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An investigation on Building Information Modelling in Project Management : challenges, strategy and prospects in the Gauteng Construction Industry, South Africa

Kiprotich, Charles Japheth Kipyab

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ABSTRACT

The modern Architectural, Engineering and Construction (AEC) industry is characterized by its fragmented, complex and multidisciplinary nature. Hence, the project success is heavily pivoted on its effective collaboration among the stakeholders during various project phases. The exchange and management of massive project information under various project delivery methods are cumbersome in modern day's projects. Information Technology applications are playing a vital role in overcoming this difficulty; however the technological adoption and its full utilisation has always been slow in the emerging economies. Among these technologies, Building Information Modelling (BIM) dominates the AEC sector in developed countries; these countries are still experiencing the transition from 3D technologies to BIM in AEC industry.

In South Africa, Building Information Modelling (BIM) is becoming the prime means of information exchange between various stakeholders involved in construction projects. Various aspects of BIM are explored and tools are developed continuously in order to make BIM more and more efficient for the whole life cycle of the construction projects. Nevertheless, in most implementations, BIM services are widely utilized in schematic design, design development and working drawings for both Engineering and Architecture as a graphical modelling and clash detection tool. But the developers of various BIM tools have listed many Project Management related benefits in their product portfolio.

Nonetheless, it's utilization in various project management knowledge areas according to PMBOK such as Integration, Scope, Time, Cost, Resource, Procurement, Communication, Quality, Risk, Safety, Environmental, Financial and Claim Management are not fully realized in South Africa. This paper investigates the BIM's utilization on the above said Project Management knowledge areas and identifies its challenges towards project management utilisation and strategies to overcome the identified challenges. The research philosophy adopted in this study follows positivism and a deductive research approach is used to unwind the truth about BIM's utilization for project management, challenges and the strategies among the South African AEC industry. A

survey research strategy is used in this research; data are collected through questionnaires and interviews.

Questionnaire responses were obtained from a sample of 34 BIM adopters, the sample includes architectural, engineering, contracting, quantity surveying and construction management firms, questions related to the project management applications, implementation challenges and effective utilization strategies of BIM were asked. The obtained non parametric responses data through the questionnaire are analysed using appropriate statistical tests. The questionnaire results are triangulated through 3 open ended interviews data. Conclusions from this study help the South African AEC sectors to realize and expand their utilization of BIM in project management processes. Further, the identified challenges and strategies in this study assist the AEC industry to plan for the effective utilization of BIM in their future projects