Journal of ENVIRONMENTAL Treatment Techniques

J. Environ. Treat. Tech.
ISSN: 2309-1185

Journal web link: http://www.jett.dormaj.com

Comprehensive Assessment of the Comfort of the Urban Environment

Elena V. Maksyutina*, Anatolij N. Makarov, Veronika V. Sagaeva

Kazan Federal University, Naberezhnye Chelny Branch, Naberezhnye Chelny, Russia

Received: 13/09/2019 Accepted: 22/11/2019 Published: 20/12/2019

Abstract

The article deals with the study of the comfort of the urban environment in modern conditions of Russia. The research discloses modern approaches to determining the essence and the main components of the comfort of the urban environment and systematizes the most important indicators and methods for assessing the comfort of living of the city population. A comprehensive assessment of the comfort of living in the city was carried out on the example of Naberezhnye Chelny of the Republic of Tatarstan. A comprehensive assessment of the living comfort of the city population was carried out using the urban environment quality index is calculated on the basis of 30 indicators. Each indicator is responsible for a certain type of urban space and shows the degree of quality of the urban environment according to one of the criteria. This analysis made it possible to identify the main directions for improving the mechanism of upgrading the comfort of living. The results of the assessment of the urban environment quality index for cities of the Russian Federation showed that only 21% of cities were characterized as cities with a favourable urban environment, and 79% - with an unfavourable urban environment. However, in case of successful implementation of the measures provided for by the federal project "Formation of a Comfortable Urban Environment", by 2021 the forecasted number of cities with a favourable urban environment should be 445 (40%), by 2024 - 667 (60%), that is, the number of cities with an unfavourable urban environment in the Russian Federation will be halved.

Keywords: urban environment comfort, quality of life, territory improvement, urban environment quality index, urban infrastructure

1 Introduction

The formation of a modern urban environment is one of the urgent problems of landscaping, which requires a set of measures aimed at creating conditions for providing comfortable, safe, and affordable living conditions for citizens. The objective of the study is a comprehensive assessment of the comfort of the urban environment and the subsequent development of measures to upgrade the comfort of the population.

2 Methods

The research work of many domestic and foreign researchers is devoted to the study of the development processes of urban entities, the problems of urban environment comfort, among which are the works by such authors as Armand D.L., Ugriumova A.A., Reimers N.F., Rusakovich M.V., Glebova I.S., Iliina I.N., Pautova L.E., end others (1-7). The analysis of modern economic literature showed a lack of unity in understanding the concept of "comfortable urban environment", as evidenced by various definitions that interpret this phrase. For example, in international practice, the concept of quality of life (liveability or quality of living), similar in meaning to the quality of the urban environment, is used. Almost all interpretations of the quality of urban life include the quality parameters of the urban environment (11-16).

In Russian practice, within the framework of the priority project "Formation of a Comfortable Urban Environment", a definition is used that includes such indicators as city maintenance, yard improvement, creation and improvement of public territories. Based on this interpretation, the main elements of the urban environment are identified and presented in three categories:

1) The elements related to the territory and place of residence of people (housing, and housing and communal services) - house and yard;

2) The elements that determine the movement of people from one point to another, ensuring and observing their safety during movement (pedestrian infrastructure and safety level) - transit spaces;

3) The elements characterizing those objects of the territory where people spend their time outside the home (the external attractiveness and uniqueness of the city; the well-being of public spaces; leisure, sports, entertainment) - points of attraction.

Creation of a comfortable urban environment shall be guided by a number of approaches most widely used in the

Corresponding author: Elena V. Maksyutina, Kazan Federal University. E-mail: lena.betty@mail.ru. Tel: 89872764580.

literature (8). In the framework of the first approach, a single integral indicator should be used, such as The Global Liveability Ranking or Quality of Living City Ranking. The advantage of this approach is that the rating includes a wide list of cities submitted for comparative analysis according to the system of indicators involved. The disadvantage of this approach is the fact that such evaluative ratings are based on the opinions of experts, and not on measurable quantitative indicators.

The second approach is based on the use of any of landmark-forming evaluation criterion selected from the system of generalized indicators. For example, the general attractiveness may be the external attractiveness and uniqueness of the city, which includes a number of indicators: the number of lighting events; a standardized signage policy; the number of significant attractions of the city; positive/negative semantics of media posts; the popularity of major attractions in online resources. These indicators are estimated with the help of sociological surveys of the population and make it possible to assess the urban environment from the point of view of its impact on city residents rather than from the standpoint of its objective characteristics.

The third approach is based on a detailed assessment of a large set of quantitative indicators. This technique both contributes to the measurement of comfort parameters of the urban environment and allows identifying its effect on satisfaction with the quality of life of city residents. For example, quantitative indicators of the infrastructure available in the city (total area of parks, length of walking areas, etc.) can be attributed to the comfort parameters of the urban environment. An assessment of the level of influence on residents is measured based on an assessment of demand for this infrastructure. The resulting assessment helps determine how efficiently investment resources in urban improvement are converted into positive perceptions and changes in the behavior of citizens. The efficiency ratio of such a conversion reflects the demand and quality of urban infrastructure. As a result of Boston Consulting Group's comparative analysis of the comfort of the urban environment of megalopolises from all continents of the world, comparable in terms of income and population, rating indicators were obtained for the success of converting investments into urban comfort with refraction in high parameters of satisfaction with the quality of life of citizens in this metropolis. As a result of the comparative analysis, the cities were grouped according to the degree of success of converting investments into positive perceptions and behavior of their residents:

1. Leading megacities - high conversion rate. They convert the quality and accessibility of infrastructure to changing the behavior and perception of citizens in all elements of the urban environment (London, Singapore, New York, Berlin, and Tokyo).

2. Mid-sized cities - average conversion rate (Moscow, Paris, Seoul).

3. Lagging megacities - low conversion rate (Hong Kong, Shanghai, Mexico City, Sao Paulo) (9).

Since 2017, Russia has been using the "Urban Environment Quality Assessment Methodology", approved by order of the Ministry of Construction and Housing and Communal Services of the Russian Federation (10). This technique is designed to determine the level of quality of the urban environment of municipalities by calculating and assigning them an index of the quality of the urban environment.

The urban environment quality index is a digital value of the state of the urban environment, obtained as a result of a comprehensive assessment of quantitative indicators characterizing the level of comfort of the population. This methodology for the formation of the urban environment quality index includes the concepts of "favourable environment" and "unfavourable environment". It should be noted that according to this methodology, the urban environment is assessed as unfavourable if the value of the urban environment quality index of urban formation is below 50% of the maximum value that the city can gain.

3 Results and Discussion

The creation and functioning of a mechanism for enhancing and developing a comfortable urban environment in the Russian Federation is envisaged by the implementation of the national project "Housing and Urban Environment", the federal project "Formation of a Comfortable Urban Environment", municipal programs "Formation of a Comfortable Urban Environment for 2018-2022", etc.

We should note that in the Russian Federation there are 1112 cities. According to the results of calculating the urban environment quality index at the end of 2018, with respect to 275 settlements, only 59 cities (21.4%) scored more than half of the maximum possible points, which can characterize the urban environment of these settlements as "favourable". 216 cities scored less than half of the maximum possible points (78.6%), which may characterize the urban environment of these municipalities as "unfavourable". Given the fact that when selecting cities for assessment, the principle of evaluating at least 3 settlements from each constituent entity of the Russian Federation was applied, we can conclude that only 20% of cities in the Russian Federation were characterized as cities with a favourable urban environment, and 80% – with unfavourable urban environment.

Naberezhnye Chelny is a large city in the Russian Federation. The total population of the city is 532 thousand people. The main sectors of the economy are mechanical engineering, electric supply industry, construction industry, food, and processing industry. The city-forming enterprise of the city is the Kama Automobile Plant, which accounts for almost three-quarters of the industrial output produced in Naberezhnye Chelny. Naberezhnye Chelny is a single-industry town.

A comprehensive assessment of the comfort of living in the city of Naberezhnye Chelny was carried out using indicators for assessing the urban environment quality index in accordance with the previously mentioned "Urban Environment Quality Assessment Methodology for Municipalities of the Russian Federation".

The assessment system consists of 30 indicators, updated annually; each is responsible for a certain type of urban space and displays the degree of environmental

quality according to one of the criteria. The obtained indicator values are compared only for cities in the same group. The integral index is calculated as a simple sum of the values of 30 indicators, evaluated on a scale from 0 to 10. Points are evenly distributed between the maximum and minimum values within the group.

A comprehensive assessment of the comfort of living in the city of Naberezhnye Chelny provided the following results:

1. The state of the environment with respect to the direction of the assessment "housing and adjoining areas": 37 points were scored out of the maximum possible 50 points. Evaluation of effectiveness according to these assessment indicators was 74%.

The maximum possible assessment points (10 points) were scored according to the criteria of safety (share of emergency housing (%) and comfort (share of housing provided with centralized heat, water, electricity, wastewater (%). The lowest number of points was scored in with respect to the criterion "environmental friendliness" (the amount of household waste disposed of per capita (thousand m3/person) was estimated - 3 points.

2. The state of the environment with respect to the direction of the assessment "green and water areas": 25 points were scored out of the maximum possible 50 points. Effectiveness was 74%.

High scores (8 points) were scored relative to the criteria for assessing "safety" (the area of green areas of general use (parks, gardens, etc.) to the area of all green spaces in general (%) and "comfort" (accessibility of parks or arrangement of the natural landscape (%)). Criteria for assessing "identity and diversity" (the number of photos on social networks made by citizens in green areas (units/km2) and "modernity of the environment" (number of various services for citizens in the green areas (units/km2) scored minimal points - 3 and 1, respectively, which indicates problems in this area.

3. The state of the environment with respect to the direction of the assessment "street infrastructure": 27 points were scored out of the maximum possible 50 points. Effectiveness was 54%.

Evaluation criteria in the direction of "safety" (the number of fatal accidents with pedestrians (units/1000 people) and "comfort" (the share of roads with improved pavement (%) - scored high points – 10 and 9, respectively. "Identity and diversity" (the number of streets with developed street retail (units) and "modern environment" (pedestrian accessibility index (%) scored the minimum points – 1 and 2, respectively.

4. The state of the environment with respect to the direction of the assessment "social and leisure infrastructure and adjoining areas": 21 points were scored out of the maximum possible 50 points. Effectiveness was 42%.

"Environmental friendliness" (accessibility of sports grounds for citizens (%)) scored high points - 9 points out of 10. Criteria of "identity and diversity" (share of cultural heritage sites that host theatres, museums, libraries (%) and "modern environment" (museum and theatre attendance (units/1000 people)) scored the most minimal values - 1 point each.

5. The state of the environment with respect to the direction of the assessment "public and business infrastructure": 30 points were scored out of the maximum possible 50 points. Effectiveness was 60%.

The assessment criterion for "safety" (the percentage of illuminated parts of streets, driveways, embankments in the total number (%)) scored a maximum of 10 points. The lowest scores were obtained according to the assessment criterion for "identity and diversity" (concentration of objects of cultural heritage (units/km2) - only 1 point.

6. The state of the environment with respect to the direction of the assessment "a city-wide area": 23 points were scored out of the maximum possible 50 points. Effectiveness was 46%.

The criterion of "comfort" (average distance between stops of public transport (m)) gained 9 points out of 10 possible. Criteria of "identity and diversity" (number of places with the largest concentration of street photos from social networks (units)) and "modernity of environment" (the share of citizens working in the tertiary sector of the economy (%)) scored the minimum values – 1 and 2 points, respectively. A general assessment of the quality of the urban environment of Naberezhnye Chelny is "satisfactory urban environment". The integral assessment index of the quality of the urban environment of Naberezhnye Chelny is 163 points out of the maximum possible 300. Efficiency was only 54%. Naberezhnye Chelny has adopted the "Strategy for the socio-economic development of the municipality of Naberezhnye Chelny until 2021 and for the period until 2030". The strategy provides a list of measures regarding the development of urban space (spatial development, agglomeration development of Naberezhnye Chelny, comfortable urban environment, "smart city", etc.). Also, the Executive Committee of the municipality of Naberezhnye Chelny developed a municipal program "Formation of a Comfortable Urban Environment for 2018-2022". The implementation of program activities will improve the quality of the urban environment and raise the standard of living of the city's population.

4 Summary

At the present stage, one of the important components of the socio-economic development of the Russian Federation is to increase the comfort of living. Comfortability of the urban environment is one of the most significant factors in ensuring the competitiveness of municipalities, constituent entities of the Russian Federation and the country in general. The results of the assessment of the urban environment quality index for cities of the Russian Federation showed that only 21.4% of cities were characterized as cities with a favourable urban environment, and 78.6% - with an unfavourable urban environment. However, in case of successful implementation of the measures provided for by the federal project "Formation of a Comfortable Urban Environment", by 2021 the forecasted number of cities with a favourable urban environment should be 445 (40%), by 2024 - 667 (60%), that is, the number of cities with a favourable urban environment in the Russian Federation will double. A general state of the quality of the urban environment in the

city of Naberezhnye Chelny is satisfactory, which suggests that the indicators of the assessment of "green and water areas", "identity and diversity", "modern environment" are important factors for the life of the population. To improve the quality of the urban environment, attention should be paid to problems related to street infrastructure and traffic capacity. The solution to these problems will improve the quality of life of the population of the city.

5 Conclusions

The development of ideas about the comfort of the urban environment and its impact on the development of the city will allow avoiding strategic mistakes in building the potential of insignificant and uncomfortable areas for residents. The formation of a system of estimated indicators of a comfortable urban environment contributes to the efficiency of the use of investment resources of the city. A comprehensive assessment of the current level of comfort of the urban environment allows us to holistically form an idea of the trajectory of the city and adjust the priorities of future changes and improvements.

Acknowledgments

The work is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University.

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