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EVALUATION OF THE IMPLEMENTATION OF THE SMART CITY CONCEPT IN VISEGRAD GROUP COUNTRIES

OVERVIEW OF THE SMART CITY ISSUE IN V4 DOCUMENTS

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ANNEX II. OVERVIEW OF THE SMART CITY ISSUE IN V4 DOCUMENTS

RESEARCH PROCESS

The research question that guided this section of the project was the following:

Q1: How the concept of Smart Cities has been implemented in key strategic, programming documents in V4 countries?

Desk research helped to understand the mechanisms of Smart City concept realization and gave knowledge about territorial and inhabitants needs. The analysis was held in a 'top-down' direction, starting from the study of assumptions and priorities at EU level, moving on to the national level, where particular attention was paid to those factors in the development of Smart City that the national authorities place most emphasis on and what this means. Then it was checked, whether the provisions of the strategic documents are faithfully reproduced, or whether a room is left for adapting these provisions to the specificity of cities in a given country. An interesting research thread was to explore the differences between the V4 countries in their approaches to development. Additionally, we aimed at a minimum of 4 interviews with representatives of urban policy or Smart City government units, according to the established scenario, to check the usefulness of the strategic documents for implementing the Smart City concept at project level and the transferability of a good practice to the Cohesion Policy 2021-2027. Those elements helped to assess researched projects, the extent to which the projects examined respond to the needs set out in the strategic documents. The review of strategic documents (and possibly legal acts) also provides identification of changes in the models of local government or legislation.

The analytical process consisted of three steps. We discuss their details and methods in the following sections.

STEP 1: PILOT TESTING ANALYSIS

In the first step, a pilot testing analysis of EU and Polish documents was held by the core team of the Contractor. In the case of each document, it started from the recognition of its function in policy system – purpose and importance for public policy practise. Next, definitions, descriptions and characteristics of Smart City used in the documents were found. Those elements helped to understand, how the concept is implemented in the country on different levels.

The keywords searched for the context analysis were defined first. The core team tested them by use of coding methods through Polish documents and the application of a dedicated tool - Maxqda. Then, coding strategy for analysis of the documents from other V4 countries was developed. One of the basic challenges in that step was the selection of appropriate cities.

The aim was held on cities and their functional areas of a different size but also scoped on most interesting cases in the country. All of that provided a guidance note for national experts for selection of documentation.

STEP 2: EXECUTING COUNTRY BY COUNTRY ANALYSIS

National experts were asked for preliminary document finding. Purpose of this task was to identify the situation with the availability of documents in each country. Experts were asked for beneath documents:

- fundamental horizontal strategies or operational programmes for a given country (not less than 3);
- 2-3 sectoral strategies (following 10 areas of the matrix);
- urban development or Smart City development strategies for:
  - the capital of the country;
  - 3-4 cities of different sizes.

In the second step of the study, national experts provided Czech, Hungarian and Slovakian documents (national and city), using extended guidelines prepared by the core team. Then, the Polish team coded documentary using methods developed in Step 1.

After analyzing documents for each country, the team performed a synthesis, too. The synthesis covered each country's perceptions of Smart City concept:

- in what context "Smart City" term appears;
- how it is usually defined - what are the dominant motifs, themes, elements of characteristics, wording, framing, perception;
- what is rarely there - words, terms, concepts that stick out.

STEP 3: DEVELOPING COMPARATIVE SYNTHESIS

Core team applied the conceptual framework as a benchmark to compare findings across four countries. The study aimed at assessing to which extent each area (humana, automata, agora) is realized in strategic documents on different levels. The comparative synthesis also provided understanding how authorities at the local level define the concept of smart, how they actually implement it and in which areas, e.g.: energy, education, transport; smart actions are most visible and how their effectiveness and efficiency is assessed (e.g. by independent evaluation or scientific research).

PILOT TESTING ANALYSIS

METHODOLOGY OF THE PILOT TESTING ANALYSIS

Pilot analysis of strategic documents covered 50 documents on three levels – EU, national and local, according to the provisions of both TOR and methodological report.

The list of the reviewed documents included:

- EU level:
  - European Charter of Local Self-Government with explanatory report;
  - documents published as part of the EIP-SCC (European Innovation Partnership on Smart Cities and Communities):
    - Smart City Guidance Package;
    - Citizen Engagement Solution Booklet;
    - How National Governments Can Help Smart Cities Succeed;
  - strategic and programming documents for the 2014-2020 and 2020+ periods
    - Europe 2020 strategy;
    - Urban Agenda for the EU;
  - legislation for the 2014-2020 and 2020+ periods:
    - Regulation (EU) No 1301/2013 of the European Parliament and of the Council of 17 December 2013 on the European Regional Development Fund and on specific provisions concerning the Investment for growth and jobs goal and repealing Regulation (EC) No 1080/2006;
    - Regulation (EU) No 1304/2013 of the European Parliament and of the Council of 17 December 2013 on the European Social Fund and repealing Council Regulation (EC) No 1081/2006;
    - Regulation (EU) No 1300/2013 of the European Parliament and of the Council of 17 December 2013 on the Cohesion Fund and repealing Council Regulation (EC) No 1084/2006;
    - Proposal for a Regulation of the European Parliament and of the Council on the European Regional Development Fund and on the Cohesion Fund;
    - Proposal for a Regulation of the European Parliament and of the Council on the European Social Fund Plus (ESF+);
- national level:
  - national strategic documents:
    - Strategy for Responsible Development and integrated strategies;
    - "Efficient State 2020" strategy;
    - Strategy for Innovation and Efficiency of the Economy "Dynamic Poland 2020";
    - draft resolution of the Council of Ministers on the adoption of the strategy "Efficient and Modern State 2030";
    - National Strategy of Regional Development 2030;
    - Strategy for Sustainable Transport Development until 2030;
    - draft Productivity Strategy 2030;

- National Urban Policy 2023;
  - operational programmes and detailed descriptions of priority axes:
    - 2014-2020 Partnership Agreement;
    - assumptions of the 2021-2027 Partnership Agreement;
    - OP Infrastructure and Environment 2014-2020;
    - OP Digital Poland 2014-2020;
    - OP Knowledge Education Development 2014-2020;
    - Smart Growth OP 2014-2020;
    - OP Technical Assistance 2014-2020 (Competition "Human Smart Cities. Intelligent cities co-created by residents");
    - ROP for Łódzkie Voivodeship 2014-2020;
- local level:
  - strategies (actual till 2030):
    - large cities: Warsaw, Cracow;
    - medium cities: Kielce, Płock;
    - small cities: Nowa Ruda, Nakło nad Notecią;
  - Smart City concept implementation plans:
    - large cities: Warsaw;
    - medium cities: Gdynia, Rzeszow;
    - small cities: Pleszew.

Three rounds of desk research in the quality content analysis programme (MAXQDA) were conducted. First, the terms "smart city" and "smart" were sought. Then the found fragments of the documents were analysed in terms of the context in which the search terms appear. We have analysed different keywords for future analysis. In the last step, these fragments were searched for information about the areas of Smart City intervention and the dimensions of the concept (automata, humana, agora).

Besides, EIP-SCC documents were analysed in detail. The conclusions were consulted during interviews with urban policy units in ministries and are applied in the final report.

STRATEGIC DOCUMENTS IN POLAND AND THE EU

SMART CITIES DEFINITION

In Polish strategic documents the slogan "smart city"/"smart cities" appears in 85 fragments, in 16 documents. Only 20 times it appears in documents at a national level. In the broadest sense, the concept is described in the National Urban Policy, where the vision of the city is additionally described as part of the "smart city" concept.

In other national documents, the concept of "smart city" appears parallel to the concept of "smart villages", in a slogan-like manner (Strategy for Responsible Development, Assumptions of the 2021-2027 Partnership Agreement) or the form of a reference to the "Human Smart Cities" competition financed from OPTA 2014-2020. In some national documents (Strategy for Innovation and Efficiency of the Economy 2020, draft Productivity Strategy 2030), "smart city" is understood as a set of technological solutions that fit into a broader definition of the 4.0 or digital economy. However, the general definition of the concept is similar, according to which it involves the use of the latest technologies that improve the quality of life of residents with their involvement. To the greatest extent, the provisions concerning the idea of the "smart city" refer to innovations in the way cities are managed.

At the local level, provisions concerning the concept of a "smart city" appear in documents with a 2030 perspective, i.e., those adopted relatively recently or planned, in particular, in documents which provide guidelines on the "smart city" for a given city, and not documents of strategic importance. This means that over time, cities have begun to aspire to be smart. There are also records that being smart is the inevitable future of all cities that want to develop. The definitions of the concept are similar to those of the National Urban Policy and take the quality of life of the inhabitants as their starting point. However, the areas in which it would be desirable to implement smart solutions have been clarified. What is also interesting, smaller cities refer to their participation in the "Human Smart Cities" competition, and smart solutions are specific technological solutions to the diagnosed problems. An exceptional case is Kielce, where the city development strategy was combined with the strategy of implementing the "smart city" concept. However, there is no element of social participation in the quoted definition.

In the analysed documents, the word "smart" appears more often than the expression "smart city". Most provisions refer to the characteristics of the technology as smart (e.g., smart grid, smart power grid), mainly concerning the area of energy. The word "smart" both with the city and technology is used along with the words "intelligent" and "wise". "Smart cities" are otherwise known as intelligent cities (also: co-created by residents). Other expressions found are "smart districts", "smart functionalities", "smart labs" and "smart government" understood as "open government".

"Smart" also appears in references to EU documents, where one of the objectives of EU policy is a –"Smarter Europe".

In selected documents at the EU level, the expression "smart city" appears relatively more times than in Polish documents (791 times in 10 documents). However, references to the concept of "smart city" appear only in EIP-SCC (European Innovation Partnership for Smart Cities and Communities) documents and in the Urban Agenda for the EU as a reminder of EIP-SCC activity. The EIP-SCC documents primarily raise the topics of government support for the implementation of the concept of "smart city" in cities, the involvement of city dwellers in the creation of solutions and problems with the implementation of smart solutions encountered by practitioners. Smart Cities are considered together with low energy districts. They are assigned four objectives, related to improving the quality of life, accessibility of public services and local economic development. In this context, making a city smarter is about making it sustainable and a better place to live.

The Urban Agenda for the EU also mentions the slogan "smart cities" as one of the priority themes for urban development. In this context, the concept of "smart cities" is presented as a purely innovative approach and a separate topic concerning, for example, effective urban governance, sound and strategic urban planning and social change. Again, more records are provided by searching by the word "smart". This is primarily due to the pillars of the Europe 2020 Strategy, which are smart, sustainable, and inclusive growth. Such a reference appears repeatedly in almost all the documents analysed at EU level. Smart growth, or intelligent growth from the Europe 2020 Strategy, is understood to mean building an economy based on knowledge and innovation and strengthening them as factors of future growth. The word smart also appears as an element of the expressions smart distribution (similarly to Polish documents in relation to energy distribution) and smart specialisation (defined in The Regulation (EU) 1301/2013 smart specialisation strategies). Not once does the word smart or the expression "smart city" appear in the European Charter of Local Self-Government or the supplementary report to it. Neither do slogans related to the functioning of cities (city, cities) appear there.

SMART CITY AREAS

The most common area of smart intervention in national documents is energy, not always in the context of the "smart city". In particular, it concerns documents such as some operational programmes, Strategy for Responsible Development, Strategy for Innovation and Efficiency of the Economy as well as Partnership Agreements for 2014-2020 and 2021-2027.

In several documents, the areas of intervention are listed as examples of the application of the Smart City concept or as a separate area of intervention, e.g., alongside urban mobility. Whenever the document only uses the term "smart city" as a slogan, it usually mentions the area of city management as the target area of intervention.

The areas of intervention are also described quite generally in the National Urban Policy. The following have been defined as elements requiring intervention, simultaneously significantly influencing the quality of life and assessment of the place of residence: safety, good access to high-quality public services, including health services, labour market, housing offer, leisure

activities, cultural offer, environment and public transport or attractive public spaces. It was also emphasised that the city can be an attractive place to live in three aspects. Apart from the attractiveness of the place of work and place of residence, the availability and quality of the so-called third place - places to spend free time and wider actions to improve public health are important. The choice of areas in which to intervene depends primarily on the size and location of the city. In relation to the initial matrix of thematic areas, new elements have emerged, including the quality of housing and labour market provision and the issue of spatial planning.

The most detailed description of the areas is contained in the regulations of the Human Smart Cities competition, in which the cities in question refer to their participation. Among the 9 thematic areas mentioned were housing, mobility, municipal management (including energy and water and sewage management), city management, combating climate change and other pro-environmental activities as well as data use.

The provisions concerning thematic areas of intervention can be found in 5 analysed strategic documents at the local level (for 5 cities). In the local documents, the areas of intervention are described concretely, according to the diagnosed specificity of the city. For Warsaw, the key areas of intervention are primarily intelligent management of environmental resources and intelligent city management. The areas of intervention in Kielce include electronic administration, open data, and energy. In the strategy for Nowa Ruda, despite a small number of provisions related to the "smart city" concept, the quality of educational services was indicated as the key to further development of the city within the "smart city" concept. General and detailed thematic areas for discussion with the residents are planned in Pleszew. The general ones are water, earth, and air, while the detailed ones are the management of spatial gaps, improvement of urban mobility (city bicycle), urban greenery or improvement of the natural environment. Some areas were selected by residents during consultation walks, e.g., air quality or intelligent lighting of parks.

Most of the areas where the "smart city" concept can be implemented have been defined in the strategy for Cracow until 2030 and include all actions for sustainable development with particular emphasis on environmental measures, transport system and open data.

The areas of smart intervention mentioned in documents at the EU level are primarily energy (smart grids, smart metering, smart distribution, smart energy management) and transport. The EIP-SCC documents mention the areas of intervention in the implementation of the Smart City concept, but only to illustrate good practice or clarify issues. These are e.g., road infrastructure, public transport, waste management systems, public safety, energy efficiency or solutions for people with disabilities etc. More than specific areas, the content of the documents focuses on practical problems for smart solutions regardless of the area.

SMART CITY DIMENSIONS

The definition of the "smart city" concept from the National Urban Policy considers all three dimensions. According to the provisions, the idea of the concept often boils down exclusively to innovative technological solutions without the necessary changes in other areas of operation. It has been emphasised that the full word "smart" is only conveyed by an integrated approach to city management, which consists of both the use of modern technologies (automata) and the goal of increasing the quality of life of the inhabitants (humana) and building their feeling that it is the city they co-create (agora). The National Urban Policy also mentions the multiplicity of user groups. The city is not only the inhabitants but also those who work there and visit for tourism and business purposes.

In national strategic documents, quite a little attention has been paid to issues related to understanding the concept of the "smart city" in the context of humana and agora. The authors of most documents use only slogans, i.e., promotion of innovation, intelligent use of modern technologies, digital economy, innovative systems, or a simple understanding of the three-component nature of the concept. Automata is the use of technology, humana is the quality of life of the inhabitants, and agora means their involvement.

A more detailed understanding of the dimensions of the "smart city" concept is contained in the regulations of the Human Smart Cities competition, in particular the dimensions of humana and agora. The social element of the concept is understood here as modelling processes and areas of suburbanisation for the creation of local structures providing necessary services and guaranteeing the high quality of life for the inhabitants.

Agora, on the other hand, is the creation of further development with the active participation of the inhabitants, which is defined as the next stage of evolution in the implementation of the "smart city" concept. In the context of the concept of the agora, there is also the issue of administrative efficiency and its significance for the implementation of the "smart city" concept. This means not only social participation but also strengthening the competences of local government through the exchange of experience and cooperation with the inhabitants.

In contrast to national documents, strategic documents at the local level devote the least attention to issues related to technology. National documents focus on the infrastructural aspect of the concept, while local documents present only the basic understanding of the participation of technology in the implementation of the Smart City concept. Besides, in local documents there is emphasis on the analysis of data collected as part of the use of smart solutions in order to improve the situation in a city.

The social context of the Smart City concept was presented in two ways. Part of the documents also presented its basic understanding (i.e. a life-friendly city, offering its inhabitants the best quality/level/comfort of living), and part of the documents also presented a broader one, where the implementation of the "smart city" concept means diagnosing problems in the city and seeking solutions for them, promoting pro-ecological solutions and increasing safety, as well as economic issues - increasing competitiveness while focusing on the needs of current and future generations.

The issue of a participatory approach is what distinguishes local documents from national documents to the greatest extent. In this context, the Smart City is intelligently managed, consisting of the institutional efficiency of the local government, social participation with its inhabitants as initiators of change, cooperation with science and business. It is worth stressing that all of the cities (even if they omit social participation in their understanding of the "smart city" concept, e.g., Kielce), base their diagnoses and strategies on the results of consultations with the inhabitants (surveys, diagnostic walks).

The tripartite nature of the "smart city" concept in documents at the EU level is reflected in the Europe 2020 Strategy, and more specifically in its three objectives: smart, sustainable, and inclusive growth. Smart growth refers to building on knowledge and innovation, sustainable growth on respect for resources, and inclusive growth on building social and territorial cohesion. However, the development described here as smart is based, to the greatest extent possible, on the use of ICT to respond to the major challenges for society.

In the context of the agora's dimension, there are also provisions concerning smart regulation, that is, the reduction of administrative burdens and the creation of a more favourable environment for business.

In other documents at EU level, which contain appropriate provisions concerning the "smart" or the "smart city" concept in the draft regulations for the 2021-2027 perspective and the Urban Agenda for the EU, there are only provisions concerning the automata dimension processes of digitisation and the development of technologies, for example.

In EIP-SCC documents, however, the agora is the most frequently appearing dimension. In particular, this dimension is the focus of those documents whose main themes are the involvement of citizens in co-creating the city (EIP-SCC Citizen Engagement Solution Booklet) and support at the national level for Smart City initiatives (EIP-SCC How National Governments Can Help Smart City Succeed).

The involvement of citizens is recognised here as the key to the success of a Smart City that is not blindly led by new technologies. On the other hand, support for the "smart city" initiative at the national level is defined as an indispensable factor for success, among other things, because of the possibility of exchanging experiences between cities or the issue of insufficient incentives for investment in research, which individual cities have. Also, this promotes the replication of good solutions and their adaptation to local conditions. Other issues raised in them include the co-creation of solutions and the efficiency of administration.

COUNTRY-BY-COUNTRY ANALYSIS

METHODOLOGY OF THE COUNTRY-BY-COUNTRY ANALYSIS

The country-by-country analysis of strategic documents covered 65 documents on three levels – international national and local. 55 documents were provided by national experts and the other 10 documents were proposed during interviews or consultation process of Working Paper 1. The list of documents is presented in Table 1.

The initial search was conducted with the term "smart city". The set of keywords included also synonyms ("intelligent city", "wise city"), main characteristics of a city ("efficient city", "compact city", "sustainable city", "coherent city", "competitive city", "strong city") and other aspects mentioned in the literature review ("knowledge city", "digital city", "wired city", "comfortable city", "resilient city", "aware city", "better city", "well-performing city", "self-decisive city", "independent city", "forward-looking city" and "future city"). The keywords were translated into national languages, depending on the language of the documents. The set of keywords is included in Table 2 and the steps of analysis are provided in Figure 1.

Then the context of the searched fragments was analysed. The provisions were analysed more broadly. Among other issues, we have been trying to answer the following questions:

- Does the document contain a coherent vision of the city? Or is it just a slogan for the idea of a Smart City?
- When using the term "smart city", do the authors refer to EU, EIP-SCC documents either define the concept? Or is it only the goal of smart growth and the aspect of technology?
- Is the term "smart city" connected with the support for cities, funding mechanisms (specific institutions, funding sources), tools for activating citizens?

The third stage of the research included also additional questions. Whenever the areas and dimensions were analysed, the answers to the following questions were sought:

- What are the areas of intervention? Are there more or fewer areas than provided in the initial matrix? What are the new areas emerging (as housing, focus on spatial planning in Poland)?
- Are there any unaddressed needs besides the mentioned areas? Do the authors provide a diagnosis of the state of development of the Smart City concept for the country? Do they see any threats resulting from the development of Smart City solutions?
- What is the main dimension of the Smart City concept in a country? What is the role of digitalisation, an increase in the quality of life, citizen participation? How is it reflected in documents of different levels and cities of different sizes?
- Are the documents created based on consultations with the citizens/residents of a city? What is the consultation form?

Table 1. List of documents for country-by-country analysis

NO.	COUNTRY	LEVEL	ORIGINAL NAME OF THE DOCUMENT	TRANSLATED NAME OF THE DOCUMENT	LANGUAGE	SOURCE
1	UN	-	New Urban Agenda	-	English	Interviews
2	EU	-	The New Leipzig Charter | The transformative power of cities for the common good	-	English	Working Paper 1
3	EU	-	Territorial Agenda 2030 | A future for all places	-	English	Working Paper 1
4	EU	-	Territorial Agenda 2030 | Summary	-	English	Working Paper 1
5	EU	-	Territorial Agenda 2030 Pilot Actions	-	English	Working Paper 1
6	EU	-	Implementing the Territorial Agenda 2030 | Examples for a territorial approach in policy design and delivery	-	English	Working Paper 1
7	Poland	National	Prezentacja założeń projektu „Human Smart City – Przestrzeń i Społeczeństwo"	Presentation of assumptions of the "Human Smart City - Space and Society" project	Polish	Polish Ministry

NO.	COUNTRY	LEVEL	ORIGINAL NAME OF THE DOCUMENT	TRANSLATED NAME OF THE DOCUMENT	LANGUAGE	SOURCE
8	Poland	National	Założenia aktualizacji Krajowej Polityki Miejskiej 2023	Assumptions for updating the National Urban Policy 2023	Polish	Interviews
9	Poland	National	Narodowy Plan Szerokopasmowy	National Broadband Plan	Polish	Interviews
10	Slovakia	National	Podpora inovatívnych riešení v slovenských mestách	Support for innovative solutions in Slovak cities	Slovak	Interviews
11	Czech Republic	National	Strategický rámec UR ČR 2030 (MŽP)	Strategic Framework of the UR CR 2030	Czech	National experts
12	Czech Republic	National	Aliance Společnost 4.0	Alliance Society 4.0	Czech	National experts
13	Czech Republic	National	Akční plán pro Společnost 4.0	Action Plan for Society 4.0	Czech	National experts
14	Czech Republic	National	Zásady urbánní politiky (MMR)	Principles of Urban Policy	Czech	National experts
15	Czech Republic	National	Státní energetická koncepce (MPO)	State Energy Concept	Czech	National experts
16	Czech Republic	National	Národní akční plán pro chytré sítě (MPO)	National Action Plan for Smart Grids	Czech	National experts

NO.	COUNTRY	LEVEL	ORIGINAL NAME OF THE DOCUMENT	TRANSLATED NAME OF THE DOCUMENT	LANGUAGE	SOURCE
17	Czech Republic	National	Národní akční plán energetické účinnosti (MPO)	National Action Plan for Energy Efficiency	Czech	National experts
18	Czech Republic	National	Státní politika životního prostředí (MŽP)	State Environmental Policy	Czech	National experts
19	Czech Republic	National	Digitální Česko 2 (MPO)	Digital Czechia 2	Czech	National experts
20	Czech Republic	National	Akční plán pro rozvoj digitálního trhu (MPO),	Digital Market Development Plan	Czech	National experts
21	Czech Republic	National	Dopravní sektorové strategie (MD)	Transport Sector Strategies	Czech	National experts
22	Czech Republic	National	Národní akční plán čisté mobility (MD)	National Action Plan for Clean Mobility	Czech	National experts
23	Czech Republic	National	Akční plán rozvoje inteligentních dopravních systémů (ITS) v ČR do roku 2020 (s výhledem do roku 2050) (MD)	Action Plan for the Development of Intelligent Transport Systems (ITS) in the Czech Republic until 2020 (with a view to 2050)	Czech	National experts

NO.	COUNTRY	LEVEL	ORIGINAL NAME OF THE DOCUMENT	TRANSLATED NAME OF THE DOCUMENT	LANGUAGE	SOURCE
24	Czech Republic	National	Dopravní politika ČR pro období 2014–2020 s výhledem do roku 2050 (MD)	Transport policy of the Czech Republic for the period 2014–2020 with a view to 2050	Czech	National experts
25	Czech Republic	National	Bílá kniha - Koncepce veřejné dopravy 2015-2020 s výhledem do roku 2030 (MD)	White Paper - Public Transport Concept 2015-2020 with a view to 2030	Czech	National experts
26	Czech Republic	National	Koncepce nákladní dopravy pro období 2017-2023 s výhledem do roku 2030 (MD)	Freight transport concept for the period 2017-2023 with a view to 2030	Czech	National experts
27	Czech Republic	National	Strategie komunitně vedeného místního rozvoje území MAS Bobrava	Community-led local development strategy territory of LAG Bobrava (example)	Czech	National experts
28	Czech Republic	National	Strategie regionálního rozvoje 2021+	Regional Development Strategy 2021+	Czech	National experts
29	Czech Republic	National	Inovační strategie České republiky 2019-2030, The Country for The Future	Innovation Strategy of the Czech Republic 2019-2030, The Country for The Future	Czech	National experts
30	Czech Republic	National	Metodika Konceptu inteligentních měst	Methodology of the Smart Cities Concept	Czech	National experts

NO.	COUNTRY	LEVEL	ORIGINAL NAME OF THE DOCUMENT	TRANSLATED NAME OF THE DOCUMENT	LANGUAGE	SOURCE
31	Czech Republic	National	Metodika financování Smart City projektů	Methodology of financing Smart City projects	Czech	National experts
32	Czech Republic	Local	Koncepce Smart Prague do roku 2030	The concept of Smart Prague until 2030	Czech	National experts
33	Czech Republic	Local	Strategy #brno2050	-	English	National experts
34	Czech Republic	Local	Strategie Smart City Plzeň	Strategy Smart City Pilsen	Czech	National experts
35	Czech Republic	Local	Koncepce Smart City Orlová – rozvojová strategie města	Concept Smart City Orlová - development strategy of the city	Czech	National experts
36	Czech Republic	Local	Smart Prostějov | Manuál chytrého města	Smart Prostejov | Smart City Manual	Czech	National experts
37	Slovakia	National	Stratégia výskumu a inovácií pre inteligentnú špecializáciu	Research and innovation strategy for smart specialization	Slovak	National experts
38	Slovakia	National	Koncepcia inteligentného priemyslu pre Slovensko	The concept of intelligent industry for Slovakia	Slovak	National experts

NO.	COUNTRY	LEVEL	ORIGINAL NAME OF THE DOCUMENT	TRANSLATED NAME OF THE DOCUMENT	LANGUAGE	SOURCE
39	Slovakia	National	Koncepcia pre podporu startupov a rozvoj startupového ekosystému v Slovenskej Republike	Concept for support of startups and development of startup ecosystem in the Slovak Republic	Slovak	National experts
40	Slovakia	National	Partnerská dohoda Slovenskej republiky na roky 2021 – 2027	Partnership agreement of the Slovak Republic for the years 2021 - 2027	Slovak	National experts
41	Slovakia	National	Moderné a úspešné Slovensko	Modern and successful Slovakia	Slovak	National experts
42	Slovakia	National	Mechanizmus pilotnej schémy pre mestá a obce v oblasti Smart Cities financovaných z prostriedkov EŠIF a nástrojov podpory Európskej únie vrátane návratných foriem financovania	Mechanism of a pilot scheme for Smart Cities-funded cities and municipalities funded by ESI Funds and European Union support instruments, including repayable forms of funding	Slovak	National experts
43	Slovakia	National	Strategický plán rozvoja dopravy SR do roku 2030	Strategic plan for the development of transport in the Slovak Republic until 2030	Slovak	National experts

NO.	COUNTRY	LEVEL	ORIGINAL NAME OF THE DOCUMENT	TRANSLATED NAME OF THE DOCUMENT	LANGUAGE	SOURCE
44	Slovakia	National	Nízkouhlíková stratégia rozvoja Slovenskej republiky do roku 2030 s výhľadom do roku 2050	Low-carbon development strategy of the Slovak Republic until 2030 with a view to 2050	Slovak	National experts
45	Slovakia	National	Aktualizácia národnej stratégie regionálneho rozvoja Slovenskej republiky (pôvodná aktualizácia strategického dokumentu na roky 2014 až 2020)	Update of the National Strategy for Regional Development of the Slovak Republic (original update of the strategic document for the years 2014 to 2020)	Slovak	National experts
46	Slovakia	Local	BRATISLAVA rozumné mesto 2030 | Koncepcia Smart City	BRATISLAVA smart city | 2030 Smart City concept	Slovak	National experts
47	Slovakia	Local	Program hospodárskeho rozvoja a sociálneho rozvoja Mesta Nitry | Aktualizácia na programovacie obdobie 2015 – 2023	Economic Development and Social Development Program of the City of Nitra | Update for the programming period 2015 - 2023	Slovak	National experts
48	Slovakia	Local	Program rozvoja mesta Hlohovec na roky 2016 - 2023	Development program of the town of Hlohovec for the years 2016 - 2023	Slovak	National experts

NO.	COUNTRY	LEVEL	ORIGINAL NAME OF THE DOCUMENT	TRANSLATED NAME OF THE DOCUMENT	LANGUAGE	SOURCE
49	Slovakia	Local	Program hospodárskeho rozvoja a sociálneho rozvoja mesta Trnava na roky 2014 - 2020 s výhľadom do roku 2030	Program of economic development and social development of the city of Trnava for the years 2014 - 2020 with a view to 2030	Slovak	National experts
50	Slovakia	Local	Stratégia implementácie SMART technologii v Meste Trenčín	Strategy for the implementation of SMART technology in the City of Trenčín	Slovak	National experts
51	Hungary	National	Részvételi tervezés a településfejlesztési és -rendezési tevékenységekben	Planning for participation in settlement development and management activities	Hungarian	National experts
52	Hungary	National	Az okos város fejlesztési modell módszertani alapjai	Methodological foundations of the smart city development model	Hungarian	National experts
53	Hungary	National	Smart City Tudásplatfrom	Metodikai Javaslat	Smart City Knowledge Platform	Methodological Recommendation	Hungarian	National experts
54	Hungary	National	Településértékelés és Monitoring	Módszertani Javaslat	Settlement Assessment and Monitoring	Methodological Proposal	Hungarian	National experts

NO.	COUNTRY	LEVEL	ORIGINAL NAME OF THE DOCUMENT	TRANSLATED NAME OF THE DOCUMENT	LANGUAGE	SOURCE
55	Hungary	National	A Digitális Jólét Program 2.0	Digital Wellbeing Programme 2.0	Hungarian	National experts
56	Hungary	National	Közgyűjteményi Digitalizálási Stratégia (2017-2025)	Public Digitalisation Strategy (2017-2025)	Hungarian	National experts
57	Hungary	National	Digital Child Protection Strategy of Hungary	-	English	National experts
58	Hungary	National	Digital Education Strategy of Hungary	-	English	National experts
59	Hungary	National	Digital Export Development Strategy of Hungary	-	English	National experts
60	Hungary	National	Digital Startup Strategy of Hungary	-	English	National experts
61	Hungary	Local	Smart Budapest | Okos Város Keretstratégia	Smart Budapest | Smart City Framework Strategy	Hungarian	National experts
62	Hungary	Local	Budapest Főváros Xiii. Kerületi Önkormányzat | Intelligens Kerület koncepció	Budapest Capital XIII District Municipality | Smart District concept	Hungarian	National experts
63	Hungary	Local	Józsefváros Smart City Stratégia	Józsefváros Smart City Strategy	Hungarian	National experts

NO.	COUNTRY	LEVEL	ORIGINAL NAME OF THE DOCUMENT	TRANSLATED NAME OF THE DOCUMENT	LANGUAGE	SOURCE
64	Hungary	Local	Szeged Megyei Jogú Város | Smart City Jövőkép és Koncepció	City of Szeged | Smart City Vision and Concept	Hungarian	National experts
65	Hungary	Local	Letenye város smart city és IKT koncepció	Letenye city smart city and ICT concept	Hungarian	National experts

Source: own study.
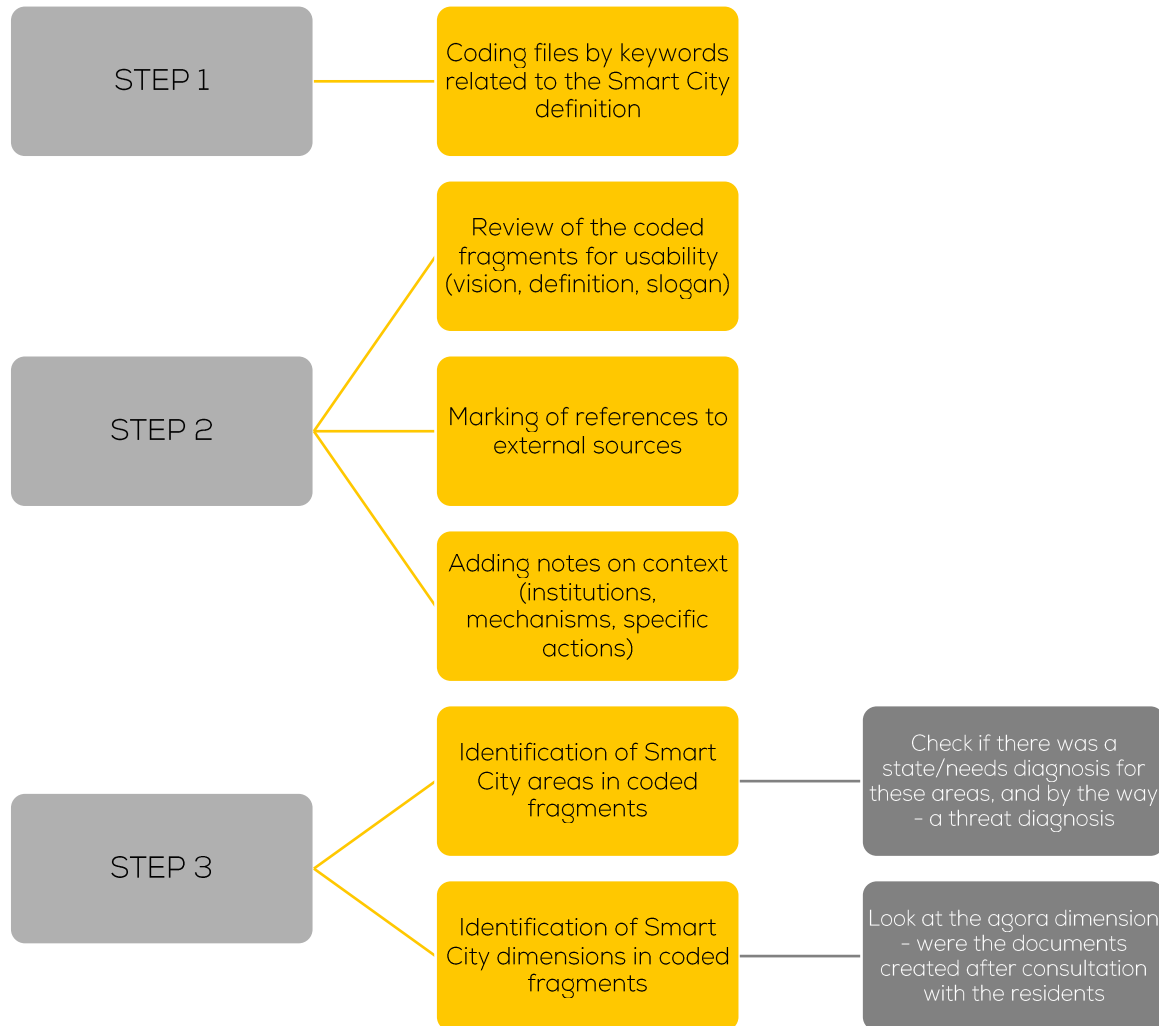
Table 2. List of keywords for country-by-country analysis

KEYWORD	POLISH	CZECH	SLOVAK	HUNGARIAN
Smart city	Inteligentne miasto	Chytré město	Inteligentné mesto	Okos város
Intelligent city	Inteligentne miasto	Inteligentní město	Inteligentné mesto	Intelligens város
Wise city	Mądre miasto	Moudré město	Múdre mesto	Bölcs város
Efficient city	Wydajne miasto	Efektivní město	Efektívne mesto	Hatékony város
Compact city	Kompaktowe miasto	Kompaktní město	Kompaktné mesto	Kompakt város
Sustainable city	Zrównoważone miasto	Udržitelné město	Udržateľné mesto	Fenntartható város
Coherent city	Spójne miasto	Soudržné město	Súvislé mesto	Koherens város
Competitive city	Konkurencyjne miasto	Konkurenční město	Konkurenčné mesto	Versenyképes város
Strong city	Silne miasto	Silné město	Silné mesto	Erős város
Knowledge city	Miasto wiedzy	Znalostní město	Znalostné mesto	Tudásváros
Digital city	Cyfrowe miasto	Digitální město	Digitálne mesto	Digitális város
Wired city	Miasto przewodowe	Drátové město	Drôtové mesto	Vezetékes város
Comfortable city	Wygodne miasto	Pohodlné město	Pohodlné mesto	Kényelmes város
Resilient city	Odporne miasto	Odolné město	Odolné mesto	Ellenálló város

KEYWORD	POLISH	CZECH	SLOVAK	HUNGARIAN
Aware city	Świadome miasto	Vědomé město	Vedomé mesto	Tudatos város
Better city	Lepsze miasto	Lepší město	Lepšie mesto	Jobb város
Well-performing city	Miasto dobrze prosperujące	Dobře fungující město	Dobre fungujúce mesto	Jól teljesítő város
Self-decisive city	Miasto decydujące o sobie	Samorozhodující město	Samorozhodujúce mesto	Öndöntő város
Independent city	Niezależne miasto	Nezávislé město	Nezávislé mesto	Független város
Forward-looking city	Miasto patrzące w przyszłość	Výhledové město	Do budúcnosti smerujúce mesto	Előre tekintő város
Future city	Miasto przyszłości	Budoucí město	Budúce mesto	Jövő város
Sensible city	Rozsądne miasto	Rozumné město	Rozumné mesto*	Értelmes város

* This keyword has been added to the set after the analysis of city strategy for Bratislava.

Source: own study.

Figure 1. The steps of country-by-country analysis

| STEP 1 | Coding files by keywords related to the Smart City definition |

STEP 2	Review of the coded fragments for usability (vision, definition, slogan)
	Marking of references to external sources
	Adding notes on context (institutions, mechanisms, specific actions)

| STEP 3 | Identification of Smart City areas in coded fragments | Check if there was a state/needs diagnosis for these areas, and by the way - a threat diagnosis |
| | Identification of Smart City dimensions in coded fragments | Look at the agora dimension - were the documents created after consultation with the residents |

Source: own study.

Additionally, seven interviews were conducted. One was conducted in Slovakia, two in Hungary and four in Poland. All of the respondents were representatives of national ministries dealing with Smart City issues or associated with other governmental organisations and initiatives. Some of the interviewees provided additional information on strategic documents that had to be taken into account. Most of them commented on the already included documents and their role and usability within the implementation of urban policy in their countries. All of them expressed the need of constant improvement of strategic documents.

However, we were not able to contact any representative of the Ministry of Regional Development of the Czech Republic.

SUPPLEMENTARY OVERVIEW OF POLISH DOCUMENTS

Supplementary overview of Polish documents included three documents. A presentation of assumptions of the "Human Smart City - Space and Society" project (connected to a widely discussed competition for Smart Cities financed within the EU framework), assumptions for updating the National Urban Policy 2023, which proved to be the most important national document in terms of Smart City issues in Poland, and National Broadband Plan, a new strategic document mentioned in the interview.

All of the documents required a more detailed analysis than only coding. The terms "smart city" or "intelligent" have been used frequently in the documents but the context provided a better understanding for the use of these words. The study referring to the "Human Smart Cities" competition has added a different light on the Smart City definition included in the earlier analysed documents. The smartness is translated as availability of the city. An available city means the availability of the decision process for all stakeholders, available information about the city services, mobility as well as social bonding and networking.

When it comes to the new strategic document (National Broadband Plan) in the analysis, it covers the most technological dimension of the Smart City concept. However, the document covers the issue of broadband and 5G infrastructure which is crucial in further development of Smart Cities initiatives. Improving the infrastructure means lower costs and higher quality of service, which means creating new standards for Smart Cities development. The lack of complex regulation for public administration responsibilities concerning Smart Cities is also mentioned.

The most important document to view in this matter was the overview of assumptions for the new National Urban Policy. What is particularly interesting, the vision of the city has slightly changed. Whereas the original National Urban Policy described the ideal smart city as "efficient, compact, sustainable, coherent – and as a result – competitive and strong", the new National Urban Policy will focus on different features . The future city should move in the direction of strong and resilient cities and by that is meant just, productive, green, smart and compact. Being smart became one of the feature of an ideal city. And here the smartness is due to digitalization. As far as the areas of Smart City initiatives are concerned, smart urban mobility, energy efficiency, sustainable housing, public services, commerce, supply of necessities and bottom-up management are mentioned as important elements of urban development that can become smarter. Despite starting with digitalization, the Smart City concept in the new National Urban Policy can be visible in three dimensions.

Starting with *automata* (the IT solutions and high-quality public services), through *humana* (focus and goal of the quality of life and being human-centred), ending with *agora* (inclusion in the decision process and diminishing the risk of divisions resulting from digitalization). In a smart city or an intelligent city there are different actors (at least three groups, such as administration, residents and entrepreneurs), all of them are attracted by the city and benefitting from its development.

SUPPLEMENTARY OVERVIEW OF INTERNATIONAL DOCUMENTS

The supplementary overview of other documents covered the New Leipzig Chapter with all its annexes and supplements and the Territorial Agenda 2030. Both documents have been accepted in the course of the study (respectively on the 30th November and the 1st June).

The New Leipzig Charter sets out guidelines for the development of European cities. It is an update of the first version of the Leipzig Charter on Sustainable European Cities adopted by EU Ministers in 2007. The need to update it was advocated by ministers in the Bucharest Declaration in 2019. The New Leipzig Charter is a set of strategic principles and directions for good urban governance that defines urban policy in Europe beyond 2020. While the postulates from the first version of the document are still valid, the New Leipzig Charter strongly emphasizes the need for transformation towards equitable, green and productive cities. The main differences are highlighted in Table 3.

As far as Smart City concept is concerned, in the New Leipzig Charter it is not mentioned it by its name. But digitization is analysed as a separate issue. It is an important aspect, with both the benefits of digital transformation and the risks like increasing inequality or threatening privacy. The areas include smart urban mobility, energy efficiency, sustainable housing, public services, retail, supply of daily goods and civic-led governance. These are the exact areas that will be covered in the new National Urban Policy. A part of shaping the digital transformation of cities will be e.g. developing and implementing integrated and inclusive Smart City strategies with impact assessment and awareness of long-term effects.

It has already been seen in Poland that newer local strategies are Smart City strategies and tend to be based on consultation process with residents.

Table 3. The differences between the Leipzig Charter and the New Leipzig Charter

AREA	THE LEIPZIG CHARTER	THE NEW LEIPZIG CHARTER
Message	Cities face specific problems, which need to be addressed.	The world is facing specific problems and these need to be addressed through urban policies. Unprecedented challenges are emerging (mainly the climate crisis and digitalization) that will be particularly relevant in cities. The key working principles in the 2007 Leipzig Charter are still valid. However, they need to be updated in view of today's global challenges and implemented by all those involved in urban development.
Policy	Little reference to how the policy is made, rather the conditions given to strive for.	More emphasis on cooperation and complementarity of functions and policies on different levels-neighbourhood, city, regional, national (the issue appeared in the old version, but in the new one it is more emphasised and described in detail). The way of doing politics is outlined quite generally, but given more space.
Digitization	No reference.	Digitization was given a separate thought. It is an important aspect, with both the benefits of digital transformation and the risks like increasing inequality or threatening privacy.

AREA	THE LEIPZIG CHARTER	THE NEW LEIPZIG CHARTER
Poor neighbourhoods / socially vulnerable groups	Policy for poor neighbourhoods is emphasised strongly as it was given a separate chapter.	Less emphasis that equal access of residents to public services and infrastructure is very important. Recommending that neighbourhoods should be socially diverse, focusing not on residents of poor neighbourhoods but on socially vulnerable groups in general.
Education	Education emerges as both one of the four most important citywide policies and one of the four most important policies for increasing the quality of life in the poorest neighbourhoods.	Education only appears in the context of equal opportunities for all residents to access public services.

Source: Leipzig Charter, the New Leipzig Charter.

The second document, adopted by European ministers on the 1st December, is the EU's Territorial Agenda 2030, which sets out the actions necessary to strengthen territorial cohesion, i.e. to ensure good living conditions for all inhabitants of Europe. The main differences between the new document and its predecessor, the Territorial Agenda 2020, are outlined in

Table 4. What is particularly important, the changes are similar to the ones visible in the approach to the National Urban Policy.

Not only has the focus shifted in the direction of sustainable development, public transport and climate change, but also the participation issues have been clearly outlined. The mostly general statements of how to reach the objectives have been replaced with sharply pointed objectives and recommendations addressed to specific institutions. Financing framework has finally been addressed in National Urban Policy as well. Naturally, the Smart City concept appears in the document, but it is only referred to as smart specialisation and smart mobility or as an element of an example worth mentioning.

Table 4. The differences between Territorial Agenda 2020 and Territorial Agenda 2030

AREA	TERRITORIAL AGENDA 2020	TERRITORIAL AGENDA 2030
Challenges	Increased exposure to globalisation (i.e. the global economic crisis) EU integration Territorially diverse demographic and social challenges, segregation of vulnerable groups Climate change and environmental risks Energy challenges Loss of biodiversity	All challenges from the old document are valid. Challenges that have appeared in the new version: • quality of government and governance; • quality of life; • services of general interest; • digitalisation and the 4th industrial revolution; • employment and economic development; • circular value chains.
Priorities - competitiveness	Ensuring global competitiveness of the regions based on strong local economies is a separate priority.	Competitiveness is mentioned in various contexts but emphasis is rather put on sustainable development.
Priorities - sustainable connections	Main focus on access to infrastructure.	Different focuses, among others: mobility as a service, digital transformation (with low carbon footprint), e-government, e-services. Great emphasis on public transport.
Priorities - environment	Main focus on qualitative conservation of natural heritage (also appears in Territorial Agenda 2030).	Greater emphasis on protection of ecosystems and climate crisis. Desired actions are listed.
Priorities - circular economy	No reference.	The focus appears in a separate subchapter.
Participation	No reference.	Appears in various contexts, explicitly and implicitly.

AREA	TERRITORIAL AGENDA 2020	TERRITORIAL AGENDA 2030
How to reach the objectives	Fairly general statements of what should be improved, what should be continued, etc. Usually without any indication of institutions responsible.	Pointed objectives. Recommendations addressed to specific institutions - e.g. EC, EP, EIB

Source: Territorial Agenda 2020 and Territorial Agenda 2030

The Smart City concept has also been mentioned in a document at a level higher than European. The New Urban Agenda, among other provisions, includes a commitment to adopt a Smart City approach. However, the understanding of the concept is similar to the one in European and Polish documents, especially outlined in the assumptions for updating the National Urban Policy. In the New Urban Agenda it is advised to make use of *opportunities from digitalization, clean energy and technologies, as well as innovative transport technologies, thus providing options for inhabitants to make more environmentally friendly choices and boost sustainable economic growth and enabling cities to improve their service delivery*. Again, the lack of smart and green issues as well as their interactions can also be seen in the Polish document where a smart and a green city are mentioned among the objectives.

Summing up, the international documents, along with the most important Polish ones, seem to reflect the global trend of thinking. In many cases, older versions of the documents recommended policies that consisted of "firefighting". The objective was solving current urban problems, but without a paradigm shift. The newer ones saw all sorts of connections in a much broader context, and looked deeper for the causes. The focus was on urban transformation, not just narrowly understood development.

STRATEGIC DOCUMENTS OF THE CZECH REPUBLIC

NATIONAL LEVEL

In the Czech Republic, there is a whole Smart Cities concept that is reflected in strategic documents and policies. The Ministry of Regional Development is responsible for implementing the concept. It supports cooperation at the national level through the leadership of the Working Group for Smart Cities under the Government Council for Sustainable Development and Pilot Project Smart City / Smart Region. The ministry provides methodological support to cities in introducing the concept into city administration, through a certified Methodology of the Concept of Smart Cities and related professional seminars, which it organizes for city representatives. It further promotes awareness of concept, for example, using the Smart Cities website (www.smartcities.mmr.cz) and organizations and participation in professional events.

The concept has its origins in European strategic documents. The earliest strategic document that Czech documents refer to is the Strategic European Technology Plan (SET-Plan) published in 2007. The SET Plan aimed to address issues related to the future of energy. Smart Cities was also a part of it. Then the European Innovation Partnership on Smart Cities and Communities was defined which also stands as an example for Czech institutions. The Czech concept of Smart Cities is also relevant from the point of view of the basic strategic document of the EU Strategy Europe 2020. The strategy is also a top document for the area of Cohesion Policy, therefore, according to the EC, this approach should also appear in the documents of the Member States.

That is why the Smart Cities concept is elaborated in the recommended document Methodology of the Smart Cities Concept, which is followed by the Methodology of financing Smart City projects. Although they are not strategies, both documents are under the responsibility of the Ministry of Regional Development of the Czech Republic, which is the guarantor of the entire concept. However, the concept is addressed in different strategic documents at national level, both general development strategies and sectoral ones. Because all strategic documents mention the same term – the "Smart Cities" concept, we can call it a holistic approach at national level.

The most important document in the above outlined context is naturally the Methodology of the Smart Cities Concept (Metodika Konceptu inteligentních měst). First of all, it presents the definition of the concept. *The term Smart Cities means the concept of strategic management of a city, or municipality or region (for simplicity, hereinafter referred to only as "Smart Cities", "SC concept", "SC" without further distinction).* According to the document, the primary objective of Smart Cities concept is to ensure a good quality of life for residents (*humana*), where modern technology is used as a tool (*automata*) to influence the quality of life in the city.

In doing that, synergies occur between the various activities and public services that make the city functional (*agora*). It all forms a 3-dimensional definition with the social aspect (*humana)* in the first place.

The understanding of the definition is also reflected in other strategic documents, e.g. Strategický rámec Česká republika 2030. What is stated there is that not only technological change is significant, but also social and organizational innovation. The goal is to create and support vibrant communities and viable cities.

The areas where the intervention is necessary are mainly transport, energy and information and communications technologies. As it is stated in the methodology, these technological pillars are embedded in the green infrastructure of the city. This leads to an extent where the smart issues can be understood as sustainable. The greatest application of the concept is required in the field of transport, energy and ICT, but also in other areas such as waste management, water management, e-government and crisis management. In all these areas the Smart Cities concept can lead to better quality of life and streamline the administration of public affairs. Among others, the Smart Cities concept is directly referred to in strategic documents connected with sustainable mobility - Koncepci nákladní dopravy pro období 2017-2023 s výhledem do roku 2030, intelligent transport systems - Akční plán rozvoje inteligentních dopravních systémů (ITS) v ČR do roku 2020 (s výhledem do roku 2050) - and electromobility - Národní akční plán pro chytré sítě 2019-2030.

What is particularly important, the Methodology of the Smart Cities Concept provides not only theoretical background of the Smart Cities concept. Besides it presents the orderly suggestions about the objective, the content and the structure of a strategic document, stakeholders in developing and implementing the strategy and tips for evaluating the success of the Smart Cities strategy as well as some practical application of the concept, i.e. basic types of projects for implementing modern technologies. It is worth mentioning that the general methodology for the concept is followed by a practical methodology for financing a Smart City initiative. The document covers not only financing from the European Union (divided into EU subsidies and EU financial instruments) that are available and preferable, but also debt financing and mixed financing, including DBFO, PPP or crowdfunding. The documents as well as good practices and contact information to a specific person responsible for the concept within the ministry are available on the governmental website.

Last but not least, the Ministry of Regional Development conducts the following activities in order to implement the concept: they teach municipalities and cities how to properly proceed in the implementation of the concept, coordinate the activities of various leading experts and public opinion through meetings, lead a working group that

identifies current trend, offer reviews of project financing and support their implementation and organize workshops and professional conferences with the participation of prominent personalities.

All in all, the holistic approach adopted in the Czech Republic has both strategic and operational features. It appears in different forms, starting from various documents and methodologies, through publicly available support via the website and contact point, ending with direct support at conferences and workshops. At the national level all documents can refer to the concept implemented by the ministry.

LOCAL LEVEL

At the local level the provisions in the strategic documents of the Czech Republic also usually refer to the Smart Cities concept supervised at the national level. There is no definition provided in the documents as it is clear and understood in the same way as it is presented in general methodologies for Smart Cities projects. However, different areas are pointed out at the local level. More emphasis is put e.g. on the safety, resilience and governance issues. As it is stated in a document for Prague (Koncepce Smart Prague do roku 2030), Smart Cities offer a number of options and innovative procedures for ensuring the safety and protection of the city's inhabitants, or the internal security of the office's operation.

The documents created by or for particular cities tend to present a more pragmatic approach to the implementation of the concept. They focus more thoroughly on the areas that should be supported within the Smart Cities concept (Smart Prostějov. Manuál chytrého města) or already specified smart solutions (Koncepce Smart City Orlová – rozvojová strategie města). They also include detailed descriptions of stakeholders that should be taken into account during decision processes, e.g. the public companies, academic and research institutions, local governments. An analysis of local strategies, general and sectoral, and their cohesion with national documents and Smart Cities concept is often included. SWOT analysis or a similar analysis is sometimes provided and proves to be an important part of a strategy (Strategie Smart City Plzeň).

Most of the mentioned documents have been created on the basis of a detailed diagnosis. The analytical part was prepared with the use of the already gathered data, with a careful selection of existing data sources (digital and non-digital). The presented conclusions had been drawn from the earlier conducted consultation process. The process included interviews with residents as well as seminars with the city representatives (Koncepce Smart City Orlová – rozvojová strategie města) as they are important stakeholders and are aware of the city capabilities. The methodology was usually presented with a reference to the national methodology of the Smart Cities concept.

An exception among these documents is the strategy for Brno (Strategy #brno2050). This is the only document that has a different time frame than the others and was written in English, not in the national language. It contains a vision of the city in 2050. Although it does mention the Smart Cities concept, the vision of the city shares different features of a smart city. As it is stated in the document, Brno wants to be a city that is open, accountable, respectful, efficient, diversified, modular and smart. Other features of the future city are: attractive, developing, vibrant, harmonious, sustainable and well administered. All of that accounts for a smart city of the future.

Summing up, the holistic and unified approach adopted at the national level is reflected in the documents at the level of cities. All the analysed cities, whether they adopted the Smart City strategy or not, present their issues and actions in a very practical manner. The differences between those documents result from the local specifics.

STRATEGIC DOCUMENTS IN SLOVAKIA

NATIONAL LEVEL

One thing that is characteristic for Slovakia is that they do not have a Smart City strategy at the national level. However, the strategy is being currently created and is supposed to be published in June 2021. It will contain not only the main strategic documents but the whole package of methodological guidelines, e.g. in the IoT area.

The existing strategic documents rarely mention the idea of Smart City. Even though they consider the areas similar to Smart City areas, they do not refer to the concept directly. As it is stated in one of the documents, some intelligent concepts already exist in Slovakia (among others Smart Cities), others need to be created (smart grids, smart homes, smart buildings), but the most important is the interconnection and mutual communication of these concepts (Koncepcia inteligentného priemyslu pre Slovensko).

There are also two documents that can serve as textbooks for institutions implementing Smart City solutions. The first one is called Support for innovative solutions in Slovak cities (Podpora inovatívnych riešení v slovenských mestách). This document contains all basic information in this matter, describes the key aspects of the Smart City topic with emphasis on their implementation in practice through business entities and provides a practical tool for businesses and cities in the form of new support mechanisms. The structure is similar to the one of the methodological document of the Czech Republic. Its main parts concern, among others, the principles of implementing the Smart City concept, the stakeholders groups, the main focus areas, a kind of a diagnosis including residents' opinions as well as examples of pilot projects. Given that no specific state aid measure supporting innovative projects in the field of Smart City has been implemented in the Slovak Republic, the document also includes a proposal for a scheme to support

the introduction of innovative solutions in cities. At the end of the document there is a set of recommendations for more effective development of the Smart City topic in Slovakia, which relate mainly to clear identification of the Smart City coordinator at national level, introduction of a new support mechanism or creation of an investment platform to support Smart City.

The second document presents a higher level of detail and is entitled Mechanism of a pilot scheme for Smart Cities-funded cities and municipalities funded by ESI Funds and European Union support instruments, including repayable forms of funding (Mechanizmus pilotnej schémy pre mestá a obce v oblasti Smart Cities financovaných z prostriedkov EŠIF a nástrojov podpory Európskej únie vrátane návratných foriem financovania). It corresponds to the Czech document concerning methodology of financing smart solutions, but if focuses mainly on public funding. The content concerns funding opportunities from ESI Funds operational programs, cross-border cooperation programs and other EU sources, sources of the state budget of the Slovak Republic, financing mechanisms provided by financial institutions, Norwegian and Swiss Financial Mechanisms or combining public and private resources.

However, as it was outlined during the interview, both documents are described by the recipients as hard to understand and not very practical. As cities and municipalities in Slovakia are mostly small and medium size, the guideline should be provided in a simpler and more coherent way.

The definitions presented in the above documents focus on all 3 dimensions of the Smart City concept (*automata*, *humana* and *agora*). Smart Cities are urban areas where information and communication technologies are used as a tool to solve complex problems. In the above documents it is perceived both as an opportunity and a challenge for Slovak small and medium-sized enterprises, which will be able to apply their innovative solutions in cities in order to increase the quality of life of the population. Another description of Smart City claims that it is a new approach in the development of cities and urban regions, their management and planning, using technical and technological innovations, including information and communications technologies. It is an effort to increase the quality of life and the quality of the business environment in cities and regions, to increase the efficiency of their operation, to make them safer, cleaner, more energy efficient and able to respond to social, environmental or other challenges and needs. Both these statements refer to technological and social aspects with the participation of different entities. It is outlined in one of the documents that there is currently no international legally binding definition or legal framework for the given concept, which would precisely regulate the procedure for achieving the required state. Each country follows its own "smart" concepts and

methodologies, which are in line with the global documents dealing with this issue. What is characteristic for this Slovak definition, there is greater emphasis on the contribution of business in creating smart solutions.

Focus areas of Smart City initiatives in Slovakia should be government / self-government, mobility, healthcare, education, energy and the environment. There is also one focus area that has not appeared before, neither in Poland nor in the Czech Republic. The area is building, which is understood here as interconnected device management, smart homes and intelligent construction.

Apart from strategic documents, Slovakia has undertaken similar actions to the Czech Republic in terms of implementation of the Smart City concept. There is also a governmental website (https://www.smartcity.gov.sk/) where good practices from Slovakia and other countries are gathered. Information concerning available competitions and EU funding is also available. What was already mentioned in the case of the Czech Republic and emphasised during the interview with Slovak representative, there is a separate governmental position responsible for the development of Smart Cities, a contact point. Another fact worth mentioning in that Slovakia has prepared a Smart City Index (https://inteligentnemesta.sk/).

A summary for the Slovak approach to Smart Cities at the national level can be the provision of a strategic document suggesting that in the Czech Republic the perception of the Smart City concept is more intense than in Slovakia. This can sound like an inspiration of the holistic approach adopted by the Czech Ministry of Regional Development and a goal for the future.

LOCAL LEVEL

Strategic documents in Slovakia refer to the concept of Smart City even less often than the ones in the Czech Republic. Among the analysed documents only 3 documents mentioned the concept (each of them in a different manner) and 2 cities called themselves smart.

On one hand, the city of Hlohovec only mentioned Smart City applications as one tool within the objective of healthy economy. However, the vision of the city consists of different features of a Smart City: an open and accessible city, healthy economy (Digital City Hlohovec), attractive city, socially and ecologically responsible city (Program rozvoja mesta Hlohovec na roky 2016 – 2023).

In contrast with Hlohovec, Bratislava's strategy openly refers to the Smart City concept in its widely understood form. As it is stated at the very beginning of the document, Smart City is a concept that can be understood in a broader sense as the city of the future (Bratislava Rozumné mesto 2030. Koncepcia Smart City). In particular, Smart City

represents an ideological approach focused on the ability of cities to respond to the emerging challenges of their territorial development, which is primarily aimed at improving the quality of life based on innovation. The basic idea of the Smart City vision in Bratislava is "Reasonable Bratislava - a better place to live". The implementation of the Bratislava Reasonable City 2030 concept in the initial phase consists of the preparation and implementation of measures planned in the priority area of development "city administration", which are key to fulfilling the essence of Smart City. This means that smart can be translated as reasonable and resilient, whereas the main and general focus area is city administration. As far as the dimensions of the Smart City concept are concerned, local strategic documents seem to be focused on the quality of life (*humana*) with a little assistance of technological solutions (*automata*).

Only the last document, which is the Smart technology implementation strategy in the City of Trenčín (Stratégia implementácie SMART technológií v Meste Trenčín) is a comprehensive Smart City strategy. It contains all necessary elements of a local strategy with reference to the Smart City concept: a brief description of linked strategic documents, a detailed diagnosis of the existing infrastructure (separately for technical, social and environmental infrastructure), a collection of already implemented smart solutions, a SWOT analysis, a list of identified development challenges, a strategic framework with a set of objectives, an assurance of financing sources and monitoring mechanisms. Although the document describes the smartness of the city only as a part of the development vision, it is the ambition of Trenčín to be smart and to move to the state where modern technologies in conjunction with human and social capital and broader economic policy can successfully influence the city's development and functioning. Among different focus areas (such as transport, energy, environment, social infrastructure and public policy management), coordination and education in the field of the Smart City concept is one separate strategic priority.

To sum up, the lack of one holistic understanding of the Smart City concept allowed the city to create its own approach to them being smart.

STRATEGIC DOCUMENTS IN HUNGARY

NATIONAL LEVEL

Hungary has the most unique organisational structure on the national level among all the V4 countries. First of all, there is an institution that is responsible for Smart City issue and is partially dependent on the government. The Lechner Knowledge Centre (Lechner Tudásközpont) is the professional background institution of architecture, construction, real estate registration and GIS in the Prime Minister's Office, and its mission is to digitize and socialize its wide-ranging public services related to the built

environment and spatial data. The institution is responsible for creating strategic documents and guidelines in terms of Smart City. These include, among others:

- Részvételi tervezés a településfejlesztési és -rendezési tevékenységekben (Planning for participation in settlement development and management activities);
- Az okos város fejlesztési modell módszertani alapjai (Methodological foundations of the smart city development model);
- Smart City Tudásplatfrom | Metodikai Javaslat (Smart City Knowledge Platform | Methodological Recommendation);
- Településértékelés és Monitoring | Módszertani Javaslat (Settlement Assessment and Monitoring | Methodological Proposal).

Secondly, in Hungary there is an official definition of the Smart City concept in the law. According to the Hungarian Government Decree No. 56/2017, which was issued in the Official Gazette on 20th March 2017, an official definition to the meaning of "smart city" is as follows. A smart city is a settlement or a group of settlements, which develops its natural and built environment, digital infrastructure, and the quality and economic efficiency of its locally available services by adopting novel and innovative information-technologies, in a sustainable way, through the increased involvement of its residents.

Thirdly, there is plenty of strategic documents which does not mention the Smart City concept specifically but at the same time they concern different aspects of digital development of the country: These are e.g.:

- A Digitális Jólét Program 2.0 (Digital Wellbeing Programme 2.0);
- Közgyűjteményi Digitalizálási Stratégia 2017-2025 (Public Digitalisation Strategy 2017-2025) ;
- Digital Child Protection Strategy Of Hungary ;
- Digital Education Strategy Of Hungary;
- Digital Export Development Strategy Of Hungary;
- Digital Startup Strategy Of Hungary.

Finally, Hungary is also the only country where in the documents there is little reference to the Smart City concept in English. The term "Okos Város" is used commonly in the documents and is referred to without any additional explanations.

When it comes to the definition of the Okos Város / Smart City concept, it is clear that in Hungary the *humana* dimension is the starting point for understanding the concept. In this framework, technological and intelligent service solutions are only tools for more complex goals of quality of life, efficiency, ecological and economic sustainability that, when used in conjunction with other tools, can work successfully. It is also stated in the

documents that the existing idea of Smart City, developed and systematized primarily by development companies, consultants and researchers, can hardly be interpreted for the part of the Hungarian public administration serving at the municipal level. That is why the documents mention also the cooperation dimension (*agora*), which concerns not only business stakeholders. A proof for this is also a separate document focusing on the issue of stimulating participation (Részvételi tervezés a településfejlesztési és -rendezési tevékenységekben).

In addition to this, there is also no specific emphasis on particular issues or areas of intervention. The idea of Smart City can actually be applied in every field of the city development, to any of the identified problems. What is mentioned on the Lechner Knowledge Centre's website "being a Smart City is a process, a journey of continuous improvement". City management and public services are mentioned in the documents on a regular basis, but in fact it refers also to providing residents with public transport, green energy etc.

As far as the overall approach to Smart City concept and its role in urban policy making is concerned, Hungary represents a strong, experienced and mature point of view. The policy makers are aware of the strong lobbying of the technological companies. On one hand, Smart City concept seems to be only a thread within the complex urban policy, while on the other hand it looks as if it is the urban policy itself. The methodological document prepared by the Lechner Knowledge Centre does not resemble any of the documents analysed before. Its content can be described as a combination of Polish National Urban Policy 2023 (with a clear vision and deep understanding of the cities situation) with methodological documents of the Czech Republic and Slovakia (practical application and funding mechanisms). The document starts with the analysis of background processes and what shapes today's world cities. Then it moves to the issue of Smart Cities – the definition, key actors, forms of cooperation, advantages and challenges. A reference to EU and national regulations is also included. After that comes the operational part of the document regarding the development model of a particular Smart City and what should taken into account while building one. At the end the coherence of the content with other documents is checked.

All the above mentioned factors create an image of Hungary is a country which is aware of how the Smart City concept should work. However, the policy makers emphasize the need for constant improvement of both documents and actions.

LOCAL LEVEL

Local strategic documents in Hungary at the first glance are not very different than the ones in other V4 countries. All of them are compliant with the proposed methodological documents and cover the most important elements for a strategy. Here there are also

strongly focused on the Smart City issue, not only the city development in the spirit of smartness. They all refer to the same or similar definition of the Smart City concept, which is of course outlined in the law. With the help of the Smart City framework, cities can create a liveable urban environment and a system of related services in the medium term, providing residents with the right living conditions, comfort and health, while paying significant attention to environmental protection, energy efficiency, sustainability, cost optimization and competitiveness (Letenye város smart city és IKT koncepció). The main objective of a strategy is to formulate a comprehensive, long-term, feasible document to follow, give directions for development with corresponding measures and provide guidance for many spatial and sectoral plans. The local specificity is widely underlined. The projects and funding sources should be identified for the city specifically (Józsefváros Smart City Stratégia).

Generally the documents put even greater emphasis on the *agora* dimension. The intervention is initially described regardless of the specific focus area. These are rather the "smartening" processes, such as urban governance, cooperation, social creativity, etc. (Smart Budapest. Okos Város Keretstratégia). Little information is provided on the particular information and communications technologies that can be used in projects within the Smart City concept. It is not stated anywhere that an example of a measure can be mobile apps, intelligent transport systems or smart grids. The ideas for projects seem to grow out of necessity for improvement.

There is one particular focus area that stands out in Hungary in comparison to other V4 countries. It is the strong interest in housing, settlements and real-estate market. This refers first to projects, among others energy efficient buildings, smart metering, intelligent building energy management, building management systems based on ICT, smart homes, camera and sensor systems, automatically controlled heating, cooling and lighting, monitoring electrical equipment in the home, geothermal energy (Szeged Megyei Jogú Város. Smart City Jövőkép és Koncepció). The next thing is the situation in the real estate market. It is frequently pointed out as a disadvantage that the margin of private ownership in Hungary is very high. This somehow determines the level of the ability to build communities as with many owners it is difficult to work as a unit for the greater good. And as a result, this can explain the focus on settlements and not cities, which can also be described a bottom-up approach and stimulating initiative. Even the definition of the Smart City written in the law mentions settlements, not cities. Another example of this interesting approach is the number of Smart City strategies prepared for each neighbourhood of Budapest (Budapest Főváros Xiii. Kerületi Önkormányzat | Intelligens Kerület koncepció, Józsefváros Smart City Stratégia). All in all, the local level of Hungarian strategic documents represents the bottom-up approach as well as focus on initiative and cooperation.

SUPPLEMENTARY INTERVIEWS

As it was mentioned earlier in the report, seven interviews were conducted. One was conducted in Slovakia, two in Hungary and four in Poland. There was no possibility to conduct an interview in the Czech Republic as the team could not contact the right representative, despite many trials. All the interviews took place online and according to a specific scenario.

At the very beginning the respondents were asked about the elements related to the implementation of the Smart City concept in their country that they are proud of (following the initial presentation of the study). Answering the questions, they discussed ways of supporting Smart City solutions by the state that have proven particularly effective from their point of view. Along with, the positive feature problems and challenges were discussed. The respondents had the task to present both problems to which solutions require actions at national or European level and those for the solutions of which cooperation or exchange of experience between individual cities is necessary? An interesting part included also the advantages of an exchange of experience. When it comes to the results of the interviews, what was described as an advantage for one ministry representative, was considered a disadvantage for another person. In other words, in Hungary there was emphasis on the definition outlined in the law whereas in other countries the respondents mentioned the lack of it.

Another vital part of the interview was the discussion on specificity of V4 countries. It included the specificity of the country interviewed among other V4 countries as well as the characteristic features of the V4 group as a whole. This part aimed at finding the factors that may influence the implementation of smart solutions and their transferability to other countries. The factors were understood not only as those at national strategic level, but also many other characteristics. Among others, the respondents mentioned e.g. the number and size of cities (varying across V4 group), additional activities conducted by the state or social issues affecting the willingness to participate.

The last and the most detailed part of the interview focused on particular strategic documents and their provisions, which can facilitate or hinder the implementation process of smart solutions. The respondents were also asked if the strategic provisions on how to implement projects are adequate to the objectives set. They also discussed the general state support approach for smart city initiatives if it is sufficient to disseminate effective smart solutions in the country as well as ensure competitiveness of national solutions. Some thoughts of the sustainability were also shared. What is the most important, the respondents provided names of documents and discussed their role in shaping Smart City projects.

Summing up the conclusions drawn above, the representatives of national ministries provided several success factors for implementation of smart solution in V4 countries, from their strategic point of view.

In the first place, they mentioned the existence of a uniform definition of a Smart City (in a strategy or a legal act) as an undeniable advantage for the development of the concept. In some countries the projects, which obviously can be qualified as smart, are not called that way and as a result the funding possibilities are unclear. What is more, such definition guarantees the coherence of a local strategy with a national one. Later the coherence may influence the allocation of funding for a project. The process of writing and consulting a strategy, especially its aspect of financial stability, is very expensive and time-consuming. That is why the coherence of the strategy with the basis of a uniform definition is the key to the successful Smart City performance.

Another success factor was a holistic, national approach to the Smart City concept. Lack of a central institution distributing funds and providing knowledge may significantly hinder the development process. It was often stated that the distribution of funding among cities of different sizes has been uneven. Only biggest cities, which are financially and mentally capable of implementing a smart solution anyway, have benefitted from the Smart Cities support programmes. The instructions for the city council should involve practical and applicable instructions, not scientific deliberations. Additionally, wherever there is one institution responsible for dealing with the issue of Smart Cities, both on the national and local level, it is easier to prevent lobbing activities of technological companies. Many policy makers are aware of the phenomenon and they recognize the risks related to it. As there is no holistic approach currently applied, it is also impossible to force the private solutions market to adapt to the needs of cities. Nowadays, it is still more likely that the conditions of solutions' implementation are defined by the contractors, not the owners.

Furthermore, the approach should also be of a participatory nature. Innovative, smart solutions are usually considered solutions of a high risk. The answer to the challenge is an advanced diagnosis of inhabitants' needs and conducting consultation processes (e.g. via urban labs). Due to that elements taken into account, local strategies are getting gradually better. The more the policy makers investigate the needs of inhabitants, the more suitable strategies and projects are executed. In the end there is less chance of failure. Lack of the requirements concerning participatory approach have been called a drawback for the development of the Smart City concept.

Last but not least, the awareness of technical issues affecting the development of the Smart City concept should also be included among the success factors. Smart solutions will never perform properly without a transmission network (broadband or 5G).