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## Breaking through the Barriers to Green Building Movement in Indonesia: Insights from Building Occupants

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### Abstract

As one of the biggest countries in the world and the 4<sup>th</sup> rank in construction industry in Asia, Indonesia is very far behind compared to some neighboring countries in terms of green building movement. It is confirmed by the fact that only 16 buildings in Indonesia that have been earned GREENSHIP, the certification issued by the Green Building Council Indonesia up to present. Therefore, the research was conducted to identify the barriers to green building movement in Indonesia from building occupants' point of view. The data presented in this paper are mainly derived from interviews and responses to a questionnaire which distributed randomly to building occupants who had experiences either in conventional or in green buildings around Jakarta and Bandung. Based on the findings from 75 respondents, it was identified that the barriers are: burdensome implementation, lack of supported atmospheres, resistance to change, inadequate knowledge and information, negligence, high cost of green building options, insufficient supervision, lack of awareness, low availability of green products on the market, and lack of building management role. The work concludes with recommendations of performance improvement strategies analyzed by SWOT method.

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*Keywords:* green building movement; barriers; building occupants

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### 1. Introduction

According to a report issued by United Nations Environment Programme (UNEP) in 2009, the building sector consumes up to 40% of the global annual energy consumption, 20% of global annual water usage, and contributes to 40% of global annual total waste as a result of building construction and demolition activities, and more so, 40% of global annual greenhouse gas (GHG) emissions [1]. Given the massive growth of construction industry all over the world for the last decades, if nothing is done, it is estimated that the construction industry will be responsible for the destruction of natural habitats and wildlife on over 70% of the Earth's land surface by 2032 [2].

### 2. Green building in Indonesia

In Indonesia, the green building movement has just evolved in recent years. In fact, the Green Building Council Indonesia (GBCI), a non-for-profit organization that plays an important role to the development of this movement in

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Indonesia was only established in 2008. However, since then, a lot of efforts have been done by GBCI, and one of them was the GREENSHIP. It is the first comprehensive rating scheme for evaluating the environmental design and performance of Indonesian buildings. It was developed specifically to suit the local market, considering the tropical weather, environmental and development context, cultural and social needs. 6 main categories, i.e. appropriate site development, energy efficiency and refrigerant, water conservation, material resources and cycle, indoor air health and comfort, and building and environment management, are considered in the evaluation of a green building in Indonesia. This rating scheme is currently classified only into 3 types: for new building, existing building, and interior design. GBCI, collaborating with the Ministry of Environment, is also committed to disseminate the information to the community in applying best practices and facilitating the transformation towards a sustainable construction industry.

To date, the council has awarded only 16 GREENSHIP certificates - 9 of them to new developed buildings, 6 to existing buildings, and the other 1 to interior design. Those buildings consist of commercial buildings, head offices, government buildings, bank, library and education building. This number is still very far behind, even compared to the other Asian countries. China as the largest construction market in Asia, currently, has 2,965 buildings in China are registered or certified as green buildings under the two standards, i.e. LEED and GBEL [5], while Hong Kong had 9 million m<sup>2</sup> space and 50,000 residential units HK-BEAM certified, accounting for more than 37% of commercial space, and approximately 28% of homes built in 2009 [6]. Japan, the second largest market, had more than 450 buildings CASBEE certified, as of April 2015 [7]. Up to December 2015, more than 3,456 building are registered with the IGBC, out of which 754 buildings are certified and fully functional in India [8]. Moreover, 900 other buildings are certified by LEED, making India the third rank in the top 10 countries outside the U.S. [9]. As in the nearest neighboring countries, Singapore and Malaysia, great achievements have been accomplished by both countries for the past few years. Singapore's Green Mark certification has been awarded to 25 million m<sup>2</sup> space, accounting for about 12% of all built-up space in Singapore, plus 12 million m<sup>2</sup> more in Vietnam, China and Malaysia in 2011 [10]. Meanwhile, Malaysia already has 327 certified buildings and thousands more on the way up to October 2015 [11].

Considering all these facts, it can be inferred that the green building movement in Indonesia still requires great endeavor. One question is: "what are the problems faced by Indonesia to date that leads to the slow movement?" To answer the question, this research aims to identify the barriers that hinder the success of green building movement in Indonesia. Figuring out these barriers is necessary, and only after that, can corresponding solutions can be planned effectively. In this paper, however, only the barriers faced by the building occupants that will be further discussed.

### 3. Research methodology

First of all, literature reviews on green and sustainable development in Indonesia, as well as in other countries were carried out. Basically, the reviews aimed to classify the differences between conventional and green building characteristics, and to identify the barriers encountered along with the approaches taken in green building movement overseas which could be implemented in Indonesia's context. Survey and interview were developed soon after the reviews, in order to understand more detail about the movement in Indonesia, and to identify the other possible barriers from the feedback of the occupants which were not reckoned in the literature review. The survey was conducted through a questionnaire distributed randomly to building occupants; who had experiences either in conventional or in green buildings around Jakarta and Bandung.

The questionnaire form was designed into 4 main sections: (1) Respondent's background, (2) General knowledge and perception about green building, and its relation to global warming, (3) Green building practices, and (4) Barriers to green building movement. The respondents were asked to answer a few essays, and mostly to rate some statements with Likert scales (on 1 to 4 point basis). In addition, the interviews were also done to building owners and managers, to gain deeper insight and understanding of the barriers. Furthermore, the data was qualitatively analyzed using Strengths, Weaknesses, Opportunities, and Threats (SWOT) method, and as the result, new strategies were recommended to eliminate the barriers in the future.

### 4. Barriers to green building movement

Out of the 150 questionnaires disseminated, 75 completed copies were received at the end of November 2015. The respondents were divided into 80% with age up to 30 years old, and 20% above 30 years old. 79% of respondents have achieved the education up to senior high school, 5% with a college degree, 7% with a post graduate degree, and the rest was occupants with junior high school. As for occupation, the majority of respondents were students with 76%, employee 11%, housewife 7%, lecturer 5%, and businessman 1%. The results revealed that, 82.13% of respondents are "familiar" with basic knowledge of green building concept, and its relation to global warming. However, only 30.5% of the respondents claimed to practice it in everyday life. Furthermore, the barriers encountered during implementation can be summed up as follows:

1. **Burdensome implementation** experienced by 58.55% of the respondents as the biggest issue. Disposing the organic and non-organic waste, smoking in the designated space, turning off unused electronic stuffs, providing 30% green area at home, making biopori holes in every home, applying “one tree-one house” concept, carrying their own shopping bag, bringing their own water bottle, were some efforts that considered as being troublesome to do in their everyday life.
2. The second barrier faced by 47.23% of respondents was **lack of supportive atmospheres**. The referred atmospheres were as follows: limited space at home for biopori holes and/or 30% of green areas, ignorant smokers that made the green efforts ineffective, uncertain hygiene due to water/soap saving, discomfort due to weather, environment and building condition that forced the excessive use of AC, re-mixing of pre-sorted wastes in the final waste disposal site that made the green efforts seemed useless, and limited eco-community causing no assistance for the beginner to do the efforts.
3. **Resistance to change** was considered by 36.05% of respondents to be one of the barriers. The respondents already felt comfortable doing the old practices, regardless the environmental impacts caused by such practices.
4. 34.5% of respondents, including the ones who have and have not implemented the green building practices, equally felt the issue of **inadequate knowledge and information about green building concept** was still considered as one of the barriers. Based on the survey results, one-third of respondents have done the green building practices in daily life, such as turning off the unused electric appliances, and using LED lamps, rechargeable batteries, and reusable containers, without knowing that such efforts were considered in green building concept. It shows that those respondents were not fully understood about the concept. Knowledge and latest information throughout the building’s life cycle are needed to maintain the results of green building efforts from previously phase(s). In the case of new buildings, an issue that often arises was the **absence of further evaluation** or follow-up of the green building practices after the closing-out and commissioning phase.
5. **Negligence** due to unaccustomed with green building practices was experienced by 31.93% of respondents as another issue that led to ineffective implementation. The survey showed that the respondents had already understood what acts to do to support the green movement; however, they admitted that they tend to forget it most of the time. The reason was, the respondents did not see the immediate benefits of such acts.
6. 30.04% of respondents underwent **higher costs for green building options than conventional ones**. Energy-saving lamps, energy-efficient electric appliances (TVs, air-conditioners, and washing machines), auto water taps, auto and/or dual flushes toilet, biopori holes, infiltration wells, recycled tissues were some examples of the referred green products for daily needs, according to them. Lack of local products accounted for the higher cost, and further affected the promotion and marketing of the imported products. The price difference between the two could reach 10 times, and it could certainly make building owners and/or managers unwilling to use the green products. In addition, the respondents experienced a longer time to recoup their purchase’s money on the green products and therefore, they often viewed the costs of these products to be too high.
7. **Insufficient supervision from responsible parties**, i.e. fellow occupants, building owners and/or building managers, and others, considered by 21.18% of respondents to be the barrier. The respondents demanded an active role from the building owner to use more green products in occupied buildings. They also thought that the building management team has not performed well in terms of periodic evaluation of the green efforts. In addition, the respondents hoped that fellow occupants could warn one another if there were any inappropriate behaviors/actions.
8. 18.40% of respondents said that **lack of awareness of the building occupants** has contributed to the slow movement of green building in Indonesia. The respondents have not fully convinced on the benefits of green building in short and long term. There were **not enough research and case studies in Indonesia** to prove the payback time and the benefits they could obtain as the results of practicing the green efforts, such as the effects of indoor quality on the health and productivity of the building occupants, the effect of good light and ventilation on energy saving, etc.
9. **Low availability of green products on the market** was another barrier according to 12.06% of respondents. A few respondents admitted that they have decided to use earth-friendly items; however, the hurdle was they could not find them on the market without any trouble. For example, solar panels for housing needs were not easy to obtain. The suppliers tend to choose selling solar panels with a greater capacity for industrial purposes for better profit.
10. **Lack of building management role in supporting green building movement**, such as placing reminder stickers to turn off unused lamps, air-conditioners, and taps; setting up green information center on occupied buildings; providing smoking area, separated waste bins, waste recycle center; supervising the implementation, activating the reward and penalty system, and so forth, contributed to the slow green movement. The respondents thought that these supporting acts should always be done by building owners/managers towards more effective implementation.

Interviews with the building owners and/or managers also managed to find some barriers from their point of view, namely:

1. **Risk of investment.** The building owners opined that the high risk of investment on green building projects caused by unequal distribution of benefits. They thought that the building users were the ones who would accrue more benefits generated from the green building than them. They agreed that the high investment cost due to the high risk could be passed on to the users, but it certainly would not be an instant process. In addition, the building owners were also concerned about the high price/rents that would cause disinterest from the third parties on choosing the green buildings. This would certainly lead to longer time in obtaining the profits. They also expressed their concerns on the high costs that needed to be spent on their old buildings to meet the green requirements.
2. Achieving green certification added a layer of accountability and integrity to the building owners. However, the cost incurred to obtain the GREENSHIP certification in Indonesia was very expensive according to the interviewees. The fee ranged from Rp. 75 to 165 million, depending on the building type and size, for a 3-year validity period. This number did not include the Rp. 5 million of donation cost, and other costs required on the assessment period. Meanwhile, in 2014, Indonesia GDP per capita was only USD 1865.65 (approximately equal to Rp. 26,053,802), and GDP from construction was Rp. 223,600. It certainly became a burden to the building owners, and no wonder that **the high cost of certification** was also considered as a barrier to them.
3. **Deficient financial support from the government and banks.** To support the green building movement in Indonesia, the government, along with GBCI, Ministry of Environment, and Ministry of Public Works, has conducted some programs i.e. issuing laws and regulations, promoting “Program Bangun Praja” which was actually a program of sustainable city, building a pilot project, and giving incentives to those who implemented the green efforts. However, the building owners said that the incentives, i.e. tax holiday, investment allowance, exemption of payable and import duty, and also other programs developed by Government Investments Center (Government Regulation No. 3/2005), were still unclear. The reason was the absence of detail explanation on the amount and procedure in the current regulation. They would also like more support from the banks. So far, only 2 banks in Indonesia, i.e. Bank Negara Indonesia (BNI), and Bank Jawa dan Banten (BJB) which are members of United Nation Environment Programme Finance Initiative, a public-private partnership between UNEP and financial sector that coordinates its environmental activities, assisting developing countries in implementing environmentally sound policies and practices. Current programs offered by the two banks were credits, and low interest loans for green projects.

It can be concluded that despite some barriers, the building occupants still had the desire to get involved in the green building movement. Of the respondents who have not practiced any green building efforts, 88.57% respondents were so aware of the current environmental problems, and it motivated them to practice the green efforts in the future. Other reasons that motivated them were cost savings on energy and water (20% of respondents), and the benefit to health and comfort (11.43% of respondents). They also expressed their willingness to participate in self-development programs, and change the lifestyle in accordance with the green building concept.

## 5. Analysis and recommendations

SWOT analysis was used to identify the strengths and weaknesses (i.e. internal factors according to building occupants), and opportunities and threats (i.e. external factors according to other stakeholders, i.e. government and GBCI, present currently in green building movement in Indonesia (see Table 1). Furthermore, some improvement strategies related to building occupants towards the success of green building movement can be recommended as follows:

1. **Comprehensive education programs** on green building are needed in order to increase the knowledge, and raise the public awareness. One thing that should be emphasized on the programs is the benefits of green building practices that people can gain both in short and long term. By doing so, they are expected to automatically implement the green practices by themselves. The government and GBCI can work together with schools, universities, and industries to run programs through talks, seminars, presentations, competitions, study tours, research, advertisements, etc. **The media influences** should also be harnessed to communicate the key messages of the green movement, raise awareness, support research, and conduct awareness sessions and trainings.
2. The schools and universities need to **incorporate green building practices in their curriculum** in order to prepare the next generations who concern about the environment. With enough knowledge, the students are expected to be able to implement the green practices as a habit in daily life, including in the workforce later on.
3. The government, together with the industries and particularly universities should also be active in **providing grants for research and creative innovation** on green options. It is intended to enhance the local products at a more affordable price. The industries also have to **improve the marketing strategies** to effectively introduce and bring more updates of green options to other stakeholders.

4. The efforts to raise public awareness on green building movement in Indonesia definitely will take decades to reach the expectation. In order to generate maximum result, this bottom-up approach should be combined with top-down approach. It is admitted by the respondents that somehow, the interference and pressure from the government to raise the green building practices will most likely be more effective due to the nature of Indonesian people. This **top-down approach** ensures the green practice done by all, even by the one who actually do not want to adopt it. For this moment, the top down approach would be faster and more effective on achieving the objective.

Tabel 1. SWOT analysis

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>- High motivation to practice green building due to cost savings on energy and water, and benefits to health and comfort</li> <li>- Willingness to participate in self-development programs, and change the lifestyle in accordance with the green building concept</li> </ul>	<ul style="list-style-type: none"> <li>- Inadequate knowledge and information</li> <li>- Lack of awareness</li> <li>- Lack of supportive atmosphere</li> <li>- Resistance to change</li> <li>- Negligence</li> <li>- High cost and low availability of green options</li> <li>- Lack of building management role i.e. exemplary behaviors</li> <li>- Lack of supervision (absence of reward and penalty scheme)</li> <li>- Risk of investment</li> <li>- Deficient financial support</li> <li>- Unclear regulations and codes</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>- Rising energy price</li> <li>- Changes in people needs regarding healthier and more productive life that can be obtained through green building practices (growing demand of green building)</li> <li>- The presence of GBCI that fully committed to green building movement in Indonesia</li> <li>- The commitment promised by the government to provide incentives</li> </ul>	<ul style="list-style-type: none"> <li>- Entry of foreign competitors in local construction industry</li> <li>- Stringent government demand of green building due to their commitment to reduce the CO<sub>2</sub> emission by 26% in 2020</li> </ul>

5. Reward and penalty scheme is one way to support the top down approach. The rewards in the form of **incentives**, i.e. green soft loans, tax reduction, exemption of payable and import duty, cash money, award, recognition, etc. can be offered by the government, banks, industries, and even the building management for a saving on energy and water. However, to balance the previous efforts, the penalty must be given strictly to any violations of green practices, starting from a warning to real punishments. **Supervision** is required to ensure that such scheme works well. Only then, the public will respect the applicable rules/regulations and will continue to practice the green efforts. The supervision can be done by all the stakeholders, either by the government, building management, or even by each individual.
6. The existing regulations should be deepened in the forms of **codes of practices**, as well as GREENSHIP requirements into **more detailed measurements**, in order to ease the building occupants and other stakeholders on implementing the green practices. In relation to the certification, based on complaints conveyed by the building occupants, GBCI is expected to consider a **reduction of certification fee** to raise interest from the stakeholders to label their green products/buildings.
7. **All stakeholders should be active** in developing and promoting green programs or approaches to the public. Especially to the building users, the role of building management is very important to a successful green movement. Approaches such as organizing green talks/seminars, competitions, and training for appropriate skills, utilizing green options in occupied buildings, promoting and reminding users of daily green practices using posters, stickers, and banners, providing smoking area, and more important, evaluating the green practices done by building users are some examples needed to reduce the negligence and raise awareness among the building occupants.

## 6. Conclusions

The findings revealed that the main barrier of green building movement in Indonesia is inadequate understanding of green building concept from building occupants, and even from other stakeholders. This key issue leads to other problems such as burdensome implementation, lack of awareness, negligence, and resistance to change to the new green lifestyle. Top-down approach which relies on high level of coercion and strict enforcement to other stakeholders to incorporate green building practices in future developments are expected to address the issues of reluctance and indifference of Indonesian people on green building movement. Lack of supports, appreciations, as

well as exemplary behaviors from the government, banks, industries, and building managements also creates a challenge to building practitioners and occupants to own, design, build and practice in green concept more effectively. In addition, unclear current regulations and codes, less detailed measurements of GREENSHIP, lack of creative innovations and ineffective marketing strategies of green products are some issues that need to be considered for future developments by the relevant parties. At the end, only through the integration of all efforts by the stakeholders in construction industry can it play the great result of green building movement in Indonesia.

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