Building the Future: Smart, Sustainable, and Digital Transformations in Construction

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Editor

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In this special issue, I would like to express my deep gratitude to all authors for their contribution, and to the reviewers and editors for their valuable guidance. I also extend special thanks to the EPPM journal and EPPM conference team for their efforts in evaluating, selecting, and compiling high-quality articles for this special issue. This special issue presents eight selected, double-blind peer-reviewed research papers focusing on themes related to digital transformation, sustainability, and emerging technologies in the construction and infrastructure sectors. All papers were accepted and presented at the 14th International Conference on Engineering, Project, and Production Management (EPPM 2024), hosted by Al-Zaytoonah University of Jordan from September 17 to 19, 2024, in Amman, Jordan.

Alhammadi et al. investigated the causes of disputes in the construction industry using a case study in Malaysia. A survey data from 125 respondents analyzed by using Fuzzy Synthetic Evaluation (FSE) showed that the main causes of disputes are resource shortage and quality issues caused by poor management, improper contract administration, non-compliance of contract parties with the contractual obligations, and inaccuracies in contract documents. Farouk et al. conducted semi-structured interviews with Building Information Modeling (BIM) professionals to investigate the factors affecting soft cost in BIM-based construction projects. The findings revealed organizational factors such as development charges, certification fees, commissioning fees, and ongoing maintenance costs; and project factors such as contingency fees, levy fees, and documentation fees. Athamlebbe and Rahman developed a Digital Leadership (DL) competency framework for entry-level positions through semi-structured interviews conducted with construction industry professionals. The developed framework includes digital, technical, and sustainable project management knowledge; managerial, technical, and interpersonal skills; and professional and personal attributes. The study by Bathich et al. identified the strategies for integrating equitable transition to net zero in built environment roadmaps using Digital Twins (DT). The results by semi-structured interviews with twenty built environment experts showed that the strategies are divided into four themes: collaboration and education, sustainable technology, data management and policy, and inclusive project management.

Razak et al. conducted an interview survey with eighteen experts in the infrastructure fraternity to investigate the strategies to enhance the inclusion of social dimensions into the Circular Economy (CE) in infrastructure projects. The study identified three strategies, which are integration, regulatory policy, and transparency. The study by Ahmad et al. investigated the challenges to the application of blockchain technology for sustainable material handling. Interviews with twenty-one experts have revealed challenges related to technological infrastructure, regulatory framework, cost implications, and industry readiness. On another note, Rabayah et al. proposed a framework illustrating a holistic view of 3D printing across the lifecycle of construction projects, and how it maps to different Sustainability Development Goals (SDGs). The study conducted a systematic review and analysis of key case studies to illustrate the alignment of 3D printing with global SDGs, particularly SDG 9 (Industry, Innovation, and Infrastructure), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action). Finally, Ghadi examined the long-term and dynamic relationship between traffic accidents and tourism in Jordan by using the autoregressive distributed lag (ARDL). The results demonstrated that increased tourism income has a positive effect on the risk of slight accidents in the long term, but a negative effect on fatalities and serious accidents in the long term. In addition, the results showed a strong unidirectional effect of overnight visitors, single-day visitors, and tourism income on traffic accident indicators.

In summary, the papers in this special issue highlight the intersection of digital tools, sustainability, and advancements in the construction sector. They emphasize the use of digital tools, such as AI, blockchain, 3D printing, BIM and digital twin technologies in the built environment. They also discuss the challenges, opportunities, and future directions of sustainable development and digitalization. This special issue encourages its readers to leverage technology-driven solutions to achieve resilient and sustainable built environments and helps bridge the digitalization and sustainability gap in the built environment using emerging technologies.