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TRENDS IN SMART CITIES 2022

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Abstract

The dynamic development of technology has a significant impact on building Smart City concepts. The city's success depends on its level of readiness, flexibility and adaptation. The aim of the article is to identify the latest trends of 2022, which directly affect Smart City concepts. Methods of secondary analysis, synthesis, summarization, induction, deduction, abstraction, comparison and logic were used to achieve the set goal. Trends such as centralized data management, citizen-centered centrist, cyber security transparency achieve the highest frequency. Preferred trends reflect the social aspect based on resilience, protection, sustainability and values. In current and future Smart Cities, the element of success is the interconnection of the technological and social aspects, as technologies serve the population to increase their quality of life, and not the other way around.

Key words: *Smart City, trends, development, technologies*

1 INTRODUCTION

World cities have to face external environmental factors that affect the social, economic and environmental aspects of citizens' lives. Several authors and experts predict that by 2050, more than 75% of the world's population will live in cities. Cities cover only 3% of the earth's surface, but they are a driving force for development, quality of life and resilience. It is essential to build the resilience of urban concepts through the stabilization, creation and sustainability of Smart Cities [1, 7].

The dynamics of their development is also evident in 2022. The contribution of Smart City concepts is argued by all parties involved, such as citizens, the city council, the government or the business sector. Development depends above all on a technological core that aims to build a compact place to live [7].

In 2022, the trends affecting Smart City concepts are reflected in a holistic approach focused on citizens' needs, cooperation, participation and an efficient data-based infrastructure [1].

However, population growth, migration and urbanization also generate problems in the form of pollution, lower resilience and insufficient infrastructure. The solution is trends in technological development [5].

According to Kim, the development of Smart City can be divided into five stages. The first is Ubiquitous City based on information and communication technologies. The second is the phase of construction of basic infrastructure, followed by the application of technologies to specific Smart City areas, holistic application to entire urban areas and finally urban planning, which is the preferred element of development since 2020. The main goal of the last stage is to create flexible, resilient and efficient Smart Cities with adaptation to changes and trends [5].

2 METHODS

The aim of the article is to identify the latest trends of 2022, which directly affect Smart City concepts.

The Web of Science and Scopus databases, including the results of consulting firms, were used to search for relevant publications.

The keywords for article selection were "trends", "Smart Cities". Professional relevance is ensured by citation databases, time selection of articles from 2022, type Open Access and Articles.

Methods of secondary analysis, synthesis, summarization, induction, deduction, abstraction, comparison and logic were used within the fulfillment of the set goal.

3   RESULTS

The driving force behind ecosystems in the Smart Cities concept will be data in 2022. Internet of Things (IoT) data sharing, sensitive data protection, real-time transmission and processing provide the information needed for management and decision-making functions. According to surveys, open data platforms will increase sustainability by 58% and quality services by 57%. Virtual communication ecosystems, such as Smart City Seoul, are also a new trend [1]. An important aspect of data management will be centralization [6].

Resilience, which must respond to unexpected changes such as the Covid-19 pandemic, is an essential aspect of planning and Smart City development. The resilience of cities in 2022 must comply with the principles of RAMS, i. e. reliability, availability, sustainability and security [1]. On the social side, citizens are important for cities. In 2022, urban concepts are being built that are centrist-oriented to citizens' values, needs and expectations, building digital platforms, awareness and participation [1].

Transparency and cyber security should be built in repositories such as cloud computing on the principle of shared economy. A new element will be the preference for sharing best practice cases across multiple Smart Cities in the form of mutual assistance, inspiration and cooperation [6].

Micropayments will be preferred for payments. Mobile applications or modern means of transport will work on the vision of the user experience [6].

The potential of artificial intelligence can be exploited in the areas of security, automation and prediction. Monitoring of systems and data is mediated by machine learning with the resulting effect of higher security. Automated maintenance services reduce costs and eliminate disruptive to everyday life, for example through downtime. At the strategic level of the city, it will be important to predict problems before they occur, i. e. prefer action in the form of predictions over reaction [3].

In the field of the environment, the emphasis will be on reducing emissions through smart buildings. Classic buildings generate 30% of emissions, which makes it impossible to meet the city's environmental goals. Effective building management thus contributes to the protection of limited resources such as water, land, energy and air. 5G technology will be used in particular [3].

New York has also incorporated the decarbonisation trend into its plans, which aims to reduce the city's share of emissions by 100% [2].

Collection, refurbishment and recycling based on circular circular economy will be preferred in the production of products [2].

Technological progress will ensure greater confidence and participation of citizens. Technological progress will ensure greater confidence and participation of citizens [2].

In the field of transport, cycling, shared transport and electric cars will be developed. In 2022, the aim of the city council is to build a central source of data from libraries and not the Internet. What they want to bridge the digital divide, unverified facts, misinformation, etc. [2, 4].

The pandemic has also contributed to the creation of new patient monitoring applications, the reduction of social inequalities and the shift of health care from the individual to the communal level [4].

4   DISCUSSION

A summary of the latest trends in the Smart Cities concept for 2022 in connection with the results of the Results section can be found in the following table (Table 1).

Table 1. Trends in the Smart Cities concept for 2022

Trend	Frequency (min. 1, max. 5)
Data management	5
RAMS principle	1
Centrist orientation towards citizens	5
Transparency and cyber security	5
Micropayments	1
Artificial intelligence	3
Smart buildings	4
Circular circular economy	3
Shared transport, electric cars	3
Bridging the digital divide	4
Smart Health	3

Source: own elaboration according to the results found in the Results section

In Table 1, the frequency was determined on a scale from 1 (minimum) to 5 (maximum) according to the occurrence of a specific trend from five relevant sources (experts on Smart City trends, consulting companies).

All five experts identified data management on the basis of centralization, centrist orientation towards citizens, transparency in connection with cyber security as the biggest trends.

Data is the basis for information creation and subsequent transparency. In current Smart City projects, it is appropriate to participate with citizens, gain their consent, trust, and thus their involvement and awareness raising. Prioritizing the values of key stakeholders, including citizens, is a win-win strategy for all involved.

The basic value that the new Smart City concepts should convey to their citizens is resilience security. The information that citizens receive should be protected but also transparent. Protection should never diminish the credibility of the data shared.

Trends focused on building smart buildings, with combined protection of limited resources and bridging the digital divide in relation to data security, manifested a frequency with a score of four.

Trends in specific areas of mobility or health achieve an average frequency. Micropayments and the newly established RAMS principle have the lowest frequency.

It follows that the preferred trends are those that reflect the social dimension on the basis of resilience, protection, sustainability and values.

5   CONCLUSION

The development of urban concepts is dynamic and subject to changes in the form of trends. Population growth, urbanization and migration create the preconditions for the creation of resilient, sustainable, flexible, adaptable and modern cities of the future. The analysis of professional articles and the results of consulting companies shows that the preferred trends are social aspects based on technology. The values, expectations, attitudes, consent and trust of citizens have a strong impact on Smart Cities. Data, data sharing and transparency are also key. After analyzing the data and their transformation into information, they are used at the strategic level of the city in managerial and decision-making functions. Analyzing the latest trends provides a win-win strategy for all parties involved, as predicting and preparing

solutions to problems that have not yet occurred saves costs, time and energy. Can build cities based on effective management of limited resources, innovative technologies, citizen participation and cooperation of other global Smart Cities. An associated consequence is the transfer of best practice knowledge, the building of a knowledge base and the satisfaction of citizens.

Acknowledgment

References
1. Capgemini. (2022). 2022 Key Trends in Smart Territories. [online]. [2022-04-20]. Available on: https://www.capgemini.com/2022/01/2022-key-trends-in-smart-territories/
2. CROWE, C. (2022). 12 predictions about the trends that will shape smart cities in 2022. [online]. [2022-04-20]. Available on: https://www.smartcitiesdive.com/news/12-predictions-about-the-trends-that-will-shape-smart-cities-in-2022/616439/
3. Ebuties. (2022). Smart city trends for 2022 put people first. [online]. [2022-04-20]. Available on: https://ebuties.com/smart-city-trends-for-2022-put-people-first/
4. Identity Review. (2022). Top 5 Smart City Trends in 2022. [online]. [2022-04-20]. Available on: https://identityreview.com/top-5-smart-city-trends-in-2022/
5. KIM, J. H. (2022). Smart city trends: A focus on 5 countries and 15 companies. Cities 2022, 123, 103551. https://doi.org/10.1016/j.cities.2021.103551
6. PELIKH, K. (2022). Top smart city trends for 2022. [online]. [2022-04-20]. Available on: https://www.o-city.com/blog/top-smart-city-trends-for-2022
7. Smart Cities Tech. (2022). Smart Cities & Key 2022 Trends. [online]. [2022-04-20]. Available on: https://smartcitiestech.io/2021/12/smart-cities-key-2022-trends/

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