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У збірник включені тези доповідей, які присвячені сучасним тенденціям розвитку цифрові інновації в Індустрії 5.0 та в автоматизації в промисловості; адитивне виробництво (3D-друк) як частина цифрової та зеленої трансформації виробництва; сталий розвиток та цифрова трансформація в енергетичних системах; інтернет речей (IoT) та розумні міста: менеджмент та технології; штучний інтелект та машинне навчання для сталого розвитку; цифрова освіта та її роль у формуванні сталого суспільства; цифрові інновації в галузі охорони здоров'я; блокчейн та фінансові технології для сталого розвитку; управління проектами цифрової та зеленої трансформації; BLUE-GREEN інфраструктура як спосіб пом'якшення зміни клімату.

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The collection includes abstracts on current trends in digital innovations in Industry 5. 0 and automation in industry; additive manufacturing (3D printing) as part of the digital and green transformation of production; sustainable development and digital transformation in energy systems; Internet of Things (IoT) and smart cities: management and technologies; artificial intelligence and machine learning for sustainable development; digital education and its role in shaping a sustainable society; digital innovations in healthcare; blockchain and financial technologies for sustainable development; project management of digital and green transformation; BLUE-GREEN infrastructure as a way to mitigate climate change.

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INNOVATIVE SOLUTIONS FOR SMART CITIES: HOW IOT AND 5G CAN CHANGE ROAD INFRASTRUCTURE AND REDUCE EMISSIONS

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Abstracts: The report discusses innovative solutions for smart cities based on IoT and 5G technologies. The main focus is on adaptive traffic management, which reduces congestion, optimizes traffic flows, and reduces CO₂ emissions. The technical aspects of implementing such systems and their impact on sustainable development are analyzed. A comparison of traditional and innovative solutions shows the benefits of using IoT in transport infrastructure.

Keywords: Internet of Things, 5G, smart cities, transportation, ecology

Today, Internet of Things (IoT), Big Data, and robotics technologies have become key drivers of digital transformation in all spheres of life [1-3]. IoT devices, from smart home systems to industrial sensors, generate huge amounts of data that, thanks to Big Data technologies, can be efficiently analyzed to gain valuable insights and make informed decisions. Robotics, in turn, uses this data to automate processes and create intelligent systems that can adapt to changing conditions [4]. The synergy of these technologies opens up unprecedented opportunities for optimizing production, improving the quality of life of people and developing innovative solutions in medicine, logistics, agriculture and other industries.

In today's world, cities face several challenges related to transportation infrastructure, including congestion, air pollution, inefficient traffic management, and high carbon dioxide (CO₂) emissions. One of critical solutions to overcome these problems is introduction of Internet of Things technologies combined with 5G capabilities, which allow for creation of intelligent transportation management systems. The development of 5G opens up new opportunities for IoT deployment on massive scale due to its high data transfer speeds and minimal delays. This allows cities to implement real-time adaptive solutions that help optimize traffic flows, reducing congestion and, as result, reducing CO₂ emissions.

The Internet of Things enables new models of transport infrastructure management where all elements of road system interact with each other. Sensors, cameras, smart lights, and other devices connected to single network can collect and exchange data in real time. This allows for accurate traffic control decisions based on current load on roads.

One of most promising solutions is smart traffic lights and road signs, which can regulate traffic flow depending on current road situation. For example, traffic lights can automatically adjust their cycle to provide so-called "green wave" - when several traffic lights work in unison, allowing cars to move without stopping at intersections. This not only reduces travel time but also helps to reduce emissions, as cars are not idling while waiting for green signal.

Adaptive road signs can change their information depending on current situation, for example, to provide traffic direction recommendations in case of traffic jams, accidents, or other emergencies.

One of main benefits of IoT-based adaptive traffic management systems is their contribution to sustainable urban development. Reducing vehicle idling time in traffic jams and optimizing traffic flows directly affect reduction of CO₂ and other harmful air emissions.

To effectively implement IoT and 5G solutions in transportation infrastructure of smart city, several vital technical aspects must be taken into account. First, infrastructure for low-latency data transmission is provided by 5G networks and intelligent systems for processing vast amounts of information in real-time.

Advantages of 5G for IoT in transportation: providing data transmission speeds of up to 20 Gbps, which allows for transfer of large amounts of data in real-time; latency in 5G networks has been reduced to 1 ms, which is essential for operation of adaptive traffic management systems; 5G allows millions of IoT devices to be connected in small area, making it possible to massively deploy sensors and cameras to monitor traffic in megacities.

Implementing such system requires comprehensive infrastructure that includes:

- sensors and cameras to collect data on traffic flows;

- cloud computing systems for processing large amounts of data;
 - artificial intelligence (AI) systems for real-time data analysis and decision-making in transportation management. Table 1 compares traditional and innovative traffic management solutions.

Table 1 – Comparison of traditional and innovative traffic management solutions

Parameter	Traditional traffic management systems	Smart systems based on IoT and 5G
Type of control	Fixed traffic light cycles	Adaptive cycles that change in real time
Delay in decision-making	High (manual control)	Low (less than 1 ms, automated solution)
Data collection	Local, limited	Scalable, by IoT sensors
Traffic optimization	Limited	High, taking into account real workload of tracks
Environmental impact (CO ₂ emissions)	High due to standing in traffic jams	Reduced due to optimized movement and reduced time idle time
Implementation of new technologies	Difficulties in modernization	Easy integration of new technologies and updates

The introduction of innovative IoT and 5G-based systems into transportation infrastructure of smart cities has significant impact on sustainable development. One of the most apparent advantages is significantly reducing negative environmental impact.

A study conducted in smart cities such as Barcelona and Amsterdam showed that introducing adaptive traffic management systems can reduce CO₂ emissions by 10-15 %.

Adaptive traffic management can reduce need to build new roads and expand transportation infrastructure, which helps preserve natural green spaces in cities. This contributes to better environmental situation and preservation of biodiversity in urban areas.

CONCLUSIONS. Innovative solutions based on IoT and 5G have vast potential to change cities' transportation infrastructure. Introducing smart traffic lights, adaptive road signs, and traffic monitoring systems can significantly improve traffic management efficiency, reducing congestion, cutting greenhouse gas emissions, and increasing overall level of comfort for city residents.

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ECOSYSTEM MODEL OF THE CONCEPT OF INDUSTRY 5.0

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Annotation: The ecosystem model of the concept of Industry 5.0 provides for the integration of technologies of the fourth industrial revolution with a focus on the human factor and sustainable development. This model emphasizes collaboration between robots and humans, implementing artificial intelligence to improve productivity while maintaining ecological balance. It also envisages the creation of synergies between digital innovation and social needs, promoting the development of cyber-physical systems within the framework of sustainable production.

Keywords: Industry 5.0, ecosystem, concept.

The evolution of Industry 5.0 technologies differs from the digital revolution of Industry 4.0 in that it transforms human labor into a joint activity of robots and creative individuals in order to produce customized products and services that meet the tastes, wishes and financial capabilities of consumers. Theoretical and empirical studies by scientists [1–5] allow us to assert that Industry 5.0 is comprehensive and universal and has progressive development potential, that is, the ecosystem model of the concept of Industry 5.0 can be presented in Figure 1.



Figure 1 – Ecosystem of the Industry 5.0 concept

The methodology of Industry 5.0 as a relatively new direction has an interdisciplinary nature and
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