TU Delft

Delft University of Technology

Preface

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DOI
10.1049/PBBE007E_fm

Publication date
2025

Document Version
Final published version

Published in
Blockchain, Smart Contracts and Distributed Ledger Technologies in the Built Environment: Key concepts, technologies, and applications

Citation (APA)
Kassem, M., Maciel, A., & Hall, D. (2025). Preface. In M. Kassem, A. Maciel, & D. M. Hall (Eds.), *Blockchain, Smart Contracts and Distributed Ledger Technologies in the Built Environment: Key concepts, technologies, and applications* (pp. xxi-xxii). Institution of Engineering and Technology. https://doi.org/10.1049/PBBE007E_fm

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Preface

Blockchain and distributed ledger technologies (DLTs) are increasingly recognised for their potential to address complex challenges across various sectors. Within construction and the built environment, these technologies are beginning to show promise not only in tackling persistent issues such as inefficiencies, fragmented processes and trust deficits but also in reshaping business models, enabling new forms of organising and driving value creation. Construction and the built environment, known for their significant economic and environmental impact, face growing pressures to adopt innovative, sustainable and collaborative approaches.

In this context, this book brings together a range of perspectives to explore how blockchain can contribute to addressing the critical challenges of the construction and built environment sectors. This book was conceived to bridge a critical gap in the discourse surrounding blockchain's role in the built environment. While the potential of this technology is often discussed in abstract terms, this volume seeks to ground the discussion in both theoretical insights and practical applications. By bringing together leading academics and industry practitioners, we aim to provide a comprehensive exploration of blockchain's foundational concepts, technical attributes and real-world implications for the architecture, engineering, construction and operations (AECO) sectors.

Our motivation in compiling this volume stems from a shared recognition of the urgent need to modernise the built environment and the promising, yet often misunderstood, potential of blockchain to support this transformation. The construction sector's global significance, its substantial environmental footprint and intricate socio-technical ecosystems present unique challenges and opportunities for blockchain adoption. This book was written not just to highlight blockchain's potential but also to critically examine its limitations and implementation challenges.

This book is intended for a diverse audience including researchers, industry professionals, policymakers and educators. It offers value to those seeking to understand blockchain's technical underpinnings, its application in construction workflows and the broader socio-technical and regulatory contexts influencing its adoption. Whether you are a seasoned blockchain developer, a construction industry stakeholder exploring digital innovations or a student delving into the intersection of technology and the built environment, this book provides insights tailored to your needs.

The chapters are structured to guide readers through a progressive understanding of blockchain in the built environment, starting with foundational

knowledge that introduces blockchain's technical principles and explores its integration with other technologies such as IoT, building information modelling and digital twins. Subsequent chapters focus on applications including information management, supply chain management, energy trading, property tokenisation, collaborative decentralised design, digital building logbooks, contract administration and the legal perspective. The concluding chapter synthesises the book's cross-cutting themes, addresses adoption barriers and proposes actionable strategies for adoption. Readers are encouraged to engage with the chapters selectively or sequentially, depending on their focus or expertise. For those new to blockchain, beginning with the foundational chapters is recommended, while practitioners may find the case studies and practical insights particularly valuable.

This book would not have been possible without the contribution of our esteemed lead authors and their co-authors. We are deeply grateful for their contribution, insightful chapters and unwavering commitment to advancing knowledge in this field.

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15 January 2025