Cities 4.0 Research Trend

Muhammad Ikhsan Setiawan and Ronny Durrotun Nasihien
Department of Civil Engineering, Narotama University, Surabaya, Indonesia
ikhsan.setiawan@narotama.ac.id

Agus Sukoco, Firman Aditya and Amrun Rosyid
Department of Management, Narotama University, Surabaya, Indonesia

Che Zalina Zulkifli
Faculty of Arts, Computing and Creative Industry, Sultan Idris Education University, Malaysia

Muhammad Isradi
Department of Civil Engineering, Universitas Mercu Buana, Jakarta, Indonesia

Abstract

A digital city is a result of the development of a city through a technology-based or digital platform. This research is conducted descriptively based on scopus.com data, where researchers obtained 586 documents over the last ten years (2012-2021). The analysis process uses (1) research country documents, (2) affiliation documents, (3) affiliation documents, and (4) funding sponsor documents. From the results and discussion, researchers find that (1) The United States has the most digital city research articles over the last ten years (2012-2021), followed by China and the United Kingdom. (2) The University with the most research articles on digital cities over the last ten years (2012-2021) is Pontificia Universidade Catolica do Parana (Brazil), followed by Universidade de Sao Paulo - U.S.P. (Brazil), The University of Sydney (Australia), and the University of Illinois at Chicago (U.S.). (3) The field of social studies has been a favorite of research articles on digital cities for the last ten years (2012-2021), followed by the field of computer science and engineering. Finally, (4) the National Natural Science Foundation of China has the most research funding sponsors in digital cities over the past ten years (2012-2021), followed by the European Commission and U.K. Research and Innovation. Digital city research is the future of the world.

Keywords
Digital city, digital platforms, social studies, computer science

1. Introduction
A digital city is a result of the development of a town through a technology-based or digital platform. This research is conducted descriptively based on scopus.com data, where researchers obtained 586 documents over the last ten years (2012-2021). Scopus data covers more than 7,000 publishers, 12,751 serial titles, 82 million items, 80,000 affiliate profiles, 17 million author profiles, and 1.7 billion references cited since 1970. Authors and researchers can find trends and collaborators by analyzing thousands of search results with only one click. Scopus helps researchers succeed with common research workflows. The four main tools of Scopus analysis are Results Analysis, View Citation Overview, Search Sources & Compare Journals, and Scopus Profile – Author output analysis (M.I. Setiawan, Abdullah, Lestari, & Yuniningsih, 2019b).

2. Literature Review
The literature used is based on the 2020 research, namely Ikhsan Setiawan et al. (2020) "Sustainable Mobility, Maritime, Airports, and Local Government Revenue and Expenditures (APBD)," Ikhsan Setiawan, et al. (2020) "City G.D.P., Transport, and Warehousing that are Sustainable," Ikhsan Setiawan, et al. (2020) "Sustainable mobility, development of integrated public transportation technology 4.0 GIS supports regional development,"


3. Methods and Data Collection
A digital city is a result of the development of a town through a technology-based or digital platform. This research is conducted descriptively based on scopus.com data, where researchers obtained 586 documents over the last ten years (2012-2021). Scopus data covers more than 7,000 publishers, 12,751 serial titles, 82 million items, 80,000 affiliate profiles, 17 million author profiles, and 1.7 billion references cited since 1970. Authors and researchers can find trends and collaborators by analyzing thousands of search results with only one click. Scopus helps researchers succeed with common research workflows. The four main tools of Scopus analysis are Results Analysis, View Citation Overview, Search Sources & Compare Journals, and Scopus Profile – Author output analysis. (M.I. Setiawan, Abdullah, Lestari, & Yuniningisih, 2019b). The analysis process, using: (1) research country documents; (2) affiliation documents; (3) affiliation documents; and (4) funding sponsor documents.

Figure 1 above shows the SCOPUS.COM profile.
4. Results and Discussion
First, the results obtained are in the form of research country documents, namely the United States with 95 documents, China 70, the United Kingdom 49, Italy 37, Brazil 35, Spain 30, Russian Federation 29, Australia 23, Germany 23, Canada 22, and the Netherlands 21 documents. The United States has the most research articles on digital cities over the past ten years (2012-2021), followed by China and the United Kingdom.

Figure 2. the documents of the research country

Second, the results obtained are in the form of affiliation documents. Pontificia Universidade Catolica do Parana (Brazil) 12 documents, Universidade de Sao Paulo - U.S.P. (Brazil) 6, The University of Sydney (Australia) 6, the University of Illinois at Chicago (U.S.A.) 6, Uniwersytet im. Adama Mickiewicza w Poznaniu (Poland) 5, Texas A&M University (USA) 5, Universidad Complutense de Madrid (Spain) 5, University of Ottawa (Canada) 5, University of Wuhan (China) 5, Universidad Nacional Autónoma de Mexico 5. Pontificia Universidade Catolica do Parana (Brazil) has the most research articles on digital cities over the past ten years (2012-2021), followed by Universidade de Sao Paulo - U.S.P. (Brazil), The University of Sydney (Australia), and the University of Illinois at Chicago (U.S.A).

Figure 3. the documents of the affiliation

Third, the results obtained are in the form of documents in the field of study. Social Sciences 247 documents, Computer Science 239, Engineering 185, Arts and Humanities 79, Business, Management, and Accounting 61,
Earth and Planetary Sciences 58, and Environmental Sciences 52. The field of social studies has become a favorite research article on digital cities for the past ten years (2012-2021), followed by the field of study in Computer Science and Engineering.

**Figure 4. the documents of the subject area**

Finally, the results obtained are in the form of funding sponsor documents. Researchers found 13 documents from the National Natural Science Foundation of China, European Commission 11, U.K. Research and Innovation 11, Engineering and Physical Sciences Research Council 8, Conselho Nacional de Desenvolvimento Científico e Tecnológico 7, National Science Foundation 7, Horizon 2020 Framework Program 6, Ministério da Ciência, Tecnologia e Inovação 6, Ministry of Education, Culture, Sports, Science and Technology 5, and Russian Foundation for Basic Research 5. China's National Natural Science Foundation has sponsored the most research funding in digital cities during the last ten years (2012-2021), followed by the European Commission and U.K. Research and Innovation.

**Figure 5. the documents of the funding sponsor**

5. Conclusion

Digital city is the development of cities through technology-based or digital platforms. This research was conducted descriptively based on SCOPUS.COM data, obtained 586 documents over the last ten years (2012-2021). Analysis using: (1) the documents of the research country; (2) the documents of the affiliation; (3) the documents of the affiliation; and (4) the documents of the funding sponsor. From the results and discussion, researchers find that (1)
The United States has the most digital city research articles over the last ten years (2012-2021), followed by China and the United Kingdom. (2) The University with the most research articles on digital cities over the last ten years (2012-2021) is Pontificia Universidade Catolica do Parana (Brazil), followed by Universidade de Sao Paulo - U.S.P. (Brazil), The University of Sydney (Australia), and the University of Illinois at Chicago (U.S.). (3) The field of social studies has been a favorite of research articles on digital cities for the last ten years (2012-2021), followed by the field of computer science and engineering. Finally, (4) the National Natural Science Foundation of China has the most research funding sponsors in digital cities over the past ten years (2012-2021), followed by the European Commission and U.K. Research and Innovation. Digital city research is the future of the world.

**Acknowledgments**

The authors thank to Direktorat Jenderal Pendidikan Tinggi Kementerian Pendidikan dan Kebudayaan Republik Indonesia, for their Grants Financial Support, Penelitian Terapan Unggulan Perguruan Tinggi scheme, 2021.

**References**


Biographies

Muhammad Ikhsan Setiawan received his Bachelor of Civil Engineering (1998) from Universitas Merdeka, Malang, Indonesia, and Master of Civil Engineering (2000) from Universitas Indonesia before pursuing Doctor of Philosophy (Civil Engineering) at Universitas Tarumanagara, Indonesia (2018). He is currently an Assistant Professor at the Faculty of Civil Engineering, Narotama University, Indonesia, and registered as Engineer Expert Certified. He currently leads a research team in Sustainable and Digital for Transportation, Tourism and Regional Economic, a grant from the Ministry of Education, Indonesia. His research interests include Smart City and Sustainability. He is also a Chairman of WORLD CONFERENCE. I.D., IPEST commerce, SONGSONG rtd, member of IEEE, editors, and reviewers some Journal indexed in SCOPUS, DOAJ, CROSSREF, and GOOGLE, also until now as Vice-Rector of Narotama University, Indonesia.

Ronny Durrotun Nasihien is an Assistant Professor at Faculty of Engineering, Universitas Narotama, Surabaya Indonesia. Bachelor of Architecture from Institut Teknologi Adhi Tama Surabaya, Indoensia (1997), Master of GIS in Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia (2011) and Doctoral of Management Business in
STESIA Indonesia (2021). He has been recognized as a professional architecture and construction management consultant with over 20 years of experience.

Agus Sukoco is an Assistant Professor at the Faculty of Economics and Business, Universitas Narotama, Surabaya, Indonesia. Bachelor of Marine Engineering in faculty naval engineering from Institut Teknologi Sepuluh Nopember (1996), Master of Management Business in Narotama University (2006), and Doctoral of Management Business in STESIA Indonesia (2021). He has been recognized as a professional management business consultant with over 18 years of experience working with closely-held businesses. He is also Editor in Chief of IJEML International Journal of Entrepreneurship and Business Development, indexed International DOAJ, as Head of Department Management, Narotama University, Indonesia.

Firman Aditya earned a Bachelor's degree in Civil Engineering (1992) from the Sepuluh Nopember Institute of Technology (ITS), Surabaya, Indonesia, and a Master of Business Administration in Finance (1994) from Hawaii Pacific University, Honolulu, Hawaii, U.S.A. He is currently working as a Lecturer at the Faculty of Economics and Business, Narotama University, Indonesia. His research interests include Management, Finance, and Business.

Amrun Rosyid received his Bachelor of Mechanical Engineering (2002) from Sepuluh Nopember Institute of Technology (ITS), Surabaya, Indonesia and Master of Management (2018) from STIE YAPAN Surabaya. He is currently a Lecturer at the Faculty of Business and Management, Narotama University, Indonesia. He is currently also a Mendeley advisor and often gives workshops on reference managers. His research interests include Human Resource Management, Strategic Management, and Tourism. He is also an International Journal Editor and often gives workshops on writing papers for international publications.

Che Zalina Zulkifli (Universiti Pendidikan Sultan Idris) is a Professor in the Computing Department, Faculty of Arts, Computing and Creative Industry at Sultan Idris Education University, Malaysia. She had over 22 years of professional teaching experience as a lecturer and active researcher in Electronics & Electrical Engineering, I.O.T., Embedded System, and Wireless Sensor Network. Her research projects have collaborated with multinational company which contributes to a network that leads to new ideas and concrete research projects. The developed automation projects that focused on Automation, IoT, and Wireless Communication fields have been successfully adopted by the industry to date. A total of more than 3 million Ringgit has been generated as an income to the University mainly from the Research grant, Commercialization of innovative research products, and the services as a principal consultant. Expertise in the agriculture sector with a new invention to improve crop production adopted high technology. Sincerely dedicated to the very wise in the green project, she was appointed by Seberang Perai City Council as a Project Leader for the Edu-Green Centre located in Seberang Perai, Penang, Malaysia, which is an active site for green technology hub.

Muhammad Isradi, born in Kandangan on 18 August 1972. He is the secretary of the Civil Engineering Department at Mercu Buana University. He earned a degree in Civil Engineering from Universitas Muhammadiyah Malang in 1998 with the thesis entitled "One-Way Flat Plate Planning at Ratu Plaza Madiun. He then obtained a Master's degree in Civil Engineering, Transportation Concentration from Brawijaya University in 2001 with a thesis entitled "Family Movement Awakening Model in Sawojajar Housing Area, Malang." He also teaches several subjects such as Pavement Planning, Geometric Road Planning, Transportation Planning, and Environmental Engineering.