BOOK OF PROCEEDINGS

INTERNATIONAL CONFERENCE
13th - 14th October 2023

ISSUES OF HOUSING, PLANNING, AND RESILIENT DEVELOPMENT OF THE TERRITORY

Towards Euro-Mediterranean Perspectives

ISBN (print) 9789928352286
ISBN (e) 978-9928-352-29-3
DOI 10.37199/c41000100

Issues of Housing, Planning, and Resilient Development of the Territory Towards Euro-Mediterranean Perspectives

Conference Theme and Rationale

Albania, along with other Western Balkan countries, has undergone significant economic, social, and political changes in recent years. As a result, housing, planning, and the resilient management of territorial development have emerged as critical issues. This is because these regions face significant challenges in providing affordable housing, addressing the impact of urbanization on the environment, fostering evidence-based decision-making on the territory, and bringing forth the commitments towards climate neutrality.

The organizers use the term "multi-modality" to define complex situations (in matters of territorial planning, management, architecture, housing, public space, technology, etc.) that have historically encompassed Western Balkans and Mediterranean cities in a logic of coexistence and value co-creation. A combination of knowledge and heritage that throughout time and history have given life to civilization in this region of Europe. The active involvement of Albania in the existing network of the Mediterranean Basin and the EU, through a joint action plan with UN / UNECE, and the Albanian and regional authorities, including reputable scientific bodies such as the Academy of Sciences of Albania, makes this conference even more intriguing to explore fascinating areas of research. The conclusions, to be considered as a stage for open innovation, will include recommendations for further scientific and applied research, projects, and events.

The geographical focus of the conference covers three dimensions: i) Albania; ii) the Western Balkans; iii) Euro-Mediterranean countries. POLIS University aims to focus on the above-mentioned research areas that are of common interest to both Western Balkans and Mediterranean cities, including, but not limited to: housing policies, urban history and architecture typology, innovation and digitalization in urbanism, energy efficiency, resilience and environmental sustainability, governance and smart technologies for city management, education and gender aspects in urban planning research.

In this regard the main aim of this international conference is to bring together scholars, policymakers, and practitioners to examine the pressing issues of housing, planning, and land development in these regions, in a context of transition fatigue, climate challenges and post-pandemic realities.

Issues of Housing, Planning, and Resilient Development of the Territory Towards Euro-Mediterranean Perspectives

Conference Aim

The main aim of this international conference is to bring together researchers, policy makers and practitioners to examine the urgent issues of housing, planning and land development in these regions, in a context of transition, climate challenges and post-pandemic realities.

Objective

-Consolidation of the cooperation network between Albanian and non-Albanian researchers, lecturers, managers, with the aim of participating in joint research projects at the regional and international level;
-Support of local authorities with contemporary data, on the state of housing issues, planning and sustainable urban and environmental management, as well as representatives of public and private institutions operating in this field.

The conference is organized by POLIS University (U_POLIS) in cooperation with the Academy of Science of Albania, and supported by other local and international partners.
In the framework of resilience, the main conference theme is devoted to Issues of Housing, Planning, and Resilient Development of the Territory from a Euro-Mediterranean Perspective, including Albania, Western Balkans and the Mediterranean Basin. This event aims to bring together academics, policymakers, researchers, experts, practitioners, and stakeholders from diverse backgrounds to discuss and address critical challenges related to housing, urban planning, and the development of resilient territories.

Scientific Committee

Prof. dr. Sherif Lushaj;
Polis University

Prof. dr. Besnik Aliaj;
Rector of Polis University,

Prof. dr. Tamara Luarasi;
Polis University

Prof. dr. Gjergj Ikonomi;
Polis University

Akad. Adrian Civici;
Academy of Sciences

prof. dr. Neritan Shkodrani;
Polytechnic University of Tirana

Prof. dr. Perikli Qiriazi.
Academy of Sciences

Organizing Committee

Prof. assoc. dr. Xhimi Hysa;
Polis University

Dr. Sotir Dhamo;
Polis University

Dr. Elona Karafili;
Polis University

Sadmira Malaj;
Polis University

Akad. Kosta Barjaba;
Academy of Sciences

Akad. asoc. Gëzim Hoxha;
Academy of Sciences

Akad. Jorgaq Kaçani;
Academy of Sciences

Akad. Neki Frashëri.
Academy of Sciences

Table of Content

The challenges of applying Big Data in the urban planning practices for the developing countries. Case study in Albania.

Ph.D. Candidate. Dhurata SHEHU[1]
Dr. Lucca LEZZERINI[1]
[1]*POLIS University, Albania*

DOI: 10.37199/c41000117

Abstract

While urban populations are expanding, institutions are demanding more sustainable urban development, which has greatly increased urban planning complexity. The traditional urban planning method needs to shift in favor of an automated and optimized procedure due to the necessity to take into account social, legal, environmental, and economic factors. During the planning and decision-making phases of urban design, an important amount of data from multidisciplinary sources has to be constantly processed. Unfamiliar multidisciplinary data sets, on the other hand, can only result in confusion and ambiguity. Data Mining ensure a data-driven strategy to assist the urban design process. It refers to the process of searching for information hidden in a large amount of data through algorithms. Urban logistics can be planned more effectively using data mining technologies, which can also reduce logistics costs and speed up the development of the urban economy. A few nations are undertaking ambitious efforts to make use of this massive information bank for urban planning decision-making. But what are the pros and cons in this data-driven decision process? In Albania although ICT infrastructure is well-developed in urban areas, connection in rural areas is still a problem. Despite the significant advancements made in this field, the application of digital tools and technology in the context of urban planning difficulties is still not fully understood. The purpose of the study is to analyze the challenges of applying Big Data and Data Mining techniques in Albania and in other developing countries in the region.

Keywords
Urban Planning, Data Mining, Smart city, Big Data, Urban Challenges

Introduction

According to projections in the UN World Urbanization Prospects, 68% of the world's population would reside in urban areas by the year 2050 raising serious issues for urban management and placing a new level of demand on resources(up from 54% in 2016) (Ritchie & Roser, 2018). Also, economic and social pressures have increased as a result of population growth. On the other hand, because of problems with design, economic viability, decision-making theory, conflict resolution, advocacy, social equality, legal framework, and sustainability, urban planning has grown very complicated(Vera et al., 2011). Traditional design techniques, analogue systems, and document-based systems have all been put to the test by this complexity(Noardo et al., 2022). Traditional architecture design tends to concentrate on elements like practicality and aesthetics by incorporating quantitative criteria relatively late in the process(Turrin et al., 2011) (Miao et al., 2018).The fundamental drawback of this approach is that it is rigid and unable to address the complexities of contemporary urban planning.

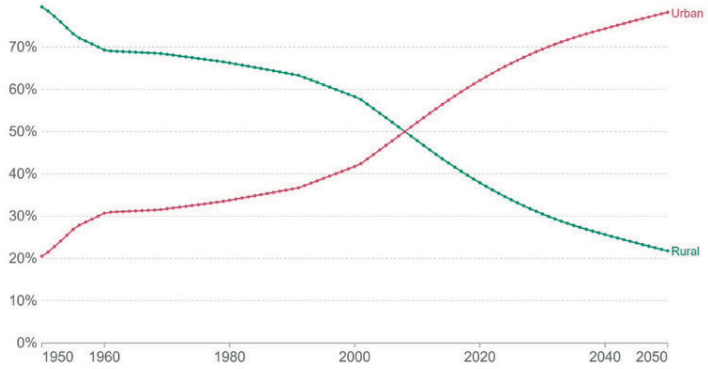

Figure 1: Albania urbanization 1950 to 2050 / Source: (Ritchie & Roser, 2018)

The city is experiencing a massive transformation currently. Building an intelligent network-based infrastructure is necessary for development. New cities should be built on top of technologies, and existing cities should include them. Based on the idea of an integrated strategy, these responsibilities can be resolved through the adoption of BDT (Big Data) technology(Ivanov & Gnevanov, 2018). Because of developments in technology, institutions, society, and business, new sources of Big Data are quickly developing. It has also aroused the curiosity of professionals and decision-makers looking for answers for the administration, planning, and management of numerous urban sectors. By utilizing new data sources, the growing discipline of urban informatics concentrates on exploring and comprehending urban processes. Urban Informatics and applications have the greatest potential in four areas: (1) improved dynamic resource management strategies, (2) conceptual awareness and familiarity with urban systems and patterns, (3) techniques for civic participation and urban inclusion, and (4) advances in planning for cities, management, and policy evaluation (Thakuriah et al., 2016). In order to understand and handle complex areas including transportation, the built environment, housing, built environment, urban economics, environment, and health and geographic evaluation should use a variety of methodologies. As a result, decision-makers must consider a wide range of issues, such as: What approaches are required to run

cities profitably and effectively? How can the possible effects of complex social policy changes be assessed? How can we build cities that are resilient to shocks and what factors make an economy strong and resilient? Which approaches are required for civic engagement, community involvement, adaptability, and innovation? According to estimates, the adoption of new technologies will need reskilling for 50% of all workers by 2025. Modern urban planners must fully understand what BDT (Big Data Technology) technologies are, how to apply them, and how to visualize the outcomes of their use. With this new "scarce and plentiful" info, how will future generations deal? They will also need to incorporate learning and talent, two further facets of digital transformation. One of this paper's goal is to examine how Big Data and Data Mining are used in urban settings by various professional and academic organizations, with an emphasis on Urban Computing. According to Thakurah et al. (2016), urban computing includes the analysis and comprehension of urban systems for the management of dynamic resources, the examination and comprehension of urban patterns and dynamics, urban dwellers' involvement in politics and involvement, as well as the study of urban planning and policy. Both, theory and empirical based on data perspectives are used in urban computing research methods, which are cantered on new Big Data sources.

Data collection complexities in developing countries

It is necessary to examine the different aspects of digital progress in various nations as ICTs become more crucial for achieving the Sustainable Development Goals by 2030. As the situation is evolving into a new normal where "digital" is not only a solution to an emergency but also a long-term investment against risk. The collecting of data stage typically presents researchers with significant difficulties. They must maintain the reliability of conclusions while also planning for unforeseen circumstances that can affect the outcomes. Preserving the validity of the data through an effective and accurate data gathering method is one of the most crucial aspects of preserving the reliability of research findings. When acquiring data in underdeveloped countries where respondents' socioeconomic status, levels of education, and capacity for enumeration are all extremely diverse, the challenges multiply (Marthoenis, 2018). Collection of data is limited to state institutions in developing countries like Albania. These state-based statistical organizations deal with both internal and external issues. The external issues are the low literacy rate as well as the lack of awareness regarding the data collecting, while the internal issues are the lack of institutional setup and insufficient infrastructure. One of the most important issues facing our generation is the unequal distribution of possibilities to utilize the development-enhancing potential of ICTs, access information and knowledge networks, and contribute to and profit from them. A sizable fraction of the 2.9 billion people worldwide without internet access reside in the Least Developed Countries. Key players must understand the access constraints and available remedies to close the digital divide in order for nations to use ICTs for development(Session 286— ICTs Opportunities and Challenges in Developing Countries – An Academic..., n.d.). Although in Albania technological infrastructure is established in urban areas, connection in rural areas is still a problem. Some areas, particularly rural ones, may have high costs and poor penetration. "One of the major gaps" that prevents the country's growth is the lack of connectivity in the rural areas(Digital Development Albania, n.d.). This can be explained in part by the following facts: many urban areas lack access to a wide range of ICTs applications, lack of user-friendly software, lack of understanding of the advantages associated with its use, growth in information and tools aimed at certain disciplines or fields, but missing an entire interdisciplinary vision of their usage etc. The Network Readiness Index (NRI) which is one of the leading global indices on the application and impact of information and communication technology (ICT) in economies around the world, ranks Albania

80th out of the 131 countries. The area where there is the most scope for improvement is technology(Albania – Network Readiness Index, n.d.).

Dimension	Albania	Upper-middle-income countries	Europe
NRI	46.5	49.66	63.72
Technology	35.3	43.11	56.43
People	49.8	44.94	56.35
Governance	49.12	57.08	74.79
Impact	51.79	53.5	67.3

Figure 2: Albania scores vs. averages of its income group and region / Source: (Empowering Youth in Least Developed Countries through ICT – Network Readiness Index, n.d., p. 74)

80th out of the 131 countries. The area where there is the most scope for improvement is technology(Albania – Network Readiness Index, n.d.).

It is significant to highlight that the rankings of those pillars may be impacted by the lack of data. Urban Computing' use of big data raises significant philosophical concerns with relation to general forms of research inquiry, institutional structures, and the overall political economy with regard to access and usage. In previous years, quantitative urban research has used data from surveys, censuses, and specialized sensor systems. The availability of high-quality data for urban research, planning, and operations has faced significant challenges due to declining percentages of people responding to traditional surveys, rising costs associated with conducting the decennial census, and the need to maintain and replace sensor systems. Due to these difficulties, there is a growing interest in exploring additional options for enhancing the urban digital ecosystem. The development of smart cities has attracted a growing number of people who are interested in urban sensor systems, particularly in how to integrate them and improve their performance. Sources of urban data can be also governmental open data, administrative data, user generated content (social sensors) etc. Until that point, there have been substantial shifts in the methods that people exchange knowledge with each other, and a lot has been done about social media, volunteer geospatial data, and content generated by users (UGC) as a whole. Additionally, advances in technology for communication and information (ICT) have expanded the number and types of ways that individuals can take part in urban planning and design, cast votes for and discuss urban projects, and offer feedback on laws and proposals that might change how cities operate. Large amounts of data on urban systems are produced by sensors in the infrastructure related to urban transportation, climate, energy, water, waste, structures governance of the environment, and structure health monitoring, and other aspects. From a wide variety of actual and anticipated applications include cooperative or connected car systems, systems for connecting cars to the grid, grid-based innovations, and a variety helpful device for elders and persons with disabilities. They monitor a variety of urban phenomena, including as inanimate items, physical characteristics of urban regions (atmospheric conditions, water, vegetation, and land use), as well as movement of vehicles, people etc. Some of them can be in operation for a long time and may be either publicly or privately controlled with significantly varying access and data control requirements. Massive amounts of materials are also produced every second of every day as a result of consumers sharing

details about their life and their experiences online, which is related to retro UCG. But with the right information recovery and analytics methods, these data can enable the identification and observation of events and patterns of concern, in addition to the capacity to pinpoint interests and the needs of the public, particularly in response to information, disruptions in urban operations, and regulatory adjustments, for an understanding of urban transformations in actual time. Sensory systems with user participation, citizen scientists' initiatives, social media, browsing habits, GPS, online social networks, and other data collected by society are a few examples of these types of networks.

Challenges

Big Data for Data Mining presents a number of difficulties, including those that are technological, methodological, theoretical and epistemological, as well as political and economic in nature (Thakuriah et al., 2016).

Challenges	Characteristics
Technological	Information generation and capture Management Processing, Archiving Information sharing
Methodological	Challenges in collecting data Extraction of data and accessibility Information integration and data connectivity Cleaning, anonymizing, and evaluating the quality of the data Creating techniques for data-driven modeling and urban modeling using an enormous amount of data
Political economy	When using administration-related data for accountability and program review, privacy concerns and centralized systems of authority pose serious problems, but the availability of transactional information from the business community, privately-controlled sensor technology, and user-generated content (UGC) are open to promoting advancement.

Table 1: Data collecting challenges on developing countries / Source: Author

The requirement to develop, capture, manage, analyze, transmit, and discover urban information creates technological challenges especially in developing countries. Establishing an information network, using cloud storage and multi-cloud structures, language and execution environments, and multi-cloud architectures are a few of the primary information management difficulties. The graphical representations below depict the current state of Albania's telecommunications infra-

structure and. It highlights the important hurdles that must be overcome in order to achieve the necessary degree of quality in digital transformation. But, as demonstrated in the figure 4, it's important to point out that are made a lot of progress on improving the network infrastructure in Albania.

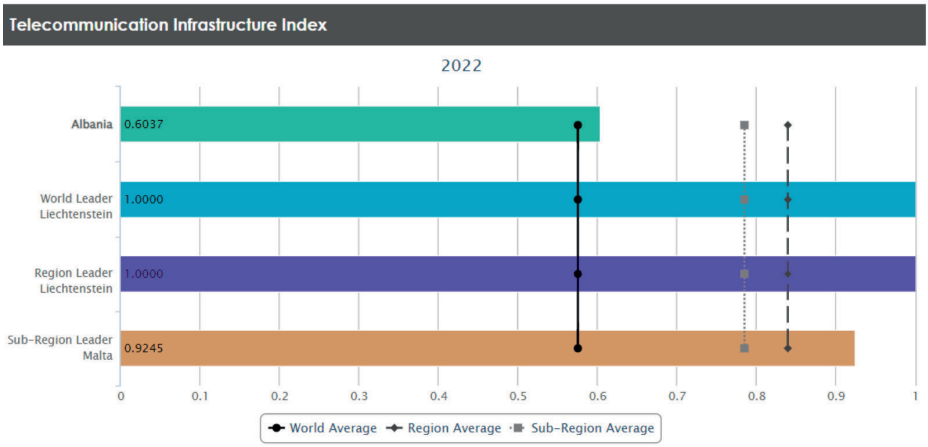

Figure 3: Albania Telecommunication Infrastructure Index / Source: Author

Telecommunication Infrastructure Index	2022	2020	2018	2016	2014	2012	2010	2008	2005	2004	2003
Albania (Value)	0.60370	0.57850	0.43180	0.35296	0.35480	0.33702	0.16293	0.12508	0.06795	0.05778	0.04940

Figure 4: Albania Telecommunication Infrastructure/ Source: (EGOVKB | United Nations > Data > Country Information, n.d.)

Additional aspects include the software, hardware, and clearly defined interfaces for applications (API) needed to compile, organize, seek out, ask questions about, and assess the data. One of the biggest challenges is that the urban knowledge is frequently divided, cluttered and unorganized. With so many instances of large-scale information, confidentiality of information also becomes crucial. Albania faces the same shortage of cybersecurity experts as other countries. Having access to tools for finding resources of superior quality, ontologies for knowledge representation, and a data governance framework that includes the harmonization of standards, key terms, and operational aspects is another crucial factor in determining data access. Machine learning analytics frequently occur along with, information retrieval from the raw data streams when dealing with particular types of unstructured data. As a result, the collecting information and data examination elements of the process are much more closely related, necessitating the acquisition of new skills by urban researchers who intend to utilize these details or work closely with data scientists who possess these skills. In the other hand, retrieval of data using internet-based repositories and networking sites, as well as the analytics of the resulting user-generated content (UGC) hat has been produced in the past, whether either immediately or from archival data, have exploded an important data-specific industry. However, access to the data directly has given rise to a new societal economy of massive information that is confined by the terms of service agreements demanded

Conclusion

Developing countries are susceptible to circumstances that can limit the development of analytics in their respective industries. These nations face difficulties with IT adoption and transfer due to inadequate administrations, weak infrastructure, and a lack of proper education and qualifications. It is essential that developing nations acquire and implement the usage of information technology in order to achieve sustainable development. While there are several urban big data kinds that have been utilized for a while, such as administrative data and particular sensor systems, there are also many innovations, such as newly connected systems of sensors and related information produced by society or in a hybrid form, which produce data in new formats or structures. Due to the close relationship between gathering unstructured data and data analysis as well as the vast range of technological, methodological, and political economic challenges involved, a wide range of skills are required. Today, the professional community of architects and urban planners, as well as the government, business, and society as a whole, have an extremely limited chance to shape the character and layout of cities utilizing a tool like Data Mining. But there are a number of issues that must be resolved before this prospect can be fully achieved. First, there needs to be a standard that governs how Data Mining is used and applied on Big Data by the professional community. This requires modifications to the regulatory framework. Another problem is the requirement to combine the efforts of planners, urban planners, and urbanists during the phases of data collection and analysis. Third, is the need to understand how to use Data Mining effectively. Big Data technologies tend to be a significant part of urban planning since they have an enormous amount of potential for bridging the knowledge gap between urban real data gathered through different technical methods and conceptual understanding of cities.

Bibliography

Peng, Z.-R., Kaifa, L., Liu, Y., & Zhai, W. (2023). The Pathway of Urban Planning AI: From Planning Support to Plan-Making. Journal of Planning Education and Research. https://doi.org/10.1177/0739456X231180568

Dayalan, M. (2020). Top Challenges in Data Mining Research. httpElezaj, O., Tole, D., & Baci, N. (2018). Big Data in e-Government Environments: Albania as a Case Study. Academic Journal of Interdisciplinary Studies, 7, 117–124. https://doi.org/10.2478/ajis-2018-0052

s://doi.org/10.1729/Journal.19988

Laporte, B. (n.d.). Risk management systems: Using data mining in developing countries' customs administrations. 5(1).

Kandt, J., & Batty, M. (2021). Smart cities, big data and urban policy: Towards urban analytics for the long run. Cities, 109, 102992. https://doi.org/10.1016/j.cities.2020.102992

Albania – Network Readiness Index. (n.d.). Retrieved September 10, 2023, from https://networkreadinessindex.org/country/albania/

Digital Development Albania. (n.d.). Retrieved July 24, 2023, from https://albania.un.org/sites/default/files/2022- 05/Digital%20Development%20Country%20Profile_Albania_final_02.22.pdf

EGOVKB | United Nations > Data > Country Information. (n.d.). Retrieved September 14, 2023, from https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/2- Albania/dataYear/2022

Empowering youth in least developed countries through ICT – Network Readiness Index. (n.d.). Retrieved September 10, 2023, from https://networkreadinessindex.org/empowering-youth-in-least-developed- countries-through-ict/

Ivanov, N., & Gnevanov, M. (2018). Big data: Perspectives of using in urban planning and manage-

ment. MATEC Web of Conferences, 170, 01107. https://doi.org/10.1051/matecconf/201817001107
Marthoenis, . (2018). Challenges of Data Collection for Research in a Developing Country: Proceedings of the Aceh International Nursing Conference, 164–169. https://doi.org/10.5220/0008396001640169
Miao, Y., Koenig, R., Knecht, K., Konieva, K., Buš, P., & Chang, M.-C. (2018). Computational urban design prototyping: Interactive planning synthesis methods—a case study in Cape Town. International Journal of Architectural Computing, 16(3), 212–226. https://doi.org/10.1177/1478077118798395
Noardo, F., Wu, T., Arroyo Ohori, K., Krijnen, T., & Stoter, J. (2022). IFC models for semi-automating common planning checks for building permits. Automation in Construction, 134, 104097. https://doi.org/10.1016/j.autcon.2021.104097
Ritchie, H., & Roser, M. (2018). Urbanization. Our World in Data. https://ourworldindata.org/urbanization
Session 286—ICTs opportunities and challenges in developing countries – An Academic.... (n.d.). WSIS Forum 2022. Retrieved September 10, 2023, from https://www.itu.int/net4/wsis/forum/2022/Agenda/Session/286
Thakuriah, P., Tilahun, N. Y., & Zellner, M. (2016). Big Data and Urban Informatics: Innovations and Challenges to Urban Planning and Knowledge Discovery. Springer Geography, 11. https://www.academia.edu/17785970/Big_Data_and_Urban_Informatics_Innovations_and_Challenges_t o_Urban_Planning_and_Knowledge_Discovery
Turrin, M., Von Buelow, P., & Stouffs, R. (2011). Design explorations of performance driven geometry in architectural design using parametric modeling and genetic algorithms. Advanced Engineering Informatics, 25, 656–675. https://doi.org/10.1016/j.aei.2011.07.009
Vera, C. M. A., Mels, A. R., Keesman, K. J., & Rijnaarts, H. H. M. (2011). Resource management as a key factor for sustainable urban planning. Journal of Environmental Management, 92(10), 2295–2303. https://doi.org/10.1016/j.jenvman.2011.05.016

Scientific Academy of Albania