

The role of 5G technology in fostering sustainable economic development

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Abstract. This paper analyzes the evolution of mobile communication technologies, focusing on the progress from the early mobile networks to the sophisticated 5G network. Since the inception of wireless communications by Guglielmo Marconi in 1895, this research highlights how each generation of mobile networks has contributed to the radical transformation of communication, transitioning from simple voice calls to advanced data services.

2G networks revolutionized communication by introducing digital voice services, followed by 3G, which paved the way for mobile internet. The 4G network significantly improved data transfer speeds, integrating services such as VoLTE (Voice over LTE). The latest innovation, 5G, offers extremely fast speeds, low latency, and the ability to simultaneously connect millions of devices, facilitating the development of IoT, AR, and VR applications.

An essential aspect of this paper is the analysis of the impact of 5G technologies on the sustainable economy. These advanced networks contribute to optimizing resource consumption and reducing carbon emissions, being fundamental in implementing smart grid solutions in the energy sector. In transportation, 5G plays a crucial role in the development of autonomous vehicles and smart infrastructure, improving traffic efficiency and reducing pollution.

In agriculture, 5G technology facilitates the use of precision technologies, promising more sustainable resource management. We conclude that the implementation of 5G networks not only redefines mobile communication but

also has a profound impact on sustainable economic development, contributing to innovation and efficiency across multiple industrial sectors. Thus, 5G networks are essential for achieving global sustainable development goals.

References

- [1] J. G Andrews, et al. (2014). "What Will 5G Be?" IEEE Journal on Selected Areas in Communications, 32(6), 1065-1082.
- [2] A. Osseiran, et al. (2014). "Scenarios for 5G Mobile and Wireless Communications: The Vision of the METIS Project." IEEE Communications Magazine, 52(5), 26-35.
- [3] G. A. Akpakwu, et al. (2017). "A Survey on 5G Networks for the Internet of Things: Communication Technologies and Challenges." IEEE Access, 6, 3619-3647.
- [4] 3RD GENERATION PARTNERSHIP PROJECT (3GPP) specificații: 2G (GSM 02.01-03.22), 3G(TS 36.xxx), 4G LTE (TS 36.xx), 5G NR (TS 38.xx). <https://www.3gpp.org/>
- [5] Verizon. (2021). "Verizon 5G Overview." <https://www.verizon.com/5g/what-is-5g/>
- [6] Ericsson Mobility Report, November 2023: <https://www.ericsson.com/en/reports-and-papers/mobility-report/reports/november-2023>