Urbanization and cities of the future

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Abstract

World population is continuously and rapidly growing, urban areas representing the future. Citizens' needs and requirements are becoming the focus points of urban development strategies. Therefore, developing sustainable strategies is essential for boosting the creation and development of more inclusive communities. This paper aims to present various ways in which urbanization is changing the world as we know it, smart urban planning contributing to smart urban areas' development, formed by strong inclusive communities, giving as example different cities around the globe that have implemented successful projects. The methodology used to carry out this research is both bibliographic – opting to study and present the work of specialists in the field, authors from Romania and abroad, and empirical – formed by a case study on various smart cities around the world that have found ways to cope with the new change the world is facing today. The digital space is starting to be a very important issue in the evolution of smart cities, contributing at facilitating and improving the relationship between state and citizens. Although technology is a significant element, citizens and public institutions must be open to collaborate in order to find and implement the best solutions for solving communities' problems.

Keywords: urbanization; smart cities; sustainable development; digital change; civic engagement

1. Introduction

As the World Health Organization (WHO) states, global urbanization is a process that's changing the social and environmental setting on every continent, it meaning the migration of population from rural to urban areas, thus causing a natural urban demographic growth [WHO, (a)].

Following this idea, we can mention that in 2019 the urban population was represented by 55.7%, reaching 56.2% until this moment in 2020, thus being 4,378,993,944 individuals that currently live in urban areas [Worldometer, 2020, (b)]. The percentage of the global urban population is expected to increase to 68% by the year 2050, this meaning that urban population will almost double its size. The Organisation for Economic Co-operation and Development (OECD) has calculated that by 2100, the urban population will grow up to 9 billion, thus approximately 85% of the global population will live in cities [OECD, 2015].

Table 1. World population and world population by region

WORLD POPULATION (2020 AND HISTORICAL)								
Year (July 1)	**Population**	**Yearly change (%)**	**Yearly change**	**Median age**	**Fertility rate**	**Density (P/Km²)**	**Urban pop. (%)**	**Urban population**
2020	7,794,798,739	1.05 %	81,330,639	30.9	2.47	52	56.2 %	4,378,993,944
2019	7,713,468,100	1.08 %	82,377,060	29.8	2.51	52	55.7 %	4,299,438,618
2018	7,631,091,040	1.10 %	83,232,115	29.8	2.51	51	55.3 %	4,219,817,318
2017	7,547,858,925	1.12 %	83,836,876	29.8	2.51	51	54.9 %	4,140,188,594
2016	7,464,022,049	1.14 %	84,224,910	29.8	2.51	50	54.4 %	4,060,652,683
2015	7,379,797,139	1.19 %	84,594,707	30	2.52	50	54.0 %	3,981,497,663
2010	6,956,823,603	1.24 %	82,983,315	28	2.58	47	51.7 %	3,594,868,146
2005	6,541,907,027	1.26 %	79,682,641	27	2.65	44	49.2 %	3,215,905,863
2000	6,143,493,823	1.35 %	79,856,169	26	2.78	41	46.7 %	2,868,307,513
1995	5,744,212,979	1.52 %	83,396,384	25	3.01	39	44.8 %	2,575,505,235
1990	5,327,231,061	1.81 %	91,261,864	24	3.44	36	43.0 %	2,290,228,096

WORLD POPULATION BY REGION (2020)									
Region	**Population**	**Yearly change %**	**Density (P/Km²)**	**Land area (Km²)**	**Migrants (net)**	**Fert. rate**	**Med. age**	**Urban pop. %**	**World share**
Asia	4,641,054,775	0.92 %	150	31,033,131	-1,729,112	2.15	32.0	50.9 %	62.9 %
Africa	1,340,598,147	2.54 %	45	29,648,481	-463,024	4.44	19.7	43.8 %	18.2 %
Europe	747,636,026	0.12 %	34	22,134,900	1,361,011	1.61	42.5	74.5 %	10.1 %
Latin America and the Caribbean	653,962,331	0.94 %	32	20,139,378	-521,499	2.04	31.0	82.5 %	8.9 %
Northern America	368,869,647	0.65 %	20	18,651,660	1,196,400	1.75	38.6	82.6 %	5.0 %
Oceania	42,677,813	1.38 %	5	8,486,460	156,226	2.36	33.4	67.8 %	0.6 %

[Adapted after Worldometer, 2020, (b), (a)]

According to The World Health Organization, urban population at a global level is estimated to grow around 1.84% per year between 2015 and 2020, 1.63% per year between 2020 and 2025 and 1.44% per year between 2025 and 2030 [WHO, (b)].

We can understand that urban population is growing at a fast pace, therefore the quality of global and local ecosystems and the urban environment will play a fundamental role in urban sustainable development [WHO, (a)] and management processes.

Urban development represents a system of residential expansion activities that creates cities, taking place in vacant areas or areas that need to be modernized. These various planning activities should thus be

integrated into cities, towns and neighbourhood areas as part of the urban development process, being taken by different stakeholders, such as: architects, project managers, evaluators and environmental planners and civil and design engineers [Brooks, 2017].

In successfully addressing urban challenges, there are a few fundamental approaches that can be adopted, such as: stakeholder partnerships (cities create partnerships with the private sector, different organizations and other cities), city development strategies (based on SWOT analyses and visions for long-term periods), local cooperation (connections between rural and urban areas), cities as ecosystems (there must be found a balance between economic, social and environmental issues) and city leaders as economic managers (they need to adopt methods of entrepreneurial and economic management) [Asian Development Bank, 2019].

The European Union is focused on this topic too, helping member states by engaging in partnerships and creating initiatives for sustainable urban development. We can mention here the new *European Urban Initiative* created in order to support cities innovate, access information and understand policy and also offer support for networking and capacity building [European Commission, 2019, (a)].

Moving towards a sustainable Europe by 2030, EU is providing support for: policy foundations for a sustainable future (EU is putting in place the world's first comprehensive Plastics Strategy for circular economy, it is offering support for the transition to sustainable agriculture through a modernised Common Agricultural Policy 2021-2027, providing future-proof energy, buildings and mobility measures and ensuring a socially fair transition to ecologically sustainable economic growth and competitiveness) and horizontal enablers for the sustainability transition (education, science, technology, research, innovation and digitisation; finance, pricing, taxation and competition; responsible business conduct, corporate social responsibility and new business models; open and rules-based trade; governance and ensuring policy coherence at all levels) [European Commision, 2019, (b)].

2. Cities of the future

Computers are the ones that provide the useful technological metaphor for defining visions of smart cities [Townsend, 2014]. The Internet was another technological system that transformed the world, this industrial revolution reopening the material basis of society and introducing technologies and products that we still use today [Townsend, 2014].

We are now in a time when we have Internet components, software, protocols, languages and capabilities so that these components can be combined in ways that create new innovations [McKinsey & Company, 2009, cited by Townsend, 2014].

Through its evolution, the Internet has shown that organic evolution does not have to be slow, although it can be unpredictable. For a smart city technology combination approach to succeed, a much wider universe of ideas, technologies and innovations must be created [Townsend, 2014].

2.1 Building a sustainable future

The process of growth does not necessarily mean one of development. Regarding the evaluation of the sustainable development agenda implementation, we can see that it is mainly focused on growth indicators, this demonstrating that we are still a bit far from being able to achieve a sustainable future [Pyrkosz, 2016].

Sustainable development is a real and achievable goal, but individuals need to re-establish their priorities and re-evaluate what should lead their life, economy and society as a whole [Pyrkosz, 2016].

Social development emphasizes the importance of development based on intangible resources of various relationships, values, ethical and cultural behaviors. This approach can make a difference regarding the social-economic development, the values, the culture and the relations being able to become an additional resource in the process of obtaining a comparative advantage. Only after this approach is effectively understood and implemented will development truly become sustainable [Pyrkosz, 2016].

2.2 Promoting digital change in a smart city

At the urban level, citizens, public sector institutions and companies have certain needs and requirements within different fields of activity which are based on electronic applications, infrastructures and digital systems. Thus, smart cities must elaborate development strategies and implement solutions oriented at technological infrastructure and at developing and supporting partnerships between the public and private sectors, which focus on increasing the city‘s attractiveness, the quality of services that the public administration provides to citizens and improving prosperity at a local level [Săvulescu, Antonovici, 2017].

Digital technologies contribute at eliminating geographical obstacles, being of great importance for issues such as trade, social interaction and communication [Săvulescu, Antonovici, 2017].

The fundamental factors for a sustainable digital ecosystem refer to the following issues [Săvulescu, Antonovici, 2017]:

- **smart governance of the local digital ecosystem** – the development of this ecosystem must take into account the coordination actions that take place between the local administrations, universities, citizens and NGOs;
- **digital skills' improvement for enhancing digital change** – digital skills are fundamental contributors to gaining digital knowledge, therefore public sector authorities must provide training programs to improve such skills, being important to develop an educational strategy in this regard;
- **access to new technologies and relevant data for finding solutions for local needs** – promoting the economic environment's digitalization is important and at the same time ensuring access to data and technologies so as to contribute to increasing transparency and accountability of local public administrations, to provide citizen-centered public services and to create a favorable framework for innovation and experimentation of local enterprisess;
- **investments in technological infrastructure** – smart cities must support the process of integrating digital technologies in order to optimize the use of resources of any kind.

2.3 Virtual jobs for the development of smart urban centers

Globally, managers face an increasingly fragmented and geographically dispersed workforce [Koles, Nagy, 2014, cited by Fayomi, 2017], this leading to a large divergence of virtual jobs in organizations‘ management strategies [Fayomi, 2017]. The location of these organizations and their employees is of great importance as the tools and frameworks required for the successful implementation of the virtual workplace paradigm are not so common [Fayomi, 2017].

Social factors and those associated to the dimensional tasks (cohesion, relationship building and

coordination) that affected the effectiveness were the foundation of an effective virtual work [Lin, Standing, Liu, 2008, cited by Fayomi, 2017]. Thus, large and small urban centers propose the smart city as a new urban model, it being seen as a community of medium technological dimensions, interconnected and sustainable, which offers comfort and safety to its residents [Lazaroiu, Roscia, 2012, cited by Fayomi, 2017].

We must therefore understand the increasing importance of adding virtual jobs to the organizational strategy in order to support organizations in maintaining their competitiveness and ensuring the long-term employee well-being. This new approach benefits organizations and institutions because they can attract efficient human resources and increase productivity and competitiveness [Fayomi, 2017].

2.4 Civic engagement in the digital age

ICT and social media sites have reshaped the way citizens communicate and get involved in civic life. As a result of these actions and developments, citizens become more involved, actively participating in both online and offline communities [Zait, Andrei, Horodnic, 2017].

Education and civic engagement contribute to empowering the generations of young people, having long-term positive effects on the various issues related to the social-economic side, while contributing to personal growth and economic development [Kahne, Sporte, 2008, cited by Zait, Andrei, Horodnic, 2017]. In this context, we can thus understand that civic participation and involvement contribute to psychological and social well-being, social intelligence, supportive democracy behaviors, social innovation and happier societies [Wallace, Pichler, 2009, cited by Zait, Andrei, Horodnic, 2017].

3. Global cities – successful examples

Cities and smart technologies are fundamental elements in this new era of development and economic growth [OAV, 2019]. The actors involved in the process of developing smart cities are often asked to identify the problems the cities face, problems that, given the complexity of an area, can be individualized and solved, at least in part, by using modern technologies specific to the information era we live in. It is expected from them to write down all the ideas that appear so that, at the design stage of a smart city, these ideas can be mentioned or used also by investigating the existing infrastructure, data and technologies.

In this scope, we want to mention the first ten countries of the world with the highest population and subsequently some of their major cities that have implemented successful urban development projects.

Table 2. The first ten countries of the world by population (2020)

Country	Population (2020)	Yearly change (%)	Net change	Density (P/Km^2)	Land Area (Km^2)	Migrants (net)	Fert. rate	Med. rate	Urban pop. %	World share
China	1,439,323,776	0.39 %	5,540,090	153	9,388,211	-348,399	1.7	38	61 %	18.47 %
India	1,380,004,385	0.99 %	13,586,631	464	2,973,190	-532,687	2.2	28	35 %	17.70 %

U.S.A.	331,002,651	0.59 %	1,937,734	36	9,147,420	954,806	1.8	38	83 %	4.25 %
Indonesia	273,523,615	1.07 %	2,898,047	151	1,811,570	-98,955	2.3	30	56 %	3.51 %
Pakistan	220,892,340	2.00 %	4,327,022	287	770,880	-233,379	3.6	23	35 %	2.83 %
Brazil	212,559,417	0.72 %	1,509,890	25	8,358,140	21,200	1.7	33	88 %	2.73 %
Nigeria	206,139,589	2.58 %	5,175,990	226	910,770	-60,000	5.4	18	52 %	2.64 %
Bangladesh	164,689,383	1.01 %	1,643,222	1,265	130,170	-369,501	2.1	28	39 %	2.11 %
Russia	145,934,462	0.04 %	62,206	9	16,376,870	182,456	1.8	40	74 %	1.87 %
Mexico	128,932,753	1.06 %	1,357,224	66	1,943,950	-60,000	2.1	29	84 %	1.65 %

[Worldometer, 2020, (c)]

The first example we want to present is China and how the country is rapidly urbanizing, the economy growing continuously, thus cities becoming essential tools for delivering sustainable development [OAV, 2019]. The urban population is growing at increasing rates and by 2050 it will account for 80 percent of the country's population [OAV, 2019]. One project we want to mention in this context is *Sino-Singapore Guangzhou Knowledge City (SSGKC)* [SSGKC] that aims to be developed as a vibrant knowledge-based hub with an estimated population of 500,000 people within the next 17 years. These digital cities solutions will help Guangzhou Knowledge City (GKC) become a sustainable, eco-friendly, knowledge sharing smart city, Guangzhou being the first city to use CyAM, a cloud-based software suite that displays real-time information regarding the air quality detected by sensors spread across the city, predicting values for the next three to five days. This is only the first solution of the Green City Digital Platform project powered by MindSphere which aims to meet and solve the city's challenges in an open, interactive and holistic way, deploying future modules around issues such as: smart traffic, smart energy, smart manufacturing and intelligent buildings [OAV, 2019].

In India, smart cities and urban development projects are being developed and implemented in various cities. One of these cities is the popular tourist destination and historical trade hub, Cochin city. *Cochin Smart Mission Limited (CSML)* is seeking to build a more centralized ICT-enabled urban area, focusing on many aspects, among which urban mobility is an essential one, which is being developed through: public bicycle sharing – the system has approximately 1000 cycle spread around the city area; electric feeders – system developed to improve connectivity through various sustainable modes of transportation; elevated walkways and travel areas – local pedestrian improvement of community walkability; intelligent traffic management – integration and management of different transport ways through technology for a better traffic condition; smart bus shelters; smart bus interchanges

with commercial spaces – improvisation of major bus interchanges and commercial spaces development etc. [CSML].

Another example is offered by Mexico city, Mexico, which has carried out a number of sustainable urban development projects, including the *Neighborhood and Community Improvement Program* [Rules of operation of the Neighborhood and Community Improvement Program, 2019]. This program aims at promoting citizen participation and equity, through social infrastructure planning and rehabilitation of territorial units that have a very low and low social development index in the city's statistics. The beneficiaries of this project are residents which are facing different urban and social degradation situations that impact their quality of life [SIBISO, 2019].

In this context, we also want to mention Romania, even though the country is not present in the top ten countries of the world according to their high population level. The country is increasingly implementing new projects and developing existing ones in order to help the development and sustainability of its cities. Therefore we want to give as a successful example *Cluj IT cluster*, founded in 2012 as an innovation based network for national IT companies and organizations that aims to develop IT services and products, making them more competitive, and to create a highly effective and strong partnership between the public and the private sectors, its main goal being to improve the community's life quality. The cluster offers support to essential actions aimed at improving the collaboration between its members, helping them share knowledge and ideas and assisting further research, the results impacting the whole Romanian society [Cluj IT, (b)].

An important project developed within Cluj IT cluster is *Cluj-Napoca: Next Generation Brained City*, financed through the Sectoral Operational Program for Increasing Economic Competitiveness which aimed to generate a living area based on the innovative concept of ecological and fully computerized urban type community as an element of the networked ecological city. As part of the project's actions, 4 innovative IT products were developed up to the marketability stage and other 12 IT products were developed up to the analysis and design stage. A part of the project's budget was also intended for the organizational development of the cluster mentioned, as it contributes to supporting the IT sector which brings substantial contribution to community development [Cluj IT, (a)].

4. Conclusion

The public administration can become more efficient through the use of information and communication technology, carrying out more transparent activities to help citizens increase their confidence, thus contributing to the development of smart communities and, implicitly, cities.

The public sector plays an important role in stimulating the creation of innovations and the use of information and communication technology for the development of new projects, thus increasing productivity, stimulating the creation of public value, increasing the efficiency in the relationship between citizens and public administration, responding to the challenges that today's society raises [Matei, Săvulescu, Antonovici, 2015].

As we can easily understant, one of the modern tools that the modern world enjoys is information and

communication technology, which contributes to the implementation of democracy and the development of services offered by the public administration. Thus, we consider that the states of the world must provide access to all individuals who use digital information, in a free, equal and non-discriminatory way [Matei, Iancu, 2009].

It should be remembered, however, that although digital technologies provide important help in terms of social innovation and community development, the fundamental element in any interpersonal relationship has been and will always remain the human resource. Therefore, the interaction between individuals should not be stopped in absolute proportion, but a balance must be found between using traditional technologies and methods to perform certain actions [Tîrziu, 2016]. At the same time, the desire of individuals to adapt to the new trends and to acquire the necessary skills and knowledge is of major importance, because if this willingness is missing then the whole process of developing smart cities will be affected.

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