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Eco -Centric Solutions: Enhancing Sustainability through Green Materials Re-use and Recycling

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ABSTRACT

Purpose: The purpose of this study is to examine the role of green materials in environmental sustainability, specifically their effects on remediation, reuse, recycling, and sustainable production. This study's goal is to look into the relationships between financial factors, consumer perceptions, and community involvement in promoting environmentally friendly practices.

Design/Methodology/Approach: This study employs a quantitative research design and has a sample size of 335. This study employs statistical analysis to investigate the relationships between financial aspects, consumer perceptions, and community engagement, offering a comprehensive examination of the role of green materials in environmental sustainability.

Findings: This research reveals that there is no negative relationship between the financial cost of green materials and corporate adoption, emphasizing the benefits to profitability. Furthermore, consumer intentions to use green materials are positively related to perceived effectiveness, whereas increased recycling access promotes community involvement.

Conclusion: This study focuses on the complex interplay of financial considerations, consumer perceptions, and community involvement in the field of green materials. The findings provide valuable insights, emphasizing the materials' multifaceted impact on environmental sustainability, such as remediation, reuse, recycling, and sustainable manufacturing practices.

Originality/Values: This research contributes to the body of knowledge on environmental sustainability by analysing the intricate relationships between monetary costs, consumer perceptions, and community involvement regarding green materials. It provides a sophisticated perspective that is vital for promoting sustainable development and offers insightful information about the difficulties in putting green practices into practice.

Keywords: Environmental Sustainability, Green Materials, Remediation, Recycling,
Sustainable Production

INTRODUCTION

Environmental sustainability is defined as the appropriate use of resources to safeguard ecosystem balance & reduce environmental impact of human activities [1] [2]. It comprises putting in place measures to ensure the long-term health of the environment while also considering its ecological, social, and economic components. Carbon footprint reduction, support for renewable energy, wildlife preservation, and waste reduction are all key components [3] [4]. To achieve environmental sustainability, we need innovative technologies, prudent consumer habits, and worldwide collaboration. It aims to foster peaceful coexistence between human activities and the natural environment to create a resilient and thriving planet that can fulfil current needs without jeopardising future generations' ability to meet their own.

Remediation, reuse, recycling, and sustainable production constitute a comprehensive approach to environmental stewardship. Remediation comprises resolving and reducing environmental damage, whereas reuse extends the lifespan of products [5]. Recycling tries to turn rubbish into valuable resources while reducing environmental impact [6]. Sustainable production uses ecologically friendly procedures to reduce resource depletion and emissions [7]. This comprehensive framework aims to create a closed-loop system in which waste is reduced and natural resources are protected. These principles help to build a circular economy by encouraging responsible consumption, which aligns human activities with natural balance and assures a resilient, sustainable future.

Green materials are critical in creating transformative change in remediation, reuse, recycling, and sustainable manufacturing practices [8]. These materials, derived from renewable or recycled sources, serve to mitigate environmental impact. They help to rehabilitate ecosystems by replacing traditional, harmful materials. When reused, green materials increase longevity and endurance, reducing the need for frequent replacements. Recycling creates closed-loop systems by utilising its environmentally friendly qualities.
Sustainable production employs green resources to mitigate resource depletion and emissions [9]. Overall, the use of green materials encourages holistic environmental solutions, resulting in a shift toward more responsible and sustainable practices [10] [27].

This study aims to investigate creative approaches to environmental sustainability, with a focus on the transformative role of green materials in promoting positive change in remediation, reuse, recycling, and sustainable manufacturing processes. This study is to investigate how using green materials contributes to a more ecologically responsible and resource-efficient framework within the larger context of environmental sustainability. The main objectives of this study include:

- To evaluate influence of green materials on remediation methods, including their effectiveness in decreasing environmental damage and promoting ecosystem restoration.
- To investigate how green materials improve product longevity, encourage reuse, and contribute to effective recycling operations to create sustainable closed-loop systems.
- To explore the use of green materials in manufacturing processes, evaluating their performance in terms of reducing environmental footprints and resource consumption while improving overall sustainability.

This investigation covers several key elements in the parts that follow. In Section 2, previous research that is relevant to the research question is thoroughly examined. After that, a thorough explanation of the research techniques employed in this study is given in Section 3. Correlation, moderation, and mediation studies are among the empirical results from data analysis examined in Section 4. This section provides a summary of the study's findings, highlighting important discoveries and takeaways from the data analysis. Next, the results of the investigation are presented in Section 5. The practical implications of the research findings are finally examined in Section 6, along with their possible influence on industrial strategy, role in shaping policy, and prospective avenues for future research.

1. 2 LITERATURE REVIEW

1.1 2.1 Relationship between the financial cost of green materials (FCGM) and corporate adoption of these materials in remediation, reuse, recycling, and sustainable production

Corporate use of these materials for remediation, reuse, recycling, and sustainable production has no negative correlation with the FCGM. Regarding environmental effects, biodegradability, and technical performance, green materials such as nanotechnological developments, green bio-composites, and value-added green products offer several benefits [11][12][13]. These materials have proven to be useful in reducing pollution and promoting sustainable development through successful usage in environmental remediation, water treatment procedures, and oil and gas industry applications [14][15]. The financial performance of plastic manufacturing companies

has improved due to increased spending on environmental costs, resulting in increased profitability and financial sustainability. Consequently,
encouraging the adoption of green products and enhancing the overall financial performance of enterprises can be achieved by allocating more money and resources to environmental expenses.

There is a negative correlation between the FCGM and corporate adoption of these materials for sustainable production, reuse, recycling, and remediation. Green supply chain management techniques that negatively impact profitability as measured by return on equity include waste reduction, recycling, and the use of renewable energy [16]. However, the Chinese chemical industry's adoption of industrial waste recycling does not translate into greater corporate cost savings and profitability [17]. The Johannesburg Stock Exchange-listed mining and cement companies were subjected to a study that also found a negative and significant association between return on equity and environmental costs, which include recycling, pollution control, and carbon management [18]. These findings suggest that while adopting eco-friendly practices and goods might boost a business's standing and encourage long-term expansion, businesses may not always see a rise in revenue or cost savings as a result of doing so.

1.2 2.2 Relationship between the perceived effectiveness of green materials (PEGM) and consumer intentions to use these materials in daily life

There is a strong positive correlation between the PEGM & consumer intentions to use these goods daily [19][20]. Green advertising pitches that emphasize environmental advantages of green products are more effective at spreading green messages when consumers perceive that ecological resources are scarce [21]. On the other hand, clients who struggle with a lack of personal resources benefit from employing the green understatement strategy, which highlights the performance advantages of green products [22]. Additionally, eco-labels improve consumer perceptions of product quality and customer efficacy, which in turn boosts environmental concerns and green purchasing [23]. These findings suggest that consumer perceptions about the effectiveness of green materials have a substantial impact on their intent to use them and that various appeals may be more effective depending on the circumstances surrounding resource constraints.

1.3 2.3 Relationship between access to recycling facilities (ARF) and community participation in recycling programs (CPRP)

There is no statistically significant correlation between ARF & CPRP [24]. ARF and
CPRP exhibit a significant positive association. Studies reveal a strong correlation and significant influence between profession and education on community participation in waste management programs [25]. The amount and method of recycling that the villagers plan to do so are greatly influenced by their understanding and knowledge of recycling. Furthermore, trash separation procedures are encouraged by the presence of infrastructure and the participation of community leaders [26]. These findings suggest that increasing ARF, putting in place educational initiatives, and starting community service programs will all help to enhance CPRP.

1.4 2.4 Problem Statement

This study's central issue is the conflicting results about the connection between FCGM and corporate adoption in the areas of sustainable production, reuse, recycling, and remediation. Supporters of the positive association point to the possible financial gains and enhanced company performance that could come from higher spending on environmental costs especially, on green materials. On the other hand, opposing viewpoints cast doubt on the relationship, arguing that using green products and adopting green behaviors may not always result in better financial outcomes. Furthermore, the study looks into the complicated interaction between PEGM and consumer intentions, as well as the role of ARF in CPRP. To address these problems, this study provides insights and solutions to competing viewpoints, resulting in a more cohesive understanding of sustainable practices.

2. 3 RESEARCH METHODOLOGY

3.1 Research Design

3. Questionnaire Preparation

This study contains 30 questions designed to evaluate the relationship between two different criteria. The Dependent Variables (DV) are Corporate Adoption of Green Materials (CAGM), Consumer Intentions to Use Green Materials (CIUGM), and CPRP. Independent variables (IDV) include the FCGM, PEGM, and ARF. As a result, the DV consists of three variables, each with five questions. Similarly, the IDV consists of three variables, each with five questions.

4. Response Collection

The survey instrument for this study was turned into a Google Form. As a result, the study concentrated on the act of completing a survey among people with a link to sustainability, aged 18 to 40 years. The data collection approach was used in the unique geographical region of Kiel in Germany, where responses were carefully acquired from people who have a connection to sustainability and live in the area.

5. Statistical Analysis

The SPSS tool, a popular statistical analysis software package, was utilized to thoroughly assess and critique the comments made by people involved in sustainability. Several quantitative approaches, such as regression tests, T-tests, descriptive statistics, and correlation analysis, were carefully used in the Statistical Analysis to analyze and evaluate the study's data. These statistical methods were carefully selected to assess the hypothesis's validity and dependability. Using these tests, we were able to meticulously analyze the links, trends, and interactions between the essential variables, increasing our understanding of the study topic at hand.

5.1 3.2 Online Survey and Sample

This research encompassed a total of 335 individuals who willingly shared their thoughts and information through a variety of online avenues such as social media platforms, email lists, and discussion forums. To gather demographic data, as well as dependent variables (CAGM, CIUGM, and CPRP) and independent variables (FCGM, PEGM, and ARF), a well- structured questionnaire was employed. The survey was conducted on a secure online platform to safeguard the data of both male and female respondents. Before the commencement of the study, each participant provided informed consent, and the Random Sampling Approach yielded 335 valid samples and 0 invalid samples.

5.1. 3.2.1 Design and Sample

The demographic profile of responders displays a wide range of features. Majority of participants are between 18-25 age range, accounting for 44.5% of sample, followed by 26-35 years (34.9%). The gender distribution is rather balanced, with 54% male and 46% female respondents. Environmental awareness is very strong, with a significant portion reporting moderate to very high levels of worry (3.9% not concerned, 29% somewhat concerned, 34.3% moderately concerned, 28.7% very concerned, and 4.2% extremely concerned). Lifestyle choices differ, with a considerable part identifying as average consumers (43%) and aware consumers (38.2%), while a notable number are early technology adopters (46.6%).
Geographically, respondents are spread throughout urban (41.8%), suburban (48.7%), and rural (9.6%) areas.

This diversified demographic makeup provides a complete picture of the study's participants, including age groupings, gender representations, environmental attitudes, lifestyles, technology adoption patterns, and geographic regions. This diversity increases the study's generalizability and enables for more detailed analysis of the correlations between these factors in the context of green material adoption and environmental sustainability.

The results of the questionnaire administered on CAGM indicate that a significant majority of respondents (80.5%) are in agreement or strongly in agreement with the notion that organizations consider environmental factors when acquiring materials. This signifies a conscious recognition of the ecological impact involved in procurement decisions. Furthermore, 80.6% of the participants express their support for the utilization of green materials in manufacturing processes, thereby emphasizing a dedication to sustainable production practices. The majority of respondents also endorse the engagement of the organization in initiatives related to remediation and recycling, as well as the provision of comprehensive training on green materials. The findings of CIUGM reveal a positive orientation towards environmentally responsible practices within the organizations that were surveyed. A substantial majority (80.0%) of the participants feel a personal responsibility to choose products that are made from green materials, which underscores their commitment to contributing to environmental sustainability. The information about a product being made from green materials significantly influences the decision to use or purchase it. A considerable proportion (80.6%) of the respondents believe that products made from green materials are more effective in fulfilling their intended purpose compared to conventional alternatives. The perceptions of community members regarding local recycling programs exhibit a diverse range of opinions, with a majority (80.3%) being aware of such programs, but a significant portion (19.7%) expressing disagreement or neutrality. However, there is evidence of a positive trend in community engagement in regular recycling activities, which underscores a commitment to sustainable waste management practices. A substantial majority (79.1%) holds positive views regarding the collective impact of recycling efforts on environmental conservation, and a significant portion (78.5%) expresses a willingness to advocate for and support the expansion of recycling programs within the community. The collaboration of the community in educating residents is also a significant factor, as it highlights the potential for collective efforts to promote sustainable production and awareness of environmental health. Overall, the findings emphasize a positive inclination towards recycling activities within the community, while also identifying areas that could benefit from targeted awareness campaigns and collaborative initiatives.

The survey discloses that survey takers possess a nuanced viewpoint concerning the economic elements of green materials. A substantial majority (77.7%) maintain the belief that green materials are economically attainable, exhibiting reasonable pricing in comparison to non-eco-friendly alternatives. Monetary incentives also serve as a driving force for enterprises to embrace green materials, with 78.2% indicating agreement or strong agreement. Stakeholders within the industry acknowledge the economic feasibility of incorporating green materials, with 77.4% perceiving them as a sustainable and cost-effective selection. A staggering 78.8% of participants believe that businesses investing in green materials enjoy a favorable return on investment, thus highlighting the perceived long-term financial advantages of environmentally conscious practices. Respondents express a notable willingness to pay a premium for products manufactured from green materials, thereby signifying an acknowledgement of the financial value associated with sustainable and eco-friendly decisions. The survey further demonstrates that survey takers hold optimistic attitudes about the environmental impact and sustainability aspects of products created from green materials. An overwhelming majority (76.4%) are convinced that such products have a more positive effect on the environment when compared to conventional alternatives. Stakeholders perceive the adoption of green materials as an effective measure in diminishing the carbon footprint linked to product production and usage, with 80.6% of respondents expressing agreement or strong agreement. Furthermore, 78.3% of participants believe that the utilization of green materials has a positive influence on a company's brand reputation, thus indicating a dedication to environmental sustainability & responsible business practices. All in all, these findings underscore the favorable environmental perceptions connected to the adoption of green materials across various dimensions, ranging from resource management to brand reputation.

5.1. 3.2.2 Measures

Descriptive statistics offer valuable insights into the characteristics of the sample population. The respondents, who have mean age of 1.97 & std. deviation of 1.188, displaying a wide range of ages. In terms of gender, the majority falls into category 1, indicating a value of 1.46 with a std. deviation of 0.499. Participants' environmental consciousness is evident in mean score of 3.00 with a std. deviation of 0.949. When it comes to lifestyle choices, mean is 2.44 with a std. deviation of 0.790, suggesting moderate variability. The inclination of the participants to adopt technology is apparent with a mean score of 1.62 & a std. deviation of 0.640. Location preferences, as specified by the mean of 1.68 & a std. deviation of 0.641, implies a balanced distribution. Key constructs related to green practices and sustainability, such as CAGM (Mean: 3.9313, SD: 0.85636), CIUGM (Mean: 3.8693, SD: 0.68042), CPRP (Mean: 3.8507, SD: 0.56435), FCGM (Mean: 3.8293, SD: 0.85624), PEGM (Mean: 3.8316, SD: 0.85195), and ARF (Mean: 3.7331, SD: 0.83247), demonstrate a positive trend, highlighting a generally favorable attitude towards green initiatives and sustainability practices among the surveyed individuals.

6. 4 RESULTS

6.1 4.1 Reliability Test

Table 1 shows the reliability analysis results for the tested constructs, which demonstrate a high level of internal consistency. The aggregate Cronbach's Alpha coefficient is 0.949, indicating that the measurement device is quite reliable. Cronbach's Alpha for standardized commodities is consistently high, at 0.950. These figures, which are far higher than the usually accepted threshold of 0.70, suggest that the scale's 30 items have high reliability and internal consistency. The N of Items column indicates that all 30 items were included in this study. These findings illustrate the research instrument's dependability, revealing that the items consistently test the intended constructs, hence increasing this study's credibility and trustworthiness.

Table 1: Reliability Test

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.949	.950	30

6.2 4.2 ANOVA Test

Table 2 displays the results of a two-way mixed-design ANOVA to determine the sources of variability in the dataset. This study discovers significant discrepancies between people, as illustrated in the Between People row, with a sum of squares (SoS) of 4465.892, 334 degrees of freedom (df), and a mean square (MS) of 13.371. Within people, variability is further classified as Between Items and Residual Causes. Across Items, which depicts variability caused by differences between items, has a total of squares of 101.290, 29 df, an MS of 3.493, an F-ratio of 5.102, & a very significant p-value of 0.000. Residual non-additivity and balance components have a low SoS and are not statistically significant (p-values of 0.971 & 1.000, respectively). The Total represents the SoS, df, and MSs, which helps to understand the dataset's overall variability. The findings emphasize the significance of differences between persons and items, providing helpful insights into the study's sources of variation and boosting the interpretation of the study's conclusions.

Table 2: ANOVA Test between People

<table>
<tr><th colspan="3"></th><th>Sum of Squares</th><th>df</th><th>Mean Square</th><th>F</th><th>Sig</th></tr>
<tr><td colspan="3">Between People</td><td>4465.892</td><td>334</td><td>13.371</td><td></td><td></td></tr>
<tr><td rowspan="5">Within People</td><td colspan="2">Between Items</td><td>101.290</td><td>29</td><td>3.493</td><td>5.102</td><td>.000</td></tr>
<tr><td rowspan="3">Residual</td><td>Non-additivity</td><td>.001[a]</td><td>1</td><td>.001</td><td>.001</td><td>.971</td></tr>
<tr><td>Balance</td><td>6631.409</td><td>9685</td><td>.685</td><td></td><td></td></tr>
<tr><td>Total</td><td>6631.410</td><td>9686</td><td>.685</td><td></td><td></td></tr>
<tr><td colspan="2">Total</td><td>6732.700</td><td>9715</td><td>.693</td><td></td><td></td></tr>
<tr><td colspan="3">Total</td><td>11198.592</td><td>10049</td><td>1.114</td><td></td><td></td></tr>
</table>

4.3 Hotelling T-Square Test

Table 3 summarizes the results of Hotelling's T-squared test, which was used to examine multivariate differences between groups. The estimated Hotelling's T-squared statistic is 96.705, with the numerator and denominator df of 29 and 306, respectively. The computed F- ratio is 3.055, with a highly significant p-value of 0.000. This indicates that there are statistically significant differences between groups in the multivariate space. The test considers multiple DVs at the same time, allowing for a comprehensive examination of group differences. The significant discovery means that at least one group's mean differs from others in multivariate space. Overall, Hotelling's T-squared test gives useful information on the presence of group differences, which improves our understanding of multivariate relationships in the data set.

Table 3: Hotelling T-Square Test

Hotelling's T-Squared	F	df1	df2	Sig

96.705	3.055	29	306	.000

6.3 4.4 T-test

Table 4 shows results of independent sample t-tests, which compare mean differences across many factors. The test values, or t-statistics, are extremely significant for all variables, with p-values of 0.000 indicating substantial differences in means. Each test has 334 df. Age, gender, environmental consciousness, lifestyle choices, technology adoption, geographical preferences, and key dimensions related to green practices and sustainability, such as CAGM, CIUGM, CPRP, FCGM, PEGM, and ARF, all had statistically significant mean differences ranging from 1.460 to 3.93134. The 95 % confidence intervals for mean differences do not include zero, indicating that the observed differences are valid. These results indicate considerable variations between the groups for each variable, emphasizing the importance of these variances and demonstrating the various perspectives and attitudes of the investigated population toward environmental sustainability and related issues.

Table 4: T-test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Age	30.343	334	.000	1.970	1.84	2.10
Gender	53.528	334	.000	1.460	1.41	1.51
Environmental	57.899	334	.000	3.003	2.90	3.11
Lifestyle	56.445	334	.000	2.436	2.35	2.52
Technology Adoption	46.347	334	.000	1.621	1.55	1.69
Location	47.911	334	.000	1.678	1.61	1.75
CAGM	84.025	334	.000	3.93134	3.8393	4.0234
CIUGM	104.081	334	.000	3.86925	3.7961	3.9424
CPRP	124.887	334	.000	3.85075	3.7901	3.9114
FCGM	81.854	334	.000	3.82925	3.7372	3.9213
PEGM	82.318	334	.000	3.83164	3.7401	3.9232
ARF	82.078	334	.000	3.73313	3.6437	3.8226

6.4 4.5 Factor analysis

Table 5 displays results of the factor analysis's sample adequacy and sphericity. The KMO measure for sample adequacy is 0.912, indicating a strong fit for factor analysis. A KMO value close to one implies that the dataset is well suited for this analytical approach. Furthermore, Bartlett's Test of Sphericity yields an approximate chi-square value of 1556.250 with 15 df, indicating a highly significant p-value of 0.000. This means that the correlation matrix deviates significantly from an identity matrix, supporting need for factor analysis. The significant Bartlett's Test, together with the high KMO value, verifies the dataset's eligibility for factor analysis by confirming intercorrelations between variables, giving confidence in the meaningful extraction of underlying factors.

Table 5: Factor Analysis

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.912
Bartlett's Test of Sphericity	Approx. Chi-Square	1556.250
	df	15
	Sig.	0.000

6.5 4.6 Hypotheses

6.5. 4.6.1 Hypothesis 1

This study examines considerable negative relationship between financial cost of green materials and their application by businesses in activities such as remediation, reuse, recycling, and sustainable production. This study's goal is to better understand the costs associated with incorporating environmentally friendly materials into various processes.

Table 6 displays the Pearson correlation coefficients for CAGM and FCGM. Correlation between CAGM & FCGM is strong, with value of 0.814. This significant association suggests a strong, positive linear relationship between the CAGM and its associated financial costs. The correlation matrix illustrates that increasing CAGM causes a rise in FCGM and vice versa. The diagonal coefficient of 1.000 represents the entire connection between each variable and itself. Overall, the strong positive correlation between CAGM and FCGM suggests that companies that prioritize the use of green materials incur higher financial costs when implementing environmentally friendly practices, reflecting the trade-off between sustainability initiatives and financial considerations.

Table 6: Correlation of Hypothesis 1

		CAGM	FCGM
Pearson Correlation	CAGM	1.000	.814
	FCGM	.814	1.000

Table 7 shows the regression model's main statistics. R Square value of 0.663 specifies that model's IDV(s) are responsible for about 66.3 % of the variance in the DV. The Adjusted R Square (.662) corrects for potential bias caused by the number of predictors while keeping consistent with the R Square. R-value of 0.814 specifies a strong positive correlation between model's variables. Std. error of estimate, which measures average departure of observed values from regression line, is 0.49779. This metric indicates how accurately the model predicts the DV. Overall, the model appears to have strong explanatory power, capturing a considerable amount of DV variability as evidenced by the high R Square, R, & Adjusted R Square values, while Std. Error of estimate shows prediction accuracy.

Table 7: Regression of Hypothesis 1

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.814[a]	.663	.662	.49779

Table 8 displays the results of a regression analysis, which breaks down the total SoS into regression and residual components. The regression SoS is 162.425, with one degree of freedom, resulting in an MS of 162.425. The associated F-ratio of 655.476 with a p-value of 0.000 shows that regression model is statistically significant. This demonstrates that the model's IDV plays an significant role in explaining the DV variability. Residual SoS is 82.516, with 333 df and an average square of 0.248. These values represent the model's unexplained variability. The total SoS is 244.941, which includes both explained and unexplained variance. The strong F-ratio and significance emphasize the model's overall explanatory power and support the notion that the regression relationship is not due to chance.

Table 8: ANOVA of Hypothesis 1

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	162.425	1	162.425	655.476	.000[b]
	Residual	82.516	333	.248		
	Total	244.941	334			

Table 9 displays the correlations and covariances for the variable FCGM. The correlation coefficient of 1.000 indicates that FCGM has a perfectly positive correlation with itself, as expected. This coefficient appears on diagonal of correlation matrix and shows correlation between each variable and itself. The covariance value of 0.001 in the Covariances section denotes the correlation between FCGM and itself. Because covariances are influenced by variable scale, the small amount here indicates a low absolute covariance, implying that the changes in the variables are consistent with their scales. In conclusion, our findings corroborate FCGM's significant positive correlation with itself while also providing information on the covariance structure, emphasizing the variable's univariate characteristics in isolation.

Table 9: Correlation Coefficient of Hypothesis 1

Model			FCGM
1	Correlations	FCGM	1.000
	Covariances	FCGM	.001

6.5. 4.6.2 Hypothesis 2

This study investigates the strong positive association between consumers' opinions of the efficacy of green materials and their aspirations to adopt them into their daily lives. This study's goal is to identify elements that effect customer decisions and behaviors regarding ecologically friendly products.

Table 10 displays the Pearson correlation coefficients for CIUGM and PEGM. Correlation between CIUGM & PEGM is moderately strong, with value of 0.680. This high correlation suggests a substantial positive linear relationship between firm expenditure in green material upgrading and perceived efficacy. The correlation matrix illustrates that when business investment in green materials increases, so does the PEGM, and vice versa. The diagonal coefficient of 1.000 represents the entire connection between each variable and itself. Overall, the moderately strong positive correlation between CIUGM and PEGM implies that companies making higher investments in upgrading green materials tend to have a stronger perception of the effectiveness of these materials, emphasizing the potential positive impact of financial commitment on perceived outcomes in the context of sustainability initiatives.

Table 10: Correlation of Hypothesis 2

		CIUGM	PEGM
Pearson Correlation	CIUGM	1.000	.680

	PEGM	.680	1.000

Table 11 displays the crucial statistics for the regression model. R Square value of 0.463 shows that the model's IDV accounts for about 46.3% of the DV variation. The Adjusted R Square (at 0.461) accounts for potential bias induced by the number of predictors while remaining consistent with the R Square. An R-value of 0.680 suggests reasonably significant positive correlation between model's variables. Std. error of estimate, which measures average departure of observed values from regression line, is 0.49949. This metric measures model's ability to predict DV. Overall, model appears to have moderate explanatory power, capturing a considerable amount of the variability in the DV, as demonstrated by R Square and Adjusted R

Square values, while Std. Error of Estimate reflects prediction precision.

Table 11: Regression of Hypothesis 2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.680[a]	.463	.461	.49949

Table 12 displays the results of a regression analysis, which includes dividing the total SoS into regression and residual components. The regression SoS is 71.554 with one degree of freedom, resulting in an MS of 71.554. The associated F-ratio of 286.804 with a p-value = 0.000 shows that regression model is statistically significant. This demonstrates that the model's IDV plays an significant role in explaining DV variability. Residual SoS is 83.079, with 333 df and 0.249 as the MS. These values reflect the model's unexplained variability. The total SoS is 154.633, which includes explained and unexplained variability. The strong F-ratio and significance emphasize model's overall explanatory power and support the notion.

Table 12: ANOVA of Hypothesis 2

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	71.554	1	71.554	286.804	.000[b]
	Residual	83.079	333	.249		
	Total	154.633	334			

Table 13 displays the correlations and covariances for the variable PEGM. The correlation coefficient of 1.000 shows a perfect positive association between PEGM and itself, as predicted. This coefficient appears on diagonal of correlation matrix and shows correlation between each variable and itself. The covariance value of 0.001 in the Covariances section denotes the correlation between PEGM and itself. Because covariances are influenced by variable scale, the small amount here indicates a low absolute covariance, implying that the changes in the variables are consistent with their scales. Thus, these data corroborate PEGM's significant positive correlation with itself while also providing information on the covariance structure, emphasizing the variable's univariate properties in isolation.

Table 13: Correlation Coefficient of Hypothesis 2

Model			PEGM
1	Correlations	PEGM	1.000
	Covariances	PEGM	.001

6.5. 4.6.3 Hypothesis 3

This study looks into the considerable beneficial relationship between the availability of recycling facilities and community participation in recycling programs. The research aims to improve understanding and promote effective ways for encouraging sustainable waste management practices at the local level by investigating the factors that influence community participation.

Table 14 displays the Pearson correlation coefficients for CPRP and ARF. The correlation between CPRP and ARF is moderate, with a value of 0.507. This positive connection suggests a linear association between perceptions of CPRP & ARF. The relationship matrix shows that when people's perceptions of CPRP improve, so does their attitude toward recycling facilities, and vice versa. The diagonal coefficient of 1.000 represents the entire connection between each variable and itself. Overall, the moderate positive correlation between CPRP and ARF indicates that people who perceive higher levels of CPRP are more likely to be positive about recycling facilities, highlighting the potential impact of CPRP on environmental attitudes.

Table 14: Correlation of Hypothesis 3

		CPRP	ARF
Pearson Correlation	CPRP	1.000	.507
	ARF	.507	1.000

Table 15 shows the relevant statistics for the regression model that investigates the association between CPRP and ARF. The R Square value of 0.257 indicates that model's IDV (CPRP) accounts for about 25.7 % of the variance in the DV (ARF). The Adjusted R Square (.255) adjusts for any bias caused by the number of predictors. R-value of 0.507 shows a somewhat positive connection between CPRP & ARF. Std. error of estimate, which measures average departure of observed values from regression line, is 0.48704, indicating that the model is accurate in predicting ARF. Overall, the model suggests that CPRP explains a moderate proportion of variability in ARF, as evidenced by R Square and Adjusted R Square values, while std. error of the estimate reflects accuracy of the predictions.

Table 15: Regression of Hypothesis 3

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.507[a]	.257	.255	.48704

Table 16 displays the findings of regression analysis to assess relationship between CPRP & ARF. Regression SoS is 27.386, with one degree of freedom, giving an MS of 27.386. The corresponding F-ratio is 115.450, with p-value of 0.000, indicating that regression model is statistically significant. This demonstrates that CPRP is an important factor in explaining the variation in ARF. The residual SoS is 78.991, with 333 df and an MS of 0.237, showing that the model exhibits unexplained variability. The overall SoS is 106.377, which includes both the explained and unexplained variability. The high F-ratio and its significance support the overall validity of the regression model, implying that the observed link between CPRP and ARF is unlikely to be attributable to chance.

Table 16: ANOVA of Hypothesis 3

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	27.386	1	27.386	115.450	.000[b]
	Residual	78.991	333	.237		

	Total	106.377	334			

Table 17 displays the correlations and covariances for the variable ARF. The correlation coefficient of 1.000 indicates that ARF has a perfectly positive correlation with itself, as expected. This coefficient appears on diagonal of correlation matrix and shows correlation between each variable and itself. The covariance value of 0.001 in the Covariances section denotes ARF's covariation with itself. Because covariances are influenced by variable scale, the small amount here indicates a low absolute covariance, implying that the changes in the variables are consistent with their scales. Thus, these results support ARF's significant positive correlation with itself while also providing information on the covariance structure, emphasizing the variable's univariate properties in isolation.

Table 17: Correlation Coefficient of Hypothesis 3

Model			ARF
1	Correlations	ARF	1.000
	Covariances	ARF	.001

7. 5 DISCUSSION

This study investigates three fundamental hypotheses about the FCGM, the perceived efficacy of these materials, and ARF. Hypothesis 1 explores the correlation between the FCGM and corporate adoption in diverse sustainability practices. The results of this study offer valuable insights into whether cost influences integration of eco-friendly materials in remediation, reuse, recycling, and sustainable production. Hypothesis 2 delves into the association between the PEGM and consumer intentions to incorporate them into their daily lives. Understanding this correlation is crucial for businesses and policymakers aiming to encourage environmentally conscious consumer behaviors. Hypothesis 3 examines the potential positive relationship between ARF and CPRP. This highlights the significance of infrastructure and community involvement in promoting sustainable waste management practices.

The discourse underscores the implications of this study's findings for businesses, policymakers, and communities striving for environmental sustainability. A comprehensive understanding of the financial considerations, consumer perceptions, and community dynamics provides insights into the challenges and opportunities of adopting green materials and sustainable practices. Recommendations may encompass targeted initiatives to mitigate the financial barriers associated with green materials, educational campaigns to enhance consumer awareness and perceptions, and investments in accessible and efficient recycling facilities to foster community involvement. In essence, the study contributes invaluable knowledge to the ongoing discourse on innovative approaches to environmental sustainability, providing actionable insights for facilitating positive change across corporate, consumer, and community dimensions.

8. 6 CONCLUSION

This study presents significant discoveries regarding the dynamics of incorporating environmentally friendly materials in various domains, including corporations, consumers, and communities. Findings of this study provide a clearer understanding of complex relationship between FCGM and corporate adoption, highlighting the importance of strategic approaches to overcome potential obstacles. The positive connection found between the PEGM and consumer intentions emphasizes the critical role of consumer perceptions in shaping sustainable behaviors. Moreover, the study emphasizes the significance of ARF in promoting CPRP, underscoring the importance of robust infrastructure and community engagement.

These revelations have substantial implications for businesses aiming to improve their sustainability practices, consumers who are interested in eco-friendly choices, and communities striving for effective waste management. For businesses that are navigating the adoption of green materials, addressing cost considerations becomes extremely important, and aligning strategies with consumer perceptions can lead to widespread acceptance. At the same time, promoting community involvement through enhanced ARF emerges as a key strategy for sustainable waste management initiatives. Ultimately, this study offers valuable insights into the broader discussion on environmental sustainability, providing practical recommendations for stakeholders to navigate the complex landscape of green material adoption and promote positive change towards a more sustainable future.

9. 7 IMPLICATION

This study's implications have far-reaching effects in the realms of corporate, consumer, and community dimensions. For businesses, comprehending the positive correlation between the PEGM and consumer intentions emphasizes the significance of open communication and marketing strategies that emphasize environmental advantages of their products. This understanding can influence businesses in their product development and marketing strategies to align with consumer values, thereby promoting the adoption of sustainable practices. Furthermore, this study's findings on the relationship between the FCGM and corporate adoption have noteworthy consequences for businesses striving to integrate environmentally friendly materials into their processes. The identified positive correlation implies that investments in green materials can result in improved corporate sustainability practices, potentially attracting environmentally conscious consumers and enhancing overall corporate reputation.

For policymakers, acknowledging the positive correlation between the ARF and CPRP underscores the importance of infrastructure development and community engagement initiatives. Policymakers can utilize this knowledge to implement targeted interventions, such as enhancing recycling infrastructure and conducting educational campaigns, to enhance community involvement in sustainable waste management. Overall, this study's implications go beyond theoretical insights, providing actionable guidance for businesses, policymakers, and communities to collectively drive meaningful change towards a more environmentally sustainable future.

10. Reference

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