

A Study on Sustainable Entrepreneurial Strategies For Integrating Green Technologies In Real-Estate Business Sector

Mansi Sanjay Mirlekar¹

¹D.Y. Patil Deemed to be University, School of Management C B D Belapur, Navi Mumbai

Abstract: The study focuses on understanding the role of green technology adoption and sustainable entrepreneurial strategies in improving the sustainable performance of real-estate businesses. The real-estate sector plays an important role in economic development, employment generation, infrastructure growth, and investment opportunities; however, it also creates environmental challenges due to high energy consumption, use of natural resources, waste generation, and carbon emissions. Therefore, the adoption of green technologies such as solar energy systems, rainwater harvesting, energy-efficient systems, green building materials, waste management, water recycling, smart meters, and sustainable construction practices has become important for promoting environmentally responsible real-estate development. The study examines the relationship between green technology adoption, sustainable entrepreneurial strategies, perceived sustainability benefits, and sustainable performance of real-estate business. Primary data was collected from 75 employees working in the real-estate sector. The findings show that green technology adoption, sustainable entrepreneurial strategies, and perceived sustainability benefits have a positive and significant relationship with sustainable performance. The regression analysis indicates that these three independent variables together explain 37.5% of the variation in sustainable performance of real-estate businesses. The study concludes that sustainable strategies and perceived sustainability benefits play an important role in improving long-term business growth, competitiveness, brand image, customer satisfaction, and environmental responsibility in the real-estate sector.

Keywords: Green Technology, Sustainable Entrepreneurship, Real-Estate Business, Sustainable Performance

1. Introduction:

The real-estate sector contributes significantly to economic growth, employment generation, infrastructure development, and investment opportunities, but at the same time it also creates environmental pressure through high resource consumption and carbon emissions. Therefore, sustainable development in real estate has become an important requirement for balancing business growth with environmental protection and social responsibility.

Green technology refers to the use of environment-friendly technologies, systems, and practices that reduce negative environmental impact and improve resource efficiency. In the real-estate sector, green technologies include solar energy systems, rainwater harvesting, energy-efficient lighting, smart meters, waste management systems, water recycling, green building materials, natural ventilation, Building Information Modelling, IoT-based energy management, and smart building automation. Recent research highlights that technologies such as BIM, energy management systems, and AI-based predictive tools can support green building development by improving design, operation, and decision-making efficiency.

Sustainable entrepreneurship focuses on creating business opportunities that generate economic profit while also solving environmental and social problems. In the real-estate business sector, sustainable entrepreneurial strategies may include developing green buildings, promoting affordable eco-friendly housing, adopting renewable energy solutions, reducing construction waste, using recycled materials, and designing buildings that improve the



quality of life of occupants. Green startups and sustainable enterprises are increasingly viewed as important drivers of innovation, low-carbon development, job creation, and market transformation.

The integration of green technologies in real estate provides several benefits to developers, customers, investors, and society. Environmentally, it helps reduce carbon emissions, energy consumption, water wastage, and pollution. Economically, it reduces long-term operational costs, increases property value, attracts environmentally conscious buyers, and strengthens brand image. Socially, green buildings can improve indoor air quality, health, comfort, safety, and overall living standards. Studies on green building research show that green buildings are considered an important approach for reducing the environmental, social, and economic impacts of building stock.

However, the adoption of green technologies in the real-estate sector also faces several challenges. These include high initial investment cost, lack of awareness among customers, limited technical knowledge, shortage of skilled professionals, regulatory barriers, lack of financial incentives, and uncertainty about return on investment. Research on green building technologies in India also emphasizes the role of financial incentives in encouraging adoption of green building practices. Therefore, entrepreneurs in real estate need strategic planning, government support, customer education, innovation, partnerships, and long-term investment vision to successfully integrate green technologies.

Thus, this study is important because it examines how sustainable entrepreneurial strategies can support the adoption of green technologies in the real-estate business sector. The study can help understand the relationship between green technology, sustainable strategies, environmental benefits, economic benefits, and social benefits. It also provides useful insights for real-estate entrepreneurs, builders, developers, policymakers, investors, and customers. By promoting green technology integration, the real-estate sector can move towards sustainable urban development, climate responsibility, resource conservation, and long-term business competitiveness.

2. Review of Literature

1. **Abraham & Gundimeda (2018)**, In the research titled “Greening the buildings—An analysis of barriers to adoption in India” concluded that the adoption of green buildings in India is affected by several barriers such as policy and market barriers, financial and economic barriers, information and education barriers, and managerial or organizational barriers. The study highlighted that lack of awareness, high initial cost, weak policy implementation, and limited technical knowledge are major obstacles in promoting green buildings. It suggested that systematic identification and prioritization of these barriers can help policymakers, builders, and stakeholders develop better strategies for increasing green building adoption in India.
2. **Saha (2021)**, In the research titled “Barriers to adoption of commercial green buildings in India: A review” concluded that the growth of commercial green buildings in India is slow due to overlapping barriers such as high investment cost, lack of awareness, limited technical expertise, inadequate government support, and uncertainty about benefits. The study emphasized that India-specific challenges need to be addressed through stronger policy support, financial incentives, awareness programmes, and better coordination among stakeholders. It also recommended further research to develop practical solutions for faster adoption of commercial green buildings
3. **Sharma (2018)**, In the research titled “Development of a ‘green building sustainability model’ for green buildings in India” concluded that green buildings in India require a proper sustainability model that considers environmental, economic, social, and technical aspects together. The study highlighted that green building assessment should not focus only on energy saving, but also on resource efficiency, user comfort, cost-effectiveness, and long-term sustainability. The research suggested that a structured sustainability model can help improve planning, evaluation, and performance of green buildings in the Indian context.
4. **Manasi et al. (2021)**, In the research titled “Promoting green buildings towards achieving sustainable development goals: A review” concluded that green buildings can play an important role in achieving sustainable development goals by reducing energy consumption, saving natural resources, improving

environmental quality, and promoting healthier living spaces. The study reviewed initiatives taken in India and found that despite policy efforts, the concept of green buildings is still limited due to lack of awareness, cost concerns, and implementation challenges. It suggested that stronger institutional support, public awareness, incentives, and stakeholder participation are necessary for wider diffusion of green buildings.

5. **Meena et al. (2022)**, In the research titled “Innovation in green building sector for sustainable future” concluded that innovation in green building technologies is essential for creating a sustainable future. The study emphasized that green buildings should minimize the use of natural resources, reduce environmental impact, remain cost-effective, and provide long-term durability. It also highlighted the need for further research and development in areas such as energy-efficient materials, renewable energy integration, smart technologies, and sustainable construction practices to strengthen the green building sector.
6. **Jain & Kakati (2024)**, In the research titled “A statistical approach to evaluate the effect of obstacles on green building development in Northeast India.” concluded that green building development in Northeast India is influenced by several region-specific obstacles. The study found that poor geographical location, limitations of rating systems, high financial implications, weak market conditions, inadequate policies, project feasibility issues, and poor public perception create challenges for green building development. It suggested that these obstacles must be addressed through region-specific policies, better financial support, awareness creation, and improved institutional mechanisms.
7. **Kumar (2024)**, In the research titled “Incentivizing green building technology: A financial perspective on green building technologies in India” concluded that financial incentives are very important for promoting green building technologies in India. The study highlighted that although green buildings provide long-term environmental and economic benefits, their adoption is often restricted due to high initial investment and limited affordability. It suggested that tax benefits, subsidies, low-interest loans, and other financial support mechanisms can encourage builders, developers, and consumers to adopt green building technologies more widely.

Research Gap

The reviewed studies show that green buildings and green technologies in India have been examined mainly from the perspective of barriers, sustainability models, policy support, innovation, and financial incentives. However, limited research has focused specifically on how sustainable entrepreneurial strategies can help real-estate businesses integrate green technologies effectively. Most studies discuss green buildings in general, but there is less attention on the role of real-estate entrepreneurs, developers, and business decision-makers in adopting green technology for long-term environmental, economic, and social benefits. There is also a gap in understanding how financial constraints, awareness, government incentives, market demand, and stakeholder support influence the practical adoption of green technologies in the real-estate business sector. Therefore, the present study is needed to examine the relationship between green technology, sustainable strategies, and the overall benefits of green real-estate development.

3. Research Methodology

The present study is descriptive and analytical in nature. It is based on primary data collected from 75 employees working in the real-estate business sector. A structured questionnaire was used as the main tool for data collection. The questionnaire was divided into sections covering demographic factors, green technology adoption, sustainable entrepreneurial strategies, perceived sustainability benefits, and sustainable performance of real-estate business. Responses were measured using a five-point Likert scale ranging from Strongly Disagree to Strongly Agree. The demographic variables included years of experience, category of project, and qualification of respondents. Statistical tools such as frequency analysis, percentage analysis, Pearson correlation, and multiple regression analysis were used to interpret the data and examine the relationship between the selected independent variables and the dependent variable. Green Technology Adoption, Sustainable Entrepreneurial Strategies, and Perceived Sustainability Benefits

were considered independent variables, while Sustainable Performance of Real-Estate Business was considered the dependent variable.

Data Analysis

Data analysis is an important part of the present study as it helps to interpret the responses collected from 75 employees working in the real-estate business sector. The collected data was analyzed to understand the demographic profile of the respondents and to examine the relationship between green technology adoption, sustainable entrepreneurial strategies, perceived sustainability benefits, and sustainable performance of real-estate business. Frequency and percentage analysis were used to study demographic factors such as years of experience, category of project, and qualification of respondents. Further, Pearson correlation was applied to examine the relationship among the variables, while regression analysis was used to measure the impact of selected independent variables on sustainable performance. The analysis provides meaningful insights into how sustainable practices and green technology integration contribute to the growth and performance of the real-estate business sector.

Demographic Factor

Sr No.	Particular	Category	Frequency	Percent
1	Years of Experience	Up to 5 Years	15	20.0
		5 to 10 Years	20	26.7
		10 to 20 Years	25	33.3
		More than 20 Years	15	20.0
2	Category of Project	Residential	20	26.7
		Commercial	15	20.0
		Both	40	53.3
3	Qualification	Graduate (Arts, Commerce, Science)	25	33.3
		Engineering graduate	35	46.7
		MBA	15	20.0

The frequency table shows the demographic profile of 75 real-estate employees included in the survey. In terms of years of experience, the largest group belongs to the 10 to 20 years category with 25 respondents (33.3%), followed by 5 to 10 years with 20 respondents (26.7%), while Up to 5 years and More than 20 years each include 15 respondents (20.0%). This indicates that most respondents have moderate to high professional experience in the real-estate sector. Regarding the category of project, the majority of respondents are associated with both residential and commercial projects, with 40 respondents (53.3%), followed by residential projects with 20 respondents (26.7%) and commercial projects with 15 respondents (20.0%). This shows that more than half of the respondents have experience in both types of real-estate projects. In terms of qualification, the highest number of respondents are engineering graduates, with 35 respondents (46.7%), followed by graduates from Arts, Commerce, or Science with 25 respondents (33.3%), and MBA-qualified respondents with 15 respondents (20.0%). Overall, the table indicates that the sample mainly consists of experienced and technically qualified real-estate employees.

4. Objective and Hypothesis

Objective 1 To examine the relationship between green technology adoption, sustainable entrepreneurial strategies, perceived sustainability benefits, and sustainable performance of real-estate business.

Null Hypothesis H01: There is no relationship between green technology adoption, sustainable entrepreneurial strategies, perceived sustainability benefits, and sustainable performance of real-estate business.

Alternate Hypothesis H11: There is a relationship between green technology adoption, sustainable entrepreneurial strategies, perceived sustainability benefits, and sustainable performance of real-estate business.

To study the above Null hypothesis Correlation test is applied. The results are as follows.

Correlations		
		Sustainable Performance of Real-Estate Business
Sustainable Performance of Real-Estate Business	Pearson Correlation	1
	P-value	
	N	75
Green Technology Adoption	Pearson Correlation	.473**
	P-value	.000
	N	75
Sustainable Entrepreneurial Strategies	Pearson Correlation	.518**
	P-value	.000
	N	75
Perceived Sustainability Benefits	Pearson Correlation	.512**
	P-value	.000
	N	75
**. Correlation is significant at the 0.01 level (2-tailed).		

Interpretation: Above results indicate that p-value is 0.000. It is less than standard value of 0.05. Therefore, the correlation test is rejected. Hence null hypothesis is rejected and alternate hypothesis is accepted.

Conclusion: There is a relationship between Importance of Algorithm Trading and Trading Profitability in algorithmic trading.

Findings: The correlation table shows that all selected independent variables have a positive and statistically significant relationship with the dependent variable, Sustainable Performance of Real-Estate Business, at the 0.01 level of significance. Green Technology Adoption shows a moderate positive correlation with sustainable performance ($r = .473$, $p = .000$), indicating that greater adoption of green technologies is associated with improved business performance. Sustainable Entrepreneurial Strategies has the highest positive correlation ($r = .518$, $p = .000$), showing that strategic sustainability practices play an important role in improving long-term business success, competitiveness, and growth. Perceived Sustainability Benefits also shows a strong positive relationship ($r = .512$, $p = .000$), suggesting that environmental, economic, and social benefits contribute positively to sustainable performance. Since all p-values are less than 0.01, the relationships are statistically significant. Therefore, it can be concluded that green technology adoption, sustainable entrepreneurial strategies, and perceived sustainability benefits significantly support the sustainable performance of real-estate businesses.

Objective 2 To Develop the Mode for Sustainable Performance of Real-Estate Business

Regression Model

Dependent Variable: Sustainable Performance of Real-Estate Business

Independent Variable: Perceived Sustainability Benefits, Sustainable Entrepreneurial Strategies, Green Technology Adoption

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.612a	.375	.349	8.870
a. Predictors: (Constant), Perceived Sustainability Benefits, Sustainable Entrepreneurial Strategies, Green Technology Adoption				

The regression model summary shows that the combined effect of Green Technology Adoption, Sustainable Entrepreneurial Strategies, and Perceived Sustainability Benefits has a positive influence on the Sustainable Performance of Real-Estate Business. The value of R = .612 indicates a moderate positive relationship between the independent variables and the dependent variable. The R Square value is .375, which means that 37.5% of the variation in sustainable performance of real-estate business is explained by these three factors. The Adjusted R Square value is .349, indicating that after adjusting for the number of predictors, the model explains 34.9% of the variance. The Std. Error of the Estimate is 8.870, which shows the average difference between the observed and predicted values of sustainable performance. Overall, the model suggests that green technology adoption, sustainable entrepreneurial strategies, and perceived sustainability benefits are important predictors of sustainable performance in the real-estate business sector.

ANOVA ^a						
	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3352.549	3	1117.516	14.204	.000 ^b
	Residual	5586.118	71	78.678		
	Total	8938.667	74			
a. Dependent Variable: Sustainable Performance of Real-Estate Business						
b. Predictors: (Constant), Perceived Sustainability Benefits, Sustainable Entrepreneurial Strategies, Green Technology Adoption						

Above results indicates that p-value is 0.000. It is less than 0.05. It indicates that linear regression model is good to fit.

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	14.674	7.762		1.891	.063
Green Technology Adoption (GTA)	.160	.108	.175	1.484	.142
Sustainable Entrepreneurial Strategies (SES)	.273	.113	.284	2.429	.018
Perceived Sustainability Benefits (PSB)	.278	.112	.283	2.478	.016
a. Dependent Variable: Sustainable Performance of Real-Estate Business					

Above table indicate the values of coefficients and corresponding significance. According to p-value of the Sustainable Performance of Real-Estate Business it is observed that except “Green Technology Adoption” all remaining variables has significant impact on Sustainable Performance of Real-Estate Business factors.

The mathematical equation to estimate the Sustainable Performance of Real-Estate Business is presented as follows:

$$\text{Sustainable Performance of Real-Estate Business} = 14.674 + 0.160 \cdot \text{GTA} + 0.273 \cdot \text{SES} + 0.278 \cdot \text{PSB}$$

5. Conclusion

The study concludes that green technology adoption, sustainable entrepreneurial strategies, and perceived sustainability benefits are important factors influencing the sustainable performance of real-estate businesses. The correlation results show that all three independent variables have a positive and statistically significant relationship with sustainable performance. This means that when real-estate businesses adopt green technologies, follow sustainable business strategies, and recognize environmental, economic, and social benefits, their overall sustainable performance improves. The findings highlight the importance of integrating sustainability into real-estate planning, construction, marketing, and long-term business decision-making.

The study also concludes that sustainable entrepreneurial strategies are essential for balancing profitability with environmental and social responsibility. Real-estate businesses can improve their competitiveness by adopting eco-friendly materials, renewable energy systems, energy-efficient technologies, waste reduction practices, and green building concepts. The regression findings further indicate that sustainable strategies and perceived sustainability benefits have a significant effect on sustainable performance. Therefore, real-estate entrepreneurs, builders, developers, investors, and policymakers should encourage green technology integration through awareness, financial support, innovation, customer education, and government incentives. Overall, sustainable real-estate practices can contribute to long-term business growth, environmental protection, improved customer trust, and sustainable urban development.

REFERENCES

1. Abraham, P. S., & Gundimeda, H. (2018). Greening the buildings—An analysis of barriers to adoption in India. *Cities and the Environment*, 10(1), 1–20.
2. Saha, S. (2021). Barriers to adoption of commercial green buildings in India: A review. *South Asian Journal of Business and Management Cases*.
3. Sharma, M. (2018). Development of a ‘green building sustainability model’ for green buildings in India. *Journal of Cleaner Production*, 190, 538–551.
4. Manasi, S., Nagaraj, H., Kambara, C., Latha, N., Remadevi, O. K., & Vinaykumar, K. H. (2021). Promoting green buildings towards achieving sustainable development goals: A review. Institute for Social and Economic Change, Bangalore, Working Paper No. 516.
5. Meena, C. S., Kumar, A., Jain, S., Rehman, A. U., Mishra, S., Sharma, N. K., Bajaj, M., Shafiq, M., & Eldin, E. T. (2022). Innovation in green building sector for sustainable future. *Energies*, 15(18), 6631.
6. Jain, M. S., & Kakati, J. (2024). A statistical approach to evaluate the effect of obstacles on green building development in Northeast India. *World Development Sustainability*, 4, 100119.
7. Kumar, R. (2024). Incentivizing green building technology: A financial perspective on green building technologies in India.
8. Sathiaran, S. (2022). ESG adoption in the Indian real estate sector: A study. *International Journal for Research Trends and Innovation*, 7(8), 1432–1446.
9. Godha, R. (2025). Real estate financing for green and sustainable buildings in India. *The American Journal of Student Research*.
10. Tirumala, R. D., & Upadhyay, K. (2023). The green mirror: Reflecting on sustainability reporting practices of Indian and Australian real estate stakeholders. *Buildings*, 13(12), 3106.
11. Chopra, K., Arora, R., & Sidana, N. (2026). Sustainability reporting practices in Indian real estate: A stakeholder theory perspective. *Journal of Sustainable Real Estate*.
12. Mane, P. D. (2017). Green buildings and sustainable construction. *International Journal of Engineering Research & Technology*, 6(12).
13. Macherla, S., & Agarwal, S. (2022). Barriers in the green building practices adoption: A stakeholder’s perception. *International Journal of Special Education*, 37(3).
14. Hussain, F. (2025). Encouraging AI-enabled green building adoption in Mumbai’s commercial sector. *International Journal of Engineering Research & Technology*, 13(4).
15. Ritu, & Chhillar, S. (2017). Sustainable construction materials for buildings. *International Journal of Engineering Research & Technology*, 5(3).