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POLISH SMART CITY – THE LEGAL PERSPECTIVE

Abstract

The intensification of urbanisation processes, involving the population moving to cities, poses a challenge to public administration. The smart city concept can help to challenge them. In this article, I will introduce its historical background and doctrinal approach to it as well perform research on it from a legal science perspective. I will analyse the international, EU and national regulations constituting the legal basis for the establishment of smart cities in Poland. In the search for a legal definition of the concept of a smart city, I will refer to the methods of measuring it. I will attempt to answer the question of whether we can currently discuss Polish smart cities at all. I will also state the *de lege ferenda* proposals for the definition of a smart city.

KEYWORDS

smart city, legal definition, Polish smart city

SŁOWA KLUCZOWE

miasto inteligentne, definicja prawna, polskie miasto inteligentne

INTRODUCTION

As the United Nations data¹ indicates, currently 55% of the world's population lives in urban areas. This number is projected to rise to 66% in 2050. This trend is also present in Poland, ranking among the 30 countries out of 233 in which the rural population will decrease by at least 30% between 2018 and 2050.² In Poland in 2022, approximately 60% of the population lived in cities.³ The movement of people to cities constitutes a major challenge for public administrations managing cities. The literature⁴ indicates that social, resource and climate challenges are emerging as a result of the intensification of urbanisation processes. This phenomenon therefore raises problems and challenges on many levels, such as development, transport, public services and climate.

One urban planning concept – the smart city concept (in Polish, *miasto inteligentne*) – can provide a remedy for this situation. Its defining feature is the prevalence of innovation processes, a sequence of activities leading to the production of new and improved products, processes and systems. In such an urban environment, various systems work together: energy management, water, greenery, lighting, traffic, sewerage, resident services, monitoring and Internet of Things.

A smart city is defined as a city managed with the support of technology, where residents and businesses have simple access to all the information and por-

¹ United Nations, *Department of Economic and Social Affairs, World Urbanization Prospects. The 2018 Revision*, New York 2019, p. XIX, <https://desapublications.un.org/publications/2018-revision-world-urbanization-prospects> (accessed 15 March 2023).

² United Nations, *Department of Economic and Social Affairs, World Urbanization Prospects. The 2018 Revision*, New York 2019, pp. 46-47, <https://desapublications.un.org/publications/2018-revision-world-urbanization-prospects> (accessed 15 March 2023).

³ Główny Urząd Statystyczny, *Ludność. Stan i struktura oraz ruch naturalny w przekroju terytorialnym w 2022 r. Stan w dniu 30 czerwca* (Statistics Poland, *Population. Size and structure and vital statistics in Poland by territorial division in 2022. As of 30 June*), Warszawa 2022, <https://stat.gov.pl/en/topics/population/population/population-size-and-structure-and-vital-statistics-in-poland-by-territorial-division-in-2022-as-of-30-june-2022,3,32.html> (accessed 15 March 2023).

⁴ A. Baranowska, D. Dylewski, *Warszawa – miasto inteligentne. Ocena poziomu wykorzystania technologii informacyjno-komunikacyjnych w ujęciu koncepcji smart city w m.st. Warszawa*, (in:) A. Hyrlik, D. Dylewski, S. Traczyk, *Miasta XXI wieku – wybrane zagadnienia*, Łódź 2021, p. 30.

tals they need.⁵ Synonyms for the term smart city are: intelligent city,⁶ knowledge city,⁷ creative city,⁸ sustainable city,⁹ digital city,¹⁰ or wired city.¹¹

As indicated in the doctrine,¹² the idea of the smart city involves a fundamental reorganisation of administration in public space. We are moving towards a public administration as an intelligent organisation.¹³ However, will we find a legal basis for the establishment of smart cities in the Polish legal system? What is the legal definition of a smart city? What is a smart city for the Polish legislator? How are smart cities being measured? Are smart cities even present in Poland? I will try to answer these research questions in my article, showing the concept of smart cities from a legal science perspective.

⁵ M. Ganczar, *Data Governance Act – wyzwania dla samorządu terytorialnego*, (in:) K. Małyśa-Sulińska, M. Stec Mirosław (ed.), *Wspólnotowy wymiar samorządu terytorialnego. Rzeczywistość a oczekiwania*, Wolters Kluwer Polska 2022; compare M. Muraszkiewicz, *Ku nowej utopii, ku inteligentnym miastom*, (in:) D. Gotlib, R. Olszewski (ed.), *Smart city. Informacja przestrzenna w zarządzaniu inteligentnym miastem*, Warszawa 2016, pp. 18–19.

⁶ C. Harrison, B. Eckman, R. Hamilton, P. Hartswick, J. Kalagnanam, J. Paraszczak *et al.*, *Foundations for Smarter Cities*, Journal of Research and Development 2010, Vol. 54 (4), pp. 350–365.

⁷ F.J. Carrillo, *Capital Cities: A Taxonomy of Capital Accounts for Knowledge Cities*, Journal of Knowledge Management 2004, Vol. 8 (5), pp. 28–46.

⁸ P. Hall, *Creative Cities and Economic Development*, Urban Studies 2000, Vol. 37 (4), pp. 639–649; R. Florida, *The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community, and Everyday Life*. Basic Books, New York 2002.

⁹ A. Sobol, *Inteligentne miasta versus zrównoważone miasta*, “Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach” 2017, No. 320, pp. 76–78.

¹⁰ G.S. Yovanof, G.N. Hazapis, *An Architectural Framework and Enabling Wireless Technologies for Digital Cities & Intelligent Urban Environments*, Wireless Personal Communications 2009, Vol. 49 (3), pp. 445–463.

¹¹ A. Augustyn, *Zrównoważony rozwój miast w świetle idei smart city*, Białystok 2020, p. 80; compare T. Nam, T.A. Pardo, *Conceptualizing Smart City With Dimensions of Technology, People, and Institution*, *Proceedings of 12th Annual International Digital Government Research Conference: Digital Government Innovation in Challenging Times*, ACM New York 2011, p. 28; S. Dirks, M. Keeling, J. Dencik, *How smart is your city*, IBM Institute for Business Value, New York 2009, pp. 4–10; S. Alawadhi, A. AldamaNalda, H. Chourabi, J.R. Gil-Garica, S. Leung, S. Mellouli, *Building understanding of Smart City initiatives*, *Proceedings of 11th IFIP WG 8.5 International Conference*, EGOV 2012 Kritinsandv 2012, pp. 40–54.

¹² G. Szpor, *Jawność i jej ograniczenia. Tom I. Idee i pojęcia*, Legalis 2016; ISO/IEC JTC 1, *Information technology. Internet of Things, Preliminary Report 2014*, ISO 2014; compare S. Piątek, *Telekomunikacja a Internet rzeczy*, (in:) G. Szpor (ed.), *Internet rzeczy. Bezpieczeństwo w Smart city*, Warszawa 2015, pp. 21–32; J. Olbrycht, *Idea Smart city*, (in:) G. Szpor (ed.), *Internet rzeczy. Bezpieczeństwo w Smart city*, Warszawa 2015, pp. 85–88.

¹³ J. Boć, *Ku administracji publicznej jako organizacji inteligentnej*, (in:) A. Dębicka, M. Dmochowski, B. Kudrycka (ed.), *Profesjonalizm w administracji publicznej*, Białystok 2004.

2. HISTORICAL BACKGROUND OF THE SMART CITY AND ITS DOCTRINAL APPROACH

The smart city is a relatively new concept. It constitutes a variant of the post-industrial (post-manufacturing) city, which replaced the 18th century industrial city. That is where the population began to migrate in search of work in the developing industry. This model was replaced in the 1970s by a post-industrial model in which factories had given way to culture and its promotion.¹⁴ The programme objectives of the urban policy of the post-industrial city include: sustainable development, reurbanisation,¹⁵ recycling of spatial and building resources, and social integration.¹⁶ A characteristic feature of the post-industrial city is the dominance of the service sector as opposed to the significant role of industry found in industrial cities. The factor most strongly affecting industrial cities is globalisation.¹⁷

The term ‘smart city’ itself was first used by David V. Gibson, George Kozmetsky and Raymond W. Smilor in the 1992 publication *The Technopolis Phenomenon Smart Cities, Fast Systems, Global Networks* in reference to smart buildings and smart offices.¹⁸

At the origin of the smart city concept is the search for the concept of the ideal city – one that, while retaining the benefits of urbanisation, would eliminate the negative effects. Such a city grows intelligently (smart growth), limiting urban sprawl.¹⁹

¹⁴ A. Korenik, *Smart cities. Inteligentne miasta w Europie i Azji*, Warszawa 2019, p. 15; widely A. Billert, *Miasta w postindustrialnej Europie i w kleszczach polskiej transformacji*, (in:) P. Filar, P. Kubicki, *Miasto w działaniu. Zrównoważony rozwój z perspektywy oddolnej*, Warszawa 2012, pp. 57-89.

¹⁵ Reurbanisation is a phase of urbanisation, or the process of urban development. The phases that constitute the so-called city life cycle model – according to Leo von Klaassen – are: preurbanisation, suburbanisation, desurbanisation, reurbanisation. In preurbanisation, there is a concentration of people in the city, the population rate of the central area is much faster than that of its surroundings. In suburbanisation, a suburban zone is developing. In disurbanisation, the inner city is deconcentrated and the population is moving to towns and rural areas. In the reurbanisation phase, inner city areas are revitalised through revitalisation; A. Korenik, *Smart cities. Inteligentne miasta w Europie i Azji*, Warszawa 2019, pp. 11-12; J. Zasina, *Reurbanizacja w świetle dotychczasowych badań nad miastami europejskimi*, “Studia Miejskie” Vol. 20 (2015), pp. 158-159.

¹⁶ A. Billert, *Założenia, modele i planowanie polityki rozwoju miast. Próba konfrontacji dwóch światów jednej Unii Europejskiej*, (in:) K. Derejski, J. Kubera, S. Lisiecki, R. Macyra (ed.), *Deklinacja odnowy miast, Z dyskusji nad rewitalizacją w Polsce*, Poznań 2012, p. 29.

¹⁷ A. Korenik, *Smart cities. Inteligentne miasta w Europie i Azji*, Warszawa 2019, p. 17.

¹⁸ D.V. Gibson, G. Kozmetsky, R.W. Smilor, *The Technopolis Phenomenon: Smart Cities, Fast Systems, Global Networks*, Boston 1992, p. 92.

¹⁹ A. Augustyn, *Zrównoważony rozwój miast w świetle idei smart city*, Białystok 2020, pp. 79-80.

The literature²⁰ highlights the difficulties in defining the concept of a smart city. Interestingly, as representatives of the doctrine²¹ rightly point out – the problem with defining the content of the smart city concept is not – as is usually the case – in the lack of definitions, but in their excess.²² Its interdisciplinary nature is pointed out above all. It concerns urban planning and urban development but also fields such as social sciences, energy, environment, transport, innovation or e-government.²³

The concept of ‘smart cities’ is subject to debate, it is changing and is not framed in a homogeneous way. Its understanding depends on the geopolitical context and the specific issues arising in individual countries or of interest to various institutions.²⁴

There is no single, generally accepted definition of the smart city concept. Historically, the degree to which **technology** has been used in the operation of cities has been the main consideration in defining it. Nowadays, apart from this element, this model of the city is based on **human capital**, friendliness to inhabitants and assistance in solving major social problems such as poverty, unemployment or the social marginalisation of the poor and the disabled (social exclusion).²⁵

In a smart city, human capital, social capital and the Information and Communication Technologies (ICT) infrastructure are created and combined to generate greater and more sustainable economic development and a better quality of life²⁶.

²⁰ A. Augustyn, *Zrównoważony rozwój miast w świetle idei smart city*, Białystok 2020, p. 80.

²¹ A. Chrisidu-Budnik, J. Przedańska, *Smart city projects - mechanizmy implementacji idei inteligentnego miasta*, “Samorząd Terytorialny” 2018, No. 11.

²² Overview of smart cities concepts compare A. Korenik, *Smart cities. Inteligentne miasta w Europie i Azji*, Warszawa 2019, pp. 19-20; N. Komnimos, L. Mora, *Exploring the Big Picture of Smart City Research*, pp. 36-39, https://www.researchgate.net/publication/319598847_Exploring_the_Big_Picture_of_Smart_City_Research/link/5f8a94f0299bf1b53e2c44ad/download (accessed 17 April 2023).

²³ M. Kidyba, *Smart metropolia*, (in:) B. Dolnicki (ed.), *Organizacja i funkcjonowanie aglomeracji miejskich*, Wolters Kluwer Polska 2018.

²⁴ M. Stębelski, A. Szafrąński, P. Wojciechowski, *Miasto zrównoważone w Agendzie 2030*, (in:) M. Stębelski, A. Szafrąński, P. Wojciechowski (ed.), *Zrównoważone miasto. Stan faktyczny i wyzwania prawne realizacji Agendy 2030*, Legalis 2022.

²⁵ A. Augustyn, *Zrównoważony rozwój miast w świetle idei smart city*, Białystok 2020, p. 80; M. Sitarski divides the concept under discussion in relation to people with disabilities into a variation of the so-called hard smart city and the so-called soft smart city. In the first, assistance is provided to them only in the technological field (e.g. increasing infrastructural efficiency). In the second variety there is a focus on social issues; M. Sitarski, *Inkluzja niepełnosprawnych w systemie edukacji szkolnej*, (in:) M. Stębelski, A. Szafrąński, P. Wojciechowski (ed.), *Zrównoważone miasto. Stan faktyczny i wyzwania prawne realizacji Agendy 2030*, Legalis 2022; P. Tota, *Miasto inteligentne – miasto dostępne. Nowoczesne technologie miejskie w kontekście projektowania uniwersalnego*, “Środowisko Mieszkaniowe” 2017, No. 19, p. 5.

²⁶ M. Stębelski, A. Szafrąński, P. Wojciechowski, *Miasto zrównoważone w Agendzie 2030*, (in:) M. Stębelski, A. Szafrąński, P. Wojciechowski (ed.), *Zrównoważone miasto. Stan faktyczny i wyzwania prawne realizacji Agendy 2030*, Legalis 2022; widely F. Russo, C. Rindone, P. Panuccio, *The process of smart city definition at an EU level*, Conference: Sustainable City 2014,

The aim of the smart city is to make life in cities better, more efficient, environmentally friendly and easier for people.²⁷ In other words, the implementation of the smart city concept aims to achieve sustainable development.²⁸ Smart cities are therefore framed as urban spaces based on new innovative technologies and concepts of sustainable development. The reorganisation of traditional spaces usually refers to the concentration of pro-development activities in previously intensively used areas that have now largely lost their function. This applies to industrial estates, former factory sites, post-military sites, etc. It allows previously degraded spaces to be used, giving them new functionality.²⁹

Most often, the concept of a smart city is associated with cities that use a variety of innovative technology-based initiatives to increase the efficiency of urban service delivery, thereby increasing the overall competitiveness of the community.³⁰ Smart cities are characterised by innovation that dominates traditional urban functions such as work, leisure, housing and transport.³¹

The creation of smart cities involves the comprehensive large-scale application of the Internet of Things to a number of interrelated areas of urban functioning (e.g. traffic control, connectivity, security, provision of utilities and services).³²

R. Mędrzycki³³ takes an interesting approach to the concept of the smart city, 'dividing' it into the concepts of 'smart' and 'city'. The first refers to things that use computer technology to make it more efficient. The advanced features of the device make it smart so that in addition to the primary function of the device, other functions appear. A smartphone, for example, is no longer just used for making calls and sending short text messages, but also as a tool for accessing the internet, a router or a source of entertainment. In the smart city, life becomes efficient and existing devices acquire new functions. For example, a street lamp increases its light intensity depending on darkness or the phase of the moon, or a bus shelter becomes a place for free internet access. The Author refers the

Volume: 191, p. 2, https://www.researchgate.net/publication/269030924_The_process_of_smart_city_definition_at_an_EU_level (accessed 20 March 2023).

²⁷ T. Świętnicki, M. Jakubik, *Nowe technologie w koncepcji inteligentnego miasta*, "PNT" 2022, No. 3, pp. 21-22.

²⁸ M. Bień, W. Jarczewski, B. Piziak, *Urban Lab. Narzędzie poprawy jakości życia mieszkańców miast zgodnie z ideą „smart city”*, Warszawa–Kraków 2020, p. 14.

²⁹ M. Dacko, M. Jakubik-Grzybowska, I. Łącka, A. Malkowski, A. Oleńczuk-Paszal, A. Płonka, M. Śpiewak-Szyjka, *Ochrona środowiska i przyrody – wybrane aspekty prawne i ekonomiczne dotyczące JST*, Legis 2020.

³⁰ OECD, *Smart Cities and Inclusive Growth, Building on the outcomes of the 1st OECD Roundtable on Smart Cities and Inclusive Growth*, OECD 2020, pp. 8-13, https://www.oecd.org/cfe/cities/OECD_Policy_Paper_Smart_Cities_and_Inclusive_Growth.pdf (accessed 17 March 2023).

³¹ M. Sokołowicz, J. Zasina, *Sektor kultury jako czynnik transformacji miasta przemysłowego w kierunku miasta kreatywnego i inteligentnego? Przykład Łodzi "AUL FO"* 2016, No. 4 (324), p. 6.

³² M. Mostowik, *Ochrona danych osobowych w Internecie rzeczy w prawie UE*, Legis 2022.

³³ R. Mędrzycki, „Zielona fala” na drogach smart city, (in:) G. Szpor (ed.), *Internet rzeczy. Bezpieczeństwo w Smart city*, Warszawa 2015, pp. 21–32.

concept of cities to the definition in Article 2(3) of the Act of 29 August 2003 on official names of towns and physiographic objects.³⁴ According to that definition, a city is a settlement unit with a predominantly compact built-up area and non-agricultural functions, which either has city rights or the status of a city granted in accordance with separate regulations.

The doctrine distinguishes both approaches to the smart city, its models and generations, and identifies its characteristics. The four basic approaches defining the smart city concept identified in the literature³⁵ are: smart technology in the city; smart people in the city; smart collaboration in the city; combinations of smart technology, smart people and smart collaboration in the city.

In other terms,³⁶ there are four smart city models. The first is custom-built for local authorities by external companies that provide the technology, mobile applications and security for the integrated network. In the second model, free software is provided to residents to allow them to use smart technology (sponsored smart city). The third model is based on a bottom-up structure of creating the conditions for the development of technologies to facilitate urban life by the citizens themselves, similar to building an urban open technology environment – free software (resilient smart city). The fourth model uses bottom-up, open-access technology solutions (common-based smart city).

Generations of smart cities are also distinguished in the literature.³⁷ In the first generation, advanced technologies take a primary role, but the solutions offered are not matched to the diverse characteristics of cities. In the second generation, an important role is played by the city authorities who are the active party and seek the best-performing solutions. In the third generation, the city's residents take the initiative, proposing new solutions. Their ideas, expressed in the form of needs and expectations, are translated by high-tech providers into implementable projects. Here, the city authorities have a role as an assistant, observer or facilitator in the communication process.

Local government administration has a special role in the smart city concept. It is seen as an important catalyst for improving the quality of service processes for residents in terms of environmental protection, among other things, and as a player responsible for finding a balance between urbanisation processes and the consump-

³⁴ Consolidated text, Journal of Laws of 2019, item 1443, as amended.

³⁵ A. Chrisidu-Budnik, J. Przedańska, *Smart city projects - mechanizmy implementacji idei inteligentnego miasta*, "Samorząd Terytorialny" 2018, No. 11, pp. 5-14.

³⁶ G. Blicharz, T. Kisielewicz, *Prawne aspekty zarządzania common wobec technicznych wyzwań rozwoju smart city*, "Forum Prawnicze" 2017, No. 1, pp. 48-49.

³⁷ A. Bitkowska, K. Łabędzki, *Koncepcja inteligentnego miasta – definicje, założenia, obszary*, "Marketing i Rynek" ("Journal of Marketing and Market Studies"), Vol. XXVIII 2021, No. 2, p. 5; M. Bień, W. Jarczewski, B. Piziak, *Urban Lab. Narzędzie poprawy jakości życia mieszkańców miast zgodnie z ideą „smart city”*, Warszawa–Kraków 2020, p. 15; B. Cohen, *The 3 generations of smart cities. Inside the development of the technology driven city*, <https://www.fastcompany.com/3047795/the-3-generations-of-smart-cities> (accessed 17 April 2023).

tion of natural resources. The concept discussed here is dominated by a relational approach in which the issue of creating cross-sectoral relationships has a central role. “They support innovative and unique public service delivery solutions”.³⁸

On the other hand, according to the representatives of the doctrine,³⁹ the characteristics of the smart city are:

- smart economy, an economy that is highly productive and technologically advanced through the use of Information and Communication Technologies (ICT), developing new products and services, and new business models; encouraging the establishment of local and global links and the international exchange of goods, services and knowledge;
- smart mobility, integrated transport and logistics systems using mainly clean energy;
- smart environment – which is economical with natural resources, aiming to increase the use of renewable energy sources; which controls electricity grids, water supply networks, street lighting and other public services so as to optimise the environmental and financial cost of their operation; which measures, controls and monitors pollution continuously; which renovates buildings to reduce their energy consumption;
- smart people, which is made possible by social diversity, tolerance, creativity and commitment;
- smart living, meaning safe and healthy living in a city with a rich cultural and residential offer, providing wide access to ICT infrastructure for lifestyles, behaviour and consumption;
- smart governance, in which public participation in decision-making, including decisions of a strategic nature, transparency of operation, quality and accessibility of public services, smart public management to organise and integrate the other elements of the smart city that have an important role to play.

³⁸ A. Chrisidu-Budnik, J. Przedańska, *Smart city projects – mechanizmy implementacji inteligentnego miasta*, “Samorząd Terytorialny” 2018, No. 11, pp. 5 et seq.; A. Chrisidu-Budnik, *Barriery w wyłonieniu partnera współpracy międzysektorowej*, (in:) J. Zimmermann (ed.), *Pogranicze prawa administracyjnego*, Wolters Kluwer Polska 2019.

³⁹ T. Świętnicki, M. Jakubik, *Nowe technologie w koncepcji inteligentnego miasta*, “PNT” 2022, No. 3, pp. 21-22; these areas are also indicated by C. Manville et al., *Mapping Smart Cities in the EU*, Study, Directorate General for Internal Policies, Policy Department A: Economic and Scientific Policy, January 2014, pp. 26-27; as well as by researchers from the Vienna University of Technology (TUWIEN, Technische Universität Wien), *European Smart Cities 4.0* (2015), <https://www.smart-cities.eu/> (accessed 29 March 2023); R. Giffinger, C. Fertner, H. Kramar, R. Kalasek, N. Pichler-Milanovic, E. Meijers, 2007, *Smart cities – ranking of european medium-sized cities*, Vienna University of Technology; https://www.smart-cities.eu/download/smart_cities_final_report.pdf (accessed 18 April 2023); A. Sobol, *Inteligentne miasta versus zrównoważone miasta*, “Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach” 2017, No. 320, pp. 76–78; J. Mielczarek-Mikołajów, *Zrównoważony transport w kontekście zarządzania metropoliami*, „Samorząd Terytorialny” 2021, No. 7-8, pp. 162-173.

3. LEGAL DEFINITION OF THE SMART CITY

The literature⁴⁰ emphasises that the smart city concept is not a legal term. However, references to the concept are discernible internationally, most notably in the United Nations' 2012 document "**The Future We Want**", summarising the UN Conference on Sustainable Development Rio+20.⁴¹ In point 66 of this document, states have committed "to adopt a smart city approach by exploiting the opportunities offered by digitalisation, green energy and technology, as well as innovative transport technologies, thus providing citizens with more environmentally friendly choices and stimulating sustainable economic growth, and enabling cities to achieve improvements in service delivery".⁴²

In September 2015, the UN General Assembly adopted the document "Transforming our world: the 2030 Agenda for Sustainable Development".⁴³ Its objective 11 targets cities and human settlements to be made "safe, stable, sustainable and inclusive". According to Agenda 2030, the 'smartness' of a city – understood as its use of new information and communication technologies (ICT – Information and Communication Technologies) – is one of the components of a smart city – a sustainable city.⁴⁴

In the countries of the European Union, the European Commission's 2010 Communication "Europe 2020: A strategy for smart, sustainable and inclusive growth" is indicated above all as the basis for creating and supporting the development of smart cities.⁴⁵ In this communication, the Commission set out three mutually interlinked priorities: smart growth – developing an economy based on knowledge and innovation; sustainable growth – promoting a more resource-effi-

⁴⁰ G. Blicharz, T. Kisielewicz, *Prawne aspekty zarządzania common wobec technicznych wyzwań rozwoju smart city*, "Forum Prawnicze" 2017, No. 1, p. 54.

⁴¹ The Future We Want, Outcome document of the United Nations Conference on Sustainable Development, Rio de Janeiro 2012, p. 14; <https://sustainabledevelopment.un.org/content/documents/733FutureWeWant.pdf> (accessed 20 March 2023).

⁴² Recalled for M. Świdarska, *Transport publiczny w zrównoważonych miastach*, (in:) M. Stębel, A. Szafranski, P. Wojciechowski (ed.), *Zrównoważone miasto. Stan faktyczny i wyzwania prawne realizacji Agendy 2030*, Legalis 2022.

⁴³ <https://sdgs.un.org/2030agenda> (accessed 20 March 2023).

⁴⁴ Widely A. Baranowska, D. Dylewski, *Warszawa – miasto inteligentne. Ocena poziomu wykorzystania technologii informacyjno-komunikacyjnych w ujęciu koncepcji smart city w m.st. Warszawa*, (in:) A. Hyrlik, D. Dylewski, S. Traczyk, *Miasta XXI wieku – wybrane zagadnienia*, Łódź 2021, p. 30.

⁴⁵ Communication from the European Commission of 3 March 2010. "Europe 2000: A strategy for smart, sustainable and inclusive growth", CELEX No. 52010DC2020; widely F. Russo, C. Rindone, P. Panuccio, *The process of smart city definition at EU level*, https://www.researchgate.net/publication/269030924_The_process_of_smart_city_definition_at_an_EU_level (accessed 20 March 2023).

cient, greener and more competitive economy; and inclusive growth – fostering a high-employment economy delivering social and territorial cohesion.

Based on the above Communication, the European Commission is supporting the European Innovation Partnership on Smart Cities and Communities (EIP-SCC) bringing together cities, industry, small or medium-sized enterprises, banks, research and other actors in the field of smart cities. Their common aims are to improve citizens' quality of life, increase the competitiveness of European cities and industry, and reach European energy and climate targets.⁴⁶

On its website, the European Commission defines a smart city as a place where traditional networks and services are made more efficient with the use of digital and telecommunication technologies, for the benefit of its inhabitants and businesses.⁴⁷ “A smart city goes beyond the use of digital technologies for better resource use and less emissions. It means smarter urban transport networks, upgraded water supply and waste disposal facilities and more efficient ways to light and heat buildings. It also means a more interactive and responsive city administration, safer public spaces and meeting the needs of an ageing population”.⁴⁸

The European Commission supports the digital transformation of cities and communities through:

- the living-in.eu movement – a city-led collaborative platform for cities and communities to accelerate their digital transformation the “European way” (citizen-centric approach, ethically and socially responsible data usage, co-creation with and engagement of citizens, open and interoperable standards);
- local data platforms – implementing interoperable local data platforms that enable digital technologies to integrate data flows via open standards within and across city systems. Both the public and private sector can then use data to deliver smart services;
- data space for smart communities – facilitating data sharing through the creation of a data space for smart communities. This will be an interoper-

⁴⁶ The European Innovation Partnership for Smart Cities and Communities COM(2012)4701, <https://eurocities.eu/projects/eip-scc/>; <https://digital-strategy.ec.europa.eu/en/library/smart-cities-and-communities-european-innovation-partnership-communication-commission-c2012-4701> (accessed 20 March 2023); widely F. Russo, C. Rindone, P. Panuccio, *The process of smart city definition at EU level*, https://www.researchgate.net/publication/269030924_The_process_of_smart_city_definition_at_an_EU_level (accessed 20 March 2023).

⁴⁷ European Commission, *Smart cities*, https://commission.europa.eu/eu-regional-and-urban-development/topics/cities-and-urban-development/city-initiatives/smart-cities_en (accessed 15 March 2023).

⁴⁸ European Commission, *Smart cities*, https://commission.europa.eu/eu-regional-and-urban-development/topics/cities-and-urban-development/city-initiatives/smart-cities_en, European Commission, *Shaping Europe's digital future*, Smart Cities and Communities, <https://digital-strategy.ec.europa.eu/en/policies/smart-cities-and-communities> (accessed 15 March 2023).

able and secure environment, where currently fragmented and dispersed data can be shared, based upon voluntary agreements;

- local digital twins – building the capacity of cities and communities to implement their local digital twins. Local digital twins are virtual representations of the area's physical assets, processes and systems. They use AI algorithms, data analytics and machine learning to create digital simulation models that can be updated and changed as their physical equivalents change. They allow real-time city management and long-term, strategic policy decisions, using models, visualisation and scenario building. The latter will provide a good basis for digital Bauhaus initiatives.⁴⁹

In order to provide financial support for the four above activities,⁵⁰ on 29 April 2021, the European Parliament and of the Council adopted regulation (EU) 2021/694 establishing the Digital Europe Programme and repealing Decision (EU) 2015/224.⁵¹ In this regulation, the Parliament established the Digital Europe Programme for the duration of the MFF 2021-2027 (Article 1 of the Regulation). Among its 5 specific objectives was specific objective No. 5 – Deployment and best use of digital capabilities and interoperability (Article 3(2)(5) of the Regulation). According to Annex I of that Regulation, activities under this objective related to the digital transformation of areas of public interest include: transport, mobility, energy and environment (section 4) and assume: “Deploy decentralised solutions and infrastructures required for large-scale digital applications such as connected automated driving, unmanned aerial vehicles, smart mobility concepts, smart cities, smart rural areas or outermost regions, in support of transport, energy and environmental policies and in coordination with the actions for digitalising the transport and energy sectors under Connecting Europe Facility”.

Smart city concepts are also supported under the European Commission's Horizon Europe programme (2014-2020 and 2021-2027). The current programme was established by regulation (EU) 2021/695 of the European Parliament and of the Council of 28 April 2021 establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, and repealing Regulations (EU) No 1290/2013 and (EU)

⁴⁹ European Commission, *Shaping Europe's digital future, Smart Cities and Communities*, <https://digital-strategy.ec.europa.eu/en/policies/smart-cities-and-communities> (accessed 15 March 2023); widely about the Bauhaus initiative: https://new-european-bauhaus.europa.eu/index_en (accessed 30 March 2023).

⁵⁰ European Commission, *Shaping Europe's digital future, Smart Cities and Communities*, <https://digital-strategy.ec.europa.eu/en/policies/smart-cities-and-communities> (accessed 15 March 2023).

⁵¹ Official Journal of the European Union L 166/1; the regulation replaced the Decision (EU) 2015/2240 of the European Parliament and of the Council of 25 November 2015 establishing a programme on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector (OJ L 318, 4 December 2015, p. 1).

No 1291/2013⁵². This programme is the EU's main research and innovation funding programme.⁵³ Using digital and telecommunications technologies to enhance traditional networks and services for the benefit of local communities through developing projects such as smart cities is also declared by the European Parliament and the Council in regulation (EU) 2021/1058 of 24 June 2021 on the European Regional Development Fund and the Cohesion Fund.⁵⁴ Supporting infrastructure projects aimed at promoting smart, inclusive and accessible cities is one of the investments of the InvestEU Fund, as stated by the regulation of the Commission delegated regulation (EU) 2021/1078 of 14 April 2021 supplementing Regulation (EU) 2021/523 of the European Parliament and of the Council by setting out the investment guidelines for the InvestEU Fund.⁵⁵

In Polish law, it is difficult to find a definition or reference to the smart city concept at the legal level. Not without reason, it is argued in the literature⁵⁶ that the terms smart cities and smart villages appear in many scientific publications and official journals of the European Union, and sporadically in national law and case law.

However, the term smart city appears in acts of the rank of regulations, Polish standards and governmental and municipal development strategies.

The legislator uses the concept of smart city in the annex “Drought Plan” to the Regulation of the Minister of Infrastructure of 15 July 2021 on the adoption of the Drought Plan.⁵⁷ In the analysis of the potential for increasing available water resources, this concept is listed among the measures to strengthen and restore the retention capacity of an area, citing: “It is, therefore, necessary to synergise the measures taken to minimise the combined risks of flooding and drought, while optimising costs. Measures to strengthen and restore the retention capacity of an area, such as: implementing the principle of sustainable urban planning and design (the so-called smart city, introducing elements of blue-green infrastructure, point 3)”. In this view, the smart city is, for the Polish legislator, an urban area implementing the principles of sustainable planning and design.

Smart cities are the subject of interest for the Minister of Digital Affairs, who established a working group on the Internet of Things in 2018. It has prepared the 2019 report “IoT in the Polish economy”, concerning, among other things, smart cities and buildings. The authors of the report refer to a smart city as a space that makes use of information and communication technologies to increase the

⁵² Official Journal of the European Union L 170/1.

⁵³ https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_pl (accessed 20 March 2023).

⁵⁴ Official Journal of the European Union L 231/60.

⁵⁵ Official Journal of the European Union L 234/18.

⁵⁶ M. Olszewska, G. Szpor, *Władza w inteligentnej gminie*, (in:) Z. Duniewska, R. Lewicka, M. Lewicki (ed.), *Władza w przestrzeni administracji publicznej*, Wolters Kluwer Polska 2020.

⁵⁷ Journal of Laws of 2021, item 1615.

interactivity and efficiency of the urban infrastructure and its component parts, as well as to raise the awareness of citizens. A city is “smart” when it undertakes investments in human and social capital and communication infrastructure to actively promote sustainable economic development and a high quality of life, including wise management of natural resources, through citizen participation. The working group indicates in the report that the implementation of the smart cities concept can be an important driving force for the Polish economy, bringing measurable benefits to citizens, public administration entities and private enterprises.

The definition of a smart city is also provided by the Polish Committee for Standardisation,⁵⁸ indicating that it refers to a city with a development strategy that focuses on creativity, openness to innovation and flexibility, understood as the ability to adapt quickly to external and internal conditions. These cities base their strategy on the application of information and communication technologies (ICT) in areas such as economy, environment, mobility and governance. The activities they undertake are aimed at improving residents’ living standards and increasing their participation in important decisions. According to the Committee, “The Smart City will not emerge without standards. It is the standards that contain the expertise and best practices that cities can use and adapt to their individual needs. Standards are fundamental to guaranteeing urban residents high-quality goods and services that do not pose health or environmental risks. They can also provide harmonised urban development indicators to assess the implementation of the development strategies being developed, or propose proven methods for managing the resources at hand. Finally, they can ensure that there is adequate risk analysis for the implementation of particular technologies, which will improve the decision-making process in this regard”. The standard used for the smart city is PN-ISO 37120:2015-03 Sustainable social development – Urban services and quality of life indicators from February 2017.⁵⁹ According to Article 5(3) of the Act of 12 September 2002 of standardisation,⁶⁰ the application of Polish standards is voluntary and they do not constitute universally binding law due to the lack of publication in official promulgation journals. Nonetheless, they are regarded as binding norms – when the legislator refers to specific norms in generally applicable acts.⁶¹

The implementation of the smart city concept is one of the objectives indicated in Resolution No. 102 of the Council of Ministers of 17 September 2019 on the adoption of the “National Regional Development Strategy 2030”,⁶² adopted pursuant to Article 14(5) of the Act of 6 December 2006 on the principles of

⁵⁸ <https://www.pkn.pl/smart-cities> (accessed 20 March 2023).

⁵⁹ <https://www.pkn.pl/norma-pn-iso-37120> (accessed 20 March 2023).

⁶⁰ Consolidated text, Journal of Laws of 2015 item 1483, as amended.

⁶¹ K. Wojciechowska, *Lotniskowy obszar ograniczonego użytkowania*, Warszawa 2019, p. 121.

⁶² The Polish Monitor of 2019, item 1060.

development policy.⁶³ In the resolution, a smart city consists of using modern technologies – especially information and communication technologies and open public data – to manage the city more efficiently and to improve the quality of life of the inhabitants with the involvement of the inhabitants in the co-creation of the city.

Data from the Institute for Urban and Regional Development⁶⁴ shows that 15% of municipalities in Poland have a strategy dedicated to smart cities.⁶⁵ The grounds for the preparation of the municipal development strategy are laid down in Article 10e *et seq.* of the Act of 8 March 1990 on Municipal Government.⁶⁶ The concept of a smart city therefore appears in the resolutions established by cities. For example, it is referred to:

- Resolution No. XCIV/2449/18 of the Kraków City Council of 7 February 2018 on the adoption of the document “Development Strategy of Kraków. This is where I want to live. Kraków 2030”;⁶⁷ among the challenges for the coming years, it points to “the withdrawal of parts of society into privacy, reluctance to participate in community building, civic attitudes and local social connections”. Kraków aspires to be the so-called smart city and in this context, there is a strong emphasis on smart management, i.e. “public management in which competence, public participation in decision-making play an important role”;
- Resolution No. XLV/912/2021 of the Kielce City Council of 13 May 2021 on accession to the preparation of a draft strategy for the development of the city of Kielce for 2021 - 2030 and the determination of a detailed procedure and timetable for the development of the draft strategy, including the consultation procedure;⁶⁸ the city proceeded to the preparation of a draft Development Strategy of the City of Kielce for 2021-2030 called “Development Strategy of the City of Kielce 2030+ towards Smart City”;
- Resolution No. 861 of the Konin City Council of 28 December 2022 on the adoption of the Smart City Plan – Konin.⁶⁹

⁶³ Journal of Laws of 2023, item 225, as amended.

⁶⁴ A. Miazga, K. Dziadowicz, P. Pistelok, *Cyfryzacja urzędów miast*, Instytut Rozwoju Miast i Regionów, Warszawa – Kraków 2022, pp. 7, 14; <https://obserwatorium.miasta.pl/wp-content/uploads/2022/10/Cyfryzacja-urzedow-miast.pdf> (accessed 20 March 2023).

⁶⁵ Widely about the city’s development policy: D. Sikora-Fernandez, *Koncepcja „smart city” w założeniach polityki rozwoju miasta – polska perspektywa*, “Acta Universitatis Lodziensis. Folia Oeconomica” 2013, p. 290.

⁶⁶ Consolidated text, Journal of Laws of 2023, item 40, as amended.

⁶⁷ https://www.bip.krakow.pl/?dok_id=167&sub_dok_id=167&sub=uchwala&query=id%3D23155%26typ%3Du (accessed 30 March 2023).

⁶⁸ Journal of Laws Świętokrzyskie Voivodship of 2021, item 1880.

⁶⁹ Journal of Laws Wielkopolskie Voivodship of 2023, item 419.

4. SMART CITY MEASUREMENT METHODS. POLISH SMART CITIES.

In order to compare cities, models, indicators and rankings have been developed to measure the smart city.⁷⁰

Among the most commonly used are: the global Global Smart City Performance Index (developed by Juniper Research), the European Smart City Model (by the Vienna University of Technology, Delft University of Technology and the University of Ljubljana),⁷¹ the Smart City Index 2019 (by Easy Park Group); the Green City Index (developed by the Economist Intelligence Unit), or the rankings included in the ISO371 certification.

Leading the Global Smart City Performance Index for 2022⁷² are: Shanghai, Seoul, Barcelona, Beijing, and New York. It assesses the categories: mobility, healthcare, public safety, and productivity.

The Smart City Model ranking takes into account the areas of: smart economy, smart mobility, smart governance, smart environment, smart people, and smart living. It includes 70 medium-sized European cities, selected on the basis of the following criteria: urban population between 100,000 and 500,000 (to obtain medium-sized cities); having at least one university (to exclude cities with a weak knowledge base); with an area of influence of less than 1,500,000 inhabitants (to exclude cities that are dominated by a larger city). Luxembourg is in the first place. The following Polish cities were ranked in this ranking: Rzeszów (place 48), Białystok (place 53), Bydgoszcz (place 57), Szczecin (place 62), and Kielce (place 64).⁷³ The ranking does not include the largest Polish cities, such as Warszawa, Kraków, Łódź, Wrocław or Poznań, due to the population criterion adopted.

⁷⁰ H. Komsta, *Rankingi jako narzędzie oceny Inteligentnego Miasta*, "Logistyka" 2016, Vol. 1, pp. 22-24; widely P. Popęda, *Czy w smart city żyje się lepiej? Wprowadzenie do tematyki zależności inteligencji miast i oferowanego przez nich standardu życia*, "Samorząd Terytorialny" 2021, No. 9.

⁷¹ <https://www.smart-cities.eu/model.html> (accessed 20 March 2023).

⁷² <https://www.juniperresearch.com/press/worlds-no-1-smart-city-for-2022-shanghai> (accessed 20.03.2023); compare Ł. Dziura, *Dobre praktyki w zakresie smart city*, (in:) J. Czapska, P. Mączyński, K. Struzińska (ed.), *Bezpieczne miasto: w poszukiwaniu wiedzy przydatnej praktykom*, Kraków 2017, pp. 148-167.

⁷³ <https://www.smart-cities.eu/ranking.html>, dla miast o tej wielkości najnowszy ranking jest dostępny za rok 2014 (version 3.0; accessed 20 March 2023).

On the other hand, in the Smart City Index 2019, there was no city from Poland in the top 100.⁷⁴ Interestingly, the organisation now measures the “The Cities of the Future Index”,⁷⁵ rather than the Smart City Index.

The Green City Index measures the environmental performance of 30 major European cities.⁷⁶ It includes Warsaw, which is ranked 16th.

The first city to be awarded the Smart City (ISO 37120) certificate in Poland was Gdynia. Planet Partners’ Polish smart cities include Białystok, Gdańsk, Gdynia, Kielce, Kraków, Poznań, Rzeszów, Szczecin, Warszawa and Wrocław.⁷⁷

The doctrine⁷⁸ emphasises that the smart city concept is becoming increasingly popular. Each of Poland’s 13 largest cities, in terms of population (Warszawa, Kraków, Łódź, Wrocław, Poznań, Gdańsk, Szczecin, Bydgoszcz, Lublin, Katowice, Białystok, Gdynia, Częstochowa) describes itself as aspiring to be a smart city. The concept in discussion is unfortunately often treated as a political slogan, manifested in: “extending” it to typical 21st-century city developments (e.g. the introduction of free Wi-Fi in public places), the implementation of a single smart solution without linking it to another solution or system.⁷⁹ Furthermore, the transformation of a city into a smart city should be preceded by the identification and elimination of the city’s basic problems, e.g. smog (Kraków), congestion (Wrocław) or depopulation (Bytom).

An interesting comparison entitled “Smart city solutions in Poland” was drawn up by A. Korenik⁸⁰ on the basis of data from the European Economic Congress. It shows that none of Poland’s 13 largest cities has implemented solutions in five categories: (1) public transport, traffic and parking management systems, (2) management of energy, heat and street lighting systems, availability of online services, computerisation of the city, (3) open data, (4) systems allowing civic intervention, and (5) living lab solutions.

⁷⁴ A. Baranowska, D. Dylewski, *Warszawa – miasto inteligentne. Ocena poziomu wykorzystania technologii informacyjno-komunikacyjnych w ujęciu koncepcji smart city w m.st. Warszawa*, (in:) A. Hyrlik, D. Dylewski, S. Traczyk, *Miasta XXI wieku – wybrane zagadnienia*, Łódź 2021, p. 41.

⁷⁵ <https://easyparkgroup.com/news/the-cities-of-the-future-index/> (accessed 29 March 2023).

⁷⁶ <https://impact.economist.com/sustainability/circular-economies/the-european-green-city-index> (accessed 30 March 2023).

⁷⁷ A. Lewandowski, *Przykłady Smart Cities Jakie są inteligentne miasta w Polsce?*, https://almine.pl/smart_city_przyklady_polska/ (accessed 29 March 2023).

⁷⁸ A. Korenik, *Smart cities. Inteligentne miasta w Europie i Azji*, Warszawa 2019, pp. 43-44.

⁷⁹ Differently A. Baranowska, D. Dylewski, according to whom the implementation of one of the component concepts (smart economy, smart mobility, smart environment, smart people, smart living, smart governance) results in a city being called smart; A. Baranowska, D. Dylewski, *Warszawa – miasto inteligentne. Ocena poziomu wykorzystania technologii informacyjno-komunikacyjnych w ujęciu koncepcji smart city w m.st. Warszawa*, (in:) A. Hyrlik, D. Dylewski, S. Traczyk, *Miasta XXI wieku – wybrane zagadnienia*, Łódź 2021, p. 32.

⁸⁰ A. Korenik, *Smart cities. Inteligentne miasta w Europie i Azji*, Warszawa 2019, p. 45.

Table 1. A. Korenik, Smart city solutions in Poland, (in): A. Korenik, Smart cities. Inteligentne miasta w Europie i Azji, Warszawa 2019, p. 45.

	Smart city solutions	Urban centres with implemented solutions
1.	Public transport, traffic and parking management systems	Szczecin, Bydgoszcz, Białystok, Warszawa, Poznań, Wrocław, Łódź, Kraków, Gliwice, Rzeszów
2.	Management of energy, heat and street lighting systems	Szczecin, Bydgoszcz, Słupsk, Gdynia, Gdańsk, Płock, Poznań, Warszawa, Mińsk Mazowiecki, Lublin, Częstochowa, Sosnowiec, Katowice, Wrocław, Ostrów Wielkopolski
3.	Availability of online services, computerisation of the city, open data	Gdańsk, Poznań, Legnica, Rzeszów
4.	Systems allowing citizen interventions	Suwałki, Warszawa, Łódź, Kielce, Wrocław
5.	Living lab solutions	Warszawa, Kraków

Warszawa is considered to be one of the most advanced cities in the application of the smart city concept in Poland. It has been implementing numerous smart city solutions, but compared to other countries in the world, the Polish capital lacks efficiency and innovation in management.⁸¹

According to A. Baranowska and D. Dylewski,⁸² Warszawa does not fulfil the smart economy criterion. They see economic dysfunctions in this area such as homelessness, the issue of the re-privatisation of Warszawa tenements nationalised under the Bierut Decree, low wages for immigrants and the wage gap (the difference between the average income of women and men). In the area of smart mobility, the capital city, according to the above authors, makes extensive use of modern technologies and system solutions. This manifests itself, for example, in the construction of Line 2 of the underground, the connection of the underground section between Młociny Metro and Nowodwory Terminal (Białołęka) with a tram line, the replacement of buses with low-emission or electric vehicles, the designation of new bus lanes, the creation of a system of Park and Ride (Park&Ride) car parks, the city's Veturilo bicycle hire network and the possibility of commercial rental of electric scooters. At the same time, the authors negatively evaluate the lack of service for Veturilo clients in winter months, especially in

⁸¹ Vienna is considered an excellent example of an existing smart city, while the example of a smart city being built from scratch is Masdar in Dubai; A. Baranowska, D. Dylewski, *Warszawa – miasto inteligentne. Ocena poziomu wykorzystania technologii informacyjno-komunikacyjnych w ujęciu koncepcji smart city w m.st. Warszawa*, (in:) A. Hyrlik, D. Dylewski, S. Traczyk, *Miasta XXI wieku – wybrane zagadnienia*, Łódź 2021, pp. 39-41; compare M. Kidyba, Ł. Makowski, *Smart city. Innowacyjne rozwiązania w administracji publicznej a zarządzanie inteligentnym miastem*, Poznań – Chorzów 2018.

⁸² A. Baranowska, D. Dylewski, *Warszawa – miasto inteligentne. Ocena poziomu wykorzystania technologii informacyjno-komunikacyjnych w ujęciu koncepcji smart city w m.st. Warszawa*, (in:) A. Hyrlik, D. Dylewski, S. Traczyk, *Miasta XXI wieku – wybrane zagadnienia*, Łódź 2021, pp. 33-39.

view of the warming climate and the failure to record very low temperatures, as well as the inadequacy of the public transport network in the eastern Białołęka area, the low competitiveness of the price of “normal” city transport tickets (PLN 4.40 for a single ticket) as compared to travelling by car. The smart environment area is positively evaluated because of: large green areas within or near the city (Mazowiecki Landscape Park, Kabacki Forest, Młociński Forest, Kampinos National Park, greenery routes along the Vistula River), measures against smog (financing the replacement of the entire cost of a coal fired cooker, warnings about high smog levels, permanent air quality measurement points), limiting car traffic in the city centre through high parking fees, stopping the dumping of ash from the Żerań thermal power station, plans to rehabilitate the landfill for this waste and work on gasification. The negative assessment of the area, in turn, results from: uncontrolled development in the peripheral districts, smog, noise pollution, mainly caused by car traffic, felling of trees, insufficient public transport, and insufficient availability of electric scooters and bicycle rentals. The strengths of the smart people area in Warszawa are: 126 higher education institutions with the University of Warsaw at the forefront, 40 universities of the third age, an extensive scholarship system, attractively priced public transport travel for pupils and students, a comprehensive educational offer in all areas of science, the Copernicus Science Centre, and the “Warsaw Volunteers” volunteering project. The civic budget, urban public consultations, e.g. on reclaiming the area of the Żerań furnace waste dump, or changes to public transport routes fulfil the criterion of smart governance. What is negatively evaluated in this area is the insufficient use of the city’s ICT system, evident during the coronavirus pandemic, which affected delays in case processing, that required a stationary visit to the authority for many cases. The area of smart living is filled with initiatives such as the Vistula Quarter or the City Contact Centre Warsaw 19115.

5. CONCLUSIONS

The research shows that the referenced international and European Union regulations should be considered as the basis for the creation of smart cities in Poland, most importantly: the United Nations document “The Future We Want” of 2012 and the document “Transforming our world: Agenda 2030 for sustainable development”, as well as the European Commission’s communication “Europe 2020: A strategy for smart, sustainable and inclusive growth” of 2010, European Innovation Partnership on Smart Cities and Communities and the European Parliament and of the Council of 29 April 2021 Regulation (EU) 2021/694 establishing the Digital Europe Programme and repealing Decision (EU) 2015/2240. In national law, reference to the smart city concept can be found at the level of

regulations, Polish standards as well as government and municipal development strategies.

The smart city is not legally defined. It is rightly pointed out that the plurality of doctrinal definitions of the smart city makes it difficult to define precisely and clearly what it actually is, as well as what role the solutions introduced in it have.⁸³ There is also no universal smart city measurement system. I believe *de lege ferenda* that the formulation of a legal definition of a smart city would prove desirable and would introduce order in this subject. In my opinion, a smart city is a city that uses Information and Communication Technologies (ICT), in which other – additional, operating – functions appear alongside the primary functions of devices, things, systems and processes, and in which the participation of its inhabitants in this use is active. At the same time, defining the term smart city seems advisable in connection with the use of this concept by national and EU legislators in the legislation they establish. In particular, this applies to regulations that financially support the development of smart cities.

Although each of Poland's 13 largest cities – in terms of population – aspires to be a smart city, only Warszawa can be considered the most advanced in applying the smart city concept. It is necessary to agree with the thesis that, with regard to Polish cities, the idea of creating smart cities is still at an early stage of development.⁸⁴ At the same time, it is rightly pointed out in the literature⁸⁵ that urban centres should treat the use of new technologies as a tool and not as a necessary objective in itself.

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⁸³ A. Baranowska, D. Dylewski, *Warszawa – miasto inteligentne. Ocena poziomu wykorzystania technologii informacyjno-komunikacyjnych w ujęciu koncepcji smart city w m.st. Warszawa*, (w:) A. Hyrlik, D. Dylewski, S. Traczyk, *Miasta XXI wieku – wybrane zagadnienia*, Łódź 2021, p. 31.

⁸⁴ M. Pichlak, *Inteligentne miasta w Polsce – Rzeczywistość czy utopia?*, "Zeszyty Naukowe Politechniki Śląskiej" 2018, Seria: Organizacja i Zarządzanie, Vol. 127, p. 204.

⁸⁵ A. Baranowska, D. Dylewski, *Warszawa – miasto inteligentne. Ocena poziomu wykorzystania technologii informacyjno-komunikacyjnych w ujęciu koncepcji smart city w m.st. Warszawa*, (w:) A. Hyrlik, D. Dylewski, S. Traczyk, *Miasta XXI wieku – wybrane zagadnienia*, Łódź 2021, p. 31.

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