



How to Improve the Adoption and Implementation of BIM in Africa?

Name

Institution

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### **Introduction**

The construction industry is considered to be one of the most significant sectors in the world. Also, it continues to contribute to the development and modernization of all countries around the globe. Despite this being the case, it still lags behind when it comes to such factors as sustainability, quality, productivity, as well as efficiency (Eastman, Teicholz, Sacks, & Liston, 2011). The trend is partly related to the slow adoption of information technologies in various areas of practice and operation. Today, changes in organizational structure, consumer needs, and globalization have made information technology a critical tool to be used to achieve competitiveness in the market. In the construction industry, however, the traditional industry model has made it difficult for stakeholders in the sector to embrace digital technologies and tools that can improve the levels of productivity (Matarneh & Hamed, 2017). Previous studies have focused on examining the gap between information technology and the construction industry.

One of the areas that have attracted the attention of the researchers is the interoperable technology application known as Building Information Modeling (BIM). There is a wide range of benefits associated with BIM, which should be highlighted to create awareness about the systems (Teicholz, Sacks, & Liston, 2011; Barlish & Sullivan, 2012). Such a system helps manage the information, eliminate conflicts at various stages of the project, and save both money and time (Teicholz, Sacks, & Liston, 2011; Barlish & Sullivan, 2012). Also, it allows for the easier follow up of the various activities and processes that are taken at different phases of the project. If the construction companies and stakeholders were aware of this system and its benefits, they would be ready to integrate and implement various BIM solutions. According to research evidence, BIM adoption has been slow in some areas, e.g. in Africa, even though it has proved to be an essential tool that can help the sector achieve goals, sustainability, and cost-effectiveness (Matarneh & Hamed, 2017). The aim of this paper is to explore how the adoption and implementation of BIM in Africa can be promoted and improved.

### **Background and Significance**

BIM is regarded as a critical tool that helps in applying, maintaining, and utilizing an integrated digital representation of various types of information at different stages of a construction project (Azhar, Khalfan, & Maqsood, 2012). Also, it can help in creating, coordinating, documenting, managing, operating, and updating the data about a particular phase of a project. In general, it is a tool that continues to transform the construction industry globally. The implementation of the intervention supports and promotes the notion of integrated project delivery that has emerged to be an essential approach to reducing wastes, and optimizing efficiency (Barlish & Sullivan, 2012).

Consequently, many governments around the world have embraced the concept and put in place adequate strategies for its use and implementation in the construction sector.

This study is significant since it will provide up-to-date information and insights that can be used to address the problem of slow adoption of BIM in the construction sector in Africa. Although BIM has evolved to become part of the global construction sector, the implementation of BIM technologies in Africa has been a slow process. Consequently, it is imperative to examine how the trend can be reversed to help African countries to understand the value of BIM and its benefits. The results of the study may be used by construction practitioners, governments, and policymakers, as well as encourage construction stakeholders to use BIM in their everyday work.

## Literature Review

### BIM Adoption

Recently, the construction sector has been on the verge of a significant change in the way various projects are managed and delivered. In particular, attention has shifted from the design aspect to the economic, environmental, and social effects of the building projects. In addition, there were attempts to come up with sustainable structures and strategies that are anchored on factors such as resource consumption, type of building, culture, and climate. BIM is regarded as one of the primary factors that are driving such changes around the world (Eastman, Teicholz, Sacks, & Liston, 2011). In developed countries such as the U.S., BIM is regarded as one of the tools that stakeholders should use to achieve sustainability. In the U.K., the government has come out to support the use of BIM in public sector projects leading to a dramatic rise in BIM adoption (McGrawHill Construction, 2014).

It is undeniable that BIM is quickly becoming part of the global construction sector. However, there seems to be a significant difference between how various construction companies and business view and experience the benefits of the concept in different regions. In particular, research has shown that developed nations, such as the US, Germany, Finland, and France have been able to integrate BIM into the core of their construction activities. In addition, the concept has gained an industrywide adoption and awareness (Eastman, Teicholz, Sacks, & Liston, 2011). In other regions such as New Zealand, South Korea, and Japan, BIM is also successfully adopted as contractors continue to integrate it into their activities and processes. In China and Hong Kong, the governments have come up with various BIM frameworks that can be used to generate design solutions, minimize errors, check design integration, and maximize the levels of productivity (Eastman, Teicholz, Sacks, & Liston, 2011).

In the African context, the implementation of BIM tends to vary from one country to the other with significant challenges experienced in most regions. In Nigeria, for instance, the BIM awareness levels have been high with major contractors embracing the technology. In South Africa, construction firms and the government face significant hurdles as they strive to make BIM an integral part of their operations (Arayici, Egbu, & Coates, 2012). The limited adoption of BIM in Africa is attributed to a wide range of factors, i.e. resistance to change, low levels of government support, and weakened economies that provide minimal opportunities for development. Other factors such as the lack of legal aid in developing BIM, overlapping standardization procedures, and the lack of awareness have also been linked to the trend (Zejnilovi?, 2017). These are issues that need to be addressed if African countries want to benefit from the implementation and use of BIM.

### Successful Adoption and Implementation of BIM

The successful adoption and implementation of BIM require nations to come up with BIM solutions and systems that are in line with their needs and capabilities. Every state has a unique construction sector that strives to address specific issues and problems that affect the citizens (Zejnili?, 2017). Therefore, the way BIM is developed and adopted cannot be reproduced or transferred merely from one prosperous country to the other. Also, the adoption of BIM has proved to be easier in developed nations because the latter understand the issues that ought to be addressed through the BIM tools in the construction sector. The developing countries, on the other hand, lack the capability and capacity to develop their BIM tools and systems. In such cases, the uptake of BIM will tend to be low (Zejnili?, 2017). Such countries can take priceless lessons from the developed nations that have been able to tailor-make their BIM systems to suit the needs and capabilities. In addition, they can learn from the mistakes made in other countries so that BIM is implemented in a manner that will help in improving the construction sector and solving local needs.

The creation of awareness about the system and its benefits is the other area that researchers have focused on while addressing the issue of BIM implementation. Available research evidence suggests that several limitations affect the adoption of various BIM technologies and tools in the construction sectors in both developed and developing nations (Zejnili?, 2017; Eastman, Teicholz, Sacks, & Liston, 2011). The lack of awareness remains a major hindrance to the adoption of the tools in some countries. In particular, stakeholders in the construction sector are not aware of the system and its benefits (Arayici et al., 2011). Consequently, governments and other players should take a proactive approach to enlightening construction stakeholders about the BIM technology and its benefits.

The success of BIM system rollout has further been linked to the existence of a standard guide for the solutions and tools implementation. According to Wu, Li, and Wang, the lack of a standard and harmonized guide for the implementation of BIM systems and solutions, coupled with the lack of training and awareness, has significantly slowed the uptake of BIM in the construction industry (Barlish & Sullivan, 2012; Kekana, Aiglavbo, & Thwala, 2014). In other cases, the lack of an implementation guide has made it impossible for professionals in the sphere to identify and rectify properly the challenges that can occur during the implementation of BIM. The consequences of such trends are far-reaching and may include cost overruns, delays, and lack of professional responsibility. Such guidelines help companies to be aware of the challenges to expect and the interventions that they can use to address them. In addition, those instructions will enable the construction firms to prepare before they embark on the process of adopting and implementing BIM.

The adoption of BIM is an important area that researchers have dwelt on as they strive to examine the trends in the construction sector. In particular, studies have underscored the importance of BIM while also analyzing the pertinent issues that contribute to the successful implementation of the system. However, further studies are needed to examine the specific measures that can be undertaken to ensure that BIM is successfully integrated into the African construction sector.

## **Methodology**

In the proposed study, the quantitative research method will be applied to explore the topic of BIM and determine measures that can contribute to its successful implementation in Africa. Quantitative research entails conducting empirical investigations of a particular problem or phenomenon through the use of computational, mathematical, or statistical data and techniques. In this case, quantitative data will be used to deduce the general perception of construction sector practitioners' readiness and possible mandatory initiatives for successful BIM implementation. The sample population will consist of African AEC professionals. They are expected to provide vital insights into

the topic of study because of their experience in the African construction sector. The data will be collected through an online survey and subjected to statistical analysis to provide a fundamental connection between the issue of interest and the information gathered from African AEC professionals.

### **Conclusion**

Companies operating in the construction sector have been looking for ways of achieving a competitive edge in the market and improving their productivity and effectiveness. In addition, they strive to come up with high-quality products that can meet the needs of the local communities. BIM is one of the interventions that can be used to achieve these goals and contribute to the sustainability of the sector. In Africa, BIM is yet to be developed into a holistic and integral part of the construction sector. However, many countries are working towards making it a mandatory and essential method of work in the sphere. By addressing some of the major factors that hinder the implementation of the systems, African nations can improve the adoption of BIM in the construction sector.