

Green Building and Sustainable Development: Prospects and Challenges to Infrastructure Advancement of Bangladesh

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Abstract

Recently, there has been discussions about energy conservation and going green. So nowadays, developing countries are trying to be green building based country. Bangladesh is not an exception in this case. The aim of this research is to identify and explore the prospects and challenges of green building towards sustainable development. An extensive literature scan was carried out to perform a questionnaire survey for the study. Relative Importance Index (RII) was used to analyze and rank the fourteen possible prospects and seventeen challenges to green and sustainable development. It is evident from the analysis that long term cost-effectiveness, habitant's health improvement, savings in energy and electricity, creation of strong and global partnership and optimization of site potentiality are the main prospects. In addition, resources and skill gap, absence of public awareness, misconception about cost-effectiveness, lack of market consciousness and insufficient knowledge on green building design and execution are the major challenges towards green building development. The research tends to set effective recommendations to reduce abundant challenges and implement the prospects for the growth of green economy within the green infrastructure development.

Keywords: *Green building; Sustainability; Prospects; Challenges; Bangladesh.*

1. Introduction

Green building refers to a structure that uses special techniques for the construction and provides the tenants a great atmosphere inside the building by being naturally sustainable. The significance of such structures are seen in case of energy, material and water efficiency, indoor environment quality preservation, reducing pressure on natural sources, providing better health to human and so on to acknowledge them as green. On the contrary, changing of climate, deficient energy and increasing environmental contamination are some major international drawbacks in the current world that creates tremendous challenges to the property way forward for ethnic society. Around the world, the average temperature has been increasing day by day. The world's greenhouse gas discharge from force-related outlay may increase quickly with time (Zhang et al., 2017). Meanwhile, rising demography leads to make a serious problem in Bangladesh as well as around the globe. So, among these issues, the building industry has been defamed due to exploiting a great amount of energy and natural resources. In several cities, the

structural sector is becoming one of the highest force shoppers over trade and transportation systems. Warnings and explorations show that energy use on engineered surroundings can rise at about 34% by 2030 (Lombard et al., 2007). Large usage of force in the structural sector has deposited the segment's share in total greenhouse gas discharges. Besides, typical style of building have a negative impact on local climate, natural system and human health, but green building is designed to scale back that negative impact from the surroundings. To solve such problems, the concept of green building came and environment-conscious folks are encouraged to construct green building to control environmental downfall around the world. In addition, the concept of sustainable design is a process to make connection between building and environment and make our home environment friendly and energy efficient. More specifically, sustainable building construction emphasizes on diminution of natural losses and substance optimizations. International goals of sustainability have led to the development of the green building motions that has guided wonderful success. Although green building was not so popular in Bangladesh in past, currently the trend is going high. If Bangladesh can implement green practices, huge prospects will come in the way. Green building practice around the country can lessen the use of energy, water, power. In addition, recycling of materials and wastewater, enhancement of building's internal air quality for human well-being, long term durability of structures and decrease of carbon emission as well as saving our environment and climate can be seen.

On the contrary, enormous challenges and barriers come in the way of green and sustainable practice. Inadequate level of awareness and inadequate knowledge of stakeholders are the main barriers (Serpell et al., 2013). Also, Resistance of stakeholders to change and higher cost are counted as the most critical challenges (Chan et al., 2016). In addition, inadequate information, cost, lack of incentives, disinterest and demand, and lack of GB codes and regulations towards the implementation of green and sustainable practices (Darko and Chan, 2017). So, considering such cases, Bangladesh requires to act strictly for achieving the sustainable development goals. If proper initiatives are not taken quickly, the country will fall a quick victim to energy, water, power crisis and global warming. So, the research aims to identify and analyze the prospects and challenges of green building with respect to achieve the sustainability. This work may help higher authorities, stakeholders, sponsors and clients to understand every factor that are related to green building movement. Finally, the paper will set fruitful recommendations that may help in removing the barriers and challenges in the way of acquiring sustainable development and the prospects of green building becomes visible.

2. Methodology

The necessary data was assembled from research papers and practical points of view. The data was observed to identify the possible prospects and apparent challenges related to green building. A good portion of significant data and information was accumulated particularly from a decent inquiry and the rest were stated utilizing available sources.

2.1. Data Collection

The type and conduct of this review can be termed as quantitative data collection. In this approach, observation via journals and conference papers, contents etc seemed to be effective for the design of questionnaire survey. From the effective literature scan, fourteen possible prospects and seventeen crucial challenges towards the green building and sustainable development were found. The questionnaire was then distributed through google form to 104

judicious person to complete the online survey by their responses. In this process, the active respondents were architects, engineers, contractors, project managers and students from the relevant field. Following tables represent the short sample of response collection, where level of each factor was judged based on relative value (1-Negligible, 2-less, 3-medium, 4-high, 5-very high):

Table 1. Prospects of green building

Prospects	Relative Value				
	1	2	3	4	5
Utilization of renewable energy				*	
Enhancement of internal atmosphere quality			*		
Recycling of materials and wastewater				*	
Long term cost-effectiveness for structure					*
Mitigation of climate change risks			*		
Increment of sustainable business practices		*			
Impressive contribution to GDP			*		
Savings in energy and electricity				*	
To be continued					

Table 2. Challenges of green building

Challenges	Relative Value				
	1	2	3	4	5
Unfamiliarity with green building concept				*	
Lack of market consciousness					*
Misconception about cost-effectiveness				*	
Client's reluctance with proposal				*	
Scarcity of green building codes and regulations			*		
Construction consumes much time			*		
Less availability of materials and products				*	
Lengthy analysis of project before approval		*			
To be continued					

2.2. Data Analysis

Relative Importance Index (RII) was used to visualize the prospects and challenges to green building development, as this allowed to identify and rank the important factors based on participants' response. Equation (1) represents the mathematical formula for the calculation of Relative Importance Index:

$$\text{Relative Importance Index} = (\sum W)/(AN) \quad (1)$$

Here, W = Weight given to each factor (Relative value 1 to 5, where 1 means least and 5 means intense).

A = Highest value of range (In this study, A = 5) and,

N = Number of total respondents.

3. Results and Discussions

In this study, fourteen major prospects of green building were found, that are sorted below in terms of Relative Importance Index (RII).

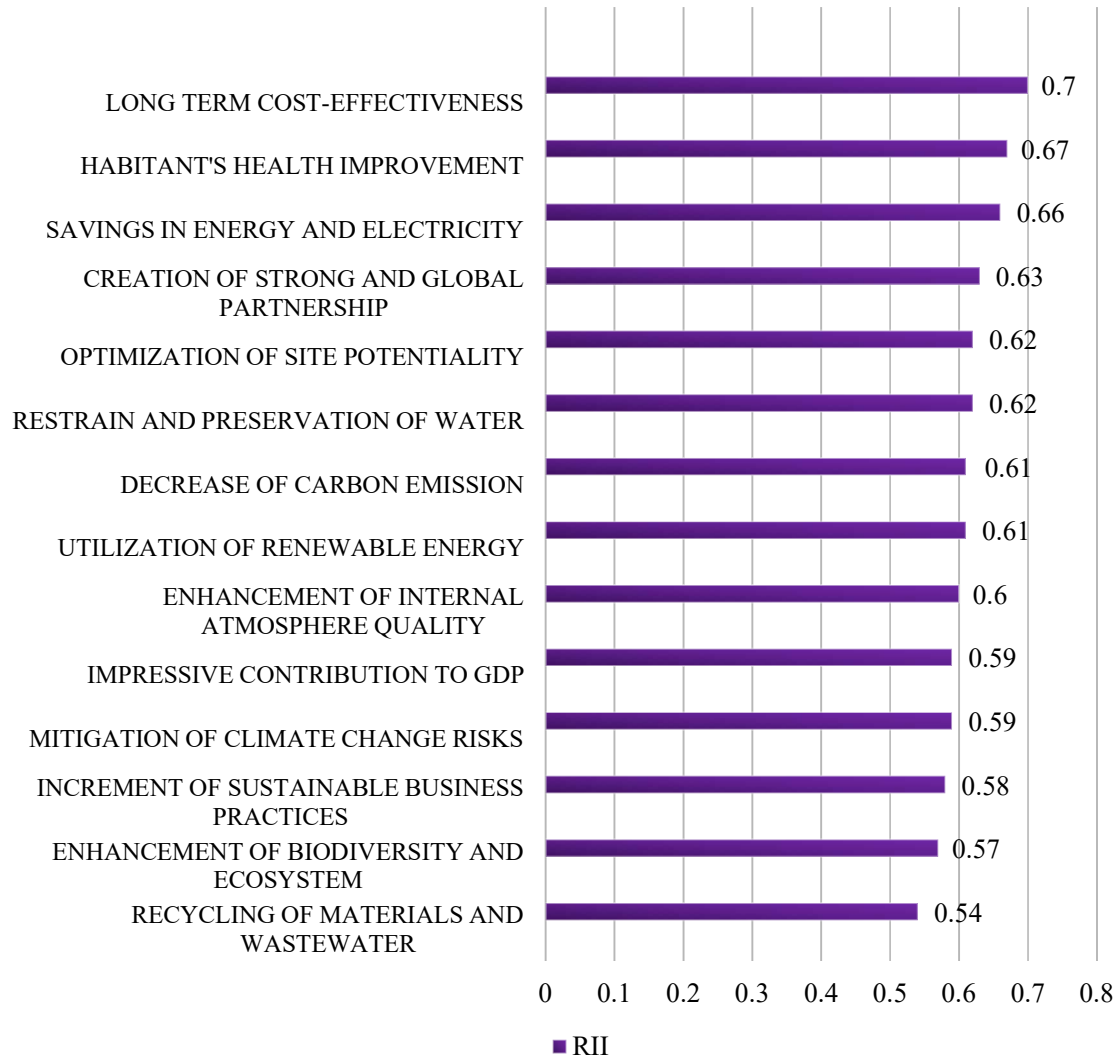


Figure 1. Prospects of green building

Above figure expressed long term cost-effectiveness, habitant's health improvement, savings in energy and electricity, creation of strong and global partnership and optimization of site potentiality as the top prospects of green building with respect to Bangladesh. Except those, other factors may contribute a lot. It is evident from the analysis if green building practices can be enhanced, the country will face enormous positive change towards sustainability and infrastructure development.

Moreover, the study sorted seventeen barriers and challenges towards the green building development and attainment of sustainability. Inadequate experience on sustainable construction, unfamiliarity with sustainable techniques, project manager's less qualifications, construction manager's less qualifications and unawareness of proper methods and processes

are the major obstacles to sustainable construction (Chowdhury et al., 2018). Figure 2 reveals the degree of challenges based on the Relative Importance Index (RII).

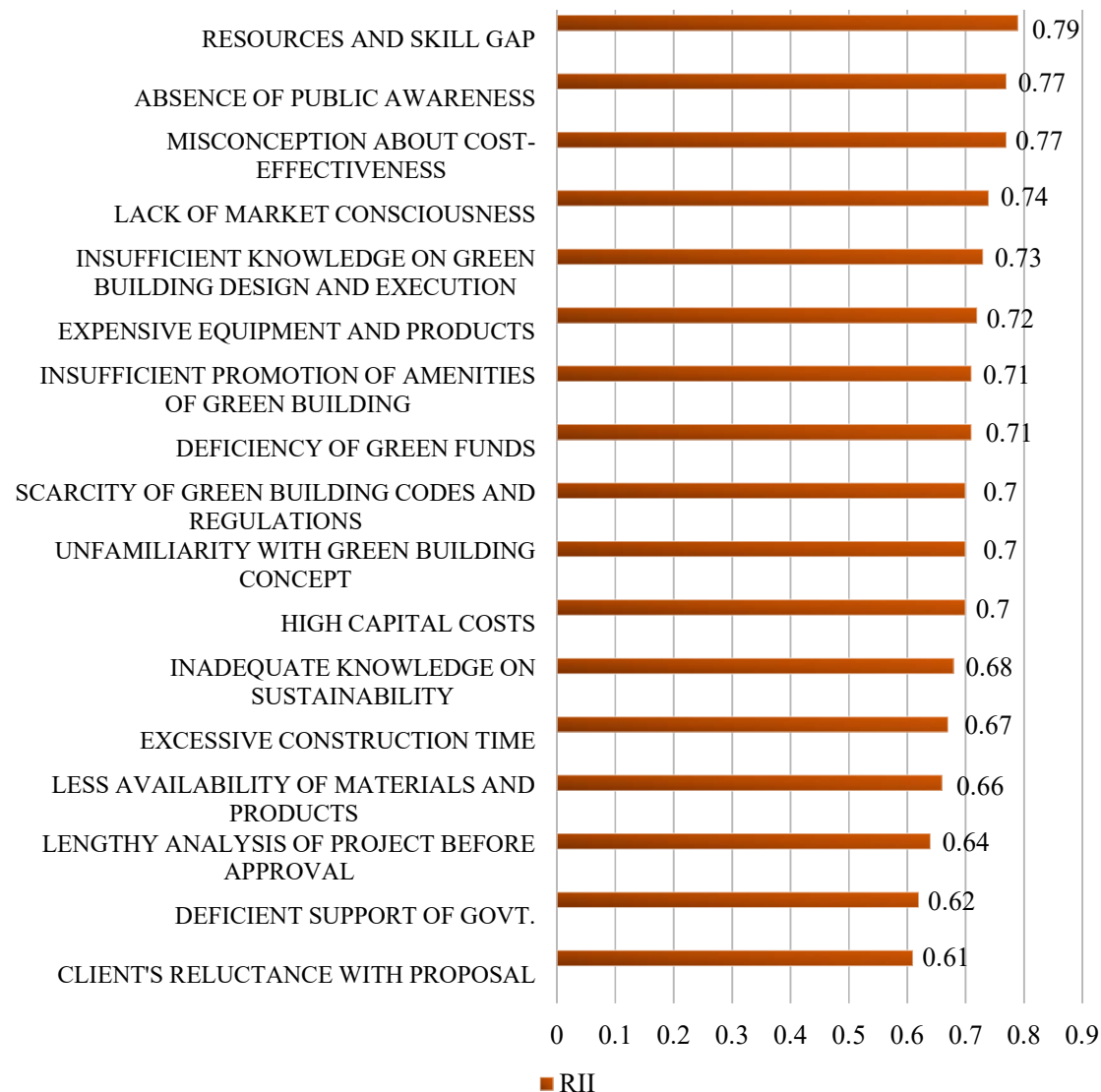


Figure 2. Challenges of green building

Figure 2 pointed out resources and skill gap, absence of public awareness, misconception about cost-effectiveness, lack of market consciousness and insufficient knowledge on green building design and execution as the top five and major challenges to green infrastructure development. The result varied from Chowdhury et al. because of this study’s updated, recent considerations and the respondent’s opinion and judgement. To conclude, all of the seventeen challenges are liable to resist the progression of green building movement for which the country is suffering from numerous ways.

4. Conclusions and Recommendations

Green building practice implementation is a great concern for developing country like Bangladesh as the country is facing too much environmental pollutions and problems. That’s

why the study was undertaken to explore the most effective prospects and the major challenges of green and sustainable movement for this country. On the basis of RII, long term cost-effectiveness, habitant's health improvement, savings in energy and electricity, creation of strong and global partnership and optimization of site potentiality were found as peak emerging prospects. Also, resources and skill gap, absence of public awareness, misconception about cost-effectiveness, lack of market consciousness and insufficient knowledge on green building design and execution were the prime challenges towards the green infrastructure advancement. This research may support the authorities, stakeholders, sponsors and clients to understand the positive aspects and hindrances towards green building execution. To minimize and remove the barriers, higher authorities must take appropriate steps. Awareness of green building concept and cost-effectiveness of structures, market consciousness, increased promotion on green building's amenities, necessary private and govt. green funds, implementation of green building codes and regulations, availability of materials and products and most importantly development of project manager, engineer and worker's skills in green design, construction and execution must be ensured. Thus, the most possible prospects can be utilized for further study and Bangladesh may go ahead with the infrastructure and sustainable development by overcoming abundant barriers and challenges.

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