

UNIVERSITI TEKNOLOGI MARA

**BUILDING INFORMATION MODELLING (BIM):
DESIGN PROCESS AND INTEROPERABILITY IN
PROJECTS**

AIMI ASHIKIN BINTI HANIB

Dissertation submitted in partial fulfilment the requirements
for the degree of
Master of Science

Faculty of Architecture, Planning & Surveying

JANUARY 2015

AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This topic has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

In the event that my dissertation be found to violate the conditions mentioned above, I voluntarily waive the right of conferment of my degree and agree be subjected to the disciplinary rules and regulations of Universiti Teknologi MARA.

Name of Student : Aimi Ashikin Binti Hanib
Studnet I.D. No. : 2013214412
Programme : Master of Sci. (Integrated Construction Project Management)
Faculty : Architecture, Planning and Surveying
Thesis Tittle : Building Information Modelling (BIM): Design Process and Interoperability in Projects

Signature of Student : 

Date : January 2015

ABSTRACT

Building Information Modelling (BIM) is the computer based to stimulate construction project management from design process until maintenance. BIM tools are to create 3D model with rich of information. The work flow of design process using BIM as a tools are administer of collaborative among designer/consultant. Therefore, implementing BIM in projects involved full commitment from all the stakeholders, consultant and contractor include supplier integration during development and design stage. This research to achieve the aim of 'to explore the appropriate design process and the concept of interoperability at design process stage in Malaysian construction industry either for government or private sector in implementing projects using BIM'. Reassuring the aims are achieve, three (3) objectives had establish that: 1) to identify process of BIM at project design stage; 2) to investigate the concept of interoperability in BIM; and 3) to identify challenges occurred in design process and interoperability of using BIM. Through literature review and engage in-depth interviews conducted, there is four (4) respondent from public and private sector. It was conclude that, all organisation are looking forward to improve the design stage in future by using BIM as a tools with enhancing the procurement system, produce more expertise and understand the BIM definition also to have BEP or Malaysia National Guideline. Interoperability is concept define as standardising the software conversion between two different software or more which related to integration of data exchange. The interoperability concept are related with human collaboration to improve the standardising of data sharing and transfer. Here, collaborative and interoperability are play as main role during design stage to produce 3D model with finalised clash analysis for construction stage. It has been notice that BIM in Malaysia AEC industry are still at early stage in implementation. There are several challenges were faced during design stage. Nevertheless, design process issue is progressively improving in BIM implementation in the nearest future by setting up the guidelines and change people mind set of BIM users in construction players widely.

Keywords: design process, interoperability concept, collaboration, BIM implementation

TABLE OF CONTENT

AUTHOR'S DECLARATION.....	i
ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iii
TABLE OF CONTENT.....	iv
LIST OF TABLES.....	vii
LIST OF FIGURES.....	viii
LIST OF ABBREVIATIONS.....	ix
1 INTRODUCTION TO RESEARCH.....	1
1.1 Introduction.....	1
1.2 Background.....	1
1.3 Definition of Building Information Modelling (BIM).....	3
1.4 Problem Statement.....	5
1.5 Research Questions.....	7
1.6 Research Aim and Objectives.....	8
1.6.1 Objective.....	8
1.7 Importance of the Study.....	8
1.8 Research Methodology.....	9
1.9 Research Parameters and Limitations.....	11
1.10 Dissertation Content.....	12
2 DESIGN PROCESS.....	15
2.1 Introduction.....	15
2.2 Application and Uses of BIM in Design Process.....	16
2.3 Implementation of BIM in Design Process.....	18
2.4 Design Process by Stages in BIM.....	22
2.5 Level of Development.....	25
2.6 Procurement type of BIM use.....	26
2.7 Summary.....	29

3	INTEROPRABILITY CONCEPT AND CHALLENGES	31
3.1	Introduction	31
3.2	Interoperability.....	31
3.2.1	Interoperability Concept	32
3.2.2	Collaboration.....	34
3.2.3	Software in BIM.....	35
3.3	Challenges in Design Stage and Interoperability	38
3.3.1	Introduction	38
3.3.2	Challenges Implementing BIM in Design Process	39
3.3.3	Interoperability issues.....	40
3.3.4	Legal, Attitudes and Technical Issues	42
3.4	Summary.....	43
4	RESEARCH METHODOLOGY.....	44
4.1	Introduction	44
4.2	Research Methodology.....	44
4.3	Qualitative Research Methodology.....	45
4.4	Research Sample.....	45
4.5	Selection of Data Collection	46
4.6	Data Analysis	47
5	DATA ANALYSIS AND FINDINGS.....	49
5.1	Introduction	49
5.2	Data Analysis and Management.....	49
5.2.1	The Interview Process.....	50
5.2.2	Data Analysis	51
5.3	Classification of Respondents and Companies.....	51
5.4	Key Findings	53
5.4.1	Process of BIM at Project Design Stage.....	54
5.4.2	Concept of Interoperability in BIM.....	65
5.4.3	Challenges in Design Process and Interoperability of Using BIM.....	73
5.5	Conclusion	79