

Construction Workforce Management in the Fourth Industrial Revolution Era

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Preface

The construction industry worldwide is a massive employer of labour. The industry depends on these workers to carry out its activities of contributing to economic growth and societal development. However, the relationship between the construction industry and its workforce is best described as paradoxical. This is because, despite being heavily dependent on workers, the industry has been notorious for its poor workforce management and lack of attention to workforce management issues. Because most construction organisations operate on project bases, whereby some workers are employed for a particular project, the relationship between employers and employees becomes transient and fluid. This lack of attention to workforce management issues has contributed to the overall poor performance noticed in the construction industry of most countries worldwide. To address this problem, it is necessary to understand the practices needed for construction organisations to manage their workforce effectively.

The review of extant literature shows a wide range of studies on workforce management. Some of these studies have proposed several practices needed for organisations to improve the management of employees. However, the current fourth industrial revolution era, which is revolutionising every industry in countries worldwide, offers the construction industry an opportunity to solve its age-long problems through digital technologies. When adopted correctly, these technologies will also impact how workers are managed and the management practices adopted by construction organisations. However, the construction industry has been lagging in adopting these digital technologies compared to other sectors. This lag is not unconnected to the constant fear of job losses among construction workers, which has led to resistance to the use of technologies on the part of the construction workforce, as noticed within the industry. To alienate this fear and resistance to change among construction workers, adopting the right practices that will lead to effective management becomes crucial.

Therefore, this book explores construction workforce management in the fourth industrial revolution era. The book, through a critical review of existing related theories, models, and practices, unearths the gaps in existing construction workforce management studies and proposes a conceptual model designed to improve the management of workers in the construction industry. The conceptualised model was further examined through experts' opinions to determine the suitability and applicability of the proposed workforce management practices and their attributed measurement variables. Furthermore, the book explored the impact of emerging digital technologies on construction workforce management

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while giving insight into the envisioned challenges of deploying digital tools for effective workforce management in construction.

This book is timely as it is designed to give direction for effectively managing the construction workforce. It promises value to readers as it presents a roadmap designed to ensure the effective management of workers within the construction industry. Owners of construction organisations can benefit from the conceptualised construction workforce management model proposed in the book in their quest for improved workers' productivity. Also, the book will support construction regulatory bodies in ensuring organisations within the industry uphold proper workforce management practices. The book's content will also benefit researchers seeking to expand the frontiers of knowledge on workforce management in construction. To this end, the authors confirm that the text utilised in this work reflects original work and, where necessary, the material has benefited from relevant context-setting / referencing.

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Chapter 1

General Introduction

Abstract

This first chapter provides a general overview of the book. The chapter describes workforce management and the lack of adequate attention to this concept within construction organisations. In the fourth industrial revolution era, where emerging technologies have continued to change how business functions, the need for an effective approach towards managing the construction workforce becomes crucial. Having a construction workforce management practice model was deemed vital at this point, where technological advancement is rapidly changing the construction environment, and skill shortage is evident in the construction industry of most countries around the world. As such, this chapter establishes that the development of a construction workforce management model that will help improve the management of construction workers serves a critical value of the book.

Keywords: Construction; construction workers; employee management; human resources; personnel management; workforce management

Introduction

The significance of the construction industry and its importance in enhancing socio-economic development in countries worldwide has been reiterated within the body of literature. Also, the industry's direct and indirect effects on other sectors and, ultimately, on any country's wealth have been noted (Aigbavboa et al., 2022; Dandan et al., 2020; Ofori, 2012). As such, the construction industry has been adjudged as a vital contributor to economic growth (World Economic Forum, 2016). The industry contributes to socio-economic development through its contribution to gross domestic product, infrastructure delivery and provision of employment. To this end, the construction industry has been described as a huge employer of labour, with significant employment of workers recorded in developed and developing countries worldwide (Durdyev & Ismail, 2012;

Mitchell, 2020; Vitharana et al., 2015). Before the Coronavirus (COVID-19) pandemic, the industry had a 7.7% contribution to global employment, with an envisaged growth of up to 13.4% in 2020 (International Labour Organisation (ILO), 2021). Despite the devastating impact of the pandemic on the industry, which saw a momentous loss of jobs and revenues for construction organisations (Aigbavboa et al., 2022), the construction industry globally has been taunted as the global engine for economic growth and recovery from COVID-19 (Robinson et al., 2021).

The construction industry has many stakeholders and depends on resources such as labour, plant, material, capital, and energy to deliver its services (Hillebrandt & Cannon, 1990). From the perspective of labour, Ofori (2012) noted that the construction industry requires human effort to deliver its products successfully. Despite the numerous emerging digital, physical, and biological technologies offered by the fourth industrial revolution (Aghimien et al., 2021; Schwab, 2017), the construction industry still relies heavily on people. These people are referred to as human resources or the organisation's workforce, and they are an organisation's most valuable asset, especially in a labour-intensive industry such as construction (Malkani and Kambekar, 2013). This workforce can be skilled, semi-skilled or unskilled, and effectively managing them is germane to successfully delivering construction projects (Ngwenya & Aigbavboa, 2017; Oke et al., 2019; Vitharana et al., 2015). The management of these workforces is known as human resource management or workforce management. Since the most common term for labour in the construction industry is 'construction workers', this book adopts the phrase workforce and workforce management in place of the popular 'human resources' and 'human resource management'.

Workforce Management

Workforce management plays a significant role in the success of any organisation (Werner, 2017). According to Dessler (2015), workforce management refers to how people are managed within organisations. Traditionally, workforce management involves the strategic management of workers (Spooner & Kaine, 2010), knowledge management amongst workers and within the organisation (Prusak, 2001), organisation development, resourcing, and performance management (DeNisi & Smith, 2014), reward management (Armstrong & Murlis, 2007), employee relations (Farnham, 2000) and occupational health and safety (ILO, 2001). Invariably, workforce management is centred around people and their relation to their organisation. With the constant changes in the social, economic, and technological climate, organisations are saddled with the responsibility of coming up with unique ways of developing and retaining their most valuable asset (i.e. their workers). This is crucial as Marchington and Wilkinson (2005) have earlier noted that the way workers are managed impacts the organisation's performance. Therefore, workforce management is responsible for improving organisational performance and capability by effectively managing employees. To this end, Kinnie and Swart (2016) submitted that employees and organisational performance depend largely on the workforce management practices adopted within

the organisation. Aside from performance improvement, [Nzuve \(2007\)](#) noted that adopting effective workforce management practices enhances employee productivity, and by extension, leads to attaining organisational goals. [Ivancevich et al. \(2008\)](#) also noted that good workforce management practices help organisations retain existing employees while attracting new ones.

There is no gainsaying that the construction industry relies heavily on its workforce to survive. Although capital, materials, and plant are equally significant for successful project delivery, workers serve as the ‘engine room’ that brings these other resources into good use. Since the construction industry is project-based, many workers are required to deliver successful projects at several stages. As such, it is necessary to manage these workers carefully to attain successful project delivery within the industry. More so, workforce management can assist in nurturing and improving employee performance and creativity ([Chang & Teng, 2017](#); [Zhai et al., 2014](#)). Through this improvement, employees who are creative and innovative in their ideas are groomed. In the long run, construction organisations tend to benefit more, as ingenious thinkers can create a remarkable competitive advantage for their organisations by providing quick and positive responses to challenges ([Jafri et al., 2016](#)).

Workforce Management in Construction

Albeit the importance of effectively managing workers for the successful delivery of projects and improved performance of organisations and workers, the concept of workforce management has continued to be on the back foot for many construction organisations ([Aghimien et al., 2023](#)). This situation is not ideal for an industry that is labour intensive ([Loosemore et al., 2003](#)) and characterised by project-based work for a defined period ([Druker et al., 1996](#)). This is coupled with the fact that getting the skills the industry needs are not always easy ([Aghimien et al., 2023](#); [Oke et al., 2019](#)); one would expect proper management of the few available skills. [Dainty et al. \(2007\)](#) noted earlier that because construction activities may differ from project to project, there may be substantial changes in the knowledge and skills required from one project to another. Likewise, high levels of labour turnover are evident in the construction industry, ultimately leading to skills shortages ([Erlick & Grabelsky, 2005](#); [McGrath-Champ et al., 2011](#); [Oke et al., 2019](#)). According to [Olsen et al. \(2012\)](#), the skills shortage is not necessarily the number of workers unavailable but the unavailability of adequately trained skilled and productive workers within the industry. To battle the skills shortage issue, some construction organisations rely on outsourced labour, collaboration, joint ventures, and subcontracting ([ILO, 2001](#); [Rubery et al., 2004](#)). While these approaches have helped cushion the effect of labour shortage in many construction organisations, the resultant effect is the lack of attention given to workforce management within these organisations, as the responsibility of managing the outsourced workforce is left to the company from whence, they were outsourced ([Dainty et al., 2004](#); [Loosemore et al., 2003](#)).

[Othman et al. \(2012\)](#) submitted that the effectiveness of workforce management in construction as a technique for performance improvement is still unclear. It was

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noted that if managing workers through project-based work was considered the strategy of project-oriented organisations, it would imply that the workforce management policies, processes, and practices in such organisations support project-oriented work. Consequently, the management of workers can move from project to project with the experience gained from one project being transferred to the next. [Loosemore et al. \(2003\)](#) believe workforce management focus has been centralised as a head-office function, yet most problems and operational issues arise on construction sites. Hence, [Othman et al. \(2012\)](#) concluded that workforce management in construction might differ from traditional workforce management functions and practices designed for typically managed organisations. It was suggested that workforce management changes in construction organisations should be tailored to workers' needs and the working environment. Likewise, [Keegan and Turner \(2003\)](#) highlighted that management should implement their policies and strategies based on their employees' needs to ensure they can contribute positively to the organisation.

[Armstrong and Stephens \(2006\)](#) confirmed that workforce management practices aid in attracting and retaining talents in an organisation. [Garavan \(2007\)](#) noted that there is now a recognised trend in well-chosen workforce management practices that directly affect individual and organisational performance. As such, there is the need to embrace workforce management practices such as planning, recruitment, selection, training, and development, which are imperative for the survival of any organisation ([Ngwenya et al., 2019](#); [Walker, 2001](#)). Similarly, other studies have noted the need to adopt practices such as compensation, benefits, occupational health and safety, and labour relations, among others ([Chukwuma & Obiefuna, 2014](#); [Ernawati & Ambarini, 2010](#); [Warnich et al., 2014](#)). Understanding these necessary workforce management practices is important for construction organisations which have been lagging in giving attention to their workforce management. Aside from these practices mentioned above, other factors need to be considered. For example, there is a deficiency in the literature on workforce management in construction regarding considering issues surrounding the emotional intelligence of both employees and management. Although emotional intelligence plays a crucial role in attaining improved performance ([Love et al., 2011](#)), studies on emotional intelligence assessment in workforce management within organisations (construction in particular) are few. The handful of available studies emphasises peripheral and broad issues such as the role of the emotional intelligence of people ([Cao & Fu, 2011](#); [Darvishmotevali et al., 2018](#); [Lindebaum & Cassell, 2012](#); [Love et al., 2011](#); [Mo & Andrew, 2007](#); [Oke et al., 2017](#)). Integrating this critical aspect of human psychology into existing workforce management practices will improve the management of workers within construction organisations.

Similarly, as noted earlier by [Othman et al. \(2012\)](#), when selecting the right management practices based on workers' needs, it is essential to consider the working environment. The current fourth industrial revolution era, which is revolutionising every industry in diverse countries worldwide, offers the construction industry an opportunity to solve its age-long problems through digital technologies. Evidently, when adopted correctly, these technologies will also impact how workers are managed and the practices adopted by construction organisations. Furthermore, it is necessary to note that construction organisations do

not function in silos. They operate within a defined environment; the norms and mode of operation might influence how these organisations function and manage their workforce. Past studies have noted the importance of assessing the external environment. However, most developed models have embedded external environmental factors within other workforce management practices. More so, none have assessed this external environment from the perspective of handling the environment's pressure as a crucial workforce management practice that could shape organisations' overall performance. Those above necessitated this book on construction workforce management in the fourth industrial revolution era.

Objectives of the Book

This book was conceptualised based on the understanding that workforce management is not given adequate consideration within construction organisations and the need for a well-defined workforce management practice model that considers factors peculiar to the construction industry. Having a workforce management practice model was deemed crucial at this point, where technological advancement is rapidly changing the construction environment, and skill shortage is evident in the construction industry of most countries around the world. To this end, the objective of this book was to provide a conceptualised construction workforce management model that will serve as a catalyst for reducing employee turnover, enhancing employee skills, and ultimately increasing employee and organisational performance. To achieve this objective, the book explores the concept of workforce management, related theories, models, and practices to unearth the gaps in existing workforce management in construction, and the impact of the pervasive digital technologies offered by the fourth industrial revolution on the effective management of the construction workforce.

The Value of the Book

Past studies have emphasised that construction organisations have placed less focus on workforce management and its practices (Dainty et al., 2004; Loosemore et al., 2003; Shafeek, 2016). This situation is worsened with the advent of ubiquitous digital technologies of the fourth industrial revolution, which offers better delivery of construction projects. While these technologies provide better project delivery, their adoption has been trailed by the fear of job losses (Aghimien et al., 2021). It is, therefore, crucial to determine how workers can be effectively managed to ensure their continuous development and alienate their fear of losing their jobs to technology.

This book becomes valuable as its submissions are important to owners and those in top management within construction organisations, the workers, and construction industry regulatory bodies. For construction organisations, the proposed conceptual model for construction workforce management will guide them to better manage their workforce by adopting the right practices. The conceptualised model showcases seven crucial practices that management in construction organisations needs to consider to manage their workforce successfully.

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For instance, the model emphasises the need for top management's commitment to employees' training and development, empowerment, and involvement in crucial organisational activities. By promoting training and skills development, ensuring newly acquired skills are shared with other workers, and also applied on the job, construction organisations will be able to identify the strength of their workers and ensure that the right individual with the right training driven by digital technology is given the right project to handle. Also, organisational learning and knowledge management can be attained by sharing knowledge gained from training within the organisations. Construction organisations can also channel the pressure from their environment to promote and improve the management of their employees. With proper attention to the coercive and normative pressure coming from the external environment, construction organisations can redefine their workforce management activities and gain more legitimacy in the process.

For construction workers, if construction organisations adopt the submissions of this book, improvement in skills and more job satisfaction can be derived from working in the construction industry. This is because the proposed conceptual model advocates the 'soft' workforce management concept, where practices that promote proactiveness, participation, and improved skills are adopted to give better quality and flexibility within construction organisations. Furthermore, issues revolving around how employees are recruited and selected, how they are remunerated, the evaluation of their performance, and the management of their EI can be carefully managed for optimum positive outcomes. For construction industry regulatory bodies, the book's submissions can be used to assess members' compliance regarding improving their respective workforce. Regulatory bodies can assist construction organisations in improving their workforce management by ensuring that favourable regulations (including regulations that support emerging digital technologies) are developed. Also, many countries around the world are faced with the problem of unemployment. As such, several initiatives are being implemented to address this excruciating problem. Should construction organisations adopt the submissions of this book, there will be a better-trained and developed skilled construction workforce, which will lead to less employee turnover and, by extension, a reduction in the number of unemployed individuals.

Aside from these practical values of the book, it also offers some theoretical value. The study theorised that a construction organisation that will attain its strategic objectives in the current fourth industrial revolution era must be willing to promote the EI of its workers and external environment factors along with other traditional practices such as recruitment and selection, compensation and benefits, performance management and appraisal, employee involvement and empowerment, training and development. This submission can serve as an excellent platform for future researchers who seek to explore further the concept of worker management within the construction industry.

Structure of the Book

This book is divided into eight chapters, with Chapter 1 presenting a general introduction of the book. Chapter 2 is designed to illuminate the concept of

construction workforce management. This chapter gives an overview of the construction industry and its inherent challenges while expanding on workforce management, particularly in the construction industry. The challenges facing effective workforce management, as well as the measures for improving this management of workers, were explored. Chapter 3 centred around construction workforce management in the fourth industrial revolution era. This chapter explored the fourth industrial revolution and its relationship to the construction industry. Also, the relationship between the emerging technologies of this industrial revolution with workforce management was explored. The chapter also gave insight into the key opportunities for workforce management in deploying digital technologies within construction organisations. Chapter 4 explored related workforce management theories, models, and practices. This chapter set the base for the proposed conceptual construction workforce management model. Based on the reviewed theories, models, and practices, Chapter 5 was developed to showcase the gaps in construction workforce management studies. This chapter emphasised the need for two major practices (i.e. emotional intelligence and external environment). Chapter 6 provided the conceptualised construction workforce management model, while Chapter 7 showcased the exploration of the conceptualised model through experts' opinions. Chapter 8 gave the conclusion, contribution to knowledge and the book's recommendations.

Summary

This chapter provides the readers with the idea behind the conception of this book. The high dependence on labour and the lack of adequate attention given to the management of these workforces necessitated the development of a conceptual model that can help construction organisations effectively manage their workers. This is coupled with the fact that the current fourth industrial revolution era offers organisations digital tools that can help them better manage their workers effectively. The chapter gave an overview of the construction industry, and workforce management in construction. It also revealed the need for a construction workforce management model in the current fourth industrial revolution era, the objectives and the value of conducting the study. The next chapter describes the concept of construction workforce management in the construction industry.

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