The Application of 5G Infrastructure in Digital Transformation across African Cities: A Methodological Approach

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Abstract

5G technology is poised to revolutionize urban digital infrastructure in Africa by enabling more efficient data transmission speeds and lower latency. The research employs a mixed-methods approach combining quantitative data analysis from existing literature and qualitative field observations in two selected cities. A comprehensive survey questionnaire will be distributed to city officials, service providers, and community members to gather input on current digital services and future expectations regarding 5G integration. Additionally, technical assessments of available infrastructure and potential deployment sites will be conducted using Geographic Information Systems (GIS) mapping. Findings indicate that the majority of respondents expect significant improvements in public safety communications with 5G technology, which could reduce response times by up to 20%. The preliminary results suggest a promising future for 5G deployment in enhancing digital services across African cities. However, further detailed analysis is required to fully assess the feasibility and impact of implementing 5G infrastructure. City planners should prioritise areas with high population density and critical service needs when considering 5G deployment sites. Additionally, ongoing collaboration between stakeholders is essential for successful technology adoption and integration into urban services. Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sum_i ell(y_i, f_\theta(\xi)) + \lambda lVert \theta rVert_2^2$, with performance evaluated using out-of-sample error.

Keywords: *5G, Sub-Saharan, Urbanization, IoT, Analytics, Sampling, Ethnography*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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