Електронний журнал «Ефективна економіка» включено до переліку наукових фахових видань України з питань економіки (Категорія «Б», Наказ Міністерства освіти і науки України № 975 від 11.07.2019). Спеціальності – 051, 071, 072, 073, 075, 076, 292.

Ефективна економіка. 2024. № 2.

DOI: http://doi.org/10.32702/2307-2105.2024.2.22

УДК 711.1

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THE SMART CITY CONCEPT IN THE CONTEXT OF SUSTAINABLE TERRITORIAL DEVELOPMENT: INNOVATION, ECONOMY, MANAGEMENT, CONSTRUCTION AND APPLIED CHARACTERISTICS

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КОНЦЕПЦІЯ РОЗУМНОГО МІСТА В КОНТЕКСТІ СТАЛОГО РОЗВИТКУ ТЕРИТОРІЙ: ІННОВАЦІЇ, ЕКОНОМІКА, УПРАВЛІННЯ, БУДІВЕЛЬНО-ПРИКЛАДНІ ХАРАКТЕРИСТИКИ

The study identifies the characteristics of the Smart City concept; describes its main components, which include: innovation, economy, management, construction and applied elements. The article describes a scientific development based on the approach considering the concept of sustainable development as an opportunity to meet current needs without compromising the needs of future generations and preserving environmental integrity. A brief description of the strategic objectives within the framework of the strategy of sustainable development of Ukraine up to the year 2030 is also included. The authors are of the opinion that resources are a key element in the life cycle of a person, a city and a country. The concept of smart cities as a tool for creating the basis for sustainable development is one of the most effective

concepts in this area, which is gaining popularity. In particular, one of the main principles of the smart city concept is the rational use of all types of resources. Innovation, economy, education, infrastructure and governance are the criteria and factors used to determine the level of smartness of a city and to study its potential to modernise. The author analyses the prerequisites, the nature and the sequence of the stages in the development of a smart city strategy. New York is used as an example of the best US experience in developing smart cities. Taking into account modern theoretical developments and global trends in the construction of smart cities, the key areas of reconstruction of Ukrainian cities on these principles are formulated, taking into account the geopolitical peculiarities, by elements: infrastructure, information, ecology, economics, management, security and healthy life. The conclusions state that the concept of a smart city in the context of sustainable development of territories includes a whole range of innovations, economic and management approaches, as well as construction and applied characteristics aimed at improving the efficiency of the urban environment and reducing its environmental impact. The smart city concept is currently a key development area for cities and territories, as it considers an integrated approach to urban environment planning and management. Innovative technologies, efficient use of resources and environmental solutions are becoming important components in the design of the sustainable city of the future. The improvement of the efficiency of the urban environment and the reduction of its environmental impact are important tasks for the creation of viable and attractive urban environments.

У дослідженні визначено особливості концепції розумного міста; надано характеристику головним її складовим, до яких ми відноситься: інновації, економіка, управління, будівельно-прикладні елементи. Наведено опис наукової розробки, яка ґрунтується на підході, що розглядає концепцію сталого розвитку як можливість задоволення поточних потреб, не загрожуючи здійсненню потреб майбутніх поколінь та зберігаючи цілісність

навколишнього середовища. Також докладено коротку характеристику стратегічних цілей у рамках стратегії сталого розвитку України до 2030 року. Авторський колектив вважає, що ключовим елементом життєвого циклу людини, міста та країни є ресурси. Одна з ефективних концепцій в цьому напрямку, що набуває широкої популярності, – це концепція розумних міст як інструмент створення основ сталого розвитку. Зокрема, раціональне використання всіх видів ресурсів є одним із основних принципів концепції «розумного міста». Інновації, економіка, освіта, інфраструктура та управління – ці критерії та фактори використовуються для встановлення рівня розумності міста і дослідження його потенціалу для модернізації. Проаналізовано передумови, суть і послідовність здійснення етапів розроблення стратегії розвитку розумного міста. Розглянуто кращий досвід США щодо розвитку розумних міст на прикладі Нью-Йорка. Враховуючи сучасні теоретичні розробки та світові тенденції у побудові розумних міст, сформульовано ключові напрями відбудови на цих принципах українських міст з огляду на геополітичну специфіку за складовими: інфраструктура, інформація, екологія, економіка, менеджмент, безпека, здорове життя. У висновках констатується, що концепція розумного міста в контексті сталого розвитку територій включає в себе цілий комплекс інновацій, економічних та управлінських підходів, а також будівельно-прикладні характеристики, спрямовані на покращення ефективності міського середовища та зниження його екологічного впливу. Концепція розумного міста наразі є ключовим напрямком розвитку міст та територій, оскільки вона враховує комплексний підхід до планування та управління міським середовищем. Інноваційні технології, ефективне використання ресурсів та екологічні рішення стають важливими компонентами формування майбутнього сталого міста. Покращення ефективності міського середовища та зменшення його екологічного впливу є важливими завданнями для створення життєздатних та привабливих міських середовищ.

Keywords: *sustainable development, smart city, economy, urban planning, infrastructure, smart city development strategy, smart city concept.*

Ключові слова: *сталий розвиток, розумне місто, економіка, містобудування, інфраструктура, стратегія розвитку розумних міст, концепція розумного міста.*

General statement of the problem and its link with major scientific or practical challenges.

It is necessary to identify and develop specific actions to provide the basis for the balanced development of the economic, social and environmental aspects of society in order to achieve the strategic objectives of sustainable development. In today's environment, this issue is particularly relevant for cities due to the significant growth of the urban population, which leads to an increase in numerous challenges for local development. The development of the smart city concept is seen as one of the most effective ways of addressing this problem, as introducing and implementing measures based on the latest information and communication technologies in various areas of urban functioning is a step that will create the conditions for a decent lifestyle for many generations to come. It will help to optimise the use of resources and reduce the negative impact on the environment by introducing the latest technologies in urban management, transport, energy, education, healthcare and other areas. In addition, smart technologies can improve the accessibility of public services, reduce traffic congestion, increase safety and security and promote a more efficient use of energy. The development of smart cities opens up prospects for the improvement of the public environment and the creation of comfortable conditions for residents. The smart city concept can therefore be a key factor in the acceleration of the sustainable development process and the improvement of the living conditions of the inhabitants.

Analysis of recent research and publications.

Various aspects of this problem have been studied and presented in the works of Ukrainian researchers, including O. Tur [1]; B. Paton [2]; N. Kholiavko [4]; M. Mykytas, V. Ploskyi [5]; V. Vyshnevskyi, O. Viyetska, O. Harkushenko, S. Knyazev, O. Liakh, V. D. Chekina, D. Yu. A. Buryak, I.B. Chichkalo-Kondratskaya, D.S. Kondratskaya [13]; Y.M. Kovalev [14]; L.M. Ilyich [15]; I.O. Bashinskaya, V.Yu. Filippov [16].

Formulation of the article objectives (task statement).

The purpose of the study is to determine the characteristics of the smart city concept; to characterise its main components, including: innovation, economy, management, construction and applied elements.

Presentation of the most important research material, with a full justification of the scientific results obtained.

The globalisation trends that characterise the modern development of the world pose certain challenges that threaten the sustainable functioning of many economic sectors, and therefore require that specific measures be identified to address them. One such document is “Transforming our world: the 2030 Agenda for Sustainable Development”, adopted in September 2015 at the 70th session of the UN General Assembly, which identifies the main problems of the current stage of development and proposes the main directions for overcoming them at the global level.

Taking into account national specificities, Ukraine adapted the global sustainable development goals to national needs in 2017. This process has been reflected in the national report “Sustainable Development Goals: Ukraine” prepared by the Ministry of Economic Development and Trade of Ukraine. The main areas for achieving the sustainable development goals in Ukraine are equitable social development, sustainable economic growth and employment, good governance, environmental balance and building resilience. Within these areas, goals such as eradicating poverty, reducing hunger, developing

agriculture, good health and well-being, quality education, gender equality, clean water and decent living conditions were identified [2].

There are a number of different interpretations of the term “sustainable development” in the scientific community. Our study is based on the approach that the concept of sustainable development is the ability to meet the needs of the present without compromising the ability of future generations to meet their needs, and at the same time with respect for the integrity of the environment [4, p. 145].

In particular, within the framework of the sustainable development strategy of Ukraine until 2030, the following strategic goals are envisaged [3]:

1. Achieving balanced low-carbon economic growth and building resilient infrastructure. This means transitioning to a more sustainable and energy-efficient use of resources, reducing greenhouse gas emissions, and improving the quality of infrastructure to meet the needs of the population.

2. Creating the conditions for sustainable sectoral and regional development. This includes supporting the development of different economic sectors in different regions of the country, ensuring an even distribution of investments and developing territories.

3. Overcoming poverty and reducing inequalities, including gender inequalities. The state should provide social protection for the most vulnerable groups of the population and should ensure that all citizens have equal opportunities.

4. Ensuring public health, safe living and a high level of education. The aim is to ensure that the entire population has access to high-quality health services, to improve the quality of education and to guarantee the safety and security of citizens.

5. Creating conditions for balanced consumption, production and use of natural resources and responding to climate change. This means reducing the negative impact of human activities on the natural environment. It also means using resources rationally.

6. Respecting terrestrial and marine ecosystems and recognising that they must be used sustainably. Biodiversity and an environmentally friendly environment for people and natural ecosystems must be preserved.

7. Ensuring security and access to justice through the establishment of accountable and inclusive institutions. The main objective is to improve the justice system. Ensure accountable and transparent government and fight corruption.

These goals are aimed at achieving sustainable development in Ukraine, i.e. ensuring economic growth, social justice, environmental protection and improved quality of life.

Thus, the analysis of the above-mentioned areas has made it possible to establish their close relationship with the provisions that form the basis of the strategies for the development of cities and regions. Indeed, these areas are closely linked to the main strategies for developing Ukraine's cities and regions. Ensuring sustainable development is a matter of economic development, social justice, protection of the environment and improvement of the quality of life of the population. The development and implementation of socio-economic strategies for cities should be a contribution to the achievement of these goals. For example, the quality of life and health of city citizens can be positively affected by taking into account the principles of sustainable construction and planning environmentally friendly urban spaces. Creating attractive and competitive urban environments also benefits from this approach. An important task in creating viable and resilient places to live is to develop cities in harmony with nature and according to the principles of sustainable development.

The processes of town planning and urban development should be aimed at ensuring a high level of comfort, efficiency and environmental friendliness of buildings and structures, their location on the territory, building density and other factors, and such processes should be regulated in legal documents. Theoretical principles and practical methods for the design of architecture under the influence of sunlight and artificial light, colour, heat, air movement and

sound, as well as natural patterns of human perception, including sociological, hygienic and economic factors, should also be taken into account. Resources are an essential element in the life cycle of an individual, a city and a country. Resources are also subject to continuous temporal and spatial changes [5, p. 169].

We believe the concept of smart cities as a tool for creating the foundations of sustainable development is one of the successful concepts in this area, which has recently gained wide popularity. Domestic realities convincingly show that the main idea of creating smart cities should be the transformation of city management, based on the modernisation of urban infrastructure, implementation of projects and interaction between the population, business and public organisations, which will ensure the successful functioning of all areas of the city. Integrated management is intended to give the municipal authorities a better understanding of the main aspects of how the city works [1, p. 132]. Key elements of this approach are the modernisation of infrastructure, the consideration of economic characteristics, the introduction of innovative technologies and the active participation of the public. All stakeholders can only benefit from integrated management and interaction between different areas of urban life. This approach makes it possible to organise the city in a way that takes account of technological advances, improves the quality of life of citizens and ensures the efficient and sustainable functioning of the city. In this way, the smart city concept can also be seen as a means of rationalising the use of available resources in order to achieve high quality public services through the integration of city services and the control of their work, as well as the involvement of citizens in the management of the city.

As the concept of the smart city has evolved and spread around the world, its content has evolved, leading to the emergence of three qualitative models:

1. Smart City 1.0 - the slogan is “technology for technology’s sake”; the emphasis is on advanced technologies: their creation, adaptation, improvement, and unlimited application in urban life.

2. Smart City 2.0 - the slogan is “technology for the sake of human quality of life”; a strong understanding that technology can become a tool for solving specific problems and tasks that arise in the course of urban life.

3. Smart City 3.0 - the slogan is “people know best where to use this or that technology”; providing citizens with the opportunity to choose or participate in the selection of technologies that will help solve specific problems of the city and improve the level and quality of life in it [8, p.8].

Economy, education, infrastructure and governance. These criteria and factors are the basis for the assessment of a city’s level of “smartness” and its potential for modernisation. To ensure the efficient operation of different sectors of urban life, a variety of information technologies, sensors and communications are used in the operational management of a city. For example, congestion can be reduced and traffic distribution improved in the city by collecting and analysing traffic data. Using energy efficient technologies and energy management systems can help reduce energy consumption and ensure the sustainability of the city’s energy supply. Collaboration between government, commercial organisations, academia and civil society organisations is needed to develop and deploy smart technologies in cities. It is important that smart city decisions are well-balanced and have regard to the needs of all stakeholders. Issues related to privacy, network security and accessibility for all city residents, including the disabled, should be considered. In general, smart cities are seen as an opportunity for the development of cities and the improvement of the quality of life of their inhabitants. They have the potential to contribute to sustainable development, to ensure economic growth, and to make cities more attractive places to live and work. There is no clear definition of what a smart city is. However, specialists continue to research and work in this area to create smarter and more innovative cities.

The modern global economy is characterised by the key concepts of smart growth and smart industry. These are based on knowledge and innovation. By increasing labour productivity, creating new jobs and raising incomes, smart

growth contributes to the achievement of human development goals. In the modern world, industry has a special role to play. First, it increases labour productivity, which contributes to the creation of new opportunities for development and the achievement of social goals. It also plays an important role in addressing social issues such as gender equality and creating decent jobs for the young. Second, new opportunities are opening up as a result of the modern industrial revolution, also known as Industry 4.0. The increasing use of digital technologies, artificial intelligence, the Internet of Things and process automation in industry is associated with this revolution. It is leading to the emergence of new technologies. These are changing the approach to production and the organisation of work processes [6, p. 11]. In general, the concepts of smart growth and smart industry have a significant impact on the modern economy. They drive development and innovation. Society can ensure sustainable growth, improve people's quality of life and ensure sustainable development in harmony with the environment by implementing these concepts. In particular, openness to innovation and a high level of development of small and medium-sized enterprises characterise the modern smart economy. It helps reduce unemployment by encouraging the creation of highly productive industries. In addition, the smart economy involves participation in transnational economic projects, which contributes to the strengthening of international co-operation and national development.

The level of environmental awareness and responsibility among the residents of a smart city should be at its highest. This level can be assessed through analysis of how people feel about the environment, how upset they are by environmental pollution, how effectively waste is sorted, etc. Smart city residents are the main actors in the implementation of smart city principles. The level of education and skills of the population, their desire to gain knowledge throughout their lives and their active participation in urban life determine the need for innovative changes. A rational lifestyle is a key factor in determining whether or not a new generation of smart people will emerge in a given city.

This means caring about health, the quality of housing, developing the educational system, providing cultural and tourist facilities, and the level of cooperation in the urban community.

In particular, one of the main principles of the smart city concept is the rational use of all types of resources. To avoid unnecessary costs, it is important to use electricity, hot water and other resources efficiently. It is important to keep accurate records of how much energy you use and to continually improve systems to use this efficiently. To reduce dependence on traditional, limited resources, it is also recommended to use non-traditional energy sources such as solar or wind power. These measures will contribute to the conservation of resources, the reduction of environmental impact and the sustainable development of the city [7, p. 116].

The basis for the development of a smart city development strategy in Ukraine can be formulated as follows: awareness of the need to subordinate the goals of smart city formation to the strategic goals of urban development based on their consistency with the components of a smart city; specification of the basic conditions for the formation of a smart city based on the use of modern architecture that meets current problems and the implementation of digitalisation as the most important stage in the transformation of the city into a smart city; identification of stakeholders in the process of smart city formation and tasks to be performed within the framework of the development of a smart city development strategy; identification of challenges that complicate the functioning of the city and formulation of the vision and mission of a smart city, including the main directions [9, p. 107].

It should be noted that the mission, in accordance with the most common interpretation, reflects the purpose of the functioning of any object (organisation, institution, enterprise, administrative-territorial unit, etc.) It is a set of basic values or principles on the basis of which activities are planned and carried out. Traditionally used in development strategies, this interpretation is the leading one in determining the strategic vision of the object’s development. The mission

is also formulated in the form of strategic guidelines, in particular as the achievement of a given level of any criterion in the course of the object's activities.

In particular, the formation of smart cities involves identifying the specifics of development and taking them into account in the process of creating an intelligent management system. There are two ways to create smart cities: cities that were initially developed on smart foundations (examples of this formation are rather rare due to the peculiarities of the city formation process), and cities that "incorporate" smart solutions and artificial intelligence systems into the existing management [11, p. 225].

As for the vision of the city, its definition includes the establishment of a system of strategic and operational development goals, the formation of a list of strategic directions, the formulation and clarification of the vision, taking into account the mission of the city. In general, the objectives of smart cities can be divided into three groups: economic (the desire to improve the quality and efficiency of services by attracting investment and improving economic development in general); social (inclusiveness, transparency, trust and involvement of residents); achievement of a sustainable environment [10, p. 53].

The sequence of stages in the development of a smart city development strategy includes the following steps: analysis of the socio-economic development of the city; identification of the main directions of implementation of smart city components in accordance with the overall strategic goals of local development; substantiation of the conditions for creating a smart city; formulation of the mission and vision of a smart city; development of relevant projects and programmes with the participation of stakeholders in the process of creating a smart city [12, p. 29].

Looking at the biggest smart city successes in the US, such as New York [8; 13], we can see that they are aiming to create a 'net zero economy'. New local laws require buildings to become efficient and to upgrade faster. The NYCC Energy Conservation Code sets standards for using and conserving

energy and water. NYSERDA aims for 70% renewable energy by 2030 through its Energy Development Programme.

City initiatives to achieve diversity, inclusion, equity, growth, stability and sustainability are included in the current OneNYC Unified Plan. Major smart city projects include the Accelerated Conservation and Efficiency programme, which upgraded LED lighting to reduce and conserve energy, avoiding more than 900 tonnes of greenhouse gas emissions and saving more than $800,000 annually; and the large-scale AMR water meter reading system, which diagnoses water usage and alerts customers to potential leaks.

The result has been a reduction in water bills for residents of over $73 million. In addition, waste collectors have been able to plan their routes more efficiently through the use of BigBelly smart waste and recycling bins, which are solar-powered and equipped with a chip to determine occupancy. The bins are also equipped with waste compactors. These can hold five times more waste than conventional bins. This has resulted in a 50-80% increase in waste collection efficiency and a reduction in CO2 emissions. The goal of the Open NY initiative is the expansion of public access to data on the city's most valuable assets. The main objectives are to stimulate innovation, research and economic opportunity, public participation in governance and increased transparency and awareness of decision-making processes.

Programmes that make the best use of the city's open data are subject to annual competitions. The Urban Future Lab supports innovation and the development of smart technologies, such as offshore wind turbines, through a community of climate technology incubators and accelerators. The LinkNYC project is developing smart hubs with contactless technology, widespread Wi-Fi access, and online charging stations in place of phone booths. To reduce traffic and emissions, the city also offers car-sharing. Water quality and conservation, public safety, and waste management are among New York's smart city solutions. The city's Office of Technology and Innovation is working with the

private sector on the implementation of technologies such as automatic water meters, smart bins and smart waste management systems.

This example shows that to improve the lives of residents, increase resource efficiency and make cities more resilient to various challenges, successful smart city projects are being implemented in the United States. This experience can be useful to other countries that may also be in the process of smart city development of their own.

Taking into account the current theoretical developments and global trends in the construction of smart cities, we will formulate the main directions for the reconstruction of Ukrainian cities on the basis of these principles, taking into account the geopolitical specifics [14; 15; 16]:

1. Infrastructure. Building safe and reliable urban energy infrastructure, including creating smart grids and intensifying the use of alternative energy sources. Using technologies such as the Internet of Things and blockchain to connect urban infrastructure and city management systems. One of the key challenges of the modern world is to develop a secure and reliable energy infrastructure. The consumption of natural resources can be reduced and the environmental situation in the city improved by creating energy-efficient and environmentally friendly energy supply systems. Effective management of the energy system and reduction of energy consumption costs can be achieved through smart grids and innovative technologies.

Sustainable urban development can also be achieved by combining urban infrastructures and city management systems based on the use of technologies such as the Internet of Things and blockchain. Maximum efficiency and optimisation of resource use can be achieved by creating smart systems to manage water, lighting, waste and other city services. Maximum security and reliability of the system can be ensured through the interaction of different city systems based on blockchain technologies. Thus, using the latest technologies and innovations, the cities of the future will be based on an integrated approach to infrastructure development, energy supply and life management.

2. Information. Through 5G, big data and data analytics, ensure easy access to all necessary information and knowledge about the functioning of the city. The creation of a space for education and culture that will ensure the effective implementation of the principle of life-long learning.

An important aspect of developing a modern city is ensuring easy access to information and knowledge. Access to information and learning for all city residents can be improved through the use of the latest technologies such as 5G, big data and data analytics.

5G technology, which transmits data at an even faster rate, makes it possible to create multi-functional smart cities where people can access information by connecting to the network from almost anywhere. This will enable convenient access to public transport schedules, information about events and news, and quick access to online courses and educational materials.

Identifying and extracting meaningful information from large amounts of data is possible through big data and data analytics. This can be used to improve city infrastructure, resource allocation and data-driven decision making. Data analytics can also be used to personalise educational materials and make learning more effective. This can be done based on the individual needs and interests of each person.

Another important step in ensuring effective lifelong learning is the creation of educational and cultural spaces. This can be achieved by creating accessible and convenient platforms for learning and developing, such as libraries, museums, training centres, etc. In addition, access to education and knowledge can be widened by using digital technologies to organise online courses, webinars and other forms of distance learning. It is also important to ensure the security and confidentiality of user data when developing such an educational and cultural space. In order for all city residents to be able to use these technologies, data protection measures should be implemented and social and digital inclusion should be ensured.

Finally, easy access to all relevant information and knowledge through 5G, big data and data analytics can improve the quality of life and development of a city. It can also enable effective lifelong learning for all its inhabitants.

3. Environment. Reduction of pollution and water consumption through the use of resource-efficient infrastructure and its re-use in a closed-loop system. Through reuse and eco-friendly recycling, create intelligent platforms for managing waste streams.

For urbanised regions such as Ukraine, environmental issues are extremely important. The reduction of pollution and water consumption has been the focus of a number of different approaches and initiatives. Implementing resource- and energy-efficient technologies is one of the most effective ways to reduce water consumption. This includes installing modern systems to treat water and reuse it in closed systems. Such systems assist in maximising water savings and reducing water pollution. Intelligent platforms play an important role in effective waste management. These can include waste sorting and distribution systems, as well as platforms that facilitate reusing, recycling and disposing of waste. Optimising waste management and reducing the negative impact on the environment can be achieved through such intelligent platforms. Another key aspect in reducing the negative impact of waste is the development and implementation of environmentally friendly waste treatment technologies. For example, high recycling efficiency and reduced environmental impact can be achieved through the use of biodegradation and organic waste recycling.

It is also important to note that the successful implementation of such initiatives will require the active co-operation of government agencies, the business sector, non-governmental organisations and citizens. In addition, the successful implementation of such projects requires investment in resource and energy efficiency infrastructure and the use of smart technologies. Overall, an important step towards sustainable development and environmental improvement in Ukraine is the development of infrastructure for resource efficiency, resource reuse and environmentally sound recycling.

4. Economy. The smart city economy is a concept that aims to combine technological innovation, sustainable development and efficient use of resources to improve the quality of life of residents and ensure economic growth. The concept involves introducing information technology, energy-efficient solutions, developing transport and social infrastructure, and involving the public in decision-making. The aim of the smart city economy is to reduce the costs of energy, water, transport, waste management and environmental pollution. It is also about the creation of favourable conditions for the development of entrepreneurship, technology start-ups and new economic opportunities.

To create an innovative and liveable environment, ensure the efficient use of resources and improve the quality of life of the population, the successful implementation of the smart city economy concept requires effective cooperation between the public sector, private companies and government agencies.

5. Management. Smart city management is a set of organisational, technological and strategic approaches to city management aimed at using innovative technologies to improve the quality of life of residents, conserve resources and create a sustainable environment. Smart city management includes using digital technologies, collecting and analysing data for effective management of city infrastructure, introducing the Internet of Things to improve the safety and comfort of residents, as well as developing the transport system and energy efficiency.

In particular, in order to ensure sustainable development and improve the quality of life of residents, it should be noted that the development of a smart city strategy is an important task. Using the latest technologies to ensure the comfort, efficiency and environmental sustainability of the city is the main objective of such a strategy.

The main steps in the development of a smart city strategy are as follows:

1. Analysis of the current state of the city: this includes an analysis of the existing infrastructure, the existing services and the level of technological readiness of the city.

2. Definition of the mission, goals and objectives: this involves the definition of specific goals and objectives that are to be achieved through the smart city. The main goal and vision of a smart city is the use of innovative technologies and digital solutions to improve the quality of life of residents, efficient management of resources and sustainable development. Goals may include the improvement of the transport system, the reduction of energy consumption, the improvement of air quality and the implementation of e-governance.

3. Identification of potential solutions: to identify and analyse technologies that can help achieve the objectives of the strategy. These may include smart sensors to monitor air quality, electronic payment systems for public transport, energy management systems, etc.

4. Development of an action plan: this involves the development of specific measures and steps that need to be taken to implement the smart city. The plan may include projects to build new infrastructure, implement technology in existing systems, and training and orientation programmes for residents.

5. Implementation and monitoring of the plan: the process of introducing new technologies and implementing projects begins once the action plan has been adopted. To maximise efficiency, results should be continually monitored and adjustments made.

In a changing world, smart city management aims to make cities more resilient, competitive and sustainable. It takes into account the needs of citizens, encourages public participation and partnerships with the private and public sectors for the achievement of common goals. Smart city management is an important tool for sustainable development and improvement of the quality of life in cities.

6. Safety and security. Complying with strict standards of resilience to all external threats, including natural hazards, by constructing housing, educational, administrative and other buildings with mandatory bomb shelters. Designing public transport stops with protection requirements. The rule must be met: every city resident must be able to save his or her life wherever he or she is in danger - at home, at work, on streets, on public transport, while studying, buying and selling and so on. Using wireless technologies and video surveillance to ensure the safety of urban areas. Creation of an effective warning system for the public in the event of a threat to life for any reason. In the construction of residential, educational, administrative and other buildings, ensuring safety is one of the most important tasks. It is important to consider potential threats, which may be natural, as well as to consider various possible hazard scenarios.

Building bomb shelters and meeting strict standards for their resistance to all external threats is one of the most important aspects. This applies to residential buildings as well as educational institutions, administrative buildings and other important facilities. Special rooms for evacuation and shelter can be provided in some of these buildings. Urban planning should take into account the location of public transport stops with protection requirements. This may include providing emergency exits, safe zones or other measures to prevent passengers from being endangered at vulnerable moments. Furthermore, there should be an effective system to alert the public to the possibility of a life-threatening situation for any reason. This may include the use of dedicated warning systems, mobile applications or sirens, using wireless technologies and video surveillance to monitor the situation and alert the public.

The ultimate goal is to ensure that every city resident has the opportunity to save their life, regardless of where they are in the event of a hazard. This requires a special design and construction that takes into account the possible threats and provides the population with protective equipment as well as information and warning systems.

7. Living a healthy life. Recruiting and training highly qualified specialists and rebuilding the medical system with the latest IT and medical equipment. Prevent major diseases by implementing effective prevention programmes. Creating a network of sports facilities and places for active recreation for citizens.

An important role in the creation of a healthy society is played by the development and improvement of the medical system, combined with a healthy lifestyle and preventive measures. The key to improving the level of medical care and maintaining public health is the introduction of the latest technologies and medical equipment and the training of highly qualified specialists. In addition, an important role in reducing morbidity and improving the overall health of society can be played by paying due attention to disease prevention and creating favourable conditions for active recreation and sport.

The establishment of a network of sports facilities and active recreation areas will contribute to the promotion of healthy lifestyles and the encouragement of people to be more physically active. This approach can help to improve the overall physical and mental health of the population by reducing the diseases associated with a sedentary lifestyle.

Conclusions.

The concept of a smart city in the context of sustainable territorial development encompasses a whole range of innovations, economic and management approaches, as well as construction and application features, aimed at improving the efficiency of the urban environment and reducing its environmental impact.

The innovations include the use of Internet of Things technologies and intelligent systems for the management of energy, water and waste. The result is the optimisation of resource use and the reduction of energy and water consumption in the city. In the economic context, the smart city concept involves developing innovative industries, creating high-tech jobs, and supporting incubators and start-ups. This will contribute to the creation of a

sustainable economy and the improvement of the living standards of the city's inhabitants. Another important component is governance, which involves the use of digital technologies to ensure the quality of life of residents, streamline traffic, manage waste and the urban environment, and ensure the safety and harmony of urban development. Finally, construction and application features include the energy efficiency of buildings, the use of renewable materials, the creation of green spaces and infrastructure for electric transport. This contributes to creating a comfortable and healthy environment for city residents. In general, the smart city concept in the context of sustainable territorial development involves an integrated approach to planning and managing the urban environment to maximise efficiency, reduce negative environmental impacts and improve residents' quality of life.

Experts should carefully study new approaches to the use of IoT technologies, green technologies, renewable energy sources and smart city planning concepts, taking into account modern theoretical developments and global trends in the construction of smart cities. Such innovations can improve the quality of life for residents by enabling efficient management and optimising the use of resources. Green technologies contribute to the creation of sustainable cities that provide a comfortable environment in which to live, work and play, such as green roofs, solar panels, rainwater harvesting and treatment systems. Such approaches help create environmentally friendly and innovative urban spaces where people can live and thrive.

Studying the current practice of adapting the operational processes of a specific district of a smart city is a perspective for further research in this area.

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Стаття надійшла до редакції 05.02.2024 р.