

**Ministry of Higher Education
and Scientific Research
University of Diyala
College of Engineering**



**Developing the Documentation System for the
Construction Project by Using Building
Information Modeling**

**A Thesis Submitted to the Council of College of Engineering
University of Diyala in Partial Fulfillment of the Requirements
for the Degree of Master of Science in Civil Engineering**

By

Hamsa Rasheed Majeed
BSC. Civil Engineering, 2009

Supervised by

Prof. Nidal Adnan Jasim
Prof.Dr. Wadhah Amer Hatem

2022 A.D

IRAQ

1443 A.H

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

﴿ يَا أَيُّهَا الَّذِينَ آمَنُوا إِذَا تَدَايَنْتُمْ بِدِينٍ
إِلَىٰ أَجَلٍ مُّسَمًّى فَاكْتُبُوهُ وَلْيَكْتُبَ بَيْنَكُمْ
كَاتِبٌ بِالْعَدْلِ... ﴾

صدق الله العظيم

سورة البقرة

آية 282

SUPERVISOR CERTIFICATION

We certify that the thesis entitled “**Developing the Documentation System for the Construction Project by Using Building Information Modeling**” presented by “**Hamsa Rasheed Majeed** ” was prepared under our supervision in the Department of Civil Engineering ,University of Diyala, in partial fulfillment of the Requirement for the Degree of Master of Science in Civil Engineering

Signature:

Prof. Nidal Adnan Jasim

Supervisor

Signature:

Prof.Dr. Wadhah Amer Hatem

Co- Supervisor

In view of the available recommendation, we forward this thesis

For debate by the Examining Committee.

Signature:

Name: Prof. Dr. Wissam Dawood Salman

Head of the Department of Civil Engineering

Date: / /2022

SCIENTIFIC AMENDMENT

I certify that this thesis entitled “**Developing the Documentation System for the Construction Project by Using Building Information Modeling**” presented by “ **Hamsa Rasheed Majeed** ” has been evaluated scientifically, therefore, it is suitable for debate by examining committee.

Signature.....

Name:

Address:

Date:

Signature.....

Name:

Address:

Date:

LINGUISTIC AMENDMENT

I certify that this thesis entitled “**Developing the Documentation System for the Construction Project by Using Building Information Modeling**” presented by “ **Hamsa Rasheed Majeed** ” has been corrected linguistically, therefore, it is suitable for debate by examining committee.

Signature.....

Name: Assist. Prof. Ahmed Adel Nouri

Address: College of Education for Humanities

Date:

COMMITTEE CERTIFICATION

We certify that we have read the thesis titled (**Developing the Documentation System for the Construction Project by Using Building Information Modeling**) and we have examined the student (**Hamsa Rasheed Majeed**) in its content and what is related with it, and in our opinion, it is adequate as a thesis for the degree of Master of Science in Civil Engineering.

Examination Committee	Signature
Prof. Nidal Adnan Jasim (Supervisor)
Prof.Dr. Wadhah Amer Hatem (Supervisor)
Assist. Prof .Dr. Kadhim Raheim Erzaij (Member)
Assist. Prof .Dr. Hatim Abdul-Kareem Rashid (Member)
Prof. Dr. Walid Mustafa Khamas (Chairman)

Prof. Dr. Wissam Dawood Salman (Head of Department)

**The thesis was ratified at the Council of College of Engineering /
University of Diyala.**

Signature.....

Name: Prof. Dr. Anees A.Khadom

Dean of College of Engineering / University of Diyala

Date:

DEDICATION

*This thesis is dedicated to my parents,
For their endless love, support and encouragement*

ACKNOWLEDGEMENTS

First of all, I am very much indebted and grateful to Allah.

I would like to my express deep thanks to my supervisor Prof. Nidal Adnan Jasim and Dr. Wadhah Amer Hatem for the illuminated instructions and directions throughout writing this thesis.

In this opportunity, I would like to thanks the Dean of the College of Engineering as well as the teaching staff of the College of Engineering, University of Diyala, Department of Civil Engineering.

I am grateful to my father Prof.Dr. Rasheed Majeed AL- Rubaiy for his useful guidance, and excellent support through all stages of preparing this thesis.

Finally, many thanks to Eng. Omer Selim and Engr. Eman Magdy for their help during my study.

Abstract

Developing the Documentation System for the Construction Project by Using Building Information Modeling

By

Hamsa Rasheed Majeed

Supervised by:

Prof. Nidal Adnan Jasim

Co- supervisor:

Prof. Dr. Wadhah Amer Hatem

Documentation is an important part in the construction process provides a contemporary record of actual events. Therefore, documentation errors are a significant problem during the construction stages. Errors contained in contract documents can also contribute to loss of profits, reduced productivity, cost and time overruns, as well as contractual disputes. Also, the nature of the construction work requires dealing with a huge of information and documents. The processes of documentation and information sharing have become management challenges. Project managers who still use paper documents have difficulty searching through a huge number of documents, especially when they are managing several projects. Modern technology, such as Building Information Modeling has alleviated this issue and allowed users to centralize the construction project documentation into a singular source.

This study aims to develop the documentation system in Iraqi construction projects by using Building Information Modeling to improve data documentation and improve construction document management.

The data was collected from a literature review and questionnaire to evaluate the documentation system in construction projects. The results indicated that the construction sector in Iraq lacks a database due to the lack of application of information technology, as well as accumulation of documents which makes it difficult to manage and access documents because of the huge

number of papers that could reach thousands, this causes waste of effort and time when searching for any document, as well as the cost due to consumption a large number of papers. Also, the study found that the documentation method in construction projects is a 2D system, which is paper documents, (CAD) drawings, or PDF files. This method doesn't give a full visualization of the building and doesn't discover the conflicts between the different disciplines.

To achieve the objectives of the study, the case study was documented using Revit software, and time schedule was linked with a 3D model in the NavisWork software to create a 4D model that simulates reality. Also, a comparison of quantities was made between actual and BIM for (foundations, columns, beams, slabs, staircase, floors, secondary ceiling, tiles, and stone), the percentages of difference between actual quantities and BIM are (1.614%, 1.7%, 2.4%, 0.29%, 4.15%, 0.52%, 0.32%, 2.13%, and 0.23%) respectively and these percentages are small and acceptable. Then, documents and a 3D model were uploaded to BIM360DOCS.

Finally, the researcher concluded that BIM is characterized by accuracy in documenting construction project information in a singular source, and gives a visualization of the building. Also, the accuracy of BIM quantification of materials compared with a traditional method as it is inefficient, time-consuming, and prone to error which has a negative impact on project performance. As a result, using questionnaire and according to the opinion of the experts and engineers, an evaluation was made for BIM 360 DOCS, and it was found that it increasing efficiency, improving quality, and reducing risk by making project information accessible to the project team when and where they need it.

Table of Contents

No.	Subject	Page No.
	Supervisors Certification	I
	Scientific Certification	II
	Linguistic Certification	III
	Committee Certification	IV
	Dedication	V
	Acknowledgements	VI
	Abstract	VII
	Table of Contents	IX
	List of Figures	XIII
	List of Tables	XV
	List of Abbreviations	XVI
Chapter One	Introduction	
1.1	General	1
1.2	Justifications of the Study	2
1.3	Aims and Objectives of the Study	3
1.4	Limitations of the Study	3
1.5	Methodology of the Study	4
1.6	Structure of the Study	7
1.7	Previous Studies	9
1.8	Summary	13
Chapter Two	Literature Reviews	
2.1	Introduction	14
2.2	The Concept of the Construction Industry	14
2.3	Construction Projects	14
2.4	Documentation	16
2.4.1	History of Documentation	16
2.4.2	Definition of Documentation	16
2.5	Collection of Data	19
2.5.1	Structured Data files	20
2.5.2	Semi-Structured data files	20
2.5.3	Unstructured Text Data Files	21

2.5.4	Unstructured Graphic Files	21
2.5.5	Unstructured Multimedia Files	22
2.6	Classification Methods	22
2.6.1	Written and Printed Files	22
2.6.2	Computer Files	23
2.6.3	Manual Methods, such as an Indexing System and Users' Manual	24
2.6.4	An Automated Document Classification Method	27
2.6.5	A Web Classification Method	28
2.6.6	Web Classification's Advantages	30
2.7	Types of Documentation	30
2.7.1	Traditional Documentation (Paper Documentation)	30
2.7.2	Advantages of paper documentation	31
2.7.3	Disadvantage of Paper Documentation	31
2.7.4	Electronic Documentation	32
2.7.5	Advantages of Electronic Documentation	32
2.7.6	Disadvantage of electronic documentation	33
2.7.7	Electronic document management system	33
2.7.8	Advantages of an EDMS	33
2.8	Documents	34
2.8.1	Document and information security:	35
2.8.2	The Importance of document and information security	35
2.9	Documentation and construction industry	36
2.10	Document Management in the Construction Industry	36
2.11	Design and Engineering Documentation:	37
2.12	Methods of Documentation	38
2.12.1	Photogrammetry	38
2.12.2	Documentation Using Technology (3D Laser Scanning)	39
2.12.3	Geographic Information System	40
2.12.4	Computer-Aided Design	41
2.12.5	Building Information Modeling	42
2.13	Concept of Building Information Modeling	43

2.14	Definition of BIM	43
2.15	Advantages of BIM Application	45
2.16	BIM vs. CAD	47
2.17	BIM Tools	48
2.17.1	Autodesk Rivet Software	48
2.17.2	Navisworks Manage Software	49
2.17.3	BIM 360 DOCS (Document Management)	49
2.18	BIM and Documentation	50
2.19	BIM and Documentation of Heritage Buildings	54
2.20	Assuring Better Information Management	55
2.21	Summary	56
Chapter Three	Documentation System in Iraq	
3.1	Introduction	57
3.2	Design of Questionnaire	57
3.3	Arbitration of the Questionnaire	58
3.4	Reliability of Questionnaire	59
3.5	Questionnaire Distribution	61
3.5.1	Sample Size and Response Rate	61
3.5.2	Sample Description	61
3.6	Statistical Analysis	65
3.7	Summary	73
Chapter Four	Practical Aspects and Research Methodology	
4.1	Introduction	74
4.2	Case Study: Technical Administration Institute	74
4.3	Reasons for Selecting a Case Study	76
4.4	Collection of Data for Case Study	76
4.5	Creating a 3D Case Study Model	76
4.5.1	Creating Foundation for Case Study	77
4.5.2	Creating the Columns	78
4.5.3	Creating the Beams for the Case Study	79
4.5.4	Creating the Finishing	80
4.6	Creating of Time Schedule	80
4.7	Creating 4D Model	81

4.8	Documentation and Preservation of Documents	86
4.9	BIM 360 DOCS	87
4.9.1	Creating Project	89
4.9.2	Uploading 3D Models Plan Sets	91
4.9.3	Adding Members to a Project	94
4.9.4	Assigning Folder Permissions	95
4.9.5	Creating and Managing Issues	96
4.9.6	Creating Markups	97
4.9.7	Sharing Project Files	97
4.10	Summary	98
Chapter Five	Results and Discussion	
5.1	Introduction	99
5.2	Quantification for Case Study in Naviswork	100
5.3	Evaluation of Documentation and Document Management in BIM 360 DOCS Application	110
5.4	Summary	117
Chapter Six	Conclusions and Recommendations	
6.1	Introduction	118
6.2	Conclusions	118
6.3	Recommendations	120
6.4	Suggestion for Future Studies	121
-	References	122
-	Appendix A	
-	Appendix B	
-	Arabic Abstract	

List of Figure

Figure NO.	Title	Page No.
(1.1)	Research Methodology (Researcher)	6
(2.1)	Building documentation using 3D laser scanning	40
(2.2)	Representation of information flow in paper-based documentation environment	50
(3.1)	The percentage of respondents according to work sector	61
(3.2)	The age proportion of respondents	62
(3.3)	Respondents' Educational Levels	62
(3.4)	Respondents' Specialization	63
(3.5)	The respondents' group	63
(3.6)	The respondents' practical experience	64
(3.7)	The percentage of documentation types	64
(4.1)	The Interface of Revit Software (2020)	77
(4.2)	The foundation of case study	78
(4.3)	The columns of case study	79
(4.4)	The Beams of case study	79
(4.5)	The finishing of case study	80
(4.6)	Creating time schedule of the project by M.S project	81
(4.7)	Exporting 3D Model from Revit to Naviswork Manage (2020)	81
(4.8)	3D Model in Navis work Manage 2020	82
(4.9)	Imported BIM model in Navisworks Manage	82
(4.10)	Importing time schedule information from M.S Project	83
(4.11)	Assignment of elements to tasks	84
(4.12)	4D construction simulation for foundation in Navisworks Manage	84

(4.13)	4D construction simulation for slab and beams for second floor in Navisworks Manage	85
(4.14)	Construction simulation for Slab and beams for roof	85
(4.15)	4D Simulation for Case Study	86
(4.16)	Documentation of priced bill of quantities	86
(4.17)	Documentation of Brick test	87
(4.18)	Interface of BIM 360 DOCS	88
(4.19)	Project Information	90
(4.20)	Project Profile	90
(4.21)	Project Home	91
(4.22)	Uploading of files	91
(4.23)	Uploading of 3D model	92
(4.24)	Uploading of AutoCAD files	92
(4.25)	Uploading of (Ground floor Plan)	93
(4.26)	Uploading Photo of the Building	93
(4.27)	Uploading of other pdf documents	94
(4.28)	Adding of Members to the Project	95
(4.29)	Assigning Permissions	96
(4.30)	Creating Issue	96
(4.31)	Creating markup	97
(4.32)	Sharing Project File	98
(5.1)	Quantification for Case Study in Naviswork	100
(5.2)	Selection of model properties	101
(5.3)	Calculation of materials quantities	102
(5.4)	The percentage of respondents according to work sector	111
(5.5)	The age proportion of respondents	111
(5.6)	Respondents' Educational Levels	112
(5.7)	Respondents' Specialization	112
(5.8)	The respondents' group	113
(5.9)	The respondents' practical experience	113

List of Tables

Table NO.	Title	Page No.
(1.1)	Review of previous studies	9
(2.1)	Types of Construction Projects	15
(2.2)	Definition of Documentation	18
(2.3)	Definition of the BIM	44
(3.1)	Arbitrators' information	59
(3.2)	Reliability Cutoff Values	60
(3.3)	Statistical analysis of items for the first part	67
(3.4)	Statistical analysis of items for the second part	71
(4.1)	Case Study Information	75
(5.1)	Quantities of foundation works	102
(5.2)	Quantities of Columns Works	103
(5.3)	Quantities of Beams Works	104
(5.4)	Quantities of Slab Works	104
(5.5)	Quantities of Staircase Works	105
(5.6)	Quantities of Flooring Works	106
(5.7)	Quantities of secondary ceiling works	106
(5.8)	Quantities of tile works	107
(5.9)	Quantities of stone works	107
(5.10)	Comparison of BIM and actual quantities for case study	108
(5.11)	Collect engineers' opinions on the evaluation of documentation in BIM 360 DOCS	114

List of Abbreviations

Abbreviations	Explanation
AEC	Architecture, Engineering and Construction
BIM	Building Information Modeling
CAD	Computer Aided Design
EDMS	Electronic Document Management System
EDS	Electronic Documentation System
XML	Extensible Markup Language
4D	Four Dimension
GIS	Geographic Information System
HBIM	Historical Building Information Modeling
HTML	Hyper Text Markup Language
SPSS	Statistical Package for Social Sciences
TLS	Terrestrial Laser Scanner
3D	Three Dimension
2D	Two Dimension

Chapter One

Introduction

1.1 General

Documentation plays a crucial role in every construction project. The nature of a construction project involves the generation of a large amount of information. This information must be collected and saved not only to describe the unique nature of a construction project but also to preserve memory and serve as a reference or evidential material. According to construction industry sources, 70% of project documentation is papers based, and 50% of all construction projects include litigation. As a result, the project team gets preoccupied with creating a plethora of documentation in order to efficiently communicate and document the construction progress(Rajab, 2014)

The huge volume of items makes control challenging and reliance on filing cabinets full of paperwork and plans that can delay progress. Even electronic communication and storage systems can rarely be efficiently searched. This can make review and approval processes difficult to manage, particularly as working on outdated and poorly coordinated information is a major cause of errors, duplication, and rework.

Documentation is the process of gathering documents from a company's works, then archiving and classifying information so that it is easy to find and use in the future (Rajab, 2014).

Currently, the traditional documentation method such as Computer-Aided Design (CAD) is more widely used in construction projects. New techniques like building information modeling-based assist in improving the quality of construction documentation. There are several major differences between the traditional-based documentation process (CAD) and the BIM-

based documentation process, including the fragmented nature of the software, a lack of collaboration and integration between the parties involved, a significant amount of missing data, and a lack of visualization capability (BARATI, 2013).

The conventional method of data storage is 2D, which is either paper, CAD or PDF files. When it comes to retrieving and updating the parameters of a facility or a piece of equipment, the storage method system is fragmented and inefficient. BIM is an efficient means of storing, exchanging, and upgrading data. (Khamees, 2018).

1.2 Justifications of the Study

There are many problems that lead to the use of Building Information Modeling (BIM) in the documentation process.

1. One of the main problems of construction projects is the loss of many contract documents therefore, the demand emerged for the documentation of projects by using BIM.
2. Lack of accessibility: Document accessibility is crucial for promoting efficiency, communication, and the prevention of delays. Project managers who still use paper documents have difficulty searching through a huge of documents, especially when they're managing a high number of projects. Modern technology, such as BIM technology, has alleviated this issue and allowed the users to centralize the construction project documentation in a singular source.
3. The difficulty of evaluating the practice of document management in the construction sector

1.3 Aims and Objectives of the study

This research aims to develop the documentation system for the construction project through use of Building Information Modeling (BIM). The objectives are as follows:

1. The objective of this study will be to research the possibility of introducing documentation into engineering management programs.
2. The research objective is as follows:
 - A. Prevent wasted efforts, cost, and time.
 - B. Prevent the emergence of physical errors, shortages, and any manifestation of corruption illegal, whether intended or unintended.
 - C. Precision, organization, and optimal use of resources and time.
3. Documentation of case study in Revit software.
4. Created the 4D BIM model in Naviswork software to document the schedule of project.
5. Comparison of the quantification between the traditional method and BIM.

1.4 Limitations of the Study

This study is limited to the following:

1. Spatial limitations: This study focuses on the projects of the Middle Technical University in the Iraqi construction sector (Institute of Technical Administration) and implemented by the Technical Education Foundation / Ministry of Higher Education and Scientific Research.
2. Temporal limitations: Limited-time period (2020-2021).

1.5 Methodology of the Study

Methodology of the research is mainly divided in to two parts: Theoretical aspects and practical aspects, as shown in figure (1.1):

A. Theoretical Aspects

Reviewing the literature on the subject of documentation in construction projects, its types, importance, and methods of documentation used, as well as the use of Building Information Modeling (BIM) technology in the documentation.

B. Practical Aspects

The practical part of the research includes:

1. Design of questionnaire: the questionnaire method was used to evaluate the documentation system in construction projects. As it includes questions that were distributed to respondents who work in the construction sector to give their opinion on the documentation system currently used in construction projects and to know their wish for developing the documentation system in the construction sector.
2. Analysis results of the questionnaire, Statistical analysis by using (SPSS) version (25) program.
3. The project data, which are two-dimensional AutoCAD files and paper documents, were collected through interviews with engineers in the Technical Education Foundation.
4. Creating a 3D model using Autodesk Revit 2020.
5. To make a four-dimensional time simulation of the model, the 3D model exported from Revit to the Navis Works Manage 2020 software, which is one of the most important BIM tools, as it links the project

schedule time with the 3D model to create a four-dimensional model and create a temporal simulation of the building.

6. In light of this, the quantities of materials are deduced through Navisworks Manage2020.
7. Documentation of the construction project documents and 3D model using BIM 360 Docs.
8. Conducting a questionnaire for evaluating the documentation and document management in BIM 360 DOCS
9. Finally, reaching conclusions and recommendations.

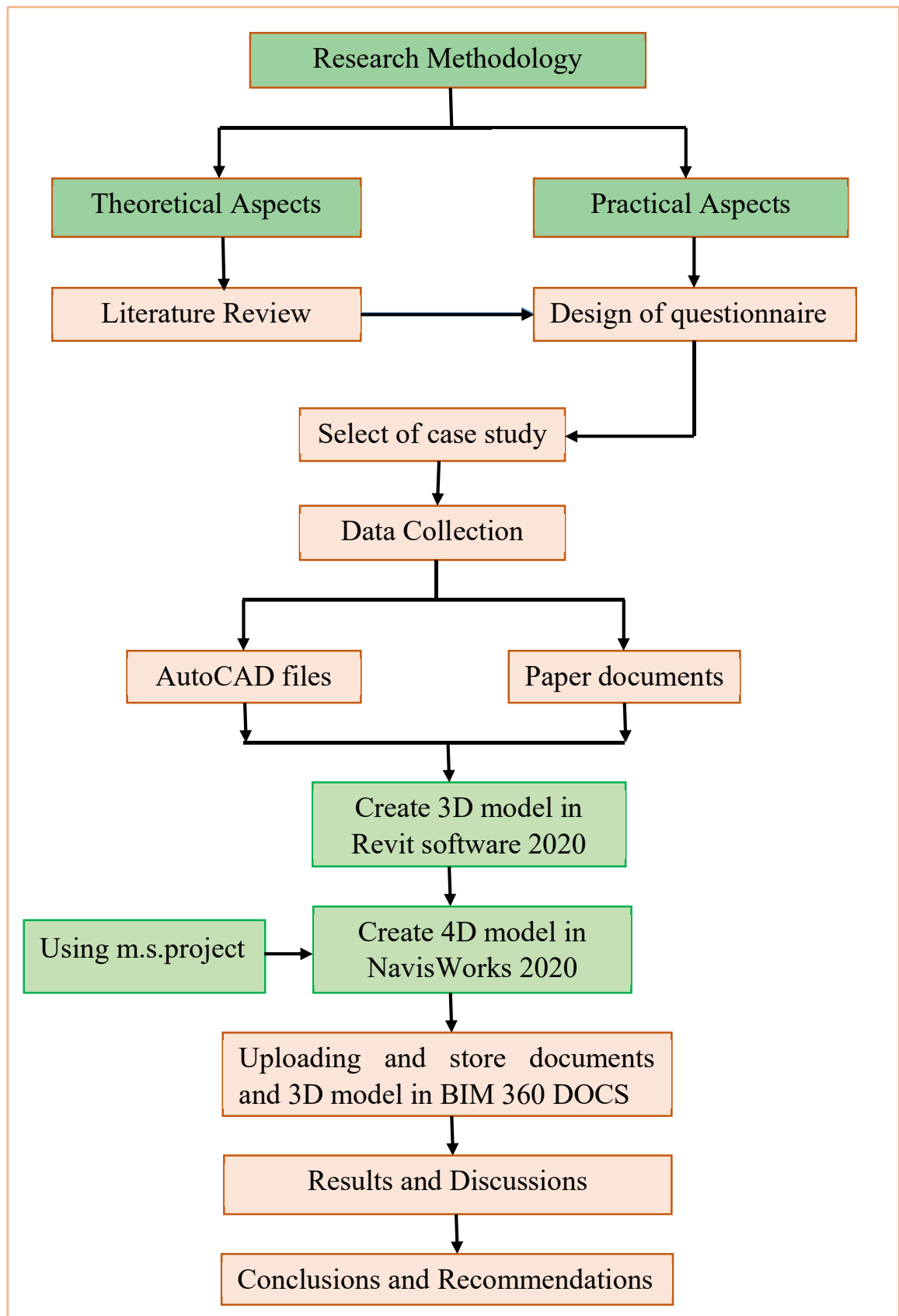


Figure (1-1): Research Methodology (Researcher).

1.6 Structure of the Study

The thesis is divided into six chapters: a brief explanation of each chapter is below.

Chapter One: Introduction

It clarifies the background of the research, research problem and justifications, research aim and objectives, research limitation and scope, explanation of the research methodology as well as explain previous Studies.

Chapter Two: Literature Review

This chapter introduces the concept of the construction industry and types of construction projects, the history of documentation, definitions of documentation, types of documentation, advantages and disadvantages of each type, documentation and the construction industry, methods of documentation, and building information modeling (BIM). Also, BIM vs. CAD (Computer-Aided Design), the advantages of BIM applications, BIM and documentation, BIM and documentation of heritage buildings, and lastly ensuring better information management are illustrated.

Chapter Three: Documentation System in Iraq

This chapter reviews the questionnaire method to evaluate the documentation system in construction projects. As it includes questions that were distributed to respondents who work in the construction sector to give their opinion on the documentation system currently used in construction projects and to know their suggestions for developing the documentation system in the construction sector.

Chapter Four: Practical Aspects and Research Methodology

This chapter discusses the use of Revit software according to BIM to document the building and documentation of schedule in Navisworks then uploading and storing of different documents in BIM 360 DOCS.

Chapter Five: Results and Discussions

This chapter includes two topics:

The First topic is the comparison of the quantities between the actual quantity and BIM quantity, i.e., the quantities calculated by naviswork according to BIM and the quantities calculated by traditional methods (actual).

The second topic in this chapter: Evaluation of documentation and document management in BIM 360 DOCS application.

Chapter Six: Conclusions and Recommendations

This chapter illustrates the major conclusions and important recommendations in addition to suggested future studies.

1.7 Previous Studies

The previous studies are summarized in the Table (1-1).

Table (1.1): Review of previous studies

NO.	Researcher and country	The work
1	(Hergunsel 2011) (United States)	<p>Title: Benefits of Building Information Modeling for Construction Managers and BIM based Scheduling</p> <p>The aim of this study is to understand the benefits of BIM for construction managers and examine BIM-based scheduling. The research identified the uses of Building Information Modeling for preconstruction, construction, and post-construction phases. Then, the project examined the uses and benefits of BIM in the construction of a research facility. Then, a prototype 4D Building Information Model was created. The BIM-based schedule was integrated into the 4D model. The results show that the Revit model demonstrates the benefits of parametric modeling in comparison to two-dimensional (CAD). The parametric model denied overlapping of the elements. There were no errors, omissions, or conflicts of information at different views. Moreover, the role of the Navisworks application as an effective tool for integrating project documentation was highlighted.</p>

2	(Lee Worrell 2015) (United States)	<p>Title: Building Information Modeling (BIM): The Untapped Potential for Preservation Documentation and Management.</p> <p>The purpose of this research is to study the possibility of using BIM in constructing a three-dimensional user interface for tracking and storing historic and managerial documentation. The Nathaniel Russell House, held by the Historic Charleston Foundation (HCF) in Charleston, South Carolina, was used as the case study for this research. A 3D model constructed in Autodesk Revit shows the Russell House's structural evolutions through time. The 3D model created in Revit is input into Autodesk NavisWorks to link micro-information. The researcher found that BIM is the untapped potential resource needed in the preservation field for documentation and management needs, and it is also an interactive, digital filing cabinet.</p>
3	(Baik, et al., 2015) (Saudi Arabia)	<p>Title: Integration of Jeddah Historical BIM and 3D GIS for Documentation and Restoration of Historical Monument.</p> <p>In this study, the research reviewed the process of integrating 3D (BIM) with 3D (GIS) to provide semantically rich models. The development of such models is important and beneficial for the documentation and preservation of historical</p>

		<p>buildings. A Terrestrial Laser Scanner (TLS) and Close-Range Photogrammetry were used to scan this building. The 3D JHBIM was then designed on the Revit Platform. This model was integrated into a 3D GIS system through Autodesk InfraWorks. The results showed that integration will give decision-makers information about the building and surrounding environment that are relevant for preservation and restoration activities.</p>
4	<p>(Themistocleous, et al ., 2016) (Greece)</p>	<p>Title: 3D Documentation and BIM Modeling of Culture Heritage Structures using UAVS: The Case of the Foinikaria church.</p> <p>The purpose of this research is to study the possibility of using unmanned Aerial Vehicle (UAV) and BIM technology to document the heritage building, Unmanned Aerial Vehicle (UAV) was used to take images of the heritage building. The images were processed by using Structure in Motion techniques to generate an accurate digital 3D model. (BIM) was then used to generate drawings of the church and also produce a 3D model and CAD drawings of the structure that will be used for future restoration and/or expansion works. The study found that using UAV provides a relatively quick, and cost-effective manner of documenting cultural heritage sites compared with traditional survey methods and</p>

		generating digital 3D models using novel techniques and innovative methods.
5	(Alaa S. Khamees, 2018) Iraq	<p>Title: Revitalization of Completed Structures Using Building Information Modeling.</p> <p>In this study, the researcher aims to study the possibility of adopting building information modeling technology in documentation due to loss of project documents, and change orders. The results extracted from this study showed the accuracy of BIM technology to give distinguished results in the field of treating completed buildings through rehabilitation and development of previously completed engineering facilities. The accuracy of quantities was between actual and BIM (93.5%) for the first case study and (96.9%) for the second case study, and it was concluded that the BIM technique provides better management for databases within the Revit software to fit with any project.</p>
Current study (2021)		
<p>This research aims to study the benefits of BIM to improve documentation system of educational buildings in Iraq. the researcher used Autodesk Revit software to document design phase , the 3D model was linked to create 4D model in Naviswork software, finally upload and storage various of documents to the cloud (BIM 360 Docs)</p>		

1.8 Summary

This chapter shows a brief background on documentation in construction projects, description of the research problem and its justifications, clarifying the aim and objectives of the research, research limits and scope, the structure of the thesis, research methodology, and finally a review of previous studies was discussed.