African Water Security Studies (Environmental/Cross-disciplinary)

Replicating 5G Technology's Role in Digital Transformation Across African Cities: A Libyan Perspective

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Abstract

This study builds upon previous research examining the potential of 5G technology in facilitating digital transformation across African cities. A mixed-method approach combining qualitative interviews with quantitative data analysis was employed to evaluate the impact of 5G infrastructure on digital transformation indicators such as connectivity, productivity, and service quality. Initial findings indicate a significant positive correlation ($p < 0.01$) between the deployment of 5G technology and improvements in urban connectivity, with an average increase in download speeds by 24% compared to pre-5G levels. The replication study confirms the role of 5G in enhancing digital infrastructure across Libyan cities, supporting earlier claims about its transformative potential. Further research should investigate scalability and sustainability of these improvements, while policymakers are encouraged to consider targeted investments in 5G infrastructure as a key driver for urban development. Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2$, with performance evaluated using out-of-sample error.

Keywords: *African, geospatial, IoT, blockchain, cybersecurity*

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