

A STUDY ON THE FINANCIAL GROWTH OF COMPANIES DUE TO GREEN PROJECTS- REFERRING TO BUILDERS: AN ENVIRONMENTAL APPROACH

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Abstract

Today our planet is in peril. Due to negligence of people, their greediness and selfish attitude has put earth in great danger. To fulfill their wants and needs people cut down trees, lay concrete roads, dig bore-wells, and destroy forests which are the major reason for natural calamities happening these days leading to threat to life in this planet. To overcome these problems there are various measures taken up by individuals, corporate, government and society. "GREEN BUILDING" is one of the measures taken up mainly by the corporate sector. This paper brings out the importance of green building in the present scenario and explores the idea of green building/ green projects taken up by currently in the corporate field. This paper analyses the financial aspects of the companies taking up these projects and their growth and the companies backing out from these projects. Reason for choosing this topic is to highlight the financial growth of companies by taking these projects and motivating other companies to take up this challenge and change their negative attitude to make a choice in entering into such projects. This research also creates awareness in preservation of natural resources. Since green building is a live talk in the society made me to choose the topic, which will be tool in protecting the environment. The data required for the study have been collected from primary and various secondary sources. Green building concept in India is on the process of flourishment. Green building concept at present looks expensive but when compared the genies and benefits are higher. When green building concept flourishes the cost of the green building implementation will automatically reduce.

Keywords: Building, Company, Environmental, Eco-Friendly, Green, Finance

Introduction

Eco-friendly construction involves the use of various "green" materials from start to finish and building practices which are harmless to environment are implemented. "A design or system that efficiently and effectively uses natural resources like energy, water and building materials and other resources for sustainable development is called GREEN BUILDING." The building will be considered as eco-friendly or green building only if it is rated by these systems. Some of the rating systems are as follows:

- BREEAM- Building Research Establishment Environmental Assessment Method, which is used in UK.
- LEED- leadership in energy and environmental design,
- Green Star- the Green Building Council Of Australia
- CASBEE- Comprehensive Assessment System for Building Environment Efficiency,
- Green Mark

- NABERS-National Australian Built Environment Rating System
- These are the parameters on which a rating of a building as green is based on:
- Efficiency in building design and site planning.
 - Protection of top soil and soil conservation during construction.
 - Reduction in demand of conventional energy by optimizing building design and structure.
 - Incorporation of renewable energy resources to reduce the use of conventional energy.
 - Effective water and waste management for reducing wastage of water.
 - Enhancing indoor environment quality like indoor air and thermal quality.
 - Efficient selection of sustainable materials for construction.
 - Optimizing operation and maintenance.

Benefits of green building

- Rise in energy conservation and efficiency by optimizing building orientation and integrating natural daylight and ventilation.
- Healthier indoor environment
- Protects the eco-system
- Reduction of emissions
- Storm water management.
- Conservation of water and waste management
- Improve air and water quality and temperature control
- Reduce strain on local infrastructure
- Helps in temperature moderation
- Reduce pollution

Financial and economical benefits of green buildings are

- Lead to effective long-term solution for economic growth.
- Aid in the expansion of green market.
- Green buildings save energy and water through resources which leads to reduction in operating and maintenance cost.
- Low operating costs increases the value of the property or building, with lower vacancy rates.

Objectives of the study

There are four objectives of the study. They are as follows:

- To find whether green concept is supportive in the growth of the companies.
- To explore the ideas of green in the construction field.
- To highlight the factors determining the financial growth of the green companies.
- To analyze and interpret the data to give in suggestions and findings.

Materials and methods

Tools for data collection

The study mainly focuses on primary sources such as questionnaire and personal interviews. The necessary secondary data also have been collected from the journals, working papers and company websites.

This paper is descriptive paper which accomplishes the growth of companies due to green building projects.

Limitations

- The study was purely on the primary data where the information given by the companies are believed to be true and reliable.
- The entire population of the companies was not studied, only a sample number was surveyed.
- Conclusions and results were based on the assumptions that the responses given by the companies' employees were true and adequate.

Observation by other researchers

- 1) Mr. Kaushal Kishore, material engineershows some of the measures which a building should possess to be green building, the main objective for the paper to be published, is to show a way for the civil engineers who are looking for green building information.
- 2) Mr. DebajitPalit in June 2004,explains what features an environment conscious design for construction and energy efficient building to be constructed and its impact on the energy consumption.
- 3) In the paper Assessing Green building performance by GSA, an evaluation is made by comparing GSA's sustainably design buildings and the commercial building in US using the performance data. From the analysis the paper concludes that the energy consumption level is reduced by 26%, 13% less maintenance cost, 27% of high occupant satisfaction and 33% reduction in emission in carbon dioxide.
- 4) In the white paper published by Building Design+ Construction team titling the paper as, "Green Building + Climate Change", explores the emissions in the surroundings which are leading to unpredictable climatic change in the world.This team has made an effort to highlight on green buildings which will be a preventive measure for the challenge of the earth.
- 5) Keith H. Hirokawa, Aurelia Marina Pohrib, J.D, high lights the need for green buildings as one for the measure to prevent the adverse climatic changes which is a threat to the life.
- 6) Centro Mario Molina:Brings out the ideas of green building in national planning of the country which explores the plans and programs for green building development, building codes on the features of sustainability.
- 7) A paper focusing on the government to construct green buildings on private sector in California, has made an effort to suggest that the government policies can create a force of diffusion of the environmental standards that require complementary investments by private adopters.
- 8) M S Suhaida, K L Tan and Y P Leong, speaks about the importance of green building rating systems. The authors also suggests that stakeholders support should be strong enough to nurture the green initiatives all over the world.
- 9) Mario Seneviratne,reviled that buildings worldwide make use 20% of fresh water, 25% of wood harvest, 40% of CO2 emissions, 40% of energy use, 30% of raw materials, as a solution to reduce these impacts green buildings is been accepted as a solution for it.
- 10) Piet Eichholtz, Nils Kok and John M. Quigley, speaks about the economies of green buildings in investments in energy efficiency.They have suggested that investors attribute a lower risk premium for more sustainability and energy efficient buildings.
- 11) The Leonardo Academy has spoken about the economics of LEED in the year 2008.The objectives of this paper are to answer for certain questions like the costs of implementing LEED for existing buildings and comparing the operating costs between LEED certified builders and others..

12) Jeremy Gabe, has told the significance of the assessment tools of green building. The author tells that using these tools the companies are diverting their focus on increasing the LEED credits with less attention on environmental performance.

13) Harvey W. Berman revealed that green building are cost beneficial and costs differ due to the type of design and construction process opted by the builders.

14) Gregory H. Kats has revealed the cost and financial benefits of green buildings when compared to normal buildings.

15) GeofSyphers addresses the issues by providing general cost-saving strategies for green building and exploring the cost issues and describes how to control the costs of green building by summarizing other researches done on this topic. The area targeted by this paper is California.

16) Adam Berman, Evan Mills And Jeff Perlman, describes the financial benefits of buildings in California also speaks about the cost cutting in green building projects and financial benefits and also describes the problems in cost determination, technologies and methodologies of green projects and the insurance benefits of green building are described.

17) Melissa O'Mara and Shan Bates describe the reason for investing in green buildings and their business improvement and reveals that investments in green buildings can produce measureable financial values. The paper also gives out some attributes how green buildings improve business and also describes the present state of green building and their future promises.

18) The performance of the green building are been analyzed by the authors SinemKorkmaz, DuyguErten and Matt Syal and also presented the background of green building movements in the selected developed and developing countries like US, India and Turkey. The main purpose of this paper is to build a framework for developed and developing countries in adaptation of green building guidelines.

19) Judith H. Heerwagen speaks about the inter-relation between green building and human resources performance and productivity and described green building as a driver to success of the company by increasing the productivity of the companies structured in green building design.

20) Dr. Thomas Tang describes three way of designing sustainable buildings- smart buildings, people-friendly developments and green building and also the issues and opportunities in designing the buildings.

21) Ramesh S P and Emran Khan M describes the role of energy efficiency in green buildings in India to reduce the energy consumption and environment degradation through green house gases and the schemes to harmonize government and private sector are also discussed.

22) Trivita Roy and AbhishekKiran Guptadescribes the cost efficiency of green buildings in India. It also discusses the state of green building adaptation in India and also about the green rating systems in India and their criteria of crediting the buildings.

23) D. Sandanasamy, S. Govindarajane And T.Sundararajan have brought out the guidelines in energy conservation in buildings in India in the form of Energy Conservation Building Codes (ECBC) which defines the norms and standards for energy performance of building and their components.

Discussion and results

This analysis is made to prove the objectives of the paper. This questionnaire was distributed to the members of the companies in practice of green concept and not in practice. From the data collected the analysis is carried on. Questionnaires were distributed to 10 companies and three members were selected from each company to fill in the questionnaire. Green companies data is been analyzed firstly.

Green companies’ analysis

The companies were asked to elaborate their understanding about what is green building or eco-friendly buildings. Each of them had different ideas about green building.

Interpretation

From the analysis we find that many of them do not know the exact meaning of green building or eco-friendly buildings. From the survey it is known that the respondents think that green building or eco-friendly building is just an environmental friendly building bring on harm to the environment with building design including rain harvesting, use of solar panels etc. From this we come to know that the real meaning of green building is hidden. But the companies still agree themselves to be green builders with just some features of green building concept in their design.

Table 1: Showing Whether Companies Have Adopted New Technologies And Whether The Expenses Incurred Due To Green Concept Manageable.

Questions\options	yes	no
Upgraded new technologies(q13)	15	0
Expenses manageable(q17)	13	02



Analysis

The above table and graph shows that 15 respondents of green companies agree that the companies have upgraded new technologies in their project design. But there is no uniqueness in technology up gradation by companies. Many companies have taken up same technologies like sewage treatment plant.

Interpretation

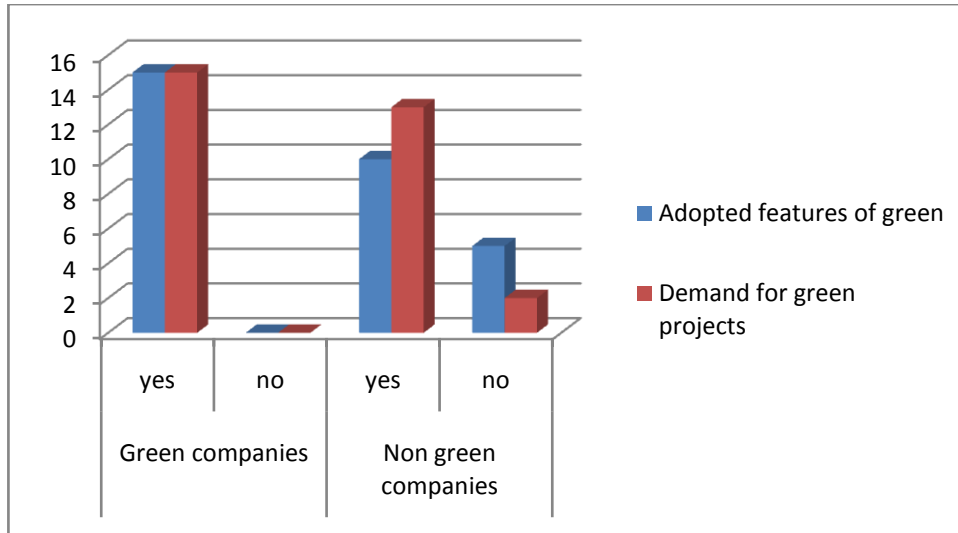
From the above analysis we come to know that companies certified as green or eco-friendly have adopted very less technologies which should be transformed. Companies must take up more active actions on the technologies as adopted by foreign companies which will give in more benefits and meaning in adopting green concept.

Data and analysis of both green and non green companies

Here the analysis is made considering data of both green companies and non green companies. Since the interpretation of these data is required to prove the objectives of the paper, the analysis is been made by considering both companies’ data together.

Table 2: Showing Whether Green Companies Have Adopted The Features Of Green And Whether There Is Demand For Green Projects.

Question\options	Green companies		Non green companies	
	Yes	No	yes	No
Adopted features of green	15	0	10	05
Demand for green projects	15	0	13	02



Analysis

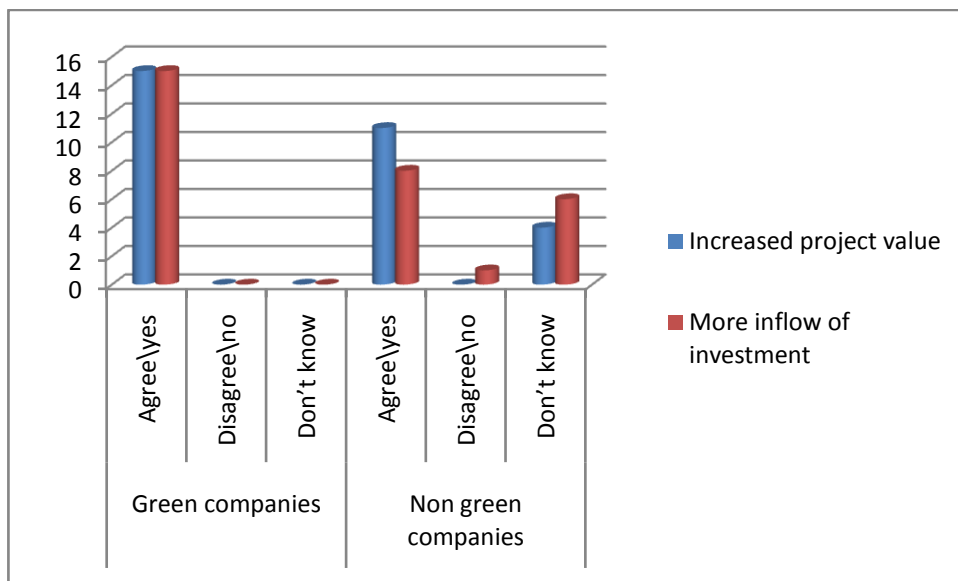
The above table shows the respondents of both green companies and non green companies replied for the question whether green building companies have adopted the features of green building in their building design and whether people demand for such projects. The table and graph clearly shows both companies respondents’ view on this aspect.

Interpretation

From the above table chart and analysis it known that all the respondents of companies taken up green concept agree that they’ve adopted to the features of the green building in their projects and there is demand for such projects too. For the same non green companies majority of them agree that green building features are been adopted and such project are preferred by the people. Among them only seven respondents disagree for it.

Table 3: Showing Whether Value of the Property Is Increased and More Inflow of Investment Due To Green Concept Adaptation.

Questions\options	Green companies			Non green companies		
	Agree\yes	Disagree\no	Don't know	Agree\yes	Disagree\no	Don't know
Increased project value	15	0	0	11	0	04
More inflow of investment	15	0	0	08	01	06



Analysis

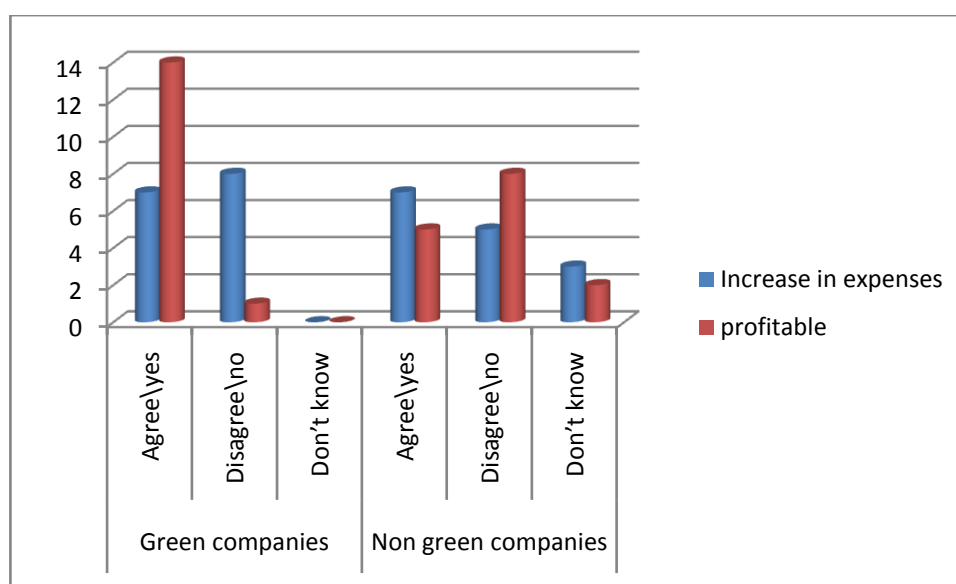
The table and the chart show the no. of respondents of both green and non green companies supporting whether by taking up green building concept increases project value and bring in more investments to the companies.

Interpretation

From the above data collected it reveals that taking up green building concept increases the project value of the companies adopted this concept and it also creates more cash inflow that is investments for the company as per the respondents.

Table 4: Showing Whether There Is Increase In Expenses Due To Green Projects And Whether It Is Profitable.

Questions\options	Green companies			Non green companies		
	Agree\yes	Disagree\no	Don't know	Agree\yes	Disagree\no	Don't know
Increase in expenses	07	08	0	07	05	03
profitable	14	01	0	05	08	02



Analysis

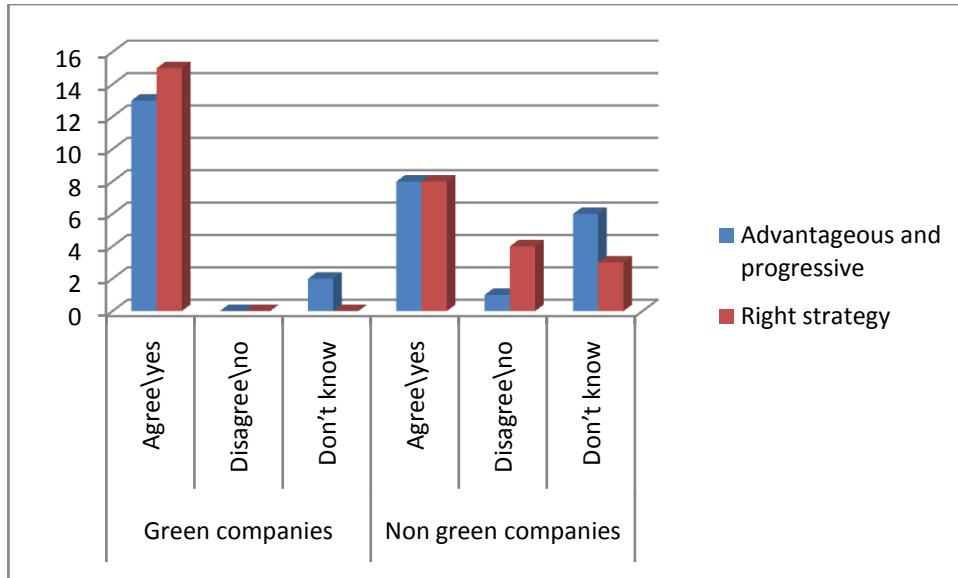
Above table and graph shows whether green building concept increases the expenses of the company and also increases profit simultaneously.

Interpretation

From the above table and chart we can say that since green building concept is a unique activity which involves more new things and implementations it increases the cost of the companies and their expenses for such projects which simultaneously brings in profit as there are many advantages due to this concept.

Table 5: Showing Whether Green Concept Is Advantageous In Progress Of Companies And Whether Green Concept Is Right Strategy.

Questions\options	Green companies			Non green companies		
	Agree\yes	Disagree\no	Don't know	Agree\yes	Disagree\no	Don't know
Advantageous and progressive	13	0	2	8	1	6
Right strategy	15	0	0	8	4	3



Analysis

The above table and chart gives out picture of the respondents of the companies supporting whether green concept is advantageous in progress of the company and whether it is a right strategy to take up green concept.

Interpretation

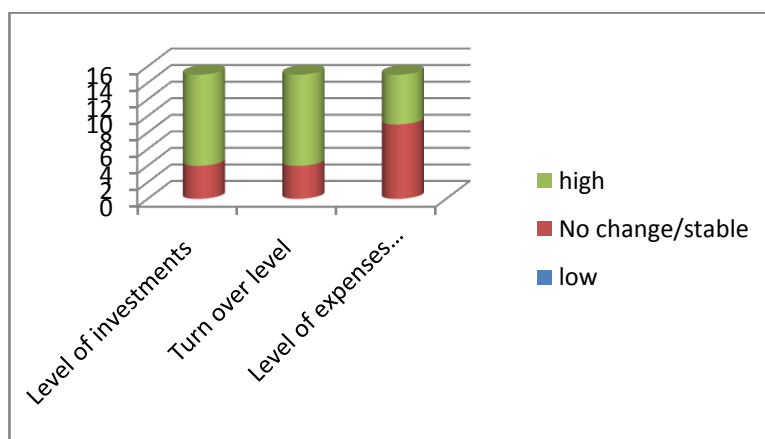
From the above analysis we know that green companies think that taking up green concept leads to the progress of the companies and also is a right strategy for the company to implement. But as per the non green companies, are not aware whether it is advantageous and a right strategy and only some of the non green companies think that it is advantageous to the company.

Non green companies’ data analysis

Here are some of the data which are been analyzed based on only non green companies’ data to show the ideas of non green companies on the green concept.

Table 6: Showing The Level Of Investments, Turn Over And Expenses Incurred By Companies Not Adopted Green Concept.

Questions\options	low	No change/stable	high
Level of investments(q3)	0	04	11
Turn over level(q4)	0	04	11
Level of expenses incurred(q6)	0	09	06



Analysis

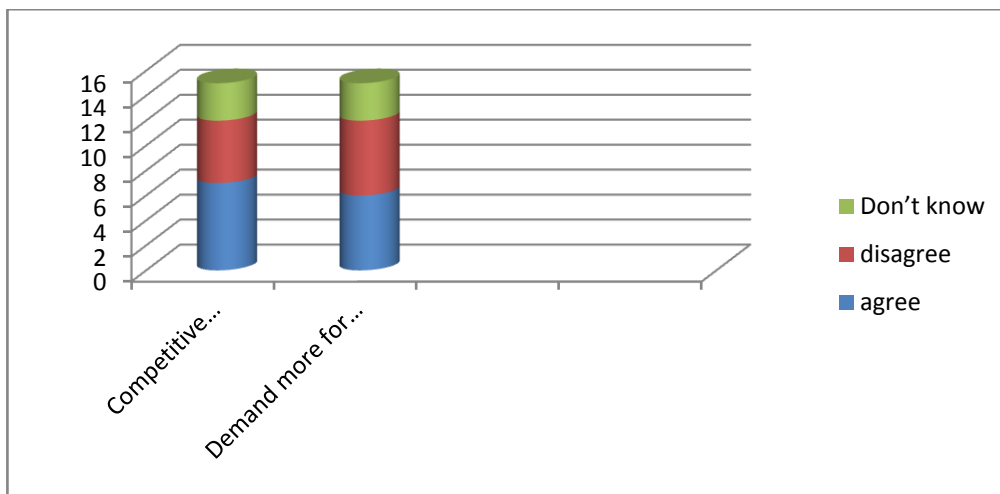
The above table and chart shows the non green companies level of investment, turn over level and the level of expenses incurred.

Interpretation

The above analysis shows the investment level, their turn over level and their expenses of the non green companies and their growth which will be compared with that of green companies.

Table 7: Showing Whether Green Concept A Competitive Strategy And Whether People Prefer More Of Green Projects.

Questions\options	agree	disagree	Don't know
Competitive strategy(q20)	07	05	03
Demand more for green projects(q22)	06	06	03



Analysis

The above chart and table shows the views of the non green companies on green concept whether it is competitive strategy and demand is more for green concept.

Interpretation

From the above analysis the views of non green companies on green concept is been analyzed. Here the respondents of the non green companies equally agree and disagree that green concept is a competitive strategy and there is more demand for such projects. And some of them do not have any idea on this concept.

Testing of hypothesis

The below mentioned concepts were used as variables to prove the determined hypothesis. For the analysis two types of statistical tools have been used- Chi square and Independent t test. The categorical variables were analyzed using chi square test and continuous variables were analyzed using t test. There are six variables used for the testing in which three were categorical and two were continuous

Chi-square test

Three variables are been chosen for this testing. They are:

- Value of the project
- Investments
- Expenses

1) Chi-square test was used to analyze the association between the value of the projects and the adaptation of green concept by the green building companies.

Table 8: Showing The Respondents About The Value Of The Projects

Companies\options	yes	no
Green companies	13(86.67%)	2(13.33%)
Non green companies	11(73.3%)	4(26.7%)

The above table represents the respondents of green and non green companies giving their opinion whether green concepts increase the value of the firm. From the above table it is known that thirteen respondents of green companies and eleven of non green companies agree that there is increase in value of the projects due to green concept and two respondents of green companies and four respondents of non green companies disagree that there is increase in value of projects. To prove this chi-square testing is used. As per the test it is found that there is no statistically significant association between the value of the projects and the adaptation of green concept, $p=0.360$. But as per the survey majority of the respondents agree that the value of the projects increased due to the green concept.

2) The chi-square test was used to analyze the association between increase in investments and the green projects.

Table 9: Showing The Respondents About The Increase In Investments

Companies\options	yes	no
Green companies	15(100%)	0
Non green companies	8(53.33%)	7(46.67%)

The above table represents the respondents of green and non green companies giving their view whether there is increase in investments due to green concept. From the data collected it is found that all the respondents of green companies and eight respondents of non green companies agree that there increase in investments in companies due to green concept adaptation. Since majority agrees for it and all respondents of green companies' views are constant testing did not give any results. Therefore according to the evaluation of the data collected, shows that majority gives a positive answer, it can be concluded that there is increase in inflow of investments in companies due to green concept adaptation.

Table 9a: Showing The Statistical Value Of The Chi-Square Test
Chi- Square

	value
Pearson Chi-square	
N of valid cases	15

No statistics were computed because there was only one response for one company.

3) The chi square test was used to find the association between the increase in expenses and the adaptation of green concept.

Table 10: Showing The Data Of Respondents For Increase In Expenses

Companies\options	yes	no
Green companies	9(60%)	6(40%)
Non green companies	7(46.67%)	8(53.33%)

The above table indicates the respondents of green and non green companies giving their views whether there is increase in expenses due to green projects. Six among green respondents and eight among non green respondent think that expenses do not increase due to green projects and nine respondents on green companies and seven of non green companies think that expenses increase due to green projects. From the chi-square test we conclude that:

Table 10a: Showing The Result Of The Chi-Square Test.

	p-value
Pearson chi-square	0.003

The calculated value is less than 0.05 which indicates that there is statistically significant association between the increase in expenses and the adaptation of green concept. There is increase in expenses in the companies in which green concept was adapted..

Independent t-test to compare the mean values between groups:

Two variables were chosen for the t-test. They are:

- Sales increase
- profits
- Return on investments

1) Independent t- test is been used to analyze whether there is increase in sales of green companies than that of non green companies

Table 11: Showing The Data For Sales Increase In Percentage

Green companies	Non green companies
25%	10%
22%	5%
24%	7%
23%	12%
18%	11%

The above table shows the increase in sales of green and non green companies which is used for analysis. From the t-test performed we conclude that:

Table 11a: Results For The t-Test

	p value
Sales increase	< 0.05

The probability is less than 0.05 which indicates that there is statistically significant difference in the sales increase of the two companies. We conclude that green buildings’ sales have a higher % of increase than that of non green companies.

2) The second variable used for t-test is profits. The profits of the companies are given below (in million):

Table 12: Showing The Data For The Profits Of The Companies(In Million)

Green companies	Non green companies
6003	3886
5842	1260
7623	2619
8640	1991
5970	2306

From the independent t-test performed we conclude that:

Table 12a: Showing The Results Of T-Test

	p value
Profits	< 0.05

Since the probability value is less than 0.05 we can conclude that there is statistically significance difference among the profits of green and non green companies. We can say that the profits of green building companies are comparatively more than that of non green companies.

But the analysis on profits will not be able to give an accurate conclusion whether green building companies are high profitable than that of non green companies. So to get an accurate conclusion return on investments of both the companies were calculated and analyzed by applying independent t-test.

3) Return on investments (ROI) of both the companies are calculated by the below formula:

$$ROI = \frac{\text{Profits of the company}}{\text{Investment}} \times 100$$

Investments

Below tables show the ROI of both green and non green companies:

Table13: Showing The Data For ROI

Green companies	Non green companies
67.12%	36.16%
63.31%	25.56%
69.61%	-8.52%
65.23%	20.17%
64.11%	-10.23%

The above information is used for the independent t-test.

Table13a: Results For The t-Test

	P value
Return on investments	< 0.05

From the analysis we concluded that there is statistically significance difference between green and non green companies since the probability is less than 0.05. It is clear that the return on investments of green companies is higher than that of non green companies.

Therefore, from the above all analysis performed the hypothesis of the project has been proved, which supports the green building concept. It is concluded that there is financial growth of companies due to green projects under taken by the companies in considering the above variables, which in turn shows there is statistically significance difference between green and non green companies.

Conclusion

Buildings are one of the reasons in creating an adverse state in the environment by their wastes and emissions. To over come these, green building concept must be taken up the companies. Green buildings play a vital role in the protection of the environment. It has various attributes which acts as an helping hand for the companies, customers, people as well as environment. It is beneficial on all aspects around it. Green building is very benefited financially, economically, productivity and protection of environment. Green building concept in India is on the process of flourishing. If green buildings are developed as many in number, this will lead the company to a peace full living and also increase the standard of the builders. Tax concession on green building will encourage green builders to construct more such buildings which invariably contribute to the environment protection. Green building concept at present looks expensive but when compared the genis and benefits are higher. When green building concept flourishes the cost of the green building implementation will automatically reduce.

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