

DEVELOPMENT OF A SOCIAL SUSTAINABILITY MODEL IN INDUSTRIAL  
BUILDING SYSTEM

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## DEDICATION

“I am going to appoint a successor on the Earth”

(Surah Al- Baqarah ayat 30)

“I’m neither worried about tradition, nor modernity, civilization, culture or any other similar abstract concepts. I’m just worried about human beings made of flesh and blood, who come to life, suffer, and depart. I don’t care what happens to global economy, culture, civilization, modernity, tradition and etc. It’s the humans and their fate which are of utmost importance to me. I have never understood the benefits of contributions towards civilizations, while humanity, the very kernel of existence, is neglected. I care about this essence. I believe we must just think about people who are born, suffer and perish and we have to ease the difficulties for our fellow human beings, those whom their lives are filled with despair and misery. Therefore, to occurrence of this vision try, the humans face realities more, suffer less and gravitate to philanthropy and righteousness. In order to obtain these goals, they should gain advantage of everything beneficial, including religion, science, philosophy, music, art, literature and any other human achievements” (Mostafa Malekian).

I dedicate this thesis to

The human who is the successor of God on the Earth

The human who demonstrated to me the succession of God

Those who I was born from (my parents)

Those who live with me (my family and sisters)

Those who taught me (my supervisors and teachers)

Those who were beside me in hardship and joy (my friends)

Those who were kind to me and who was unkind to me

And to all human beings who come to life, suffer, and depart like me.

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## ABSTRACT

Industrialization of building systems is a key country-level strategy toward sustainable development. Due to sustainability international concerns, the concept of Industrial Building System (IBS) has received significant attention toward sustainable construction in Malaysia. Therefore, the transformation from traditional construction methods to the sustainable IBS methods is crucial for the country. In this regard, a control mechanism of building systems is necessary to monitor the economic, environmental and social aspects of sustainability. The previous researches indicate the social dimension as the fundamental part of sustainability has received far less attention. To date, despite growing researches on IBS and sustainability, there is no social sustainable framework and model in IBS at the country level. Therefore, this research proposes to develop a social sustainability model in IBS and advances the concept of social sustainability by presenting an applicable framework which is approved through Confirmatory Factor Analysis (CFA). Based on this framework the Analytic Hierarchy Process (AHP) was implemented to determine the most suitable social sustainability model in building systems. In compare with the social sustainability factors ranking obtained from AHP model, variety of ranking methods has been investigated to assess the priority of IBS social sustainability factors. Then, a hybrid model, using AHP and Neural Network (NN) methods, is developed to assess IBS Social Sustainability Power Ratio (SSPR). The result from this hybrid model shows SSPR is 0.7212 which is categorized in acceptable level. Nevertheless IBS as a primary step towards sustainable construction must perform careful planning to upgrade its social sustainability factors. The result suggests that development of IBS need to be more concentrated toward social sustainability. The presented social sustainability hybrid model can use as an assessment and a guideline within IBS supply chain players.

## ABSTRAK

Perindustrian kepada sistem bangunan adalah kunci utama bagi strategi negara ke arah pembangunan yang lestari. Disebabkan oleh kebimbangan antarabangsa berkenaan dengan perlestarian, Sistem Bangunan Berindustri (IBS) telah menerima perhatian ketara ke arah pembinaan lestari. Oleh itu, transformasi dari kaedah tradisional kepada kaedah perlestarian IBS adalah penting bagi negara ini. Oleh itu, mekanisma kawalan dalam sistem bangunan adalah perlu untuk memantau aspek perlestarian ekonomi, persekitaran dan sosial. Kajian terdahulu menunjukkan dimensi sosial sebagai bahagian asas pelestarian menerima perhatian yang sangat sedikit. Sehingga kini, walaupun kajian semakin meningkat tentang IBS dan pelestarian, tidak ada rangka kerja dan model sosial lestari dalam IBS di peringkat nasional. Oleh itu, kajian ini bercadang untuk membangunkan model perlestarian social dalam IBS dan memajukan konsep perlestarian sosial dengan membentangkan satu rangka kerja berkaitan yang diluluskan melalui Pengesahan Analisis Faktor (CFA). Berdasarkan rangka kerja ini, Proses Hieraki Analitik (AHP) telah dilaksanakan untuk menentukan model perlestarian sosial yang paling sesuai dalam sistem binaan. Dengan membandingkan faktor kedudukan perlestarian sosial yang diperolehi daripada model AHP, pelbagai kaedah kedudukan telah disiasat untuk menilai keutamaan faktor perlestarian sosial IBS. Kemudian model hibrid, menggunakan kedah AHP dan Rangkaian Neural (NN), dibangunkan untuk menilai Kuasa Nisbah Perlestarian Sosial (SSPR) IBS. Hasil daripada model ini menunjukkan SSPR hibrid adalah 0.7212 yang dikategorikan dalam tahap yang boleh diterima. Walau bagaimanapun IBS sebagai langkah utama ke arah pembinaan lestari perlu melaksanakan perancangan yang teliti untuk meningkatkan faktor perlestarian sosial. Hasil menunjukkan bahawa pembangunan IBS perlu menjadi lebih tertumpu ke arah perlestarian sosial. Model perlestarian sosial hibrid yang dibentangkan boleh digunakan sebagai penilaian dan garis panduan oleh rangkaian pemain IBS.

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## LIST OF ABBREVIATIONS

IBS	-	Industrial Building System
OBS	-	Open Building System
CIDB	-	Construction Industry Developing Board
SCM	-	Supply Chain Management
GT	-	Grounded Theory
PEST	-	Political, Economical, Social, Technological
SWOT	-	Strengths, Weaknesses, Opportunities and Threats
AHP	-	Analytic Hierarchy Process
CR	-	Consistency Ratio
SI	-	System Identification
NN	-	Neural Network
LM	-	Levenberg-Marquardt
SEM	-	Structural Equation Model
FA	-	Factor Analysis
EFA	-	Exploratory Factor Analysis
CFA	-	Confirmatory Factor Analysis
AR	-	Average Ranking
RI	-	Relative Index
FWA	-	Fuzzy Weighted Average
TOPSIS	-	Technique of Order Preference by Similarity to Ideal Solution
EC	-	EXPERT CHOICE
MATLAB	-	Matrix Laboratory
SPSS	-	Statistical Package for the Social Sciences
LISREL	-	Linear Structural Relation
CCPR	-	Cumulative Capability Power Ratio
SSPR	-	Social Sustainability Power Ratio



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## **CHAPTER 1**

### **INTRODUCTION**

Thesis introduction acquaints the readers with the thesis topic, explaining the basic points of the thesis research and pointing the direction of the research. Therefore in this chapter, it has been tried to describe and determine the preliminaries, overall structure, main hypothesis and the necessary of the study. Initially the main research topics and questions express and then the importance and necessity of research to be addressed. In continue, according to the research objectives and hypotheses, its innovative aspects are considered. Finally the research scope will state.

#### **1.1 Background of the Study**

Increasing housing demand, causing a critical need for housing is becoming a problem in Malaysia. Conventional methods of building with slow execution and high costs are not responsive to existing needs (1997). As a result the construction industry must find an alternative that in addition to overcome the present crisis, has advantages in terms of productivity, indoor quality, durability and cost (IEM, 2001). A method which increase the speed of construction process by relying on the new advanced technologies and innovative methods of construction (Haron *et al.*, 2005b). In this regard Malaysian construction industry is experiencing a transition from the

traditional system to a mechanized building system which is called the Industrial Building System (IBS).

IBS has been introduced in Malaysia since 60's by the use of precast concrete beam-column elements. Construction Industry Developing Board (CIDB) published the IBS Roadmap 2003-2010 which detailed the needs and requirements of Malaysian construction industry. This roadmap was endorsed by Cabinet on October 29, 2003. The content of this roadmap is focused towards achieving the industrialization of the construction sector. The main advantages of using IBS, according to a report published by the Malaysian Ministry for Local Government and Housing (1997), are speed of construction and economic advantage, all of which are required to meet such a large demand for housing and other constructions. This method of construction can increase productivity and quality of work through the use of better construction machinery, equipment, materials and extensive pre-project planning. Malaysia is presently taking a hard look at IBS as an answer to a housing shortage problem.

In the other hand, construction practitioners worldwide are beginning to appreciate sustainability and acknowledge the advantages of building sustainable. This was further supported by Heerwagen (2000), Bartlett and Howard (2000) and Pettifer (2004), who added that sustainable buildings will contribute positively to better quality of life, work efficiency and healthy work environment. The concept of sustainability in building has initially focused on issues of limited resources especially energy, and on how to reduce impacts on the natural environment with emphasis on technical issues such as materials, building components, construction technologies and energy related design concepts. As well the appreciation of the significance of non-technical issues (soft issues) has grown, giving recognition to social sustainability concerns as well as cultural heritage of the built environment as equally important (Zainul Abidin, 2009).

There is general agreement that the different dimensions of sustainable development have not been equally prioritized by policy makers within the sustainability discourse (Smith, 1995). In particular, the relative lack of focus on the social dimension is notable and the social dimension of sustainability has received far less attention than the economic and environmental aspects (Partridge, 2005; Alkon and Agyeman, 2011). This lack of attention is noted by many writers (eg, Koning, 2001; Adebowale, 2002; WACOSS, 2002; McKenzie, 2004) and the conceptual framework for social sustainability is widely acknowledged as underdeveloped. It has not been reached regarding which indicators of societal sustainability should be addressed or how to relate the indicators to decisions (Partridge, 2005).

Nonetheless, for the purpose of this study, it refers to social sustainability as the base of sustaining ability of Industrial Building System (IBS) to function in the long term. Since delivering sustainable construction requires action from all engaged in constructing and maintaining the structure or building including those providing design, consulting and construction services (WS Atkins Consultants, 2001) this study is going to focus on IBS supply chain players.

## **1.2 Problem Statement**

Problem statement defines the key elements of any scientific research because researchers figure all their research activities on the basis of problem statement. By that, they found their uncertain and unknown and what they must do. Many reasons such as personal experiences, study of written documents, oral sources and research applicants can be involved in problem research explanation. On behalf of researcher in the current study, the following reasons were most effective in clarification of the research problem:

Personal experience: dealing with the advantages of prefabricated systems and lack of social approach to the use of these systems. Oral sources: discuss with construction experts and supervisor, visit and participation in the construction industry and IBS exhibitions, conferences and workshops. Study of written documents: Preliminary study on the research gap in construction management that is attached in appendix A, as well as, the special situation of IBS in Malaysia construction industry. Applicants for research: The emphasis of CIDB on the IBS and display the sustainability issues by focusing on IBS supply chain as IBS targets for future, organizing the exhibitions, conferences and professional workshops by CIDB in order to develop the IBS research with the prospect of OBS, and the Malaysian government particular emphasizing on the construction industry movement towards IBS. These are the main reasons for entering the researcher into the research problem. By the way, the problem statement is going to explain considering the three time periods of (1) past (lack of research), (2) present (importance of issue) and (3) future (the necessity and the needs of investigation) as follow:

**(1) Past:** Preliminary studies and systematic reviews done on finding a gap of research in the field of construction management shows, the lack of enough study on the area of pre-casted elements and their procurement and maintenance in the construction field. Moreover sustainability is the major issue which construction industry is engaged with it, nowadays. So, the entrance of the aforementioned area with sustainability consideration in the field of construction studied is required for future research (Sarkisa *et al.*, 2012; Taherkhani *et al.*, 2012). Therefore, the review of the previous study leads and motivates the research into the topic that includes discussions about the sustainability and industrialized building systems.

**(2) Present:** Sustainable development is a continuous mission for future developments of human society and sustainable construction in recent years, become one of the most important performance-related issues within the construction industry (Adetunji *et al.*, 2008). More than ever, the construction industry as a globally emerging sector, and a highly active industry in both developed and developing countries (CSIR Building and Construction Technology, 2004; Zhang *et*

*al.*, 2008) is concerned with improving the integration of the social, economic and environmental indicators of sustainability into construction business strategies and practices (Ortiz *et al.*, 2009). Accordingly the principles of sustainable development are applying to the comprehensive construction cycle as its supply chain from the extraction of raw materials, through the planning, design and construction of buildings and infrastructure, until their final deconstruction and management of the resultant waste (Tan *et al.*, 2011).

As global interest on sustainability has steadily blooming, Malaysia should not fell short in its attitude on sustainability and sustainable construction. Malaysia needs to demonstrate that it can abide by this new interest and can compete in the global market (Zainul Abidin, 2009). As it mentioned above Malaysia is presently taking a hard look at IBS as an answer to a housing shortage problem and IBS is one of the essential strategies and necessary step to move Malaysia's construction industry further up the value chain (Luo *et al.*, 2005). Therefore, to maximize the value of IBS in sustainable building construction, a critical consideration is to fully understand the relationship between the two. In this regards CIDB is emphasized on the IBS and sustainable issues in the 2011-2015 roadmap (CIDB, 2010). Consequently according to the necessity and importance of social dimension which is explained previously, addressing social sustainability in IBS is accurately required.

**(3) Future:** In the other side, as well as incidence and emergence of open building system (OBS) as a next paradigm of building system, transition from IBS as a mass production building system to the OBS as a mass customization building system is unavoidable in the construction industry. In fact, IBS as a current method is the playing field and base of formation, promotion and development of OBS as a future and coming method of building systems. For that reason to enter the next step, while recognizing its needs and requirements, construction industry needs to properly identify and resolve the deficiencies and shortcomings of its current stage. So the IBS should be explored and its success rate in various fields of technical, administrative, managerial and other aspects should be evaluated.

In particular, one of the issues that should be attended is the changes of supply chain management by shifting from industrial to open building systems. More highlighted login of customers to the building system by OBS causes to the major changes in supply chain arrangement and creation of more customer-focused supply chain. Therefore, at the same time as dominate the current supply chain and eliminate its shortcomings, it is necessary to have a sufficient understanding of the new supply chain since providing the foundation of its impeccable creation. As it mentioned the OBS as a customized system is focused on the customer and supplying his demand therefore in order to achieve sustainable building in this new customer-centric system, the social dimension become more important. Accordingly to realize sustainable building the social factors will become the basis of the new customer-oriented paradigm and without satisfying the social factors; primarily the new paradigm loses its relevance. Consequently, for the improvement and success in the next paradigm of production, construction industry fundamentally needs to the realization of IBS social sustainable development as its current production paradigm.

In this regards, to achieve corporate sustainability within any organization, it is essential that sustainability issues are addressed throughout the organization's whole supply chain. The implementation of SCM and sustainability is, however, an extremely complex undertaking (Adetunji *et al.*, 2008). A number of case studies have shown that managing the entire supply chain has become a major success factor in delivering successful IBS approach (Gibb, 2001; Faizul, 2006; Pan *et al.*, 2008; Blismas and Wakefield, 2009), and supply chain plays an important roles in improving the productivity and quality of construction process (Abd Shukor *et al.*, 2011). To realize the government's aspiration in moving towards a more efficient IBS construction approach, good practice of supply chain integration should be investigated and fully established (Abd Shukor *et al.*, 2011). Consequently the issue of rethinking on IBS supply chain players towards social sustainability shows possible potentials of working on OBS as a mass customization era for the future.

Ultimately, (1) confirmation of IBS and sustainability issues as existing gaps in the field of construction management by review the past research, (2) the need of addressing IBS and its supply chain with a sustainable approach in the current state

of the Malaysian construction industry, as emphasized by CIDB, and (3) addressing the mandatory of IBS social sustainability as the base of entering to the OBS as a next step of building systems, and the lack of a comprehensive framework and model which can figure and measure the impact of social factors in IBS implementation lead the current research to focus on social sustainability in IBS supply chain players. It intended to narrow the gap between theoretical social sustainable requirements and current IBS practices. Therefore this research is going to review adoption of IBS towards social sustainability within its supply chain players by answer to the following research question:

### **1.3 Research Question**

**Main research question:** How to implement social sustainability in IBS supply chain players?

**Sub research questions:** Two steps are required to optimize an issue. Firstly it is necessary to accurately assess the status quo and secondly, to achieve the desired status rely on the current situation. Similarly, in this study the research questions are divided into two sections. The first section includes the existing situation and the second section deals with the ideal and desired situation.

#### **Current situation**

- i. What are the current aspects of IBS and its current practices?
- ii. What are the current aspects of social sustainability and its current practices?
- iii. What are the factors of social sustainability?



### **Desired situation**

- iv. How to design a framework of social sustainability?
- v. How to design a model of social sustainability?
- vi. How to design and implement a model of social sustainability in IBS supply chain?

### **1.4 Research Objective**

Any activity requires determining the clear observe objectives because based on the specified objectives, the activities can plan and their efficiency rate of performance can be measured. The aim of this study is to improve IBS supply chain players towards social sustainability. Rest on the above description, the desired aim and objectives of this research can be stated as follows:

- i. To identify the current status of IBS
- ii. To identify the current status of social sustainability
- iii. To define social sustainable factors
- iv. To propose a framework for designing the social sustainability
- v. To design a model for social sustainability
- vi. To design and implement a model of social sustainability in IBS

### **1.5 Significance of study**

- i. To bring social sustainable aspects to the Industrial Building System.
- ii. To reduce the implementation of the conventional method.

- iii. To consider the upstream and downstream requirements in IBS production at the same time.
- iv. To achieve more sustainable structure in social perspective with attention to the customer satisfaction in IBS production supply chain.
- v. To increase the level of IBS adoption.
- vi. To provide the base of OBS adoption.
- vii. Hoped to fulfill the vision of CIDB and the Government of Malaysia.

## 1.6 Hypothesis

The research hypothesis is a paring down of the research problem into something testable and falsifiable. Hypotheses are the expected results of the research (Thomas *et al.*, 2010). The goal of all research is to test hypothesis and all researchers should have hypothesis before they conduct their research. A research hypothesis is not a general topic. It is a specific prediction about how two or more variables will be related. This might be a question, a statement or an ‘If/or’ statement. A hypothesis must be testable, taking into account current knowledge and techniques, be realistic, be verifiable by statistical and analytical means, to allow a verification or falsification (Shuttleworth, 2008; Mitchell and Jolley, 2012). The hypotheses are the expression of existing relations within the variables or about how the objectives situations. Therefore by attention to Table 1.1 the hypotheses of the study through IBS social sustainability are:

- i. There is a significant relationship between the political subsystem and social sustainability. The examined variables include: government and participation.
- ii. There is a significant relationship between the cultural subsystem and social sustainability. The examined variables include: community and culture, quality of life and sense and perception

- iii. There is a significant relationship between the institutional subsystem and social sustainability. The examined variables include: knowledge and education
- iv. There is a significant relationship between the economic subsystem and social sustainability. The examined variables include: equity & accessibility, economy, job and empowerment
- v. There is a significant relationship between the environmental subsystem and social sustainability. The examined variables include: safety and health, future and environment.

**Table 1.1:** Research Hypothesis Classifications

	<b>Hypothesis</b>	<b>Group</b>	<b>Factor</b>	<b>Number of Questions</b>
<b>Social Sustainability</b>	H(i)	A1: Socio-Political	a7: Government & NGOs a8: Participation & Democracy	4 3
	H(ii)	A2: Socio-Cultural	a9: Sense & Perception a10: Quality of Life a3: Community & Culture	7 5 7
	H(iii)	A3: Socio-Institutional	a4: Knowledge & Education	5
	H(iv)	A4: Socio-Economic	a6: Job & Empowerment a1: Equity & Accessibility a2: Economy	4 6 4
	H(v)	A5: Socio-Environmental	a5: Future a11: Safety & Health a12: Environment	4 4 4

## 1.7 Scope of Study

Any research should be restricted due to the limited scientific ability of researcher and other factors such as time and financial limitation and high workload. Besides, it is almost impossible doing the research that its results are valid at all the times, places and circumstances, except in such fields as mathematics. Therefore, any investigation will select a certain scope and tries to answer to the research questions through addressing the objectives within that research scope. In this regards, to narrow the focus of the research it need to specify the scope of what is to be done. The following segmentations is adopted from De Vaus' (2001) research topic break up, to help narrow down the research scope. According to this guideline the researcher should mention the scopes of each objective in terms of concept, time, geographic, generality, interest, method and tools which are described as follow:

- Concept (what is the scope of the core concept? what is to be included in the scope?)
- Time (what is the time frame for the scope? over what period?)
- Area (what are the research area / geographical location for the scope?)
- Generality (how general is the scope to be? To be able to describe patterns for specific subgroups?)
- Interest (what aspect of the topic are interested in? the interest is in what?)
- Method (what is the method of analysis or data collection? How to collect information and draw conclusions?)
- Tools (what tools are used?)

Based on the above description Tables 1.2 and 1.3 show the scope of the study

**Table 1.2:** The Scope of the Research

Objective	Scope						
	Concept	Time	Area	Generality	Interest	Method	Tools
Identify current of IBS	1) Definitions, background, classification, advantages, disadvantages, etc. 2) current status and adaptation of IBS	From 1960s (started main IBS projects in the word and first IBS project in Malaysia)	1)Research Documents, Literatures consisted of the review of approximately 100 books, articles, research documents, published reports, and professional documents and road maps * 2) IBS experts	Worldwide and specially Malaysia construction industry	The necessity of addressing social sustainability in IBS	1)Secondary data 2)SWOT and PEST analysis by Average and fuzzy weighted Ranking	1)Search (Libraries & online sources) 2)questionnaire, semi-structured interviews, Microsoft Excel 2007
Identify current of social sustainability	1) Definitions, background, sustainability dimensions and their interrelationship and integration, etc.	From 1970s (when sustainability concept originated)	1)Research Documents, Literatures consisted of the review of approximately 150 books, articles, published reports, and professional documents	All sustainability studies	The necessity and level of social dimension through Sustainability	1)Secondary data	1)Search (Libraries & online sources)
To define sustainable	1) Definition, roles, current situation, features, framework, assessment methods and models	From 1970s (when sustainability concept originated)	1)Research Documents, Literatures consisted of the review of approximately 150 books, articles, research documents, published reports, and professional documents	All sustainability studies specially social dimension	Preliminary factors to propose a social sustainable framework and model	1)Secondary data collection	1)Search (Libraries & online sources)

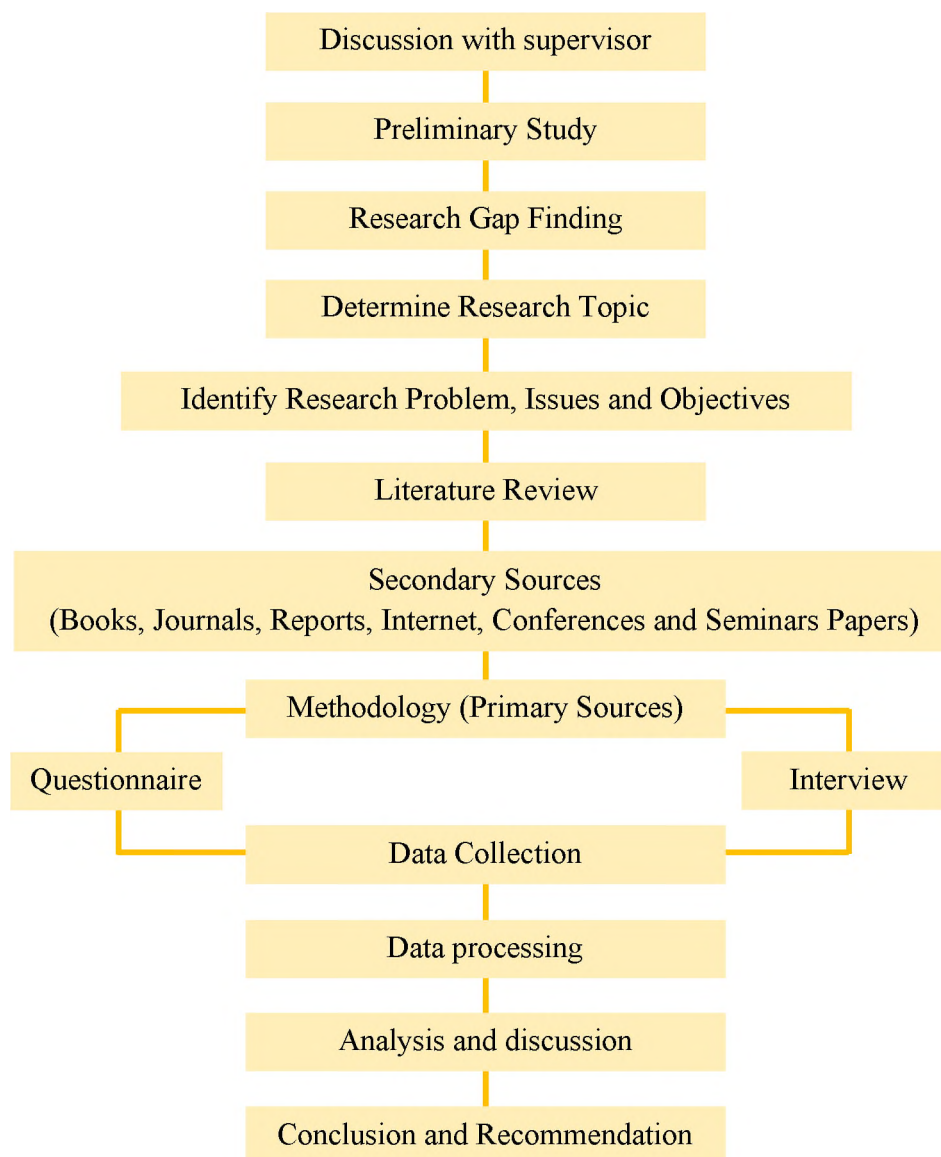
\*Sources included the researcher's university library, scholarly, peer-reviewed journals, and the web and CIDB data center

**Table 1.3:** The Scope of the Research

Objective	Scope						
	Concept	Time	Area	Generality	Interest	Method	Tools
to use a framework for measuring the sustainability	1) Social sustainable factors sorting	2011-12 (research period)	1) Social sustainability factors (objective iii) , Social experts	Commonly applicable	Provide a basis of social sustainable model	1) Group Focus, Grounded Theory	1) Interview
to design a framework for sustainability	1) Framework confirmation 2) Model design with AHP	2011-12 (research period)	1) Social sustainable framework, IBS supply chain players 2) Social sustainable framework, Social experts Construction industry experts	Commonly applicable Applicable in building systems and IBS	General model which be applicable in building systems and IBS	1) Confirmatory Factor Analysis (CFA) 2)AHP	1) question SPSS19 and LISREL8.3 2) question and EXPERT CHOICE1
to present and a model of social sustainability of supply chain players	1) IBS social factor ranking 2) System Identification and Neural Network model application	2011-12 (research period)	1) IBS supply chain players 2) Social sustainability AHP model, System Identification and Neural Network model, IBS supply chain players (Contractors, Consultant, Manufacturer, Clients) and Academic experts	Construction Industry and IBS in Malaysia	Social sustainability measurement and evaluation in IBS	1) Average, Friedman, TOPSIS Ranking 2) System Identification and Neural Network	1) question and SPSS19 2) question and MATLAB

## 1.8 Research Methodology

The research methodology has been carried out to fulfill the objectives of the study which include the method of data collection such as documents study, case study, preparation of questionnaires and data analysis. The research procedures are as shown in Figure 1.1.



**Figure 1.1** Research Methodology Flow Chart

## 1.9 Structure of Report

The research report is consists of five chapters where the content of each chapter are summarized as follows:

Chapter 1 is the introduction part for the research report. It provides an overall view of the whole report. Chapter 1 includes introduction, problem statement, hypothesis, objective, and scope of the study, significance of the study, research questions, research methodology and the structure of the report.

Chapter 2 is the literature review that based on findings from various different sources of information such as journal, technical papers, books, research paper etc on IBS and social sustainability. Chapter 2 includes definitions, classification of building system and IBS, essential characteristic of IBS, benefits and shortcomings of IBS, experiences and implementation of IBS in other countries, IBS in Malaysia, barriers of IBS in Malaysia, IBS Roadmaps and Construction Industry Master Plan (CIMP 2006-2015). In continue, this section is going to look at sustainable development and its three-dimensional model, then focus more closely and particularly the place of 'the social' within it.

Chapter 3 describe in detail the research methodology which covered literature review, questionnaires, preparation of the questionnaires, and method of analysis.

Chapter 4 analyzed the data using frequency analysis and also was discussed in detail the data analyzed and the findings were highlighted.

Chapter 5 highlights the findings and concludes the overall study on the subject and evaluate whether the objective of the research are achieved. Recommendations for further studies are also included in this chapter.



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