ISSN 0323-9004

Economic Archive

Svishtov, Year LXXIX, Issue 2 - 2026

D. A. TSENOV ACADEMY OF ECONOMICS
SVISHTOV

Икономически архив
Година LXXIX книга 2 - 2026
Year LXXIX, Issue 2 - 2026
Economic Archive

Editorial address:
2, Emanuil Chakarov street, Svishtov 5250
Prof. Teodora Dimitrova, PhD – Editor-in-Chief
☎ (++359) 631 66 201
Elena Petkova – technical secretary
☎ (++359) 631 66 201, e-mail: nsarhiv@uni-svishtov.bg
Blagovesta Borisova – computer graphic design
☎ (++359) 882 552 516, e-mail: b.borisova@uni-svishtov.bg
Milena Aleksandrova – computer graphic design
☎ (++359) 888 303 402, e-mail: m.aleksandrova@uni-svishtov.bg

In 2026, the journal will be printed using a financial grant from the Scientific Research Fund – Agreement № KP-06-NP7-66 from Bulgarska Nauchna Periodika – 2026 competition.

ECONOMIC ARCHIVE

YEAR LXXIX, BOOK 2 – 2026

CONTENTS

STRATEGIC BENEFITS FROM SMART CITY INITIATIVES – A ROAD MAP FOR INTELLIGENT TRANSFORMATION

Assoc. Prof. Mihail Chipriyanov, PhD
D.A. Tsenov Academy of Economics – Svishtov
E-mail: *m.chipriyanov@uni-svishtov.bg*

Abstract: The article presents an analysis of urban system modernization, focusing on smart strategies and solutions for sustainable development. The study is based on a three-stage methodology comprising theoretical analysis, strategic modeling, and an empirical assessment of the Bulgarian context. The research presents the smart city as a flexible organizational model. Emphasis is placed on the academic discussion regarding the process of policy integration in this field, the role of public-private partnerships, and the opportunities for overcoming infrastructure and workforce deficiencies at national level. The findings provide a rationale for a transition toward smart cities, a process based on achieving a balance between economic development, social equity, and environmental sustainability.

Key words: smart city, intelligent city, sustainable development, urban development, strategic management, digital transformation.
URL: nsarhiv.uni-svishtov.bg
DOI: https://doi.org/10.58861/tae.ea-nsa.2026.2.02.en
JEL: O18, Q01.

* * *

1. Introduction

The smart city concept initially emerged as a strategic response to new urban challenges, particularly climate change, resource scarcity, and demographic issues. Of particular importance is the so-called demographic pressure on public services. In this context, the smart city concept extends well beyond the scope of technological innovation, defining a relatively new model of urban organization. This model is much more strongly oriented toward sustainability and social engagement. Academic literature defines the smart city

as a complex system for managing the "urban metabolism" (Harrison, 2010, 54 (4)). The integration of critical infrastructure components (Hall, 28 September 2000) and the implementation of information and communication technologies (Services, 2010) aim to enhance resource allocation and utilization.

Tracing the evolution of smart city definitions reveals a gradual expansion of their scope beyond infrastructure alone. Increasingly, the focus has shifted toward improving citizens' quality of life (Nam, 2011) and investing in human and social capital (Caragliu, 2011, 18 (2)). In this regard, it should be emphasized that the successful development of such systems requires a clear governance framework as well as the coordinated participation of a wide range of stakeholders (Dameri, 2013, 11 (5)). Within the Bulgarian academic context, a smart city is assumed to be an (eco)system of interconnected elements (Атанасова, 2021, стр. 15) (Веселинова, 2017, 10). Such a system enables citizens to allocate their time and resources more efficiently, thereby improving both individual well-being and the overall functioning of the urban environment (Василев, 2020 (5), стр. 28) (Веселинова, 2018, 1) (Luchkov, 2024).

From a governance perspective, a smart city can be defined as a highly efficient system. In strategic terms, it integrates information and communication technologies (ICT) with the city's physical and social infrastructure.

At the core of the smart city are technologies such as the Internet of Things (IoT), artificial intelligence (AI), and big data analytics. Together, these technologies transform the city into a form of "self-learning platform." The process of digitalization should not be viewed as an end in itself. According to leading scholars in the field, it would be more appropriate to regard it as a means of achieving "energy democracy" (Norouzi, 2022, 167) and enhancing citizen participation (T. Nam, June 12 - 15, 2011). The smart city is increasingly becoming a "social laboratory" for new forms of collaboration (A. Meijer, 2016, 82(2)) in which sustainability can be viewed as a dynamic balance between technological progress and social equity.

This article is a part of a broader monographic study devoted to the challenges and development of smart cities. The object of the study is the implementation of smart strategies and solutions, while its subject are the governance mechanisms involved and the intended socio-economic outcomes. The aim of the article is to present a scientific discourse regarding the capacity of smart technologies to generate additional economic, social, and environmental value based on an analysis of the existing theoretical and empirical findings.

The article begins with a review of the conceptual foundations and strategic modeling approaches related to smart cities. It then proceeds to its core section - a scientific discussion based on empirical evidence drawn from Bulgarian practice. Due to space limitations, the emphasis is placed on synthesizing the findings rather than providing a detailed presentation of the data. These

findings serve as a justification for the authors' proposed solutions for the digital and environmental transformation of cities.

2. Theoretical and empirical basis

Defining and developing a contemporary scientific thesis in the field of smart cities requires a synthesis of theoretical concepts and practical realities. This section of the article brings to the forefront the findings of the monographic study conducted by the authors. These findings are systematized within the following methodological framework: conceptual approaches, strategic modeling, and empirical validation (in the context of Bulgarian conditions).

The described logical structure was chosen in an effort to demonstrate the transition from the theoretical understanding of the smart city concept to the identification of specific governance solutions with significant potential, taking into account the characteristics of the Bulgarian administrative and social environment. We believe that this approach will enable the research to go beyond mere description and provide an analytical foundation for the formulation of sustainable policies. In doing so, we are guided by the understanding that the smart city represents a comprehensive solution and, respectively, a response, to the demographic, economic, and environmental challenges of the present day.

2.1. Theoretical framework

The first stage of our research substantiates the proposition that the contemporary smart city is not limited to its technological dimension. In our view, it is more accurately described as a driver of holistic synergy, where digital solutions serve as instruments for realizing the concept of sustainability. In this context, technological progress is "legitimized" through its integration into the United Nations Sustainable Development Goals (SDGs). In other words, technology functions as a means of optimizing resource utilization and significantly reducing the adverse impact of human activities on the urban environment.

The theoretical analysis leads to the conclusion that evaluating the effectiveness of urban systems requires a comprehensive approach. Quantitative assessments based solely on indicators such as the level of sensor network development or data transmission speed are insufficient. Instead, integrated systems of indicators are needed. The objective should be to implement multidimensional indicator frameworks capable of combining technological capacity with social equity and the well-being of urban residents. In essence, the smart city should evolve as a flexible and integrated system, where digital transformation is viewed in relation to its capacity to enhance the human

dimension while simultaneously strengthening the environmental integration of the urban territory. To successfully implement such a model, a transition toward a comprehensive strategy is required - one that combines technological innovation with effective resource management and the promotion of social sustainability.

2.2. Strategic modelling

The second stage of our research focuses on rethinking the existing strategic models that have been applied to date. The general conclusion in this regard is that the principal deficiency of contemporary urban planning stems from its fragmented nature. This is often referred to as a fragmented or sectoral approach and is characterized by an uncoordinated implementation of various public policies. Consequently, this leads to the so-called "institutional inertia" associated with inefficient resource allocation. Suggestions for adoption of a model of horizontal integration are increasingly put forward as the need for a new strategic model of smart development is becoming increasingly apparent. Such a model is considered a means of overcoming the existing sectoral barriers by means of functional synergies among the different sectors including energy, urban mobility, public utilities, etc. We believe that achieving this level of interconnectedness in urban systems management could be an effective solution. The expected outcome is the establishment of the essential mechanism that could generate substantial added value for the urban community.

Within the strategic discourse, we would also like to emphasize the importance of public-private partnerships (PPPs) and, more specifically, the need to reconsider their role in this process. The empirical evidence indicates that PPPs can play a much greater role than merely serve as a source of financing if they are used as technology transfer vehicles. Moreover, they provide access to innovation-related expertise that is often lacking within municipal administrations. We believe that in this role PPPs can establish an environment for cooperation characterized by shared risk and joint development of solutions. Under current conditions, PPPs represent a reliable mechanism for ensuring the long-term sustainability of smart city initiatives.

2.3. Empirical analysis

The third (empirical) stage of our research includes collection of primary data through interviews and an analysis of this data. Broadly speaking, its objective was to identify the most significant aspects of the transition toward smart cities in Bulgaria. It should be noted that several successful initiatives have been identified within the country. Overall, however, the empirical evidence reveals the absence of a comprehensive strategic approach for establishing a

systematic framework and an integrated methodology for smart city development. The data also reveals some substantial disparities among cities in terms of technological fragmentation, indicating uneven levels of digital infrastructure, technological readiness, and implementation capacity across different urban areas.

The analysis of the empirical data collected revealed several challenges that hinder efforts to accelerate the transition toward smart development, which can be summarized as follows:

- First, the most significant challenge are the infrastructure constraints resulting from the varying levels of development of the existing digital infrastructure. Modernization and the transition to high-quality 5G networks are undoubtedly an imperative for the real-time operation of intelligent systems. At the same time, our research identified a signifycant shortage of expertise and qualified personnel. There is a noticeable lack of specialists possessing interdisciplinary competencies. This constitutes a serious barrier to improving the efficiency of managing complex urban projects that involve advanced technologies and urban planning.
- From an institutional point of view, the empirical findings reveal a certain degree of regulatory uncertainty. The study identified the absence of unified standards for the interoperability of various smart solutions. This situation generates systemic risks that quell investors' interest. Furthermore, considering the financial mechanisms provided through European Structural Funds, the findings indicated insufficient capacity for their strategic utilization.
- In addition, multidisciplinary assessments highlight challenges related to the social dimension of smart city development. A relatively low level of citizen engagement was observed, along with a limited public understanding of the benefits associated with digitalization. This clearly points to the need for a reconsideration of current communication strategies. It is widely acknowledged that the transition toward sustainability remains difficult to achieve without active community participation and the development of public trust in technological innovations.

The key empirical findings outlined above will serve as a starting point for the next section of this article. It presents a scientific discussion and the authors' proposals for further improvement.

3. Scientific discussion

At the outset, we should assume that smart strategies have the potential to make a significant contribution to overcoming the challenges identified above. These may also be described as systemic challenges. More specifically, the

implementation of smart strategies can improve resource management and enhance access to services. The effects may be observed across three interrelated dimensions:

- Social transformation – improving quality of life;
- Economic modernization – enhancing competitiveness;
- Environmental sustainability – creating a cleaner environment.

In our view, it is precisely within this framework (social, economic, and environmental) that the benefits of intelligent urban innovations should be analyzed and ultimately translated into tangible outcomes.

3.1. Social transformation

Undoubtedly, a modern city cannot function and develop sustainably without the participation of its citizens. This is often referred to as social inclusion, particularly in relation to citizens' involvement in the process of digitalization. Smart cities are clearly committed to implementing advanced technological solutions. In our view, the key consideration should be to ensure that these solutions are both accessible and beneficial to all social groups. Digital inclusion should therefore become a strategic priority (Table 1). It is important to explain the rationale behind this argument: a lack of access to digital technologies can further exacerbate the existing social inequalities. Conversely, failure to address this issue carries a significant risk of leading to the technological exclusion of entire social strata.

Table 1

Aspects of digital inclusion in smart cities

Key indicator	Description	Possible solution
Access to technologies	Provision of basic access to internet.	Free Wi-Fi in public areas.
Digital literacy	Development of technological skills across all social groups.	Digital skills training.
Accessibility	Adaptation of electronic services to meet the needs of people with disabilities and special requirements.	Universal design.
Social inclusion	Inclusion of vulnerable groups in decision-making processes.	Online consultations for the general public.
Ciber security	Ensuring the security and reliability of digital services.	Data protection policy.

Source: author's interpretation.

Moreover, smart cities act as a catalyst for transforming the urban environment, including through implementation of technologies aimed at enhancing public safety and protecting public health (Table 2).

Table 2

Technological solutions supporting people's safety and health

Smart solution	Function	Realization
Video analytics	Automatic hazard notification	Traffic and crime risk control.
Intelligent lighting	Improved visibility.	Energy efficient lighting in parks and residential areas.
Pollution sensors	Hazardous impact monitoring.	Screens with information about the levels of pollution.
Emergency platform	Coordination of data from various systems.	Emergency response command centers.
Heat maps	Geographic analysis of crime and pollution risk areas.	Software for localization of the problem areas and allocation of resources.

Source: author's interpretation.

Analysis and Strategic Significance. The implementation of solutions and systems such as those outlined above would allow for a more proactive approach to urban management. In our view, the principal benefits can be expected in the following aspects:

- prevention of threats;
- improvement of the public health microclimate;
- strengthening citizens' trust in public institutions and urban governance;
- design and implementation of highly efficient governance models.

The direct outcome of the implementation of these measures would be an improvement in the quality of life and the creation of what may be considered an intelligent community, ultimately resulting in a social transformation.

3.2. Stimulating Economic Dynamics and Innovation-Driven Growth

The next important consideration stems from the overarching objective of improving the management of resources and services. Efforts should be directed toward enhancing operational efficiency. But what does this mean in practice? The solution should be sought in the following fields:

- management of energy resources;
- optimization of transportation systems;
- waste management;
- monitoring of public services;
- Big data processing in strategic planning.

As progress is achieved in these areas, smart cities will gradually acquire the characteristics of dynamic platforms. Such platforms foster growth among businesses, technology hubs, and educational institutions. This concept is illustrated in more detail in Figure 1.

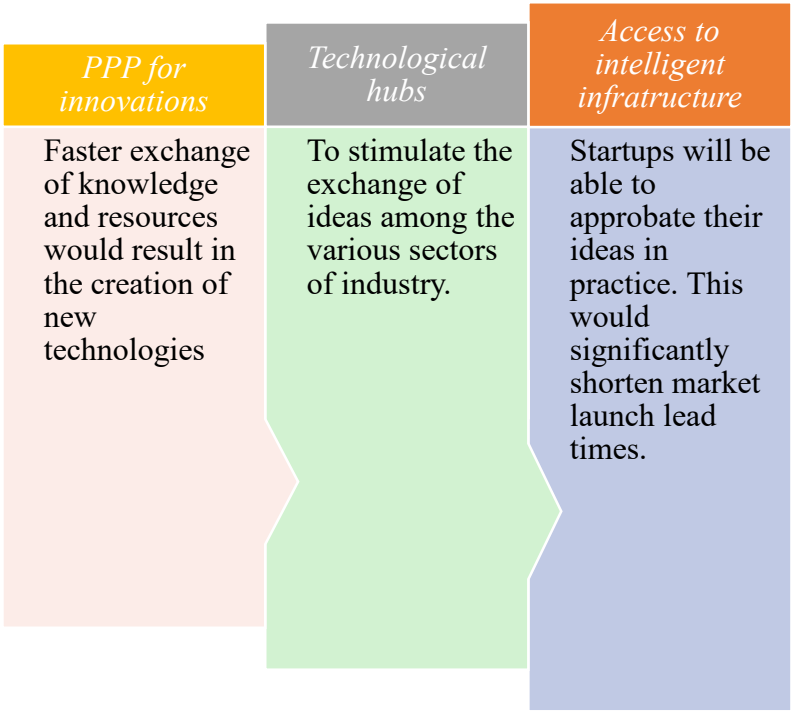

Figure 1. ***Evolution of the business ecosystem in smart cities (Source: author's interpretation)***

Smart solutions implemented within urban infrastructure and across various industries are positive factors for attracting and increasing investments. One particularly effective approach would be the establishment of smart industrial zones. Thus, smart cities can create a favorable environment for the development of new technologies and industries (Table 3).

Table 3

Intelligent industry development factors

Factor	Description
Connectedness	Development of platforms for communication and collaboration among economic agents.
Intelligent infrastructure	Implementation of advanced technological solutions in transportation, energy, and other sectors.
Green technologies	Promotion of industries that prioritize the use of renewable energy sources (RES).
Digital governance	Application of digital solutions in the management of industrial processes.
CE	Transition to production and commercial cycles that reduce waste and encourage the reuse of resources.

Source: author's interpretation.

This concise structural development framework will facilitate the attracttion of high-tech and innovation-driven industries to smart cities.

3.3. Achieving environmental sustainability

The optimization of water resource utilization and waste management is of critical importance for achieving environmental sustainability. This can be achieved by means of intensive implementation of smart technologies (Table 4). Innovations such as smart grids, automated systems, and Internet of Things (IoT) devices are increasingly being put into practice. We firmly believe that these efforts should be guided by a strategic approach. Such an approach offers the greatest potential for reducing the environmental impact of modern cities while simultaneously enhancing their economic efficiency.

Table 4

Technological solutions for water resource utilization and waste management

Technology	Description	Benefits
Smart Water Supply and Sewerage Networks	Real-time monitoring.	Reduced water leakages. Improved service.
Automated containers	Sensor-equipped containers.	Cost reduction.
Recycling systemse	Automated recycling solutions.	Sustainable use of resources.

Source: author's interpretation.

It is important to note that all of the measures and initiatives outlined above are fully aligned with the Sustainable Development Goals (SDGs).

4. Findings and conclusion

The comprehensive research and the subsequent analysis enable us to formulate several key findings that correspond to the authors' position regarding the development of large cities in Bulgaria and may be summarized as follows:

- Achieving a conceptual shift. A transition is taking place from viewing the city as a "technological hub" to understanding it as a "social organism." The concept of a smart city clearly extends beyond the mere implementation of modern infrastructure. Physical infrastructure is enhanced through digital technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and Big Data, which provide continuous feedback between the urban environment and governance systems. The key contribution lies in shifting the focus from technological capabilities alone toward improving social outcomes.
- Understanding integration as a driver of sustainability. Empirical evidence demonstrates that the highest added value is generated through synergy and interaction among different sectors. Local authorities should therefore concentrate their efforts on integrating energy systems, mobility, and resource management into a unified strategic platform.
- Democratizing governance through digitalization. This involves a collaborative improvement of the urban environment, where citizens become active participants in the development of the urban system. Smart technologies should serve as a key driver of this process. Digital access should be recognized as a democratic right and regarded as a safeguard against social exclusion.
- Strategic orientation and long-term vision. Below, we outline a conceptual roadmap for the development of Bulgaria's major cities. It is based on a phased approach with a clear time horizon as follows:
  - Short-term horizon (toward 2030). Priority should be given to the digitalization of core urban services. In this regard, the deployment of 5G networks and the establishment of a centralized urban data platform are of particular importance.
  - Medium-term horizon. The objective should be the full electrification of public transportation, combined with the widespread deployment of smart energy grids. These efforts should be supported by flexible and adaptive regulatory frameworks.

- Long-term horizon. The goal should be the complete transformation of the urban system into one that is fully integrated, flexible, autonomous, and self-learning. Such a system should be capable of proactively modeling and responding to emerging climatic and/or technological crises.

In conclusion, it should be pointed out that technological progress alone cannot guarantee the success of smart cities in Bulgaria. The key factor is the existence of strong political commitment, accompanied by a willingness to pursue administrative modernization. Only through such efforts can the desired dynamic balance among the three principal objectives - economic competitiveness, environmental integration, and social justice - be achieved The proposed roadmap may be regarded as a working document that outlines an ongoing process of strategic learning, in which technological advancement serves people and promotes societal well-being.

References

Атанасова, А. (2021). *Интелигентните градове - нова възможност за планиране и развитие на градската инфраструктура (автореферат на дисертационен труд).* София: СУ "Св. Климент Охридски".

Василев, В. О. (2020 (5)). „Умните градове“ – от добри практики към устойчиви резултати. *Годишник на департамент „Администрация и управление”*, 22-42, https://doi.org/10.33919 yamd.20.5.2.

A. Meijer, M. B. (2016, 82(2)). Governing the smart city: a review of the literature on smart urban governance. *International Review of Administrative Sciences*, 392-408, DOI:10.1177/0020852314564308.

Caragliu, A. D. (2011, 18 (2)). Smart cities in Europe. Journal of Urban Technology. *Journal of Urban Technology*, 65–82. https://doi.org/10.1080/10630732.2011.601117.

Dameri, R. (2013, 11 (5)). Searching for Smart City definition: a comprehensive proposal. *International Journal of Computers & Technology*, 2544. https://doi.org/10.24297/ijct.v11i5.1142.

Hall, R. E. (28 September 2000). The vision of a smart city. *2nd International Life Extension Technology Workshop.* Paris, France: 1-6.

Harrison, C. E. (2010, 54 (4)). Foundations for smarter cities. *IBM Journal of Research and Development*, 350-365.

Luchkov, K. (2024). Issues and Challenges Facing Renewable Energy Sources in Achieving Sustainable Development. *Conference Proceedings of the 16th International Scientific Conference „E-Governance and E-Communications"* (pp. 152-156). Sofia: TU - Sofia.

Nam, T. &. (2011). Conceptualizing smart city with dimensions of technology, people, and institutions. *Proceedings of the 12th annual international conference on digital government research* (pp. 282-291, https://doi.org/10.1145/2037556.2037602). Association for Computing Machinery.

Norouzi, F. H. (2022, 167). A review of socio-technical barriers to Smart Microgrid development. *Renewable and Sustainable Energy Reviews*, Article 112674, https://doi.org/10.1016/j.rser.2022.112674.

Services, I. G. (2010). *Smarter cities for smarter growth: How cities can optimize their systems for the talent-based economy.* Retrieved from www.ibm.com: https://www.ibm.com/ibm/responsibility/smarter-cities/Smarter_Cities_Brochure_ENG.pdf

T. Nam, T. P. (June 12 - 15, 2011). Conceptualizing smart city with dimensions of technology, people, and institutions. *Proceedings of the 12th Annual International Conference on Digital Government Research*, (pp. 282-291, DOI:10.1145/2037556.2037602, 282-291). College Park, MD, USA.

Атанасова, А. (2021). *Интелигентните градове - нова възможност за планиране и развитие на градската инфраструктура (автореферат на дисертационен труд).* София: СУ "Св. Климент Охридски".

Василев, В. О. (2020 (5)). „Умните градове“ – от добри практики към устойчиви резултати. *Годишник на департамент „Администрация и управление”*, 22-42, https://doi.org/10.33919 yamd.20.5.2.

Веселинова, Н. (2017, 10). Стратегически аспекти в политиката на България за е-управление. *e-Journal VFU*, 1-17.

Веселинова, Н. (2018, 1). Роля на лидерството за разработване на качествена, надеждна и устойчива инфраструктура за подпомагане на икономическото развитие и благосъстоянието на хората. *ИЗВЕСТИЯ на Съюза на учените - Варна. Серия Хуманитарни науки.*, 48-51.

Assoc. Prof. Mihail Chipriyanov, PhD is a faculty member in the Department of Strategic Planning at D. A. Tsenov Academy of Economics – Svishtov. He currently holds the position of Head of the Department. His **research interests** focus on strategic planning and management, public administration, and project management.