
ҚАЗАҚСТАННЫҢ ИННОВАЦИЯЛЫҚ ЖӘНЕ ПОСТИНДУСТРИАЛДЫҚ САЯСАТЫН ЖҮЗЕГЕ АСЫРУ ТИІМДІЛІГІ

ЭФФЕКТИВНОСТЬ РЕАЛИЗАЦИИ ИННОВАЦИОННОЙ И ПОСТИНДУСТРИАЛЬНОЙ ПОЛИТИКИ В КАЗАХСТАНЕ

EFFECTIVENESS OF IMPLEMENTATION

THE POST-INDUSTRIAL AND INNOVATION POLICY IN KAZAKHSTAN

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The role of «Smart city» concept in social infrastructure management of single-industry towns

The article deals with the theoretical foundations of the concept of «smart city». The authors of the article studied the scientific works which devoted to the research and development of technological components of Smart City and their implementation in various areas of the city (transport infrastructure, social infrastructure, e-government services, e-business and others). The article presents international practice to determine the factors that form the content of initiatives to create smart cities. The main attention is paid to the role of standardization, which covers many aspects of the design, organization and functioning of the smart city. The authors describe the national standards in the field of Smart City, which regulate the unified requirements for fundamentally new possibilities of centralized management of urban processes. The article defines the functions and tasks of the social infrastructure of single-industry towns, which should be taken into account in the implementation of the concept of Smart City. Selected areas of activity specified in the concept of Smart City, which are closely related to the development of social infrastructure of single-industry towns of Kazakhstan: medical care; education; social services; public services; movement around the city; emergency. The authors of the article identify the practical benefits received by citizens of single-industry towns from the application of the concept of Smart City in social infrastructure.

Keywords: smart city, social infrastructure, single-industry town, education, health care, social security, standard, concept, management.

Recently, the term «smart city» has often been used around the globe. Smart cities are complex social engineering systems that contribute to improving the quality of life through the use of advanced technologies for decision-making in the field of economical and environmentally friendly use of urban life systems.

In the Address «New opportunities for development in the conditions of the fourth industrial revolution» Nursultan Nazarbayev noted the need to build «smart cities» for «smart nation». In his opinion, «Smart cities» will become the main leverage of regional development, distribution and improvement of quality of life throughout the country [1].

Throughout the world, ensuring acceptable living conditions in a rapidly growing urban population requires a deep understanding of the smart city concept. However, as mentioned above, this concept is only emerging. The term itself is already used worldwide in various structures of urban problems, contexts and meanings. A number of variants of the term, often used, is generated by the replacement of the adjective smart with such adjectives as digital, connected or intelligent.

There are a lot of works devoted to the study and development of technological components of smart city and their implementation in different fields (transport infrastructure, social infrastructure, e-government

services, e-business, etc.). Nevertheless, with the absolutization of the technological component, there is a risk of succumbing to the illusion of making a «smart city» of standard technological units, and to believe that this design will work effectively.

It becomes obvious that for the effective functioning of the new «smart cities», it is necessary to take into account the adaptive abilities of the population, as well as management factors that determine the resource provision of the territories.

In the scientific literature we can find evidence of individual attempts to conceptualize the concept of «Smart city». While some researchers have focused on finding the boundaries of the term [2], others have focused on the lack of any consensus on what the term means [3–5].

«A smart city is a safe, environmentally protected (green) and efficient urban center of the future with an advanced infrastructure of sensors, electronics and networks that stimulates sustainable economic growth and high quality of life» [6].

«The city will become smart when investments in human and social capital and in traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life. These investments should be supported by wise management of natural resources through participatory (including residents) management of the city» [7].

«This is a city that strategically builds and implements the development of the economy, human capital, city management system, mobility infrastructure, environmental protection and quality of life. Such development is based on a smart combination of endowments and activities of citizens, consciously and freely making decisions» [8].

As can be seen from the analyzed works, the concept of «smart city» is depicted from different perspectives. For example, H. Chourabi [5] describes smart cities as intelligent, digital, or creative, based on a variety of attributes, such as their ability to manage stakeholder relationships and usage of infrastructure in all areas of life. Some authors [10] in the development of smart cities leave priority to information technology, while others [11, 12] define innovation and entrepreneurship as primary levers.

N.N. Yarosh, in his study, makes an attempt to consider the historical and conceptual link between the ideas of the ideal city and modern technologies of transformation of real cities into smart cities [12].

A.A. Golenkova, S.I. Shagbazyan, N.R. Stepanova examine the concept of «smart cities» and the need to explore it in the light of the trends of the present time for the improvement of life in cities [13].

As noted by the Spanish economist, an expert in the field of «smart» cities Hermenegildo Seisdedos, the concept of «smart city» essentially means efficiency achieved through intelligent management and integrated ICT, as well as active participation of citizens in the development of the city [14].

«Smart cities» can be defined as systems that integrate the following activities within a single urban space [15]:

- 1) smart economy;
- 2) smart mobility;
- 3) smart environment;
- 4) smart people;
- 5) smart life;
- 6) smart management.

The list of areas that requires the introduction of smart technologies covers almost all areas of urban economy and urban infrastructure: analytics, banking, buildings, commerce, e-government, communications, education, energy, emergencies, public catering, health, manufacturing and services, transport, retail, public safety, ecology and environmental monitoring, water and gas supply, and much more with no exception. The general scheme of the process of «intellectualization» of urban management is quite a complex phenomenon that requires taking into account many factors, including the differences introduced by residents of certain places.

«A smart city is an advanced and high-tech city that unites people, information and elements of urban infrastructure. It has a simple system of management and maintenance of urban economy and uses new technologies for sustainable formation of green city (improvement of environmental protection), creation of competitive and innovative trade and improvement of quality of life» [16].

At the same time, it is impossible to change the city, it can only be transformed in order to improve the efficiency of the urban economy, living standards and sustainable development. This transformation must take into account: growing competition between cities and countries; the need to create new jobs, and mainly

in the standard of smart working; the requirements of increasing the attractiveness of the city for residents, investors and tourists.

«Smart city» is an administrative unit of human settlement (district, city, region or small country), for which a holistic approach is applied to the use of information technologies working in real time to ensure its (administrative unit) sustainable economic development» [17].

The world experience of creating information systems in various spheres of human activity, recorded in the methods of the world's management consulting grants (Big four, IBM, McKinsey, Microsoft, etc.), suggests that any initiative to create a smart city (construction from scratch in the «clean field») or the transformation of the existing «smart» city into a smarter city should be accompanied by the following set of documents [18]:

- * Smart city initiative framework (Framework);
- * Smart city architecture (Architecture);
- * Assessment of readiness for the smart city initiative (Smart city readiness assessment);
- * Assessment of the level of maturity of the smart city (Smart city maturity);
- * Road map to create a smart city (Smart city road map);

Based on the study of an extensive body of literature (43 titles) from various disciplines, the international team of scientists from Canada, the USA and Mexico identified [19] eight clusters of critical factors forming the content of initiatives to create smart cities:

- management and organization;
- ICT-technologies;
- guide;
- political context;
- people and communities;
- economy;
- built infrastructure;
- environment.

These factors form the basis of an integrative smart city model that can be used by city authorities to shape and implement these initiatives and which is essentially the framework of the initiative.

There is no doubt that it is necessary to improve the social infrastructure of the city: energy efficiency of the main and municipal engineering systems of the city; improving the efficiency of the social sphere; schools, public safety, etc.; improving the living conditions and health of the population. Therefore, it is necessary to plan these activities.

The first ISO 37120:2014 [20] standard for smart city indicators was released in may 2014. It has enabled city managers, policy makers and those planning changes in cities to objectively assess their progress and compare their results with what is being done in other cities. The key indicators or measurements in this standard allow a clear focus on its implementation. ISO 37120: 2014 was made as part of a future set of standards and this set of standards will have to ensure continuous and sustainable development of urban areas. It is designed so that it can be used in any city, municipality or local government, regardless of their size, location or level of development. The set of indicators in the standard also provides basic statistical indicators and some type of information to help officials select the cities that are best suited to their development plans and capabilities to meet the requirements of the standard.

Kazakhstan has approved national standards in the field of Smart City. They regulate uniform requirements for fundamentally new opportunities for centralized management of urban processes. These standards include [21]:

– *ST RK BSI PD 8100-2016* «review of smart cities. The manual» contains instructions for the executive authorities on the application of certain actions of smart cities. The standard aims to provide possible benefits of strategies and provides recommendations on the first steps towards the creation of a smart city. The requirements are based on the successful practice of smart cities and provide a list of standards used to develop and apply their own effective strategies;

– *ST RK BSI PD 8101-2016* «Smart cities. A guide to the assessment of the role of planning and development» is a guide for planning and implementation of development projects and infrastructure, the implementation of which it is possible to benefit from the potential of intelligent technologies and approaches. The standard contains requirements for the basics of development of large infrastructure projects, repair programs, as well as a step-by-step algorithm for their implementation;

– *ST RK ISO 37151-2016* «Intellectual infrastructure and utilities. Principles and requirements to the system operating parameters» contain principles and sets out the requirements for harmonization of the

operational characteristics of the infrastructure and communal services gives recommendations for the analysis, including intelligence and security of infrastructures and utilities;

– *ST RK BSI PAS 180-2016* «Smart city. Dictionary» reveals the terms used in various areas of smart city services, including concepts for different infrastructures and systems. The standard applies to cities, including small towns and urban settlements;

– *ST RK BSI PAS 181-2016* «integrated structure of smart city. Guidelines for the creation of strategies for the development of smart cities and communities» contains provisions for the management of smart cities and settlements, the development, coordination and provision of strategies for smart cities. The standard includes the strategies necessary for further development and development of the smart city's own strategy;

– *ST RK BSI PAS 182-2016* «smart city model concept. The guide to creating a data interaction model» describes the concept of a smart city model (SCCM), which provides a framework for the relationship between smart city components and systems used in different sectors. Components include concepts (such as organization, location, community, item, service, resource) and relationships between information (such as organization resources, in-place events). The standard covers semantic interchangeability, which defines the meaning of information, especially from many data sources.

These standards summarize international experience that meets the requirements of the standards that must be implemented in the implementation of the concept of Smart City. The requirements of the standards form the general guidelines that should be taken into account by the heads of the Executive power, determining the policy of management of the social infrastructure of a single-industry town.

Social infrastructure is a system of objects necessary for human life support, communications, as well as enterprises, institutions and organizations that provide social and household services to the population, management bodies and personnel whose activities are aimed at meeting the social needs of citizens corresponding to the established indicators of quality of life.

The functions of the social infrastructure of single – industry towns are defined and subordinated to the objectives of social and economic development of society-to achieve social homogeneity and comprehensive, harmonious development of the individual. The most significant target functions of the social infrastructure of single-industry towns include:

- creating conditions for the formation of progressive trends in demographic processes;
- efficient use of human resources;
- provision of optimal housing and communal and living conditions of the population;
- improvement and preservation of physical health of the population;
- rational use of free time by citizens.

The development of social infrastructure takes into account the main objectives of social policy aimed at improving the quality of life of the population, improving its well-being and longevity, the formation and reproduction of a healthy and creatively active generation. All these aspects should be taken into account in the implementation of the concept of Smart City in the management of social infrastructures of single-industry towns of Kazakhstan.

Smart City concept is new strategy of urban development in the world, a key direction of the National technology initiative (NTI), which belongs to the EnergyNet market. It is aimed at helping cities to use the latest developments in the scientific sphere, providing residents with a better quality of life [22–24]. With the consolidation of megacities there are a number of problems, such as: high population density, increasing number of vehicles, inefficient use of resources, climate change, deteriorating energy infrastructure.

Currently, the holding «Zerde» developed and presented the concept of Smart City for all regions of Kazakhstan. The concept allows to unify the approach to the implementation of Smart City in the regions of Kazakhstan, as well as to create the practice of using the benchmark to use the best industry practices and solutions.

Smart City makes optimal use of ICT to improve the quality of life of citizens, the competitiveness of the economy, the creation of the necessary innovative, energy-efficient infrastructure, the development of international competitive products and services for local and foreign tourists and ensure sustainable development.

The concept identifies certain areas of activity that are closely related to the development of social infrastructure of single-industry towns of Kazakhstan [25]:

– *Receiving medical care* is a complex of preventive, therapeutic and other medical processes with the use of high-tech equipment and innovative drugs. This approach will reduce the duration of visits to medical institutions with the optimization of paper procedures and ensure transparency of treatment;

– *Education* - the purpose of smart learning is to make the learning process more effective by transferring the educational process into an electronic environment. This approach will copy the knowledge of the teacher and provide access to them to everyone. At the same time, knowledge should be located in a single repository, assuming the presence of an intelligent search system. The quality of the information placed in the repository should be constantly monitored through the implementation of Smart City, and work in a single link with the educational process management systems;

– *Getting social services* - the main goal is to build an accessible environment for people with disabilities and establish healthy interpersonal relationships in society;

– *Utility service* is an effective management of housing and communal services and engineering infrastructure of buildings and structures, contributing to extend the life of equipment and communications, improving energy efficiency of residential and office buildings, responding quickly to the occurrence of faults, based on performance indicators to determine the ways and directions of optimization and development of housing and communal services components;

– *Movement around the city* - organization of traffic with the use of intelligent transport system is to ensure safe and comfortable traffic for all participants;

– *Emergency* - ensuring the safety of the population with the installation of sensors and video cameras that collect information about the situation in the region for the timely recognition of the threat, analysis and transmission to the relevant services and others.

Thus, all the presented areas of activity should be covered by projects within the framework of Smart City. A single-industry town that wants to become «smart» should move in all these directions, but should not reject alternative points of development, considering them with regard to long-term prospects and consequences of implementation. The practical benefits of the concept can be:

– *improving the health status of the population on the basis of affordable health care and improving the quality of medical services.* «Smart healthcare system» is the one that effectively uses information, analyzes it in detail and quickly applies it, using an electronic integration system of patient data. This will reduce the number of medical errors and improve the effectiveness of treatment. There should be a constant exchange of information so that any doctor can get access to the full current medical history of the patient applying to him and quickly choose the right course of therapy;

– *creation of conditions for individualization of educational courses, formation of a system of continuous education and career development.* «Smart education» involves the transition from passive content to active, online. E-learning allows for multi-faceted communication between teachers, students, employers, other potential consumers of intellectual services, regardless of their distance and even national borders;

– *development of the housing sector in the monotown.* The infrastructure of the «smart city» helps the municipal sphere, enterprises and households to increase economic efficiency; reduce the burden on the environment; ensure the comfort and safety of residents and guests of the city. Environmental friendliness, efficiency, aesthetics, comfort, availability and safety of housing are the characteristics that determine the modern priorities in choosing a place of residence and work;

– *creation of security conditions for each person, whether it is personal security, security of his home or business.* The concept of a safe «smart city» covers not only the equipping of households and critical urban infrastructure with surveillance cameras, remote monitoring and control sensors, but also the organization of safe traffic, the most convenient and safe organization of urban space (roads, parking slots, yards, squares, etc.), information security.

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Б.С. Есенгельдин, Г.М. Мухамедиева, Г.С. Акыбаева, А.Т. Жансейтов

Моноқалалардың элеуметтік инфрақұрылымын басқарудағы «Ақылды қала» тұжырымдамасының рөлі

Мақалада «ақылды қала» түсінігі дамуының теориялық негіздері қарастырылған. Авторлар «Smart city» технологиялық компоненттерін әзірлеуге және оларды қаланың әртүрлі салаларына (көлік инфрақұрылымына, элеуметтік инфрақұрылымға, электронды мемлекеттік қызметтерге,

электрондық бизнеске және басқаларға) енгізуге арналған ғалымдардың ғылыми жұмыстарын зерттеген. Мақалада ақылды қалаларды құру бастамаларының мазмұнын қалыптастыратын факторларды анықтау үшін халықаралық тәжірибеде қолданылатын көрсеткіштер келтірілген. Мақала авторлары ақылды қаланы жобалаудың, ұйымдастырудың және жұмыс істеудің әртүрлі жақтарын қамтитын стандарттаудың рөліне ерекше көңіл бөлген. Олар қалалық үдерістерді орталықтандырылып басқару үшін түбегейлі жаңа мүмкіндіктерге арналған бірыңғай талаптарды реттейтін «Smart city» саласындағы ұлттық стандарттарды сипаттаған. Мақалада «Smart city» тұжырымдамасын іске асыру кезінде назарға алынатын монокалалардың әлеуметтік инфрақұрылымының қызметтері мен міндеттері анықталған. Мақалада Қазақстандағы монокалалардың әлеуметтік инфрақұрылымын дамытумен тығыз байланысты «Smart city» тұжырымдамасында анықталған қызметтің тандаулы бағыттары көрсетілген: медициналық көмек алу; білім беру; әлеуметтік қызметтер; мемлекеттік қызмет; қала айналасында қозғалыс; төтенше жағдай. Мақала авторлары монокала тұрғындарының «Smart city» тұжырымдамасын әлеуметтік инфрақұрылым нысандарында енгізуден алатын тәжірибелік пайдасын анықтаған.

Кілт сөздер: ақылды қала, әлеуметтік инфрақұрылым, монокала, білім беру, денсаулық сақтау, әлеуметтік қамту, стандарт, тұжырымдама, басқару.

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Роль концепции «Умный город» в управлении социальной инфраструктурой моногородов

В статье рассмотрены теоретические основы развития понятия «умный город». Исследованы научные труды ученых, посвященные изучению и разработке технологических компонентов «Smart city» и их внедрению в различных сферах города (транспортная инфраструктура, социальная инфраструктура, электронные государственные услуги, электронный бизнес и др.). Приведена международная практика по определению факторов, образующих содержание инициатив по созданию умных городов. Основное внимание уделено роли стандартизации, которая охватывает разные аспекты проектирования, организации и функционирования умного города. Авторами охарактеризованы национальные стандарты в области «Smart city», которые регламентируют единые требования к принципиально новым возможностям централизованного управления городскими процессами. Определены функции и задачи социальной инфраструктуры моногородов, которые должны быть учтены при реализации концепции «Smart city». Выделены отдельные сферы деятельности, указанные в концепции «Smart city», которые тесно связаны с развитием социальной инфраструктуры моногородов Казахстана: получение медицинской помощи; получение образования; получение социальных услуг; коммунальное обслуживание; передвижение по городу; чрезвычайное происшествие. Авторами статьи выявлены практические выгоды, получаемые гражданами моногородов от применения Концепции «Smart city» в объектах социальной инфраструктуры.

Ключевые слова: концепция «Умный город», социальная инфраструктура, моногород, образование, здравоохранение, социальное обеспечение, стандарт, концепция, управление.

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