A Digital and Flourishing Built Environment

The built environment sector is undergoing a digital transformation, led by governments that use open, shareable asset information to drive improvements in cost, value, and carbon performance. Addressing complex challenges—like climate resilience, aging infrastructure, and long-term sustainability—demands a digital approach that links physical assets with data insights, guiding smarter interventions at every level, from single assets to entire systems. Trigger events such as the Grenfell Fire and the falling masonry at Oxgangs Primary School in Edinburgh underscore the need for centralized, integrated infrastructure data management. Today, technologies like Building Information Modelling (BIM), Geographic Information Systems (GIS), Digital Twins, and AI are converging to reshape planning, construction, and maintenance of critical infrastructure, prioritizing both the efficiency of processes and positive outcomes for communities.

The digital shift is redefining value-based assessments, influencing funding, consumption, and carbon management in new project designs. For example, AI can automate reporting in road construction and maintenance, improving efficiency and reducing labor needs. This trend mirrors broader economic shifts where autonomous machines and robotics have drastically reduced labor demands, such as in farming, where jobs fell 90% over two centuries while productivity increased by 50%. Technology also impacts affordability, as seen in music production, where AI software has made once-costly processes accessible for free. However, dependence on such technology raises concerns. For instance, Bitcoin mining consumes more electricity than Switzerland, and widespread IT infrastructure contributes significantly to global pollution, a risk factor associated with millions of deaths worldwide. As the built environment evolves, it must balance technological gains with an awareness of environmental and societal impacts.