Website: https://ejournal.unisayogya.ac.id/ejournal/index.php/JUARA/index
Vol 2, No 2 (2019): September (Jurnal Arsitektur dan Perencanaan), 138-157

Developer's Perception on the Barriers of Green Rating System Implementation in Malaysia

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Abstract: *This paper aimed to explore the developer's perception on the implementation of Green Rating System in Malaysia. There had been a lot of negativity in the construction industry in Malaysia to achieved sustainable environment. 55 respondents from various developers were analysed to obtain the barriers of Green Rating system implementation varied from social barrier, financial barrier, economic barrier, knowledge barrier, technology barrier and political barrier accordingly. An in depth study on specific Green Rating System of Malaysia is highly suggested in the future.*

Keywords: *Green Building; Green Rating System; Sustainable Barriers.*

Abstrak: Penelitian ini bertujuan untuk mengeksplorasi persepsi pengembang tentang penerapan Sistem Peringkat Hijau di Malaysia. Ada banyak hal negatif dalam industri konstruksi di Malaysia untuk mencapai lingkungan yang berkelanjutan. 55 responden dari berbagai pengembang dianalisis untuk mendapatkan hambatan penerapan sistem Peringkat Hijau yang bervariasi dari hambatan sosial, hambatan keuangan, hambatan ekonomi, hambatan pengetahuan, hambatan teknologi, dan hambatan politik. Studi mendalam tentang Sistem Peringkat Hijau spesifik Malaysia sangat disarankan di masa depan.

Kata Kunci: Bangunan hijau; Sistem Peringkat Hijau; Hambatan Berkelanjutan

Article history:
Received: 2019-08-20
Revised 2019-08-25;
Accepted 2019-09-26;

INTRODUCTION

According to Kuhlman and T. Farrington (2013), stated that Economy, Society and Environment were the three (3) pillars of sustainability. The contribution in term of technical innovation, transferability and architectural quality is at the highest level related to the pillars stated earlier. With the trend of pollution dramatically rising, the experts on sustainability are currently looking for solutions to prevent or slow it down, protect remaining environments and conserve natural resources (Sustainabilitydegrees.com, 2013).

By looking on the construction industry, it is arguably fair to say that the industry can be considered as one of the major player that strongly related to sustainable environment. Sustainable construction defines as to meet daily needs for housing, working environments and infrastructure without jeopardising the needs for the future generations (Lafarge Holcim Foundation, 2017). Due to the realisation of construction industry as one of the major contributor on global environmental impacts brought to the searching of effective solutions and strategies on sustainability and sustainable buildings (Carvalho, Granja & Silva, 2017).

Briefly looking to the scenario in Malaysia's construction industry, this is industry is one of the major contributors and important to the economic growth. The increasing awareness of the need for more sustainable buildings are due to the fact that the negative impacts sustained by the environment because of the industry itself. The awareness had been manifested to the implementation of Malaysia's Green Rating System, commonly known as Green Building Index (GBI). In order to reduce the negative impact to the environment, the industry had been introduced to Green Building as the basis of sustainable construction development.

In order to achieve a sustainably better future, Malaysia had driven the way forward to develop 'green' and sustainable buildings. To date, about 40% of new buildings in Malaysia started to take the initiatives of green building by implementing more zero carbon emission and energy-efficient building design and planning (The SunDaily, 2018). Coined from World Green Building, 2016, a 'green' building is to be said that, in its design, construction or operation would eliminate negative impacts and create positive impacts on the climate and natural environment.

For the past two decades, there had been a positive development on the construction industry when fairly large numbers of developed countries started to construct the outline of a green building rating systems (Shan and Hwang, 2018). This rating systems purposely to act as tool to rate and evaluate the building performance according to the criteria outlined (Gou and Lau, 2014). Shan and Hwang in their paper identified the primary criteria in the evaluation of the rating tools, stated energy, site, indoor environment, land and outdoor environment, water, material and innovation are considerably vital.

As stated earlier, the purpose of study is to determine the perception on the eye of developer on the barriers of implementing green rating system. In order to achieve the objectives of the

research, this paper will identify the barriers of Malaysia green rating system implementation from the developer's perspectives. Since the study of sustainable construction is a vast field of research areas and scopes, this research intently will focus on construction developers in Malaysia. This include infrastructure and real estate developers. Thus, a total up to 1,141 developers ranging from real estate developers listed by Real Estate and Housing Developers' Association were taken into account for the purpose of this study. Due to limitation of time and cost, the target respondent will be from Selangor. This is due to the fact Selangor has the highest number of registered developers by REHDA.

LITERATURE REVIEW

The use of sustainable rating tools and construction in the built environment also presents challenges and obstacles. The literature describes many difficulties and barriers because justifying these difficulties can encourage sustainable activities in the built environment (Ahn *et al.*, 2013).

Due to market insecurity and high risk of investment, according to an analysis of data by Samari et al. (2013) found that builders have no interest in participating in the green market. Several studies approved the statement because of the uncertain potential for investments in Green buildings and because of the danger of production of an unsellable unit (Aliagha et al. 2013, Zainul Abidin Nasirah 2010) developers were afraid to build expensive structures.

Halim (2012) discovered that the primary barrier to green building by the construction industry was discussed in past research in terms of cost-effectiveness. This barrier is concentrated on the green buildings market, which always drives project profitability by players like developers, investors and tenants. Zainul Abidin Nazirah (2010) supported this statement, in which the author analysed developers that profit focuses only on sustainability when the demand came from the client. Green buildings are only constructed, purchased or leased when performance and money value compared to conventional buildings are worthwhile.

The absence of credit resources to cover up front costs is another major barrier of the green rating tool. Aliagha et al. (2013) have identified that the real cost involved is one of the barrier to sustainable development. Other studies in the United States and New Zealand have also been evaluated in terms of the results that the significant barrier of sustainable buildings is greater capital

upfront, in which most reactions agree (Smith, Baird and Nz, 2006; Ahn et al. 2013).

The market demand is restricting the growth of green buildings, according to (Ding et al. 2018). Some authors support the statement where the lack of demand is one of the most common obstacles to sustainable development implementation (Samari et al., 2013; Khalfan et al., 2015). Previous Marjaba and Chidiac (2016) studies have shown that as reported by World Watch Institute, a large proportion of materials that are used for building, 40% of worldwide materials and power are used by structures in sustainable building are used by equipment, 55% for timber supplies. This showed obviously that materials are crucial to the effectiveness of sustainable constructions. However, several research studies investigate the obstacles to implementing the green rating system are sustainable materials and product. This is due to supply limitations, unfamiliarity and high cost of materials and products that are sustainable (Zainul Abidin Nazirah, 2010; Yin, 2012, Ahn et al., 2013; Chian, 2013, Khalfan et al., 2015).

In addition, greater final prices and the demand for a lengthy payback period are also the barriers to sustainable building. The assessment by Khalfan et al. (2015) and Samari et al. (2013) shows that elevated price participation is one of the obstacles to viable building throughout the construction phase. This result has led to investors and developers investing greater upfront costs for sustainable strategies. A series of research have discovered that the most significant barrier is the need for lengthy payback periods from the implementation of sustainable practices (Smith, Baird et Nz, 2006; Ahn et al., 2013).

The certification method at the design level is just the way in which certain developers support building and recognition. However, they focus in the real situation on the costs of operation and adaptation including the maintenance costs of the system, from which developers will no longer be able to assemble the necessities for profits, even if they encourage sustainable development (Ding et al., 2018). This paper also found that the market's failure to safeguard developer's interests is a barrier to implementing the green rating system.

The author notes that one of the obstacles to going green is too much green washing according to Chian (2013). This is because of the latest upward trend in market branding with 'green'. As far as the database is concerned, the lack of information and the database is one of the main obstacles listed, based on a research conducted by Samari et al. (2013). Ding et al. (2018) have

found that one of the strategies that has an important impact on the implementation of green buildings is to train green building practitioners because of a lack of technological knowledge that acts as an impediment to their implementation. These obstacles have also been identified and supported by Aliagha et al. (2013). Several studies have concluded that lack of technical understanding acts as a barrier to green development implementation (Yin, 2012; Ahn et al., 2013).

Data from a number of sources shows that one of the obstacles to the implementation of green rating is the lack of commitment of a company to green development (Samari et al., 2013; Ding et al., 2018). Ding et al. (2018) have identified the lack of a Green Development Strategy, and have suggested it is the responsibility of the government to promote sustainable development technology. The statement was agreed by Aliagha et al. (2013) and they supported that a shortage of workers can also contribute to hinder green development implementation.

Several studies have printed that lack of sizeable measure constraint the sustainable improvement and the developers have the tendency to hold their contemporary practice alternatively than to exchange the norm (Zainul Abidin Nazirah, 2010; Ahn et al., 2013; Aliagha et al., 2013; Ding et al., 2018). Ding et al.(2018) has carried out structured interviews thru the learn about and a huge evaluation has been recognized that the development players do not meet the requirement in order to obtain the inexperienced certification. Furthermore, according to Zainul Abidin Nazirah (2010) demonstrated that the revolution towards a sustainable construction enterprise has diminished due to inter-dependency among development practitioners.

Many studies have shown that failure by the government in that country to encourage and develop green buildings is one of the hurdles of sustainable development (Aliagha et al., 2013; Chian, 2013; Samari et al., 2013; Khalfan et al., 2015). Similar investigations have shown that a shortage of building codes and regulations is one obstacle to sustainable growth (Aliagha et al., 2013; Ding et al., 2018). Similar studying the obstacles to green buildings in Malaysia has shown. Previous studies have shown that there are restrictions of the implementation of the green rating system to lack of coordination and management by departments, strict requirements for green design certification, different evaluation methods and political issues (Smith, Baird and Nz, 2006; Ding et al., 2018).

In addition, several writers have noted that the absence of law enforcement and tracking, as well as bad socio-political administration, will slow down sustainable growth (Zainul Abidin Nazirah, 2010; Chian, 2013). Further, several surveys have shown that the lack of knowledge of professionals and contractors is one of the main obstacles to green ratings (Smith, Baird and Nz, 2006; Ahn et al., 2013; Aliagha et al., 2013; Khalfan et al., 2015; Ding et al., 2018; Elforgani and Rahmat, 2012). Earlier research has shown that the absence of knowledge of green buildings amongst experts and the public has helped to limit viable growth (Smith, Baird and Nz, 2006; Zainul Abidin Nazirah, 2010; Yin, 2012; Aliagha et al., 2013; Samari et al., 2013; Khalfan et al. 2015, Elforgani and Rahmat, 2012). Furthermore, the scientists agreed that the application of the green rating system might turn out to be unsatisfactory to developers (Chian, 2013).

RESEARCH METHOD

According to Osuala, 2001, a study and evaluation of the situation factor is a method for the investigation of alternatives to a issue. In the meantime, a methodology of studies is a systematic general process for solving the research problem, achieving the goals and concluding it. This section generally outlines the way this study is conducted. The primary concept of the research methodology is to detail the information collection method used by the scientist to accomplish the study goals. The main idea of research methodology is designed to detail out the specified data collection process that is used by the researcher in order to achieve the aim and objectives of the research. The research methodology is essential for acquiring suitable main and secondary data and the assessment is based on the information gathered. Finally, on the basis of the results of this study, conclusion and recommendation are produced.

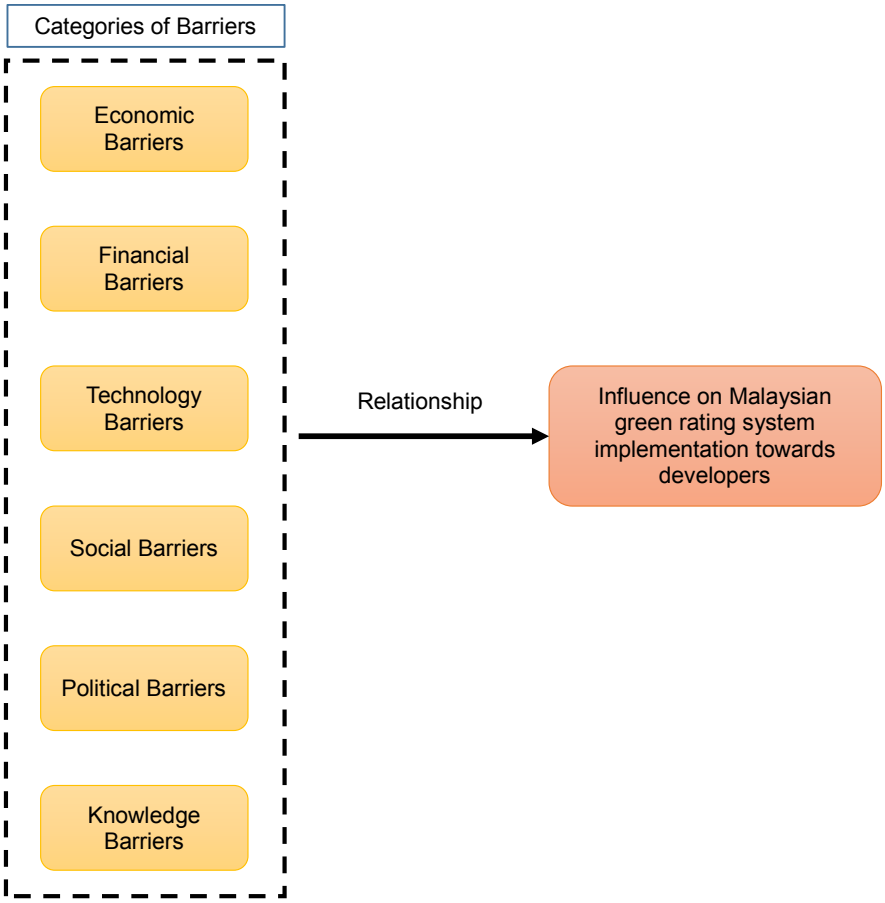

Figure 1. Research framework of relationship between barriers and influence of Malaysian green rating system implementation towards developers

Hypothesis 1: There is a significant relationship between barriers and Malaysian green rating system implementation

H1a: There is a significant relationship between economic barrier and Malaysian green rating system implementation

H1b: There is a significant relationship between financial barrier and Malaysian green rating system implementation

H1c: There is a significant relationship between technology barrier and Malaysian green rating system implementation

H1d: There is a significant relationship between social barrier and Malaysian green rating system implementation

H1e: There is a significant relationship between political barrier and Malaysian green rating system implementation

H1f: There is a significant relationship between knowledge barrier and Malaysian green rating system implementation

In order to carry out this study there are two approaches to information collection involving two categories of primary and secondary data sources. The information generated comes from the target respondents. The primary data are acquired through the latter portion of the questionnaire study. The secondary data of this study are meanwhile acquired in the literary examination and used in the assessment of the findings of this study. The literature review has its origin in the newspapers, books, articles and others, acquired from Science Direct and other electronic sources.

The survey was generally created as a closed question survey. The study includes questionnaires. Four (4) parts of the questionnaires were described below. According to the Association of Real Estate and Housing Developers (REHDA), there are about 270 developers in Selangor. The research scope will be discussed in next section.

Secondary data basically provide secondary sources for data or information gathered. In order to obtain information and understanding about Malaysian green rating schemes, the secondary data is the analysis of appropriate literature. A clear framework is provided for the literature review and it provides predictors for the collection of primary data. Sources are acquired from reading materials such as publications, articles, websites, books, prior theses, reports and conferencing documents. The most frequently reported papers are from the databases of UiTM-subscribed newspapers, namely Science Direct, Scopus, Emerald and many more. These secondary sources are mainly used in Chapter 2, for the preparation of Literature Review.

RESULT AND DISCUSSION

The findings from the study of questionnaires distributed to developers concerning the application of the green rating system in Malaysia are presented in this section. The developers received 155 questionnaires and 55 of them were gathered, indicating a response rate of 36%. SPSS version 23 is used to analyze the collection of 55 information collected from all participants from the questionnaires. The acquired information is specifically evaluated in table form.

Respondents are questioned about their specific background. The results are presented and further discussed. People are questioned about their sex, their organizational category, their work experience and their greatest educational qualifications. The participants are also questioned if they ever participate in the project for a green building.

The summary statistics for the profile of participants are presented in Table 1.1. The gender distribution indicates that the amount of male (50.9%) participants is slightly higher than female (49.1%). The participation of the male and female participants in the questionnaires provides differing views. Further analysis shows that majority of the respondents are working in the middle-level management (67.3%) while other two categories which are top-level management and low-level management have equal number of respondents (9%). Next, most of the respondents are having less than 5 years' working experience (41.8%). However, the frequencies of those interviewed with working experience over 6 to 10 years of age (23.6%) and over 20 years (20.0%) almost reached equilibrium between the population. In principle, most of those surveyed (52.7%) participated in the construction sector in green building projects.

Table 1.1. Distribution of Respondents

Descriptions	Frequencies	Percentage (%)
A. Gender		
Male	28	50.9
Female	27	49.1
B. Job category		
Top-level management	9	16.4
Middle-level management	37	67.3
Low-level management	9	16.4
C. Working experience		
≤ 5years	23	41.8
6-10 years	13	23.6
11-15 years	7	12.7
16-19 Ears	1	1.8
≥ 20 years	11	20.0
D. Highest academic qualification		
Diploma	16	29.1
Bachelor degree	35	63.6
Masters	4	7.3
E. Involved in green building		

Descriptions	Frequencies	Percentage (%)
project		
Yes	29	52.7
No	26	47.3

The obstacles to the application of Malaysian green rating systems are economic barrier, financial barrier, technology barrier, social barrier, political barrier and information barrier for this studies. In the following chapter, we evaluated the mean score and rank for each variable.

Table 1.2. Factors of economic barrier

Item	Descriptions	Mean	Perception Level	Rank
1)	Lack of market demand which bring to lack of developers' interest	3.67	Agree	6
2)	Unbalanced green tax incentives	3.73	Agree	5
3)	High cost incurred for sustainable materials and products	4.31	Agree	1
4)	Limited supply of sustainable materials and products	3.89	Agree	3
5)	Unfamiliarity with sustainable materials and products	3.82	Agree	4
6)	Over-dependence on earth natural products such as fossil fuel	4.13	Agree	2

Table 1.2 shows that there are a number of variables that have led to financial barriers to the application of the green rating system. The primary economic barrier (mean=4.31) for 'High cost incurred for sustainable materials and products' was discovered, followed by 'Over-dependence on earth natural products such as fossil fuel' (mean=4.13). The mean rating for 'Limited supply of sustainable materials and products ' (mean= 3.89) is, meanwhile, slightly distinct from that for 'Unfamiliarity with sustainable materials and products' (mean= 3.82). The participants felt, however, that there was no evidence of the "unbalanced green tax incentives" and " Lack of market demand which bring to lack of developers' interest " whereby they achieved an average score of 3.73 and 3.67.

Table 1.3. Factors of financial barrier

Item	Descriptions	Mean	Perception Level	Rank
1)	Lack of credit resources to cover up front cost	4.13	Agree	3
2)	High risk of investment due to unsellable unit	4.00	Agree	4
3)	High final price at the end of construction progress	4.27	Agree	1
4)	Requirement for long payback period	3.84	Agree	6
5)	Developers are profit driven for their projects	4.15	Agree	2
6)	Well-built firm potentially to go beyond the minimum standards compared to small firms	3.93	Agree	5

The economic obstacles to the application of green rating systems are described in Table 1.3. The main factor that has led to the economic obstacle class is, as can be seen in the above table, the 'High final price at the end of construction progress' (mean= 4.27). In the meantime, the factors 'Developers are profit driven for their projects' (mean=4.15) and 'Lack of credit resources to cover up front cost' (mean=4.13). The information also shows that the economic obstacle of execution influenced 'High risk of investment due to unsellable unit' (mean=4.00). Although aspects of the 'Well-built firm potentially to go beyond the minimum standards compared to small firms' (mean=3.93) and 'Requirement for long payback period' (mean=3.84) may exceed the minimum standard, the average value among the others is still quite large which indicates that the participants agree on the statements that led to the economic obstacle.

Table 1.4. Factors of technology barrier

Item	Descriptions	Mean	Perception Level	Rank
1)	Lack of database and information	3.71	Agree	2
2)	Lack of technologies	3.71	Agree	3
3)	Lack of technical understanding	3.93	Agree	1

The technology obstacle to the application of the Green Rating System has a few variables as described in Table 1.4. 'lack of technical understanding' is the key obstacle in this category

(mean=3.93). But 'lack of technologies,' 'lack of database and information' obstacles share the same mean score of 3.71.

Table 1.5. Factors of social barrier

Item	Descriptions	Mean	Perception Level	Rank
1)	Lack of company's commitment to green building	4.07	Agree	3
2)	Lack of strategy to promote sustainable development	4.16	Agree	1
3)	Tendency to maintain current practice	4.09	Agree	2
4)	Inability to meet the requirements	4.00	Agree	4
5)	Lack of workforce involving design team, construction team and expertise	4.00	Agree	5

Factors which can affect the category of social barrier are also examined. The 'Lack of strategy to promote sustainable development' in Table 1.5 (mean=4.16) is one of the other variables. The distinction between' inclination to retain present practice' (mean=4.09) and 'Lack of company's commitment to green building' (mean=4.07) is intangible. Nevertheless, two variables share the same mean value (mean=4.00), which is 'Inability to meet the requirements' and 'Lack of workforce involving design team, construction team and expertise'. In general, the participants offer positive feedback on the economic barrier variables.

Table 1.6. Factors of political barrier

Item	Descriptions	Mean	Perception Level	Rank
1)	Lack of encouragement and development of green building by government	3.38	Neutral	6
2)	Lack of building codes and regulations	3.67	Agree	4
3)	Lack of coordination and management by departments	3.78	Agree	3
4)	Strict requirements to obtain a green design evaluation label	3.55	Agree	5
5)	Lack of enforcement and monitoring of law and legislation	3.87	Agree	2
6)	Poor in managing the varied	4.09	Agree	1

Item	Descriptions	Mean	Perception Level	Rank
	social and political environment			

Table 1.6 shows that several variables have contributed to the political obstacles to the application of the green rating system. The primary political barrier to' poor management of diversified social and political environments' (mean=3.87) has been discovered as a' primary obstacle' (mean=4.09). In contrast, the mean score for "absence of coordination and departmental governance" (mean= 3.78) differs from the mean score for "absence of building codes and legislation" (mean= 3.67). However, it is felt that insufficient data is available concerning ' rigid criteria for the green design assessment label ' and ' absence of public support and growth for green construction. '

Table 1.7. Factors of knowledge barrier

Item	Descriptions	Mean	Perception Level	Rank
1)	Lack of professionals' awareness about green building	3.56	Agree	5
2)	Lack of public awareness of sustainable advantage	3.91	Agree	3
3)	Lack of professionals' knowledge	3.73	Agree	4
4)	Lack of contractors' knowledge	3.96	Agree	2
5)	Lack of exposure of benefits to developers	3.98	Agree	1

The factors contributing to the category of obstacle with the greatest reaction to that obstacle are shown in Table 1.7 as "absence of exposure to developers ' advantages" (mean= 3.98). The participants agree that "absence of information from contractors" (medium=3.96) also affects the obstacle to understanding that shows that these two variables are the highest. Apart from contractors, the third factor expressing the obstacle in the knowledge dimension is "the government absence of awareness of viable benefit" (mean= 3.91). However, the remainder who have "lack of expertise" and "absence of professional awareness of green construction" have an average complete rating respectively of 3.73 and 3.56.

Table 1.8. Overall mean for barriers categories

Categories	Mean	Rank
Economic barriers	3.92	3
Financial barriers	4.05	2
Technology barriers	3.78	5
Social barriers	4.07	1
Political barriers	3.72	6
Knowledge barriers	3.83	4

The mean score for the primary classifications is determined by analysis of the factor breakdowns for each category respectively. The 'Social Barriers' category (mean=4.07) comes first among all other categories in accordance with Table 4.7. The 'financial barriers' category (mean=4.05) was preceded by the mean slightly difference. The third largest average barrier score in this class is 'Economic barriers' with Medium= 3.92 and 'Knowledge Barriers' continues with mean score 3.83. 'Technology Barriers' (mean=3.78) requires the fifth place and finally the 'Political Barriers' (mean=3.72). All participants provide positive feedback on the obstacles mentioned in the general perspective of those obstacles.

Overall, the barriers ' perception level evaluated was assessed at the consensus stage. Social barrier, financial barriers, economic barriers, knowledge barriers, technology and the political barrier were, therefore, the primary obstacles in this research. The study has evaluated and discovered that social barrier is the main barrier to the application of the green rating system in Malaysia, when there is a lack of promotional approach towards sustainable development. This finding differs slightly from Samari et al. (2013) in which he discovered absence of advancement to be ninth among the barriers mentioned in his research paper. Ding et al. (2018) did, however, support sustainability as a consequence of market demand being constrained by an absence of knowledge promotion and reference to assist stakeholders be more effective in their execution.

In the listed categories of barriers recognized in this study, the financial barrier was second. High building final prices and high upfront cost capital were rated as the respondents ' best agreement. This research finding was supported by a variety of authors, including Zainult Abidin Nazirah (2010), Yin (2012), Ahn et al. (2013), Aliagha et al. (2013) Samari et al. (201) and Khalfan, and al. (2015). The limited drive of sustainable development is therefore also leading to a poor application of the green rating system.

Furthermore, the financial barrier was selected by the participants in this research study as one of the top list of barriers. Economic barriers linked to the limitation of sustainable materials and products for use in sustainable development have been classified. The study has demonstrated the very high expense with restricted supply in Malaysia in the application of sustainable materials and products. Zainul Abidin Nazirah (2010), Yin (2012), Ahn et al. (2013) and Chian (2013) have endorsed these results. They indicated that green materials and products in Malaysia, owing to an absence of promotion in the nation, were hard and restricted to achieve.

In general, there was good feedback from participants for the general outcomes of the identification of barriers in this studies. Most respondents agreed on the barriers to the implementation of the Malaysian green rating system. The results of this study were also endorsed in the previous literature review.

CONCLUSION AND RECOMMENDATION

Sustainable development in most developing nations around the globe is being quickly introduced. Green rating system is used to evaluate constructed green buildings in sustainable development. But challenges and barriers are obstructed in order to achieve execution. This study has allocated a number of questionnaires to 155 developers and returned questionnaires by 36% (percent).

Overall, the obstacles explored in Malaysia could slow down the application of the green rating system. This study has however shown that adoption has a strong environmental impact. In addition, the beneficial effects demonstrate obviously that the use of green rating instruments will help to create a' green' state for the benefit of future generations. The literature review of this study supports the analysed information in its entirety. Through the answers of developers at Selangor, every single aim in this study was effectively accomplished.

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