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# ANALYSIS OF POTENTIAL RISKS IN IMPLEMENTING A SMART CITY DEVELOPMENT PROJECT

*The potential risks associated with the implementation of a smart city development project, utilizing integrated digital technologies and data processing, are analyzed in the article. The main problematic aspects identified include technical difficulties, cybersecurity issues, legislative instability in the field of smart technologies, and insufficient integration between different systems and platforms. The reliability of smart city systems in emergencies is also discussed in the article, where serious consequences for citizens and city infrastructure could result from inadequate response. Additionally, challenges related to the dependence of smart cities on information technologies are highlighted, addressing potential network bandwidth limitations and the need for solutions to ensure the efficiency and availability of services. Ethical aspects are recognized as an important factor in the development and implementation of smart cities, particularly in establishing ethical standards for data usage and interaction with the public. The concept of a smart city index to assess the level of intelligence and resilience of cities in Ukraine is proposed in the article. It is comprised of two evaluation stages: digitization and conceptualization. The second stage measures citizens' quality of life, relations with authorities, environmental impact, and the city's role in the global city system. The analysis of recent publications in the field of smart technologies is also incorporated in the article, unresolved issues are identified, and the need for further research and legislative improvement is emphasized. The complexity of tasks related to the implementation of the smart city concept is highlighted, and the necessity of a systematic risk management approach to ensure sustainable and secure urban development is underscored.*

***Keywords**: smart city, smart technologies, risks, project, development, analysis, dynamics, trends, legislation, integration, cybersecurity.*

**Statement of the problem.** The seamless integration of smart city technologies faces a multitude of challenges that pose substantial barriers to progress. Critical issues include the lack of clearly established regulations and standards, vulnerability to potential cybersecurity threats, complex technical hurdles, and widespread legislative uncertainties. These formidable obstacles collectively hinder the effectiveness and efficiency of smart city projects, underscoring the need for a comprehensive and systematic approach to address and overcome these challenges. To advance smart city initiatives towards sustainable development and resilience, it is essential to navigate and resolve these complexities with a strategic and forward-thinking perspective.

**Analysis of recent publications**. The study of potential risks associated with the implementation of smart city development projects has been a focal point in the research efforts of both domestic and foreign scholars. Within the realm of smart technologies, there exists a notable enthusiasm for this subject, reflecting its significance, while simultaneously shedding light on the challenges in providing robust scientific support for this burgeoning field. One significant gap in the existing literature is the limited information available regarding the risks and unforeseen challenges that may emerge during the implementation of smart technologies in urban environments.

The execution of a smart city development project, aimed at integrating technologies and innovations to enhance the quality of life for citizens, necessitates a comprehensive analysis of potential risks. Numerous scholars have devoted their research to contemporary development issues and the effective implementation of smart technologies in urban settings. Particularly, some publications deserve special attention, written by Ratti C., Frenchman D., Pulselli R. and Williams S. [1], in their article, the authors discussed the concept of smart cities and how urban living transforming through the use of technology and data. The importance of considering the ethical and privacy implications of smart city technologies, and the need for citizen engagement in the planning and development of these initiatives was highlighted.

In the article "Strategies for Managing Risks in Smart City Development Projects", researchers Al Sharif R. and Pokharel S. [2] discuss the potential risks associated with implementing smart city development projects. They explore the concept of a smart city, which utilizes information and communication technologies to enhance the quality of life for citizens, promote economic development, and address transportation challenges. The study emphasizes the importance of smart mobility in achieving the goals of a smart city and highlights the need to consider various aspects such as human, environmental, social, cultural, energy, access, and information in order to improve the well-being of urban populations.

In their article "Concepts and problems of smart cities" [3], Holovko O., Matsiuk A., Yaskilka O. delve into the concept of "Smart City" and the potential challenges associated with its development. They emphasize the importance of technological innovations in information and communication technologies in improving city efficiency, and highlight the various factors that contribute to a smart city, including technological, economic, social, and institutional aspects. The authors noted that a modern smart city should not only be technologically advanced, but also prioritize the well-being and harmony of its citizens.

They also address the challenges related to governance, economics, mobility, environment, people, and quality of life in the context of creating a smart city. Additionally, the study explores the factors influencing the development of the smart economy and mobility in cities, as well as the need to address issues such as infrastructure deficits, economic instability, inequality, governance challenges, and social cohesion. The authors also emphasize the importance of addressing social issues such as unemployment, housing, healthcare, and crime in order to improve the quality of life in smart cities.

All the experts mentioned in the fields of urban design, sustainability, and technology are notable for their significant contributions to analyzing the potential risks connected with the development of smart cities. Despite the growing interest in smart city technologies, the analysis of potential risks in the implementation of smart city development projects has not received sufficient attention in the existing literature. This underscores the relevance and importance of the present study, aiming to fill this gap and contribute to a more comprehensive understanding of the challenges and risks inherent in the pursuit of smart city initiatives.

**Unresolved parts of the problem.** The lack of clear regulatory frameworks for the use of smart technologies in cities and the absence of standards to ensure compatibility among different systems and platforms remain unresolved challenges. Additionally, there is a recognized need for further research on the impact of smart technologies on citizens' lives and the economy, as well as in developing effective mechanisms for stakeholder interaction. These issues continue to pose significant technological risks in the implementation of smart city projects.

**The purpose of the article is** to identify potential risks in implementing smart city development projects and provide insights on how to enhance their efficiency while minimizing negative consequences. Additionally, to provide a comprehensive overview of the current efforts and progress in addressing the lack of regulatory frameworks and standards for smart technologies in cities, and also examine any developments in research and stakeholder interaction in this area.

**The research methodology.** Methodology employed in this study encompasses a rigorous analysis of academic literature, incorporating an in-depth review of scholarly publications that elucidate the intricacies of risks and challenges associated with the implementation of smart city projects. The methodology entails a comprehensive statistical data analysis, involving the examination of data derived from executed smart city projects in diverse regions or countries to discern prevalent and distinctive risks. The research further engages in precedent analysis, scrutinizing both successful and unsuccessful instances of smart city technology implementation to delineate specific risk scenarios and their ramifications. A discerning trend and innovation analysis form a critical component, involving the scrutiny of contemporary trends and innovations in the realm of smart technologies and their consequential impact on associated risks.

**Research findings.** In order to offer a thorough examination of the ongoing initiatives and advancements in addressing the need for meticulous analysis, considering a diverse range of influencing factors to ensure the sustainable and secure implementation of technologies, it is essential to explore the definition and implications of the term "Smart

City". The term "Smart city" is characterized by ambiguity and is employed in literature and research by various scientists and experts. Distinct approaches and emphases are expressed in the definitions provided by modern researchers in the field of "smart city." In the perspective of Andrienko A. [4], the "smart city" is regarded as the expansion of digital technology utilization to optimize the management of shared resources and mitigate environmental impact, aiming to deliver contemporary and highly sought-after public services. Olenych P. [5] highlights that a smart city transcends mere numerical aspects, portraying it as an ecological space designed to offer convenient services, ensuring comfort and safety for both residence and work. According to Shea S. [6], a smart city is defined as a municipality employing information and communication technologies to enhance operational efficiency, disseminate information to the public, and elevate public services and citizen well-being.

Notwithstanding variations in phrasing, researchers unanimously assert that the fundamental objective of a smart city is to enhance the city's functions and foster economic growth. This is achieved by leveraging smart technology and data analysis to ameliorate the citizens' quality of life. Moreover, the researchers underscore that the efficacy of a smart city is not solely contingent on the quantity of technologies employed but is, in fact, determined by the effectiveness of their application in addressing specific challenges and enhancing the overall well-being of citizens.

Upon scrutinizing the provided formulations, it is discerned that a smart city is characterized as an urban setting where integrated digital technologies and data converge to enhance citizens' quality of life, optimize resource utilization, facilitate efficient governance, and foster sustainable urban development. The essence of a smart city lies in pioneering solutions that prioritize citizen comfort, streamline infrastructure management, and consider the social, economic, and environmental facets of urban life. As we delve into the preliminary examination of potential risks associated with the implementation of smart city development projects, our aim is to gain a deeper understanding of this innovative approach to urban planning and development.

The main tasks in this context are to:

- identify potential threats and risks associated with the integration of smart technologies in urban environments;
- analyze a wide range of factors that could impact the success and safety of implementing technologies in urban settings;
- study both, successful and unsuccessful cases of smart technology implementation to identify specific risk scenarios and their consequences.

The modern urban environment faces a lot of challenges, such as traffic congestion, environmental problems, unstable energy supply, etc. In the context of these challenges, a smart city is defined as the innovative use of information and communication technologies to improve the quality of life of citizens, optimize urban infrastructure, and ensure sustainable development [7,8].

Smart cities are characterized by the use of modern technologies, such as the Internet of Things (IoT), artificial intelligence (AI), data analysis, and automation, to create intelligent systems aimed at optimizing various areas of urban life.

Smart cities are not only a technological achievement but also a key element in solving modern urban problems [9]. The introduction of innovative technologies is aimed at increasing management efficiency, reducing environmental impact, and improving the quality of life of residents. In this context, by looking at the potential risks, we aim to identify and understand the challenges that may arise during the implementation of a smart city and provide approaches to solve them. This article will address key aspects such as cybersecurity, system reliability, citizen privacy, financial risks, and technology adoption in legacy city systems.

Cybersecurity is one of the most critical aspects of smart city implementation, as the use of the Internet of Things (IoT) and connected devices increases the risk of cyberattacks and information security breaches. With the introduction of sensors, cameras, measurement, and communication systems into all aspects of urban life, from transportation to water supply, there are a significant number of new access points for potential cyber criminals. It is important to consider the possibility of attacks on management and data collection systems, which can lead to the leakage of confidential information or even the unavailability of critical city services [10,11].

Ensuring the cyber security of a smart city requires a comprehensive approach. The increase in the number of access points due to the deployment of sensors and data collection systems creates serious threats of cyber attacks and the possibility of leaking confidential information.

To protect against these threats, it is important to implement advanced technical solutions such as identification systems, data encryption, and antivirus programs. Also, educating residents and staff about cybersecurity rules, as well as ensuring transparency in the use of security standards and regular software updates, play an important role. In addition, it is important to constantly monitor and update cybersecurity systems, as well as engage with cybersecurity experts for regular audits and penetration testing. Active engagement and continuous improvement are key to successful cybersecurity management in a smart city.

Next, it is important to focus on aspects related to the accessibility and reliability of the smart city. In connection with the rapid development of technologies, the concept of a "smart city" requires not only high technical abilities but also reliable systems that can work under any conditions. One of the main challenges in achieving availability and reliability is the system's response to emergencies. For example, in the event of emergencies such as natural disasters or technical failures, a smart city must ensure the uninterrupted operation of its systems. The real threat is the possibility of disruption of traffic, loss of power supply, or other similar events that can lead to serious consequences for citizens.

In this regard, it is important to implement backup power systems that can be automatically activated when the main power fails. For example, power generators, batteries, or other power sources that will ensure continuous operation of systems in any conditions. An additional point of risk is the significant dependence of the smart city on information technologies. In large cities, where the flow of information is huge, insufficient network bandwidth can be another problem. Providing the necessary bandwidth and infrastructure scaling to accommodate the growing number of connected devices is an

important aspect of ensuring the availability and efficient operation of a smart city. In the conclusion of this section, it should be emphasized that the implementation of a smart city should go hand in hand with measures aimed at ensuring its availability and reliability in any conditions, in particular in emergencies, which is determined by a deep analysis of risks and the development of effective strategies for their management.

Next, it is important to consider the topic of privacy and ethics in the field of smart city development, which has become an integral part of it, since the introduction of innovative technologies in the urban environment is accompanied by increased collection and processing of personal data of citizens [2, 12, 13].

It is extremely important to establish and adhere to ethical standards in the development and implementation of smart cities. For example, covers the ethical aspects of data use, and public relations, and defines the limits of transparency in the collection and use of information. Ensuring compliance with ethical standards helps maintain citizens' trust in implemented technologies.

One of the key aspects is the protection of the personal information of citizens. Smart city systems can collect a huge amount of personal data, starting from traffic in the city and ending with household habits. Special measures must be taken to ensure the confidentiality of this data and its secure processing. It is important to take into account the rights and interests of citizens when using the received data and avoid situations where the implementation of technologies violates the basic principles of justice and equality. Successful implementation of smart city projects requires not only technical competence but also consideration of ethical issues and privacy principles. The creation of clear norms and mechanisms for their implementation will be an important component for ensuring sustainable development and public trust in smart cities [14,15,16].

Delving into the financial aspect of a smart city development project, it is important to consider possible unforeseen costs that may arise during the implementation of the project. In particular, it is necessary to take into account that technological projects are often subject to changes during implementation, which can lead to an increase in budget volumes.

Delays can also cause additional costs. Most often, they are associated with technical or organizational difficulties, as well as with economic or political factors that can affect the progress of the project. It is important to establish effective financial monitoring strategies to avoid budget overruns and ensure the stability of financial flows. Planning and forecasting financial risks should become an integral part of the project management strategy. To achieve this goal, it can be useful to install a cost control system that allows you to monitor expenses in real-time and detect any deviations from the budget in time. In addition, the development of mechanisms for assessing and managing financial risks will help ensure the financial sustainability of the project. Special attention should also be paid to mechanisms for responding to unforeseen circumstances. Financial flexibility and the ability to quickly adapt to changes in the situation will help reduce the negative impact of financial risks on the course of the project. The general idea is not only to anticipate possible financial risks but also to actively implement strategies that reduce their impact

and ensure the effective use of financial resources throughout the entire period of implementation of the smart city development project [17].

The Smart City Index for Ukrainian cities plays a vital role in assessing the levels of smartness and sustainability in urban areas. However, the lack of a universally accepted definition for a smart city and a standardized measurement methodology poses a challenge to the significance of this index, both in Ukraine and globally. Due to the absence of a singular framework, various studies have emerged, each evaluating specific aspects of the smart city concept. These assessments include the Transparent Cities Ranking by Transparency International, the Comfort Rating of Ukrainian Cities published by Focus magazine, the survey conducted by the International Republican Institute, and the Cultural and Creative Capital Index for Ukrainian Cities presented by CEDOS, among others.

In the Ukrainian context, where a universally accepted definition of a smart city is lacking, there is a proposal to divide the assessment process into two distinct stages. The initial stage revolves around creating favorable conditions for the conceptual formation of smart cities, while the subsequent stage is dedicated to the actual measurement of sustainability and smartness within these urban centers [19]. This two-stage approach aims to offer a comprehensive and nuanced comprehension of the intricate dynamics associated with the progression of Ukrainian cities towards smart and sustainable models. By recognizing the multifaceted nature of smart city assessments, this proposed framework seeks to encompass the diverse perspectives and dimensions essential for evaluating urban development in the Ukrainian context.

The initial phase, characterized as technical and organizational support, encompasses granting citizens access to devices and the Internet. Furthermore, the government is tasked with ensuring access to open data, enabling the development of intelligent applications and solutions aimed at enhancing the quality of life. This aspect can be called as "Digitization" (Fig.1).

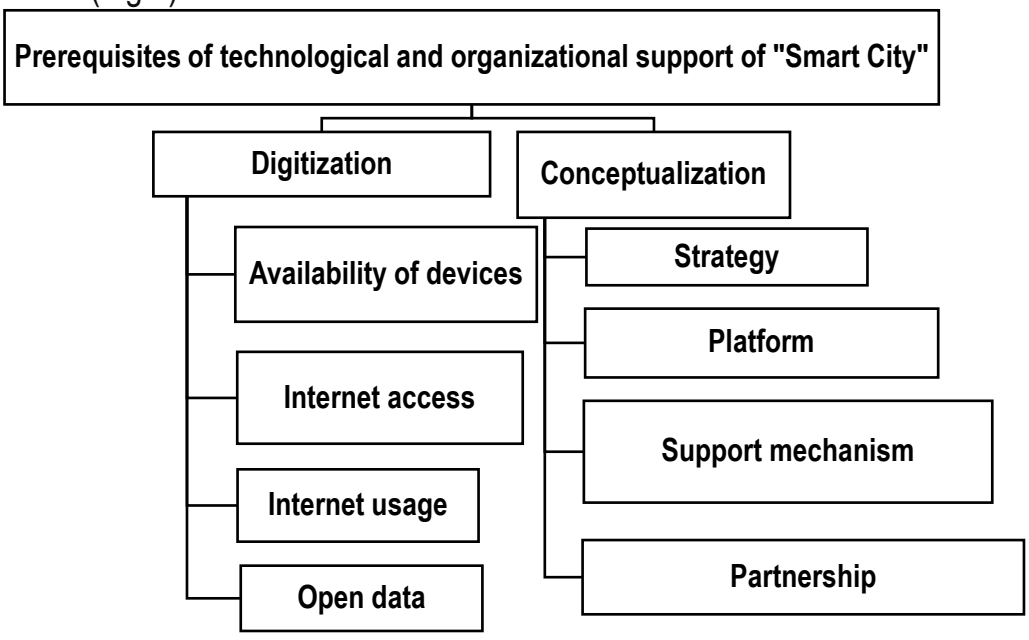



**Fig. 1. Prerequisites of technological and organizational support of "Smart City"**
Source: compiled by the authors based on [18].

The subsequent phase entails the formulation of a smart city strategy, the establishment of communication and feedback platforms, and the creation of a governing body. This facet can be denoted as "Conceptualization" (Fig.1).

During the second stage, the assessment of cities as a living environment, considering their friendliness to people, sustainability, and smartness, is conducted. This evaluation is structured according to the following criteria: ***1.Quality of life of citizens***, this aspect ensures the fulfillment of basic human needs (housing, food, clothing, health, etc.), provides opportunities for personal development (education, business creation, job opportunities), and facilitates intellectual enrichment (culture, travel opportunities, etc.). ***2. The citizen and the government,*** this dimension evaluates the quality of relationships between citizens and authorized bodies, considering factors such as transparency, service availability, accountability, and the civic activity of residents. 3. ***The citizen and the environment***, this dimension encompasses the safety of citizens and their impact on the environment. 4. ***A city in a system of cities***, this criterion measures the attractiveness of a city to individuals who do not reside there, including its appeal to tourists or businesses and the exchange of knowledge and experience with other cities. The index is computed by aggregating the components using an arithmetic average (Fig. 2).

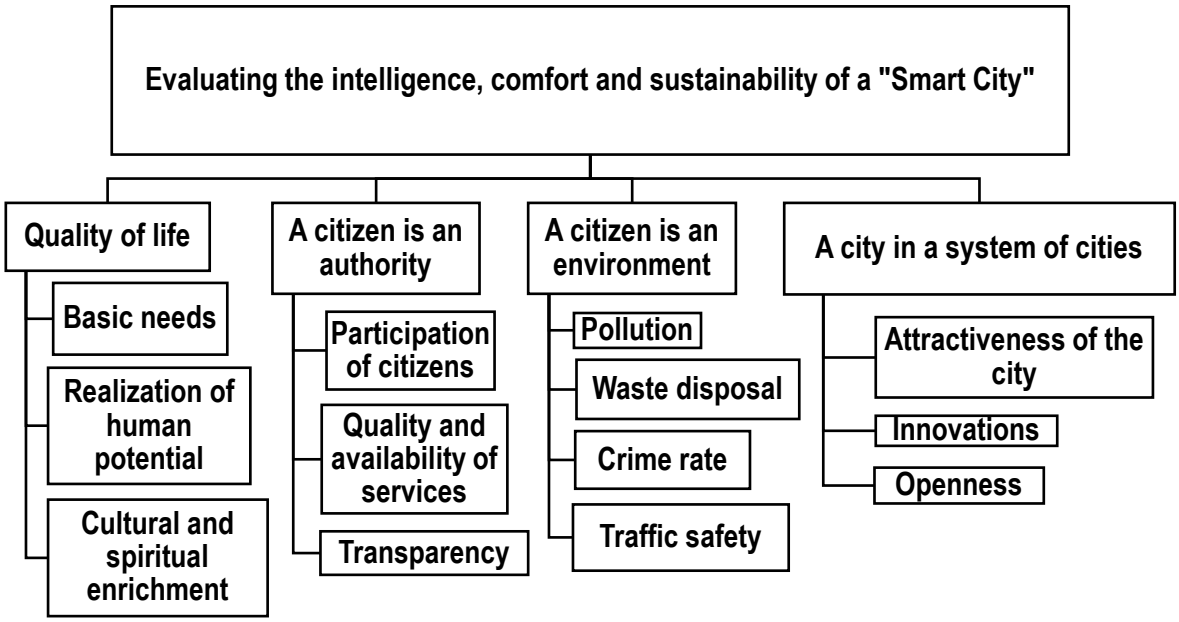



**Fig. 2. Evaluating the intelligence, comfort and sustainability of a "Smart City"**
Source: compiled by the authors based on [18]

As depicted in (Fig. 1) and (Fig. 2), the structure of the "Smart City" comprises diverse components evaluating various aspects of a city's intelligence. The significance of these components within the structure of a "Smart City" can fluctuate depending on the city's goals, priorities, and the perspectives of the evaluating entity. Nonetheless, certain components are frequently regarded as pivotal for the overall success and sustainability

of a smart city. The relative importance of these components may vary according to the specific needs and challenges of each city. An inclusive approach that considers multiple factors often contributes to the development of a more resilient and sustainable smart city.

The examination of the smart city structure (Fig. 1), (Fig. 2) a systematic methodology for formulating and updating **the Smart City Index** (Table 2) can be offered, facilitating meaningful comparisons and insights into a city's progress in smart development over the specified period.

**Table 2**

**The Smart City Index as of 2019 – 2023**

| Smart Cities | 2019 | 2020 | 2021 | 2023 |
|---|---|---|---|---|
| Zurich | 1 | 1 | 1 | 1 |
| Oslo | 2 | 2 | 2 | 2 |
| Canberra | - | - | - | 3 |
| Copenhagen | 4 | 3 | 5 | 4 |
| Lausanne | - | - | 4 | 5 |
| London | 3 | 10 | 3 | 6 |
| Singapore | 10 | 7 | 7 | 7 |
| Helsinki | 6 | 5 | 9 | 8 |
| Geneva | 7 | 8 | 6 | 9 |
| Stockholm | 9 | 9 | 11 | 10 |
| Hamburg | - | 6 | 8 | 11 |
| Beijing | 30 | 22 | 17 | 12 |
| Abu Dhabi | 16 | 14 | 12 | 13 |
| Prague | 8 | 4 | 10 | 14 |
| Amsterdam | 11 | 11 | 13 | 15 |
| Seoul | 23 | 20 | 18 | 16 |
| Dubai | 13 | 19 | 14 | 17 |
| Sydney | 22 | 32 | 29 | 18 |
| Hong Kong | 38 | 34 | 33 | 19 |

*Source: compiled by the authors based on [19]*

In 2023, the top echelons of the SCI include 20 cities, they are listed in the table 2. As seen (table 2) some cities did not have an Index of Smart Cities. The absence of Hamburg, Lausanne, and Canberrain in this Index in 2019 as well as in 2020-2021 may be due to the lack or limited availability of data for Hamburg used in compiling the index. Sometimes, certain cities may be excluded due to insufficient or low-quality information or did not provide sufficient information about their achievements in this direction.

This sample of cities uses a rating that takes into account several criteria, such as quality of life, economic development, security, infrastructure, technological development, and others. Ranking information is provided for 2019, 2020, 2021 and 2023. In 2019 the leader was Berlin (not shown in the table provided), but in 2023 the leader is Zurich.

The change in the ranking leader can be the result of several factors. Economic development plays a key role, and Zurich's impressive development in this direction makes it attractive for business and investment. Improving the quality of life, including infrastructure and social spheres, can further raise the city's prestige. Leadership in

innovation and the use of advanced technologies make Zurich a center for progressive solutions. Improvements in governance systems and public order can also influence the perception of a city and increase its ranking.

The rankings up to 2023 have been adjusted according to the new methodology for uniformity and comparability. The index of smart cities refers to an index measuring the level of development of smart cities. This index represents a comprehensive measure reflecting the degree of adoption and implementation of smart technologies and solutions in cities over the specified period. In the context of the smart city index, one can expect it to encompass various components such as communication infrastructure, digital technologies, city management, sustainability, and others, measured and evaluated for each city. The index can provide a comparative analysis between cities, offering insights into which cities are most successful in implementing smart solutions. The period from 2019 to 2023 was used to track the dynamics of changes in the development of smart cities over time, allowing an assessment of the effectiveness of adopted strategies and approaches to creating intelligent cities. The reasons behind these changes could be attributed to various factors, including technological advancements, urban development initiatives, and changes in smart city policies.

Striving to actualize the concept of a smart city entails confronting diverse challenges and potential risks that necessitate meticulous examination and strategic oversight. In (table 3) the analysis of these challenges in detail is presented. This table serves as a valuable resource for comprehending the intricate nature of challenges encountered in the execution of smart city initiatives and offers insights into sustainable and effective approaches for addressing these issues.

**Table 3**

**Comprehensive chart of potential challenges (risk) in implementing a Smart City. Development initiative and mitigation strategies.**

| № | **Challenges (risk)** | **Solutions (Development Initiative and Mitigation Strategies)** |
|---|---|---|
| **1** | **2** | **3** |
| 1 | Cyber security | Implementation of powerful encryption systems for data protection. |
| | | Regular cyber security audits and assessments to identify potential weaknesses. |
| | | Organization of training and training for personnel on cyber security issues. |
| | | Two-factor authentication systems to limit unauthorized access. |
| | | Development and implementation of strict security policies and network activity monitoring. |

| 1 | 2 | 3 |
|---|---|---|
| 2 | Availability and reliability | Installation of backup power systems to avoid interruptions in power supply. |
| | | Development and implementation of disaster recovery mechanisms for important urban systems. |
| | | Regular technical inspections and maintenance of systems to ensure their reliability. |
| | | Application of monitoring systems and automated control over the state of city infrastructure. |
| 3 | Privacy and ethics | Development and implementation of clear rules for the collection and use of personal information. |
| | | Organization of educational campaigns for the public on issues of privacy protection. |
| | | Application of data anonymization to reduce the risks of privacy violations. |
| | | Conducting regular reviews and audits regarding compliance with ethical standards of technology use. |
| 4 | Financial risks | Careful financial planning and reserving funds for unforeseen situations. |
| | | Regular budget reviews and corrections in case of changes in the cost of work or delays in project implementation. |
| | | Finding alternative sources of funding or partners to reduce financial pressure. |
| 5 | Implementation of technologies in old systems | Carrying out a comprehensive technical examination of existing systems. |
| | | Development of a modernization plan and phased introduction of new technologies. |
| | | Use of modern technical solutions that are maximally adapted to existing structures and infrastructure. |

Source: compiled by the authors.

Table 3 provides the fundamental facets of urban technology and innovation management within the framework of developing and executing a smart city project. The examination offers an intricate analysis of measures across five primary domains encompassing cybersecurity, reliability and availability, privacy and ethics, financial planning and risk, and technology integration into legacy systems. With due consideration to the delineated measures, it is evident that the smart city development project meticulously addresses crucial aspects to ensure optimal efficiency, safety, and sustainability within the contemporary urban landscape.

**Conclusions.** The results of the study made it possible to identify potential threats and risks associated with the integration of smart technologies in urban environments; analyze

a wide range of factors that could affect the success and safety of implementing technologies in urban settings; and identify specific risk scenarios and their consequences.

Therefore, the analysis of potential risks in the implementation of the smart city development project revealed a thorough study and consideration of a wide range of possible difficulties and dangers. Identified and analyzed key aspects such as cyber security, systems reliability, privacy, and financial risks are an important basis for effective project management. The analysis of the technical survey and modernization of existing systems emphasizes the need for adaptation to modern technologies while taking into account the limitations and specifics of existing infrastructures.

In general, the conducted risk analysis makes it possible to determine strategies and measures to minimize the negative impact and ensure the successful implementation of the smart city development project in the conditions of the modern technological environment.

**Prospects for further research.** There is an open opportunity for further research. Analysis of risks in implementing a smart city requires a detailed examination of specific cases, considering successes and failures, to gain valuable insights. Assessing the economic and social impacts of smart city projects is essential for a comprehensive understanding of their contribution to the lives of urban residents. Researching the legal framework regulating smart technologies in cities can identify key shortcomings and contribute to the implementation of effective regulations. Future research could focus on developing standardized risk assessment models that take into account various aspects of smart cities. Studying the ethical aspects of data use and confidentiality in smart cities can provide necessary frameworks for technology implementation while maintaining community trust.

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## АНАЛІЗ ПОТЕНЦІЙНИХ РИЗИКІВ ПРИ РЕАЛІЗАЦІЇ ПРОЕКТУ З РОЗВИТКУ СМАРТ-МІСТ

*У статті проведено аналіз потенційних ризиків при реалізації проекту з розвитку смарт-міста з використанням інтегрованих цифрових технологій та обробки даних. Основними проблемними аспектами виявлено технічні труднощі, проблеми з кібербезпекою, нестабільність законодавства в сфері смарт-технологій, а також недостатню інтеграцію між різними системами та платформами. Також було обговорено проблему надійності систем смарт-міст у випадку екстрених ситуацій, де недостатня реакція може призвести до серйозних наслідків для громадян та інфраструктури міста. Додатково, в статті висвітлено виклики, пов'язані з залежністю смарт-міста від інформаційних технологій, яка може призвести до обмежень у пропускній здатності мережі та потребує вирішення для гарантування ефективності та доступності послуг. Етичні аспекти також визнаються як важливий фактор у розробці та впровадженні смарт-міст, зокрема, встановлення стандартів етики для використання даних та взаємодії з громадськістю. У статті була запропонована концепція індексу смарт-міста для оцінки рівня розумності та стійкості міст України. Було визначено два етапи оцінювання: перший - цифровізація, що включає забезпечення доступу громадян до пристроїв та Інтернету, та другий - концептуалізація, який передбачає стратегію розумного міста та наявність відповідального органу. На другому етапі вимірюються якість життя громадян, відносини з владою, вплив на довкілля та роль міста в глобальній системі міст. Стаття також містить аналіз останніх публікацій в галузі смарт-технологій, визначає невирішені проблеми та вказує на потребу в подальших дослідженнях та вдосконаленні законодавства. Узагальнюючи, у статті висвітлено комплексність завдань, пов'язаних із впровадженням концепції смарт-міста, і підкреслено необхідність системного підходу до управління ризиками для забезпечення сталого та безпечного розвитку міського середовища.*

***Ключові слова:*** *смарт-місто, смарт-технології, ризики, проект, розвиток, аналіз, динаміка, тенденції, законодавство, інтеграція, кібербезпека.*