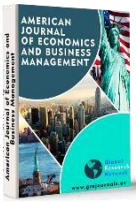

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Article

The Future of Smart Cities: Global Trends and Emerging Challenges in Urban Development

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Abstract: This article explores the evolving concept of "smart cities" and the global trends shaping their development. It examines the potential benefits of smart city initiatives, including improved resource efficiency, quality of life, and environmental sustainability. However, the article also acknowledges the challenges associated with smart city development, such as digital inequality, privacy concerns, and potential security risks.

Keywords: Smart City, Urban Development, Technology, Sustainability, Infrastructure, Digital Transformation, Citizen Participation, Data, Efficiency, Quality Of Life, Challenges, Risk

1. Introduction

The concept of "smart cities" is rapidly gaining traction as cities around the world embrace technology to improve urban living. Smart cities leverage information and communication technologies (ICT) to optimize resource allocation, enhance public services, and promote sustainable development. While smart cities offer the potential for increased efficiency, improved quality of life, and environmental benefits, significant challenges remain. Concerns include digital inequality, privacy protection, and potential security vulnerabilities. This article explores the global trends in smart city development, analyzes the potential benefits and drawbacks, and highlights the importance of citizen participation in ensuring equitable and sustainable implementation.

Analysis of the literature on the topic. The concept of 'smart city' was first mentioned in the scientific literature in 1994, and in the following years the interest in this topic in the scientific community has been steadily growing. In 1997, the smart city concept was reflected in the activities of the United Nations in the adoption of the Kyoto Agreement aimed at achieving the Sustainable Development Goals, and then in the activities of the European Commission, EU-Network, OECD and other international organisations. Nevertheless, neither a single definition of the concept of 'smart city' nor a single approach to the practical application of the concept of 'smart city' has appeared in the scientific literature [1].

If at the initial stage of development of the Smart City concept researchers paid more attention to the information and technological component of urban development, then later the work focused on taking into account the needs of citizens, involving them in the process of city management and sustainable urban development. J. Kolding and S. Bartel's study shows that most of the publications in the Scopus database are on topics related to technology or social factors in urban development[1].

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The concept of digital twin city is a relatively new but rapidly developing research area that offers innovative approaches to management, planning and decision making in urban systems. This concept has been discussed in the world scientific literature since the 1980s. Much of the research focuses on the issues of the smart urbanisation model: its nature, opportunities, risks and conditions for successful implementation. Analysis of a wide range of resources shows the main advantages and limitations associated with the implementation of such projects.

An analysis of publications on the topic of smart cities suggests that early works are mainly oriented towards a technocratic approach. They include P. Hall, B. Boverman, N. Odendaal, H. L. Patridge's works are included. In the works of these authors, information and communication technologies are considered mainly as a means of improving the quality of life in cities and increasing the efficiency of urban infrastructure management[1].

With the development of the smart city concept, criticism of the technocratic approach from the scientific community has increased, and in this regard, works that take into account the role and role of the citizen in the implementation of the smart city concept, as well as ethical, economic and environmental problems associated with the functioning of smart cities began to appear. This group of publications includes R.Hollands, R.Giffinger, R. Dameri and others[1].

Richard Florida, a renowned researcher of creative classes and urbanisation, links the development of Smart Cities to the attraction of talented people and the creation of innovative ecosystems. His works such as' the rise of the creative class ' (2002) emphasise the importance of culture and quality of life for the development of Smart Cities[2].

All the reviewed works identify modern IT technologies as a mandatory characteristic of a Smart City, the use of which is aimed at improving the quality of life in cities. As noted in a number of works, the most important characteristic of a smart city is the community, which gives citizens access to a wider range of services, participation in city management and unlocking their creative potential.

Thus, the smart city concept is based on such structural elements as traditional infrastructure and IT technologies, creative economy and efficiency, social infrastructure of the city, as well as sustainable development.

2. Materials and Methods

A mixed-methods approach was adopted for this study on "digital twins in smart city strategic planning." Theoretical methods included literature analysis, comparative analysis, systems analysis, analysis and synthesis, and scientific abstraction. Empirical methods included document analysis and data analysis.

3. Results

In the modern world, the concept of 'smart city' is gaining popularity, positioning itself as a catalyst for economic growth and improving the quality of life of the population.

The European Commission Smart cities and Communities provides the following definition: 'Smart cities are systems of people using and interacting with flows of energy, materials, services and finance to stimulate sustainable economic development and ensure a high quality of life. These flows and interactions become 'smart' through the strategic use of information and communication infrastructure and services in urban planning and management to meet the social and economic needs of society.'

Adam Greenfield presents this definition about smart cities: 'The whole idea remains disconcertingly poor in terms of specifics. Anyone who tries to understand where it is going, whether out of abstract interest or as applied to specific localised issues, finds that there is very little solid information available, mostly press releases from self-interested companies and flattering blog articles'.

A smart city can contribute to economic growth through the following factors:

1. Smart infrastructure: the use of advanced sensors, high-speed networks and data analytics ensures monitoring and efficient allocation of resources.
2. E-Governance and digital services: online platforms for interaction with citizens, digital payment systems and e-government services simplify administrative processes, reduce bureaucratic inefficiency and corruption.
3. Innovation and entrepreneurship: the availability of advanced technologies, research institutions and collaborative spaces fosters a culture of creativity and experimentation.
4. Sustainable practices, cost savings and economic sustainability: energy efficient buildings, renewable energy and optimized waste management systems reduce environmental footprints and save money.
5. Tourism and quality of life: improved urban planning, cultural initiatives and quality of life contribute to a thriving tourism industry.

The concept of smart cities, based on the idea of grid cities that emerged in the 1960s, became particularly relevant in the late 1980s due to the development of information technology.

The smart growth of digital cities has been named by the California Smart Communities Institute as smart city. The term smart city is used to refer to cities that contain technical, social and environmental elements, in other words it is a virtual, information, environmental and knowledge city personified in one city.

The characteristics of smart cities are defined by their ability to combine economic growth, social well-being and environmental sustainability. This is achieved through innovative solutions in areas such as transport, resource management, urban planning and social services.

An economy based on comprehensive modernisation and innovative development of all sectors on the basis of new generation technologies, ensuring high added value, energy efficiency, formation of a quality environment and social stability is called Smart Economy. In order to develop the smart economy, it is important to create a smart environment. ‘A smart environment is an electronic environment capable of receiving and utilising information about the surrounding reality, as well as adapting to the needs of users to improve their interaction with the external environment.

Smart Government is an innovative approach to governance that combines the physical and digital worlds to proactively engage with citizens and deliver personalised services. This process includes:

1. Obtaining up-to-date information about the authorities' activities.
2. Participation in decision-making and discussion of public issues.
3. Promptly receiving public services electronically.

The goal of creating smart cities is to form a sustainable urban environment that ensures a high quality of life for the population while minimising environmental impact. Smart cities make it possible to:

1. optimise urban management by increasing the efficiency of local authorities and improving the provision of public services.
2. Promote environmental sustainability by reducing carbon dioxide emissions, improving air and water quality, and developing environmentally friendly technologies.
3. Stimulate economic growth by creating conditions for the development of innovative industries and improving the city's competitiveness.
4. To improve the quality of life by providing access to quality educational, medical and cultural services, as well as creating a comfortable and safe urban environment.

5. Ensure social cohesion through the development of an inclusive society where every resident has equal opportunities.

Table 1 - Components of smart cities

№	Component	Description
1	Physical City:	The physical city functions as a material platform for the introduction of intelligent systems and technologies that ensure effective management of urban processes and improve the quality of life of the population. It represents the basis for the creation of a smart city.
2	The possibility and capability of innovation:	Innovation activities in a smart city can be represented as an ecosystem characterised by a cyclical process involving the collection and analysis of data on the urban environment, the development of innovation strategies and their subsequent implementation. This process ensures continuous improvement of urban infrastructure and enhances the quality of life of the population.
3	Embedded Software system	The embedded applications and systems resulting from the innovations cover a wide range of areas including developing intelligent functions, supporting educational processes, fostering collaboration and optimising marketing communications.

Source: compiled by the author on the basis of data [3]

The world experience of creating smart cities is divided into two types: construction of new cities and modernisation of existing ones. The process of transforming cities into smart cities requires the creation of an integrated system that includes a developed information and communications technology infrastructure, effective organisation of urban life and active participation of residents able to interact with digital services.

Table 2 - Difference between smart transformation and smart city creation

Smart city transformation	Creating smart cities
The process of smart transformation of urban infrastructure is the building of a sustainable and solidarity-based urban development system with the involvement of all stakeholder groups and actors in the process. The request for smart transformation comes mainly from citizens and urban communities. The main goal of smart transformation is to create incentives for socio-economic development of the city and improve the quality of life of citizens. Urban infrastructure is undergoing intensive innovative renewal aimed at meeting modern social needs.	Creating smart cities is an innovative approach to urban development based on the principles of New Urbanism. The request for the creation of smart cities comes mainly from business communities and other stakeholders. The main goal of creating smart cities is the formation of innovative growth points of the region's economy with a new quality of life. An autonomous and resistant to negative impacts and threats hard infrastructure of the city is formed, as well as soft infrastructure that expands opportunities for the production and consumption of innovations.

Source: Compiled by the author based on the studied materials

The ‘smart’ city of the XXI century is not primarily the infrastructure, but the data used. It is data that acts as a link between the city and citizens, where the city should be considered not as a part of physical reality, but as a kind of centre of life activity of the urban community. On this basis, a smart city can rightfully be considered a type of platform solution. Like other data-driven platforms, smart cities-platforms allow to reduce costs and create benefits for their users, which is the key objective of a smart city.

‘Smart’ cities create not only benefits, but also all kinds of challenges, problems and risks - environmental, physical, socio-economic and political.

First of all, the development of smart cities will inevitably have a negative impact on the labour market, as progressive automation and robotisation will significantly reduce the demand for manual labour. This raises the issue of attracting skilled labour, which is also subject to the dynamics of supply and demand. The benefits of a smart city cannot be evenly distributed among all social groups, which raises the problem of maintaining the unity and solidarity of local communities. Residents of smart cities will become more vulnerable to cybercrime. Last but not least, maintaining the resilience of digital infrastructure and smart systems:

Serious problems could arise if smart infrastructure, for whatever reason, fails to fulfil its assigned tasks or is subjected to targeted malicious interference. In other words, there are many issues that need to be addressed in the development of smart cities.

Table 3 - Barriers to smart city transformation

1	Political and legal	- excessive centralisation of public administration reduces the initiative of cities; - political conditions are not favourable for long-term planning of smart development; - the political situation limits the use of international experience; - protectionism of domestic developers reduces incentives to compete with world leaders; - linkage of management plans to political cycles and specific officials.
2	Institutional	- the lagging behind of the system of norms and standards (especially in construction) from the world ones reduces incentives to introduce smart technologies; - limited powers of local authorities; - low level of trust among economic actors prevents agreement on smart city transformation; - over-regulation of economic actors; - local shortage of managerial skills and qualified personnel; - municipal unitary enterprises have practically no incentives to implement smart technologies.
3	Economic	- insufficient budgetary allocations for local authorities; - high project risks of long-term investment programmes; - lack of business models for the introduction of smart technologies; - inconvenience of public-private partnership mechanism for business; - consumers' limited economic incentives to adopt smart technology;

		- high costs of maintenance and renewal, dependence on the supplier of technical solutions; - excessive costs of information security and risks for return on investment.
4	Social	- 'why do we need them?' or insufficient public awareness of smart technologies and their capabilities; - difficulty in engaging citizens in smart city initiatives; - low social level of the population of cities often leads to rejection of smart technologies (including vandalism and theft); - underdeveloped methods of grassroots democracy.

Source: Compiled by the author based on the studied materials

Other challenges should be noted. From a technological perspective, the ubiquity of smart systems will marginalise and displace more traditional methods of problem solving. Modern technologies can improve economic welfare, reliability of the urban environment, quality of human life and even contribute to the establishment of social justice, but all this is not achievable without appropriate changes in public policy, a developed institutional environment, competent government institutions - and all these conditions must be met simultaneously. This should not be ignored. Nor should we ignore the fact that smart cities built on different technological and business models may become a source of other societal threats in addition to the above-mentioned ones - threats to infrastructure sustainability, protection of personal information, spread of extremism, polarisation of society, spread of false information and Internet addiction.

Table 4 - Positive and negative effects of smart cities

Positive effect	**Negative effect**	**Uncertain or both positive and negative effects at the same time**
- Increase in resource efficiency; - increased productivity; - increased density; - improved quality of life; - environmental impact; - increased accessibility of resources to the entire population; - reduced cost of providing services; - increased transparency regarding the use and condition of resources; - reduction in the incidence of crime; - increased mobility;	surveillance, personal information; risk of collapse (complete blackout) in case of power supply system failures; increased vulnerability to cyberattacks.	impact on culture and sentiment in the city; - changes in the nature of urban living.

- decentralised climate-friendly energy production and consumption; - decentralised production of goods; - Improved adaptability to climate change and reduced negative environmental impact; - increased access to education; - faster/quicker access to markets; - increased employment rates; - 'smarter' e-government.		

Source: compiled by the author based on the Fourth Industrial Revolution by Klaus Schwab

After analysing the Smart City Transformation Risk matrix, it is possible to conclude that the transformation of cities into 'smart' cities carries a number of significant risks. The technological component is vulnerable to cyberattacks, system failures and data breaches. The political and legal spheres may face restrictions on freedoms, breaches of privacy and abuses of power. Economic risks include financial costs, investment uncertainty and a deepening digital divide. Social impacts can take the form of changes in the cultural environment, psychological discomfort and social exclusion of certain groups of people. To effectively manage these risks, a comprehensive solution is needed to improve security, ensure transparency and protect human rights.

Table 5 - Smart City Transformation Risk Matrix

Technological	**Political and legal**	**Economic**	**Social**
E-waste risk of increasing volumes of waste due to the rapid obsolescence of technology and its utilisation;	- risk of virtual crime development;	- movement of the shadow economy to the Internet (via anonymous networks like TOR) ;	Digital inequality: 1. Deprivation of part of the population of access to information services;
			2.Inability to express their opinions with the help of ICTs.
'Information rubbish': the amount of data transmitted over networks data is doubling every two years. Internet of Vulnerabilities. Risks of hacking into smart city systems.	- increasing political, social, economic costs of cyberattacks and data breaches. data breaches;	- cryptocurrency makes commodity-money exchange anonymous. (ordering murders, buying drugs and weapons, prostitution);	- information elitism

- 'Hole in the toaster' vulnerabilities in smart home appliance software lead to denial of service due to virus attacks.	- privacy violations in the use of urban monitoring systems monitoring;		- The possibility of increased social exclusion of certain groups of the population due to the digital divide.
- Risks of hacking of personal (especially medical) smart devices.	- personal data can be disclosed by indirect methods (collection of dirt by analysing mass media and social networks);		- psychological discomfort of a smart city;
- The risk of scaling problems from leaks due to the fact that the smart city network brings all personal data together.	- use of personal data for criminal purposes;		- the problem of dilettantism in public participation in the management of the of the city.
	- restrictions on human rights and freedoms when using digital identity;		
	- The threat of a one-time disconnection from all public services in the event of a failure;		
	- failures in copyright protection.		

Source: Compiled by the author based on the studied materials

By 2050, around 60 per cent of the world's population will live in smart cities. Cities will be reinvented with advanced technology, modern connectivity and improved infrastructure, and by the end of 2026, the fastest growing application area for smart cities will have a compound annual growth rate of 24.4 per cent. Automated and responsive lighting systems are an effective part of smart solutions to make cities smarter. Automobiles are part of smart cities, and by the end of 2030, nearly 2/3 of traffic will come from these vehicles. The main target of 50 per cent smart cities should be the Climate Change Mitigation Strategy by 2025. Globally, 93 per cent of smart cities are at an early stage of development[5].

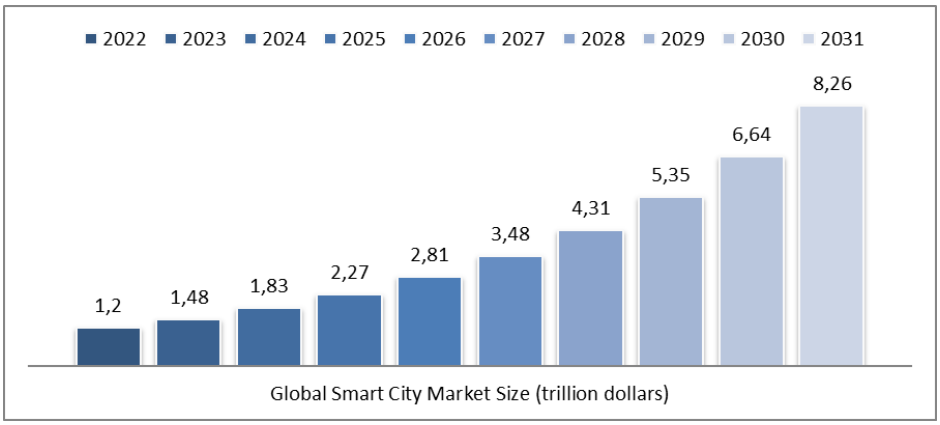

Figure 1 Global Smart City Market Analysis: Market Share by Technology from 2022 to 2032

Source: compiled by the author on the basis of data [5]

By 2024, smart cities worldwide will generate $1.83 trillion in revenue, a 21 per cent increase from last year. The global smart cities market is expected to reach $2.57 trillion by 2025, growing at a CAGR of 22.9 per cent. The market will grow to 2024 ($1.83 trillion), 2025 ($2.27 trillion), 2026 ($2.81 trillion), 2027 ($3.48 trillion), 2028 ($4.31 trillion), 2029 ($5.35 trillion), 2030 ($6.64 trillion), 2031 ($8.26 trillion), and 2032 ($10.27 trillion) in the coming years.

Globally accelerating urbanisation is driving the demand for smart cities. In addition, government R&D funding programmes have led to a diversification of demand for this group of technologies. The development of new types of ICT - Internet of Things, artificial intelligence, big data, cloud computing - along with high speed internet connectivity has made the smart city concept more realistic and contributed to the development of the smart city industry as a whole. Availability of components and software solutions have played an equally important role in the development of the smart city technology market, which is expected to grow at a CAGR of over 20% throughout the forecast period.

The expected growth of the components segment exceeds even this figure. The development of electric vehicle and renewable energy technologies can also be expected to contribute to the proliferation of smart cities.

Thus, the emergence of technological innovations increases the expected benefits of urban infrastructure owners. Recognising this, most governments around the world have shown a steadily growing interest in investing in smart cities, while remaining committed to accelerating economic growth and improving the living standards of city dwellers.

In recent years, global spending on the internet of Things (internet of things) in smart cities has reached $1.1 trillion.

The adoption of artificial intelligence in smart city applications is expected to grow at a CAGR of 30.6 per cent by 2025[5].

As of 2023, Europe is the leading region with 170 smart city projects[5].

In the US, 66% of cities are currently investing in various technologies for Smart Cities projects[5].

In the era of high-tech urban living, China is also planning to build more than 500 smart cities by the end of 2023[5].

An analysis of the IMD-2024 Smart Cities Index shows that the leading positions in the ranking are quite stable. Zurich confirmed its status as the smartest city, while Oslo and Canberra retained their positions in the top three. Geneva showed significant progress, moving up five positions[6].

According to an analysis of the IMD Smart City Index 2023 report, the chart above illustrates the rankings of smart cities around the world.

Table 5 - IMD Smart City Index 2023 report

City	Smart City Rank 2024	Smart City Rating 2024	Structure 2024	Technology 2024	Smart City Rank 2023	Change
Zurich	1	AAA	AAA	AA	1	—
Oslo	2	AA	AA	A	2	—
Canberra	3	AA	AAA	A	3	—
Geneva	4	AAA	AAA	AA	9	+5▲
Singapore	5	A	A	A	7	+2▲
Copenhagen	6	AA	AA	A	4	-2▼
Lausanne	7	AA	AA	A	5	-2▼
London	8	A	BBB	AA	6	-2▼
Helsinki	9	AA	AA	A	8	-1▼
Abu Dhabi	10	BB	BB	BB	13	+3▲
Stockholm	11	A	A	A	10	-1▼
Dubai	12	BB	BB	BB	17	+5▲
Beijing	13	BB	BB	BB	12	-1▼
Hamburg	14	BBB	BBB	BBB	11	-3▼
Prague	15	A	A	A	14	-1▼
Taipei City	16	A	BBB	A	29	+13▲
Seoul	17	AA	BBB	AAA	16	-1▼
Amsterdam	18	A	BBB	A	15	-3▼
Shanghai	19	BB	BB	BB	25	+6▲
Hong Kong	20	A	BBB	AAA	19	-1▼
Munich	21	A	A	A	20	-1▼
Sydney	22	A	BBB	A	18	-4▼

City	Smart City Rank 2024	Smart City Rating 2024	Structure 2024	Technology 2024	Smart City Rank 2023	Change
Vienna	23	AA	AA	A	28	+5▲
Tallinn	24	BBB	BBB	BBB	32	+8▲
Riyadh	25	B	B	B	30	+5▲
Reykjavik	26	BBB	A	BBB	26	—
Luxembourg	27	BBB	A	BB	45	+18▲
Wellington	28	BBB	A	BBB	23	-5▼
Bilbao	29	BBB	BBB	BB	27	-2▼
Brisbane	30	A	A	A	24	-6▼
Auckland	31	BBB	BBB	A	22	-9▼
Ljubljana	32	BBB	BBB	A	47	+15▲
Melbourne	33	A	BBB	A	31	-2▼
New York	34	BB	BB	BB	21	-13▼
Madrid	35	BB	BB	BBB	37	+2▲
Boston	36	BBB	BBB	A	34	-2▼
Berlin	37	BBB	BBB	BBB	33	-4▼
Warsaw	38	BBB	BBB	BBB	44	+6▲
Gothenburg	39	A	BBB	A	36	-3▼
Brussels	40	BBB	BB	A	35	-5▼
Rotterdam	41	A	BBB	A	41	—
The Hague	42	A	BBB	A	43	+1▲
Vancouver	43	BBB	BBB	BBB	42	-1▼
Dusseldorf	44	BB	BBB	B	38	-6▼

Source:[6]

The top 10 cities ranked for smart cities are Zurich (1st), Oslo (2nd), Canberra (3rd), Copenhagen (4th), Lausanne (5th), London (6th), Singapore (7th), Helsinki (8th), Geneva (9th) and Stockholm (10th).

London (UK) ranks first globally in terms of 5G towers, green infrastructure and charging stations for electric vehicles, as well as major investments in 6g, IoT and artificial intelligence, and is creating a more developed Smart City[5].

Despite the overall stability of the rankings, Taipei's notable jump of 13 places, marking its debut in the top 20, is a testament to its rapid progress in smart city initiatives. At the same time, several North American cities, including Washington, D.C., Los Angeles and New York, dropped in the rankings. This change is attributed to growing concerns about infrastructure and safety - areas in which European cities, especially those that outperform others on quality of life indicators, have shown marked improvement.

The report introduces the concept of 'SCI Champions', which recognises cities that consistently excel in smart city development. This elite group, which includes Zurich, Oslo, Singapore, Abu Dhabi, Beijing and Seoul, has maintained its position in the rankings through a combination of a predictable socio-economic landscape and innovative strategies to improve quality of life.

New York-another developed city with well-developed infrastructure that includes the deployment of meters and water quality sensors, as well as LPWAN (low-power Wide Area Network) technology.

France has four important smart cities - Paris, Lille, Lyon and Marseille.

Tokyo, Japan, includes many smart cities, including energy efficient buildings and many advanced technology systems such as advanced traffic management with cameras and sensors. By the end of 2050, Tokyo plans to reduce greenhouse gas emissions by 80 per cent[5].

Berlin, Germany, is known as the birthplace of energy-efficient smart streetlights, which, along with an efficient transport system, ensure sustainability and real-time traffic. By 2050, this smart city wants to achieve carbon neutrality.

Washington's smart city strategy aims to create a resilient and Equitable urban environment and stimulate economic development in 2023[5].

By the end of 2050, about 47% of the population is expected to be 65 years of age or older. Thus, the smart city has effectively digitised the healthcare system so that people can buy everything from a single shop[5].

As global cities navigate an increasingly volatile landscape marked by health crises, climate change and geopolitical tensions, the report highlights that urban centres need to prioritise sustainability, digital transformation and inclusiveness. The ongoing digitalisation of municipal services, combined with initiatives to bridge the digital divide, is necessary for cities to remain technologically advanced, people- centred and accessible to all residents

4. Conclusion

Conclude the study connecting back to the aim of the study.

The concept of a smart city has undergone a substantial evolution. From its initial focus on technological solutions, it has transitioned into a more comprehensive approach that considers social, economic, and environmental aspects of urban life.

Smart cities offer numerous benefits, such as improved quality of life, economic growth, and sustainable development. However, they also present certain risks, including digital inequality, cybersecurity threats, and data privacy concerns.

Successful Development of Smart Cities Requires a Comprehensive Approach, Including:

1. Developing a clear strategy and vision for the future of the city.
2. Investing in digital technologies and infrastructure.
3. Actively involving citizens and various stakeholders.
4. Addressing social and environmental challenges.
5. Ensuring cybersecurity and protecting personal data.

With the understanding that cities are diverse and have varying needs, the following recommendations can be made for fostering smart city growth

1. Develop a unified methodology for evaluating smart cities. A universal set of indicators should be developed to compare different cities and track progress in their development.
2. Create international platforms for sharing experiences and knowledge. Such platforms will enable cities to learn from each other and accelerate the adoption of innovations.
3. Develop a regulatory framework for smart cities. Clear rules and standards should be established to promote technological development and protect citizens' rights.
4. Invest in education and improve digital literacy. This will empower citizens to actively participate in the creation and development of smart cities.
5. Establish competence centers for smart city development. These centers could provide consulting services to cities, develop new technologies, and conduct research.
6. Strengthen cooperation between government, business, and civil society. Joint efforts will enable more effective problem-solving and the achievement of set goals.

In spite of the challenges, smart cities are poised to drive the digital economy and become the most rapidly expanding segment of the global digital market. Anticipating a robust growth of 22.9% per year, the global smart cities market is poised to reach a valuation of $2.57 trillion by 2025. This expansion will be accompanied by a significant increase in smart homes, with their number projected to exceed 300 million by the end of 2026. This means that the future of the digital economy lies in smart cities, which are on the verge of becoming an integral part of our daily lives.

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