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# Book review

## Construction 4.0: An Innovation Platform for the Built Environment

Anil Sawhney, Michael Riley and Javier Irizarry (eds). Routledge, Abingdon, UK, ISBN 978-0-367-02730-8, US$145.60, 490 pp.

Accompanying the papers and articles in this themed issue is this review of a recently published book on the theme. Edited by Anil Sawhney, Mike Riley and Javier Irizarry, *Construction 4.0: An Innovation Platform for the Built Environment* is styled as a 'handbook' and is an edited compendium from more than 60 separate contributors that explains and describes the concepts of Construction 4.0 and the many separate yet interconnected themes, technologies and processes that comprise the framework. Its introduction describes itself as essential reading for all stakeholders in the industry – including research and teaching, not just industry practitioners. This review will test and conclude on that promise.

Chapter 1 provides an introduction to Construction 4.0, basing it on Industry 4.0, and is quite theoretical in nature. Those who already have an understanding of the Construction 4.0 framework will find it quite accessible, but it uses a variety of conceptual models to convey the full extent – starting with cyber-physical systems, digital ecosystems, physical-to-digital and digital-to-physical transformations and so on with an overarching concept of Construction 4.0 as an innovation platform that considers people, process and practices and new technologies. The jargon and terminology can be quite overwhelming – but this is the reality of this subject area, and it is quite difficult to get away from it. The authors actually do a good job of cutting through the convoluted terms, but for those completely new to the subject, I suspect a hard time in forming a complete picture of what Construction 4.0 actually is.

This introductory chapter then sets the technology against the construction sector, providing the context for the emergence of Construction 4.0 and the needs it is hoped to satisfy, as well as the transformations it is hoped to enable. This context is mostly UK-centric, and while there is a passing mention to other countries, developing countries in particular, the situation in Europe is mostly overlooked and reference to the regulatory frameworks and institutional differences between countries is not provided. Nevertheless, there is a concluding list of key challenges that the global construction industry faces that the authors consider can be addressed through Industry 4.0. The chapter then provides an overview of Industry 4.0 followed by the Construction 4.0 framework (this also being the basis for the structure of the remainder of the book), as well as a quite useful list of challenges to its implementation, although it is notable that none of these challenges reflects the impacts of Construction 4.0, particularly on the worker.

The rest of the quite lengthy handbook is split in to three sections – part 1 is a further exploration of the definition of Construction 4.0 and its role. Part 2 consists of a number of separately authored chapters that consider the 'core components of Construction 4.0'. This appears to be very comprehensive – examples include additive manufacturing, digital fabrication, mixed-reality applications, unmanned aerial systems and blockchain, among many others. Part 3 considers other aspects of Construction 4.0 and the future landscape. My overall view is that as a handbook, it serves this purpose very well, and part 2 is likely to have the greatest use. Here there are 16 separate chapters provided by no less than 40 different contributors. Each chapter is formatted similarly – they open with a set of aims that clearly lay out what the reader can expect of the chapter and end with a summary and conclusions. This consistent format is ideal – edited books can often suffer from differences in the writing quality and detail, and while there is some evidence of that – to be expected from 40 separate contributors – the consistent format allows the reader to find what they need to know as efficiently as possible.

The introduction, foreword and preface to this book all contain the usual language for modern narratives on construction and the built environment – economic enablers, higher productivity, unlocking potential, transform delivery, efficient production and so on. The book appears to have been written from these perspectives and attempts to answer the questions that the industry itself asks of it, as well as its clients and policymakers, governments and institutions. For those wishing to follow and facilitate this path for construction, the book is a useful and, for some, a possible constant companion, allowing them to navigate the multifaceted nature of digital transformation and cyber-physical systems. It is a handbook of Construction 4.0 applications, and in that respect, it is successful. What it is not, and to be fair does not profess to be, is a broader consideration of Construction 4.0 and its impacts and influence. In some ways, that is what the themed issue, which this book review is part of, sets out to do – explore what Construction 4.0 will do to the construction industry and what may be the unintended consequences. However, the book does state in its introduction that it is for all stakeholders, including those in teaching and research, and not just practitioners. Indeed, one of the last sections is on 'research directions', which provides a view of the near future and the interface between academia and industry. Possibly to be expected, this is pitched with a very 'tools and process' focused narrative – technology, construction, operations and so on. What is missing is an acknowledgement that research is needed to understand the nature of Construction 4.0's adoption – we need research about Construction 4.0 and not just its components.

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