

A Study on the Knowledge Dissemination of Green Buildings among the Architects in Kerala

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Abstract

Green Building Knowledge Dissemination is very much essential for the diffusion of green buildings in the construction sector. Information is vital in molding any professionals approach towards greenness. Proper communication channels and information dissemination is of crucial importance to achieve sustainability in the built environment as construction of green buildings requires integrated set of activities. Hence, the present study tries to understand the familiarity towards green building of one of the major stakeholders of green buildings i.e., Architects; by analyzing their source of green building knowledge. Percentage analysis, one sample t test, independent sample t test and ANOVA are used to analyze the Architects profile and how they learned about green building. Gender- age- experience effect on the nature and source of information acquired by them are also analyzed. This study can help academicians and policy makers in creating effective platforms for information dissemination.

Keywords: Sustainability, Green Building, Green Building Knowledge, Architects.

1. Introduction

Green Building practices are primarily concerned with reducing the environmental degradation and unpleasant impacts associated with construction. The need for green buildings in the construction sector has become very significant in the recent decade mostly because of the major resource consumption and contamination which buildings create. Green Buildings are important to ensure sustainability in construction sector. All the major stakeholders of construction industry should join hands together in the attempt to make the built environment green and sustainable. The dissemination of Green Building knowledge and adaptation of Green Building technologies are being hindered because of lack of understanding of green building concepts among the stakeholders. So, awareness of green building is essential among the stakeholders of the construction industry to contribute to the betterment of the built environment.

2. Review of Literature

Major stakeholders of the construction industry especially developers and architects should have in-depth understanding about the concept of sustainability and green building construction knowledge. Information, Promotion and Education Barriers are found to be the major downsides for green building infusion. These barriers emerge internally due to information asymmetry, lack of knowledge and expertise in life cycle costing of building and so on. The green building sector has a lot of asymmetric information on technical and managerial perspectives and it impacts different firms and stakeholders in their choice to invest. The unbalanced data relates to issues like buildings Act, energy efficiency, wastage, energy labels etc. (Abraham & Gundimeda, 2017). This limitation of knowledge refers to the lack of comprehension about the concept of Green Building used by all the stakeholders like owners, construction managers, architects, builders, engineers and occupants who can incorporate green building concepts into a building life cycle. The significance of green building knowledge centers around three main viewpoints: the advantage of green buildings, understanding about existing green advancements, and comprehension of how to utilize Green Building technology properly and productively (Zhang Y, et al., 2019). Ahn & Pearce (2007) emphasized that most popular methods of getting green building information and

skills by the construction-related industry are by sending their workers to sustainability related conferences and by reading green building magazines. They also added that Universities should teach green building rating systems and other related aspects of sustainability and green building process and products to familiarize construction related students with green building. Berawi et al. (2019) asserted that to accelerate green building implementation, the government should play a pivotal role. They professed that in order to improve the current status of green building, it is imperative that the concepts of green building and its components should be promoted through socialization, workshop and knowledge sharing. Usman & Khamidi (2012) noted that the communication and education strategy is very important in making the stakeholders understand about sustainability issues and green building concepts. Also, NGO's, mass media, scientific community and policy creators must function unitedly in order to create awareness among the general public as well. Potbhare et al. (2009) stated that availability of better information on cost and benefits of green building guidelines can trigger green building adoption. An informed approach should be followed to create awareness through variety of information sources such as internet, print media, newspapers, workshops and seminars, courses and books etc.

3. Significance of the study

Green Building Knowledge Dissemination is very much essential for the diffusion of green buildings in the construction sector. Green building knowledge background can ideally help Architects to spearhead a more sustainable building culture. This paper is an attempt to know how green building knowledge is infused in the Architect community, whether conscious effort has been made by them to gain a good background in green building. This paper aims to evaluate architect's knowledge of green building from various sources.

4. Methodology

The researcher followed a descriptive approach in conducting the study. Data was collected from 40 Architects registered in the Council of Architecture from Kerala. Purposive Sampling method was used to select architects using the Architects Directory and asking their

interest in Green Building concepts, since many architects were not given due concern to the Green Building concept. The collected data was analyzed using Percentage Analysis, One sample t test, Independent sample t test and ANOVA.

The **main objective** of the study is to explore how Architects learned about green buildings and to what extent, Architects relied on various sources of information to gain knowledge about green building practices and techniques. The **second objective** is to analyze the effect of age gender and experience on the sources of green building information. Three Hypotheses were formulated based on this objective for the study which are as follows:

- H1: There is no significant difference in the level of green building information from various sources as far as gender of the respondent is considered.
- H2: There is no significant difference in the level of green building information from various sources as far as age of the respondent is considered.
- H3: There is no significant difference in the level of green building information from various sources as far as experience of the respondent is considered.

5. Results and Discussion

Data for the study was collected from Architects working in different parts of the state in Kerala. Profile of the Architects based on gender, age and experience is discussed in this section. Percentage Analysis was done.

Respondents Profile:

Table 1: Gender wise distribution of the respondents

Gender	Number	Percentage
Male	23	57.5
Female	17	42.5
Total	40	100.0

Source: Primary data

Table 1 shows the Gender wise distribution of the respondents. Out of 40 respondents, 57.5 percent of the respondents are male architects and 42.5 percent are female architects.

Table 2: Age wise distribution of the respondents

Age	Number	Percentage
Up to 30	17	42.5
30 – 40	14	35.0
Above 40	9	22.5
Total	40	100.0

Source: Primary Data

Table 2 depicts the Age wise distribution of the respondents. It was noted that 42.5 percent of the respondents are in the age group of up to 30 years. 35 percent belonged to the age group of 30 to 40 years. And the remaining 9 percent are in the above 40 age group.

Table 3: Experience wise distribution of the respondents

Experience	Number	Percentage
Upto 5 years	15	37.5
6 – 15	14	35.0
Above 15	11	27.5
Total	40	100.0

Source: Primary Data

Table 3 illustrated the Experience wise distribution of the respondents. 37.5 percent architects had the work experience of up to 5 years. 35 percent architects had 6-15 years of experience and 27.5 architects had experience of more than 15 years.

Architects Level of Information from Various Sources:

Green Building information can be disseminated to the Architect Community from several sources. The study analyses the various sources of information that provides green building knowledge and education to the Architects.

Table 4: Architects Level of Green Building Knowledge from Various Sources

Variables	Mean	SD	t-value	p-value
During the course of Architecture Education	2.1250	.60712	1.302	.200
Read about it in articles and books	2.6500	.57957	7.093	.000
From a colleague/supervisor	2.2000	.68687	1.842	.073
Attending Green Building Conference and Events	2.1750	.71208	1.554	.128
Internet /Websites	2.5750	.54948	6.618	.000
Professional membership associations	1.9500	.87560	-.361	.720
Independent research studies	2.2250	.80024	1.778	.083
Green Certification Agency	1.6750	.72986	-2.816	.008
Government Rating Schemes	1.4750	.67889	-4.891	.000
Professional magazines or newsletters	2.3250	.57233	3.591	.001
Taking courses about green buildings	1.8250	.87376	-1.267	.213

Source: Primary Data

Table 4 presents the mean score values obtained for the extent of green building knowledge gained from various sources of information using One sample t-test. Test value is 2.

The results indicate that the mean score is greater than the test value 2 in case of source of information reading about green building in articles and books (Mean = 2.650, SD=0.579 and p value=0.000), Internet/ Websites (Mean = 2.5750, SD=0.549 and p value=0.000) and Professional magazines or newsletters (Mean =2.3250, SD= 0.572 and p value=0.001). Calculated P value for all these sources was found to be less than 0.05. Hence the level of information from these sources are significantly very high.

The results shows that mean score is greater than test value 2 for information obtained during the course of Architecture education (Mean =2.125, SD= 0.607 and p value=0.200), from colleague/supervisor (Mean = 2.200, SD=0.686 and p value= 0.073), attending green building conference & events (Mean = 2.1750, SD=0.712 and p value=0.128) and Independent research studies (Mean =2.2250, SD=0.800 and p value=0.083). The calculated p value for all these sources is found to be greater than 0.05. Hence the level of information from these sources is also comparatively high.

The mean score for information is less than the test value 2 for information from Professional membership associations (Mean = 1.950, SD=0.875 and p value=0.720) and taking courses about green buildings (Mean = 1.825, SD=0.873 and p value=0.213). Calculated t value is found to be negative. Calculated P value is greater than 0.05. Hence the information obtained from these sources is found to be comparatively low.

The mean score for information is less than the table value 2 for information from Green Certification Agency (Mean =1.675, SD=0.729 and p value=0.008) and Government rating schemes (Mean = 1.475, SD=0.678 and p value=0.000). Calculated t value is found to be negative and calculated P value is less than 0.05. Hence the information obtained from these is significantly very low. Least information is obtained from these sources.

Comparison of Level of Information from various sources based on gender, age and experience:

The **hypotheses** were tested using Independent sample t test and ANOVA and are shown in table below:

- H1: There is no significant difference in the level of green building information from various sources as far as gender of the respondent is considered.

Independent sample t-test was applied to compare the significance of difference between male and female architects regarding the level of information from various sources and the results are presented in Table 5.

Table 5: Comparison between male and female

Gender	Number	Mean	SD	t-value	p-value
Male	23	23.2174	4.18826	.035	.972
Female	17	23.1765	2.67477		

Source: Primary Data

Table 5 reveals that the mean score obtained for green building information from various sources for male is 23.217 with standard deviation 4.188 and that of female is 23.176 with standard deviation 2.674. The p value (0.972) is found to be greater than the value 0.05 and calculated t value (0.035) is less than 2.02. There is no significant difference in the mean score of information from various sources based on gender. Hence the null hypothesis “There is no significant difference in the level of green building information from various sources as far as gender of the respondent is considered” is accepted.

- H2: There is no significant difference in the level of green building information from various sources as far as age of the respondent is considered.

Analysis of Variance was applied to compare the significance of difference among different age groups regarding the level of information from various sources and the results are presented in Table 6.

Table 6: Comparison based on age

Age	Number	Mean	SD	F-value	p-value
Upto 30	17	23.8824	2.80362	1.023	.369
30 – 40	14	23.2857	3.66750		
Above 40	9	21.7778	4.65773		
Total	40	23.2000	3.58201		

Source: Primary Data

Table 6 illustrates the mean score obtained for green building information from various sources for different age groups. Mean score for age group up to 30 years is 23.882 with

standard deviation 2.803, for 30-40 years mean score is 23.285 with standard deviation 3.667 and that of above 40 age group is 21.778 with standard deviation 4.657. Calculated F value 1.023 less than the table value 3.23. P value (0.369) is greater than 0.05. There exists no significant difference in the mean score of information among different age group in the green building information gained. Hence the null hypothesis “There is no significant difference in the level of green building information from various sources as far as age of the respondent is considered” is accepted.

- H3: There is no significant difference in the level of green building information from various sources as far as experience of the respondent is considered.

Analysis of Variance was applied to compare the significance of difference among respondents based on work experience regarding the level of information from various sources and the results are presented in Table 7.

Table 7: Comparison based on experience

Experience	Number	Mean	SD	F-value	p-value
Upto 5 years	15	23.7333	2.96327	.259	.773
6 – 15	14	22.9286	3.26907		
Above 15	11	22.8182	4.81286		
Total	40	23.2000	3.58201		

Source Primary Data

Table 7 presents the Experience wise mean score of the respondents. Mean score for work experience up to 5 years is 23.733 with standard deviation 2.963, mean score for 6-15 years of experience is 22.928 with standard deviation 3.269 and that of above 15 years work experience is 22.818 with standard deviation 4.812. Calculated F value 0.259 less than the table value 3.23. P value (0.773) is greater than 0.05. There is no significant difference in the mean score of information from various sources based on years of experience. Hence the null hypothesis “There is no significant difference in the level of green building information from various sources as far as experience of the respondent is considered” is accepted.

6. Findings & Conclusion

The paper investigated the level of information and the various source of information of green building among the architect professionals in the state of Kerala in India. From the above discussion we can conclude that high extent of information was gained mainly through reading about green building in articles and books, Internet/ Websites and Professional magazines or newsletters. This shows that the architects made a conscious effort to know about green building concepts and it is a very good indicator. The level of information obtained from Green Certification Agency and Government rating schemes were significantly very low. This stresses on the need for Government to take necessary steps to popularize green certifications and green ratings because it could lead to rapid adoption of green buildings. Effective communication and education strategies should be implemented by the Government to impart green building guidelines through agencies and rating schemes. The study also found that there exist no significant difference in the variables- age, gender and experience regarding information gained from various sources. The study concludes that the architect professionals in Kerala have awareness in green building concepts gathered from various sources. If this awareness could lead to action, it could boost the social, economic and environmental wellness of the built environment. Architects should also share this information with all the other stakeholders and express this knowledge in their professional practice.

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