

# **Construction Supply Chain Management in the Fourth Industrial Revolution Era**

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## About The Authors

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# Preface

The Fourth Industrial Revolution (4IR) originated from the manufacturing sector and is based on the premise that the manufacturing industry has gone through three revolutions: mechanisation, electrification and digitalisation. Evidence from literature and practice revealed that we are currently in the 4IR, which describes the blurring of boundaries between the physical, digital and biological worlds. The present revolution seeks a fusion of advances in artificial intelligence, robotics, the internet of things and other technologies that can alter the management of the construction supply chain (CSC). Unfortunately, most construction stakeholders do not know how to align their supply chain activities following the technologies and principles driven by the 4IR. This led to failure and underperformance, which is evident in the delay, fragmentation, corruption and other Gordian Knots of the CSC.

Towards positioning the management of CSC as the lynchpin of the Nigerian economy, this book presented the model for construction supply chain management (CSCM) practice in the 4IR era. Prior to developing the model, this book recognised some existing factors or behaviour capable of impeding the administration of CSC following the tenets and principles of 4IR. For instance, the CSC stakeholders as a culture for hoarding financial information. This culture contradicts the principles and belief of managing CSC in the 4IR era that encourages seamless information synchronisation across the supply chain. Another crucial belief for CSCM in the 4IR era is the principle of interoperability. This principle supports seamless communication and the usage of the functions of one another. The focus of interoperability performs effectively in a trusted environment. Unfortunately, the CSC is not a trusted environment due to the heavy sub-contracting within the construction industry.

In ensuring the practical application of 4IR beliefs like interoperability, this book introduced the drivers of trust, 4IR components and organisational culture to the existing variables for modelling CSCM. Trust drivers encompass the factors that eliminate opportunistic behaviour within the CSC. At the same time, organisational culture was perceived as the indicator supporting the adoption of 4IR components for CSCM. The 4IR components are divided into the cyber-physical system, virtualisation and smart management. The existing variables for modelling CSCM before the rise of 4IR are collaboration, integration and supply chain structure. The model was developed from a rich and robust existing theoretical and SCM model. The book discusses how theories such as the resource-based view, resource dependency theory, transaction cost theory, social

identity theory and change theory shaped the CSCM in the 4IR era. Also, a two-stage Delphi study regarding the future trends likely to occur within the CSC of developing economies was presented in this book. The book's content is crucial for academia, construction stakeholders and the construction regulatory bodies.

The findings from this book will enable the construction stakeholders to realign their activities with the principle and tenets of the 4IR era. Knowing the influence or impact of the model's constructs could assist construction stakeholders in planning better during the management of CSC activities. The book's content will also be significant to academia in the following areas: it serves as a road map for researchers interested in expanding the frontiers of knowledge regarding CSCM in the 4IR era. Furthermore, it will provide literature for students researching the SCM concept in the construction industry in the era of the 4IR. The book provides an operational definition of CSCM from the theoretical perspectives, thereby providing a further basis for studying CSCM. The findings from the study serve as a guide for training students on SCM practice on construction sites in the 4IR era. The robust literature review emanating from this book assists in exposing the readers to CSCM practice in developed countries such as the United Kingdom and Australia.

The book will provide tremendous support for construction regulatory bodies in determining the acceptable practice and standard for managing the CSC in the 4IR era. The regulatory bodies for construction professionals and stakeholders in conjunction with the Government can create software using the construct extracted from this study. The software will function as a pre-test in predicting the performance of CSCM in the 4IR era. Finally, the outcome of this thesis is of great significance to developing countries and their regulatory agencies through the provision of innovative ideas to improve the CSC. The book provides a guide regarding essential factors to consider for achieving efficient CSC practice in the 4IR era.

This book is divided into three parts and nine chapters for guidance and ease of use for construction stakeholders and researchers. Each chapter commences with a brief introduction describing the objective of the chapter and concludes with a summary highlighting the significant issues and their solutions. Since this is a research book, each chapter has a reference for further reading and broadening of the knowledge and scope of this book. An index of significant keywords was also provided for prompt reference to areas of interest for the readers.

The anticipated readers of this book include postgraduate students in the built environment, researchers with an interest in CSCM in the 4IR era and construction and project managers. Other potential readers are government departments that are responsible for construction project delivery as well as corporate agencies shouldered with construction management agenda including clients and contractors of construction projects. The book will also attract built environment professionals, such as operations managers, quantity surveyors, civil engineers,

estate managers, etc. It will also attract a reading audience from stakeholders in the construction educational sectors, owing to the ability of the book to function as an educational research guide, framework or material for topics related to CSCM. Finally, we hope that the readers of this book find it interesting, intuitive, and impacting and vital in improving their understanding of CSCM in the 4IR era.

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