Renovation of Moscow as a Subprogram of Creation of a Creative City

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Abstract. The state investment program of renovation of Moscow solves several complex problems: unloading of transport infrastructure; creation of a new urban barrier-free environment adapted for comfortable living, recreation and work; construction of energy-efficient apartment buildings; improvement of the environmental situation of residential buildings; repair and modernization of engineering infrastructure; formation of modern architectural appearance of the city of Moscow. Therefore, this program can be considered as an integral part of the overall program for the creation of a creative city, or as a sub-program for the creation of the creative capital of the country. In subprogram creative capital is a model "smart city-smart region-smart home-smart apartment." The main tasks of the model are resource saving, improving the quality of life and ensuring environmental safety. In order to promptly respond to the changing needs of the city's residents, the socio-economic situation is very important to have a crowdsourcing portal of interaction between the city authorities and residents. Close communication of Executive authorities should be maintained with their citizens in various ways: personal meetings, official receptions of the population, electronic surveys, the introduction of e-government feedback system, the organization of creative and sporting events. All this will allow the Government and urban residents to interact openly and affordably with each other.

1. Introduction

One of the conditions for overcoming the economic crisis in the country as a whole and in each region will be the construction of "creative cities", the arrangement of "creative urban environment" and the creation of "innovative clusters". The main goal of the "creative city" is to create an intellectual city, which means such an innovative environment in which creative industries develop. "A creative city is an association within the city and region of creative abilities (creativity) of individuals and communities to form an economically and socially prosperous urban environment" [1]. English scientist Charles Landry explained that innovation is the implementation in practice of a new idea, which was obtained through the creative thinking of the creative class [2, 3].

Socio-economic efficiency of the renovation of the territories is expected through the use of existing urban land and infrastructure engineering; saving heat and hot water about 35-50% and cold water about 40-50% and, consequently, reducing the load on the wastewater in modern homes; improving the quality of residential architecture. It can be noted that this will be possible due to the introduction of smart city technologies, the introduction of the model «smart city - smart district - smart home - smart apartment». It is a unified management of engineering systems and
communication channels and separate waste collection. This is a new level of security everywhere: CCTV cameras at the entrance, in neighborhoods, breeding information on the central control and dispatching. Thus, it is an intelligent automation system for the management of engineering systems.

2. Literature review
One of the objectives of the renovation program is to improve the energy efficiency of buildings. So, in many countries of the world on different continents this question is studied by scientists [4, 5, 6, 7, 8, 9, 10].

Energy saving potentials of Moscow apartment buildings in residential districts was also studied “Considerable energy savings could be achieved, up to 34% of the electricity demand and up to 72% of the heating demand, using different district modernization scenarios”. Energy and emission analyses of renovation scenarios of a Moscow residential district [11]. Calculations of international scientists have shown the economic efficiency of renovation of residential buildings compared to major repairs of individual buildings “The net present values for different building and district level renovation packages for a 20-year period were also calculated using different interest rates and annual energy price growth rates. The results suggest that renovation of a district may be more feasible than renovation of individual buildings” [12, 13].

Proposals to improve the energy efficiency of multi-apartment residential buildings in Finland and in Russia are available in the article [7].

3. Renovation of residential buildings as a way to the creative city
Leaders in innovative developments for the «smart city» are large telecommunications, electrical and IT companies such as Cisco, Schneider electric, IBM, Microsoft. IBM, Cisco Systems and others regularly update applications for smart cities.

The concept of «Smart city» was defined in the scientific work of Russian scientists. «Smart city» is a modern strategic development that combines many factors of urban development into a single system” [14, 15]. The success of the construction of a smart city depends on an established system of information communications. Such systems will allow managing effectively at each level: «city-district-house-apartment». And it will allow us to involve inhabitants in work with city authorities.

The state program of renovation in Moscow establishes new technical requirements for the design of residential buildings. Residential buildings to be reconstructed will take into account the solutions of the “smart standard”, which allows the introduction of new buildings in Smart city. «Smart standard» includes installation of internal distribution networks of television, telephony and the Internet in each apartment, instead of in a switchboard on a ladder platform as it was in old panel houses. The new buildings will be equipped with automatic meters for data transmission of electric and heat meters of the common house and apartment in the city information systems. In each elevator video surveillance will be installed, in entrances, halls of houses the dashboard with placement of city information will be placed. All intercoms, entrances, elevators will be equipped with an alarm button to call the dispatcher. In the future, the technical requirements for the design of houses under the renovation program will allow modernizing the system without the intervention of residents.

In order to ensure the comfort of apartment buildings erected under the renovation program, new approaches to the design of residential buildings are being introduced. Mass introduction of mobile services and 5g networks in the renovation districts of the capital is planned to start in 2022. The Department of information technologies has formed requirements for designers and developers to equip new areas and houses with power supply systems and optical lines necessary for further rapid deployment of 5g communication networks by operators. Telecom operators should be interested in developing innovations in the country. Residents of the renovation areas will get high-speed Internet up to tens of Mbit/s. This Internet is ten times faster than existing LTE networks. It will become a driver of the Internet of things: intelligent data exchange between home appliances and a smartphone or computer. It is comfortable, simple and safe for the user. On average, the Internet of things allows you to save up to 30-40% of utility costs per house, because smart control counters quickly signal
about accidents, overspending of resources, crimes, and smart intercom transmits video surveillance to rescue services. This will be possible in modern homes with advanced communication technology.

4. Results
At each stage of implementation of the state program of renovation various tasks are performed. The main tasks are resource saving; improving the quality of life and environmental. When implementing the resource saving subprogram by installing sensors for various purposes, there is a saving of heat, electricity, water consumption, gas. Due to this, the operating costs are reduced, the reliability of the systems is increased. The subprogram of improving the quality of the life population is carried out by meeting the needs of residents through the introduction of information and communication technologies (IoT) in the housing sector, the release of free time, operational communication with dispatching services, saving labor costs. The subprogram of environmental safety assumes control in the model «smart city - smart district - smart house - smart apartment» due to the possibility of video surveillance in the on-line mode; operational operation of home security sensors: smoke, gas, flood, fire alarm, data collection and dilution of information in dispatching services and professional services. The main tasks of renovation as a subprogram of creating a creative city are presented in the figure 1 (Fig. 1.).

![Figure 1. The main tasks of renovation as a subprogram of creating a creative city.](image)

In the presented model (Fig.1) will be implemented in the following systems: lighting, heating, climate control, ventilation, intercom, answering machine, multiroom (multimedia system for the distribution of audio and video signals in the rooms), electrical appliances, water supply and Sewerage, waste control, security control.
There are also negative elements of intellectual houses: self-sufficiency and underestimation of other promising areas of development of territories; "local consolidation" contradicts the mobility of capital, that is, the so-called "own transactions" can be concluded for management in «smart city-smart district -smart home-smart apartment»; questionable security of collected and processed large amounts of personal data. All this implies a possible total accounting and control of data of citizens.

The key role in the state program of renovation is given to residents. It is very important for the city authorities to have a crowdsourcing portal of interaction with residents, that is, to maintain close communication with their citizens in various ways: holding creative and sports events, conducting electronic surveys, functioning of the e-government system with feedback, allowing open and accessible interaction with each other [16,17,18]. Crowdsourcing is a new information technology of communication between the population and the Government. The technological chain of the open modern site crowd.mos.ru constructed as follows: Idea ➔ Expert selection ➔ Discussion ➔ Voting ➔ Implementation. This technology allows you to solve the most complex problems creatively and together.

Such studies are conducted in different countries before deciding on the implementation of socioeconomic programs [19,20,21]. Thus, scientists G. Marzano, J. Lizut, L. Ocha Siguenciac in their new work “Crowdsourcing solutions for supporting urban mobility” provides an analysis of the involvement of citizens to obtain information about the state of the urban environment [22].

Residents, for their part, should take an active civil position, improve their information literacy and legal culture, and have a desire to learn new knowledge in the field of information and communication technologies. Leaders in society are progressive youth, highly educated professionals.

Currently, the prerequisites for the implementation of the model «smart city-smart area-smart home-smart apartment» during the renovation of residential areas are ripe. The main prerequisites for the creation of such a system are: the renovation of residential areas, ensuring the construction of modern apartment buildings and social facilities; developed infrastructure; the availability of information and communication technologies; transport interchanges; a single information base of health and telemedicine; the possibility of distance education and e-learning, continuous training and retraining; security of information transmission, use of protected communication channels; active civil and legal culture of citizens; comfort of life.

5. Discussion
The issues of renovation of each particular residential building were necessarily discussed with the residents, meetings were held with the owners of housing, minutes of decisions of meetings were drawn up, electronic voting was held on the portal of public services. Through the interaction of the city Government with the residents were following priority directions of the state program of renovation are determined:

1. The establishment of the sequence of demolition of apartment buildings included in the renovation program, taking into account their technical condition.
2. Residents can refuse to include their house in the renovation program and they can independently perform repairs of the house.
3. The procedure for determining the points of connection of capital construction projects to the networks of engineering and technical support, power supply networks, including their location on the border of the land plot and (or) territories, in respect of which the preparation of documentation on the territory planning is carried out.
4. Construction of modern comfortable apartment panel-monolithic houses, improved planning, with high energy efficiency.
5. Transfer to residents of new apartments, ready to live, already with the finishing works.
6. The device houses means adapted for the disabled: ramps, lifts, barrier-free interior transitions.
7. Construction of municipal, transport, social infrastructure within walking distance with newly built houses.
8. Creation and development of production of building materials, products, structures for housing construction in the process of implementation of the renovation program.

9. The formation of a new and convenient road network.

10. Providing the necessary number of Parking spaces near the house or in the basement of the house.

11. Organization of a unified system of yard and intra-yard green areas, including green areas along the pedestrian and transport links (lawns, conventional planting of trees and shrubs), landscaped areas outside the yard areas (playgrounds, playgrounds, sports grounds), recreation facilities (intra-square, boulevards, gardens).

6. Conclusions
This state Investment and construction program of housing renovation as a subprogram of building a creative city will ensure effective interaction between the government of the capital, residents, civil society and business structures [23, 24, 25]. The renovation program is characterized by transparency and accessibility. Any service of the program is available at any time, in a convenient place, from any device.

Thus, the adopted state Investment and construction program of housing renovation is a step towards the construction of a creative city.

The key point is the active participation of residents in the life of the city: the Management of repair of houses, yards and roads, landscaping, organization of public space through the portals "Active citizen" and "Our city".

The renovation program will push the development of innovative technologies for the management Of construction waste after the demolition of old houses. At this stage, the problems of civilized use of construction waste, reducing the cost of the market of building materials, saving future construction will be solved.

In the future, the Moscow experience of renovation may extend to regions where there are significant amounts of panel dilapidated housing.

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