changes in supply and demand in the market. However, their results are not of analytical nature and their aim is only to describe the dynamics of property prices in the region. In addition, the research data summarizes the results for the entire real estate market, without segmenting it; they do not describe the high-rise construction market separately. Thus, a comprehensive strategic analysis including a number of steps is necessary to develop the marketing strategy for the construction companies operating in the high-rise market.

3.1 Environmental Analysis

The environmental analysis is usually considered to be an initial stage of strategic management [9]. This analysis allows us to identify factors that contribute to or hinder the commercial success of an enterprise. As the dynamics of the external environment increase their influence, such analysis becomes a vital factor for the enterprise, ensuring its survival. The elements of the external environment are not of the same value for an enterprise, so an important part of the analysis is to identify those ones which play the most important and significant role.

3.1.1 Analyzing the population size and living standards

Kirov is the regional center of the Volga Federal District; it was founded in 1374. The territory of the city is 169.7 km² with the population density of 1954.5 people per square kilometer. The size of the permanent population of Kirov is steadily growing; there are some variations in the growth, but on the whole, they coincide with the demographic changes in Russia. In 2017, the city's population was 500 thousand people. Migratory flows are mainly directed towards other regions (mostly Moscow, St. Petersburg, Kazan), but the urban population remains replenished thanks to urbanization of the Kirov region as a whole, i.e. movement of the rural population to the center of the region to settle there permanently.

Comparing income and expenditure of the population gives an understanding of the living standards in the city. The state statistics bodies do not have a separate database for each municipality, so statistics indicators are based on the averaged data for the Kirov region as a whole.

Table 1. Indicators of living standards in the region.

Indicator	2012	2013	2014	2015	2016
Average monthly salary, thousand rubles per month.	16.9	19.3	21.0	22.1	23.4
Subsistence level, thousand rubles per month.	6.2	6.9	7.6	9.3	9.3
Proportion of the population with below the subsistence level income, %	12.4	13.6	12.7	14.9	no data
Expenditure pattern, %					
- food products;	32.5	34.7	33.8	38.9	36.2
- non-food products;	44.8	41.3	43.5	36.9	40.3
- service sector payments.	22.7	24.0	22.7	24.2	23.4

Analyzing the indicators of the living standards of the Kirov region population, presented in Table 1, one can see a noticeable increase in the average monthly salary, however, the

average salary in the region is significantly lower than average figures in Russia. The average monthly salary in the Kirov region was 65% of the national average in 2016. The population income grew almost in proportion to the subsistence minimum (an increase by 1.4-1.5 times in the last 5 years), but the expenditure pattern changed as well: spending on non-food products was reduced and the expenditure shifted towards food products. When most of the income is spent to buy food, it means a decrease in the real income of the population. Real estate refers to luxury goods; therefore growth in its sales is always conditioned by the population income growth and availability of loan funds. In Kirov, the decrease in the population expenditure coincided with the hypersupply phase in the real estate market, which puts developers in an extremely tough situation.

3.1.2 Analyzing the new-built property market size

The new-built property market size is estimated by the number of buildings (square meters of buildings) put into operation for a particular period of time. The dynamics of changes in the size of the new-built property market is shown in Figure 3.

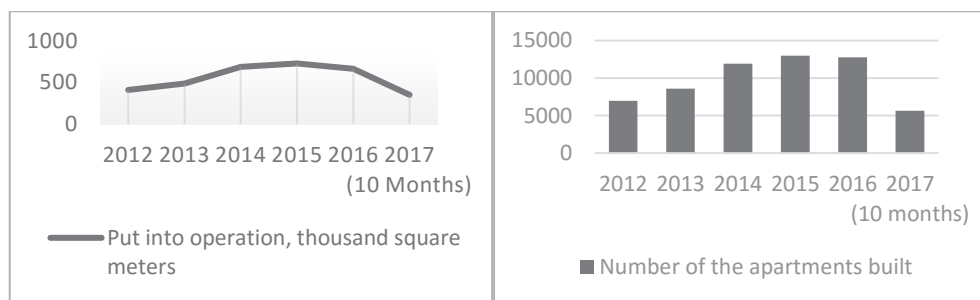


Fig. 3. Indicators of the new-built property market size.

The infographic in Figure 3 is indicative of the hypersupply phase when the supply exceeds the demand. Starting from 2015, construction activity has been slowing down, so the market size is going to decrease until there is lack of supply.

The indicators in Figure 3 reflect the general situation in the residential real estate market, while this study is aimed at the high-rise construction market. In 2017, there were only 4 high-rise residential buildings under construction in Kirov, 2 of them are located in the central district and 2 in the south-western district of the city

The central district:

- Iceberg Residential Complex– 27 floors;
- Alye Parusa Residential Complex– 25 floors.

The south-western district:

- Malakhit Residential Complex– 27 floors;
- Olimp Residential Complex– 27 floors.

All residential complexes are of premium class; they are multi-sectional and are commissioned in a phased manner.

3.2 Competitive environment analysis

If we define competition as a struggle for customers, then all aspects of the competitive environment and competitive advantages are the principal indicators which distinguish one firm from another and allow the firm to attract the attention of customers [10]. Therefore, it

is necessary to make a comparative analysis of the competitive environment in order to project the market situation.

3.2.1 Defining the geographic boundaries of the competitive market

The number and density of the population, built-up density and low demand for high-rise construction in the Kirov region have defined clear boundaries of this market. In fact, there are only 3 more high-rise buildings in the city in addition to the four high-rise complexes mentioned above: Edelweiss Residential Complex (25-storey building, commissioned in 2012), Studenchesky Residential Complex (24-storey building, commissioned in 2015) and Prestige House Residential Complex (25-storey building, commissioned in 2014). The geographic boundaries of the market under study lie within the boundaries of the Kirov municipality. In fact, they are located in the central and south-western districts of the city. The south-western part of the city is essentially a bedroom district, but it has a developed infrastructure and good transport accessibility.

3.2.2 Defining the competitive product assortment

The product assortment in the market for high-rise construction is conditioned both by general characteristics of a residential complex and by the characteristics of apartments. The characteristics of the four high-rise residential complexes are compared in Table 2.

Table 2. Characteristics of high rise residential complexes.

Indicator	Iceberg	Alye Parusa	Malakhit	Olimp
General characteristics of the residential complex				
Location district	center	center	south-west	south-west
Number of floors	27	25	27	27
Number of apartments	136	414	192	751
Wall material	brick and monolith	brick and monolith	brick and monolith	brick and monolith
Class of the residential property	premium class	premium class	premium class	premium class
Infrastructure	highly developed	highly developed	semi-developed	under developed
Parking lot	underground and ground level	underground and ground level	ground level	ground level
Children's playground	in the yard	in the park	no	in the yard
Characteristics of apartments				
Average metric area of a 1-room apartment	44.9	47.7	46.9	42.5
Average metric area of a 2-room apartment	74.6	67.0	59.6	57.0
Average metric area of a 3-room apartment	97.6	99.6	67.7	74.6
Average metric area of a 4-room apartment	112.0	-	-	93.7
Finishing	shell and core	shell and core	fine finish	shell and core

The comparative analysis of the product assortment in the high-rise construction market in Kirov has shown that Iceberg Residential Complex and Alye Parusa Residential Complex

have very similar characteristics. Alye Parusa differs only with its location. It is located at the intersection of the city's central streets, which causes quite a noisy environment and an unfavorable ecological situation with regard to air pollution caused by exhaust gases. The construction declaration does not provide additional noise insulation of the premises, which means the consumer has to bear extra costs connected with it.

The characteristics of Malakhit Residential Complex are different from the other high-rise buildings as it is located in the district which previously was not inhabited, and, accordingly, it does not have a well-developed social infrastructure. However, the complex is located in one the central city streets, which provides good transport accessibility. At the same time, there are two shopping centers and a hotel complex being built within a radius of 0.5 km, which means the infrastructure is going to develop in the short term.

Olimp Residential Complex is located on the border of the residential and industrial zones of the south-western district, so the infrastructure there is quite underdeveloped (there is even no public transportation). The complex is a large construction facility, consisting of 9 sections and 751 apartments in total. The number of future tenants will certainly become a catalyst for the development of social infrastructure in this part of the city. The design documentation for Olimp Residential Complex specifies non-residential premises which are likely to provide the residents with essential commodities.

3.2.3 Defining the market share of the market players

There are 39 construction developers in the housing construction market in Kirov (according to the data of 2017), but only 3 of them are engaged in high-rise construction: OOO SK DomInvest, OOO Kirovsky SSK и OOO Stroisoyuz. The market shares of the business entities in this market are considered to be a part of the resources of the market. Depending on the size of the market share, the developer can be a leader or an outsider in the market having a strong or weak competitive position. Since construction of high-rise buildings is, in fact, the first experience for all three market participants, one can not define the market share using such indicators as the number of the constructed facilities or square meters put into operation.

The market share is calculated according to the formula:

$$M_{sh} = \frac{Q_p}{Q_c} \times 100\%, \quad (1)$$

where:

M_{sh} – market share, %;

Q_p – the volume of the area in high-rise buildings to be commissioned, square meter;

Q_c – the total volume of the area in high-rise buildings to be commissioned, square meter.

Thus the market shares of the developers are as follows:

6 % - Ltd SK DomInvest (11 751 square meters);

49 % - Ltd Kirovsky SSK (95 694 square meters);

45 % - Ltd Stroisoyuz (86 725 square meters).

When calculations were made, the total area, including non-residential real estate, was taken into account, therefore the market share of Ltd Kirovsky SSK is bigger thanks to the shopping center located on the ground floor of Alye Parusa Residential Complex (46 586 square meters).

It is impossible to estimate an increase in the share because the high-rise buildings in question are these developers' first experience of high-rise construction in Kirov. It is interesting to note that the developers of all three previously commissioned high-rise buildings are no longer working (they are closed or undergoing bankruptcy proceedings).

To assess the efficiency of the price factor in the market, the price pressure coefficient (C_{pp}), which characterizes the variation of prices in space and time, is used:

$$C_{pp} = \frac{\sigma}{\bar{P}}, \tag{2}$$

where:

- C_{pp} – price pressure coefficient;
- σ – standard deviation of product prices;
- \bar{P} – average price of the product.

$$\sigma = \sqrt{\frac{1}{n} \sum (P_i - \bar{P})^2}, \tag{3}$$

where:

n – number of developers in the high-rise construction market.

Thus, statistical information on the prices for the facilities in question is necessary to assess the effect of the price factor (Table 3).

Table 3. Prices for the real estate units in the high-rise construction market in Kirov.

Indicator	Iceberg	Alye Parusa	Malakhit	Olimp
Cost of 1 m ² of 1-room apartment, rubles.	48 000	58 000	49 000	48 000
Cost of 1 m ² of 2-room apartment, rubles.	46 000	52 000	49 000	44 000
Cost of 1 m ² of 3-room apartment, rubles.	45 000	55 000	49 000	38 000
Average cost of 1 m ² of the real estate unit, rubles.	46 333	55 000	49 000	43 333

Thus, the price pressure coefficient is 0.08. The closer C_{pp} is to zero, the lower the price competition level is. Thus, it can be said that price competition in the market of high-rise construction is of minimal significance. This suggests that a lower price will not guarantee an increase in consumer demand. Therefore, non-price factors of competition become more important.

3.3 Consumer Analysis

Despite the fact that the goal of the consumer analysis is usually to identify segments or groups of people having similar requirements that can be directly targeted in marketing activities [11], the method of an expert survey was used in this study. Experts were realtors, as well as buyers of the residential real estate.

To analyze the perception of non-price competition of real estate units in the high-rise construction market in Kirov, all non-price competition factors influencing the consumer perception have been revealed:

- location;
- social infrastructure;
- transport accessibility;
- convenient access way, parking lots;
- construction quality;
- exterior of the building, building design;
- metric area of apartments;
- quality of common facilities;
- apartment planning;
- reputation of the developer.

As a result of the factor importance ranking, four factors were identified as having the greatest importance for consumer perception: location, social infrastructure, construction quality, and reputation of the developer. Further, the main components of non-price

competition in this market were assessed by experts on a 10-point scale; the average figures are given in Table 4.

Table 4. Non-price competition factors in the high-rise construction market.

Real estate unit	Location	Social infrastructure	Construction quality	Developer’s reputation
Iceberg Residential Complex	6.6	7.8	8.4	8.2
Alye Parusa Residential Complex	8.4	7.8	8.4	7.8
Malakhit Residential Complex	8.0	6.8	7.2	7.8
Olimp Residential Complex	5.8	6.6	8.2	7.4

The factor analysis [12] made with the Minitab Statistical Software 14 is used to process the data presented in Table 4; the result of this analysis is the product perceptual map. The analysis involves another object, the so-called “ideal point”, i.e. an object that the consumer would prefer to any other, including the objects that can be displayed in space but do not really exist. The ideal point allows one to determine the position of each object in relation to the consumers’ requirements, and also allows one to assess the position of objects relative to each other.

The results of the statistical data processing were interpreted to identify the axes of the perceptual map. The statistical indicator of factor loads was used as a basis [13]. Factor loads allow one to determine the correlation of characteristics of an object with the map axes, to determine which characteristics the factors strongly correlate with, and accordingly, give names to the map axes (Table 5).

Table 5. Factor loads of the perceptual map axes.

No	Main Factors	Axis 1: Social infrastructure and construction quality	Axis 2: Location and developer’s reputation
X ₁	Location	0.323	0.940
X ₂	Social infrastructure	0.813	0.573
X ₃	Construction quality	0.955	0.252
X ₄	Developer’s reputation	0.771	0.593

Analyzing the correlation of factor loads with the perceptual map axes, one can conclude that high correlation values for Axis 1 are observed between the variables of X₂ (social infrastructure) and X₃ (construction quality). As for Factor 2, high correlation values are observed between the variables of X₁ (location) and X₄ (developer’s reputation). Consequently, it is reasonable to analyze the results relative to Axis 1 which is “Social infrastructure and quality of construction” and Axis 2 which is “Location and reputation of the developer”.

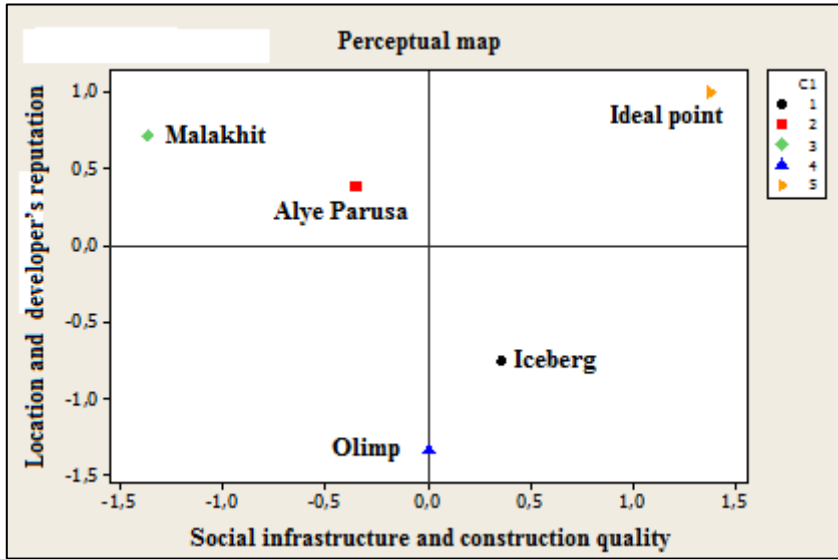


Fig. 4. Perceptual map of non-price competition of high-rise residential buildings.

The map can be interpreted by analyzing the coordinates and the relative positioning of objects with respect to the ideal point and to the axes of the perceptual map. The objects which are close to each other compete more rigidly. As one can see, these are Malakhit Residential Complex and Alye Parusa Residential Complex. The isolated objects have their own unique image, which is not always beneficial for the developer. The gaps on the map may indicate prospective opportunities to promote and position one's products in the real estate market.

The objects most distant from the axis are stronger in this characteristic. As one can see, Malakhit and Alye Parusa have a very strong position in regards to location and reputation of the developer, but the position in regards to available social infrastructure facilities and construction quality is quite weak. Iceberg, on the contrary, is quite competitive in terms of available social infrastructure facilities and construction quality, but it has a weak position in regards to location and the developer's reputation. The position of Olimp Residential Complex requires purposeful work aimed at both creating a positive perception of the location and the developer's reputation, as well as social infrastructure and construction quality.

4 Discussion

Thus, the perceptual map can show the positioning of real estate units in the marketplace and preferences of consumers in regards to efficiency of non-price competition factors. In general, the analysis has shown that all the objects under study are not able to compete in terms of perception of non-price competition; their position on the map is quite distant from the "ideal point".

Analyzing the ranks of factors of non-price competition, one can see that the location of a high-rise building is more important for the consumer. At the same time, this factor correlates with the social infrastructure factor weakly. It means selecting an attractive land plot for construction is a matter of high priority for the developer, and the infrastructure can be developed later, at the stage of construction or even after the facility has been commissioned. However, an important restriction for developers is the lack of land in attractive districts of the city.

Another problem of Kirov and other cities having a long history is the historic buildings in the central part of the city, which often have cultural and historical value. Modern high-rise buildings do not fit into the urban ensemble of the low-rise historical center. In this regard, the problem of finding an attractive location can be solved by demolishing old buildings. The construction of Iceberg Residential Complex and Alye Parusa Residential Complex began in this way.

An alternative solution may be a new microdistrict, which is more costly in terms of infrastructure development, but it gives a lot of scope to implement different architectural concepts. One can solve the problem in this way only during the Expansion phase when the demand for the residential real estate is growing. It is due to a large metric area of high-rise buildings, the construction of which should be supported by real demand.

Further analysis of consumer perceptions of the development quality with regards to high-rise construction has revealed some bias against monolithic construction technology. According to consumers, this technology has not been used in Russia until quite recently, so there are no statistical data on the quality of such construction. More than that, Russian construction companies often do not have enough experience in high-rise residential construction, but a violation of construction technology is very dangerous in this case. Such perceptions of consumers, despite the high-rise construction appeal, reduce the number of real buyers. However, a positive thing about it is that this factor is going to have less impact as the high-rise construction market is developed.

Conclusions

The conducted research allows us to draw a conclusion about the development of the high-rise construction market in Russia. The crisis of 2014 and the subsequent recession in the real estate market have also affected the high-rise construction sector.

On the whole, the environmental analysis of Kirov has shown that the residential high-rise buildings are of an infill construction type, which is explained by the demand for such facilities in the central districts of the city and lack of available land there. At the moment, 4 high-rise residential buildings are being built in the city of Kirov.

However, assessment of the price factor influence has shown minimal values. This fact suggests that lowering prices will not guarantee an increase in consumer demand. Therefore, non-price factors of competition become important.

The most significant factors of non-price competition that have an influence on consumer perceptions have been revealed to analyze the perception of non-price competition of real estate in the high-rise construction market in Kirov. They are location, social infrastructure, construction quality and the developer's reputation. The factor analysis procedure has been used to construct a perceptual map to determine the positioning of each building relative to the consumers' requirements, as well as to assess the positioning of the buildings relative to each other. On the whole, none of the buildings in the market meets the consumers' expectations of an "ideal facility". Each of the high-rise buildings has its advantages, but each of them is also noticeably distant from the "ideal point".

References

1. Yu. Granik, *Zhilishchnoe Stroitel'stvo Journal*, Vol. 2, pp. 20-22 (2008.)
2. URL: <https://www.emporis.com/building/standard/3/high-rise-buildin>
3. URL: <https://sciencepop.ru/kratkaya-istoriya-vysotnogo-stroitelstva-v-rossii>
4. E. Stein, N. Taskaeva, E. Chibisova, *Procedia Engineering* 165, 1410-1416 (2016)

5. V. Formigle, *The Four Phases of the Real Estate Cycle* (CrowdStreet, 2016)
6. I.Rozhentsova et al, MATEC Web of Conferences, 08076, DOI: <https://doi.org/10.1051/matecconf/201710608076> (2017)
7. URL: <http://www.stanford.edu/~jdlevin/papers/matching.pdf>.
8. S.L. Brue and C.R. McConnell *Economics–Principles, Problems and Policies* (15th edition). (Boston: Irvin/McGraw-Hill, 2002).
9. O. Soboleva, T. Burtseva, E.Barmina, E. Ganebnykh. and P.Tokareva, *Overcoming Uncertainty of Institutional Environment as a Tool of Global Crisis Management, Contribution to Economics / Ed. by Popkova E.G. Springer International Publishing AG*, pp. 565-574 (2017)
10. D. Aaker, *Strategic Market Management*, 10th edition. Wiley, (2013)
11. S. Silbiger, *The Ten-Day MBA: A Step-by-Step Guide to Mastering the Skills Taught In America's Top Business Schools*. HarperCollins (1999)
12. A. Pimenova et al, MATEC Web of Conferences, 73, 07018 DOI: <https://doi.org/10.1051/matecconf/20167307018> (2016)
13. Mottaeva, MATEC Web of Conferences, 08072, DOI: <https://doi.org/10.1051/matecconf/20167308072> (2017)