Sustainability Goals and Project Success from the Perspective of the Stakeholders of Green Building Project in Malaysia: A Preliminary Study

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Abstract

Green building is an emerging concept with the ultimate target to achieve sustainable development. Many studies revealed that the building project had contributed towards sustainability and project success in the past. The purpose of this study was to determine the advantages of sustainable application in building projects, looking towards project success from the perspective of Malaysian project stakeholders and to explore the establishment of sustainability goals in the green building projects in Malaysia. The Triple Bottom Line Concept of Sustainability (TBL) was used as the foundation of the theoretical framework. Quantitative, qualitative and multiple case study methods were employed. A sample of 188 Malaysian building project stakeholders was selected for questionnaire surveys, and 15 stakeholders from three award-winning green building projects in Malaysia were involved in the interviews. The quantitative data was analysed using descriptive statistic. Meanwhile, cross case analysis and literal replication logic were utilized for the multiple case study and qualitative analysis. The study found that majority of the respondents believed that the development of a green building project impacts more on the quality enhancement aspect of the building as compared to others. The goal of achieving environmental sustainability was given more priority than the other goals throughout the development of the green buildings.

Keywords: *Green building, Sustainability goals, Project stakeholders, Project Success, Malaysia.*

Introduction

Malaysia is one of the fastest growing construction industries in the world. The rapid growth of the industry has, however, created pressure on the sustainability aspects of the country, including the environment, economy and social cohesion. Increasing demand for building materials has resulted in greater greenhouse gas (GHG) emissions from the energy used in the materials production process. The Asia Pacific Economic Corporation (APEC) projected that Malaysia's primary energy demand will increase at 3.5% per annum, from 56 megatons of oil equivalent (Mtoe) in 2002 to 147 Mtoe in 2030. In 2010, total final energy consumption in Malaysia was 40,290 kilo tonne of oil equivalent (ktoe), an increase of 5.4% from 38,244 ktoe in 2009. By energy type, oil contributed the largest share, with 60.5% of consumption, followed by electricity (22.3%), gas (13.3%) and coal (3.9%) (APEC, 2012). Based on the production level in 2005, it is estimated that the oil reserves will last only 15 years while gas reserves are estimated to last for another 29 years, and electricity demand is expected to increase significantly from 96.3 TWh in 2009 to 206 TWh in 2035 (APEC, 2013). Thus, Malaysia needs more alternative energy sources to fulfill the demand of the country's rapid economic development and to better manage the growing energy demand.

It was projected that by 2035, the electricity generation sector would be the biggest source of CO_2 emissions (33%) in Malaysia, followed by the domestic transport sector (24%) (APEC, 2013). The country has an average annual temperature of 24 degrees Celsius to 34 degrees Celsius. The huge electricity consumption in Malaysia is partly due to keeping indoor conditions thermally comfortable for buildings. The mechanical cooling technologies that have been used in the buildings consume fossil fuel energy and electricity, which in turn contributes to the issues of global warming and

climate change. Activities related to the building construction industry are among the contributing factors to the environmental degradation in Malaysia. The current trend of considering minimal initial costs alone in the Malaysian construction industry has caused certain social and environmental issues in the country (CIDB, 2007).

The building sector contributes up to 30% of global annual GHG emissions and consumes up to 40% of all energy. Given the massive growth in new construction in economies in transition, and the inefficiencies of existing building stock worldwide, if nothing is done, GHG emissions from buildings will double more than in the next 20 years (UNEP, 2009). Green building development is one of the practical solutions adopted by many countries, including Malaysia, to address such issue. Green buildings contribute positively towards workforce attraction, quality of life and customer relationships. They have been revealed to contribute to lower levels of sickness and absenteeism. Green building is normally the result of holistic thinking by a team of professionals, including the client, who share similar sustainable ideas which spread from a company to its buildings, the buildings to the company and the company to the individual (Edward, 1998).

The Malaysian urban population is expected to grow more than 80% of the total Malaysian population by 2030, parallel with their consumption of energy and resources as well as their carbon emission contribution (GSB, 2013). Therefore, the encouragement of and serious attention towards sustainability consideration in building project development is seen as very urgent, in order to overcome the conventional building phenomenon in the hyper urbanization of Malaysia. In Malaysia, the green movement is still at the early age (Isa, 2015). To move towards green building development, more efforts are needed and should be directed towards realizing the green agenda of the industry. Many efforts have been done and billions of dollars have been invested by the government to encourage the green building development in Malaysia. However, the level of implementation of the green concept in the building development of the country is still poor. Despite the growing interest in the green building development and government incentives, risks of uncertainties still cloud investment in green building (Aliagha et al., 2013). The focus of the Malaysian construction industry on providing the best possible or lowest cost has downgraded the sustainability concerns to the secondary factor.

This paper focuses on determining perspectives of the Malaysian building project stakeholders on the advantages of sustainable application for building projects on project success in terms of cost reduction, schedule effectiveness, quality achievement and stakeholders' satisfaction. This study also examines the sustainability goals established for three showcase green building projects in Malaysia.

The Concept of Sustainable Development

Sustainable development refers to the process of development in a sustainable manner by integrating economic, social and ecological dimensions of objectives in order to achieve a comprehensive and holistic sustainable development. Imbalance priority given among these three dimensions may result in failure to achieve sustainability such as being highlighted in World Bank (1992):

> *Economic development and sound environmental management are complementary. Development can contribute to improved environmental management and a healthy environment is essential for sustainable development (World Bank, 1992:1.1).*

Sustainability is not considered as a new concept as it was used since the 1970's even though the practice during the time was still largely hold a preservationist philosophy. This concept only had gained global political recognition since it was introduced by the Brundtland Report titled 'Our Common Future' in 1987 at the United Nation Conference on Environment and Development. The report was the first which focuses on global sustainability which explicitly addressed the links between social, economic and environmental dimensions of development and sustainability towards devising a new development model, that of 'sustainable development'. From this moment on, it became increasingly important for organizations to be aware of this subject and presently, the sustainability concept has formed a foundation of most developments and socio-economic activities in the built and natural environments. Sustainable development has different views, meanings and

interpretations to different people. It is also viewed variously as a rubric, vision, philosophy, mission, goal, mandate, principle, marketing ploy, constraint, criteria and movement (Larsen, 2009). It occurs due to the diverse area of study and the diverse rationality of different players who interpreted this term differently. There are currently over a hundred definitions of sustainability and sustainable development. However, most of them agreed that the concept aims to satisfy social, environmental and economic goals which are based upon the 'three pillar' of 'triple bottom line concept' (TBL) as shown in Figure 1. TBL concept was developed in 1997 by John Elkington (Magis and Shinn, 2009; Edward, 1998) who then made public the definition in his article: 'Cannibals with Forks': The Triple Bottom Line of 21st Century Business' (Grevelman and Kluiwstra, 2010).

Magis and Shinn (2009) and Larsen (2009) stated that 'sustainability' is often thought of as comprised of three overlapping mutually dependent goals (TBL) which are a) to live in a way that is environmentally sustainable or viable over the long term, b) to live in a way that is economically sustainable, maintaining living standards over the long term and c) to live in a way that is socially sustainable at present and in the future. World Commission on Environment and Development (WCED, 1987) report to the United Nation (UN), which stipulated that sustainable development required concerted attention to social, ecological and economic conditions. The World Bank (1992) further discussed that 'sustainable' is about ensuring that improvements in human welfare are lasting.

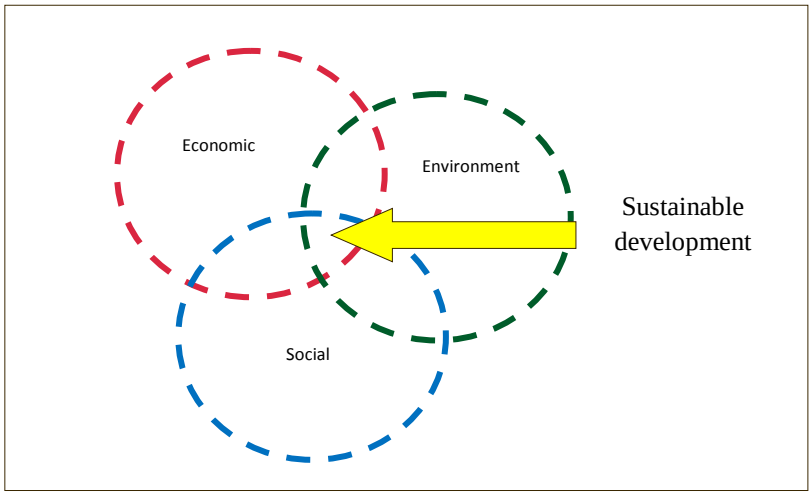

Figure 1: Underlying concept of sustainable development
Triple Bottom Line Model

Environmental sustainability is a part of the TBL and no greater importance than social and economic aspects; however this aspect is easier to be identified. One of the meanings given for 'environmental sustainability' is the matters concerned with planetary protection and the maintenance of diverse eco-systems (Sayce et al, 2004). Thus, environmental sustainability should be implemented by managing efficiently long term renewable and non-renewable resources, reducing waste and pollution and inventing ways to repair damage. The World Development Report (1992) highlighted that damage to the environment has three potential costs to present and future human welfare - human health may be harmed, economic productivity may be reduced and the pleasure or satisfaction obtained from an unspoiled environment may be lost (World Bank, 1992). The Report also highlighted that there are several principal health and productivity consequences of environmental mismanagement which are water pollution and scarcity, air pollution, solid and hazardous wastes, soil degradation, deforestation, loss of biodiversity and atmospheric changes. All economic activity involves transforming the natural world. Economic activity sometimes result in excessive environmental degradation due to the need of sharing natural resources and the true value of many environmental goods and services are not paid for by those who use them. Nevertheless, rising per capita income combined with sound environmental policies and institutions can form the basis for tackling both environmental and development problems.

The key to growing sustainably is not to produce less, but to produce differently. Edwards (1998) suggested that environmental sustainability adaptations into a building will benefit the stakeholders and the building itself. He also argued that most green buildings are economic when correctly designed and operated in a sustainable manner. Sayce et al. (2004) highlighted that environmental sustainability of a building should consider some key aspects which are: 1) legal sustainability standards (which have to be met for most employment activities and the building itself in order to be sustainable); 2) location and transport system; 3) ecological issues; and 4) adaptability (the adaptability of the building to meet new technologies and changing working practices).

Economic sustainability means different things to different groups of people depending on their relationship with the organization under consideration. It is usually considered in term of gross domestic product (GDP), real income and a range of indicators, including employment (Sayce et al, 2004). According to Pezzey (1992) economic sustainability is a condition of maintaining economic welfare right into the future. He highlighted that economic sustainability focuses more on the portion of the natural resource base that provides physical inputs, both renewable and exhaustible, into the production process. However, Sayce et al. (2004) concluded that economic sustainability is best assured by compliance with the other two heads of TBL which are environmental and social sustainability aspects. They highlighted that sustainability principles of a building should consider some key aspects: 1) the building works efficiently (efficient use of space and resources; 2) not creating waste; 3) creating employments or services and beneficial to community); 4) economic rate of return (such as owner income, prospective capital growth, stability, social cost benefits, job creation, recovery of polluted land, rates income); 5) efficient use of land, the effect of the form of property tenure; 6) the quality of the transport access (sustainable building that serve public should be located to be accessible to all potential users including disability and to those who only depends on public transport); 7) building fabric maintenance/ durability; and 8) adaptability (the ability of the building to changing circumstances.

'Social sustainability is a life-enhancing condition within communities and a process within communities that can achieve that condition' (McKenzie, 2004:12). In urban planning, the understanding of social sustainability is conceived as equity, without much thought as to what that might require or whether equity alone is sufficient for social sustainability (Magis and Shinn, 2009). Social sustainability is a new aspect in relation to building which complements the existing aspects of economic and environmental sustainability. For a building, social sustainability is not yet the one that has been reached in any quantifiable way. Sayce et al. (2004) has suggested seven key issues of social sustainability to be assessed for a sustainable building which entails adaptability, cultural importance, appeal (lovability and likeability), construction legislation such as planning and building regulations that supports the sustainability issues, occupation legislations, locations/locality and social working environment quality such as quality of design, layout and social integration. In addition, research in behavioral sciences has suggested that a good building habitat fall within the realm of sustainable design supports connection to nature, sense of community and belonging, behavioral choice and control, opportunity for regular exercise, meaningful change and sensory variability and privacy when desired (Boyden, 2004).

With the current pace of development, these three dimensions of sustainability are increasingly in competition with each other. However, full environmental sustainability without economic and social sustainability cannot be a worthy objective and vice versa. In this respect, sustainability is seen as creating conditions for the achievement of sustainable development that involves continuous effort towards fulfilling current and future human needs within the constraints imposed by environment, economic, society and technology.

Lately, sustainable development specifically in building and construction projects require simultaneous development of four interrelated dimensions – environmental, social, economic and technological (design/innovations/technical) (Isa et al., 2014b; Reyes et al. 2014; Pons and Aguado, 2012). These elements should not be perceived as independent but these elements should guarantee having a complete interaction among others and equally contribute to reach the same goal. Putting greater emphasis on one dimension above others is not possible to be practiced by construction project stakeholders.

Green Building

In the literatures, two terminologies are often used to describe the sustainable approach in building, namely 'sustainable building' and 'green building' (Isa et al., 2014a; Isa et al., 2017). Lutzkendoft and Lorenz (2006) pointed out that a green building is meant to be a building that exhibits energy efficiency, low resource depletion, low impact on the environment and the protection of health and environment. On the other hand, for a sustainable building, other requirements including 'minimization of life cycle cost, protection and /or increase of capital value, protection of health, comfort and safety of workers, occupants, users, visitors and neighbors, and (if applicable) the preservation of cultural values and heritage' should also to be fulfilled in addition to the green buildings requirements. 'Green' is commonly found in links to nature such as regeneration, fertility and rebirth, and recently the colour has been used as a symbol of environmental protection and social justice (Greenbuildingideas, 2011). Consequently, a variety of 'green' terms were used in the construction industry, such as 'green construction', 'green project' and so on. In the 1980s, under the cover of sustainable development (Rees, 1989) and sustainable design (John, 1992), the green building approach revealed to be successful in contributing towards sustainability. However, green buildings are argued to be skewed towards environmental aspects such as low energy consumption. Nevertheless, the significance of the non-technical issues such as economic, social and cultural aspects are currently being emphasized gradually in most definitions and the concept of green building is mentioned in most current published works.

Green building belongs to the concept of sustainable development, it should be a holistic solution for achieving sustainable development throughout the whole life of the projects (Isa et al., 2014a; Isa et al., 2017). As such, green building is the top priority of the United Nations in order to sustain the mother earth and to reduce global warming. Disclosure of a very large effect of building construction to the environmental degradation has led this sector to be a major focus worldwide to be replaced by a form of sustainable construction which is green building development. Past studies revealed that the increase demand of the construction of green buildings as a substitute for conventional buildings has contributed to the reduction of carbon emission as a whole, which is up to 35%, reduction in energy consumption, which is up to 30% -50%, a reduction of 70% of construction waste and a reduction of 40% of clean water consumption (CBRE, 2010). In fact, the cost needed to reduce carbon emissions is lower than the cost of economic recovery and social consequences of climate change that would be incurred (IPCC, 2003). In line with these findings, a number of building performance assessment systems (BPAS) for the achievement of green building has been created especially in developed countries such as LEED (Leadership in Energy and Environmental Design) in the United States, BREEAM (Building Research Environmental Assessment Method) in the United Kingdom, SBTool in Canada , Green Star in Australia and GreenMark in Singapore.

Malaysia intends to become a developed nation by 2020 through the development of low-carbon, sustainable, inclusive and efficient use of resources. The government *of Malaysia* has vowed for developing the country and emphasizes to the socio-economic sector to move away from the trajectory of the conventional development of 'grow first, clean up later' to the trajectory of the green growth that ensure socio-economic development is implemented from the planning stage onwards to the implementation stage and assessment (Government of Malaysia, 2015). *S*ustaining the building construction sector is the biggest opportunity for this country to reduce the carbon emissions (KeTTHA, 2011).Through the initiative of several professional bodies and government departments, some green BPAS was created such as Malaysia GBI (Green Building Index), which is adopted since 2009. In 2012, Green PASS (Green Performance Assessment System in Construction) has been set up by the government in collaboration with the Malaysian Construction Indust*ry Development Board Malaysia (CIDB)* to support the commitment of the Prime Minister of Malaysia at the COP15 Copenhagen (UN Climate Change Conference 2009) to reduce carbon emissions to 40% by 2020 compared to the year in which the commitment announced. Unlike GBI Malaysia, GreenPass has been seen trying to standardize all the requirements of green in a building to CO_2 unit and focusing on the process carried out at the construction and operation stages of a project. It was also claimed to be more practical, adaptable and efficient for application in the construction sector. In addition, P*enarafan* H*ijau, J*a*batan* K*erja* R*aya* (*PHJKR)* was developed in 2012, and followed by Green Real Estate *(*GreenRE*)* in 2013 (Hamid et al., 2014). It was revealed that several green building

developments in Malaysia, such as Diamond building, LEO and GEO building, have succeeded in reducing by up to half the buildings' total energy consumption annually (Isa et al., 2017) .

Green Project Success

The concept of project success is developed to set the criteria and standards by which projects can be completed with the most favorable outcomes. Association for Project Management (2012) has highlighted some factors that are known to contribute to project success. These include defining clear goals and objectives, maintaining a focus on business value, implementing a proper governance structure, ensuring senior management commitment, and providing timely and clear communication (PMI, 2008). The successful accomplishment of the project objective is usually constrained by four factors: project scope, cost and schedule, and user/customer satisfaction. Achieving the set goals for building projects within realistic financial and time constraints, and superior planning, design and construction process as well as having stakeholders' satisfaction, are all acutely needed for project success. Time, cost and quality are considered to be the most important project processes that contribute to the project management knowledge and practice. While, in a green building development, the sustainability performance of the project should also be taken into consideration from its early planning and design stages to achieve sustainable project success (Isa et al, 2014a).

Project management is about getting things done on time and within budget while meeting or exceeding stakeholders' expectations. Since 1980s, it has been shown that initial conventional building costs account for approximately 2% of the total costs, while operations and maintenance costs equal 6% and personnel costs equal 92% (Yudelson, 2009). In contrast, a successful green building is believed to be able to decrease the operating costs of the building by 8–9%, increase total building value by about 7.5% and increase occupancy rates by 3.5% (USGBC, 2006). Analysis from the United States indicates that the buildings attract higher rents than conventional ones and also enjoy higher rates of rental growth (CBRE, 2009). Design features that promote sustainability have resulted in greater productivity rates among employees (USGBC, 2003). Integrated design is a key component of successful green building projects (Isa et al., 2015; Isa et al, 2014a). Up-front collaboration between a project key stakeholders through this approach can minimize complications and in turn can avoid cost overruns, minimize delays and decrease change orders during construction. Finally, it can streamline operations and maintenance of the building in the post-occupancy phase and provide lower utility and maintenance costs (Choi, 2009). However, it would be incompetent to judge a green project's success only according to the criteria of cost, time, quality and stakeholders' satisfaction. Besides those four criteria for successful project performance, the green building project should also accomplish the criteria of meeting the sustainable project goal and objectives (Isa, 2015; Isa et al, 2014a).

Sustainable Goals and Project Priorities

Green building is a holistic project. It has a responsibility towards delivering sustainable development goals (Yudelson, 2009). The project is planned with the sustainability orientation approach by considering **s**ustainability goals and project priorities seriously from the early stage of the project development [Yudelson, 2009; Robichaud & Anantatmula, 2011]. It is essential to integrate sustainability concerns during the establishment of the project scope, the project charter, the drawing, the contract and the rest of the project documents. Using this approach to select the best option among alternatives from the early stage of development is vital in achieving the sustainability goals of a green building project.

Research Methodology

This study is quantitative and qualitative in nature. In the quantitative study, a set of questionnaires was constructed based on the 5-point Likert scale questionnaire (1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree). The judgment sampling was chosen for this study to obtain desire information from the project stakeholders who have the experience of involving in at least a green building project and/or knowledgeable on the project. Sekaran and Bougie (2009:277)

highlighted that 'judgment sampling involves the choice of subjects who are most advantageously placed or in the best position to provide the information required'. Green building project is still infancy in Malaysia and there are still limited stakeholders who are familiar with the project. Thus, judgment sampling was useful to select the respondents who can reasonably be expected to have expert knowledge by virtue of having gone through the experiences and processes themselves and might perhaps be able to provide good data and information to the researcher. Sekaran and Bougie (2009:277) recommended that 'judgment sampling design is used when limited number or category of people have the information that is sought'. In this case, any type of probability sampling a cross section of entire population is not useful. The sampling design may limit the generalizability of the findings, however, it is the only practical sampling method to obtain the information required from the specific persons that can give the information required (Sekaran and Bougie, 2009).

The respondents were the Malaysian building project stakeholders who have been directly involved in green building projects and/or the stakeholders who were judged as knowledgeable on the project. Respondents were divided into seven major groups of stakeholders, namely developers, architects, engineers, planners, contractors, public universities and local authorities. A total of 188 samples were successfully obtained. The respondents were 71 contractors, 48 architects, 9 engineers, 10 urban planners, 37 developers, 2 green development experts from local universities and 11 local authority officers in Malaysia. The quantitative study explores the perspectives of the building project stakeholders on the advantages of sustainability principles considerations on the achievement of green building project success in terms of cost reduction, schedule effectiveness, quality achievement and stakeholders' satisfaction. The quantitative data was analysed using descriptive statistic analysis including frequency, descriptive analysis and cross tabulation.

The second field of the study was a series of interviews conducted with 15 well-established respondents who have been directly involved with the three award-winning green building projects in Malaysia. The respondents are the owners (O1,O2,O3), the energy consultants (E1,E2,E3), the local authority officers (L1,L2,L3), the contractors (C1,C2,C3) and the energy managers (M1,M2,M3) of the three Malaysian green building projects, in which serve as the case studies for this research. Inputs from them are useful to identify the sustainability goals that have been established in the projects and practiced throughout the process. The green building projects were chosen as the case studies based on its current achievement relating to sustainability aspects. Each case were carefully selected so that it either (a) predicts similar results (a literal replication) or (b) produces contrasting results but for predictable reasons (a theoretical replication). However, the choice of case studies for this research was specified as one that fits all of four (4) criteria: i) the winner of ASEAN Energy Award; ii) a building with a full GBI Malaysia certificate; iii) the awards were received before 1st October 2012; and iv) the buildings are completed and fully occupied. The projects were predicted to have a literal replication. Cross case analysis and literal replication logic were utilized for the multiple case study and qualitative analysis.

Results and Discussion

This study provides invaluable insights into the sustainability practices of green building projects in Malaysia. The discussion is made from two aspects:

a) The perspective of Malaysian building project stakeholders concerning the advantages of sustainability adaptation in a building project towards achieving project success, and
b) Establishment of sustainability goals in the green building projects in Malaysia.

The Advantages of Sustainability Adaptation in a Building Project towards Achieving Project Success

The first section of the study is involved with the questionnaire survey and quantitative method. The findings revealed that the respondents have a positive perspective towards sustainability practices in buildings. Majority of them agreed (62.2%) or strongly agreed (28.6%) that sustainability principles should be integrated into the whole life of buildings from the early planning stage of the project. They knew very well that early consideration of sustainability is critical to realizing the goal of

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sustainability for a green building project and the decisions made at the first phase of building planning and design can significantly affect the cost and efficiencies of the later phase. Meanwhile, the rest of the respondents (9.2%) neither agree nor disagree that sustainability practices are having some extent of advantages for a building project.

The respondents were then asked for a response on sustainability integration into the green building project and whether it is beneficial for the project success or otherwise. Respondents were allowed to choose more than one answer for this question. Four choices of successful project performance measures were given: cost, time, quality and stakeholders' satisfaction. The findings are indicated in Figure 2. Only 14.5% of the respondents perceived that sustainability integration into the project planning process benefits all those four given successful project performance measures at once. 'Quality performance' was the highest choice of benefit by the majority of the respondents, returning the Total Influencing Percentage (TIP) of more than half of them, which is 55.1%. Meanwhile, the rest of the three measures – cost, time and stakeholders' satisfaction – were considered as secondary benefits of the application of sustainability into the project. The finding reflects the positive perception of the respondents towards appreciating sustainability concerns to achieve quality performance of a building project.

Figure 2: Respondents' feedback on the advantages of sustainability practices in building project.

Regrettably, majority of the respondents were less aware that sustainability practices in building project can significantly affect cost reduction, schedule effectiveness and stakeholders' satisfaction at the same level as the quality aspect. Even though a green building requires 20–50% more time to planning and designing due to the need for sustainability principles integration into the project (Kats et al, 2003), however, there is an improved probability that the number of change orders on the project is less than a conventional project due to detailed and careful planning process (Doyle et al, 2009). Ultimately, it does not only save time but also saves the changes in the project cost.

Establishment of Sustainability Goals in the Green Building Projects

The second section of the study queried into the respondents' practices in establishing sustainability goals in the Malaysian green building projects by the means of interviews (see Table 1). From the interviews, it was found that all interviewees identified that the case study projects were working towards achieving the environmental sustainability goals. It was likely that this reflected the sustainability appraisal and integration in every stage of the projects.

Table 1: Stakeholders' responses on the sustainability goals of the green building projects.

Sustainability Goals Considerations	**PROJECT A**	**PROJECT B**	**PROJECT C**	**Positive Answers**
Environmental Aspect	Yes: O1, E1, C1, M1, L1 **Overall: Yes (all 5)**	Yes: O2, E2, C2, M2, L2 **Overall: Yes (all 5)**	Yes: O3, E3, C3, M3, L3 **Overall: Yes (all 5)**	**All 15**
Economic Aspect	Yes: O1, E1, C1, M1 No: L1 **Overall: Yes (4 out of 5)**	Yes: O2, E2, M2 No: C2, L2 **Overall: Yes (3 out of 5)**	Yes: O3, E3, C3, M3 No: L3 **Overall: Yes (4 out of 5)**	**11 out of 15**
Social Aspect	Yes: O1, E1, C1, M1 No: L1 **Overall: Yes (4 out of 5)**	Yes: O2, E2, M2 No: C2, L2 **Overall: Yes (3 out of 5)**	Yes: O3, E3, C3, M3 No: L3 **Overall: Yes (4 out of 5)**	**11 out of 15**
Design and Innovation Aspect	Yes: O1, E1, C1, M1, L1 **Overall: Yes (all 5)**	Yes: O2, E2, M2, C2 No: L2 **Overall: Yes (4 out of 5)**	Yes: O3, E3, C3, M3, L3 **Overall: Yes (all 5)**	**14 out of 15**
Positive Answers	**18**	**15**	**18**	**51**
Total Answers	**20**	**20**	**20**	**60**

Note: O1,O2,O3 (owner of project A, B & C); E1,E2,E3 (energy consultant of project A, B & C); L1,L2,L3 (local authority of project A, B & C); C1,C2,C3 (contractor of project A, B & C)

There were varied and diverse perceptions of the goals of economic, social, design and innovation aspects of the projects among the interviewees. Four out of five stakeholders of Project A and Project C agreed that the projects have been delivered with the aim of achieving economic and social sustainability goals, while only three out of four stakeholders of Project B linked it to the goals of economic and social sustainability. The local authorities of Project A and Project C were not aware that besides the environmental and sustainable design and innovation aspects, the projects were also intended to achieve the economic and social sustainability goals. One reason is that the local authorities had only been involved at the approval stage of the projects. The project documents submitted to the local authorities had not clearly mentioned the economic and social goals of the projects.

Of the five (5) Project B's stakeholders, the local authority and the main contractor for this project were not aware that the Project B had also been delivered with the aim of accomplishing the economic and social sustainability goals besides the environmental and sustainable design and innovation aspects. As with the Project A and Project C, the local authorities had only been involved in the approval process of the projects. In the meantime, the main contractor had not been involved during the planning process and was not aware of the economic and social sustainability aspects of the project. Accordingly, it has reflected on the performance of Project B during the construction stage, as the main contractor perceived that the project was delivered at a poor level of cost efficiency during this stage. The finding shows that when teams are not fully engaged in a project, they are more likely not to facilitate proactive comprehensive planning and will not maintain their sustainability efforts. All stakeholders of the Project A and Project C agreed that the projects were working towards the sustainable design and innovation goals, while only four out of five of Project B's project stakeholders considered that the project had the same sustainability goals. Of the five Project B's stakeholders, the local authority for the project was not exposed to the project's sustainable design

and innovation goals. It was clearly shown that the goals of sustainability have been well promoted and have reached the project stakeholders of Project A and Project C, with the exception of the local authorities, whereas the sustainability goals of Project B had not reached the local authority or the main contractor of the project. This situation should be avoided to prevent errors in the development of the green building project.

To sum up, of the four sustainability goals, environmental sustainability was given most priority, followed by the sustainable design and innovation principles, as compared to the economic and social sustainability goals. One of the reasons is that the main concentration of the projects was towards realizing the green and energy efficient target of buildings. Three groups of stakeholders (owners, energy consultants and energy managers) have awareness of all of the sustainability goals of the three projects. There was varied and diverse awareness of the sustainability goals of the local authorities and the main contractor groups. All three (3) local authorities had awareness of the environmental aspect but had no awareness of the economic and social aspects. Two out of three local authorities (Project A and Project C) had awareness of the design and innovation sustainability goals. Meanwhile, all three main contractors interviewed had awareness of the environmental, design and innovation sustainability goals. Two (2) of the main contractors (Project A and Project C) had also aware of the economic and social aspects, but one of them (Project B) had no awareness of either of those sustainability goals.

Conclusion

In Malaysia, the green building projects are still at the pioneer stage and more efforts are needed to realize the sustainability agenda of the industry. It was revealed that there is imbalanced consideration on sustainability dimensions in the current sustainable building project in the country which heavy emphasis was put on the environmental aspect and the final product (the building) through sustainable design and innovation. Economic and social sustainability aspects of the building have been determined as separated entities by most of them. Aligned with the perception, sustainable building project were considered to contribute more towards delivering high quality of green product compared to the rest of benefits in successful project performance measure such as cost reduction, on time project delivery and achieving stakeholders' satisfaction.

Quality can emerge from people different attitudes and beliefs which evolve over the development of a project. The questionnaire surveys indicated that majority of the respondents associated sustainability approach with the quality performance of a project. The rest of the project success criteria were rarely linked to the green building project development. In extension, the interview discussions indicated that all respondents associated environmental aspect with the green building projects. Sustainable design and innovation were also regularly linked to the projects. Green building was perceived by the stakeholders as increasing the quality of the project and at the same time adding the burden of added costs. Therefore, a change of mindset is possible through examples of successful green building projects which can add value to the development of those buildings.

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References

Aliagha, G. U., Hashim, M., Sanni, A. O., & Ali, K. N. (2013). Review of Green Building demand factor for Malaysia. *Journal of Energy Technologies and Policy*, 3(11), 471-478.

APEC. (2012). APEC Energy Overview 2012. Retrieved 12th September, 2017, from http://publications.apec.org/publication-detail.php?pub_id=1432

APEC. (2013). APEC Energy Demand and Supply Outlook. 5th edns. Retrieved 12th November, 2017, from publications.apec.org/file-download.php?filename=2013_ewg...1

Association for Project Management (2012). *APM Body of Knowledge: Sixth edn*. Buckinghamshire: Association for Project Management.

Boyden, S. (2004). *The Biology of Civilisation: Understanding Human Culture as a Focus in Nature*. Sidney, New South Wales: University of New South Wales Press.

CBRE. (2009). Who Pays for Green? The Economics of Sustainable Buildings. EMEA Research. CB Richard Ellis.

CBRE. (2010). CB Richard Ellis Malaysia Special Report. *Going Green Malaysia*: CB Richard Ellis

Choi, C. (2009). Removing Market Barriers to Green Development: Principles and Action Projects to Promote Widespread Adoption of Green Development Practices. *JOSRE, 1*(1), 107-138.

CIDB. (2007). Construction Industry Master Plan Malaysia 2006-2015, Malaysia: CIDB.

Doyle, J. T., Brown, R. B., De Leon, D. P., & Ludwig, L. (2009). Building Green-Potential Impacts to the Project Schedule. *International Transactions*, PS.08.01-PS.08.11.

Edward, B. (1998). *Green Buildings Pay*. Oxford: Alden Press.

Government of Malaysia. (2015). *Eleventh Malaysia Plan*. Kuala Lumpur: Percetakan Nasional Berhad.

Grevelman, L., & Kluiwstra, M. (2010). Sustainability in Project Management: A Case Study on Enexis. *PM World Today, 12*(7).

Greenbuildingideas (2011). Differences between green and sustainable. Retrieved 15th December, 2017, from http://greenbuildingideas.info/difference-between-green-and-sustainable/, 2

GSB. (2013). What is the Green Building Index? Retrieved 9th December, 2017, from http://www.greenbuildingindex.org/index.html

Hamid, A. Z., Zain, M. Z. M., Hung, F. C., Noor, M. S. M., Roslan, A. F., Kilau, N. M., & Ali, M. C. (2014). Towards a National Green Building Rating System for Malaysia. *Malaysian Construction Reserach Journal, 14*(1), 1-16.

IPCC (2003) *Good practice guidance for land use, land-se change and forestry.* Inter-governmental Panel on Climate Change National Greenhouse Gas Inventories Program

Isa, N.K.M., Alias, A., & Samad, Z.A. (2014a). Towards Developing a Sustainability Integration Framework for Building Project. *Journal of Building Performance*, 5(1), 22-33.

Isa, N.K.M, Samad, Z.A and Alias, A. (2014b). A Review on Sustainability Principles of Building: Formulation of a Theoretical Framework. *Journal of Surveying, Construction and Property, 5(1).*

Isa, N. K. M. (2015). A Framework for Integrating Sustainability into the Project Planning Process for Buildings: The Case of Malaysia. PhD, Faculty of Built Environment, University of Malaya.

Isa, N.K.M., Samad, Z. A., Alias, A., Yunos, M.Y.M., & Ibrahim, M.H. (2015). Integrated Design Approach: A Mode towards Sustainability in Building Project. *Advances in Environmental Biology,* 9(4), 70-72.

Isa, N.K.M., Alias, A., Samad, Z.A. (2017). *Sustainable Building through the Project Planning Project The Case of Malaysia*. Malaysia: University Malaya Press.

John, A.S. (1992). The *sourcebook for sustainable design: A guide to environmentally responsible building materials and processes.* Boston: Architects for Social Responsibility.

Kats, G., Alevantis, L., Berman, A., Mills, E., & Perlman, J. (October 2003.). The Cost and Financial Benefits of Green Building: A Report to California's Sustainable Building Task Force. Retrieved 1st December 2017 from http://www.usgbc.org/Docs/News/News477.pdf

keTTHA. (2011). *Low Carbon Cities Framework and Assessment System*. Putrajaya: KeTTHA.

Larsen, G. L. (2009). An inquiry into the theoretical basis of sustainability, Ten Propositions. In J. Dillard, V. Dujon & M. C. King (Eds.), *Understanding the Social Dimension of Sustainability*. New York: Routledge.

Lutzkendorf, T., & Lorenz, D. (2006). Using and Integrated Performance Approach in Building Assessment Tools. *Building Research and Information, 34*(4), 334-356.

Magis, K., & Shinn, C. (2009). Emergent Principles of Social Sustainability. In J. Dillard, V. Dujon & M. C. King (Eds.), *Understanding the Social Dimension of Sustainability*. New York: Routledge.

PMI. (2008). *A Guide to the Project Management Body of Knowledge (PMBOK)* (Fourth ed.). United States: Project Management Institute Inc.

Pons, O., & Aguado, A. (2012). Integrated value model for sustainable assessment applied to technologies used to build schools in Catalonia, Spain. *Building and Environment* (53), 59-58.

Reyes, J. P., San-Jose, J. T., Cuadrado, J., & Sancibrian, R. (2014). Health and safety criteria for determining the sustainable value of construction projects *Safety Science, 62*, 221-232.

Robichaud, L. B., & Anantatmula, V. S. (2011). Greening Project Management Practices for Sustainable Construction. *Journal of Management in Engineering, 27*(1), 48-57.

Sayce, S., Walker, A., & McIntosh, A. (2004). *Building Sustainability in the Balance: Promoting Stakeholder Dialogue*. London: Estate Gazette.

McKenzie, S. (2004). Social Sustainability: Towards some Definitions. *Working Paper Series no.27* Retrieved 1st October, 2016, from http://www.unisa.edu.au/hawkeinstitute/documents/wp27.pdf

UNEP (2009). Buildings and Climate Change: Summary for Decision Makers, UNEP. Retrieved 1st December, 2017, from http://www.unep.org/sbci/pdfs/SBCI-BCCSummary.pdf

USGBC. (2003). Building Momentum: National trends and Prospects for High-performance Green Buildings: A Report Prepared for the U.S Senate Committee on Environment and Public Works. Retrieved 1st December, 2017, from http://www.usgbc.org/Docs/Resources/043003_hpgb_whitepaper.pdf

USGBC. (2006). Project Profile: Fossil Ridge High School. Fort Collins, Colorado. USGBC 2006 Case Studies. Retrieved 1st December 2017 from http://www.usgbc.org/DisplayPage.aspx?CMSPageID=75&

Rees, W.E. (1989). *Planning for sustainable development: A Resource Book*. B.C, Canada.: UBC Centre for Human Settlements.

Sekaran, U., & Bougie, R. (2009). *Research methods for bussiness: a skill building approach* (5th ed.). United Kingdom: John Wiley and Sons Ltd.

World Bank. (1992). *World Development Report 1992: Development and The Environment*. Washington, D.C: The World Bank.

Yudelson, J. (2009). *Green Building through Integrated Design*. United States: Mc Graw Hill Companies.