Investigating the awareness and application of sustainable construction concept by Malaysian developers

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A B S T R A C T

In Malaysia, the issues of environmental dissatisfaction with construction projects have regularly appeared in newspaper headlines. The government has urged the professional bodies and developers to take proactive actions to promote the sustainability concept within their domain and be responsive to the need for better environmental and social protection. Given rising concerns over the deterioration in the environment, developers should get their acts together and revisit the development approaches they have been so used to. The pace of actions towards sustainable application depends on the awareness, knowledge as well as an understanding of the consequences of individual actions. Two field studies, surveys and interviews, have been conducted to investigate the level of awareness, knowledge and implementation of sustainable practices based on the perceptions of the project developers in Malaysia. Presently, only large developers are beginning to take heed towards sustainable implementation in their projects. Due to limited understanding and the concern about cost, many developers are still reluctant and uncertain concerning pursuit of sustainability in their projects. To improve the momentum of sustainable practice in the industry, actions should be directed towards improving this knowledge at all levels of developers.

Introduction

Malaysia plans to reach the status of a developed country in the year 2020 and the construction industry is seen as a major catalyst to achieve this vision. However, this industry has a dark side. It also contributes to negative impacts upon the environment such as soil erosion and sedimentation, flash floods, destruction of vegetation and dust pollution, depletion of natural resources and the use of building materials harmful to human health (Construction Industry Development Board (CIDB) Malaysia, 2007a). Du Plessis (2007) stated that the challenge for the construction sector is not just to respond to the need for adequate housing and rapid urbanisation, but to do it in a way that is socially and ecologically responsible. As urged by the 5th Prime Minister of Malaysia, “Malaysian should not forget the importance of managing and utilising its natural resources in a sustainable manner and developers are warned to ensure that environment must not be sacrificed in favour of economic development” (Chin, 2005). Apart from the local call for improvement in the industry, construction players must also abide by the new interest in the global market to have a better chance of sailing through the adverse market conditions (Zainul Abidin, 2007a).

In Malaysia, the green movement is still at its infancy. Sustainable projects are mostly at the pioneer stage (Zainul Abidin, 2008). Among the examples of sustainable projects in Malaysia are the Tanarimba sustainable housing projects which focused on ecological balance, the Demonstration and Documentation Centre for Sustainable Urban Household Energy Usage (DDC) project by Centre for Environment, Technology and Development (CETDEM) which aims at building an urban energy saving house (CETDEM, 2006) and several energy-efficient office buildings initiated by Malaysia Energy Centre (MEC, 2006) and private developers (Shafti, Ali, & Othaman, 2006). To move towards sustainable construction, more efforts are needed and should be directed towards realising the green agenda of the industry. Du Plessis (2007) stated that embarking on the path of sustainable construction requires a 2-pronged approach: (1) to create a capable and viable local construction sector and (2) for the sector to respond to the demands of sustainable construction in its activities. This can only be possible if all stakeholders cooperate in its implementation and be supportive to changes.

The factors that will jumpstart sustainable movement are awareness and knowledge. With that, comes interest and demand, and follows with implementation. Du Plessis (2007) stated that behaviour changes will only come about through personal commitment to it. To encourage a person or organisation to commit to something, their personal values must be satisfied. For developers, their main personal value is that their projects must be commercially...
viable (Aye, Bamford, Charters, & Robinson, 2000). Through studies conducted, the sustainable concept can be economically viable (Hydes & Creech, 2000; Pettifer, 2004; Yates, 2001). This knowledge needs to be imparted to encourage acceptance for this new concept. Through implementation, they will learn from experience and start making improvement. This path towards building sustainable industry is illustrated in Fig. 1. Fig. 1 identified all general stakeholders in the construction industry which include the government, developers, clients, buyers/end users, contractors, consultants (architects, other designers, engineers, quantity surveyors) and manufacturers/suppliers. It is important for construction practitioners to understand sustainable construction sufficiently to be able to ensure that their individual actions, and the decisions they make that influence the actions of others, add as little as possible to the total burden on the environment (Parkin, 2000).

This paper focuses on examining the level of knowledge of sustainable practices among project developers in Malaysia. Developers are selected because they are the ones initiating the project and have prevailing influence over the overall project direction. Although the actions to raise awareness on sustainable practices have been initiated by the Malaysian government and non-governmental organisations, how many organisations have incorporated them into their projects? As stated by Ashley et al. (2003), a widespread agreement on sustainable construction does not mean a widespread implementation. It was argued that although many construction practitioners agreed with sustainability principles, many have still not grasped their meaning and even fewer have translated sustainability into action.

The concept of sustainable construction

Since the introduction of the philosophy of sustainable development by Bruntland in 1987, many progressive world events had taken place to increase the awareness on environment and sustainability agendas (Zainul Abidin, 2008). The need for greater environmental consideration in the context of sustainable development has been accepted by many governments, businesses, organisations and individuals (Ofori, Briffett, Gang, & Ranasinghe, 2000). The direction of the industry is now shifting from developing with environmental concern as a small part of the process into having the development process being integrated within the wider context of environmental agenda (Das Gandhi, Selladurai, & Santhi, 2006).

Sustainable construction is seen as a way for the construction industry to contribute to the effort to achieve sustainable development. Zainul Abidin and Pasquire (2005) have interpreted the principles of sustainability within construction industry as including:

- Showing concern for people by ensuring they live in a healthy, safe and productive built environment and in harmony with nature.
- Safeguarding the interests of future generations while at the same time, meeting today’s needs.
- Evaluating the benefits and costs of the project to society and environment.
- Minimising damage to the environmental and its resources.
- Improving the quality of buildings and services and promote social cohesiveness.
- Using technology and expert knowledge to seek information and in improving project efficiency and effectiveness.
- Legislatively compliance and responsibility.

The concept of sustainable construction governs three main pillars: environmental protection, social well-being and economic prosperity (Addis & Talbot, 2001; Brownhill & Rao, 2002). Environment protection concerns the built environment and the natural environment. The built environment refers to the activities within the construction project itself, which may, if not handled effectively, have a serious adverse impact on the environment. Environmental sustainability is concerned with the extraction of natural resources security, satisfaction and comfort (Lombardi, 2001) and human contributions: health, knowledge and motivation (Parkin, 2000). Finally, economic sustainability is concerned with the monetary gains from the project for the benefits of the clients, construction players, public and the government (Zainul Abidin, 2007b).

Construction practitioners worldwide are beginning to appreciate sustainability and acknowledge the advantages of sustainable building. As global interest on sustainability has steadily bloomed, Malaysia should demonstrate that it can abide by this new interest and can compete in the global market.

Developments in Malaysia

The CIDB Malaysia, which is a corporation established with the main function of developing, improving and expanding the Malaysian construction industry, has identified environment and other sustainability-related issues as one of the top issues of the construction industry (CIDB Malaysia, 2000). The CIDB Malaysia has organised several workshops, dialogues and discussions to systematically address and prioritise environmental needs in the construction sector (CIDB Malaysia, 2007b). Other institutions in Malaysia such as National Institution of Valuation, Malaysia (INSIPEN), Malaysian Science and Technology Information Centre (MASTIC) and local universities are among the leading institutions that have spearheading research in this area (Zainul Abidin, 2008).

The above efforts instigate interest among private construction companies and professional bodies to lead by example on sustainable projects. Projects such as low-energy and zero-energy office and DDC projects were initiated as pioneer projects. Developers have been highlighted as one of the key players in realising the vision of sustainable construction (Chin, 2005). Several programmes have been initiated by the government, professional bodies and private organisation to raise the awareness and to promote sustainable application among project developers. For example, a renewable energy programme called "SURIA 1000 for Developer" has been introduced to the Malaysian property developers to be involved in total sustainable housing development via the use of Building Integrated Photovoltaic (BIPV) to generate clean electricity from solar energy (Suria 1000, 2007). The Board of Architects Malaysia or Persatuan Arkitek Malaysia (PAM), in collaboration with the Association of Consulting Engineers Malaysia (ACEM), has launched a rating system known as Green Building Index (GBI) Malaysia in 2009 to lead the Malaysian property industry towards becoming more environment-friendly. This rating

![Fig. 1. The path for achieving sustainable construction.](image)
system provides opportunities for developers to design and construct green, sustainable buildings that can provide energy and water savings, a healthier indoor environment, better connectivity to public transport and adoption of recycling and greenery for their projects. Several seminars, professional talks and conferences have been held under the theme of sustainable construction to raise developers’ awareness about the importance of sustainable practices.

The concept of “green homes”, a relatively new home living concept to the local Malaysians, is beginning to make its way into the local housing scene (Jamaldin, 2008). Developers have also taken initiatives to improve sustainable technology of building as by introducing a concept of “Smart and Cool Homes” (2007) in housing projects. The concept of passive-design has also been incorporated in many buildings (Shafii et al., 2006).

More developers are joining the green brigade as they believe it can attract demand from the growing eco-conscious population and by earning premiums from their efforts. However, for the industry to shift from conventional way of construction onto the sustainable route requires a consolidation of effort from many, if not all, developers. Actions by a few developers would not give strong impact to the industry. However, with more developers joining hands in this quest, the industry will eventually be walking the path of sustainable construction.

Research methodology

Awareness and knowledge are the first stumbling blocks that must be conquered in creating a capable and viable local construction sector. As there have been considerable efforts by the government and professional bodies to increase the awareness and knowledge on sustainable construction concept among construction developers, it is expected that the developers would have been aware about this concept and begun incorporating it in their projects. The field studies were undertaken to investigate the present knowledge and understanding of the Malaysian developers regarding the concept of sustainable construction and their attitude towards it. The respondents were categorized as small (employment of less than 20 people), medium (21–50 people) and large (more than 50 people).

This research is qualitative in nature, which is used optimally for situations which will increase understanding, expand knowledge and explore a phenomenon that has little research done on it (Creswell, 2003). The first field study was a survey focused on developers of building construction, such as property and commercial buildings, located in the area of Kuala Lumpur (capital city of Malaysia) and Selangor. These two areas were selected because many construction developers, which have projects throughout Malaysia, have their main offices located there. The list of the construction developers was obtained from the Real Estate and Housing Developers’ Association (REHDA). A total of 271 respondents were approached and 35 questionnaires were returned for analysis. A sample size of 20–30 is deemed adequate to enable internal generalization in a qualitative study (Creswell, 2002; Gay, 1996; Leech, 2005). The second field study was a series of interviews conducted with 12 well-established developers who have been in the industry for more than 15 years and are currently responsible for projects of enormous value. A number between 6 and 12 participants is acceptable in this study as recommended by Johnson and Christensen (2004). This interview is a continuation from the survey where a few questions were linked back to the survey findings for deeper understanding of the perceived situation. Data gathered from the survey and interviews were analysed quantitatively as the information was in the form of opinions, comments and statements with exceptions on a few closed-type questions in the survey which were analysed quantitatively using averaging statistical analysis.

Results and discussion

These field studies produced invaluable insights into the progress of sustainable construction in Malaysia. The discussion will be made from 3 perspectives:

a) the level of knowledge and understanding of construction developers concerning the concept of sustainability and sustainable construction;

b) the implementation of sustainability concepts in past and current projects; and

c) the future outlook of this application in the construction industry.

Knowledge and understanding about sustainable construction

From the survey, a total of 94% of respondents considered themselves to have moderate to good knowledge of sustainable concepts. The mean level is 3.43 (moderate) out of 5-point rating system. The respondents (80%) also perceived that overall developers’ knowledge on sustainable concepts was low to moderate levels (mean of 2.80) as shown in Fig. 2. Although they believe their knowledge is above ‘moderate’, they seemed to think that overall, the knowledge was still below average.

From the interviews, a total of 83% respondents agreed with the findings of the survey (the level of knowledge of project developers is at ‘low-moderate’). This is because the developers are profit driven. The focus on sustainability (more than the minimum requirement set by the local authority) is possible when the clients demand it. For residential projects, the developers will follow market demands. In some cases, the developers will include a condition in the agreement for the project to achieve certain levels of environmental satisfaction. Developers ranged from big and well-established companies to new and small companies. The big companies of professional developers were aware of sustainability and actions were being undertaken to move to incorporate these needs through proper planning, design and with allocation of budget. These companies have taken initiatives to produce better buildings by performing well above the required standard, searching for green ways to development (such as selection of materials, energy-efficient design and meeting the needs of the disabled), aiming for green certification and others. Although medium and small-sized developers might be aware of sustainability, due to constraints such as cost, they preferred to produce a building which satisfied criteria set by the regulations. They mostly dealt with local buyers who were still not aware of sustainability and wanted cheap and affordable houses. For many developers, environmental and social aspects are not a priority. The priority is survival in the
industry by ensuring that each unit constructed is sellable. Because of this gap between the big and small developers, the level of knowledge will be moderate.

Overall, the respondents agreed that many developers are aware of sustainable construction, but implementation is a different matter. Many developers are not willing to push the boundary especially when it means they have to shift the conventional way of construction and venture into a new realm of technology which may incur more upfront costs. Many developers are satisfied with fulfilling the minimum requirements and law while some developers, who are more driven to compete, will take initiatives to be better and follow the market trends. Developers who have strong capital, good reputation, wide-range experience and expertise and whose targeting high income earners and foreign investors as potential buyers are interested in green concepts as it is seen as better quality in design. One developer stated that only 10% of developers are really interested in environmental-friendly projects. It will take some time before it will become a nationwide interest.

Sustainable construction consists of three pillars: environment, social and economic aspects. In the survey, the respondents were required to select statements that best describe their understanding about the concepts of sustainable construction. Issues that are related to environmental aspects of sustainability received the highest percentage: effective protection of the environment (89%), effective environmental planning, management and control (80%) and prudent use of natural resources (69%). Issues that related to social aspects of sustainability received moderate percentages: enhanced quality of life and customers' satisfaction (71%) and social progress which recognize the need of everyone (43%). Lastly, the issues the related to economic aspects of sustainability received lowest percentages: generating profit without compromising future needs (43%) and maintenance of high and stable levels of economic growth (49%). This is illustrated in Fig. 3. It is deduced that the majority of the respondents understand that sustainability is about protecting the environment but many are still unaware that sustainability is also about balancing social and economic aspects of construction. This finding is not surprising as the efforts by the government and professional bodies as explained before are mostly focused on raising environmental awareness. In the interviews, the respondents were asked to describe their understanding about sustainable construction. All respondents associated sustainable construction with how the environment is protected from the activities that has or will take place due to the development projects. Overall, the aspects that have been highlighted by the respondents are conserving the natural elements such as trees and waterways, creating more green areas by improving landscapes, selecting green materials that are biodegradable and non-toxic for the projects, minimising energy use or going for renewable energy sources, controlling the pollution that result from the project activities and improving land protection during clearing activity to reduce problems such as landslides, deforestation and soil erosion. Two of the respondents discussed environment aspects with social factors. They stated that the decision to be environmentally-friendly will have a positive impact on society. For example, more green open spaces will encourage congregation among the neighbours, proper land clearing will not only avoid soil erosion, it can also protect the people and structures from the danger of landslides, etc. One respondent linked the environment with economic aspects stating that with proper planning, environmental-friendly projects would be marketable and profitable. Another four respondents have briefly related sustainability with environmental protection, social improvement and economic benefits. They stated that balancing these three pillars is important to ensure that everyone can enjoy the benefit of being sustainable. For example, with a good green design and orientation, a project can maximise the natural lighting, wind and vegetation for natural cooling and landscaping. Design can also improve accessibility for the people and creating open spaces for people to enjoy. Both will add value to project and attracts buyers, thus ensuring income for the developers. From the interview discussions, it was indicated that all respondents associated environmental aspects with sustainable construction. Social well-being is rated second and followed by economic benefit.

Implementation of sustainability concepts in construction projects

Although many developers were aware and have a certain knowledge of sustainable construction, implementation is a different...
matter. Majority respondents believed that the level of implementation of sustainable practices is either low or at a moderate level. The lack of enforcement and monitoring of law and legislation is identified as one of the reasons for the current level of poor implementation. Thus, the government is singled out as the key party that can redress this situation through stronger enforcement of legislation, devising new policies, or giving incentives to developers who want to pursue sustainability in their projects. However, the burden does not rest on the government alone. Other players such as developers, contractors, consultants, suppliers and even buyers have an influence over the application of sustainability concepts. However, in Malaysia, many players are still ignorant about the importance of sustainability practices. The respondents stated that they do not feel the urgency to adapt to this practice. As in the case of developers, their interest on this matter will improve when there is a demand for it. Presently, this issue is not on their priority list as it lacks publicity and the interest of the potential buyers.

A decade ago, environmental issues were not pertinent and were not given a priority in education. The respondents stated that developers are still trying to balance the three pillars within their means. It is hard to break from their norm in practice. The younger generation, however, have been exposed to sustainable construction in their higher education studies but, due to their lack of experience in the real world, they have a problem disseminating their theoretical understanding of sustainability knowledge into practice. Another factor that impedes wider implementation of this concept is the financial constraint. A few respondents perceived that this application is not economically viable. Sustainable practice is believed to increase project cost because they need to have higher amounts of capital upfront. Higher cost means higher price. If they pursue sustainability in the projects, they need to know that there is a market for it. However, this perception differs among those who have applied this concept. Respondents from big and well-established developer companies rated their implementation of sustainable practices as high or excellent. They can appreciate the merits of this and will continue pursuing it.

They believed that by responding to the need to protect the environment and addressing social needs, they can generate more profit. It is a good move as it adds value to the project and projects a good image of the developer. The respondents stated that they can focus on sustainable practice because of their strong capital position, wide-range of experience and expertise and because of their market (high income earners and foreigners). To ensure sustainable practices are blended into the project decision making, this requirement will be made explicit as early as possible and become part of the master planning. Having sustainability elements incorporated in the building concept would make it easier to proposed green materials, green design or green system for the projects. The number of small and medium companies is larger than big companies. The ones that are currently interested in sustainable practices are well-established big companies who have large quantities of capital in hand. Small and medium companies are still not ready for this paradigm shift. In the current world economic meltdown, developers are afraid to build expensive buildings due to the risk of producing an unsellable unit. The respondents stated that all players (developers, consultants, contractors, local authorities, manufacturers and purchasers) have a role to play to ensure that the project activities have minimal impacts on the environment. The knowledge of all players must be improved to ensure commitment, implementation and participation in achieving sustainable construction.

On a positive note, another 30% of respondents are seeing the light in this sustainability journey. In their opinion, the global trend is going towards it and eventually, the Malaysian construction players will have to follow. Presently, the application is poor to moderate, but there is a gradual improvement by all parties involved in the industry and their knowledge is improving. The government and local authorities are revising some of their regulations and professional bodies such as CIDB Malaysia have introduced guidelines related to sustainable practices. With the launching of GBI Malaysia, it is expected that more developers will start aiming for this green certification. When developers’ interests improve, the rest of construction players, such as contractors and consultants, will be pulled towards this direction. Manufacturers will also be interested in introducing green products because the market is potentially lucrative. In terms of improving the knowledge of construction players, various construction-related courses offered by local universities and colleges are playing a part by including sustainable aspects as part of their subjects. The media is also participating in improving the public awareness of environmental protection and social participation. The players in construction will improve their ability and know-how about the sustainable construction application from their experience.

Conclusions and recommendations

The initiatives by the government and many others for more sustainable practices are bearing fruit as several large developers are beginning to implement this concept in their construction projects. Nevertheless, the acceptance of the sustainability concept is not industry-wide as many developers, especially small and medium companies, are still reserving themselves. Large companies have the capability (capital, experience and expertise) to apply sustainable principles in their project, while small-medium companies are inclined on fulfilling minimum standard required by the government and to ensure that their project is sellable to various levels of income earners. Implementation is believed to be low because of several factors such as lack of knowledge, poor enforcement of legislation, education vs. experience and passive culture.
a) Small and medium size developers represent a large population of developers in Malaysia. Improving their knowledge and acceptance of sustainable practice would make a huge impact to the practice of sustainable construction at the larger scale. This could be achieved by way of more conferences, training, seminars and workshops, targeting small and medium-sized developers.

b) Studies reveal that the implementation of sustainable concepts is low. Actions must be initiated to enable this concept to be applied efficiently in future construction projects. For example, sustainability issues should be introduced and committed as early as possible in the project process to give maximum impact. Research is recommended to assist developers and consultants in incorporating sustainable issues at the project conceptual stage and planning stage. Guidelines, tools or techniques introduced from such research would be useful to the industry.

c) All players (developers, consultants, contractors, local authorities, manufacturers and purchasers) have a role to play to ensure that the project activities have minimal impacts to the environment. Future research should be focused on each category of construction players to investigate how they can contribute towards sustainable construction.

d) Many developers refer to rules and regulations as guidelines for fulfilling environmental and social needs. To encourage sustainable practices, the government can revise the present standards or introduce proper guidelines for green practices or introduce new regulations. In this way, changes will be made by all developers.

e) Government has a major role to play in encouraging sustainable construction. Their support and incentives will prompt interest among construction players. A study of the weakness of the implementation of present legislation is recommended to alleviate the problem of ‘lack of enforcement’.

f) Developers view sustainable construction as a form of environmental protection and not many relate this concept to social well-being and even less relate this to economic factors. This could be the major problem in pushing this concept and practices among developers as developers are profit driven. To bring this concept to the forefront of the project initiation, sustainable construction must be projected as good business which has many tangible and intangible benefits. Research that highlights the economic benefits arising from being responsible to environment and society would provide evidence to persuade developers to accept this way of construction.

g) Finally, developers’ actions are influenced by the market situation and demand. Raising buyers demand for sustainable houses will push the housing developers to improve the specification of their houses which include certain sustainable elements to attract buyers.

To conclude, more efforts are necessary to enhance the level of environmental awareness and civic consciousness among the people to build sustainably in the future. The effort should be directed to small and medium size developers as many large developers are already onboard with this concept.

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References


