THE BIM MANAGER'S HANDBOOK

Guidance for Professionals in Architecture, Engineering, and Construction

Dominik Holzer

WILEY

THE BIM MANAGER'S HANDBOOK: GUIDANCE FOR PROFESSIONALS IN ARCHITECTURE, ENGINEERING, AND CONSTRUCTION

Dominik Holzer

WILEY

Registered office

John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, United Kingdom

ISBN 978-1-118-98242-6 (hardback); ISBN 978-1-118-98240-2 (epdf); ISBN 978-1-118-98234-1 (epub); ISBN 978-1-118-98231-0 (Wiley Online Library)

Executive Commissioning Editor: Helen Castle

Senior Production Manager: Kerstin Nasdeo

Assistant Editor: Calver Lezama

Cover design and page design: Artmedia

Layouts: Aptara

Front cover image: Copyright © Morphosis Architects

THE BIM MANAGER'S HANDBOOK

Dominik Holzer

WILEY

To my architect wife,
who doesn't understand BIM.

ACKNOWLEDGEMENTS

This book was made possible by the generous support of a number of individuals and organizations, I'd hereby like to acknowledge. First and foremost I'd like to show my gratitude to all the experts who lent their insights either via comments or interview. (Full credits for those I interviewed and quoted can be found at the end of the relevant chapters.) I want to particularly thank the University of Melbourne for its support and specifically Prof. Mark Burry in the Faculty of Architecture, Building and Planning for his guidance. I would also like to mention the assistance given to me by Steve Sanderson and Daniel Davis at WeWork (previously at CASE). They opened up their networks and introduced me to some of the key individuals who enriched this book with their commentary. Lastly, I would like to thank my publisher Wiley, and notably Helen Castle and Calver Lezama for their patience and their insistence in getting the best out of me in this truly transcontinental effort.

CONTENTS

INTRODUCTION: WHY BIM MANAGERS COUNT!

BIM is changing, and rapidly so. While it remained predominantly the domain of technology specialists in architecture and engineering firms in the early twenty-first century, it is now steadily gaining relevance for a broad range of stakeholders in the design, construction, manufacture, and operation of built assets. Hand in hand with the dissemination of BIM comes the dissemination of knowledge associated to its application and the diversification of tasks associated to its management. BIM Managers are becoming far more relevant than simply acting as implementers of technology. They are in fact change agents and if they do their job well, it ties in closely with the core business pursued by their organizations. Beyond that, BIM Managers are becoming key innovators who help to transform the construction industry and associated professions globally.

Figure I–1 University of Sheffield Heartspace, Sheffield, United Kingdom.

This *Handbook* was conceived to offer concise guidance and support to those trying to embrace the many facets of BIM Management. The chapters herein were originally published online as six eParts, each one related to all others, but at the same time sufficiently distinct to act as independent contributions to a whole. The sequential release as eParts has led to discrete, easily digestible sections on highly profiled topics, allowing for latest trends and developments about BIM to be included. In book form, the structure has the advantage that contents are very focused. The reader can go to individual chapters on a needs-to basis for information and advice.

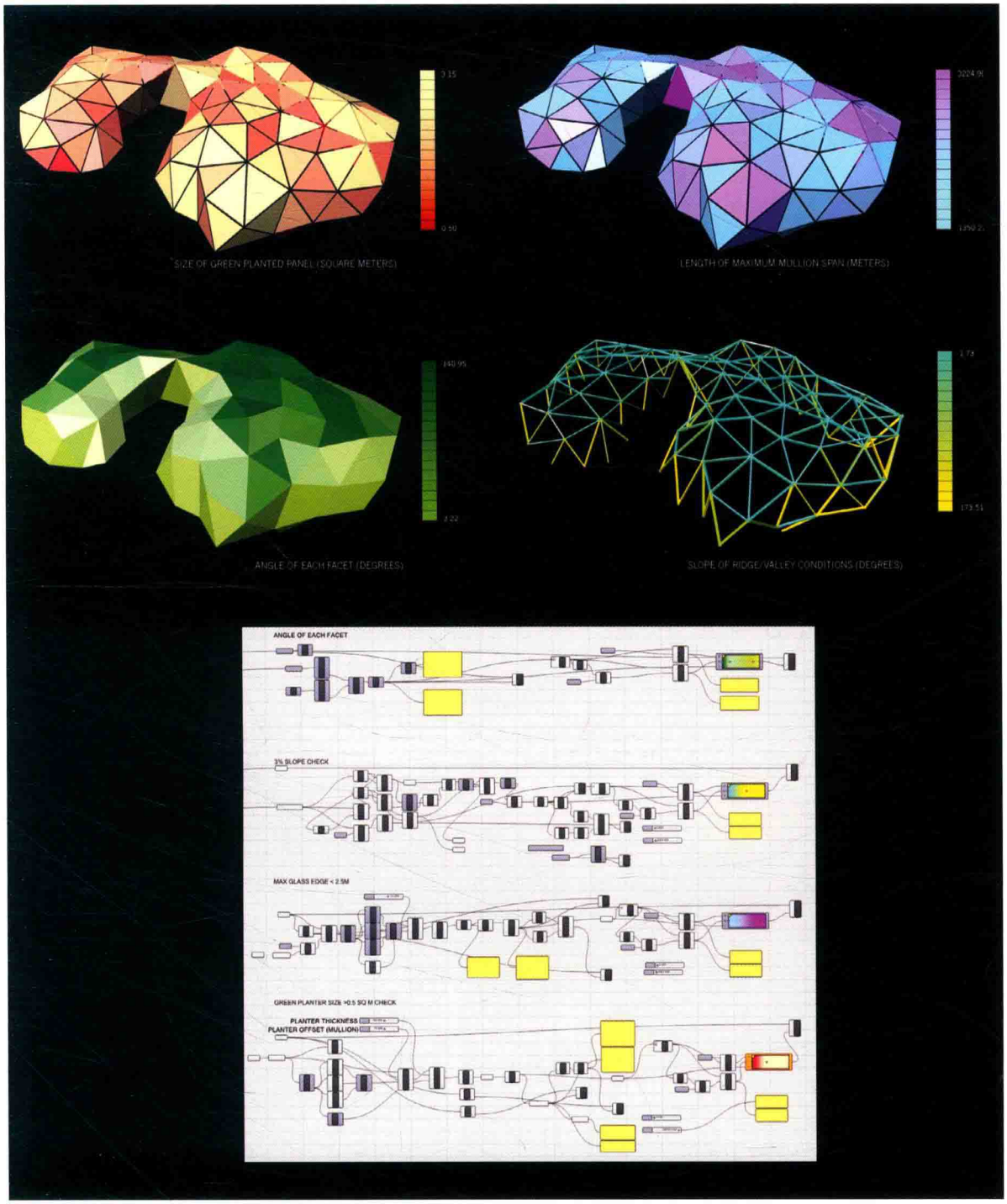
The BIM Manager: Focus on the Person behind the Title

This publication adds to the existing body of work about BIM by taking a specific stance, namely the view of the BIM Manager. *The BIM Manager's Handbook* not only offers insights into contemporary research and trends associated to BIM, it is also highly reflective about the opportunities and challenges related to work undertaken by BIM Managers in contemporary practice. Over 50 leading architecture, engineering, and construction experts from the United States, Europe, Asia, and Australia have lent their voice in telling their stories and providing their feedback to this publication. Their view is that the job title of "BIM Manager" cannot easily be identified via a uniform set of tasks. Instead, BIM Manager roles vary greatly across sectors and companies. Clearly falling under the emerging field of Design Technology, BIM Manager tasks stretch across a great number of responsibilities associated to the planning, design, delivery, and operation of built assets.

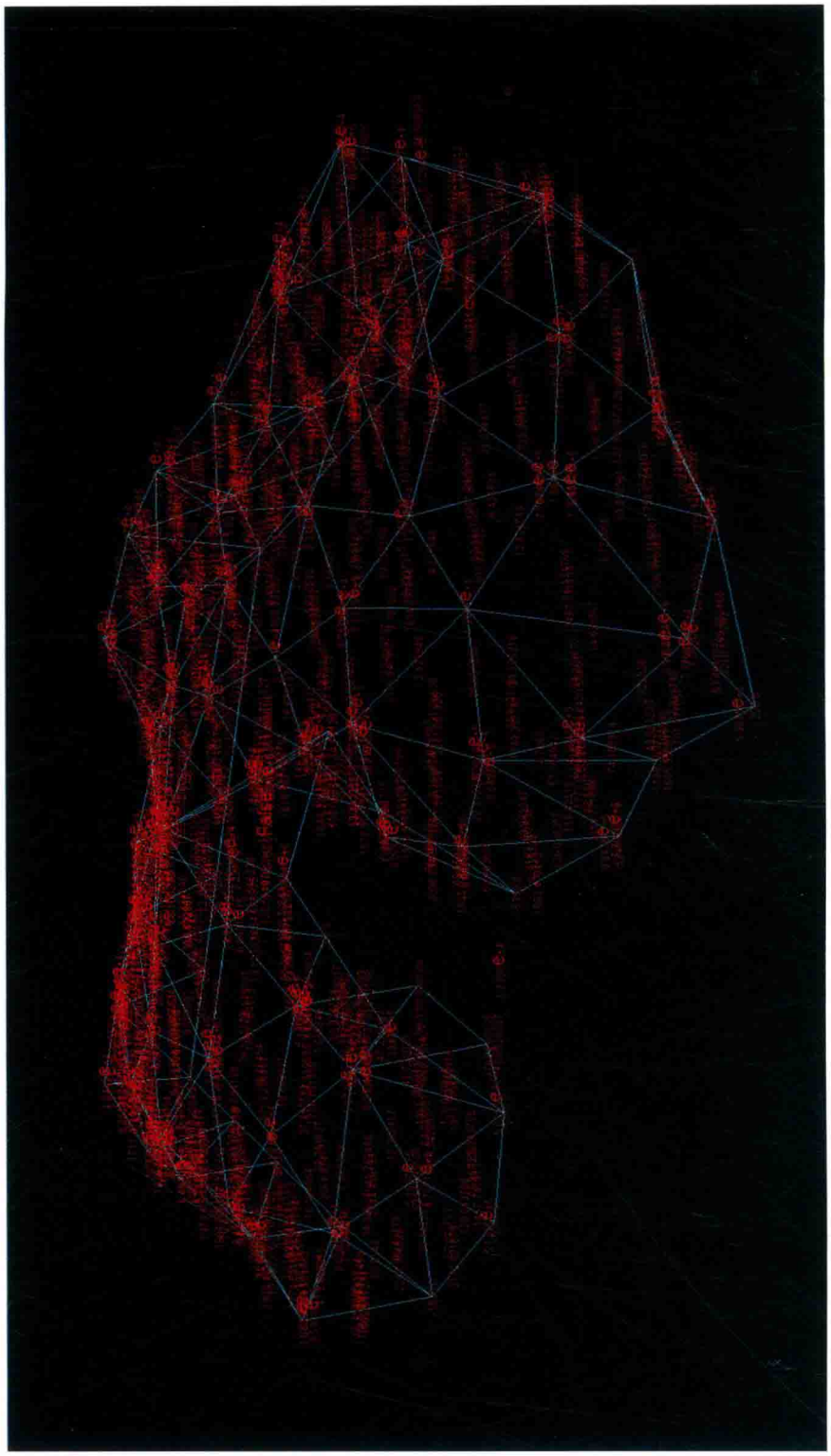
Channeled into six cohesive chapters, *The BIM Manager's Handbook* offers a key reference for those currently engaged with BIM—as well as those who are considering applying BIM on future projects. The chapters put equal emphasis on practical application as well as strategic planning and overarching principles associated to implementing BIM. One other factor that sets *The BIM Manager's Handbook* apart from related publications is the fluent cross-over of technical, social, policy, as well as business-related aspects of BIM. The role of the BIM Manager is in constant flux. BIM Managers stem from all walks of life: technology gurus, 3D modeling specialists, construction experts, drafting guns, coordination experts ... the list goes on. In current practice, most of these self-proclaimed BIM Managers have somehow grown into the role with only a very small percentage having undergone specific BIM Management training.

Given the ever-expanding context of BIM, one might struggle to find a clear definition of what BIM Managers actually do. Yet, despite the multiple directions in which to respond to this question, the answer is simple: BIM Managers are here to *manage*. They manage process, they manage change, they manage technology, they manage people, they manage policies and in doing so, they manage an important part of their organization's business.

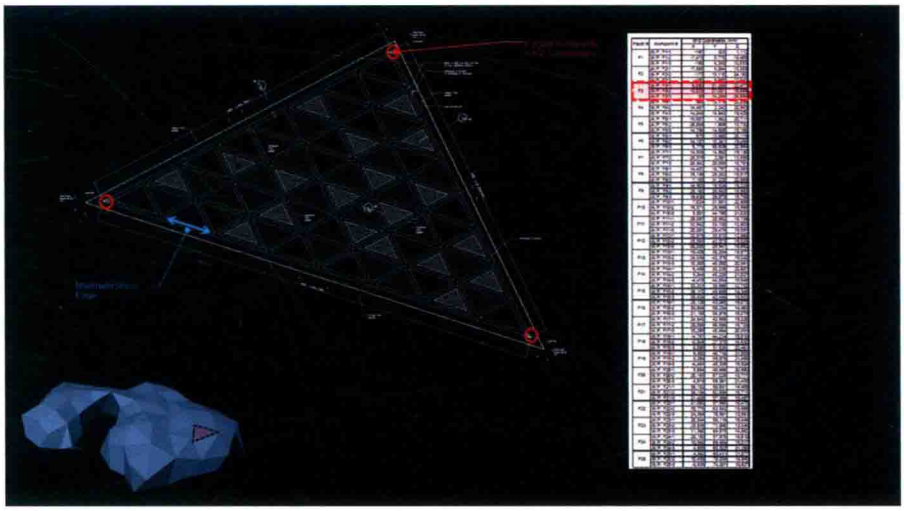
Paradoxically, as representatives of a newly emerging profession (if one can speak of one) BIM Managers are rarely skilled in management. More often than not, they are tasked to perform a narrow set of practical tasks that respond to day-to-day affordances of practice. If in the past it was sufficient for BIM Managers to know their tools, workflows, and workarounds (combined with decent people skills), the property, construction, and design industries start to expect more: With the increasing understanding that BIM is not merely a technical



Figures I–2 through I–4 KAFD Conference Center parametric design analysis, design to structural node fabrication, and subpanel layout.



Figures I–2 through I–4 (*continued*)



Figures I–2 through I–4 (*continued*)

side aspect of practice comes the expectation that BIM Managers need a broader set of skills including "management acumen." Such expectations are not only tied to a sound business sense, but they equally respond to an ever-growing set of policies, standards, and in some cases "mandates" that address how BIM is to be delivered in local jurisdictions. BIM is now more widely acknowledged as a contributing factor to reduce waste, the initial cost of construction, and the total cost of ownership of built assets. Next to that BIM can help to increase productivity across the construction supply chain and to reduce the impact of construction on the environment.

Figure I–5 Project coordination meeting based on BIM.
Copyright © Point Advisory

Given these realizations, it is surprising that the activities undertaken by BIM Managers are often badly understood within their organizations. It is not uncommon for BIM Managers to be tasked in defining their own role and to justify to upper management what it is they do.

Anyone trying to draw a precise boundary around the role description of a BIM Manager will soon realize the pointlessness of such an attempt. Roles depend on the tasks at hand and the distribution of responsibilities across multiple stakeholders. With any new job these tasks and responsibilities change and so does the role of the BIM Manager. In addition to the dynamic inherent to BIM Management, it is more than likely that in the future BIM will form an integral part of project design, delivery, and the operation of built assets. Its application will cease being looked at as a separate component and those we currently identify as BIM Managers will simply be "Designers," "Engineers," "Contractors," (or others) without requiring a BIM label. For now, BIM is still going through different rates of adoption throughout different industry sectors and geographic locations. Understanding its impact and the changes it effects on traditional means of project delivery is a crucial step for organizations to master. The BIM Manager(s) assist them on this path and they will do so for at least five to ten years to come.

Hands-On BIM

Instead of trying to offer an all-encompassing framework, *The BIM Manager's Handbook* explains how BIM can best be implemented by tapping into the on-the-floor experience of contemporary practice. By drawing from such expertise, hands-on feedback will guide the reader through a great number of real-life examples and anecdotes that will advance their own thinking. Many of these references get consolidated and summed up as practical "tips and tricks" that are easily digestible and translate to a great number of applications. Core to the information provided in all six chapters is the value proposition related to BIM and, inherent to this, the value proposition of the BIM Manager. The question thereby does not revolve any longer about use BIM or not, but about how to implement it successfully.

This *Handbook* clearly acknowledges the transient nature of BIM Management. It offers the reader an overview that aims at standing the test of time. The six chapters of this book each tackle a highly relevant portion of what those who manage BIM ought to know. First they set the scene on how to define Best Practice BIM in order to highlight the breadth of roles and responsibilities associated to its management. Drawing from this initial assessment, the consequent chapters then tackle distinct aspects of BIM Management in greater depth. Most importantly, this doesn't occur in the form of a mere technical explanation of day-to-day tasks. Instead *The BIM Manager's Handbook* addresses the wider significance of BIM Management responsibilities with far-reaching reflections on social issues, business directives, and knowledge acquisition. The reason behind this approach is simple: to answer what a BIM Manager needs to know and do in order to excel in his or her role.

When considering the BIM Manager role—the immediate needs and future requirements—it becomes apparent that there has been an overemphasis on the technology aspect in available literature. In response, this book only contains one chapter with a clear focus on technology. All others unravel the intricacies associated with

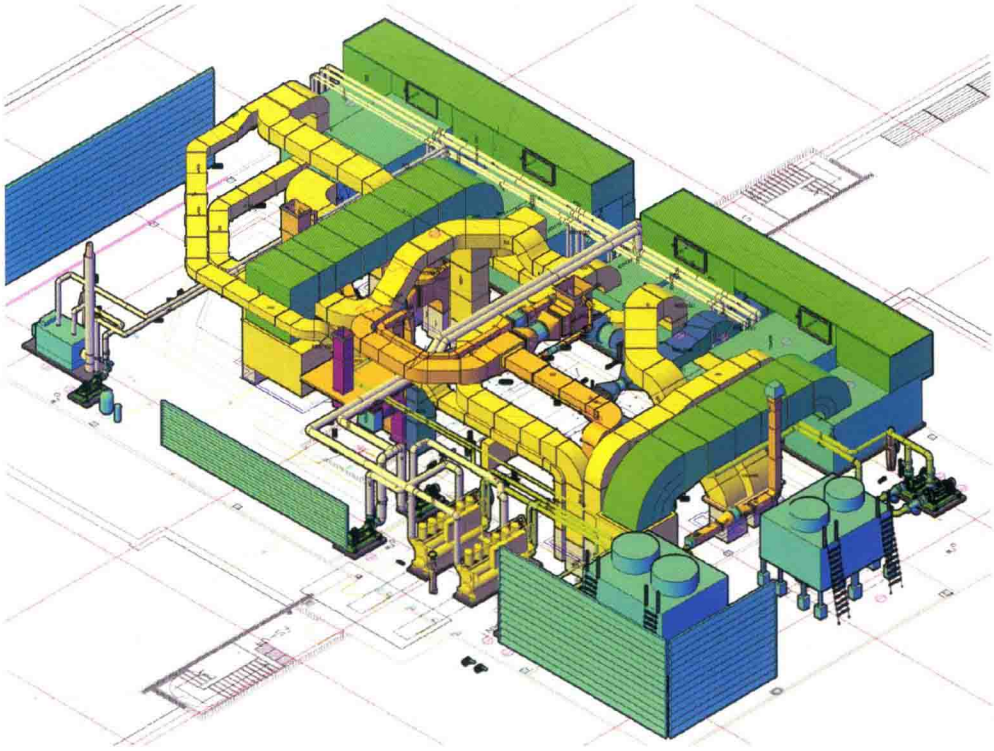


Figure I–6 Mechanical system plant room in BIM.

BIM when instilling new ways of working, changing process, the importance of good communication, and the need for continuous skill acquisition.

BIM Managers need to learn to elevate their role beyond project support and position their activities among the leadership level of their firm and beyond. *The Handbook* describes how to achieve this change of emphasis and how BIM Managers can impact on the ongoing development of BIM through the construction sector, pushing for innovation and increased productivity. A great number of BIM experts and innovators who contributed to this publication are doing exactly this: sharing their research and facilitating dialogue with a high public profile. Examples of such excellence can be found in the work of Rob Jackson at Bond Bryan Architects in the United Kingdom who, together with his collaborators, keeps on investigating processes of IFC and COBie integration to the typical project delivery workflow. As a leading Quantity Surveyor, David Mitchell at Mitchell Brandtmann in Australia regularly publishes works about BIM "Return on Investment" on a macroeconomic scale. Another outstanding BIM proponent is James Barrett in the United States, who continuously reports on the approaches taken by Turner Construction to thrive for excellence in delivering projects using BIM and Lean Construction at conferences nationally and internationally. These are just some examples; more than 50 others have lent their voice to this publication.

In order to capture the knowledge of these global industry leaders, writing this book has taken the author on a journey of discovery and consolidation. An industry leader in his own right, who is actively engaged in the

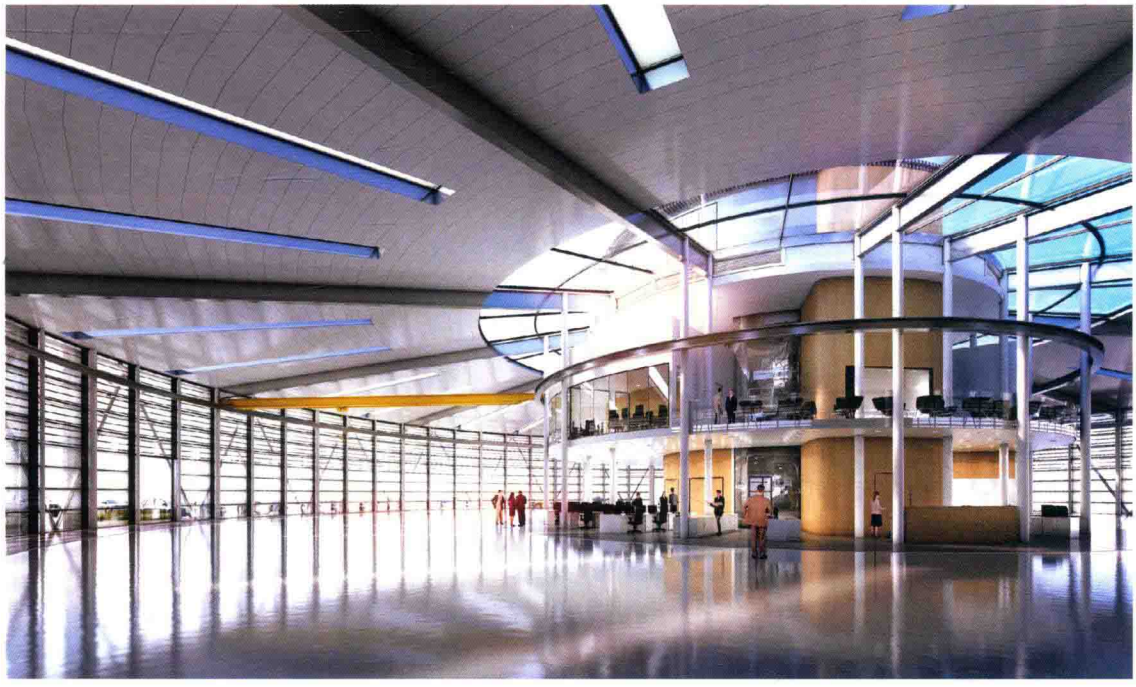


Figure I–7 Ecclesall Road mixed-use development, Sheffield, United Kingdom.

delivery of projects as well as the formulation of government policy surrounding BIM, it was pivotal to the author to reach out to a group of outstanding individuals globally. This exercise was undertaken in order to canvass both quantitative feedback (in the form of an initial survey), as well as qualitative comments from trusted experts in their field. The author has continuously expanded his network both geographically as well as thematically in order to capture both the breadth as well as the depth associated with BIM Management and its future development. The research for *The BIM Manager's Handbook* was undertaken online and in one-on-one encounters over a 15-month period. It resulted in numerous contributions from a lively, curious, and generous BIM community, united by common goals and concerns. One aspect that clearly emerged from the many discussions and the associated correspondence is everyone's enthusiasm and willingness to share their expertise and opinions. The insights offered in this publication are a testimony to the fact that the BIM community is bent on advancement over individual ownership.

Revelations and Surprises

One of the revelations from writing this book has been the startling low level of awareness of BIM Managers about their role within professional practice. With most of them entering the BIM domain via narrow pathways, they first need to expand their focus in order to understand the bigger picture. Even if they do, they then require convincing arguments to bring their firm's leadership on board and guide them in their process of making BIM

Figure I–8 Discussing latest software applications at a Revit Technology Conference (RTC).

work both internally, as well as across collaborative project teams. Providing such guidance does not come without a struggle: In a risk-adverse industry with low profit margins, the push for innovation and process change needs to be well orchestrated. BIM Managers are the key facilitators for change. They balance and harmonize the cultural with the technical, the business drivers with new opportunities of information transfer and sharing, the big policies with practical execution within teams.

The BIM Manager's Handbook demystifies a great number of misconceptions about BIM and it goes straight to the core of analyzing opportunities and challenges associated with BIM Management. It offers advice to fast-track every BIM Manager's and Design Technologist's development based on the knowledge of the best in business. It is set to become one of the key points of reference that will help us to globally take BIM further.