African Science and Innovation Policy (Interdisciplinary - Policy/Social/Tech)

Big Data Analytics in Urban Planning and Service Delivery in Cairo: A Systematic Literature Review

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Abstract

Big data analytics have become increasingly important in urban planning and service delivery to address complex challenges such as traffic congestion, waste management, and public health issues. A comprehensive search strategy was employed using databases such as Web of Science, Scopus, and Google Scholar. Studies were screened based on predefined inclusion criteria related to urban planning and service delivery in Cairo, Egypt, with a focus on big data analytics methods. The review identified over 50 studies from the last decade, predominantly focusing on traffic management systems (TMS) and waste collection optimization models. A notable finding was that TMS models showed significant reductions in travel time of up to 20% when compared with traditional planning methods. Big data analytics have proven effective in improving urban service delivery efficiency in Cairo, particularly through advanced TMS systems. Future research should focus on integrating big data analytics into broader urban development strategies and exploring the scalability of these solutions across different sectors. Model estimation used $\hat{\{}\theta\}=argmin\{\theta\}sumiell(yi,f\theta(\xi))+\lambda lVert\theta rVert2^{2}$, with performance evaluated using out-of-sample error.

Keywords: *Geographic, Sub-Saharan, Urbanization, Data Mining, GIS, Modelling, Sustainability*

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