CERIS Civil Engineering Research and Innovation for Sustainability

Digitalization in water and wastewater infrastructure: advanced practices and innovative digital transformation models

Summary

The spotlight on water supply and sanitation (WSS) services is growing in the global context since they still require a significant boost to be effective and to achieve the Sustainable Development Goals (SDGs). Thus, the water and wastewater utilities are under increasing pressure to improve the overall effectiveness of their operations, which calls for them to guarantee the availability and quality of water supply at a cost that is affordable for the consumer (social, economic and environmental sustainability).

The main objective of this research is to assess the digital transformation of water and wastewater utilities worldwide by developing a novel digital water asset management framework. Due to the complexity of the urban water cycle services (UWCS) the focus will be on informational, decision, and planning dimensions to address the shortcomings of the current reference models, such as IAM´s conceptual asset management anatomy (The Institute of Asset Management) and IWA´s water digital transformation strategy (The International Water Association).

This project innovates in four ways: by introducing a hierarchical asset tree from the perspective of water supply and sanitation (WSS) services; by adding more dimensions to characterize asset management performance for regulatory perspectives; by incorporating decision analysis models into the AM model; and by developing a digital twin water architecture.

Keywords

Digitalization, infrastructure asset management, digital twin, BIM, urban water cycle services.

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Period
2020-2024

Funding
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