Unlocking the Potential of BIM for Transformation in the Kenyan Construction Industry

Ahmed K. Alakhali
Faculty of Technology Management & Business
Universiti Tun Hussein Onn Malaysia
Johor, Malaysia
ahmed.alakhali.94@gmail.com

Abdullah O. Baarimah
Department of Civil and Environmental Engineering, College of Engineering
A'Sharqiyah University
400 Ibra, Oman
eng.baarmh@gmail.com

Aiman H Alkhadri
Faculty of Technology Management & Business
Universiti Tun Hussein Onn Malaysia
Johor, Malaysia
alkhadriaiman@gmail.com

Adham A. Gabir
Department of Civil Engineering, Faculty of Engineering
Universiti Putra Malaysia
Selangor, Malaysia
gabiradham309@gmail.com

Kamrul Hasan
Faculty of Civil Engineering Technology
Universiti Malaysia Pahang Al-Sultan Abdullah
Gambang 26300, Pahang, Malaysia
kamrulhasan5262@gmail.com

Aawag Mohsen Alawag
Department of Civil and Environmental Engineering
Universiti Teknologi PETRONAS
Perak, Malaysia
alawaj711mohsen@gmail.com

Abstract— **The adoption of Building Information Modeling (BIM) has emerged as a transformative approach in the global construction industry, enhancing project management, collaboration, and overall efficiency. This review focuses on investigating the potential impact of adopting BIM on the Kenyan construction industry. The Kenyan construction sector faces challenges such as project delays, cost overruns, inadequate communication, and limited collaboration among stakeholders. The review examines how BIM can address these issues by facilitating enhanced visualization, data sharing, and coordination throughout the project lifecycle. Through an analysis of existing literature and case studies, this review evaluates the key benefits of BIM adoption, including improved design accuracy, clash detection, and reduced rework. Additionally, it explores the potential hurdles in integrating BIM into the Kenyan context, such as technological barriers, skill gaps, and resistance to change. The review also highlights the role of government policies, industry regulations, and educational initiatives in promoting BIM adoption. Lessons learned from BIM implementation in other countries provide valuable insights into the strategies that can be tailored to the Kenyan construction landscape. In conclusion, this review underscores the potential of BIM to revolutionize the Kenyan construction industry by fostering collaboration, streamlining processes, and ultimately delivering projects more efficiently. By addressing the specific challenges faced by the Kenyan context and leveraging the advantages of BIM, the industry can overcome obstacles and work towards sustainable growth and development.**

Keywords—BIM, Benefits, Challenges, Building Project, Sustainability, Processes, Kenya

I. INTRODUCTION

Kenya's building industry, which contributes 7% of the country's GDP, is a vital economic growth engine. The building industry in Kenya is crucial to the country's economy, but it is dealing with a number of problems that are lowering productivity and return on investment. The absence of information sharing amongst stakeholders is one of the biggest problems. Project stakeholders have experienced increased waste, cost overruns, rework, time overruns, and misunderstandings as a result. The built environment industry's conventional two-dimensional (2D) approach to project execution hinders effective data sharing amongst all stakeholders at every stage of the project's development, from idea to construction to facility management. Specifically, from the design to the building phase and ultimately to the facility's operational management [1].

Building Information Modeling (BIM) has emerged as a transformative technology in the realm of architecture, engineering, and construction (AEC), presenting a digital portrayal of a building's physical and functional attributes. This facilitates efficient collaboration among stakeholders across the entire project lifecycle. The integration of BIM within the Kenyan construction industry holds substantial potential for improving various aspects of the sector [2]. BIM brings forth numerous advantages to Kenya's construction industry, aligning with its impact globally. It serves as a digital representation of a facility's physical and functional traits, fostering collaboration and effective management throughout its lifespan [3]. The following are specific advantages of implementing BIM in Kenya's construction sector: **Enhanced Collaboration and Communication:** BIM streamlines communication and collaboration among diverse stakeholders, including architects, engineers, contractors, and clients. This results in minimized misunderstandings, expedited decision-making, and smoother project workflows [4], [5].
Improved Visualization: BIM provides stakeholders with 3D models for accurate project visualization before the commencement of construction. This aids in identifying design clashes, potential issues, and opportunities for design enhancement, ultimately contributing to superior designs and reducing the likelihood of costly changes during construction [6], [7].
Clash Detection and Risk Mitigation: BIM facilitates the detection of clashes, pinpointing potential conflicts between various building components or systems. Early identification of clashes minimizes rework and reduces construction delay [4], [8].
Cost Estimation and Budget Control: BIM seamlessly integrates with cost estimating software, producing precise and detailed cost estimates. This contributes to improved budget control and mitigates the risk of cost overruns [9].
Facility Management and Maintenance: BIM models prove valuable not only during construction but throughout the entire lifecycle of a building. They can be applied in facilities