THE ROLE OF PROJECT MANAGERS IN SUSTAINABLE BUILDING PROCESS: A STUDY ON MALAYSIAN CONSTRUCTION INDUSTRY

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ABSTRACT

Providing all residences of a community with a better quality of life by developing of environmental, social and economic aspects has been focused in sustainable development for decades. In order to achieve the sustainable development, the construction industry is an important sector that should adopt the sustainability concept. Sustainable construction faces some challenges in adopting new processes and working methods due to the new technologies that require some changes in the process and considering risk. The purpose of this research is to find out the role of project managers in sustainable building process in construction industry. The main things that need to be cover are to identify the challenges in sustainable building process and to investigate the relationship between the role of project managers and the challenges. The challenges will identify in three phases such as feasibility and design phase, bidding phase and construction phase. In order to achieve this purpose, a literature review has been conducted to find out the challenges that face by project managers in the sustainable building process and questionnaire survey will use to investigate the relationship between the role of project managers and the challenges. From the finding and analysis done, the true information about the objective one and objective two can be determine. The result that gets from this finding and discussion is there have six variables that have strong positive relationship between the challenges and the role of project manager. The outcomes present the focuses and process as well as main challenges in sustainable building design and construction. These challenges are presented in a time line of a building process. As a conclusion, project managers can play a vital role in integrating sustainability to a building project during design and construction process to deliver a successful sustainable building. Their role is significant to overcome the challenges in sustainable building process.

Key words: sustainable development, role of project managers, sustainable building process, challenges, project managers, sustainability

ABSTRAK

Penyediaan semua kediaman masyarakat dengan kualiti hidup yang lebih baik dengan membangunkan aspek alam sekitar, sosial dan ekonomi telah memberi tumpuan dalam pembangunan yang mampan selama beberapa dekad. Dalam usaha untuk mencapai pembangunan yang mampan, industri pembinaan merupakan sektor penting yang menerima pakai konsep kelestarian. Pembinaan mampan menghadapi beberapa cabaran dalam menerima pakai proses dan kaedah kerja disebabkan oleh teknologi baru yang memerlukan perubahan dalam proses dan mengingati risiko. Tujuan kajian ini dilakukan adalah untuk mengetahui peranan pengurus projek dalam proses pembangunan yang mampan dalam industri pembinaan. Perkara utama yang perlu dikaji adalah untuk mengenal pasti cabaran-cabaran dalam proses pembangunan mampan dan untuk mengkaji hubungan antara peranan pengurus projek dan cabarannya. Cabaran akan dikenal pasti dalam tiga fasa iaitu kemungkinan dan fasa reka bentuk, fasa bidaan dan fasa pembinaan. Untuk mencapai tujuan ini, kajian literatur telah dijalankan untuk mengetahui cabaran yang dihadapi oleh pengurus projek dalam proses pembinaan yang mampan dan kajian soal selidik akan digunakan untuk mengkaji hubungan antara peranan pengurus projek dan cabarannya**.** Daripada dapatan dan analisis yang dilakukan, maklumat sebenar berkaitan dengan objektif satu dan objektif dua dapat dikenalpasti. Keputusan yang dapat dari penemuan dan perbincangan ini ialah terdapat enam pembolehubah yang mempunyai hubungan positif yang kuat antara cabaran dan peranan pengurus projek. Hasil daripada pembentangan, proses merupakan salah satu cabaran utama dalam reka bentuk bangunan mampan dan pembinaan. Cabaran-cabaran ini dibentangkan dalam garis masa proses pembinaan. Kesimpulannya, pengurus projek boleh memainkan peranan yang penting dalam mengintegrasikan kemampanan untuk pembangunan projek semasa reka bentuk dan proses pembinaan untuk menyampaikan pembangunan mampan yang berjaya. Peranan mereka adalah penting untuk mengatasi cabaran dalam proses pembinaan berterusan.

TABLE OF CONTENTS

		Page
SUPERVISOR'S DECLARATION		ii
STUDENT'S DECLARATION		iii
DEDICATION		iv
ACKNOWLEDGMENTS		v
ABSTRACT		vi
ABSTRAK		vii
TABLE OF CONTENTS		viii
LIST OF TABLES		xi
LIST OF FIGURES		xiii
CHAPTER 1	**INTRODUCTION**	
1.1	Research Background	1
1.2	Problem Statement	2
1.3	Aim / Focus	3
1.4	Objective	3
1.5	Theoretical Framework	4
1.5.1	Explanation of the Framework	4
1.5.2	The Development of Hypothesis	4
1.6	Scope	5
1.7	Significant of Research	5
1.8	Research Methodology	5
1.9	Expected Result	7
1.10	Conclusion	7
CHAPTER 2	**LITERATURE REVIEW**	
2.1	Introduction	8
2.2	Sustainability Concept	8
2.3	Sustainable Construction	10
2.4	Project Management and Green Building	11

2.5 The Challenges in Sustainable Building Process 13

2.5.1 The Challenges in Feasibility and Design Phase 15
2.5.2 The Challenges in Bidding Phase 19
2.5.3 The Challenges in Construction Phase 20

2.6 The Role of Project Managers in Overcoming the Challenges 23

2.6.1 The Role of Project Managers in Feasibility and Design Phase 25
2.6.2 The Role of Project Managers in Bidding Phase 28
2.6.3 The Role of Project Managers in Construction Phase 29

2.7 Conclusion 31

CHAPTER 3 METHODOLOGY

3. 1 Introduction 33

3. 2 Research Method 33

3.2.1 Primary Data 33
3.2.2 Secondary Data 34

3. 3 Population and Sampling 34

3.3.1 Population 34
3.3.2 Sample 34

3. 4 Data Collection Technique 35

3. 5 Development of measure: Design Questionnaire 36

3. 6 Statistical Technique 37

3. 7 Conclusion 38

CHAPTER 4 RESULT AND FINDING

4. 1 Introduction 39

4. 2 Descriptive Statistics 39

4.2.1 Demographic Data 40
4.2.2 Variable Descriptive Data 45

4. 3 Reliability Analysis 47

4. 4 Correlation Analysis 48

4. 5 Regression Analysis 49

4. 6 Conclusion 66

CHAPTER 5 CONCLUSION AND RECOMMENDATION

5. 1	Introduction	68
5. 2	Conclusion Objective 1	68
5. 3	Conclusion Objective 2	69
5. 4	Discussion All Objective	71
5. 5	Limitation	73
5. 6	Recommendation	74

REFERENCES 76

APPENDICES

A	Project Activities Milestone / Gantt Chart	79
B	Example Questionnaire	83

LIST OF TABLES

Table No.	Title	Page
3.5	Measurement Form	36
4.2.1.1	Frequencies	40
4.2.1.2	Gender of Respondents	41
4.2.1.3	Age of Respondents	42
4.2.1.4	Education of Respondents	43
4.2.1.5	Work Experience of Respondents	44
4.2.2.1	The Challenges in Sustainable Building Process	45
4.2.2.2	The Role of Project Managers in Overcome the Challenges	46
4.3.1	Cronbach's Alpha Value	47
4.4.1	Pearson Correlation	48
4.5.1	Regression Model Summary 1	50
4.5.2	Regression Model Summary 2	51
4.5.3	Regression Model Summary 3	51
4.5.4	Regression Model Summary 4	52
4.5.5	Regression Model Summary 5	53
4.5.6	Regression Model Summary 6	53
4.5.7	Regression Model Summary 7	54
4.5.8	Regression Model Summary 8	55
4.5.9	Regression Model Summary 9	56
4.5.10	Regression Model Summary 10	56
4.5.11	Regression Model Summary 11	57
4.5.12	Regression Model Summary 12	58
4.5.13	Regression Model Summary 13	58
4.5.14	Regression Model Summary 14	59
4.5.15	Regression Model Summary 15	60

4.5.16	Regression Model Summary 16	60
4.5.17	Regression Model Summary 17	61
4.5.18	Regression Model Summary 18	62
4.5.19	Regression Model Summary 19	62
4.5.20	Regression Model Summary 20	63
4.5.21	Regression Model Summary 21	64
4.5.22	Regression Model Summary 22	64
4.5.23	Regression Model Summary 23	65
4.5.24	All Regression Model Summary	67
5.4	The Relationship between the Challenges and the Role of Project Manager	72

LIST OF FIGURES

Figures No.	Title	Page
1.5	Theoretical Framework	4
1.8	Methodology Flow Chart	6
2.2	Components of Sustainable Development	9
4.2.1	Gender	41
4.2.2	Age	42
4.2.3	Education	43
4.2.4	Work Experience	44

CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

Ahadzie (2007) addressed the industry's growing awareness of the relationship between achieving project success and construction project management competencies. Successful construction organizations are now focusing on ensuring the project managers should get the core competencies required to succeed in their work. The project manager has direct influence over 34% – 47% of project success (Frank, 2002). Based on previous studies, it is clearly expressed that the project managers play an important role in ensuring a successful of the project.

In Malaysia, the green movement is still at its infancy. Sustainable projects are mostly at the pioneer stage. To move towards sustainable development, project managers need more effort and shall be directed towards the realization of the green agenda industry. To start on the path of sustainable construction, it requires two pronged approaches: first is to create the local construction sector with a capable and viable and second is for the sector should respond to the demand of sustainable construction in all activities. This will only be possible if all stakeholders work together in the implementation and support change.

Green building is also known as a high-performance building or sustainable construction has been practiced by builders and remodelers over centuries. But, in the modern era, the sustainable construction began in the 1970s when oil prices rise and the need for increased energy efficiency. The high performance buildings is designed and

constructed to incorporate environmental considerations and resource efficiency. This merger will be included in every step of the home building and land development process intended to reduce the environmental impact.

Green building is a realistic response to a variety of issues that affect all of us: like rising energy prices, water resource depletion and climate change. However, it also has benefits encourage the adoption of sustainable building concepts in the industry (Häkkinen & Belloni, 2011), like the operational costs of sustainable buildings is more beneficial than the operational cost of conventional buildings, improved performance of green buildings can enhance the productivity of their users and economy can benefit from reduced emissions and use of natural resources by sustainable buildings.

1.2 PROBLEM STATEMENT

Based on New Straits Times on March 12, 2013 (Tuesday), Malaysian Institute of Architects President Saifuddin Ahmad said 256 applications for the Green Building Index (GBI) have been submitted since the index was introduced, with 54 projects conditionally certified and 4 totally certified. GBI is Malaysia's green building rating developed specifically for the tropical climate. Saifuddin also said that this trend is increasing after Prime Minister Datuk Seri Najib Tun Razak announced that the government was offering owners of new or upgraded buildings with GBI certification a 100 per cent tax exemption for the additional expenditure incurred to get the certification.

However, the issue of green building is still new and not common in our country. With reference to the news published in the New Straits Times on March 12, 2013, only 256 applications for the Green Building Index (GBI) has been submitted since the index was introduced. This is a small number of applications and this can bring problems to the Green Building Index (GBI) to increase the number of sustainable building. So, the role of project managers in sustainable building process should be studied in order to increase the number of sustainable buildings in construction. One the solution from the problem is identify the challenges in sustainable building process. With identify the challenges, it can

help project managers to overcome the challenges as well be able to understand their role in the sustainable building process.

The challenges will identify in three phases such as feasibility and design phase, bidding phase and construction phase. In each phase, we will be able to identify the several of the challenges faced in sustainable building process. In this study also, we will be able to know whether the project manager have role in overcoming the challenges in this sustainable building process or not. Besides that, we also can know whether project managers are good enough to be assigned the task to overcome these challenges.

1.3 AIM/ FOCUS

The following questions have directed this research in order to accomplish the purpose:

- What are the challenges in sustainable building process?
- What are project managers' roles in overcoming the challenges?

1.4 OBJECTIVE

The purpose of this study is:

- To identify the challenges in sustainable building process
- To investigate the relationship between the role of project managers and the challenges

1.5 THEORETICAL FRAMEWORK

Dependent Variable (DV) Independent Variable (IV)

Figure 1.5: Theoretical Framework

1.5.1 Explanation of the Framework

From the above theoretical framework, there have two variables that involve in this research. Which are dependent variable and in dependent variable. Dependent variable is about the challenges in sustainable building process and independent variable is about the role of project managers in overcoming the challenges.

1.5.2 The Development of Hypothesis

The hypothesis of this research will be developing based on the research objective. The hypothesis will describe the relationship between dependent variable (the challenges in sustainable building process) and independent variable (the role of project managers in overcoming the challenges). Then, the hypothesis will be test and investigate to prove whether these variables have a relationship or not. The hypothesis reflected to the relationship between dependent and independent variable.

H1: This is positive relationship between the challenges and the role of project managers to overcome the challenges in sustainable building process.

H2: This is negative relationship between the challenges and the role of project managers to overcome the challenges in sustainable building process.

1.6 SCOPE

This study intended to identify the challenges faced by project managers and investigate how the role of the project manager can overcome these challenges. The scope of this study is focused on to simplify the process of information gathered, so it can be analyzed within an appropriate time suit. The aspects being considered are:

- This study is focusing on construction companies (G6 contractors).
- The respondents are the project managers around Kuala Lumpur.

1.7 SIGNIFICANT OF RESEARCH

This study intends to find out what are the challenges in sustainable building process for project manager and from that information we can know how the role of the project manager can overcome the challenges faced by project managers in sustainable building process in construction industry. This research also will contribute to the field of education in which information and knowledge will be shared with others. In addition, this study will help project managers to manage the project in sustainable building process and lessons can be learned, getting results that will help project managers to ensure that the project will achieve success in the future.

1.8 RESEARCH METHODOLOGY

The methodology is set to gather the data for achieving the outlined objectives. The first step is to rationalize the issue to help establish a research topic. Then the aims and objectives are set. This study used several methods of data collection for the purpose of achievement of these objectives. For the knowledge acquisition phase, the literature related to the study to be undertaken are studied through journals, books, newspapers, conference papers and internet. From that information, a set of questionnaire form has been developed. The respondents are the project managers from Kuala Lumpur. For the data analysis phase, the data were analyzed by using the Statistical Package for Social Sciences (SPSS). The final phase will be able to create a conclusion associated with the objectives of the study.

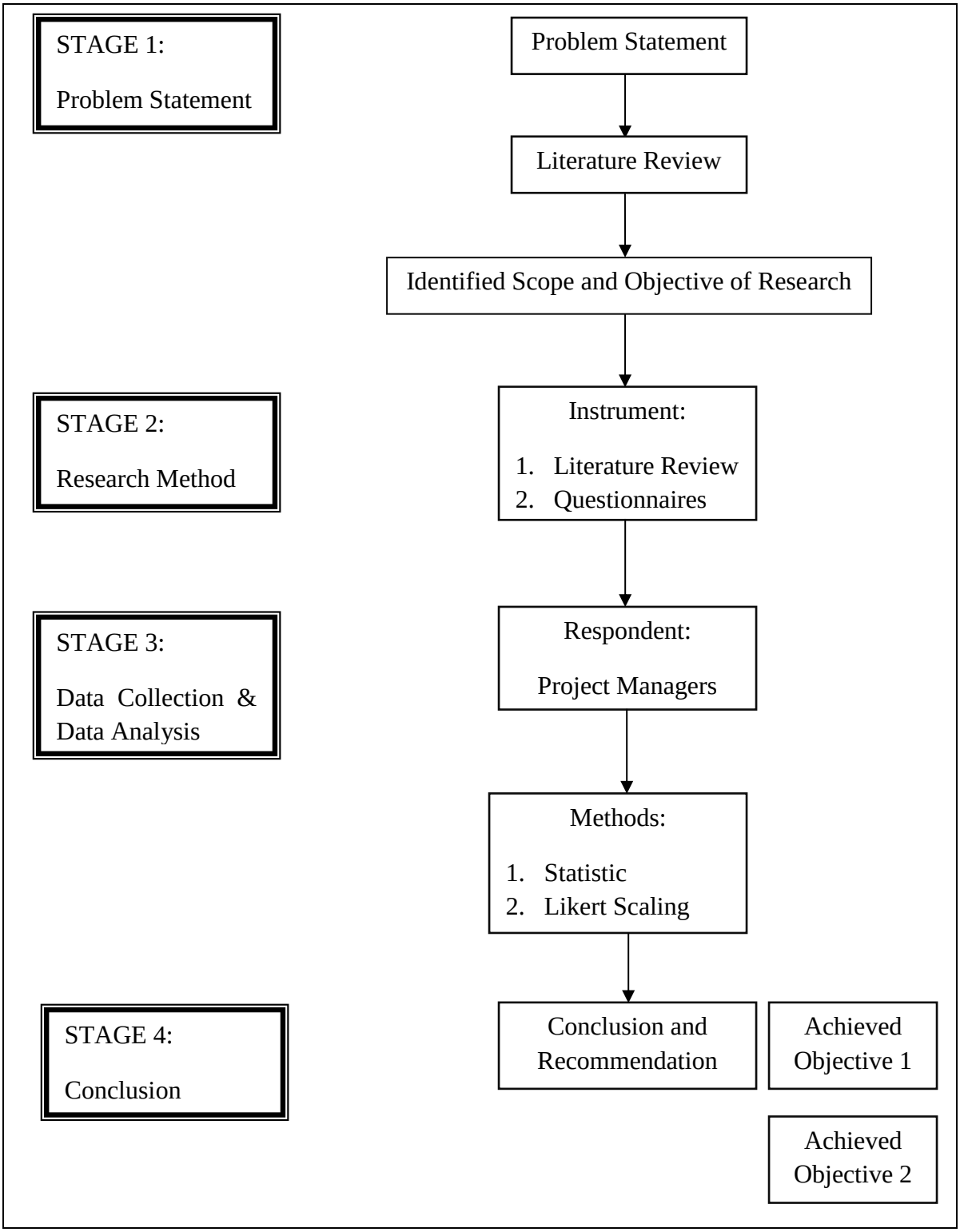

Figure 1.8: Methodology Flow Chart

1.9 EXPECTED RESULT

Expected result for this research is hopefully this study can be carried out smoothly and achieves the objectives of this study. The objectives to be achieved are to identify the challenges in sustainable building process and to investigate the role of project managers in overcoming the challenges. Several questions will be built to facilitate this study, among which are the challenges in sustainable building process and the role of project managers in overcoming the challenges. We hope that the study will continue as planned and get good results. This study may also be able to analyze the data and help identify the role of project managers in sustainable building process.

1.10 CONCLUSION

Chapter 1 has presented a brief introduction about the role of project managers in sustainable building process. This chapter also describe about background of the research, problem statement, focus and objective, theoretical framework, scope, significance of research and research methodology.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter review related article about the role of project managers in sustainable building process. From the literature findings that found, it can provide a better understanding about this study such as can know about sustainability concept, sustainable construction, project management and green building. Furthermore, this study also can identify the challenges in the sustainable building process and the role of project manager for each challenge according to the process of sustainable building.

2.2 SUSTAINABILITY CONCEPT

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (CIBSE 2004). Sustainable development ties together concern for the carrying capacity of natural systems with the social challenges facing humanity. According to Michelle Rehmann (2010), the sustainability have three most important indicators or also call as a pillar that can help to sustainable development, there are economics, environmental and sociopolitical. Based on the figure 1, the intersection of these three represents to sustainable development or sustainable remediation is optimized.

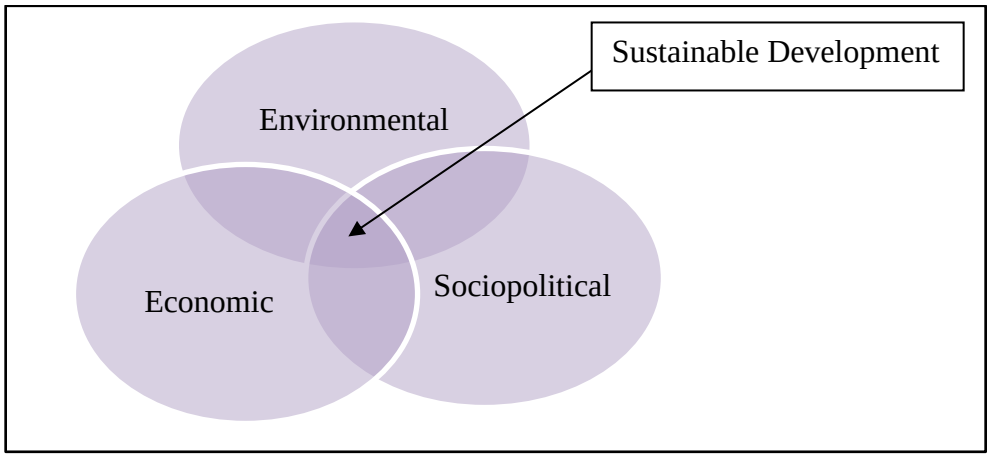

Figure 2.2: Components of Sustainable Development

One of the key indicators of environmental sustainability is a process to ensure that the rule of human interaction with the environment is as pure as natural as possible. Also economic sustainability is economic development with minimal environmental pollution or equitable development that environmentally and socially sounds. Social sustainability suggests that the future generations should have the same or greater access to social resources as the current generations.

Based on Kates, Parris & Leiserowitz (2005), the definition of sustainable development is also suggested connecting what should be kept and what needs to be developed, but there is a difference in the extreme "to keep only" and "to develop a common". Period of time worrying also differ from those expressed in standard definition "present and future". Further development of the standard definition of sustainable development was marked by the 2002 World Summit on Sustainable Development which has emphasized the three pillars of sustainable development there is economic, social and environmental (Kates et al., 2005).

Chrisna du Plessis (2002) define sustainable development is not only development that can be sustained, but the kind of development that should be pursued to achieve the sustainable state. It is not the goals, but the processes of maintain a dynamic balance

between the demands of the people for prosperity, fairness and quality of life and what is ecologically possible. Development also does not just see in the narrow meaning of growth, development and acquisition of knowledge, but as progress through improvement, evolution and effort to wisdom.

2.3 SUSTAINABLE CONSTRUCTION

Sustainable construction has been developing since the late 1980s. Matar, Georgy, & Ibrahim (2008), the author said sustainable construction should continue to enhanced because there is increasing evidence about the depletion of the environment and environmental loadings. In fact, the purpose of the sustainable construction is integrating the general sustainability concepts with conventional construction practices. Consequently, to enhance sustainable construction, the construction industry has changed dramatically in the past decade (Kubba, 2010).

Besides that, the construction industry should play an important role in adopt the concept of sustainability in order to achieve the sustainable development. This is because it has important direct and indirect relationships in different aspects of the sustainable development like economic, environmental and sociopolitical Michelle Rehmann (2010).

Sustainable construction is a comprehensive process that aims to restore and maintain harmony between the natural and built environment and create a settlement that confirms human dignity and promote economic equity (Chrisna du Plessis, 2002). It should be recognized that human being is locked into a very dynamic relationship with nature and that the two are acute mutually dependent. In addressing the complex problems of construction and the environment, efforts towards sustainable development is essentially an attempt to put in place practices that restore the balance between the natural and built environments. It is a search for ecological models that consider both the natural as a basis inter-related.

According Chrisna du Plessis (2002), in the cycle perspective, sustainable construction is seen implies holistic thinking related to the construction and management of the built environment. It shows not only the construction of new environmentally oriented design, but also a new environmentally friendly operations and maintenance procedures. Not only building materials and components produced in a sustainable way, but their use must also respond to the new needs derived from a holistic environmental conditions.

2.4 PROJECT MANAGEMENT AND GREEN BUILDING

Project management is the application of knowledge, skills, tools and techniques to project activities to meet the project requirements (PMBOK Guide Fifth Edition, 2013). Project management is accomplished through the appropriate application and integration of the 47 logically grouped project management processes, which are categorized into five Process Groups. These five Process Groups are initiating, planning, executing, monitoring and controlling and lastly closing.

Project management is the process of managing the delivery of a project through the application of knowledge, processes and tools to a wide range of activities, with the aim of fulfilling the requirements of the project. Project management focuses on the establishment and delivery of a set of objectives and outcomes for a project that has a proposed time line and trajectory.

According to McGraw-Hill Construction (2006), green building is the careful design, construction, operation and reuse or removal of the built environment in an environmentally, energy-efficient and sustainable manner, may be used interchangeably with high performance building, green construction, whole building design, sustainable building and sustainable design.

The achievement of sustainability outcomes is one of the many issues that need to be addressed on behalf of clients, along with the traditional outcomes such as meeting timelines, budgets and the needs of different user groups. Project management is important

to the successful of any commercial building project and key sustainability objectives because of the project manager's role in ensuring an integrated design and delivery process.

According to Wu et al. (2010), the technical issues related to be pay much attention in sustainable construction. Technical issues related to refer to the components of the system can help to achieve green goals, including energy efficiency and use environmentally friendly materials. Project management is considered as a set such as site management, waste management and material management and others. Wu et al. (2010) also claims that the process of project management and issues related to non-technical is not focused enough.

Meanwhile, Wu & Low (2010) said the rating systems can use for assess how green the building is. It is because the rating system can offers useful information about good practices and measures to achieve green goals. Three element most used by the rating systems in which chosen for investigated of project management assessment criteria is “LEED”, “BCA Green Mark” and “Green Globs”.

Wu et al. (2010) has identified the lack of considering the importance of project management process in a green project in two of the three most used rating system, but it believe that green building can be considered as a process and not a product because it is long-term time. In the "LEED" and "BCA Green Mark", it is more to project management practices such as waste management, environmental management program, materials management and site management. The all elements in project management practices focused in project management section for “LEED” and BCA Green Mark’ rating systems. An example of these practices in the rating system is the storage and collection of recyclable materials, recycled contents, regional materials, and public transportation accessibility.

Instead, the Green Globs were more focused on project management processes such as coordination, building commissioning, documentation and others. So, in such a strategy,

they claimed that the project manager should take an effective role in the balance between process and practice (Wu et al 2010).

Moreover, Wu et al. (2010) proposed a package of effective project management to achieve the desires of green building. Obviously, this effective project management package aimed to get an effective role of project managers. This package including:

- project management processes in the project life cycle to achieve sustainable construction
- transmission of relevant goals to the different projects without missing concept of sustainability in major places in the process
- construction management practices during the construction phase to achieve green goals
- feedback and documentation of the ongoing project life cycle enhancement

2.5 THE CHALLENGES IN SUSTAINABLE BUILDING PROCESS

Häkkinen et.al (2011) stated that the sustainable building process faces the challenges of adopting new processes and working methods to use the new technology. New technologies require changes in processes and consider the risks and cost uncertainty. Häkkinen et.al (2011) also suggests learning about the decision-making phase, a new task, the actor, the role and the way the network is needed to overcome major challenges.

As a project manager it can control the different phases of the project, introducing challenges in each phase of the green project can be more beneficial to find their roles and responsibilities. While some of these challenges can also be important to consider in conventional construction, they turn to a challenge in sustainable construction for long-term. It is because, the objectives of sustainable construction that makes the benefits of sustainable buildings intangible.

Furthermore, sustainable building practices and processes need to change the common practice in the construction industry. Because of the conservative nature of the construction industry, these changes facing some new challenges and issues even before the switch to the challenge in this situation.

Griffith (2002) are recognize the developing and implementing the new innovative ways to procure, design, construct, use and maintain development as a challenge for construction industry especially for sustainable construction. These innovative ways should meet the diverse expectations of more demanding customers, industry and community that focus on the time, cost, quality, safety and environmental impact. Griffith (2002) also stated that the interaction between the traditional separate processes and management functions is the much needed change that can improve the performance of the construction process.

Therefore, sustainable development as a driver for this change must be responsive to a number of key challenges:

- Increase the effectiveness and competencies of the construction process by the interaction between the main phases.
- Produce good quality products in a healthy work environment and safe and minimize the improper impact to the project surroundings and the populations.
- Make comprehensive and long-term improvements to the environment which was built to meet the changing demands of customers, industry and the public.

The key challenges display the difficulties of sustainable building process not due to lack of existing information, technologies and methods of evaluation. The stages described above in the sustainable building process is considered at this point as a time to introduce barriers and drivers in the sustainable building process to understand the challenges faced by project managers to deliver successful green projects. At the same time, related responsibilities of the project manager are highlighted to discuss their important role in overcoming the barriers and using the drivers.

2.5.1 The Challenges in Feasibility and Design Phase

Feasibility and design phase is important because in this planning phase, the materials and construction methods are identified and the ways in which the population will live defined (Mills & Glass, 2009). Robichaud et al. (2011) also stated that the most important step toward delivering sustainable development is done during the feasibility and design phases. The main challenges in this phase include setting clear goals, timing, understanding customers, steering mechanisms and economics.

2.5.1.1 Setting Clear Goals

The first challenge in feasibility and design phase is setting clear goals. According to Robichaud & Anantatmula (2011), setting clear goals is important for sustainable construction because in addition to the market situation and physical needs that are usually considered in the traditional construction and environmental goals. Besides that, it also important to the amount of capital investment towards green initiatives and desired level rating system considered in sustainable construction.

Customers need to make decisions and set project goals before selecting a site and preliminary design. If customers do not make decisions and set project goals, the challenge will be exist. It is recommended to create a team of professionals including managers, architects and contractors to assist clients in determining goals and priorities. In order to save costs it is also possible to hire a manager who specializes in all areas of green development.

According to Häkkinen & Belloni (2011), lack of sufficient knowledge to develop a project brief with clear targets an obstacle to the sustainable building. While making a team of professionals, some of the decisions during this phase might be made without setting and considering sustainability goals at first. For example, in the process of choosing green structural materials and systems it is common to choose a system according to the performance criteria with little discussion about sustainability.