

MARKET FOR RESIDENTIAL GREEN BUILDING – AN EMPIRICAL STUDY

Sunitha Lizzie Pereira *

Dr Mustiary Begum**.

**Research Scholar, Dept. of Business Administration, Mangalore University, Karnataka, India, Email: sunithalperreira@gmail.com*

***Professor, Dept. of Business Administration, Mangalore University, Karnataka, India, email: mb_begum@yahoo.com*

ABSTRACT

This study examines the awareness and preference of people towards residential green building in Mangaluru, India. The findings rest on a foundation of positive attitudes toward residential green building in general, with 62% of respondents describing themselves as aware of green building. Using this set of respondents, the analysis show a high concern for environment. The ratings by respondents were analysed on various elements of green building such as, energy efficiency, water conservation, location and indoor environment quality. Potential advertising methods where explored through a set of questions, garnering the results that showed the Internet search engine as the most likely source of information about residential green building, a finding that holds the potential for relatively inexpensive advertising campaigns by firms. On the whole, the findings of this research offer insights into the Indian residential building market for builders and developers by investigating the expectations and needs of the population.

Keywords: Environmental Concern, Elements of Green Building, Residential Green Building, Sustainable design, Market Research

Introduction:

Buildings are the major source of demand for energy and materials that produce greenhouse gases (GHG) as by-product. Studies show that over 40 percent of world's energy requirements are by building sector. More than 20 percent of the energy consumption and carbon dioxide generation could be saved by applying acknowledged standards to buildings. The demand for sustainable design and sustainable construction is increasing because of the depleting natural resources, increase in energy costs and awareness of global warming (Yudelson, 2008). Sustainable design for buildings offers the largest single potential for global energy efficiency. The steep rise in oil prices from 2004, affected the psychology of builders, developers, building owners, consumers and government officials. They realized that the energy prices are going to be much more in the near future than in the past. The major driving factors for the reduction in building energy use will be human induced climate change and greenhouse gas issues. This will bring about a revolution in passive solar design, incorporation of daylighting and use of natural ventilation approaches worldwide (Yudelson, 2008).

Sustainable design and Green Building have been major movements worldwide in the design, development and construction industry. A green building is one that considers and reduces its impact on the indoor and outdoor environment and human health. Green building is designed so that it consumes less energy and water. It uses recycled and locally available resources, so that the energy consumed to manufacture and transport the materials is reduced. The design of green building incorporates better site selection and development practices. In the US, United States Green Building Council (USGBC) certifies green buildings using LEED certification.

LEED certification is given by rating buildings across five categories of concern using a number of attributes in each category. These five categories are; creating sustainable sites, conserving water, conserving energy, using materials and resources efficiently and ensuring good indoor environmental quality. The LEED rating system is a form of an eco-label that describes the environmental attributes of the project. LEED provides for four levels of certification: Certified, Silver, Gold and Platinum (USGBC, 2009).

In India, Indian Green Building Council's (IGBC) rating systems was launched in 2007. IGBC has made rapid strides in the residential, commercial and industrial green building sector in India. As many as 2,996 buildings have applied for green ratings in India with over 2.63 Billion sq.ft. of constructed area. Many builders and developers have taken a lead in construction of green buildings in metro cities of India.

IGBC Green Homes rating system addresses green features under the following six categories.

They are

- Site Selection and Planning
- Water Conservation
- Energy Efficiency
- Materials & Resources
- Indoor Environmental Quality

- Innovation & Design Process

IGBC Green Homes® is designed primarily for new residential buildings. However, it is also applicable for existing buildings designed in accordance with the IGBC Green Homes criteria. Different levels of green building certification are awarded based on the total credits earned. However, every Green Home should meet certain mandatory requirements, which are non-negotiable. The threshold criteria for certification/pre-certification levels are as under. (IGBC, 2015)

Table 1: Criteria for certification

Certification Level	Individual Units	Multi-dwelling Units	Recognition
Certified	38 – 44	50 – 59	Best Practices
Silver	45 – 51	60 – 69	Outstanding Performance
Gold	52 - 59	70 – 79	National Excellence
Platinum	60 - 75	80 – 89	Global Leadership

Source: IGBC

Need for the Study:

Over the last few years, the green building movement has gained tremendous momentum. The concept “Green Building” is attracting people’s imagination. Mangaluru, is developing very fast and there is an immense pressure on environment, electricity, and waste disposal and water resources. Shortage of electricity and water has affected everyone. Though there are residential green buildings in the metro cities of India, Mangaluru does not have any. Many builders are advertising the new building as green, though, none have green certification. The residential green building market in Mangaluru is in its nascent stage and hence, the dynamics of key market elements, the most likely buyer characteristics and preferences are yet to be understood. This investigation is the first marketing survey of preference of people for Residential Green Buildings in Mangaluru. By understanding the importance of residential green buildings worldwide, the researcher has decided to study the awareness and knowledge of people towards residential green buildings. The research also provides the information to the builders and marketers to tap the untapped market.

Objectives of the study:

To know the awareness of people about green building.

- To study people’s preparedness to buy residential green building.
- To study what features people are interested in green building.
- To know whether people are willing to pay a premium for green buildings.
- To give suggestions based on the findings of the study.

Methodology:

A descriptive study was conducted focusing Mangaluru as study area using a structured questionnaire. 75 questionnaires were sent online through “Survey Monkey” an online survey portal, to respondents. 58 respondents completed the survey. These respondents were selected on the basis of convenience sampling method.

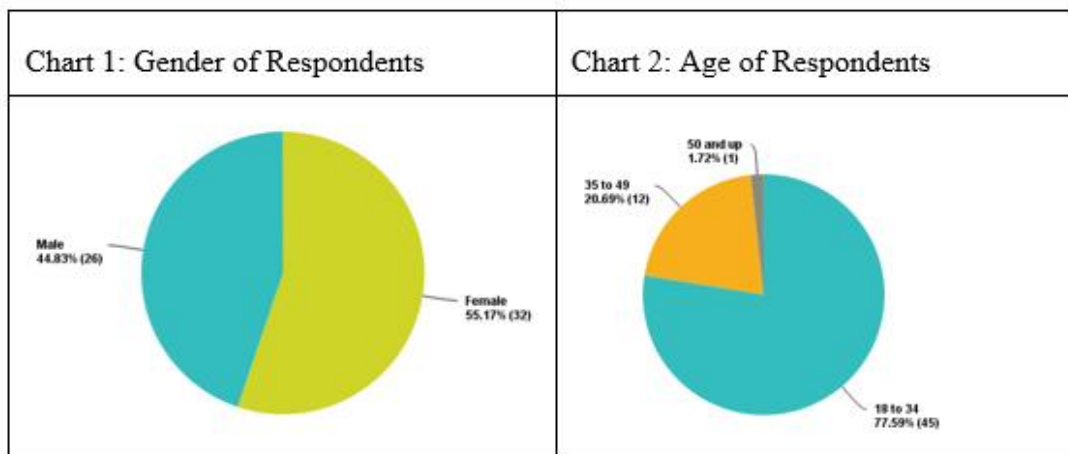
The primary data collected from sample respondents has been analysed with the help of MS Excel to draw meaningful conclusion. Along with primary data, secondary data has been collected from various published sources like books, journals, reports etc.

Data Analysis and Interpretation:

This section deals with the empirical findings related to the study. The individual characteristics of the respondents analysed are: gender, age, educational qualification, occupational status and annual income. Respondent’s awareness of green building, their willingness to pay premium, degree of influence of advertisement to buy residential flats and most important factors of green building are analysed.

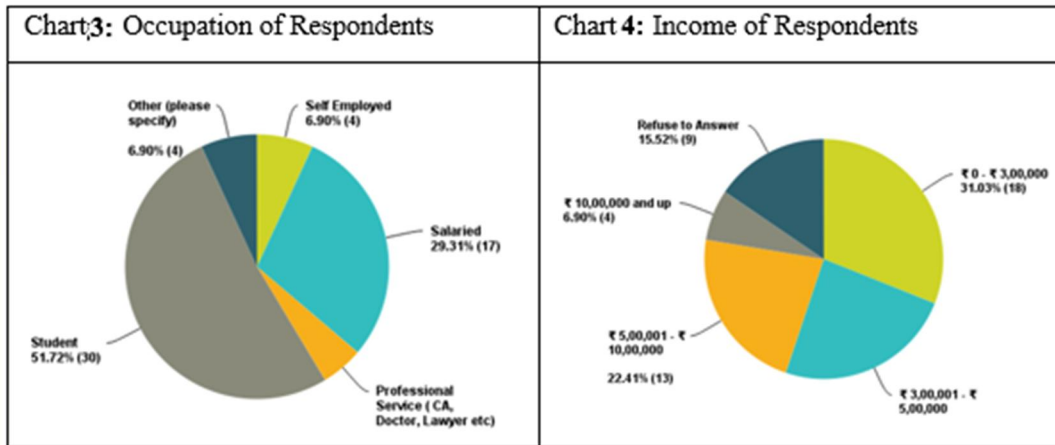
Profile of the Respondents:

The data pertaining to gender-wise classification of the respondents of the present study is shown in the Chart 1. The majority of the respondents are female 55.17% and 44.83% are male. As shown in chart 2, out of 58 respondents, 77.59% belong to the age group of 18 to 34 years, 20.69% belong to age group of 35 to 50 years and 1.72% belong to the age group above 50 years.



Source: Field Survey

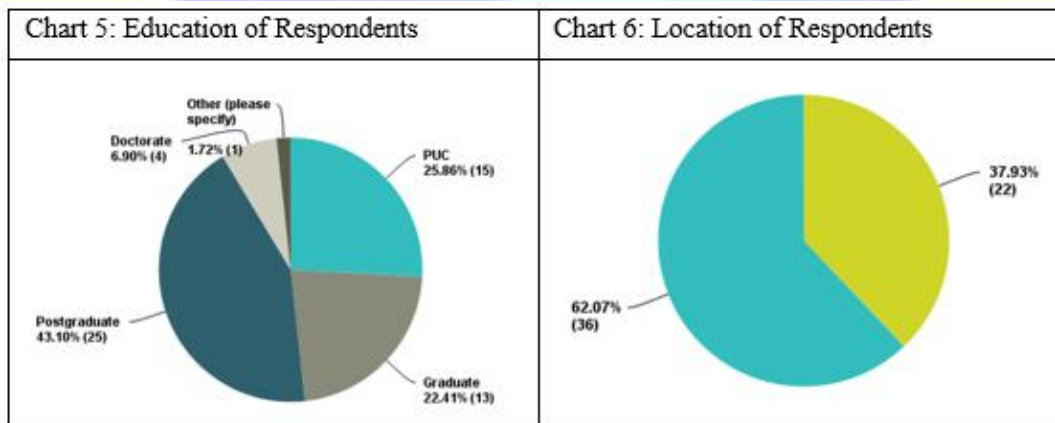
Chart 3 shows the occupational status of the respondents. 51.72 % are students, 29.31% are salaried employees, 6.9% are self-employed and 5.17% are professionals. This shows, the majority of the respondents are students and employees. The income (Chart4) of 31% of respondents is below Rs. 3 lakhs and 24.14% of respondents have income between Rs 3 lakhs to 5 lakhs where as 22.41% of respondents have income between Rs 5 lakhs and Rs 10 lakhs and only 6.9% have income above Rs 10 lakhs.



Source: Field Survey

The respondents of this study are educated as shown in Chart 5. 25.86% have done PUC and presently in undergraduate college. 22.41% are graduates, 43.1% are post graduates and 6.9% have doctorate degree.

About 38% respondents were from Mangaluru and rest are from surrounding regions of Mangaluru and other places (Chart 6).

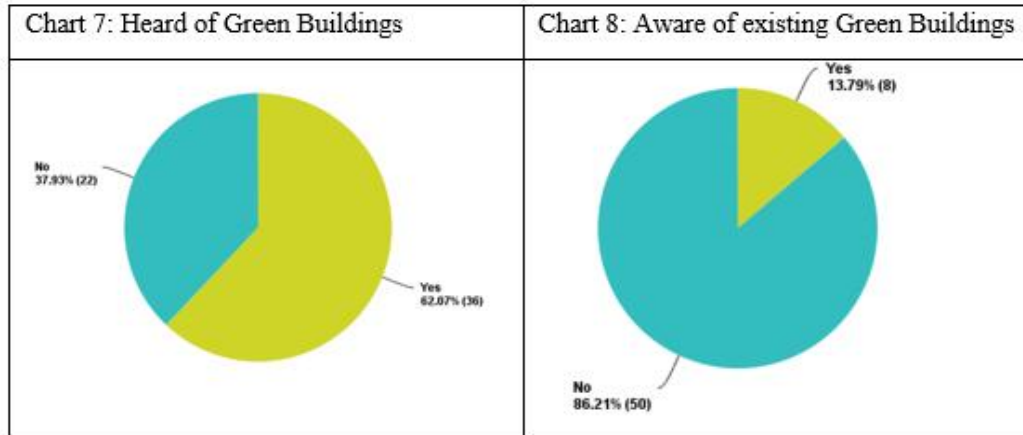


Source: Field Survey

Knowledge of Green Building

Knowledge is recognised as a characteristic that influences all phases in the decision process. Knowledge is a relevant and significant construct that affects how consumers gather and organize information (Alba and Hutchinson, 1987), to what extent they use information in decision making (Brucks, 1985) and how consumers evaluate products and services (Murray and

Schlacter). It is evident from the pie charts (Chart 7 and Chart 8), that 62% of the respondents have heard of green building and 38% have never heard of green building. At the same time 86.21% of the respondents are unaware of any green buildings in their locality. From the above analysis, it is apparent that there is a necessity to promote green building.



Source: Field Survey

Preference of Green Building Features

The researcher has made an attempt to know the preference of respondents for these attributes of green building such as creating sustainable sites, conserving water, conserving energy, using materials and resources efficiently and ensuring good indoor environmental quality. Respondents had to rate the attributes from 1 to 5, 1 being most important. Table 2 shows the average ratings given by the respondents.

Answer Options	1	2	3	4	5	Rating Average
Energy Efficiency	5	11	14	14	13	3.33
Water Efficiency	20	16	10	7	4	2.28
Indoor Air Quality	10	15	13	15	4	2.79
Location of building	14	10	10	15	8	2.88
Materials and Resources used in the Building	10	6	28			3.72

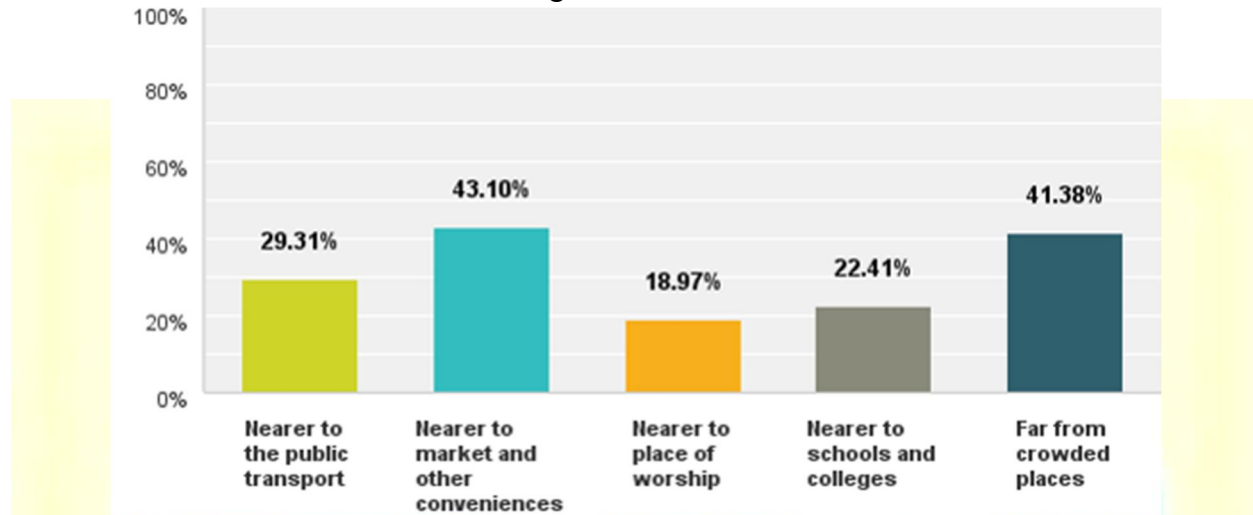
Source: Field survey

35.09% of respondents opine that water efficiency is most important (average rating 2.28) followed by indoor air quality 26% (average rating 2.79). Location of building (average rating 2.88) also finds importance as 24.56% of the respondents have found it important feature. An important conclusion from the above analysis is that people are no more worried about energy efficiency which is an important factor of green building rating system, but are worried about worsening of air quality and water scarcity.

Location of Building:

The researcher made an attempt to know the preference of respondents on the location of residential building. The features given are nearer to public transport, nearer to market and other conveniences, nearer to places of worship, nearer to schools and colleges and secluded from crowded places (Chart 9).

Chart 9: Preference for location of building

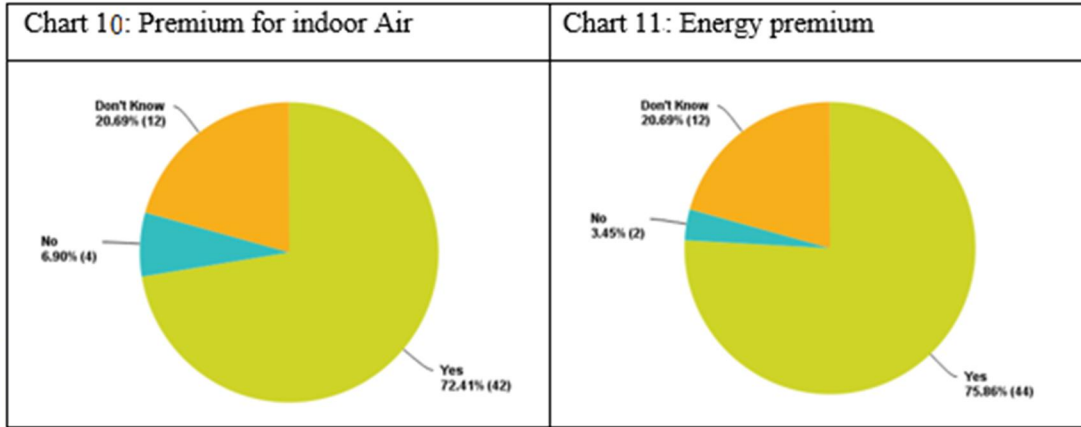


Source: Field Survey

41.38% of respondents opine that the building should be away from crowded place. At the same time they require all conveniences nearby as 43.1% want their residence nearer to market and other conveniences. Nearly 57.69% of male respondents want their house to be away from crowded place and 53.13% of female respondents want their house to be near market and other conveniences. This shows that people are willing to move outside the city for the purpose of clean air, health and well-being but at the same time they want all the conveniences nearby. Green buildings promote sustainable sites, which says the location should be near all conveniences and public transport and the place should be developed area so that people do not use their vehicles for going to market or nearby places.

Willingness to pay premium:

Research has shown that, Green buildings promote better indoor environment air quality and better energy efficiency (USGBC, 2009). It has been observed that people are willing to pay premium for improved indoor air quality and better energy efficiency. 72.41% of respondents are willing to pay premium for improved air quality (Chart 10). 75.86% respondents are willing to pay a premium for the energy efficiency (Chart 11). This shows that people are willing to pay premium for green building.

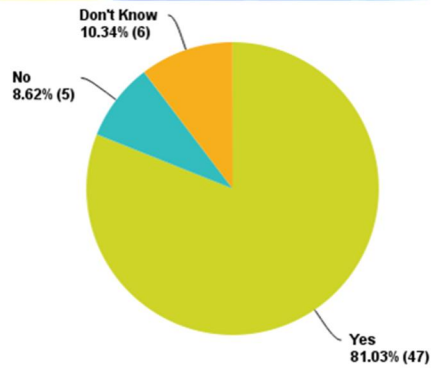


Source: Field Survey

Preference for recycled water:

Green buildings promote water conservation. Hence majority of the green buildings reuse the water for purposes like toilet flushing, gardening etc. 81.03% of the respondents prefer recycled water for non-drinking purpose. This shows people are concerned about environmental issues and are willing to conserve and reuse water.

Chart 12: Preference for recycled water for non-drinking purpose



Source: Field Survey

Advertisement

Table 3 shows the major source of information for respondents when making a buying decision.

Table 3: Degree of influence of mode of advertisement

Answer Options	Very Unlikely (1)	Unlikely (2)	Neither likely nor unlikely (3)	Likely (4)	Very Likely (5)	Rating Average
Family	6	4	13	25	10	3.50
Friends and Relatives	1	4	12	32	9	3.76
Neighbours	4	9	23	20	2	3.12
Internet search engines	0	0	6	16	36	4.52
Websites of builders	4	0	10	30	14	3.86
Newspapers	1	5	5	35	12	3.90
Magazines	3	4	12	27	12	3.71
Hoardings	4	7	18	23	6	3.34
Television	4	2	12	28	12	3.72
Radio	6	10	15	21	6	3.19
Real estate agents	9	11	15	22	1	2.91
Architects / engineers	3	4	10	29	12	3.74
Lawyers	16	8	24	8	2	2.52

Source: Field survey

The major source of information in buying a green building is Internet and search engines 62.07%, average rating 4.52. Other major influences are from website of builders, newspapers, magazine, TV advertisements, hoardings, architects and engineers as well as advocates. It can be inferred that people are willing to research before buying the green building. Since Internet is the cheapest form of advertisement, the cost of advertisement can also be reduced.

Findings:

Majority of the respondents are aware of green building, but are unaware of existing green buildings in their locality.

Preference for green building features differs. Majority prefer water efficiency, location of building and least preference is given to energy efficiency, which is the most important factor of green building rating systems.

Location of the building is given prominence. People are willing to move outside the city for the purpose of clean air, health and well-being.

Internet and search engines are considered as a useful source of information.

Majority of the respondents are willing to pay premium for green building.

Respondents are concerned about environmental protection.

Suggestions:

From the above analysis, it is apparent that there is a necessity to promote green building. Awareness programs need to be designed and widespread publicity given.

Conclusion:

More and more people are getting aware of the impact that buildings have on human health, climate change, energy usage, and environmental degradation which has led to a growing interest

in environmentally-sustainable building (Contreras et.al., 2011). A large number of consumers in developed countries are becoming aware of sustainability and green residential buildings and benefits of living in green buildings. Indian residential green building market is still in its nascent stage and much is required to promote green building. There is a momentum that will sweep across the entire design, development and construction industry over the next decade that each firm must prepare for, or risk being left at a considerable competitive disadvantage. The construction industry infrastructure is quite mature and highly complex, and it is important that green building marketers master its intricacies to get new green building designs, technologies and products into the marketplace.

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