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DIGITAL DATA AS A KEY SOURCE FOR THE DEVELOPMENT OF SMART CITIES

The author emphasises the relevance of informatization of cities in the era of a pandemic. The main effects of using data in the digitalization of the urban environment are identified, including the creation of new products or services, the optimization and automation of urban environment processes, the formation of new management approaches, including based on the involvement of citizens in decision-making processes, the creation of a unified space for data exchange and other effects.
Keywords: digitalization, city development, small data, big data, efficiency, digital data.

Автор підкреслює актуальність інформатизації міст в епоху пандемії. Визначено основні впливи використання даних у цифровізації міського середовища, зокрема створення нових продуктів чи послуг, оптимізацію та автоматизацію процесів міського середовища, формування нових управлінських підходів, у тому числі на основі залучення громадян до прийняття рішень, процесів створення єдиного простору для обміну даними.
Ключові слова: цифровізація, розвиток міста, малі дані, великі дані, ефективність, цифрові дані.

Digital data is having an increasing impact on many aspects of modern cities and people's lives. Data is growing rapidly, and global data is projected to grow 40% per year. About 90% of the world's digitized data has been acquired in just the past few years. As a result, digital data is increasingly seen as a critical resource for supporting the development and resilience of smart cities around the world. Now our world consists of information that has completely penetrated all areas. The pandemic has highlighted the importance of digital transformation for cities and communities. With an impending recession in many regions, public sector organizations are in the midst of deciding whether to pursue the same cost-cutting policy that all previous recessions have dictated, or to smooth the recession curve through the use of technology [1, p. 40].

A smart city is smart management, smart living, smart people, smart environment, smart economy, smart mobility. List of areas which require the introduction of smart technologies covers almost all areas without exception urban economy and urban infrastructure: analytics, banking, buildings, commerce, electronic government, communications, education, energy, emergencies, catering, healthcare, manufacturing and service industries, transport, retail, public safety, ecology and environmental monitoring environment, water and gas supply, and much more. General diagram of the process of "intellectualization" of urban economy management is a rather complex phenomenon, which requires taking into account many factors, including differences introduced by residents of certain places. Each city is unique and needs to be developed with taking into account local priorities, history, culture, geographic location, size and economy (last but not least). In addition to the data on the cities given above, it is necessary to add, that cities are only 2% of the territory of the earth's surface, and at the same time 75% of energy consumption, 80% of harmful emissions. At the same time, the city cannot be changed. They can only be transformed with the goal of increasing efficiency of urban economy, living standards population and development sustainability. With such transformation needs to be considered: growing competition between cities and countries; the need to create new jobs and mainly in the smart working standard; requirements increasing the attractiveness of the city for residents, investors and tourists. Definitely it is necessary to improve the energy efficiency of basic and municipal engineering systems of the city; to increase the effectiveness of the social sphere: schools, public safety, etc. improvement of conditions life and health of the population. Hence it is necessary to plan this activity/

Digitization can increase competitiveness of all sectors vof the economy, providing many opportunities for entrepreneurship and expanding access to foreign markets. The development of

digital markets opens up new opportunities for export operations, including by linking domestic companies to global value chains, or creating new markets adapted to specific local conditions (for example, in areas such as agriculture, education and health care), or the opening of new, "niche" sectors, for example, in the creative economy (based on intellectual capital).

Increasingly, the ability to collect, analyze and use data in our operations is critical to the functioning of modern cities. However, it should be noted that the creation of an integrated urban environment management system is possible only on the basis of the formation of an effective communication system between various components of the urban infrastructure, which allows the exchange of data and the use of data from various subsystems in a unified urban management system. In this regard, it is necessary to develop effective tools for the interaction of various services and organizations of the city system in order to ensure the possibility of exchanging data of a different nature and to establish communication channels within the framework of the formation of a single information space of the city. Such work also requires certain institutional changes that are necessary to formalize procedures for handling data within urban systems, to define mechanisms and tools for collecting, analyzing, and protecting data within the framework of the functioning of urban systems [2, с. 17].

Due to these features, "digital" technologies are able to support the strategy of "abrupt" development, to avoid the passage of traditional for gradual development of stages in order to reduce the gap between the level of productivity and efficiency of developed and developing countries, or relevant areas of their lives (education, medicine, transport, etc.)

This phenomenon is called the "digital leap". There are many reasons why Ukraine can and should take advantage of this. In the long run, the potential of the digital leap seems even more impressive due to the boom in Internet technology and the emergence of virtual cyberspace, which removes most of the limitations of time and distance. Internet technologies are especially important because they allow for an unprecedented variety of new and open formats for dissemination of information and creation of inter-organizational relations. However, only technologies for the implementation of "digital" information and opportunities "Abrupt" development is not enough. The market must have relevant accumulated knowledge of technology management, experience in deploying previous technologies, other related knowledge, including management. That is why "fast" development is by no means a "gift of heaven", but a painstaking preliminary analysis of the existing conditions for suitability of a field or system for new technologies. Such an approach will help to protect the already scarce investment currently being allocated to ICT, and to see whether the introduction of new technology will be successful in the current environment. Ukraine is currently having all the key conditions that allow to talk about the potential success of the "digital" leap, at least in key areas of socio-economic life. Namely:

− ability to produce and use ICT, availability of professional staff, "schools". This is evidenced by the statistics of real success of Ukrainian IT companies in international markets;

− access to ICT equipment, technologies, high absorption of ICT by citizens and businesses. This is evidenced by the presence of the internal ICT market, a huge number of "success stories" from various spheres of life and economy, the presence of local representations of manufacturers of technologies, distribution;

− sufficient level of system integration of ICT products in the country, from design to complex implementations with interaction with various technologies, software and hardware;

− "creative" culture and skills of generating ideas for the potential use of ICT, as evidenced by the rapid development in Ukraine of such a segment as "creative economy".

Nowadays several projects are successfully implemented in Ukraine. The Internet of Things is a technology that supports network communication computerized Internet devices that use microprocessors, various sensors, and wireless hardware to collecting, transmitting and performing actions on information obtained from their environment. At the heart of every device in the IoT system are sensors that collect and transmit data to the "cloud" for further analysis, processing and making "smart" decisions. The gradual introduction of high-speed Internet provides a strong connection between millions of devices and sensors, which allows IoT to work efficiently.

"Smart" street lights work like Wi-Fi hotspots equipped with surveillance cameras charge electrical and telephone outlets and measure air quality. Waste management. A "smart" garbage collection station is being introduced in the buildings, where residents dispose of garbage bags (divided into organic and inorganic). The sensor-equipped garbage collection station determines when it becomes full. And garbage is automatically sent through high-pressure pipes directly to the recycling center. Public transport. Sensors located on public transport send traffic data to urban transport management software. In real time, the time required to wait for transport is calculated; it is also possible to obtain information about congestion or about traffic delays.

The next aspect is Big Data. It is important as a set of methods and means of processing structured and unstructured different types of data in the mode real-time for analysis and use to make appropriate decisions in different segments: "Smart" energy. The introduction of "smart grids" allows city services to analyze electricity consumption in real time. Using data analytics, they can predict consumption peaks and plan energy distribution accordingly. Public transport. Transport infrastructure uses Big Data to ensure fast and safe travel the city. The city authorities receive data on traffic, which allows to manage the transport system effectively. Usually the system of "smart" transport of the city consists of intelligent transport networks. City infrastructure management. Big Data helps to control and manage issues such as waste disposal, transportation and resource savings. To do this, sensors are built into the physical infrastructure of the city. In order to transform the infrastructure into a "smart" one, a technical base consisting of a network is being formed sensors and connected devices that collect data; "smart" applications are installed that process data, translating it into notifications and actions. City security. Real-time crime mapping programs through the analysis of data reveal patterns of crimes and problem areas, predicting the number of crimes. This allows the police to increase security in the necessary areas. [3, p. 68]

The development of digital technologies has significantly changed the development priorities of modern cities. Increasingly, digital data is viewed as the main resource for the development of the urban environment, which presents opportunities for optimizing economic processes, creating innovations in the social sphere, and forming new management models.

Digital data must go through all stages of the data creation chain, from organizing a storage system to interpreting it in models and scenarios of urban development. In addition, most smart city systems require real-time digital data. These patterns of data use creates many of the problems and challenges that modern city faces. The main problem of the transition of Ukrainian cities completely to the system of "smart cities" is the lack of principles that will help transform cities and transfer them to new stages. Another problem is the lack of budget: very little money is allocated from the local budget and the state budget for such projects.

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