

# ICRP

---

# 2018

---

## PROCEEDING OF 3<sup>rd</sup> INTERNATIONAL CONFERENCE ON REBUILDING PLACE (ICRP) 2018

*Towards Safe Cities & Resilient Communities*

**13 & 14 SEPTEMBER 2018**  
**IMPIANA HOTEL, IPOH, PERAK**

**ORGANIZED BY :**



UNIVERSITI  
TEKNOLOGI  
MARA

**F|S|P|U**  
Fakulti Senibina, Perancangan & Ukur  
Faculty of Architecture, Planning & Surveying

<https://icrp2018.wixsite.com/icrp18>

# PROCEEDING OF ICRP 2018

## 3<sup>rd</sup> INTERNATIONAL CONFERENCE ON REBUILDING PLACE (ICRP) 2018



UNIVERSITI  
TEKNOLOGI  
MARA



USM  
UNIVERSITI SAINS MALAYSIA

APEX™



京都工芸繊維大学  
KYOTO INSTITUTE OF TECHNOLOGY



GRESAFE\_CITIES  
Green Safe Cities, Research Interest Group



Malaysian Institute of Planners

*Towards Safe Cities & Resilient Communities*  
13 & 14 SEPTEMBER 2018 | IMPIANA HOTEL, IPOH, PERAK

eISBN 978-967-5741-63-0

### **COPYRIGHT**

Faculty of Architecture Planning and Surveying

### **ORGANIZED BY**

Faculty of Architecture Planning and Surveying  
Universiti Teknologi MARA, Perak Branch  
Seri Iskandar Campus,  
32610, Seri Iskandar,  
Perak Darul Ridzuan, MALAYSIA

ICRP2018  
3rd International Conference on Rebuilding Place

13-14 September 2018  
ISBN 978-967-5741-62-3 eISBN 978-967-5741-63-0

**THE ENABLING FACTORS FOR GREEN BUILDING  
DEVELOPMENT IN HOUSING PROJECTS**

Nur Atifah Bahruddin <sup>1\*</sup>, Thuraiya Mohd <sup>2</sup>

<sup>1</sup>Centre of Postgraduate Studies, Faculty of Architecture, Planning and Surveying, Universiti Teknologi MARA, Seri Iskandar Campus, Seri Iskandar, 32610 Perak, Malaysia

<sup>2</sup>Department of Estate Management, Faculty of Architecture, Planning and Surveying, Universiti Teknologi MARA, Seri Iskandar Campus, Seri Iskandar, 32610 Perak, Malaysia

Email of corresponding author \*: nuratifahbahruddin@gmail.com

**Abstract** - Transformation of the housing industry in Malaysia deliver tremendous benefits but it requires a lot of involvement and efforts from various parties to implement. Here, the transformation of green housing is able to preserve natural environment by fulfilling the quality of lifestyle of homeowners. Green housing designed sustainable resources with maximizing the resources and produces less impact on the environment. In other words, green housing is designed to reduce environmental impacts in suitable manners to meet the present without compromising the current needs of future generations as intended to enhance environmental friendly and sustainable development. Currently, green housing has received significant attention in Malaysia over the years with significant growth in environmental awareness. Furthermore, the Malaysian government had shown interest and encourages the practice of green development by introducing green building index (GBI) as green rating tool for buildings to promote sustainability and growing awareness among construction players. However, the implementation of green housing is quite low-moderate due to facing barriers to be implemented. Thus, this research put emphasis on determination of the significant enabling factors considered in developing green housing projects. The research presents data collected through questionnaire survey conducted to the developers as respondents. The data were analyzed through the quantitative method by using Confirmatory Factor Analysis (CFA) technique. The finding shows the main enabling factors for developing green housing projects are institutional, knowledge, internal action and market influence. As a result, this research is attempted to highlight the significant enabling factors being considered by developers in developing green housing projects.

**Keywords**- Sustainable Development, Green Building; Green Building Index (GBI); Green Housing Project

## 1 INTRODUCTION

The demand for housing continues to expand due to the increasing number of worldwide population due to improvement of better quality of life and rapid modernization (Fazdliel, Wira, Radzi and Ilias, 2014). In Malaysia context, Nazirah, Nor'Aini and Ayman (2013) mentioned, the demand for housing is expected to be more than 30 million in 2020 due to urbanization. However, the demand for green housing development and services are quite low due to the high cost compared to conventional products. Generally, the conventional house produces 10 to 30 tons of CO<sub>2</sub> emission a year and it contributes to weather change disasters (Elias and Lin, 2015). Besides, urbanization leads to various problems to the environment such as destruction of flora and fauna, air pollution, water insufficiency and deterioration of ecological system due to uncontrolled development (Kai, Ta and Hui, 2013; Nazirah, Nor'Aini and Hanizam, 2012). Therefore, it is important for housing industry sectors to move and have balance environmental impacts by producing green housing (Elias and Lin, 2015)

In line of the rapid development, Malaysian government puts emphasis on housing provision needs to be developed towardssustainable manner by introducing green policy and green rating system as a guideline for green development(Fazdliel, Wira, Ilias and Radzi, 2013; Nazirah et al., 2012). However, the application of green housing concept is still at moderate level where the houses built do not comply with the requirement and principles of Malaysian green buildings rating systems (Elias and Lin, 2015; Fazdliel et al., 2014; Myeda, Kamaruzzaman, Zaid, and Fong, 2016; Nazirah et

al., 2012). In addition, the implementation of green housing is facing obstacle to implement in term of budget constraints (Kai et al., 2013; Samari, Godrati, Esmaeilifar, Olfat and Wira, 2013; Shari and Soebarto, 2012), lack of knowledge and information (Kai et al., 2013; Nadzirah and Carmen, 2015; Nazirah et al., 2012) and lack of enforcement by government (Nazirah et al., 2013; Shen, Tam, Tam and Ji, 2010). Despite facing various obstacles, Nazirah (2010) stated some developers have successfully and willing to transform towards green development by replacing these barriers.

Therefore, this research aimed to explore the enabling factors for green building development in housing projects by focusing on five (5) enabling factors: Institutional, Technology, Knowledge, Internal Action and Market Influence. The purpose of this paper was to determine the significant enabling factors being considered by developers in developing green housing project. The significant enabling factors are suggested based on the findings of data collection. This is in line with Nazirah et al., (2013) statement developing enablers for green housing is one of the key steps in creating encompassing perspective of the construction sector.

## 2 LITERATURE REVIEW

### 2.1 Sustainable and Green Housing

The development in past decades had used conventional methods that deliver huge environmental issues where the trend of using concrete as a structural material are commonly adopted in urban housing in Malaysia that clearly will contribute to the rapidly increasing carbon emission (Abu Hassan, Mahyuddin, Mazlina and Aulina, 2010; Nazirah et al., 2013). Therefore, the initiative by a worldwide community in mitigating environmental destruction was by introducing sustainable development. In 1987, the World Commission on Environment and Development (WCED, 1987) published 'Brundtland Report' where Brundtland Commission defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". It comprised of two key concepts (WCED, 1987):

1. The concept of "needs" is referred to the priority of world's poor
2. The idea of limitations imposed by the state of technology and social organization on the environment's ability with the goal to meet present and future needs

Sustainable development is the protection of the world which does not only specify on conserving environmental but also to fulfill the needs of future generations and other living organisms by reflecting the three (3) pillars of sustainable development: social, economy and environment. These three (3) elements must be integrated to achieve the concept of sustainability as follow (Fazdliel et al., 2013, 2014; Mahoney and Potter, 2004; Nabila and Mariana, 2012):

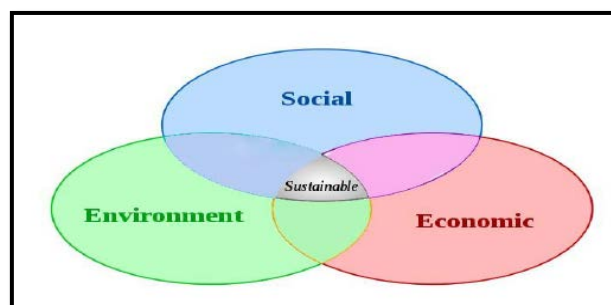


Figure 1 Concept of Sustainable Development

Apart from that, when discussing the sustainability and environmental, it specifically reflects the development where implementation of green development is one of the initiatives to realize the sustainable development. Nazirah et al., (2012) mentioned, building "green" is one of best plan towards sustainability where green building is defined as a building that improves the valuable natural resources, significant operational saving and creates a healthier build environmental for users with better living (Jamilus, Ismail and Aftab, 2013; Wenxin et al., 2017).

Therefore, for a house to be 'green', every phase of building development process should incorporate with environmental consideration where green housing is the best concept to attract buyers where it is one of the drafts of sustainable development (Nazirah et al., 2012). Green housing is able to contribute to minimise climate change, reducing the need for physical resources, decreasing contamination, enhancing air quality and health, reducing water demand, diminishing waste and land degradation (Abu Hassan et al., 2010). Meanwhile, green housing is a building built in a superior quality that has accesses to green space, close to good public transport, using design techniques to increase energy efficiency, provide facilities that able to promote social contact and have clean and safe residential environment (Nazirah et al., 2012). Nowadays, the certification of green building can be achieved through Malaysian green building rating system which is Green Building Index (GBI) which is a certification body that able to decide if a building accomplishes the criteria of a green building or otherwise.

## **2.2 Enabling Factors for Green Housing Projects**

In developing sustainable development countries, there are two – dimensional approaches that are required. Firstly is to create a fit and feasible neighborhood development and second is to ensure having demands for sustainable development (Plessis, 2007). Therefore, identifying of enabling factors is foremost to overall improvement. Plessis (2007) stated these enabling factors focus to enhance development at micro level which eventually affects the macro level. Each enabling factors has a role to play in order to create green housing as discussed below:

### **2.2.1 Institutional**

Government is an institution which has major influence on the innovation of government legislation and brings a major impact to the successful Malaysian green development industry (Diyana and Nazirah, 2013; Fazdliel et al., 2013; Nazirah, 2010; Nazirah et al., 2012; Shen et al., 2010). In order to preserve environment without waiving the need for future generation, the Malaysian government had introduced green policies and regulation related to environmental preservation towards green development. Here, the government is responsible for enforcing revising legislation and introducing various incentives as to encourage involvement in green development (Nazirah et al., 2012; Tan, Shen and Yao, 2011). Therefore, Loo (2015); Pervez et al., (2017); Suhaida, Tan and Leong (2013) mentioned government had introduced National Green Technology Policy (NGTP2009) as a green policy towards green technology that aimed to enhance national economic growth, promoting sustainability, low carbon technology and preservation natural environment. Furthermore, housing industry has contributed towards sustainability by the involvement of National Housing Policy (NHP) in introducing Sustainability of the Housing Sector under thrust 5 of NHP (NHP, 2016) which are to increase the use of new technologies, innovation and provision of environmental-friendly housing, to improve research and development (R&D) efforts in the housing sector and to encourage urban renewal and redevelopment of old buildings.

Apart from the government, contribution of Malaysian Institute of Architects (PAM) and Association of Consulting Engineers Malaysia (ACEM) shown their interest on the needs of green practice by introducing Green Building Index (GBI) in 2009 as Malaysian green building rating systems (Ashraf and Nurhayati, 2013; Sood, Chua and Peng, 2011; Zuhairi et al., 2014). GBI established based on 6 key criteria as guidelines to achieve green building awards which are energy efficiency, indoor environmental quality, sustainable site planning and management, material and resources, water efficiency and innovation (Aliagha, Maizon, Afeez and Kherun, 2013; Jamilus et al., 2013; Nazirah et al., 2012; Samari et al., 2013)

Other than that, government has introduced financial instrument as a financial initiative to encourage and support developers such as incentives, subsidies, tax exemption and rebates (Nazirah et al., 2012; Samari et al., 2013). Therefore, government has provided financing scheme under Green Technology Financing Scheme (GTFS) for companies that supply green technology by assuring to cover up to 2% of the loan interest rate and provides a guarantee of 60% on the financing (Env Dev Malaysia, 2010; Fazdliel et al., 2013, 2014; Nor Suzila, Asmalia and Nik, 2016; Samari et al., 2013).

Furthermore, the government also has taken action by offering incentives for tax exemption to development that adopts energy efficiency and renewable energy (KeTTHA, 2009).

### 2.2.2 Technology

The rapid technological development in the world has driven Malaysia to be more technology based government where Nazirah et al., (2012) asserted technology is an application of scientific knowledge where it referred to the product-based element that applied in the project like equipment, materials, process and physical solution. The technology of green housing should be more powerful in term of energy consumption, design, water saving and others. However, the acceptance of new technology in construction is slow in the beginning due to lack of confidence, high cost and limited expertise (Fazdliel et al., 2014; Nazirah et al., 2012). According to Nazirah et al., (2013), technologies are divided by two which are hard technologies (i.e: equipment and materials, physical infrastructure solutions) and soft technologies (i.e: to support the development process: adequate systems). Technology factors provided an adequate knowledge base and technical capacity for stakeholder that commonly gives impact to the implementation of green development (Plessis, 2007).

### 2.2.3 Knowledge

The green development can be more effectively implemented when it put emphasis on education and training on green development (Nor Suzila, Asmalia and Nik., 2016). Indeed, the knowledge can be discovered from databases, benchmarks, guidelines, manuals and handbooks plus the knowledge of green development that can enhance the level of understanding and provide guidelines to certain activities (Nazirah et al., 2013). Furthermore, Nazirah et al., (2012) argued the knowledge from the top management itself should be developed then extend to the organization level as ways to deliver new knowledge. The knowledge and information are also gained from the involvement of universities and research institute. The lack of knowledge and expertise are obstacles in implementing green building development. However, these involvements able to promote and increase awareness among construction players as to fill the gap of knowledge in green building by introducing new rating systems, guidelines, introducing construction-related courses, sponsoring education programs, new technology and distribute them in the conferences, reports and seminars (Durmus-Pedini and Ashuri, 2010; Nazirah et al., 2012).

### 2.2.4 Internal Action

An Internal action is an action within own organizations as to encourage green development (Nazirah et al., 2013). Internal action is separated by three (3); interest and commitment, policies and management and resources and capability. First, an internal action can be encouraged through public awareness as an initial way as explained by Nazirah et al., (2013) the growing interest and commitment among the construction players will force for policies and regulation on green development to be created. Here, the availability of this awareness towards green development, can foster the interest of construction players that commonly available as it provides information to the public, a team of building designer, stakeholders and construction team that is related to the green features of the building (Nor Suzila Asmalia and Nik, 2016). In short, the green development success in implementing is when the interest and people's commitment, policies and management is available. When there is interest and policy, the organization of the company itself should play their roles in an effort towards green development (Nazirah et al., 2013). However, the policies formed should base on the green guidelines and principles that suit the management and priorities of the companies. Additionally, resources and capabilities are two (2) types of business assets within organization where resources is referred to the assets of company (money, materials, employee and assets) while capabilities are inclined to focus more on skills or ideas that are achievable in a business (Nazirah et al., 2013). In the nutshell, the resources of the company will reflect the capability of teams to produce profitability and viability projects.

#### 2.2.5 Market Influence

Market influence is referring to the demand of the buyers where the commercial viability will push the developers to produce green housing projects (Nazirah et al., 2013). Nazirah et al., (2012) mentioned greater demand side which includes the clients, buyers and users will improve practice initiatives, good relationships with supply side and consequently, the delivery of green development will be improved. Furthermore, there are some factors that affect the market demand in Malaysia especially the intangible factors, where it will affect the demand of housing such as location, external and internal environment, ambience, accessibility, materials and finishes (as part of green building principles). These factors are perceived as added qualities to increase the value of housing and are to attract the client's interest (Nazirah et al., 2013, 2012). The increasing housing demand will reflect the rapid development of the housing industry that depends on the market condition and economic flow. Here, market influence refers to the market value that is affected by the client's demand (Diyana & Nazirah, 2013; Nazirah et al., 2013). Concisely, without the demand, the transformation of green development will be difficult to be realized.

### 3 METHODOLOGY

An exploratory research approach was conducted to achieve the aim of the research which was to gauge the enabling factors considered by developers in developing green housing projects. Questionnaire survey through close – ended questionnaire was implemented. This research applied purposive sampling method in obtaining data among the housing developer firms. The questionnaire was distributed to the selected developers that had been awarded green housing certificate within Kuala Lumpur and Selangor. With the total of 86 respondents, which are the total sample of research, the questionnaire was approached and sent by – hand. However, only 55 questionnaires gave practical responses which contribute to about 64% of response rate. In analyzing and evaluating the survey results, the quantitative approaches were used. Quantitative data were obtained through structural questions involving Likert's Scale questions type which includes structured questionnaire form that was analyzed using the Statistical Package for the Social Sciences (SPSS) software through Confirmatory Factor Analysis (CFA) technique.

### 4 RESULTS AND ANALYSIS

#### 4.1 Respondent's Profile

Based on the respondent's background, most or 43.6% of the total 55 respondent companies were established more than 15 years, while 9.1% was established for 11 to 15 years, 10.9% and 36.4% have established the company for 6 to 10 years and 1 to 5 years. In term of involvement in green building field, majority or 69.1% respondents were involved for 1 to 5 years and 30.9% involved for 6 to 10 years. It shows the majority of the respondents were moving to green development but they are still trying to sustain in the green industry with the majority has produced 1 green housing project. In short, there is the opportunity to succeed and obtaining certificate green housing development in Kuala Lumpur and Selangor area but the involvement of developers in the green industry is still low.

#### 4.2 The Significant Enabling Factors Being Considered by Developers in Developing Green Housing Projects

The significant enabling factors were analyzed by considering the Reliability Analysis (RA) and Confirmatory Factor Analysis (CFA) where the RA used to test the reliability of instrumentation while CFA was analyzed to determine significant enabling factors. Therefore, the findings revealed, all selected item were suitable and reliable as generated via Reliability Analysis (RA). The recorded Cronbach's Alpha values were 0.782 which is acceptable due to more than 0.70 (Sekaran, 2003).

Based on the CFA output, the value of Kaiser-Meyer-Olkin (KMO), Bartlett's test, Measures of Sampling Adequacy (MSA) and Communalities Value (CV) were analyzed. Here, the result of Kaiser-Meyer-Olkin (KMO) value is 0.568 and p. value of Bartlett's test is highly significant with 0.000 values where, Field (2005) recommends KMO values more than 0.5 (>0.5) are acceptable and p

value (significance) is less than 0.001 is concluded as appropriate. Hence, the CFA is considered as appropriate techniques for further analysis of data. In term of Measures of Sampling Adequacy (MSA) value and Communalities Value, it should be more than 0.500 (Dillon and Goldstein, 1984; Field, 2005) where the findings of enabling factors are. There are 16 out of 30 variables that are more than 0.5 of MSA value with all variables are more than 0.5 in Communalities Value (CV) which only 16 variables are significant and the rest should be taken out from representing as significant enabling factors being considered by developers in developing green housing projects. In regards to enabling factors, five (5) main enabling factors consisting of sub factors and attributes were tested. The results can be summarized in Table 1 below.

Overall, these 16 attributes achieved the value of MSA with more than 0.5 namely; the authority of government (0.526), Enforcement of the acts and regulations (0.552), The importance of technology (0.532), Better technology (0.519), Importance of soft skill (0.704), Support from educational sectors (0.542), Exposition to knowledge (0.697), Availability of organization (0.669), Growing of awareness (0.700), Experts' commitment (0.766), Projection of green management (0.727), Development of companies policy (0.753), Importance of developers (0.685), Importance of resources and capabilities (0.543), Organization system (0.644) and lastly, Customers' attraction (0.500).

Table 1 Significant Enabling Factors Being Considered By Developers in Developing Green Housing Projects

Enabling Factors		MSA	CV	
Institutional	Government Support	The authority of government	0.526	0.630
		Regulations and guidelines	Taken out	
		Enforcement of the acts and regulations	0.552	0.664
		Review of policies and regulation	Taken out	
	Professional Bodies	NGOs involvement	Taken out	
		Introduction of GBI benchmarking	Taken out	
		Introduction of master planning	Taken out	
	Financial Institution	Financial support	Taken out	
		Introduction of financial scheme	Taken out	
		Maximize profitability	Taken out	
Affordability		Taken out		
Technology	Green Technology	The importance of technology	0.532	0.712
		Better technology	0.519	0.725
	Level of technology skills	Taken out		
Knowledge	Knowledge Improvement	Power of knowledge	Taken out	
		Importance of soft skill	0.704	0.750
	Involvement from Universities and Research Institute	Support from educational sectors	0.542	0.667
		Exposition to knowledge	0.697	0.811
Internal Action	Interest and Commitment	Availability of organization	0.669	0.891
		Growing of awareness	0.700	0.686
		Experts' commitment	0.766	0.756
	Policies and Management	Projection of green management	0.727	0.773
		Development of companies policy	0.753	0.780
	Resources and Capability	Importance of developers	0.685	0.819
		Importance of resources and capabilities	0.543	0.708
		Companies priorities	Taken out	
Organization system	0.644	0.535		
Market Influence	Demand	Commercialize of green housing	Taken out	
		Customers' attraction	0.500	0.620
	Market demand	Taken out		

[Source: Author's Researcher, 2018]



The finding revealed that the government and professional bodies should strictly enforce the law and policies regarding green policy and green technology policy in order to prompt and preserve natural environment. However, in term of financial incentives, the offering financial scheme for green building is not offered to green housing projects where, the financial scheme only offered to Office, Shopping Complex, Hospital and Clinic, Hotel and Resort, University and Research Institution, Exhibition Hall and School (MGTC, 2017). Moreover, the awareness among developers and design team regarding the benefit of green technology elements in their design and having strong support system from the government towards increasing greener housing development should be emphasized. In addition, in order to create awareness and understanding on the benefits of green housing, the public need to gain more knowledge and input on green development especially, technology.

## 5 CONCLUSION

By developing comprehensive significant enabling factors to be considered among developers in developing green housing projects, it is hoped that the performance of green housing implementation is not an issue anymore and the barriers able to mitigate. Those enabling factors could be applied to the future of green building implementation where the power of authority and organization of companies should be emphasized in realizing sustainability development. However, for future research, it is essential for research to be conducted involving developers in Malaysia to attract more industry players to go greener in their construction industry portfolio.

## REFERENCES

- Abu Hassan, A. B., Mahyuddin, R., Mazlina, J., & Aulina, A. (2010). Awareness assessment framework for implementing the sustainable housing in Malaysia. *Asian Journal of Management Research*, (2000), 703–713.
- Aliagha, G. U., Maizon, H., Afeez, O. S., & Kherun, N. A. (2013). Review of green building demand factors for Malaysia. *Journal of Energy Technologies and Policy*, 3(11), 471–478. Retrieved from <http://www.iiste.org/Journals/index.php/JETP/article/view/8596>
- Ashraf, M. F., & Nurhayati, A. M. (2013). Green building assessment tools: Evaluating different tools for green roof system. *International Journal of Education and Research*, 1(11).
- Dillon, W. R., & Goldstein, M. (1984). *Multivariate analysis methods and applications*. United State of America: John Wiley & Sons, Inc.
- Diyana, A. N., & Nazirah, Z. A. (2013). Motivation and expectation of developers on green construction: A conceptual view. *International Journal of Social, Behavioral, Educational, Economic, Business and Industry Engineering*, 7(4), 247–251. <https://doi.org/10.1007/s13398-014-0173-7.2>
- Durmus-Pedini, A., & Ashuri, B. (2010). An overview of the benefits and risk factors of going green in existing buildings. *International Journal of Facility*. Retrieved from [https://community.ifma.org/cfs-file/\\_key/telligent-evolution-components-attachments/13-465-00-00-01-05-75-18/2010\\_5F00\\_An-Overview-of-the-Benefits-and-Risk-Factors-of-Going-Green-in-Existing-Buildings\\_5F00\\_Article.pdf](https://community.ifma.org/cfs-file/_key/telligent-evolution-components-attachments/13-465-00-00-01-05-75-18/2010_5F00_An-Overview-of-the-Benefits-and-Risk-Factors-of-Going-Green-in-Existing-Buildings_5F00_Article.pdf)
- Env Dev Malaysia. (2010). Putrajaya, Cyberjaya to go green ASAP! environmental development in Malaysia. Retrieved March 18, 2017, from <https://envdevmalaysia.wordpress.com/2010/01/26/putrajaya-cyberjaya-to-go-green-asap/>
- Ezanee, M. E., & Chong, K. L. (2015). The empirical study of green buildings (residential) implementation: Perspective of house developers. *Procedia Environmental Sciences*, 28, 708–716. <https://doi.org/10.1016/j.proenv.2015.07.083>
- Fazdliel, A. I., Wira, M. M. S., Ilias, S., & Radzi, I. (2013). Malaysian housing developers' readiness in green homes development. *ARNP Journal of Engineering and Applied Sciences*, 28(3), 343. <https://doi.org/10.5829/idosi.wasj.2013.28.03.13798>
- Fazdliel, A. I., Wira, M. M. S., Radzi, I., & Ilias, S. (2014). Green homes development: Factors affecting housing developers' readiness. *ARNP Journal of Engineering and Applied Sciences*, 9(6), 971–980.

- Field, A. (2005). *Discovering statistic using SPSS (Second Edi)*. London: Sage Publication.  
<https://doi.org/10.1016/B978-0-444-52272-6.00519-5>
- Jamilus, M. H., Ismail, A. R., & Aftab, H. M. (2013). The way forward in sustainable construction: Issues and challenges. *International Journal of Advances in Applied Sciences*, 2(1), 15–24.
- Kai, C. G., Ta, W. S., & Hui, H. G. (2013). Challenges of implementing sustainability in Malaysian housing industry.
- Loo, T. G. (2015). Implementation of Green Technology Policy in Malaysia. In *UN Climate Change Conference Paris 2015*. Ministry of Energy, Green Technology and Water.
- Mahoney, M., & Potter, J.-L. (2004). Integrating health impact assessment into the triple bottom line concept. *Environmental Impact Assessment Review*, 24(2), 151–160.  
<https://doi.org/10.1016/j.eiar.2003.10.005>
- MGTC. (2017). Criteria for building and township sector: Green technology financing scheme (GTFS). Retrieved December 6, 2017, from <https://www.gtfs.my/page/criteria-building-and-township-sector>
- Myeda, N. E., Kamaruzzaman, S. N., Zaid, S. M., & Fong, Y. P. (2016). Sustainable housing: Demographic analysis of customers'. *Journal of Building Performance*, 7(1), 116–124.
- Nabila, N. A. A., & Mariana, M. O. (2012). Local Agenda 21: Action plan for sustainable development - Case study of Shah Alam. In *Seminar Proceeding, UMRAN2012: GREEN WAVE, KAED, IIUM LOCAL*.
- Nadzirah, Z., & Carmen, T. Y. M. (2015). An insight of sustainable development a study among construction professional in Malaysia. *International Journal of Current Research and Academic Review*, (2), 56–64. Retrieved from [http://www.ijcrar.com/special/2/Nadzirah Zainordin and Carmen Tan Yee Mei.pdf](http://www.ijcrar.com/special/2/Nadzirah%20Zainordin%20and%20Carmen%20Tan%20Yee%20Mei.pdf)
- Nazirah, Z. A. (2010). Investigating the awareness and application of sustainable construction concept by Malaysian developers. *Habitat International*, 34, 421–426.
- Nazirah, Z. A., Nor'Aini, Y., & Ayman, A. . O. (2013). Enablers and challenges of a sustainable housing industry in Malaysia. *Construction Innovation: Information, Process, Management*, 13(1), 10–25. <https://doi.org/10.1108/14714171311296039>
- Nazirah, Z. A., Nor'Aini, Y., & Hanizam, A. (2012). A foresight into green housing industry in Malaysia. *International Journal of Environmental, Chemical, Ecological, Geological and Geophysical*, 6(7), 55–63.
- NHP. (2016). National Housing Policy.
- Nor Suzila, N. L., Asmalia, C. A., & Nik, A. D. N. Z. (2016). The implementation of green building in Malaysian construction industry: Determination of key success factors. *Malaysian Journal Of Sustainable Environment*, 1(2), 64–79.
- Pervez, H. S., Nursyarizal, M. N., Anwer, A. S., Perumal, N., Irraivan, E., & Shaikh, M. . (2017). Building energy for sustainable development in Malaysia: A review. *Renewable and Sustainable Energy Reviews*, 75, 1392–1403. <https://doi.org/10.1016/j.rser.2016.11.128>
- Plessis, C. Du. (2007). A strategic framework for sustainable construction in developing countries. *Construction Management and Economics*. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/01446190600601313>
- Samari, M., Godrati, N., Esmailifar, R., Olfat, P., & Wira, M. M. S. (2013). The investigation of the barriers in developing green building in Malaysia. *Modern Applied Science*, 7(2), 1–10.  
<https://doi.org/10.5539/mas.v7n2p1>
- Sekaran, U. (2003). *Research methods for business: A skill-building approach* (4th editio). USA: John Wiley & Sons, Inc.
- Shari, Z., & Soebarto, V. . (2012). Delivering Sustainable Building Strategies in Malaysia : Stakeholders ' Barriers and Aspirations. *Alam Cipta*, 5(2), 3–11.
- Shen, L., Tam, V. W. Y., Tam, L., & Ji, Y. (2010). Project feasibility study: the key to successful implementation of sustainable and socially responsible construction management practice. *Journal of Cleaner Production*, 18, 254–259.
- Sood, S., Chua, D., & Peng, D. (2011). Sustainable development in the building sector: green building framework in Malaysia. ST-8:Best Practice & SD in.

- Suhaida, M. S., Tan, K. L., & Leong, Y. P. (2013). Green buildings in Malaysia towards greener environment : Challenges for policy makers. In *4th International Conference on Energy and Environment 2013 (ICEE 2013)* (pp. 1–4). IOP Conf. Series: Earth and Environmental Science 16 (2013) 012121. <https://doi.org/10.1088/1755-1315/16/1/012121>
- Tan, Y., Shen, L., & Yao, H. (2011). Sustainable construction practice and contractors' competitiveness: A preliminary study. *Habitat International*, 35, 225–230.
- WCED, W. C. on E. and D. (1987). *Our common future: Report of the world commission on environment and development. United Nations Commission*. Oxford: Oxford University Press. <https://doi.org/10.1080/07488008808408783>
- Wenxin, S., Wenzhe, T., Siripanan, A., Zhen, L., Duffield, C. F., Wilson, D., ... Yongping, W. (2017). Critical success factors in Thailand's green building industry. *Journal of Asian Architecture and Building Engineering*, 16(2), 317–324.
- Zuhairi, A. H., Maria, Z. M. Z., Foo, C. H., Syarizal, M. M. N., Farhan, A. R., Nurulhuda, M. K., & Mukhtar, C. A. (2014). Towards a national green building rating system for Malaysia. *Malaysian Construction Research Journal*, 14(1).