

Study of a model of social efficiency of Moscow parks in the context of sustainable development

*Ekaterina Shafray**

Moscow State University of Civil Engineering, Architecture Department, 129337 Moscow, Russia

Abstract. This article views the concepts of “smart city” abroad and in Russia through literature review. The role and value of parks and public spaces (“comfortable urban environment”) in a “smart city” is being studied. Secondly, the situation with the improvement of parks in Moscow is analysed. It assumes that the role of parks as a part of social infrastructure is expanding and studies the related problems and aspects. The important problem in the situation of expanding of social activities, cultural and commercial facilities in parks seems to be the need to evaluate the visitor’s flow, considering the measuring ways and privacy concerns, and its impact on ecological sustainability of parks. It needs to be addressed and thoroughly studied in a further research.

1 Introduction

Parks and public spaces in a contemporary city play a significant role. Until the 18th and 19th centuries, public parks in cities were quite rare. At the turn of the 19th and 20th centuries, the idea of a “garden city” proposed by British urban planner E. Howard, significantly influenced the urban planning of cities. In the 20th century, many public parks and public spaces have appeared. Some private parks become available for public visits and turned to public parks, which later on caused the need to restoration and reconstruction of parks, as recreational activity increases.

“Green urbanism” is one of the concepts of a sustainable city that has been developing over the past decades. The term “green urbanism”, describing a conceptual model, includes three main components - energy and materials, water and biodiversity, urban planning and transport (according to Lehmann, 2011 [1]).

Modern Russian and international trends in a design and improvement of parks are described and studied in previous research: for example, a connection with residential development and limitation of a park area, a creation of multifunctional parks that meet a variety of needs and scenarios, a creation of specialized parks, a creation of technically complex parks (Kaidalova, 2019 [2]); a creation of parks in unsuitable sites (quarries, ravines), a renovation of industrial areas, a creation of eco-parks with minimal interference with nature (Tsurik, 2018, [3]); a creation of parks in unsuitable and reclaimed areas (Mikhailova, 2017, [4]). A consideration of ecological aspects for parks, a creation of roof gardens and multi-level green pathways for highly urbanized areas, as well as an interest in

* Corresponding author: ShafrayES@mgsu.ru

the inclusion of a natural environment into urban and engineering infrastructure is noted in previous studies.

A contemporary city should have contemporary parks and public spaces, and the presence of high-quality designed parks and open spaces can determine a cultural and technological level of development of a nation. Existing and new architectural and landscape objects in cities create an “image of the city”, are its landmarks, as well as they are the points of attraction for residents and guests of a city.

With a growth and development of a creative IT-sphere in large megacities, the digitalization of design solutions in architecture and urban planning is becoming more relevant. In recent years, a term "smart city" has become more and more common in everyday life, it is making impact on everyday resident's life in built environment. The process of digitalization and the ability to analyze a big data have appeared to influence on architectural design, research and urban planning. For architectural design projects, the ability to incorporate quantitative analysis, indicators and data in harmony with a thoughtful aesthetic, spatial and artistic design concept seems to be crucial and valuable.

In recent decades, the increase in the number of redeveloped and new city parks, squares, and open public spaces can be observed in Russia. Thus, considering this process in a “smart city” paradigm, it becomes important to manage parks – to develop analysis of their functions and role in the city, analysis of visiting parks, analysis of parks in the context of the overall urban infrastructure, from various perspectives. This article focuses on social role and social value of city parks. This paper assumes that in a large city a social role of parks is expanding and aims to study it on the case of Moscow.

This article is devoted to the consideration of parks on the example of Moscow focused on the increase of their social significance, social role, i.e. as a part of a social infrastructure of the city. Various approaches towards understanding a "smart city" are viewed and the importance of parks and public spaces (“comfortable urban environment”) is shown in this way. The main research method is a review and analysis of literature, articles and Internet sources.

2 Methods of study and study relevance

To address the study objectives, this article uses a review and analysis of literature as a main research method. Firstly, the concept of "smart city" and its components are analyzed abroad and in Russia. The role and value of parks and public spaces (“comfortable urban environment”) in a "smart city" is being studied. Secondly, the situation with the improvement of parks in Moscow is viewed. Their role for the social infrastructure of the city is studied on the basis of Internet sources and literature review. Parks of a cityscape significance, and parks of district, local significance, located within a walking distance from home, are considered.

3 «Smart City». Concept's overview

“Smart city” concepts started to appear at around 2000s and since when the number of publications on this topic is growing. Different aspects have been addressed in various research. “Smart cities” are often associated with long-term perspectives, such as handling transportation problems, ecological problems and environment protection, involving residents in ongoing changes and transformations, e-governance, as well as incorporation of Information and Communication Technologies (ICT) into decision-making. For example, a book by Peris-Ortiz M., Bennett D. R., Yábar D. P. B. (2017) contains several articles on European “smart-cities” and describes approaches, showing the change of approaches from

“industrial city” towards “smart city” and case studies [5]. One of the often-used definitions is given by Giffinger R. et al is as follows: “*A Smart City is a city well performing in a forward-looking way in these six characteristics, built on the ‘smart’ combination of endowments and activities of self-decisive, independent and aware citizens*” [6]. The six characteristics suggested by them include: smart economy, smart people, smart governance, smart mobility, smart environment, and smart living [6].

"Smart Urbanism" is another concept that can be related with smart cities. It is referred as a strategy for the development of a city with a comfortable environment, with the ways for residents to participate in changes and decisions, and implies economic, environmental and social components. The term "smart urbanism" is developed by K. Campbell in [7, 8].

Smart Urbanism operates with such tools as: *Information and Communication Technologies (ICT)* - processes and methods of searching, obtaining, processing data; *Big Data* - storage and processing of large volumes of data; and *Geographic Information System (GIS)* – a system for visualization of spatial (geographical) data and related information about objects. In this way, “Smart City” can be referred to use of technology to optimize the efficiency of city operations and services and connect to citizens. Although there are no completely smart cities, some cities and urban areas are rapidly going in this direction with the process of digitalization.

The study by Cowan, R., Hill, D., & Campbell, K. (2005) specifically viewed parks and urban green spaces as valuable assets in terms of city sustainability through various case studies [9].

With the growing attention to digitalization and Information and Communication Technologies (ICT) in cities, the ethics of managing such city services becomes a significant challenge. There has to be a trust in such smart services and technologies, unless there will be much difficulties and hard time living in this new reality [10]. With the widespread of technologies, the main concerns seem to be focused around collecting and use of data about residents, concerns about privacy, and data-driven place making for local communities. The role of public spaces seems to be always important, for socializing and to offer cultural programs and amenities that are valuable for community and improve a quality of life.

In Russia, a large number of previous studies have been devoted to the concept of “smart cities” [for instance, 11, 12, 13]. A smart city concept is becoming more popular for municipalities for city management [12]. The cities are being analyzed in terms of “smart city” strategies and programs [13].

The program “*Umnyy gorod*” (smart city) for Russian cities is implemented for the digitalization of the urban economy [14]. The objectives of this program are related with urban environment, safety of cities, digital city governance, social welfare and investments. The assessment of efficiency of digital transformation of urban economy of cities (“*IQ gorodov*”) has been developed.

Another Federal program “*Formirovaniye komfortnoy gorodskoy sredy*” (Creating a Comfortable Urban Environment) is designed to subsidize the improvement of public spaces in cities in Russia [15]. Within the framework of that project, public areas, parks, embankments are being improved. An involvement mechanism has been created for residents of municipalities. With that every citizen of the country over the age of 14 is able to take part in solving issues of urban development.

The next part of the paper views parks in Moscow in terms of their role for the social infrastructure of the city. From my point of view, the social role of parks is expanding and increasing in Moscow, especially for elder residents. The programs, such as «*Moskovskoye dolgoletiyе*» (Moscow longevity), providing various activities and events for residents are being implemented. This helps to take a fresh look on the city parks as a part of city infrastructure.

4 Parks in Moscow in terms of their social role for residents

According to [16], the percentage of public green space (parks and gardens) in Moscow constitute 18.00% of the city (2017). With that, the number of new and improved parks and urban green areas in Moscow is constantly increasing with the projects and programs of Moscow municipality. For example, according to [17], the total number of parks by 2018 has doubled over the past seven years, and there were 781 parks on the map of Moscow in 2018. According to municipality webpage [18], during 2011-2022 years 503 projects were realized for improvement of streets, alleyways, squares and boulevards with 62 projects in 2022; and during 2011-2022 years 950 parks and squares were improved, with 64 parks in 2022. Overall, various improvement of urban green spaces and parks is made, and the number of new and improved parks has been increased over recent years.

With that, the efficiency of park's management and analysis of park's use by visitors is gaining more importance and attention, according to [19]. Parks are considered as points of attraction and even can be compared with malls and shopping centers in terms of their management [19]. The analysis of visitor's flow and visitor's traffic in parks has to be taken into account when hosting a commercial business and retail (kiosks, cafeteria, etc.), to set up the cost of rent. Visiting parks depends on time of a year (it usually decreases during spring and autumn), on weather conditions, during the holidays and weekdays, on time of a day. Each park (for example, VDNH, Gorky Park, Sokolniki park, Tsaritsyno museum and park, and many others) has its own unique image, character and status for historical and cultural preservation, and has to be addressed in its own way. Hosting cultural and commercial amenities in parks increases number of visitors and "recreational load" for a park's territory. Placing cultural and commercial amenities in parks and their management require a careful analysis and study.

Parks are playing a more notable role in social infrastructure in the city, for allocating social and commercial facilities and amenities within park's territory, hosting social programs, events and festivals for various activities for visitors. Let's view two categories of parks: parks of a cityscape significance, and parks of district, local significance, located within a walking distance from home. Cityscape parks in Moscow host various events and programs (for example, flower festivals, open-air concerts, etc.), while local, district parks are used for daily activities (walking, jogging, cycling, Nordic walking, etc.). Various activities and rest in parks are especially designated and addressed to elderly audience. Some social activities performed in parks in Moscow are shown at Fig. 1.

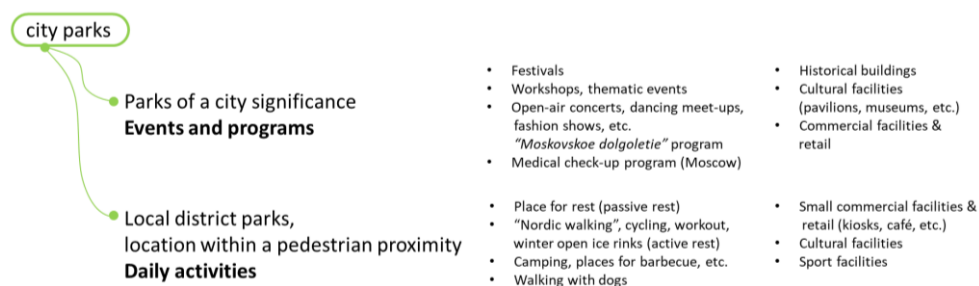


Fig. 1. Social role of city's parks in Moscow, social activities and facilities in parks.

Some recent special activities and programs in Moscow parks are as follows:

- «Zdorovaya Moskva» - medical check-up in pavilions located at city parks,

- «*Moskovskoye dolgoletiyе*» (Moscow longevity) – various activities and classes for elderly residents (such as work out, fitness, etc.). The classes can have a healing effect and contributes to an increase in physical and cognitive conditions of a person, [20],
- Moscow Urban Forum, a large conference and exhibition for urban planning and architecture, 2021 was focused primarily to the topic of urban health and facing the pandemic situation. Urban health goes in line with activities for elderly residents, etc.

All in all, parks are being more involved in a social infrastructure of Moscow (especially during the period of pandemic) and can be regarded from this perspective.

As was mentioned before, the creation of “comfortable urban environment” (with development and improvement of parks and urban green spaces) is stated as one of the components of a “smart city” in Russia [14].

The important problem in the situation of expanding of social activities, cultural and commercial facilities in parks is the need to evaluate the resident’s traffic and its impact on ecological sustainability of parks. Along with that, the way how visitor’s traffic in parks is being measured and privacy concerns becomes an important question. In general, different ways to calculate the number of visitors in parks can be available, such as counting visitors based on video recordings, use data from sensors that can be installed in frames at the entrance to the park. Another way to indirectly estimate the popularity of a park is to use the social networks. On the other hand, concerns about privacy and keeping privacy in using of data should be at the first place.

In general, online maps (such as Yandex or Google maps) show the open hours and popularity of a place during a week and day time. For visitors it can help to plan the visit, to get more information before visit. Some examples of place popularity from Yandex maps are shown at Fig.2. These examples certainly show how the process of digitalization affects every day’s life.



Fig. 2. Visitor’s traffic in parks, examples from Yandex maps.

With the growing development of digitalization and ability to process data, the opportunities for a careful live consideration of various factors are becoming more tangible. Increasing role of parks as a part of social infrastructure and growing number of visitors give rise to the need for measures to restore and maintain the ecosystem of parks and the sustainability of the natural system as a whole.

5 Conclusions and discussion

Cities are rapidly growing, it is becoming more and more difficult to manage them, and there is a need to apply various innovative methods. Moscow, as a capital of Russia and largest city in terms of population, is not an exclusion in this process. Large cities are ambiguous

and complex systems, they are largest consumers of energy and resources, as well as a source for innovation.

“Smart city” concept viewed in this article can be understood a certain strategy for development, and implies economic, environmental and social components. “Smart cities” have long-term objectives and strategies towards handling transportation problems, ecological problems and environment protection, involving residents in ongoing changes and transformations, e-governance, as well as incorporation of Information and Communication Technologies (ICT) into decision-making.

The Russian cities are regarded with the concept of “smart city” with the digitalization of the urban economy. The existing programs (for example, “*Umnyy gorod*”) developing “smart city” strategies are studied with the literature review.

This article is devoted to the consideration of parks on the example of Moscow focused on the increase of their social significance, social role, i.e. as a part of a social infrastructure of the city. City parks and urban green areas are considered as a part of “comfortable urban environment”, which is a component of a “smart city”. This paper has shown that in a large city a social role of parks is expanding, which is specifically seen on the case of Moscow.

On the case of Moscow, this article has shown that parks are playing a more notable role in social infrastructure with allocation of cultural and commercial facilities and amenities within park’s territory, hosting social programs, events and festivals in parks. Especially, there are activities designed for elderly audience, for example, social program «*Moskovskoye dolgoletiyе*».

The growing role of parks as a part of social infrastructure of city also poses its own problems, which are not all solved. An important problem is the increasing of “recreational load” on the parks. Therefore, there is an increasing need for timely measures to restore and maintain the ecosystem of parks and their sustainability. This topic requires a further comprehensive study.

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