Formation of comfortable urban environment in Russia based on international experience

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Abstract. In this paper we consider the formation of such an indicator of the urban environment as comfort. The aim of the study is to identify factors affecting this indicator and to draw up possible development paths in the conditions of our country. The main method used to study this topic is the analysis of received information on carrying out activities in foreign countries. As a result, it has been concluded that some projects can be implemented in Russia, but this topic requires more detailed study, as well as the development and implementation of a large number of projects in order to create a truly comfortable urban environment.

1. Introduction

The set of factors (physical, chemical, biological, informational, social) that surrounds a person every day of his life, we can call the "habitat". At this stage of human development in the context of rapidly growing urbanization, the urban environment and its quality occupy one of the main areas for study. The urban environment is a complex of certain conditions created by man and nature, located in a certain territory, for living and production activities of people. Soviet and American geography scientist Yuri Vladimirovich Medvedkov in his book “Man and the Urban Environment” has compared the urban environment with a very complex geosystem, in the center of which there is a person and it operates in areas with a consistently high population density, provided with long-term development and definitely distributed material elements that form a space for the cycle of everyday activities of the population, contributing to its further social development [1]. In modern cities a lot of attention is paid to the improvement of the environment so that it is comfortable for humans.

A comfortable urban environment is considered to be the most adapted for the needs of people. There are a number of factors to determine the comfort of a city. These include:

- State of the environment;
- Development of the social sphere;
- Development of the transport system;
- Safety;
- Development of the service sector;
- Visual range.
2. Methods
The main method used to study this topic is the analysis of information received on carrying out activities in this direction in foreign countries. The revitalization of abandoned, unused human spaces in cities is one of the main directions in creating a comfortable urban environment abroad.

3. Results and Discussion
The experience of other countries is very rich in this area. As an example, let us consider the old port in the city of Hamburg in Germany. During the revitalization, a modern development plan for this territory has been developed and almost implemented, 30% of which is occupied by residential buildings, 50% is allocated for office real estate, and the remaining 20% is the district’s infrastructure

Figure 1. Revitalization of the old port territory. Hamburg, Germany.

Another example is Volcano area in Oslo, the capital of Norway. The object of the revitalization was the territory of the plant which is specialized in the heavy foundry industry. Today it is not just a part of the city intended for leisure activities but it is an entire area with residential complexes, educational institutions and office buildings. The most interesting object, according to many experts, is the grain elevator, which was reconstructed into a student dormitory. The entire Volcano region is a combination of the industrial past territory and the present one (Figure 2) [2].

In Russia the experience of conducting revitalization is not as wide as in foreign countries. Interest in this area of territory development appeared only in the early 2000s, but so far this topic requires more detailed study and adaptation for the implementation of projects in our country. Since replacing the production function with only residential or public-business functions is not effective enough, it is necessary to develop our own methods for combining spaces for various purposes in one large territory. In other words, we should provide the project with the missing spaces for the full functioning of the renewed urban territories to design entire microdistricts with their infrastructure in the former industrial territories, if the environmental situation allows, or after analyzing an existing construction site around the territory that has been selected for revitalization [3].

At present, one of the most successful projects for the reorganization of unused territories is the Moscow Design Factory Flacon and New Holland in St. Petersburg. Crystal glass factory was built at the beginning of the 20th century and during the restructuring was transformed into an enterprise that produced perfume bottles. Since 2007 revitalization of the dilapidated territory of the former industrial facility has begun. Today it is a popular place for talented people of any age to work and relax. There
are showrooms, offices of creative companies in the field of design, fashion and architecture, spaces for creative workshops, a cafe, a bar and an outdoor pool.

Figure 2. Volcano Area, Oslo, Norway.

In winter, the territory is used as a free skating rink and a snowboard ramp. There are two multifunctional Loft platforms available for various events on the territory – Flacon Space with an area of 400 sq.m. and Flacon Loft with an area of 850 sq.m Figure 3.

Figure 3. Design Factory Flacon, Moscow.

The New Holland project is being implemented on an island in the Neva Delta where warehouses were previously located. Implementation of the project is planned in several stages 2016-2025. At the first stage the main focus was the improvement of the park space, special attention was paid to the
landscaping of the territory, as well as several historical buildings were restored. New Holland Park hosts large sculptures, art objects and installations of artists from around the world [4].

No doubt people need green spaces in urban conditions, therefore, this is also one of the main aspects that affect the formation of a comfortable urban environment. After all, improvement to a large extent affects the satisfaction of the residents' need for recreation and also creates an aesthetic framework that forms a visual view of the whole city and transforms its architectural appearance.

Foreign experience in the implementation of landscaping and gardening is very rich and diverse. Let us consider some examples that would be appropriate to implement in our country. In countries such as Poland and Bulgaria there are landscaping compositions on the streets and boulevards and most city parks have extraordinary beauty and are recognized as the historical value of the city. Sofiyivka Park in Uman is a good example.

In Europe much attention is also paid to greening the historical central part of cities using the methods of reconstruction and decompression of built-up areas. Due to the demolition of low-value housing, free spaces are formed, which are subsequently transformed into green streets with little traffic. This method was used in the work by the American architect L. Halprin during the reconstruction of Nikollet Mall in Minneapolis.

One of the methods for increasing greening in urban areas is the installation of roof gardens and vertical gardening of objects. Gardens and squares on the roofs of buildings can be observed around the world. In many cities, roofing is considered one of the main ways to solve the problem of improving the environment. Vertical greening is carried out by growing ornamental plants on various structures in the vertical direction. It serves as a decoration for walls, hedges, building facades in North America and Western Europe. This type of improvement performs several functions: creating a sense of security for people in urban life; protection from excessive sun thanks to the created "screen"; creation of a background due to which park and city recreation areas are perceived more effectively [5].

The experience of greening adjacent to private land areas of common use at the expense of the owners of land plots is widespread abroad. In New York, for example, the rules of land use and development contain a requirement that new construction or reconstruction of buildings with an increase in area of 20 percent or more should be accompanied by planting of trees in the common area from account 1 tree by 25 feet (7.62 m) along the border of the land adjacent to the common areas (Figure 4).

![Figure 4. Example of greening a public area in New York.](image-url)
To plant trees in a common area, you must obtain special permission. To simplify this procedure, local authorities approve the permitted tree species (Figure 5) that are allowed to be planted in certain areas of the city, as well as special standards for working with trees, the implementation of which must be observed.

| Tree Species          | Shape                                                       | Visual Interest                           | Suggested Frequency of Planting | Preferred Cultivars                        | Notes                                      |
|-----------------------|-------------------------------------------------------------|------------------------------------------|---------------------------------|--------------------------------------------|--------------------------------------------|
| Tilia americana       | Red Winter Twigs                                           | Moderately                               | ‘Redmond’ ‘McSentry’             | Excellent in partial shade                  |
| Tilia cordata         | Sparsely                                                   | ‘Glenclevyn’ ‘Shamrock’                  |                                  | Sensitive to excessive salt                |
| Tilia tomentosa       | Fragrant Spring Flowers Silver Undersides to Leaves        | Frequently                               | ‘Sterling’ ‘Green Mountain’      |                                            |
| Tilia x euchloria     | Fragrant Spring Flowers                                     | Moderately                               | ‘Laurelhurst’                   |                                            |
| Ulmus americana       | Sparsely                                                   | ‘Emerald Sunshine’ ‘Premont’ ‘Frontier’ ‘New Harmony’ | Plant only Dutch Elm Disease resistant cultivars ALB Host |
| Ulmus cultivars       | Sparsely                                                   | ‘Accolade’ ‘New Horizon’                 | ALB Host                         |
| Ulmus paniifolia      | Sparsely                                                   | ‘Allee’ ‘Dynasty’                        | ALB Host                         |
| Zelkova serrata       | Moderately                                                 | ‘MusaShine’ ‘Green Vase’                | ‘MusaShine’ more narrow          |

Figure 5. Types of permitted trees.

Similar landscaping requirements exist in Singapore. To preserve the image of the garden city, the law on parks and landscaping was enacted in 2005, according to which a greening strip (Green Planting Strip) 2 meters wide should be provided along all sides of the boundary of the development site (Figure 6).
The landscaping strip should be continuous (except when an access road is required) and it should not contain such structures as a retaining wall, drainage channels and ventilation pipes.

This strip is usually located on municipal-owned land and is maintained as public spaces [6].

In Russia various methods of landscaping are also used, for example, the introduction of Ecoparkings (Figure 7). In particular, this experience was the first to be applied in Moscow.

Figure 6. Layout of landscaping strip in Singapore.

Figure 7. Ecoparking in Moscow.
The technology of using the patented German TTE-system allows the ability to preserve a beautiful green lawn and at the same time significantly strengthen the soil in parking lots for trucks and cars, territories around sports and recreation facilities, access roads to garages and for landscaping local areas.

Main technical parameters of the TTE-system grass paver:
- possibility of laying in areas with a slope of up to 10%;
- withstands the load from the vehicle with a total weight of up to 3 tons in the absence of a bearing layer;
- withstands the load from vehicles with a total weight of up to 40 tons in the presence of a carrier layer with a thickness of about 30 cm.

The grass paver is no less durable material than paving with paving stones, stone, asphalt, etc. The principle of operation is that the main load (i.e. the weight of the car) is borne by the stiffness of the grate, while the lawn itself is not damaged. The arrangement of ecological parking allows you to replace the boring appearance of paved areas completely or partially, as well as lawns that have become unusable due to unauthorized parking of cars on them, with a green lawn.

The regulation of ecological parking arrangement using the German technology TTE-system includes the following activities:
- site preparation (sections of lawns that have become unusable due to unauthorized parking of cars on them);
- drainage system;
- lawn surface arrangement;
- watering and lawn care until establishing a stable grass cover.

Thus, the arrangement of such parking lots and roofs will make it possible to compensate for urban green areas seized in connection with the construction [7].

The study of foreign experience in the field of public transport reform is of great importance, since Russia is at a development stage in this area. One of the most useful is Finland’s experience in developing a passenger transportation system. It is also worth noting the attitude of society and authorities towards this area of the country's economy.

Helsinki is a large seaport, although it is a small city (population about 500 thousand), but at the same time it has a unique system of functioning urban public transport. There are units of European cities that have subways, trams, trains, buses, ferries and boats as passenger vehicles. At the same time water transport is included in a single system of the city passenger transport system, therefore, they have a single ticket and a single tariff policy [8].

The route network of the city is very extensive. There are more than 100 bus and 11 tram routes. The total length of the metro is about 30 kilometers. The entire transport network is built in accordance with European standards, so the stops are located in a five-minute walking distance.

In Helsinki 15-meter triaxial buses are used for especially busy routes to avoid overcrowding at any time of the day.

The fare is paid in several ways: at the expense of a long-term ticket, or in cash from the driver. Helsinki Card is used for tourists - a combination of a ticket for 1, 3 and 5 days with free access to museums and exhibitions in the same period.

You can highlight the most important factors to organize a system of public transport services that are used in Finland:
- Routes are distributed on a competitive basis between transport companies with similar qualifications and rolling stock. This allows you to attract large transnational corporations, which reduces the burden on the city budget, so redistribution funds can be used to purchase modern transport.
- Marketing tools and advertising optimize the implementation of travel tickets and increase revenue. Public transport fare is advancing like any other product.
Optimization of revenue collection by smartcard system. This allows you to accumulate a ticket for the most efficient preparation of financial plans. This system significantly reduces the amount of manual labor, which allows the driver not to be distracted and not to linger at stops. All these factors save time and money.

For the administration of the city of Helsinki, urban passenger transport is considered the most important and socially significant. Transport is a priority in city budget process. Moreover, the system of travel privileges is as simple as possible in order to increase the efficiency of passenger transportation. Urban transport problems are also resolved with mandatory consideration of the environmental problems of cities in Finland.

1. The main goals in the field of urban public transport are: to provide each citizen with the realization of the right to travel at affordable prices for all segments of the population with a service that meets all quality standards.
2. To increase the stability of the functioning of the urban passenger transport complex [9].

To realize these goals in our country, it is necessary to take the following measures:

- State regulation and financial support for the activities of urban passenger transport by municipal and local authorities, which have contracts with transport companies and through which financing and allocation of subventions, subsidies and subsidies are carried out.
- All public transport services should be strictly regulated by law, which strictly regulates the administrative and financial responsibility of transport companies, up to the termination of contracts and administrative liability.
- It is necessary to provide preferential fare or free travel for certain groups of the population. Under such a system, citizens are issued travel passes paid for by the municipality, city hall, or other government agencies.
- In addition to state funding other sources of financing urban passenger transport are needed. Therefore, it is necessary to attract private investors by creating various public transport development programs.

In the conditions of the development of a market economy in our country, the organization of urban passenger transport should be formed in such a way as to ensure the development of effective mechanisms for financing the renewal of rolling stock and transport infrastructure and to stimulate enterprises to increase the provision of quality and safe services. Accordingly, the form of transportation organization should be changed, which will be based on the principles of increasing the efficiency of transport enterprises, including through the creation of mixed enterprises [10-20].

4. Conclusion
To create a more favorable urban environment in Russia, it is necessary to pay considerable attention to this on the part of the state and municipalities. It is worth developing a public-private partnership in the field of public transport services, landscaping, the use of previously demanded but currently unused areas and other landscaping of settlements. We should pay more attention to foreign experience in the field of a comfortable urban environment and adapt some technologies to the more severe climate of Russia, if necessary. It is also worth paying considerable attention to training specialists in this field, since the lack of suitable personnel adversely affects the pace of development of this area of the national economy.

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