

Current Problems of Digitalization of Housing and Utilities Management in the Context of a Pandemic

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Abstract—The article notes the inevitability and prospects of global digital transformation. The leading countries have already been identified. These are Korea, the United States, Great Britain, Japan, and Germany. The reasons for rapid success are the increase in the number of highly qualified and competent specialists in the field of digital technologies and, most importantly, constant public and private investment in information resources in promising areas, such as smart city projects. The priorities that smart technologies give for all stakeholders are highlighted: resource saving, high quality of services provided at an adequate price, transparency of payments, comfort and functionality of housing. The number of Russian enterprises that operate effectively in the field of information technology is very small due to the lack of permanent funding, effective domestic information infrastructure and regulatory regulation of the digital environment, and low legal and information literacy of the population. The factors influencing the development of housing and utilities and the quality of public services are summarized and systematized: organizational and managerial, scientific and technical, social, sanitary and epidemiological, environmental. The quality of housing and utilities services varies greatly from low to high across the country, due to different approaches to the organization and management of enterprises in the industry, including the information component. An overview of the latest specific IT solutions for this sphere developed in Russia is given and the necessity of creating a common digital space is emphasized, its main elements are highlighted.

Keywords—management, housing and utilities, COVID-19 pandemic, common digital space, information technologies, smart cities

I. INTRODUCTION

Currently, the global crisis due to the COVID-19 pandemic is accelerating the global digital transformation. An increasing number of companies are moving to remote work, self-isolated consumers make purchases mainly online, educational processes are carried out remotely, and public services are provided on online platforms.

However, entire industries that are struggling to adapt to the new external digital environment are under attack, like the housing and utilities sector [1].

The research objective is to investigate the relationship between the factors of digital development of the leading countries in the number of smart cities and the level of

quality of provided utilities and to assess the expected social effect from the introduction of the concept of “ideal digital space for housing and communal services”.

II. MATERIALS AND METHODS

To begin with, we note that the volume of world traffic based on the Internet Protocol (IP), allowing you to see the approximate scale of data flows, according to forecasts, by 2022 will reach incredible numbers - 150,700 GB per second. Globally, cross-border data flows have already grown so much that the impact of digitalization on world GDP growth is higher than the impact of world trade in goods [2].

It is interesting to analyze the current share of the digital sector in GDP in different countries in order to identify leading countries (Figure 1) [2].

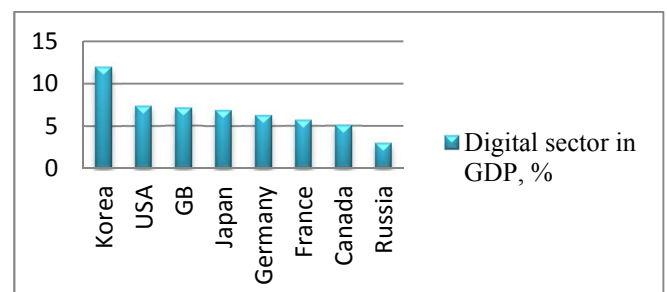


Fig. 1. Comparative analysis of the digital sector in the economy of different countries

The reasons for this incredible success of Korea, as well as such leading countries as the USA, Great Britain and Japan, are, firstly, an increase in the number of highly qualified and competent specialists in the field of digital technology, and secondly, in constant public and private investments in information resources in promising areas, such as smart city projects [3].

The annual Cities in Motion 2020 index, prepared by experts from the University of Navarre business school in Spain (IESE Business School), analyzes which cities in the world are the smartest today – technological, innovative, and safe (table 1) [4].

TABLE I. SMART CITY RATING 2020

No	City	Keys of success
1	London (Great Britain)	Increase of competent personnel (talents).
2	New York (USA)	
3	Paris (France)	Implementation of state support measures.
4	Tokyo (Japan)	
5	Reykjavik (Iceland)	Private investment in R&D.
6	Copenhagen (Denmark)	
7	Berlin (Germany)	Strengthening digital security. The development of digital infrastructure.
8	Amsterdam (The Netherlands)	
9	Singapore (Singapore)	Broadband access to the network anywhere in the country.
10	HongKong (China)	
11	Zurich (Switzerland)	Using "your own" software.
12	Oslo (Norway)	
13	Chicago (USA)	Improving digital literacy through higher education institutions.
14	Stockholm (Sweden)	
15	Washington (USA)	Participation of small businesses in the development of information technologies.

It is noteworthy that Moscow is on the 87th place in the list. This suggests that, despite the fact that the share of the digital sector in Russia's GDP is only 3%, digitalization of the economy is one of the promising strategic directions within the framework of the national programme "Digital economy of Russia 2024" [5].

Let's look at the targets set in the project passport by 2024:

- 60% of urban residents over the age of 14 have the opportunity to participate in urban development decision-making using digital tools;
- +15% increase in the share of management companies and resource-supplying enterprises using automated dispatching systems;
- translation of information in the areas of housing and utilities, landscaping, urban planning and architecture in machine-readable form;
- an increase in the number of apartment buildings connected to automated utility accounting systems [5].

So far, the number of domestic enterprises that operate effectively in the field of information technology is very small, therefore, new digital technologies are mainly imported. This situation fully reflects the lack of "digital personnel" in general and the insufficient level of training of specialists in particular.

The lack of effective domestic information infrastructure and regulatory regulation of the digital environment is also one of the factors that keep the country's digital economy in one place.

Speaking of low legal and information literacy, it is necessary to note the territorial specifics - the level of digital technology implementation in Russia varies significantly depending on the region - the minimum index value (on a 100-point scale) was 33.74 (Republic of Tyva), the maximum – 77.03 (Moscow) [5].

If the situation does not change in favor of the digital sector, according to the national programme for integrated digital transformation of the economy, there are great risks for the further digital and holistic development of the country, which is extremely important today in the context of the COVID-19 pandemic.

Speaking about the current state of the housing and utilities industry both in Russia and in the world, we can not say that it has lost consumers and opportunities to work. But the changes affected it. Consumers' incomes have fallen sharply, and the volume of service consumption has increased significantly. Management companies have sharply increased their expenses – mandatory sanitary treatment and disinfection, which are carried out manually, have been added to the planned cleaning of premises. Since the virus is not expected to disappear, a number of processes need to be automated. The workload on the staff has also increased significantly, and it is almost impossible to recruit the missing personnel in the conditions of quarantine. Debts on utility payments have grown – the state meets citizens halfway and offers benefits, temporarily canceling fines and penalties, as well as checking accounting devices – but this affects the criminal code and resource-supplying organizations that are left without financial assistance [6].

However, there is a positive point - thanks to digital online payment services, the level of utility payments collection does not fall to critical values and, moreover, allows people to stay healthy without visiting banks or post offices.

III. RESULTS

Consider the factors that affect the level of development of housing and communal services in general, and the quality of public services provided in particular, with reference to the new, current restrictions in connection with COVID-19 (table 2).

TABLE II. FACTORS AFFECTING THE DEVELOPMENT OF HOUSING AND UTILITIES AND THE QUALITY OF PUBLIC SERVICES

Organizational and managerial	Scientifically technical	Social	Sanitary-hygienic	Ecological
Efficiency of organizational and managerial activities	Degree of scientific and technical progress in the field of housing and utilities	Presence of a leader or group of leaders in the serviced object	The need to use a mechanical method of disinfection	Chemical composition of tap water
Staff competence level, experience and seniority, total number of employees	Physical wear and tear of equipment used in the production and provision of public services	The degree of dispersion of residents of the house by education, income, culture of communication, attitude to waste collection	The need to use a physical method of disinfection	Total area and density of green spaces
Solvency and financial stability of the CC or RSO	Age of constructed and operated buildings, engineering	General initiative of residents in the management of an apartment	The need to use a chemical method of disinfection	Share of harmful emissions to the atmosphere

Organizational and managerial	Scientific-ally technical	Social	Sanitary-hygienic	Ecologic al
	ng networks, passenger and freight elevators	building		
Attractiveness for private investment	Technical equipment of the enterprise and the serviced object	Residents' readiness for reforms and support for innovation	The need to use a biological method of disinfection	Share of harmful discharges to water
Net profit	The level of readiness of the object to implement innovations, including digital ones	The attitude of residents to the common property of an apartment building	The need to use a set of disinfection methods	Share of toxic waste produced by enterprises
Amount of depreciation	Technical capabilities of equipment for planned and unplanned modernization	The degree of development of the legal framework regulating relations between the state, the performer and the consumer of public services	The need to use other non-contact methods of disinfection	Share of produced, exported and disposed solid household waste

Despite the fact that the factors affecting the quality of public services in different countries are similar, the quality of services itself varies greatly from low to high.

This can be explained by delving into the local industry specifics. In most foreign countries, such as USA and some European countries, management in the field of housing is regarded as a separate type of business activity, for which the management organization receives a fee from the owners of the premises, and the Association (partnership) is responsible for the maintenance of the building) of homeowners, and all major management decisions (first of all, on the management of finances and the conclusion of contracts for the purchase of goods and services) are made by the governing bodies of the partnership (Associations) of homeowners, while the manager prepares and justifies only recommendations for the board of the partnership [7].

The housing and utilities sector is already one of the most complex and unprofitable, and non-payments will actually ruin it. At the same time, many Russians do not need an excuse in the form of COVID-19 to ignore receipts — they already do not pay. The total debt within the industry, according to Federal statistics for 2019, exceeds 1.3 trillion rubles. Of these, citizens and management companies account for more than 867 billion rubles [8]. The problem of

non-payment is particularly acute in the North Caucasus Federal district, particularly in Dagestan. According to information transmitted to the National credit history Bureau by housing and utilities companies, the number of malicious defaulters (who did not repay the debt for services despite the court's decision) at the end of 2019 was about 30 thousand people, and their debt approached two billion rubles.

Interesting statistics are provided by FinExpertiza: in each of the 365 days of 2018, the debt of Russians for housing and utilities increased by an average of 330 million rubles. Residents of 45 regions owe utility companies more than a billion rubles a year. In the top five in terms of payment discipline — Moscow (debt for the year increased by 10.2 billion rubles), Moscow region (plus 6.8 billion), Dagestan (plus 6.6 billion), Chelyabinsk region (plus 5.8 billion), Sverdlovsk region (plus 4.2 billion) [9].

What are the reasons for non-payments. Lack of financial capacity, dissatisfaction with the quality of services provided and the state of utilities are the most popular reasons not to pay. Non-transparency of payment documents, misunderstanding of how this or that column appeared, people simply refuse to pay. In addition, it is not uncommon for management companies to deceive citizens, inflate tariffs, make incorrect calculations, including those related to General household needs, include expenses that are not related to services consumed in bills, and so on [10].

According to the Ranepa, the spending on housing and utilities has increased by 55 percent (in nominal terms) since 2000. In the whole country, the share of expenditures on utilities in household consumer spending is 9.5 percent, meaning that housing and utilities services are one of the key items of expenditure for citizens [1].

Vladimir Yakushev, Minister of Construction and Housing and Utilities of Russia, noted:

Housing and communal services is a key sector of the Russian economy, employing about three million people. In the context of the spread of the COVID-19, we faced new challenges, we had to mobilize significant resources to provide Russians, enterprises, organizations with housing and communal services. Considering that the majority of citizens were at home, it was necessary that utilities were provided on time and of appropriate quality [10].

Vladimir Yakushev stressed that thanks to the well-coordinated work, the housing and communal services industry successfully coped with a serious load during the period of restrictions due to the COVID-19.

According to him, the decrease in incomes of the population in the context of a pandemic is reflected in the housing sector. In particular, on the timeliness of payment for housing and communal services.

As already noted, in order to stay afloat in a crisis, housing and communal services need digitalization. Let us analyze the latest specific IT solutions for this area, developed in Russia (Table 3).

TABLE III. DOMESTIC IT SOLUTIONS FOR HOUSING AND UTILITIES

№	Name of the service	Functions
1	Contur.ZHKKH	Program for homeowners' associations and management

№	Name of the service	Functions
		companies: calculating the rent of citizens, maintaining passport records, issuing receipts, full integration with GIS Housing
2	ELMA CRM+	Business process and performance management system
3	Domovladelets	Housing and utilities automation
4	Umnii Zhitel	Automation systems for real estate management and operation
5	Dom.Control	Service for managing apartment buildings and cottage settlements
6	Umnoye ZHKKH	Digital platform for developers, management companies, residents and suppliers
7	Domskaner	Service for holding resident's meetings online
8	RosZHKKH	The system of collecting complaints against the supplier and the organization

Note what effects developers expect from the digital solutions presented in the table for the housing and utilities industry [11, 12].

1. Improving the efficiency of urban infrastructure management, reducing accidents and losses in utility networks;
2. Improving the efficiency of collection of municipal taxes, increasing the volume of charges and fees;
3. Improving the efficiency of urban transport systems, introducing a single pass for all types of public transport;
4. Increasing satisfaction with the quality of life in the city;
5. Reducing the number of incidents of public safety violations;
6. Predictability and manageability of urban infrastructure - reducing the number of emergencies;
7. Ensuring transparency and openness of urban economy data, relevance, analyzability and information management in the sections of cities, regions;
8. Reducing the costs of municipal and regional budgets for ineffective development of information systems.

IV. DISCUSSIONS

However, only the introduction of online services is not enough. It is necessary to create the so-called "ideal digital space". What is it? On May 15, 2020, the Ministry of Construction of Russia published the concept "A common digital management space in the urban development sphere." The technological solutions presented in it are applicable to the housing and communal services industry. It is shown schematically in Figure 2.

Thus, in order for the digitalization of housing and communal services management to become a reality, comprehensive work is required in all areas, which can be done as efficiently as possible only by combining the forces of the state, science and private business, as well as following global trends in technological solutions for smart city projects.

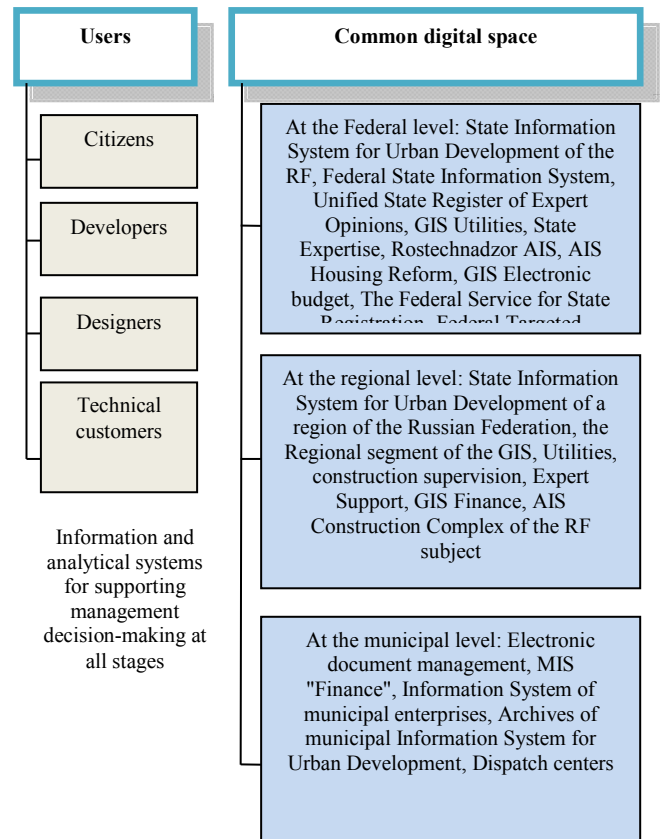


Fig. 2. Common digital space of housing management

V. CONCLUSION

The experience of "smart cities" demonstrates the feasibility of digitalization of housing and communal services management. The formation of an "ideal digital space" will improve not only the quality of managerial decision-making in the housing and utilities sector, but also increase the efficiency of public policy in general.

In the future, the construction of smart cities taking into account the factors that strongly influence the life of society. Today it is a COVID-19 pandemic.

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