

## IOT IMPLEMENTATION IN CITIES OF UZBEKISTAN

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**ABSTRACT:** *With the growing importance of cities, it is worth considering how overcrowding, enterprise automation and digital transformation will affect the development of the modern phenomenon, commonly referred to as "smart city". The issue of searching for promising technologies and directions that will come to the fore and influence the future is also becoming relevant. The article analyzes new technologies of a smart city in the Republic of Uzbekistan. Now it is very convenient and traditionally considered new innovative cities.*

**Key words:** *smart city, implementation, smart elements, factors.*

## INTRODUCTION

The concept of “smart city” is diverse, but it always means a place where technology is enriched. The essence of such technologies is that devices interact with the outside world without the presence of a person, but for their own well-being. A simple example is the use of a street lighting system that can be activated with a lack of natural light.

The Cabinet of Ministers of the Republic of Uzbekistan adopted the framework for the implementation of “Smart City” technologies in Uzbekistan. This framework entails the introduction of information and communication technologies into various areas of life.

## METHODS

Uzbekistan has also set a course for the construction of "smart" cities. In 2017, the President of Uzbekistan Shavkat Mirziyoyev approved a program of measures for

the implementation of the Safe City project for 2017-2023, covering the whole of Uzbekistan.

One of the elements of the system of "smart" cities - "Safe City" - has already been implemented in Tashkent: "smart" video surveillance cameras are operating at 120 intersections, fixing violations. Information from the cameras is transmitted to the crime monitoring center, which was launched in July 2017[1]. This project has completely covered Tashkent and is being implemented in the regions, in particular in Fergana and Samarkand. Further development of this software complex is carried out by the Center for Information Security and Assistance in Ensuring Public Order. The post of Deputy Minister for ICT Development, responsible for the implementation of Safe City projects, has been created. The software complex is integrated with information systems of government agencies, video surveillance systems, analytics sensors, data processing centers. A unified dispatch service is being created for the Ministry of Internal Affairs, the Ministry of Emergency Situations, ambulance, fire safety, which receives calls to the number "112" and signals from SOS buttons [2]. All incidents recorded by sensors and video cameras are reflected in the situational center, thanks to which the state of security in the capital is analyzed on an interactive map online. Also in Tashkent, an analytical video surveillance system has been introduced in public transport and parking lots with online payment and a car number recognition system are being created.

On January 18, 2019, the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 48 was issued, which approved the Concept for the implementation of Smart City technologies in the Republic of Uzbekistan and a plan of practical measures for its implementation for 2019-2030. The latter will be implemented in four stages [3]:

- the first stage (2019-2021) is to determine the basic approaches to building a smart city;
- the second stage (2022-2024) is the development of a strategy for the implementation of the smart city concept;
- the third stage (2025-2027) - detailed construction planning;
- the fourth stage (2028-2030) is the implementation and evaluation of the effectiveness of implemented projects.

A "smart" city in Uzbekistan is a single system with a center for managing, monitoring and responding to crisis situations. The technology solutions used should improve, maintain or optimize city-wide services while reducing resource use and costs. At the same time, the Smart City must constantly interact (exchange information)

with the citizens - users of these services, analyzing the impact of the applied IoT technologies, constantly improving them and introducing new intelligent solutions[4].

The implementation of the planned measures for the development of "smart" cities in Uzbekistan will lead to an increase in the level of security of the population, a decrease in the level of crime, an increase in the country's tourism potential, an improvement in its investment climate and the quality of services provided by the state. However, the inhibitory factors hindering the effective and accelerated implementation of smart cities are underdeveloped infrastructure, its significant wear and tear and obsolescence, which requires reconstruction and modernization.

## RESULTS

"Smart" elements of a "smart" city. The Concept for the implementation of Smart City technologies adopted in Uzbekistan provides for the following main areas:

"Smart transport". Automated traffic control system, smart parking, electronic payments, traffic monitoring, navigation and so on.

"Smart Education". AI education, distance learning, e-journals, mobile learning, online method integration.

"Smart Medicine". Unified platforms for biomedical patient data, electronic prescriptions, virtual dispensaries, network medical records.

"Smart Energy System". "Internet of things", hybrid batteries, "smart" measurement systems, autonomous sensors for voltage monitoring.

"Smart water supply and sanitation". Water supply technologies, electronic versions of route maps of water supply networks, systems for shutting off water supply in case of a leak.

"Smart housing and communal services". Automation of the process of taking meter readings, systems for transmitting information about the state of energy supply at home to user devices, "smart" meters.

"Smart Construction". Visual modeling of construction processes, construction facilitation systems, new building materials.

"Smart House". Security and fire alarms, access control system, lighting control, remote monitoring and home control via the Internet.

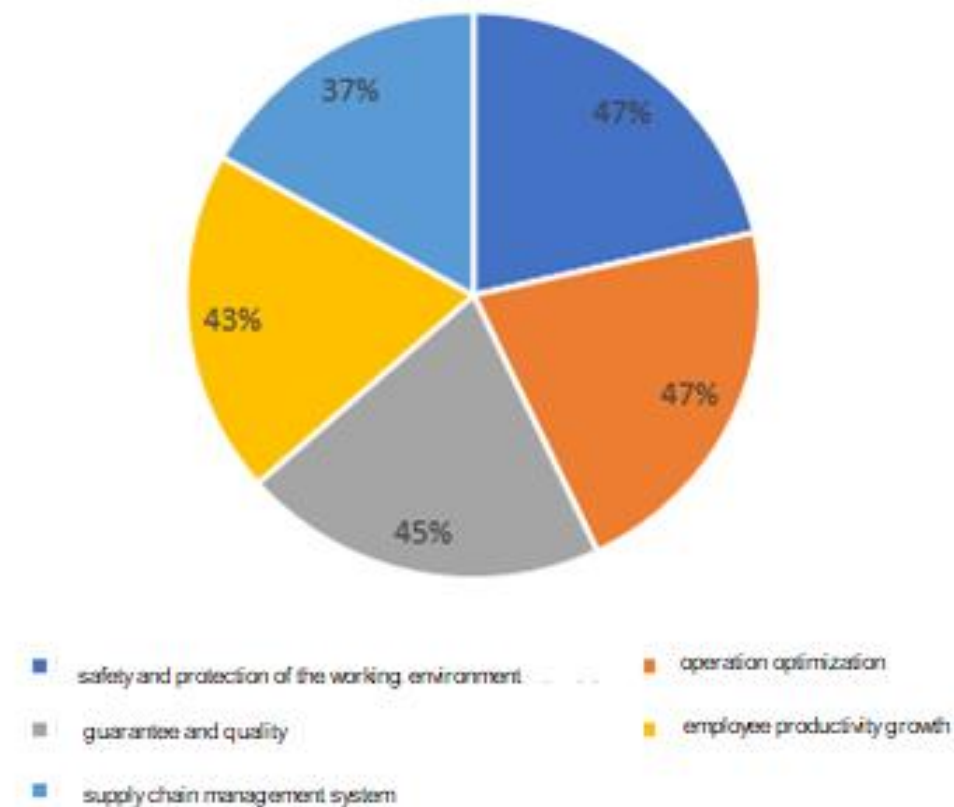
"Smart Hokimiyat". Electronic identity card with a combination of means of payment, the activity of citizens in the management of the city, local tax payment systems.

"Smart mahalla". Filling stations for electric vehicles, electronic cards in schools, carsharing, services for calling and paying for taxis.

IoT for business. At the same time, no less important than for improving aspects of urban and state management, the development of the Internet of Things technology

is also important for increasing the competitiveness of business, which has been the subject of a lot of research.

According to the Microsoft IoT Signal 2020 study, one of the top reasons for adopting IoT technologies is the pursuit of security, with 47% of companies citing it as a top technology development focus. Another 47% rely on IoT to optimize operations, and 45% rely on quality assurance(fig.1).



**Fig.1 Factors why companies implement IoT solutions**

## DISCUSSION

Increased productivity or cost savings are two potential business goals that these technologies can provide. At the same time, the Internet of Things can also create new revenue streams for businesses. If IoT technologies are implemented throughout the supply chain, and not just in individual companies, then their positive impact on the timeliness of deliveries and on the entire production management process can be even greater. A survey of 800 IoT companies conducted by Oracle and Transforma Insights in December 2021 found that the majority of decision makers favor complex offerings over individual developments. This opinion is shared by 64% of the respondents. Moreover, 75% of the study participants would like smart device connectivity issues to be resolved by the product vendor, and 70% also want analytics and data tools along

with their IoT solution. Thus, analysts note the desire of corporate customers for easier-to-implement IoT technologies that can bring business results faster [5].

Perspectives on IoT. According to Business Insider, if in 2019 there were about 8 billion connected IoT devices in the world, then by 2027 their number will exceed 41 billion. Global Data predicts that by 2023 the volume of the global IoT market will grow to \$ 318 billion. A new study by Juniper Research has shown that global industrial IoT connections will increase from 17.7 billion in 2021 to 28 billion in 2025, a growth rate of 107% [6]. The main part of the positive growth dynamics will be provided by business users, in particular retail, agro-industrial sector, companies associated with the construction of "smart" houses and "smart" power supply networks.

According to IDC, the three areas expected to spend the most on the Internet of Things are manufacturing (\$189 billion), transportation (\$85 billion) and utilities (\$73 billion). The utility industry will be dominated by spending on smart grids, as well as gas and water supply networks, and spending on cross-industry areas of the Internet of Things, such as vehicle connectivity and smart homes, is expected to rise [7].

If we summarize the numerous forecasts of experts, then in 2025-2030 we can expect the following picture: 80-100 billion connections to the Internet; 7-19 trillion dollars will be the global market for the "Internet of things".

## CONCLUSION

The framework of the "Smart City" is to be implemented in four stages. The first stage is scheduled for 2019–2021 and envisages assessing existing infrastructure in the cities and analyzing available assets. During the second phase, which is scheduled for 2022-2024, the government will elaborate on the implementation and financing strategy, define the action plan, assess possible risks and identify post-implementation assessment criteria. The third phase implies detailed planning, efficiency forecasting as well as the implementation of information systems. Implementing the technologies and evaluating the project's effectiveness is the final stage scheduled for 2028-2030.

Though Uzbekistan is making its first steps to introduce smart technologies, some pilot projects like "Safe City," "Smart Transport," "Smart Medicine" and "Smart Counters" are already underway in Tashkent. Such projects include the introduction of modern infrastructure in the city of Nurafshan and the construction of Tashkent City and Delta City.

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