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**DECISION SUPPORT SYSTEM FOR BUILDING
INFORMATION MODELING (BIM) SOFTWARE SELECTION:
A CASE STUDY IN CONSTRUCTION FEASIBILITY STAGE**



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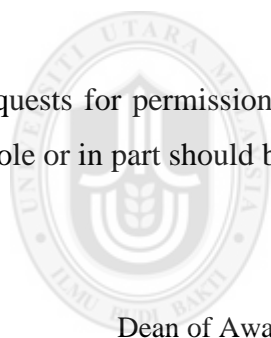
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Abstrak

Penerimaan perisian Permodelan Maklumat Pembinaan (BIM) telah terbukti bermanfaat kepada industri pembinaan bagi meningkatkan rekabentuk, analisis, pembinaan, operasi dan pengurusan data. Disebabkan pelbagai jenis perisian BIM di pasaran, proses pemilihan perisian BIM yang memenuhi keperluan projek dianggap rumit. Kajian terdahulu telah mendedahkan bahawa kebanyakan pemilihan perisian adalah berdasarkan populariti dan cadangan daripada syarikat lain. Justeru, pemilihan yang tidak tepat boleh mengakibatkan penggunaan perisian BIM yang tidak sepenuhnya dan memberi kesan negatif ke atas pelaburan perisian BIM. Berdasarkan tinjauan literatur terdapat kekurangan pendekatan yang sistematik dalam pemilihan perisian BIM bagi memenuhi keperluan projek tertentu. Ini menekankan keperluan untuk alat pembuatan keputusan bagi memilih perisian BIM yang bersesuaian. Penyelidikan ini bertujuan untuk membangunkan Sistem Sokongan Pemutusan (DSS) yang dinamakan topsis4BIM yang mengintegrasikan antaramuka pengguna, pangkalan data bercirikan BIM, Fuzzy TOPSIS dan alatan Web 2.0. Projek pembinaan sebenar telah digunakan sebagai kajian kes untuk demonstrasi dan pengesahan rangka kerja DSS. Hasil kajian menunjukkan penggunaan topsis4BIM dapat memperbaiki proses pemilihan perisian BIM berbanding amalan sedia ada. Selain itu, ianya juga telah menghasilkan satu rangka kerja baharu untuk pembinaan DSS masa hadapan dengan menggunakan alatan Web 2.0. Kajian ini memperkenalkan satu pendekatan pembuatan keputusan yang inovatif dan ekonomikal yang boleh menjadi garis panduan untuk meningkatkan penggunaan BIM dalam kalangan pengamal pembinaan

Kata Kunci: Permodelan maklumat pembinaan, Sistem sokongan keputusan, Pembuatan keputusan pelbagai kriteria, alatan Web 2.0

Abstract

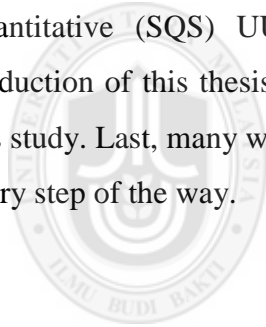
The adoption of Building Information Modelling (BIM) software has proven to be beneficial to the construction industry to improve the design, analysis, construction, operation and data management. Due to the variety of BIM software on the market, choosing the right BIM software in construction projects is deemed to be a complicated decision making process. Previous studies revealed that software selection is mainly made based on popularity and recommendation from other companies. Consequently, inaccurate selection would lead to the underutilised features and negative effect the investment on the BIM software. Based on literature, there is a lack of systematic approach to select the right BIM software for specific project requirements. This highlights the needs for decision making tools to select the appropriate BIM software. This research aims to develop a Decision Support System (DSS) named topsis4BIM which integrates graphical user interfaces, BIM features database, Fuzzy TOPSIS and Web 2.0 tools. A real construction project was used as a case study for demonstrating and validating the DSS framework. The findings indicate that the use of topsis4BIM improves the BIM software selection process compared to the current practice. In addition, it also produce a new framework for the next generation DSS using Web 2.0 tools. The study introduces an innovative and economical decision making approach that can guide construction practitioners towards the betterment of BIM adoption.

Keywords: Building information modelling, Decision support system, Multi criteria decision making, Web 2.0 tool

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Table of Contents

Permission to Use	i
Abstrak.....	ii
Abstract.....	iii
Acknowledgement	iv
Table of Contents.....	v
List of Tables	viii
List of Figures.....	ix
List of Appendices	x
List of Abbreviations	xi
CHAPTER ONE INTRODUCTION	1
1.1 Research Background.....	1
1.2 Problem Statement	5
1.2.1 Incomplete Attributes for BIM Software Selection.....	6
1.2.2 Unavailability of DSS Prototype for BIM Software Selection	7
1.2.3 Lack of Utility and Usability Evaluation DSS.....	8
1.3 Research Questions	8
1.4 Research Objectives	8
1.5 Scope of Study	9
1.6 Significance of the Study	10
1.7 Organisation of the Thesis	11
CHAPTER TWO LITERATURE REVIEW	13
2.1 Introduction.....	13
2.2 Construction Project Management.....	13
2.2.1 Construction Project Stakeholders at Design Stage.....	14
2.2.2 Type of Project Delivery.....	14
2.3 Building Information Modeling (BIM).....	15
2.3.1 The Utilization of BIM Tool during Project Life Cycle	17
2.3.2 The Availability of BIM software.....	20
2.3.3 The Software Selection Attributes	21
2.3.4 BIM Usage in Malaysia	25

2.4 Multi Criteria Decision Making Techniques for BIM Software Selection	26
2.4.1 MADM Methods.....	28
2.4.1.1 Simple Addictive Weighting Method (SAW)	28
2.4.1.2 Elimination Et Choice Translating Reality (ELECTRE)	29
2.4.1.3 Analytical Hierarchy Process (AHP).....	29
2.4.1.4 Analytical Network Process (ANP).....	30
2.4.1.5 The Technique for Order Preference by Similarity to an Ideal Solution (TOPSIS).....	30
2.4.1.6 Rank Order Centroid (ROC)	31
2.4.2 Rationale of MADM Techniques for BIM Software Selection	31
2.4.3 Extension of TOPSIS under Fuzzy Environment	35
2.4.4 Preliminaries of Fuzzy TOPSIS	36
2.4.5 Fuzzy TOPSIS Procedure	38
2.5 Decision Support System	41
2.5.1 Components of DSS Development	44
2.5.2 Web 2.0 Technology	47
2.5.3 Decision Support System and Web 2.0.....	49
2.5.4 Validation of Decision Support System.....	49
2.6 Chapter Summary.....	51
CHAPTER THREE RESEARCH METHODOLOGY	53
3.1 Introduction	53
3.2 Reasoning of Choosing Research Method	53
3.3 Research Process Framework	56
3.3.1 Phase One: Literature Review and Data Collection.....	57
3.3.2 Phase Two: Conceptual Model and DSS Development	60
3.3.3 Phase Three: DSS development.....	60
3.3.4 Phase Four: Evaluation of DSS and Conclusion.....	61
3.4 Chapter Summary.....	64
CHAPTER FOUR DESIGN AND IMPLEMENTATION OF DSS.....	65
4.1 Introduction	65
4.2 Case Study Description	65

4.2.1 Case Study: Dewan Sultan Ibrahim Result	67
4.3 The Implementation of topsis4BIM	76
4.3.1 Decision Model Development	77
4.3.2 The Architecture of topsis4BIM	80
4.4 Chapter Summary.....	84
CHAPTER FIVE VALIDATION AND DISCUSSION	85
5.1 Introduction	85
5.2 Decision Model Evaluation.....	87
5.3 Sub-system Validation	91
5.4 Face Validation	93
5.4.1 Quantitative Result.....	94
5.4.2 Qualitative Result.....	97
5.5 Discussion of Research Finding.....	101
5.5.1 Identify attributes for BIM software selection in Malaysia	103
5.5.2 An Alternatives Approach for BIM Software Selection.....	105
5.5.3 A New Generation of DSS Development	107
5.6 Model finalization	109
5.7 Chapter Summary.....	114
CHAPTER SIX CONCLUSION	115
6.1 Introduction	115
6.2 Summary of Work Performed.....	115
6.3 Conclusion	117
6.4 Research Contributions	119
6.5 Limitations of the Research	121
6.6 Recommendation for Futures Research	121
PUBLICATIONS	122
REFERENCES	123

List of Tables

Table 2.1	The Availability of Software Selection Attributes.....	23
Table 2.2	Application of MCDM in Software Selection	32
Table 2.3	Integration of TOPSIS and Fuzzy Element.....	36
Table 2.4	Decision Support Framework	44
Table 2.5	General Comparison between Web 1.0 and 2.0.....	48
Table 2.6	Measurement Criteria for DSS Evaluation	50
Table 4.1	Case Project Detail.....	66
Table 4.2	Respondent Profile.....	67
Table 4.3	Attributes for BIM Software Selection	70
Table 4.4	Description of Selection Attributes.....	71
Table 4.5	Brief Profile of BIM Software Vendors.....	73
Table 4.6	Semi-structured Result.....	75
Table 4.7	Linguistic Variable for the Importance of Weight of Attributes.....	78
Table 4.8	Linguistic Variable for the Importance of Rating for Alternative Software	78
Table 5.1	Weight of Attributes by Decision Makers	87
Table 5.2	Rating for Software Alternative by Decision Makers.....	88
Table 5.3	Result for Each Decision Makers	90
Table 5.4	Group Aggregation Result	91
Table 5.5	Decision Pattern without DSS	92
Table 5.6	Decision Pattern in Group Decision Approach.....	93
Table 5.7	Result of Face Validation in terms of Decision Methodology.....	95
Table 5.8	System Quality and Information Presentation Face Validation Result.....	98
Table 5.9	Advantages and Features of topsis4BIM Approach	107
Table 5.10	Comparison of DSS Features between Web 1.0 and topsis4BIM	109

List of Figures

Figure 2.1. Task of BIM used in the USA (Gerber & Rice, 2010)	16
Figure 2.3. Example of Decision Hierarchy of MADM	28
Figure 2.4. Standard Model of DSS	45
(Turban et al. 2005).....	45
Figure 2.5. Hierarchical Database Model	46
(Rob & Coronel, 2009)	46
Figure 3.1. Research Process Framework	56
Figure 3.2. The Validation Framework for topsis4BIM	62
Figure 4.1. Dewan Sultan Ibrahim	66
Figure 4.2. Frequency Attributes found in some Literature	68
Figure 4.3. Hierarchical of Selection Attributes	69
Figure 4.4. Decision Hierarchy for BIM Software Selection.....	74
Figure 4.5. Fuzzy TOPSIS in topsis4BIM DSS	77
Figure 4.6. Linguistic Variables for the Importance of Weight	78
Figure 4.7. Linguistic Variables for the Rating	78
Figure 4.8. Linguistic Inputs for Weight Assessment.....	79
Figure 4.9. Linguistic Inputs for Software Rating	80
Figure 4.10. The Architecture of topsis4BIM	81
Figure 4.11. Hierarchical database model for profiling BIM software.....	83
Figure 5.1 Result of Face Validation in 1 st Iteration and 2 nd Iteration	96
Figure 5.2. Attributes for BIM Software Selection in Malaysia	103
Figure 5.3. Decision Making of BIM Software Selection in Malaysia.....	105
Figure 5.4. Platform for Developing Web based DSS in BIM Software Selection	110
Figure 5.5. A New Framework for Development of Web based DSS through Web 2.0 in Construction MCDM Related Problem.....	112

List of Appendices

Appendix A Filtering and Categories the Attributes	132
Appendix B BIM Software Vendor (Ruiz, 2009)	136
Appendix C Letter of Permission.....	138
Appendix D Sample of Questionnaire to Determine BIM Software Attributes	139
Appendix E Fuzzy TOPSIS Assessment	142
Appendix F Sample of Validation Form.....	149
Appendix G Snapshot from topsis4BIM System.....	151



List of Abbreviations

3D	:	Three dimensional medium
AEC	:	Architecture, Engineering and Construction
AHP	:	Analytic Hierarchy Process
BIM	:	Building Information Modeling
CAD	:	Computer Aid-Design
CGI	:	Common Gate-away interface (CGI)
CIDB	:	Construction Industry Development Board
CM@R	:	Construction Management at Risk
CMAA	:	Construction Management of Association America
CPM	:	Critical Part Method
CREAM	:	Construction Research Institute of Malaysia
DB	:	Design Build
DBB	:	Design Bid Build
DSS	:	Decision Support Systems
EIS	:	Executive Information System
ELECTRE	:	ELimination and Choice Expressing Reality
ES	:	Enterprise System
GDP	:	Gross Domestic Product
HTML	:	HyperText Markup Language
ICT	:	Information Communication and Technology
IPD	:	Integrate Project Delivery
MADM	:	Multi Attribute Decision Making

MCDM	:	Multi Criteria Decision Making
MIS	:	Management Information System
MODM	:	Multi Objective Decision Making
MY SQL	:	Structured Query Language
OLAP	:	Online Analytical Processing
PDM	:	Project Delivery Method
PHP	:	Personal Home Page
PKK	:	Contractor Service Centre
PMBOK	:	Project Management Book of Knowledge
POM	:	Production and Operational Management
PROMETHEE	:	Preference Ranking Organization Method for Enrichment of Evaluations
PWD	:	Pubic Work Department
ROC	:	Rank Order Centroid
SAW	:	Simple Average Weight
TOPSIS	:	Order Preference by Similarity to an Ideal Solution
TPS	:	Transaction Processing System
TQM	:	Total Quality Management
UTHM	:	Universiti Tun Hussein Onn Malaysia
UUM	:	Universiti Utara Malaysia
VIKOR	:	ViseKriterijumska Optimizacija I Kompromisno Resenje

CHAPTER ONE

INTRODUCTION

1.1 Research Background

Construction sector is one of the main contributor in Malaysia's Gross Domestic Product (GDP) within the years of 1991 to 2010 with average of 4.09 % GDP, and 3 % to 5.7 % of national economy (Khan, Liew, & Ghazali, 2014). This is due to the role of construction sector who provide initial infrastructure and building for other sector such as manufacturing, industrial and even tourism sectors (Yong & Mustaffa, 2012). Therefore, the construction sector is significant in social-economy development in Malaysia.

Realising the importance of construction sector, several government agencies have been established such as Construction Industry Development Board (CIDB), Ministry of Work, the Contractor Service Centre (PKK), the Board of Engineer, the Board of Architect and the Board of Surveyors (Kamal, Haron, Ulang, & Baharum, 2012). Numerous efforts have been taken by these agencies in order to enhance the development of construction sector. Since 2007, CIDB has been actively promoting the use of a new technology which is Building Information Modelling (BIM) via seminars, workshops, development of roadmap for BIM adoption in Malaysia, and other promotional programmes. Since the introduction of BIM, it has been recognised in the industry as a significant technology that can enhance construction project management.

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