INTRODUCTION

Construction is a vital sector that contributes much to an increasing economy in country [1]. Construction sector is closely related with the development of Malaysia economy [2]. For example, Malaysia construction sector rapidly growth particularly in public infrastructure project and residential housing project [3]. Due to the significance of construction sector, several effort has been deployed by the Malaysia government thorough its agencies such as the Construction Industry Development Board (CIDB), Ministry of Work, the Contractor Service Centre (PKK), the Board of Engineer, the Board of Architect and Board of Surveyors [2].

Due to rapidly development of this sector, the construction process becomes more complicated, particularly in designing and planning phase. Through literatures, beneficial issues such as sustainable of building, time reduction and cost reduction in a project have been a demand in construction sector. However, through the traditional method, all these benefits hardly to achieve due to the fragmented procedure of work process. This concept would caused less communication and collaboration among the parties involved that always lead to the construction project problems such as delay and overrun cost [1], [4], [5].

Thus, an involvement of ICT technology is required in order to enhancing the construction management and process. However, current practices of ICT such as 2D CAD is inadequate and limited to support these needs particularly in design purpose [6]. The introducing to the ICT technology such as Building Information Modelling (BIM) has been recognized as a significant for the improvement of construction industry. Malaysia is one of the development country that has implement Building Information Modelling (BIM). This is due to its promising concept and functionalities that would improve quality and productivity of the project outcome. BIM has been introduced in Malaysia in a year 2007, since then a few pilot projects has been conducted through BIM. For example Multipurpose Hall of Universiti Tun Hussein Onn Malaysia (UTHM) [7].

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Due to evident of the effectiveness of BIM that improving of design phases and increasing collaboration among the stakeholder that enhance the quality of project, various of BIM software has been developed in order to cater the demand of BIM [6], [8]. As a result, construction companies facing problem for choosing appropriate BIM software that suit the company and project needs. Moreover, the adoption of BIM is not only required major changing in construction management, but also required high investments on software, hardware and training expenses [9]. Thus, the selection of BIM software is one of the crucial processes in order to optimize the BIM abilities and to ensure the return of an investment. However, from literature there is limited study of BIM evaluation software. This study would propose an alternative way of evaluation BIM software selection through Decision Support System. From literature, it show that DSS has been used widely for purpose of enhancing the decision process in numerous field. An integration with MCDM method has been choose in order to increase the useful and validity of the propose DSS.

Due to the establish background of effectiveness MCDM (structured decision problem, designing problems, evaluating alternative), it has been choose as a decision engine in this DSS for BIM software selection. From literatures, there were numerous of researches that implement MCDM for this type of selection problem [10]–[14].

Methodology:
This paper is part of an on-going research on the decision support system (DSS) issue that affect to the selection of BIM’s software in construction project. The information presented in it is primarily based on the review of available relevant literature materials on the system. A literature review, considered by many as part of research methodology, is essential in organizing theoretical framework, developing a pertinent problem statement and research questions, and forming conjectures before formulating hypotheses to be tested. In this regard, Wisconsin (2008) has aptly opined that a thorough literature review is a “critical analysis of a segment of a published body of knowledge through summary, classification, and comparison of prior research studies, reviews of literature, and theoretical articles.” This is precisely what this paper intends to present. Through the literature review, the definition, concept, and related issues of DSS and BIM in the construction industry is examined and highlighted. All the data and information gathered directly from libraries, books, articles and other printed materials searched in the international and national journals, proceeding and bulletin. This literature review is very important and helpful in the process of developing for the theoretical sections of the actual research.

Current Issues in BIM software selection:
Building Information Modeling (BIM) is a new technology in ICT development which is extent the ability of 2D (CAD) that only limited on design purpose. Through BIM, it more than design purpose, it allows the 3D visualization design, built a virtual model of project, allows several analysis (clash detection, energy analysis and others), can serve as knowledge storage or database (project documents and model records), increase the collaborations and communication and others [6], [15]–[18].

In simple stated BIM is reshaping the way of construction in design phases and simultaneously increase the quality of outcome of final project. As a result, many commercial software products are developed to cater demands for BIM. Each of this software is different in function, futures and cost [6]. Moreover the adoption of BIM software required a high investment not only for hardware and software but also in training expenses [9]. In addition, there is no single packages of BIM software that could optimize full ability of BIM through all project phases [8]. Due to the variety of BIM tools on the market and cost of adoption, the selection of appropriate BIM software for a certain construction project becoming more apparent.

However, the needs to aid the decision making often overlooked. Till date the study to identify the critical criteria and decision support for BIM selection in construction are largely neglected. Only Ruiz (2009) has proposed a model based on simple descriptive statistic and does not consider MCDM method for evaluation of BIM software. Thus, the main research problem is identified as “The lack of decision support framework to assist BIM software selection for construction project”. Due to unavailability for decision support, it is desirable to develop a computerized decision support BIM software selection. Pursuing to this, the author has identify three key issues. They are;
- Incomplete critical factor for BIM software selection.
- Unavailability of decision support system prototype for BIM software selection.
- Lack of utility and usability evaluation DSS for BIM software selection.

The following sub sections explain these issues which were derived from the main research problem:

Incomplete attribute for BIM software selection:
One’s of the crucial process in adoption of BIM is selection of BIM software [6], [8]. This due to the variety of BIM software available on market and each of them is different in term of cost, function and futures. A few case studies from literature show list of attribute that could be used in selection of BIM software but not in Malaysia. Only Ruiz [8] proposes a few attributes for evaluation of BIM software selection within 44 software package in
2009. The completed attribute of BIM software selection is significant in order to fulfill the need of project and company rather than select based on popular software package on market [8].

**Unavailability of decision support system prototype for BIM software selection:**

As mentioned before, only [8] proposed an evaluation model for BIM software package where the study uses simple descriptive statistics and does not consider DSS. Decision model might be difficult for construction player to use it. Hence, there is a significant of DSS for BIM software selection in software in order to provide easy and purposeful decision support tool. Research indicates there is no study attempt to develop a DSS for BIM software selection.

**Lack of utility and usability evaluation DSS for BIM software selection:**

Instead of evaluation of decision model for BIM software selection, an evaluation of DSS is also important in DSS development. It is significant in order to measure the usability and effectiveness of DSS [20]–[23]. Thus, in study will include an evaluation of proposed DSS among the user.

**Conclusion and Discussion:**

BIM is a new tool and platform for project stakeholders seem to be able design and construct almost anything they can visualize, and the data they use enables these buildings to be well managed by their owners. Even though some of researchers recommended that BIM as one of the alternative approach for improving constructions sustainability however the up taken this tool system faced a lot of barriers including a selection of an appropriate software especially during design process of a project. In addition, although BIM has been recognized as one of the effective tool for enhance the construction project performance unfortunately, the real cases or examples of BIM achievement especially in the Malaysian IBS industry are limited. In view of that, this research has been generated in order to overcome the related issue. This study discusses the fundamental aspect of construction project management, Multi Criteria Decision Making (MCDM) and Decision Support System (DSS) as decision tools in BIM selection. It is anticipates that the proposed model would enhance the selection process of BIM software for the future construction projects.

**REFERENCES**


