Smart cities as an effective tool for the internal organization of cities and the urban environment in the context of the impact of PBB on regional development

Lucia Rýsová, Peter Čajka

Abstract

The growing dynamics of life in today's societies, supported by the ever-accelerating process of innovation and improvement of technical and technological equipment of information and communication technologies, allow their wide use not only in economically and commercially interesting sectors but also in everyday life of individuals and social communities living in urban areas or rural environment.

In this respect, smart cities are the space for the efficient use of performance-based budgets (PBBs), which provides a number of possibilities for planning the tasks and activities of local government entities in connection with their priorities and the allocation of available budget resources to programs, with an emphasis on the results and efficiency of spending budget funds.

On the one hand effectively functioning PBB system has a direct impact on the quality and level of regional development and on the other hand the attractiveness as well as economic and social level of individual regions, cities.

The paper focuses on assessing the state and level of smart cities building, as well as the impact of budgets in the context of regional development within the European Integration Area and in the context of measures taken and implemented instruments to support these specific but socially and economically highly beneficial projects.

Key words: smart cities, The European Union, Performance Based Budgeting (PBB), sustainable development

Introduction

The life of contemporary societies and individual social communities, especially in economically developed countries characterized by high dynamics of economic development, is making significant progress and is subject to considerable acceleration. The recorded development trend significantly influences both political, socio-economic and cultural-social

processes taking place both at the national and at the regional and local level. The need to react as quickly as possible and to adapt flexibly to the dynamics of development is gaining more and more prominence. In this area, relatively wide possibilities are provided by information and communication technologies and various technical and technological solutions created and implemented on their basis. New, innovative procedures and ways of managing and organizing individual dimensions of life of today's communities come to the forefront of interest both at the transnational and at the national and regional level. One of the relatively often presented concepts providing a wide range of possibilities for fast and efficient organization of the urban and wider regional environment, especially with regard to the relatively rapid growth of cities and their gradual expansion into their wider hinterland, represents a new concept of modern cities.

In recent years' researchers have shown significant interest in the sustainable and smart urban development problems, which is reflected in a formulations variety related to the modern cities development trends: "smart cities", "sustainable cities", "green cities", "liveable cities", "digital cities", "intelligent cities", "knowledge cities", "resilient cities", "ecocities", "low carbon cities" … New terms appear as "Cities of Harmony". (Vukovic, et al., 2020, p. 77-81)

At the same time, it is possible to meet these trends at the municipal level by setting goals using the SMART method taken from strategic planning, where each letter in the word represents the initial letter of the characteristic - what the goal should be - specific, measurable, achievable, realistic, time oriented = SMART.

An example can also be seen in the introduction of the concept of program budgeting in local government. Municipalities strive to break down the budget into individual programs, within which they set goals, measurable indicators and achieved results. Smart city and smart community planning must include at least one of six characteristics: smart governance, smart people, smart living and housing, smart mobility, smart economy and smart environment. The concept of smart cities aims to improve the quality of life of citizens and use the deployment of appropriate information and communication technologies. The European Commission's definition also speaks of a more efficient use and interconnection of traditional services with information and communication technologies, which at the same time clearly correlates with the objectives of performance-based budgeting in the field of performance orientation. (De Vries, et al., 2019) The benefits are visible to both the public and private sectors, which are involved in or directly delivering innovations. It seems quite obvious that municipalities and cities commonly use information and communication technologies to ensure their

competencies and tasks. At present, they use them mainly to obtain and evaluate data through which the quality of public services, their availability and speed of delivery can be improved. The collection and analysis of data from various areas thus also enables effective management.

As of now, multiple definitions of smart city co-exist, so it is worth considering some widely accepted definitions referring to particular examples of European countries. The OECD views smart cities as indicatives or approaches leveraging digitalization to boost citizen's well-being and provide more efficient, sustainable and inclusive urban services and environments as a part of the collaborative, multi-stakeholder process. (OECD, 2020)

Based on this definition, the role of public authorities, in context of smartification, can be defined as follows:

- empowering extensive collaboration within/between cities as well as among private, public and individual stakeholders on local, regional and national levels;
- promoting citizen's engagement (intensifying civic participation and partnership using co-creation and co-production models, delivering citizen-focused services, creating smart collaborative platforms);
- ensuring equal public access to open data and advancing inclusivity principles;
- developing unified, integrated strategy of addressing the urbanization-caused challenges through implementing innovative digital solutions in a city governance, planning and infrastructure investment;
- documenting and researching the impacts of smart cities on community life, tracking the city performance and ensuring maximum contribution to improving a citizen's life through setting the smart indicators.

The understanding of smart city concept in particular countries has been largely determined by the peculiarities of its practical embodiment. The volatility of such reflection of smart models in a practical realm causes evolving of the core definition. For instance, the Latvian authorities view smart cities as cities that develop and implement a set of measures aimed at tackling challenges, increasing competitiveness of an area and ensuring flexible solutions. In Spain, the government stresses the holistic nature of smart cities such as enabling real-time efficient interaction between cities and citizens as well as ensuring sustainable economic, social and environmental solutions. According to the United Kingdom Department

of Business, Energy and Industrial Strategy, the concept of smart cities is viewed as a constantly changing, gradually evolving process or set of flexible steps that could be used to better adjust to challenges. The most successful smart cities are based on four pillars of comprehensive development-institutional, physical, social and economic modernizations. (Radchenko, 2020)

The concept of organizing the urban environment, especially with regard to the improvement and enhancement of its internal economic, social and environmental infrastructure, is also gaining prominence within the European integration area. Initiatives aimed at supporting the building of smart cities are contained in the whole spectrum of initial strategic documents adopted and gradually implemented at the level of the European Union as well as individual member states. Initiatives and projects aimed at building smart cities are based on a wide range of experiences and good practices of several smart cities developing gradually throughout the global geo-economics area. One of the main benefits of building smart cities in a specific urban environment can be considered the assumption that this model of management and organization of the urban environment will gradually expand to its wider background, while in the future it is possible to assume a gradual transition from smart cities to smart regions. Smart regions not only refer to the territorial level and are not limited to rural regions. The authors thus advocate an understanding of smart regions that includes urban as well as rural territories whose characteristics more and more intertwine (Mölders, et al., 2016, p. 55).

Current research on smart regions is strongly influenced by an economic perspective with an emphasis on growth, innovation and policy strategies (Calzada, 2013; Camagni & Capello, 2013; Greco & Cresta, 2017; Parada, 2017; Priano, et al., 2016). The main focus is on how technological innovation and digitalization can facilitate and improve service provision in regions. However, behavioral aspects, participatory approaches and urban-rural-relations are only marginally considered. (Matern, et al., 2020)

This assumption is also supported by one of the relatively frequently presented insights into the future prediction of the development of the global world economy, which suggests that this space will be characterized by a distinctly polycentric structure, with its core areas forming large cities or larger regional units characterized by effective internal organization of political, social, social and economic processes and thus will function as

autonomous self-organizing units that will provide a quality environment for the life and development of their population, as well as economic processes.

The core of the Smart Cities concept is the creation of effective networks and connections between individuals, the social community, the environment in which it lives and which activities are related to the effectiveness of the organization and modelling of its internal organization and information and communication infrastructure, so that this interconnection leads to sustainable development and improvement of the quality of life of the population.

Citizens, the public and other stakeholders form networks of regional actors and engage in public debate and evaluation to influence the design and implementation of public policies in the regions (Franzke, et al. 2016; Kavan, Brehovská, 2016; Dušek, 2017; Peráček, 2020). Networks of regional actors are developing dynamically in diverse interactions, under the influence of internal factors and the external environment. They acquire various forms of models, qualitatively different degrees and forms of interaction, communication and cooperation between the public and regional self-government.

Individual qualitatively different degrees of cooperation of self-government with citizens demonstrate the degree of involvement of regional actors, the degree of management by self-governing regions, the degree of involvement of the public and its civic representatives (Gašparík, 2021) in solving issues of implementing smart solutions in municipalities, cities and regions.

The concept of smart city can focus on information and communication technologies, with a broader concept including socio-economic aspects such as the use of public participation to increase sustainability, quality of life and well-being in cities. The term smart cities in Slovakia currently refers to such municipalities and cities that are looking for innovative solutions in various areas in order to improve the lives of their inhabitants based on the application of the latest technologies and solutions. (Klimovský, Nemec, 2021). At present, the emphasis is on intelligently solving the problems of transport, services, local authorities, the issue of intelligent (passive) buildings and achieving visible results for all citizens in terms of the environment and mitigating the effects of climate change. The holder of the smart city label is a city that supports smart solutions.

The concept of Smart Cities combines six basic dimensions, which are defined in the sources of professional literature, as well as within the project as:

• Smart Economy,

• Smart Mobility,

• Smart Environment,

• Smart People,

• Smart Living,

• Smart Governance. (Mapping Smart Cities in EU, 2014)

Based on the analysis of the sources of professional literature, individual initiatives and projects aimed at building Smart Cities should be based on three groups of key factors, a clear summary of which is provided in Table no. 1.

Table 1 Basic groups of factors of the Smart Cities concept

| Technology factors	Human factors	Institutional factors
Physical infrastructure	Human infrastructure	Governance
Smart technologies	Social capita	Policy
Mobile technologies		Regulations and directives
Virtual technologies		
Digital networks		

Source: Mapping Smart Cities in the EU. (2014)

Dimensions of the concept focused on building Smart Cities and their development tendencies within the European integration area

The concept of creating Smart Cities is based on six basic dimensions. The first of these dimensions is Smart Economy. Within the Smart Economy dimension, the main attention is focused on the efficient and effective use of modern information and communication technologies working mainly on broadband Internet connection, which are used in various specific areas of economic (for example development of economic and trade cooperation between selected actors). The development of economic cooperation in the use of modern information and communication technologies currently brings great opportunities and gradually expands their scope to new dimensions, also emphasized in strategic documents and investment projects of investors, therefore cities that have a well-established and functional soft infrastructure network are interesting for investors in terms of decision-making on the location of their investments in a specific environment.

The dimension of smart economy therefore includes areas such as e-business, e-commerce and giving classic trading a new dimension in the form of creating a virtual market with various commodities, but also with services, the provision of which becomes faster, more efficient. The needs of customers / clients, are successfully satisfied not only in terms of its requirements for type, scope and quality of services, but also in terms of its demands for saving time and providing the opportunity to use the service in non - standard times.

The development of the smart economy is closely linked to ensuring coverage and the effective use of information and communication technologies, in particular internet connection. Within the European integration area, in 2019, up to 91% of companies employing more than 10 employees used a fixed broadband internet connection with a relatively low connection speed.
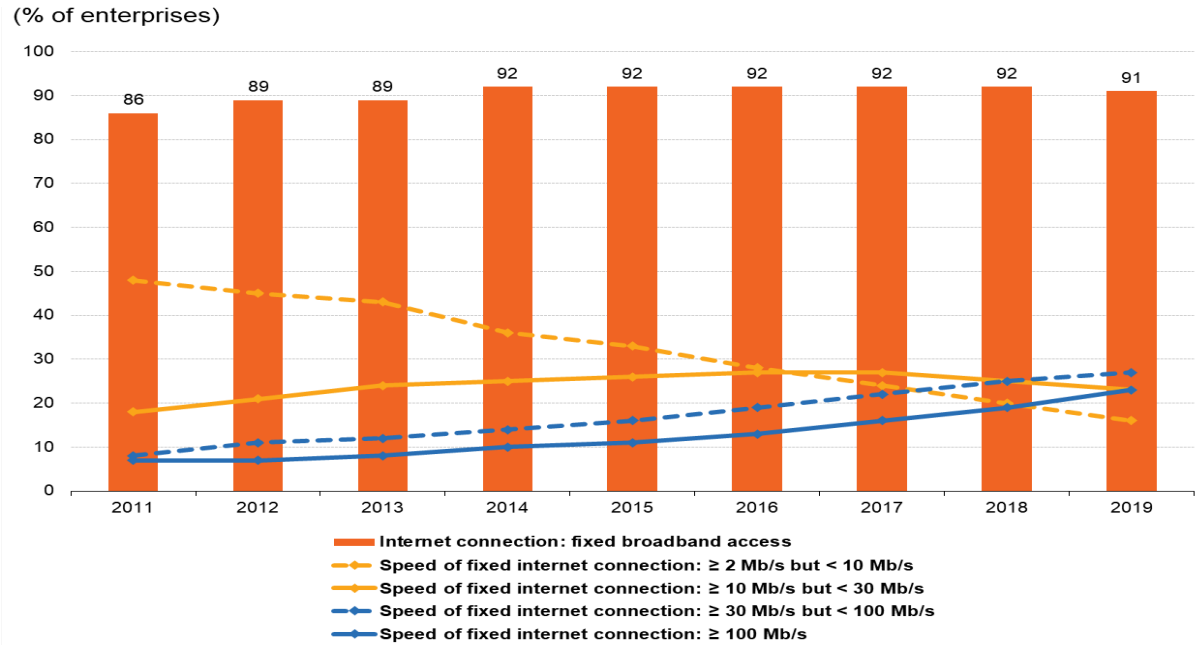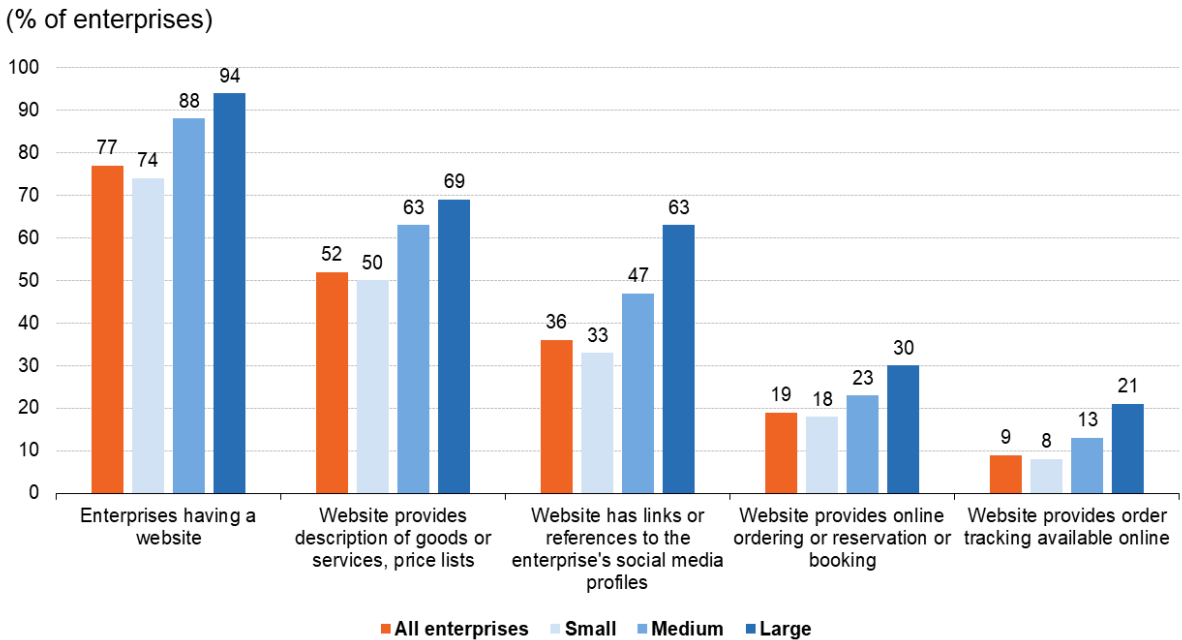

Source: Digital Ecnomy and Society Statistic, (2020)

https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Digital_economy_and_society_statistics_-_enterprises

Figrue **1 Enterprises connecting to the intenret by fixed broadband, EU 27, 2011 - 2019**

One of the basic prerequisites for the development of e-business is to have a quality and clear website with the possibility of presenting the offered commodities and services provided. In 2019, within the European Integration Area (EU - 27), more than 77% of the total number of business entities had a website, larger enterprises and companies predominating (94%). The analysis of the development of indicators aimed at monitoring the

number of business entities using a quality website for presentation of their business activities indicates, that since 2011 the share of companies and firms using the promotion and presentation of their business activities by internet has increased by 8 percentage points. The content focus of the website was focused primarily on the promotion of goods and services offered, the publication of price lists of individual commodities or services, as well as the connection of links with references and ratings from customers, or the presentation of company profiles on social networks. (Digital economy and society statistics, 2021) The share of enterprises and companies using a functional website, together with the indication of its content focus, are presented by figure 2.

(% of enterprises)

Source: Digital Ecnomy and Society Statistic, (2020)

https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Digital_economy_and_society_statistics_-_enterprises

Figure 2 Proportion of companies and firms using a functional website and focus of its content

The using of modern information and communication technologies allows companies and firms to ensure not only the promotion and presentation of products offered or services provided, but also to use them effectively in the process of internal or external communication with employees and business partners. The transfer of information thus becomes faster and more efficient. Businesses and companies use various applications for this purpose. From a number of those applications, we can mention for example, applications focused on enterprise resource planning (ERP applications), applications facilitating the management and
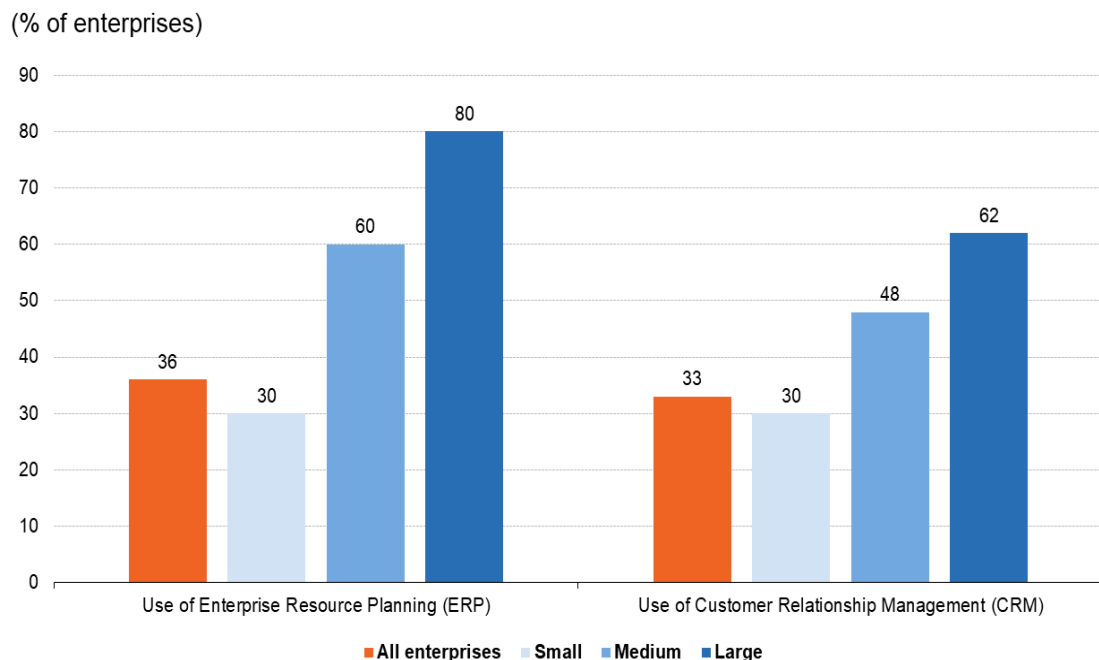
(% of enterprises)

Source: Digital Ecnomy and Society Statistic, (2020)

https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Digital_economy_and_society_statistics_-_enterprises

Figure 3 Proportion of enterprises and companies using ERP and CRM applications by their size

Another dimension of building smart cities is the area focused on smart mobility. This dimension represents a relatively large challenge for the whole of the European integration area, associated with the need to carry out several tasks and also to implement various measures. Within the European area of integration, especially in the case of large cities gradually expanding into urban agglomerations, building integrated, efficient and environmentally friendly transport networks is a matter of fundamental importance. In the

field of transport and transport systems, the European Union has set itself a number of key objectives for the period 2030 – 2050. The prediction for the period 2030 – 2050 envisages an increase in the number of transport networks and transport connections with the assumption of the use of climate-neutral technologies and thus the improvement, upgrading and acceleration of transport accessibility within the entire European integration area. Smart mobility is one of the suitable concepts that will be applied in fulfilling the given goal.

Smart mobility in the context of building smart cities is a concept associated with building both hard and soft infrastructure. In the area of hard infrastructure, this mainly represents the construction of high-quality and high-capacity transport connections capable of performing the function of efficient and fast transport, especially in exposed times. In this context, emphasis is placed not only on the use of individual, passenger transport, but above all on the use of public transport, which reduces the burden on the urban environment, especially in terms of exhaust emissions. The smart mobility model offers opportunities to use public transport, whose system solutions are based on the use of information technology. In this context, information technologies can be used, for example, in the field of transport network planning, transport interconnection planning, monitoring the development of the population using individual and public transport, as well as monitoring and evaluating the use of transport networks and connections in exposed times during the working week and on non-working days. Modern, information technologies are thus helpful in the field of improving public transport and increasing the level of transport accessibility and thus and the usability of these networks by the public. In this area, it is therefore necessary to focus on creating mobile applications that allow real-time planning and combination of transport connections and at the same time allow the purchase of a travel ticket directly without the need to print it. It is these measures that can make a significant contribution to meeting the European Union's goal of reducing greenhouse gas emissions from the massive use of public transport systems and thus contributing to reducing the carbon footprint. Increased use of public transport as well as more efficient planning of transport connections will reduce the congestion rate of key transport corridors in cities, especially in exposed times. The use of new technical, but especially technological systems in the field of transport and transport connections will also contribute to reducing the accident rate in cities and thus to economic losses resulting from downtime caused by diversion of traffic in places of accidents. In addition to the above dimension of the smart mobility model, this model of management and organization of urban transport networks can be used in the field of signalling systems providing daily management of public transport, also in the creation of early warning systems in case of unforeseen events
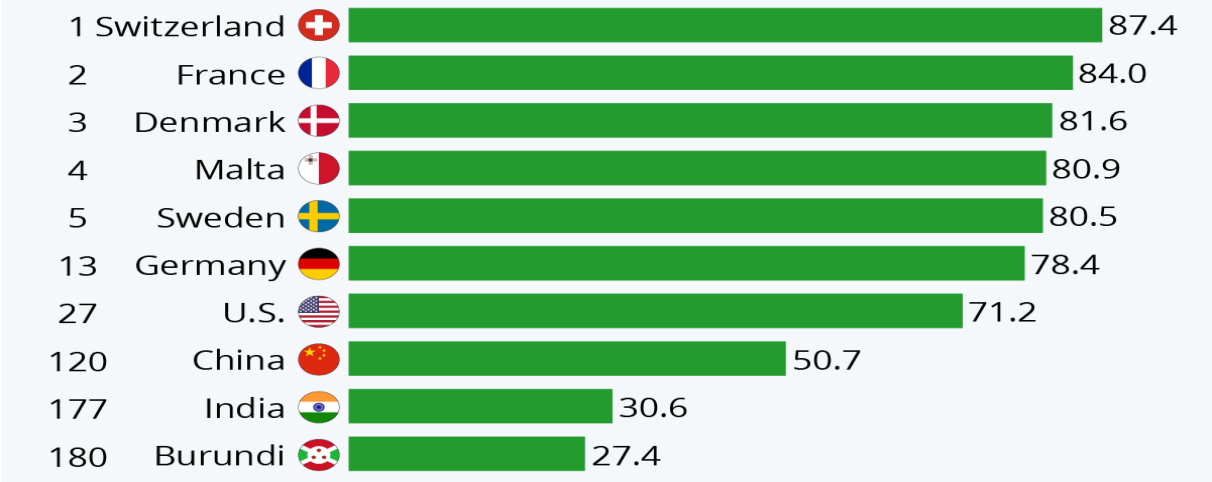
and the need to implement traffic diversion. In this way, it is possible to create a comprehensive, efficiently functioning and safe public transport system. (Kumar, 2019)

In the context of thinking about smart mobility, it is necessary to focus attention on building the so-called soft infrastructure within cities, and the wider urban environment, which includes, in particular, the coverage of online space by networks of mobile operators, as well as high-quality internet connection for companies and households. The global pandemic Covid-19 has emphasized, at the global level, but also at the supranational, national and regional levels, the role and importance of systems and technologies enabling the effective use of online space for business activities, educational needs and the needs of everyday life. (Glasco, 2019)

Smart environment represents another of the presented dimensions of the smart cities concept, which is directly connected with ensuring the sustainable development of cities and the urban environment, especially in the field of protection and preservation of the environment. Based on the analysis of examples of several cities and wider urban regions formed within large urban agglomerations, one of the main problems is the high degree of congestion and overcrowding of these areas, both in terms of economic activities and transport systems and also in terms of high population concentration. All these mentioned factors significantly affect the quality and level of the environment in these localities. The indicated development trend has been monitored for a long time within the European integration area, while several measures have been implemented in the given area at the level of the European Union and its individual member states. As part of a multiannual plan to improve the environment in cities and individual European regions, the European Union has set itself a goal by 2030 to achieve a situation where around 100 cities should operate as ecologically clean ones with a good environment. (Kumar, 2020)

In 2019, Yale University conducted a survey to assess the level and quality of the environment in 180 countries and their cities based on the Environmental Performance Index (EPI). The assessment of the level and quality of the environment was carried out on the basis of several indicators divided into two dimensions of environmental health and ecosystem vitality. Within these dimensions, indicators such as the level of biodiversity, air and water quality, the overall climate and climatic conditions, as well as the impact of economic activity on the quality of the environment, were monitored and evaluated. Based on the compiled ranking, the European states and the states of North America were placed on the highest ranks and thus the highest scores, while the states of the Asian and African continents were placed

on the lower ranks. The placement of selected countries on the EPI ranking with the determination of the achieved score is presented in figure 4.

	Country	Score
1	Switzerland 🇨🇭	87.4
2	France 🇫🇷	84.0
3	Denmark 🇩🇰	81.6
4	Malta 🇲🇹	80.9
5	Sweden 🇸🇪	80.5
13	Germany 🇩🇪	78.4
27	U.S. 🇺🇸	71.2
120	China 🇨🇳	50.7
177	India 🇮🇳	30.6
180	Burundi 🇧🇮	27.4

Source: Statista, (2021) European Countries Healtiest Environments, (2021)

(https://www.statista.com/chart/20500/european-countries-healthiest-environments

Figure 4 Ranking of countries according to the EPI index

Another group of specific dimensions of smart cities is the area of smart pepole. Human capital, its level of education and overall quality is one of the essential areas for the development of cities and regions. In the context of thinking about the importance of human capital in the process of forming smart cities, the main focus is on the specific abilities and skills of human capital to effectively use modern information and communication technologies in the process of work, but also in activities outside working hours. Within the European area of integration, therefore, there is an increasing emphasis on the development of computer literacy and computer skills in all sections of the population. It was the Covid-19 pandemic and the measures taken at national and regional level that emphasized the need to build computer skills for all sections of the population, but especially for the young and adolescent generations. Figure 5 points to the development of the number of households that have an internet connection within the European integration area in the period 2007-2020.
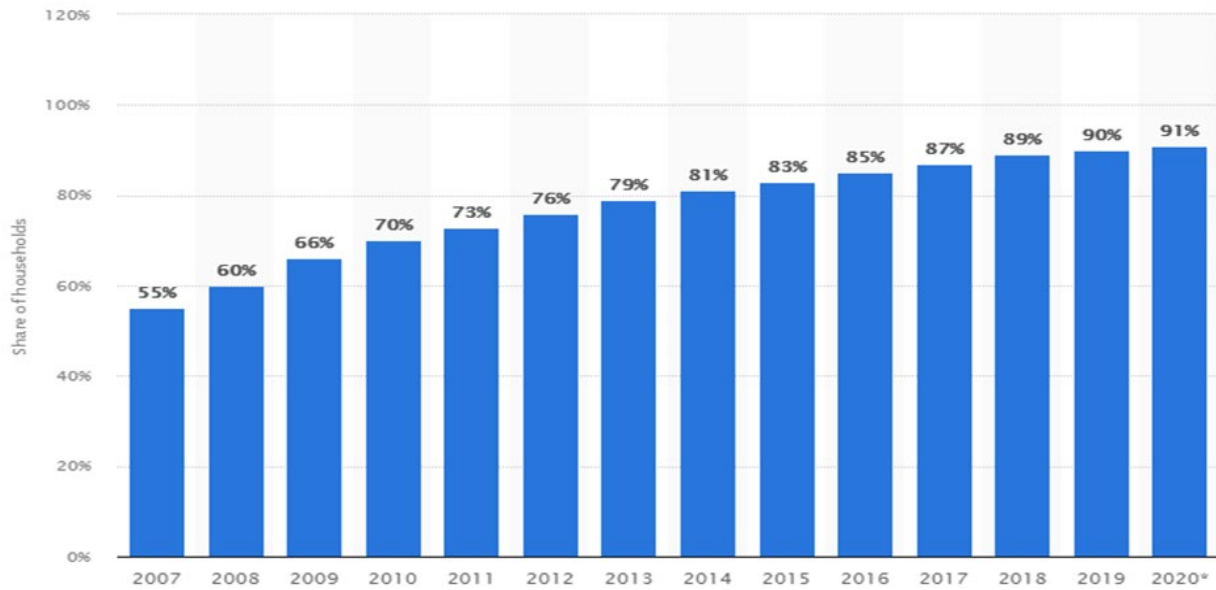
Source: Statista, (2021). Households Internet Access in EU-28

https://www.statista.com/statistics/377585/household-internet-access-in-eu28/

Figure 5 Share of households with internet access in the European Union (EU) from 2007 to 2020

From the presented figure it is clear that the share of households with internet connection increased during the period under review from 55% in 2007 to 91% in 2020. The recorded development trend reflects the gradual growth of the use of modern information and communication technologies by individual households. The use of internet connection of households is broad-spectrum, but in recent years there has been a noticeable trend in the area of use of the Internet for education, work, procurement of certain types of commodities and also to deal with matters related to ensuring the functioning of households via the Internet. Within the European area of integration, the share of the population actively using the Internet connection is also gradually growing, on a daily basis. Figure 6 present the share of the population aged 16-74 who use an internet connection daily. (Households Internet Aceess in EU-28,2021)
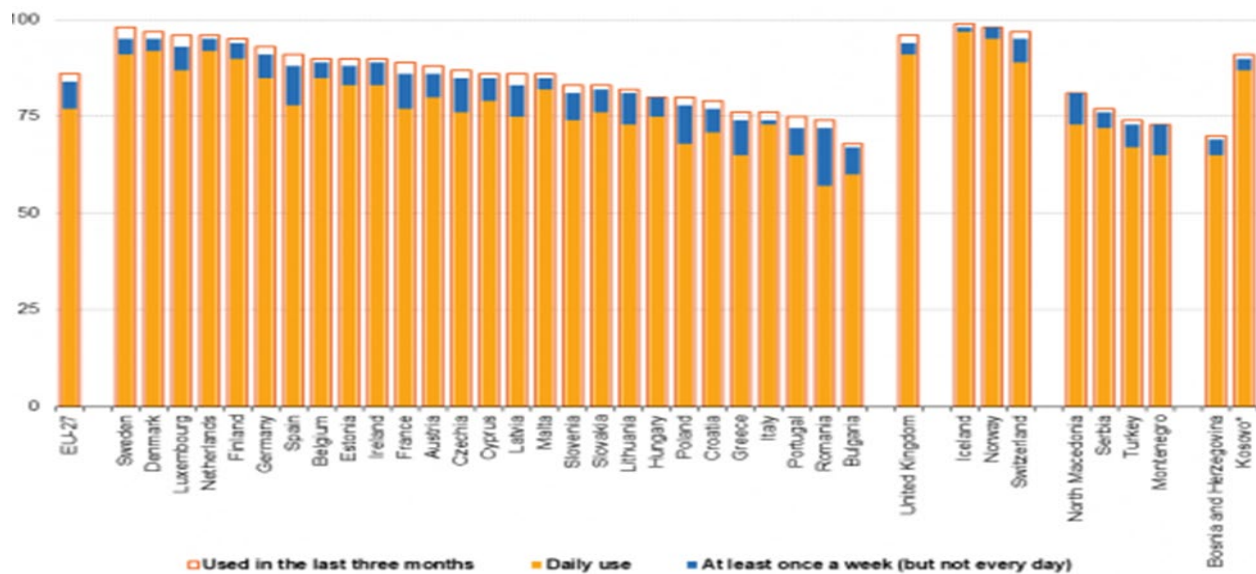
Figure 6 Frequency of internet use, 2019 (% of individuals aged 16 to 74)

In 2019, more than three quarters of the population of the European Union (77%) used the Internet on a regular, daily basis. In the same year, six out of seven people in the European Union aged 16-74 used an internet connection every three months. The share of the population of the European Union who does not use the Internet was 10% in 2019, which was two percentage points lower than in the previous year 2018. (Digital Economy and Society Statistic. Households and Individuals, 2020) As can be seen from the presented figure, the use of the Internet connection within the European integration area is growing and gradually the digital skills of the population are growing, which in the context of building smart cities represents one of the essential dimensions of their further development. The given starting point must be perceived in two basic dimensions. The first dimension is closely linked to the functioning of smart cities, which is based on the use of a qualified workforce capable of ensuring the functionality and smooth operation of all areas of smart cities, whether trading, providing service systems, providing public transport systems, management and organization of systems education, management and organization of governance, etc. The second dimension is directly related to the ability of an individual to effectively and efficiently use integrated systems within smart cities so that they enable them to achieve the highest possible level of quality of life and suitable conditions for their further growth and development. The dimension of smart people is closely connected with the previous dimensions, for example

smart economy, smart mobility. By using information and communication technologies and software systems, it is possible to monitor and evaluate the consumer preferences of individual groups of the population and, on the basis of them, to adapt the types of goods and services offered to the requirements of their consumers. In the case of smart mobility, it can be about monitoring and regular evaluation of time zones within which public transport systems are most used and on the basis of this it is possible to make adjustments and public transport schedules, or more effectively plan interconnection and continuity of transport systems. We also include the area of smart living in the area of selected, specific dimensions of the smart cities concept. In the given dimension it is possible to see the connection of all dimensions mentioned in the previous parts of the article. Smart living represents a comprehensive disability of all areas of life of contemporary societies and the creation of space for individuals and entire social and community communities to implement various activities in the field of public space. Among the most important we can mention, for example, the possibility of using modern information and communication technologies in the field of communication between citizens and various institutions to obtain the necessary information, as well as to fill in various forms and equip different types of documents (e.g. voting permanent residence). The Covid-19 pandemic in the area revealed a number of shortcomings arising from the need for direct contact between the institutions and citizens, which caused significant problems at the time of the measures taken to prevent the spread of the disease. (Digital Economy and Society Statistic. Households and Individuals. 2020)

The area of smart living can also include activities aimed at improving and protecting the environment, especially in a congested urban environment by supporting the use of renewable energy sources by households, supporting more environmentally friendly modes of individual urban transport and public transport. In the area, it is possible within the European integration area to identify efforts aimed at reducing the carbon footprint of the means of transport used by the gradual introduction of new means of hybrid propulsion. In this area, attention is also focused on the use of vehicles based on the use of hydrogen, etc., as indicated by the ongoing exhibition EXPO 2020, realized in 2021 in Dubai. Significant initiatives in this area are also focused on the support of various alternative modes of transport, especially in their combination with public transport systems (e.g. electric scooters).

In the area of smart living, it is necessary to focus attention on the area of waste management. Today's European society is increasingly influenced by the consumerist way of life, which is also reflected in the increased volume of different types of waste that individual households produce. One of the key questions in this area still remains whether and how this

waste can be recycled as efficiently as possible so that the material recovered from it can be reused. The method and mechanisms supporting the functioning of smart cities can be helpful in the area, especially for the purpose of monitoring and tracking the level of separation of individual types of waste, as well as planning the schedule of removal and collection of individual types of waste and ensuring their further recycling and treatment. The last of the selected dimensions of the smart cities concept is smart governance. This dimension captures the current development of modern societies, especially in the context of focusing attention on the ways of their socio-political management and ensuring the administration of public affairs. Research conducted in the political sciences suggests that in today's modern societies, the decision-making process is not just a matter of the central management level, and many of its competencies are gradually being transferred to lower hierarchical levels to ensure effective governance and organization of individual territorial units; at the same time, to bring governance as close as possible to the citizen. In the context of the indicated starting points, the concept of smart cities represents one of the possible ways to create mechanisms for efficient and effective administration and organization of the territory using modern information and communication technologies. Information and communication technologies thus provide a wide range of opportunities for community management of individual territorial units in the political, economic, cultural and other fields of everyday life. (Kumar, 2021) Smart cities thus bring a new dimension to the day-to-day decision-making and administration of a given area, especially in the context of opportunities to increase the level of citizen participation in the process of proposing and making major policy decisions to be implemented at a given level. In this regard, we mean, for example, the possibility of involving the urban population in decision-making by expressing a preference for a certain alternative possible solution to a selected problem related to urban, economic or cultural development of the environment, such as voting via the Internet, while ensuring verifiable and secure access systems set up in this way. This method can also be used in the exercise of the full range of other competencies that cities and regions currently have. In this case, it may be, for example, participatory budgeting, public voting on models of further urban development and growth of the city or urban region, citizen participation in decision-making on investment location in the area, citizen participation in decision-making on building other social components, or health infrastructure, etc. Information and communication technologies can also be used effectively in the process of ensuring greater awareness of the population about the performance of municipal and territorial self-government and the resulting measures, such as publication of generally binding regulations or other important information concerning the

administration of the territory (adjustment of local taxes and fees, the amount of funds spent on the development of the given territory, specific information concerning territorial development, etc.). At the same time, information and communication technologies can also be used in the area of providing the population with the opportunity to participate in council meetings, through their monitoring, for example in the form of live streams, etc. (Kumar, 2021)

A large group of activities focused on the development of individual dimensions of smart cities in a specific urban environment is gradually being implemented within the European integration area through the so-called smart cities strategies. These are usually planned for a longer period of time, while their implementation requires considerable investment from public resources. Within the European area, we can identify several cities whose operation is based on the successful implementation of the concept of smart cities. At the top of the imaginary ranking of these cities was London, followed by Helsinki, Barcelona, Vienna, Amsterdam, Stockholm, Copenhagen, Berlin, Dublin and Reykjavik.

Conclusion

Smart city can be defined as managing and integrating its long-term development strategy in an integrative way, cultivating the city's political, social and spatial environment in order to increase the city's quality of life and attractiveness, and reduce negative environmental impacts. By deploying appropriate information and communication technologies, it enables citizens to participate in the development of the city and apply their ideas and ideas through community (civic) programs.

Project proposals and their solutions can contribute to the transformation of the city into a platform for testing and implementing intelligent and sustainable development solutions. All generations of residents living in a smart city are the recipients and customers of the results of intelligent project activities and solutions. Such targeted projects have an impact not only on the attractiveness of the city, but also on the entire region, they contribute to the improvement of the regional economy and to the increase of the quality of life of its inhabitants.

Acknowledgement

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Associate Professor Lucia Rýsová, PhD. https://orcid.org/0000-0003-2956-1162
Associate Professor Peter Čajka, PhD. https://orcid.org/0000-0003-0568-394X
Department of International Relations and Diplomacy,
Faculty of Political Science and Relations, Matej Bel University Banská Bystrica,
Kuzmányho 1, 97410 Banská Bystrica
The Slovak Republic