

Stochastic Modelling and Computational Sciences

THE ROLE OF ECO-FRIENDLY STARTUPS IN PROMOTING ZERO-WASTE LIFESTYLES AMONG GEN Z

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ABSTRACT

This study explores the influence of eco-friendly startups on the adoption of zero-waste lifestyles among Generation Z (Gen Z). As climate awareness rises, Gen Z has emerged as a conscious consumer group championing sustainability. Using a mixed-method approach, the research analyses behavioural patterns, the appeal of green innovations, and market responses. Findings highlight that Gen Z is highly responsive to sustainable business models, particularly when transparency, affordability, and digital engagement intersect. The study reveals significant potential for startups to shape sustainable consumption norms and inform strategic policymaking in green entrepreneurship.

Keywords: Eco-friendly startups, Gen Z, zero-waste, sustainability, green entrepreneurship, social media, consumer behaviour

1. INTRODUCTION

Environmental concerns have accelerated a global movement toward sustainability, led significantly by Gen Z, individuals born between the mid-1990s and early 2010s. Their digital fluency and social values align strongly with sustainable living practices like zero-waste consumption. Eco-startups—businesses built around green principles—are aligning themselves with Gen Z values to promote lifestyle change.

Notable ventures such as **Loop**, **TerraCycle**, and **PANGAIA** exemplify this trend by addressing waste through reusable packaging, hard-to-recycle materials, and sustainable fashion. As market demand grows, Gen Z's preferences are reshaping mainstream consumption norms and driving innovation in eco-business models.

2. OBJECTIVES OF THE STUDY

- To analyse the role of eco-friendly startups in promoting zero-waste lifestyles among Gen Z.
- To identify key motivators for Gen Z's adoption of zero-waste practices.
- To assess how startups use online platforms and influencer marketing.
- To understand the trust factors influencing Gen Z's loyalty to green brands.

3. RESEARCH METHODOLOGY

A descriptive and exploratory research design was employed.

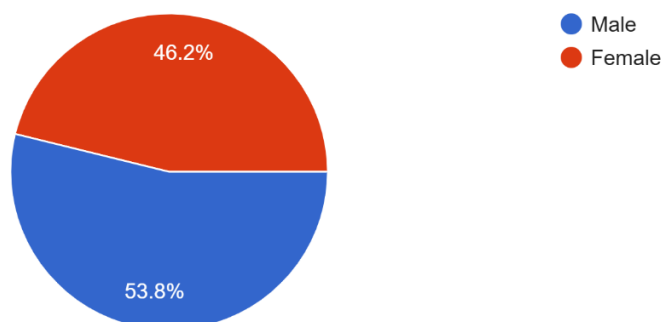
- **Sample:** 104 Gen Z respondents aged 13–28 (60 students, 40 professionals) using **stratified random sampling**
- **Primary data:** Collected through Google Forms
- **Secondary data:** Literature, case studies, and academic sources

Tools: Descriptive statistics, charts, and hypothesis testing (ANOVA) were used for analysis.

4. DATA ANALYSIS & KEY FINDINGS

Gender

104 responses

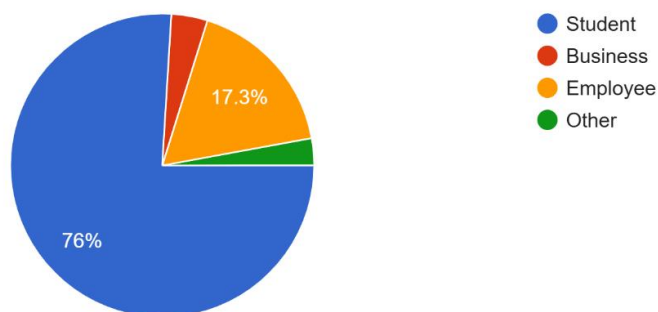


Interpretation:

The gender distribution among the respondents is quite equal, with 53.8% males and 46.2% females among the participants. It presents a diverse view among the survey findings, representing the views of both genders nearly equally.

Occupation

104 responses



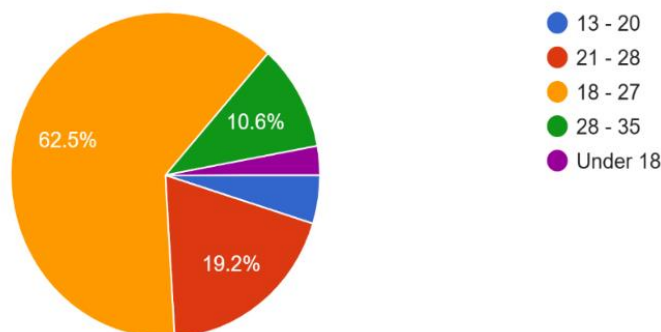
Interpretation:

The pie chart indicates that the majority of the respondents (76%) are students, pointing out that the survey primarily captures the opinions and tastes of a younger, probably Gen Z, audience who are in the process of pursuing their education. Employees constitute 17.3% of the respondents, indicating some degree of professional expertise in the answers. A lesser percentage engages in business ventures, and just a small fraction comes under the "Other" category. Such demographic analysis matters because it reveals that the responses are largely coming from individuals who might be more receptive to new concepts, fashions, and sustainability behaviours, like zero-waste lifestyle.

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Age

104 responses

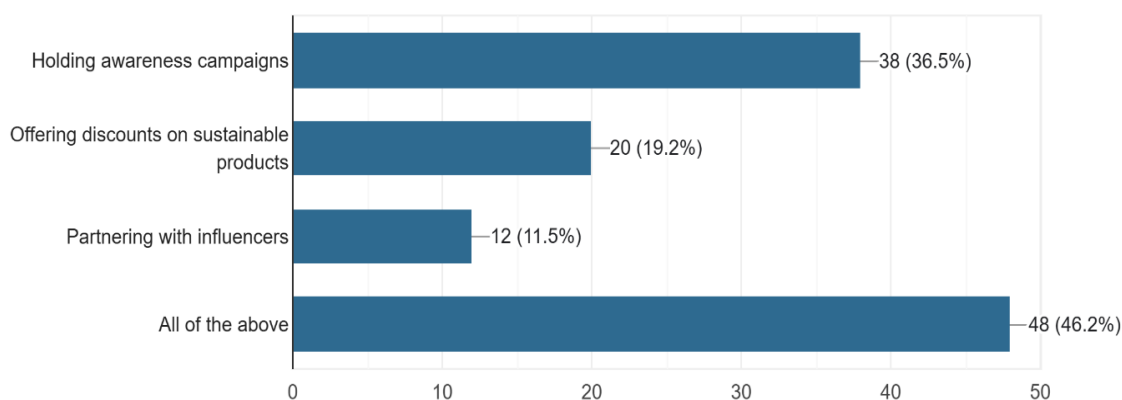


Interpretation:

Most of the interviewees (62.5%) belong to the 18–27 age category, which establishes that young adults are the biggest stakeholders in this survey. That is followed by 21–28-year-olds (19.2%), evidencing a dominance of Gen Z and early millennials. The lesser segments are for the 13–20 (blue), 28–35 (green), and below 18 (purple) age ranges, which depicts the survey covering opinions mostly from those at the onset of their working or higher-education path.

How can environmental friendly startups best encourage zero-waste living among Gen Z?

104 responses



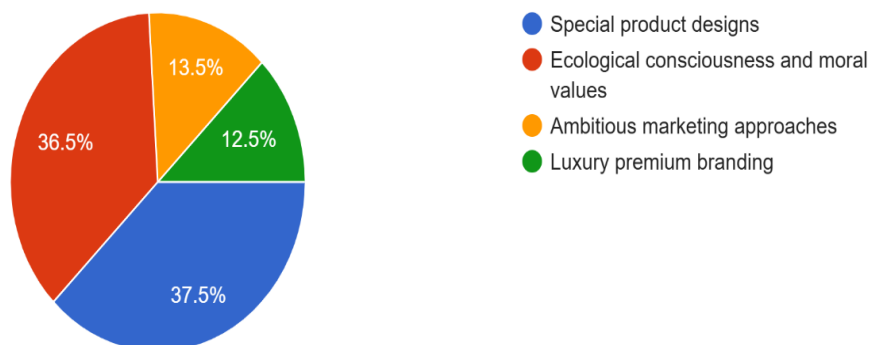
Interpretation:

The chart indicates that 46.2% of participants think a mix of awareness campaigns, discounts on eco-friendly products, and influencer collaborations is the best method of promoting zero-waste lifestyles among Gen Z for green startups. Awareness campaigns only are second at 36.5%, indicating that education is a top factor. Fewer participants responded that just discounts (19.2%) or influencer collaborations (11.5%) are best, demonstrating that a multi-faceted approach is optimal.

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Which one of these makes environmental friendly startups attractive to Gen Z consumers?

104 responses

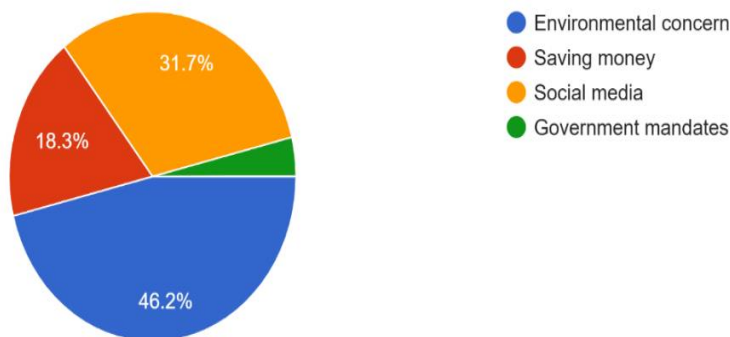


Interpretation:

Based on the findings of the survey, the strongest reason why eco-friendly startups appeal to Gen Z consumers is that they are ecologically aware and have moral principles, with 36.5% of the votes. This indicates that Gen Z is very driven by environmental issues and looks for companies that share their ethical principles.

What is the strongest motivation for Gen Z to embrace zero-waste habits?

104 responses



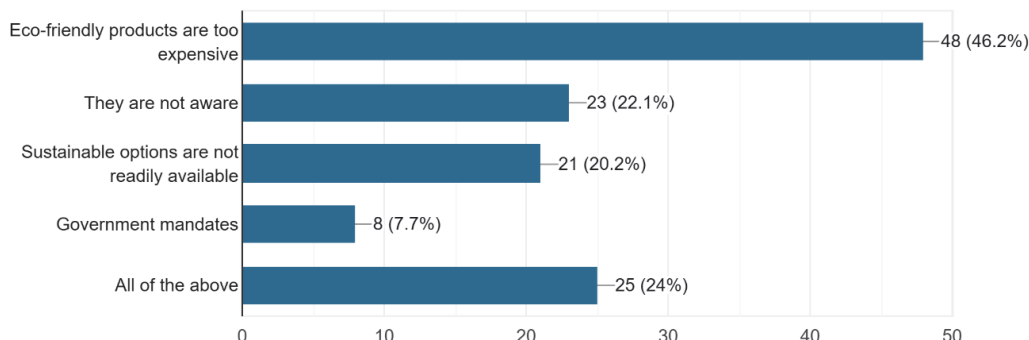
Interpretation:

The poll suggests that concern for the environment is the greatest incentive for Gen Z to adopt zero-waste lifestyles, representing 46.2% of the votes. This reflects Gen Z's ingrained consciousness about the environment and their active engagement in sustainable lifestyles.

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What is the most significant issue Gen Z encounters in embracing a zero-waste lifestyle?

104 responses

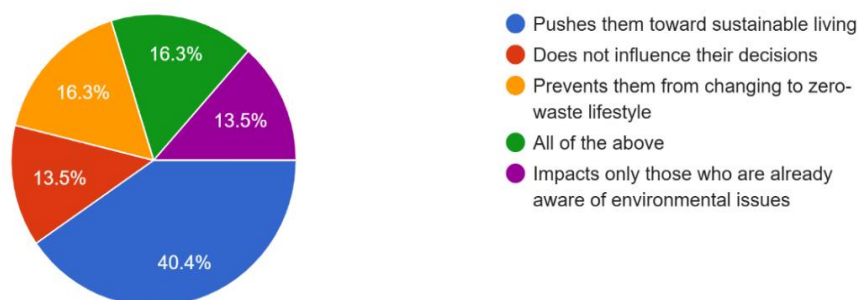


Interpretation:

The survey results indicate that the biggest problem Gen Z faces in adopting a zero-waste lifestyle is the exorbitant price of green products, mentioned by 46.2% of the respondents. This indicates that although Gen Z is eco-friendly, the economic constraint of sustainable products is a significant hindrance to adopting zero-waste practices.

How does peer influence affect Gen Z's embracement of zero-waste habits?

104 responses



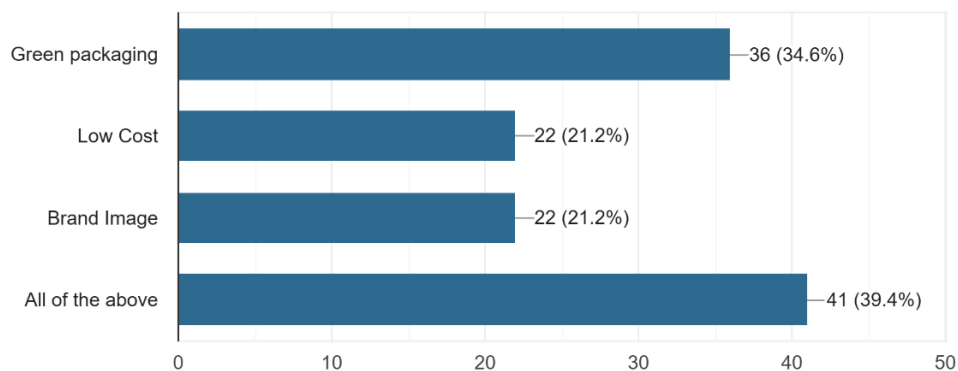
Interpretation:

The findings of the survey show that peer influence actually ****drives Gen Z towards sustainable living****, with 40.4% of the responses indicating in this direction. Although other options such as lack of influence, blocking change, covering all the options, and affecting only the environmentally conscious are also found (each at 13.5% or 16.3%), the most prominent trend shows that Gen Z's peers have an important role to play in pushing zero-waste practices.

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What feature of eco-friendly products has the greatest impact on Gen Z?

104 responses

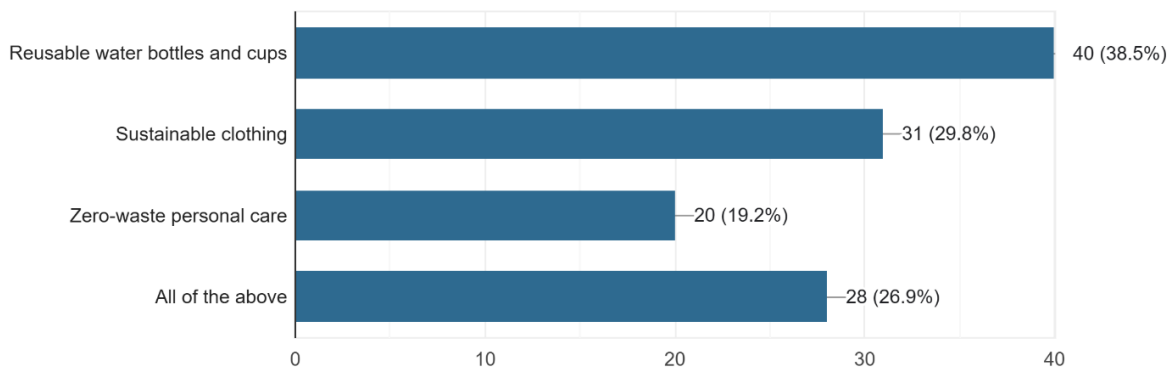


Interpretation:

The survey indicates that all of the above-mentioned features (green packaging, low price, and brand image) together have the highest influence on Gen Z when it comes to eco-friendly products, as reflected in 39.4% of the responses. Although the most impactful individual feature is green packaging at 34.6%, there is a notable section of Gen Z that is driven by a combination of these factors when deciding to take up environmentally friendly products.

What kind of eco-friendly product is most popular among Gen Z?

104 responses



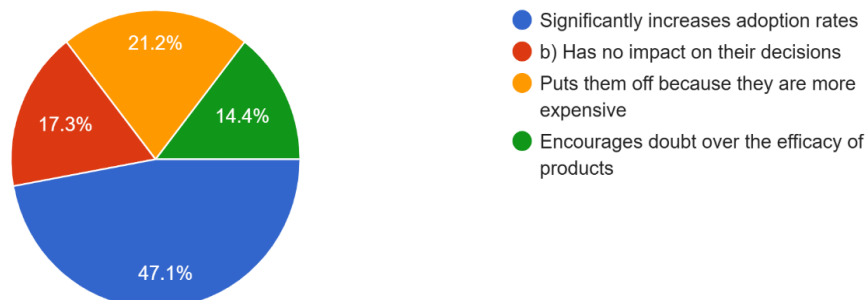
Interpretation:

The survey results indicate that reusable cups and water bottles are the most popular green products among Gen Z, at 38.5%. Although sustainable fashion is also highly popular at 29.8%, reusable drinkware is the most adopted category of green products among this generation.

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How does availability of eco-friendly products impact Gen Z's adoption of sustainable lifestyles?

104 responses

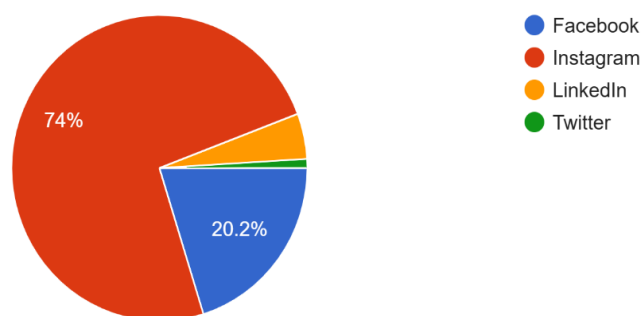


Interpretation:

Survey evidence shows that exposure to environmentally friendly products greatly increases Gen Z adoption levels of green lifestyles, where 47.1% of the responses reinforce this. As much as others think it keeps them away through increased cost (21.2%) or that it has no effect (17.3%), the majority take the view that being exposed to such products is a major reason behind Gen Z's quest for sustainability.

Which web platform do eco-friendly startups mainly utilize in interacting with Gen Z?

104 responses



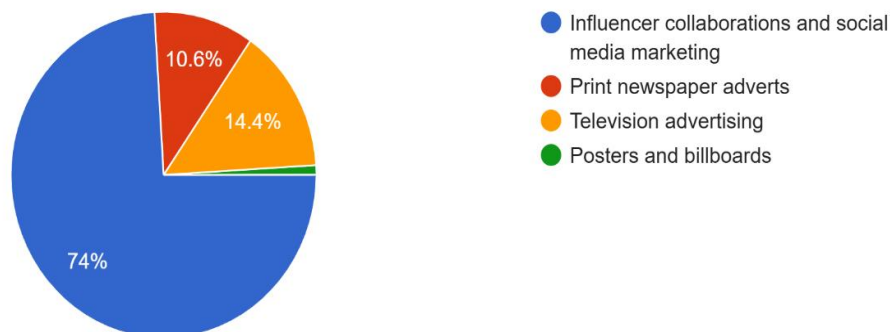
Interpretation:

The survey statistics clearly show that environmentally friendly startups primarily use Instagram to engage with Gen Z, representing 74% of the votes. Though Facebook enjoys usage by a significant percentage (20.2%), LinkedIn and Twitter register significantly lower usage for the same interaction.

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Which digital marketing channel is best suited for green startups targeting Gen Z?

104 responses

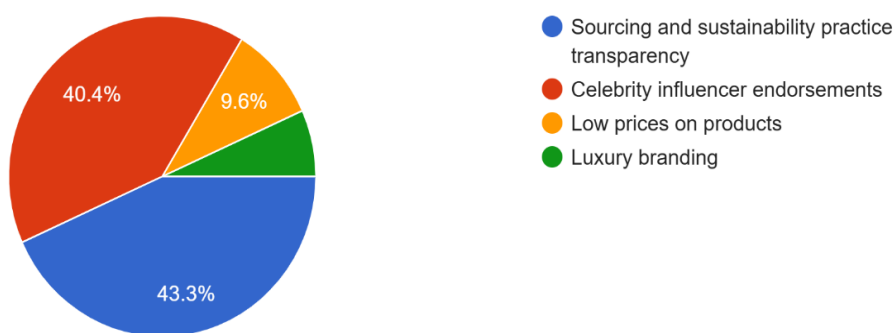


Interpretation:

As per the survey, social media marketing and influencer collaborations are the most appropriate digital marketing channels for green startups targeting Gen Z, which accounts for 74% of the answers. This clearly indicates that using social media platforms and collaborating with influencers are the most effective ways to target and connect with this segment for eco-friendly businesses.

Which of the following is Gen Z's most important factor influencing trust in environmental friendly startups?

104 responses



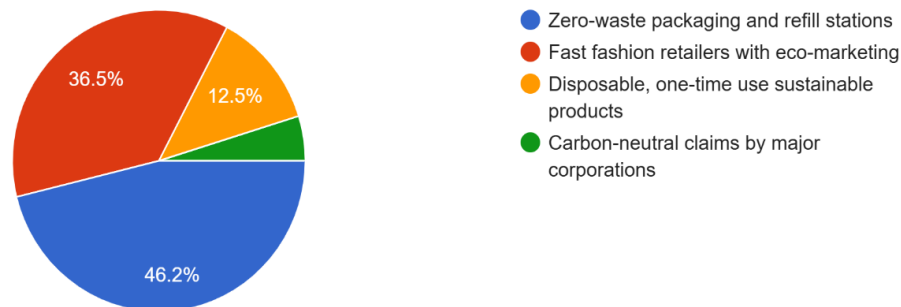
Interpretation:

The survey data indicates that sourcing and sustainability practice transparency is the most important factor influencing Gen Z's trust in environmentally friendly startups, with 43.3% of responses. While celebrity influencer endorsements also play a significant role (40.4%), transparency in how products are made, and the company's environmental efforts is the leading driver of trust for this generation.

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Which of the following environmental friendly business models is Gen Z most drawn to?

104 responses



Interpretation:

The findings of the survey indicate that zero-waste packaging and refill centres are the sustainable business models that Gen Z is most attracted to, standing at 46.2% of the votes. This indicates a high preference of this generation for business models that do not generate waste and provide sustainable options for substitute packaging.

HYPOTHESIS OF THE STUDY

Hypothesis 1:

H0: There is no significant difference in platform preference for eco-friendly startup interaction among Gen Z based on gender.

H1: There is a significant difference in platform preference for eco-friendly startup interaction among Gen Z based on gender.

Independent Variable: Gender

Dependent Variable: Web platform used by startups.

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	8.480769	1	8.480769	32.37562	4.32E-08	3.886996
Within Groups	53.96154	206	0.261949	—	—	—
Total	62.44231	207	—	—	—	—

Interpretation:

P-value = 4.32×10^{-8} , which is much less than 0.05

F = 32.37562 is greater than the F critical value = 3.886996

These results indicate a statistically significant difference between the two groups (Column 1 and Column 2). This means the average scores/responses in these two columns are not equal, and the differences are not due to random chance.

Conclusion:

Since:

P-value < 0.05

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$F > F_{crit}$,

we reject the null hypothesis.

Result:

The test shows that the two groups (e.g., types of motivation or strategies) do not perform equally — one is significantly more effective or preferred by Gen Z than the other.

There is a significant difference between Column 1 and Column 2 — the factor being tested (such as two different motivations or marketing channels, depending on your hypothesis) does have a meaningful impact on Gen Z behaviour toward zero-waste habits or start-ups.

Hypothesis 2:

H0: There is no significant difference in trust factors for eco-friendly start-ups based on preferred digital marketing channel.

H1: There is a significant difference in trust factors for eco-friendly start-ups based on preferred digital marketing channel.

Independent Variable: Preferred digital marketing channel

Dependent Variable: Trust factors for eco-friendly start-ups

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	7.3125	1	7.3125	10.74875	0.001225	3.886996
Within Groups	140.1442	206	0.680312			
Total	147.4567308	207				

Interpretation:

P-value = 0.001225 is significantly less than 0.05

$F = 10.74875$ is greater than $F_{crit} = 3.886996$

Conclusion:

Since:

P-value < 0.05

$F > F_{crit}$

We reject the null hypothesis.

Result:

This means there is a statistically significant difference between the two groups (Column 1 and Column 2). The average values between them are not equal, and the observed difference is not due to random chance.

There is a significant impact of the factor being tested (e.g., a strategy, motivation, or intervention) on the Gen Z group's responses. One group performs or is rated significantly higher than the other, suggesting the tested variable influences Gen Z behaviour toward eco-friendly or zero-waste practices.

5. FINDINGS

- **Gen Z's Environmental Awareness:** Most Gen Z participants are strongly driven by environmental issues and ethical values while making sustainable product choices. Peer influence and online exposure are key factors in determining their choices.

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- **Role of Startups:** Green startups have a significant impact on Gen Z through sustainable product designs, honest business practices, and shared values. Instagram was the most successful platform for startup–consumer interaction.
- **Barriers to Adoption:** The primary obstacle to adopting zero-waste living is the expense of environment-friendly products. Limited awareness and product availability are other significant barriers.
- **Successful Promotion Strategies:** Multi-channel approaches—converging awareness initiatives, social media partnership, and promotions—are most effective in nudging sustainable habits among Gen Z.
- **Product Preferences:** Reusable cups, bottles, and eco-friendly clothing are the most popular green products. Product packaging innovation and ethics of the brand continue to influence purchase decisions.
- **Trust Drivers:** For Gen Z, the most valued is transparency within sourcing and production, followed by influencer collaboration as secondary drivers of trust.

6. DISCUSSION

Eco-startups gain traction among Gen Z by resonating with their values—authenticity, affordability, and innovation. Social media, especially influencer marketing on Instagram, plays a vital role in behaviour shaping. However, economic challenges like product pricing remain a significant barrier.

Transparency, emotional brand narratives, and ethical production are crucial drivers of loyalty. The intersection of education, visibility, and affordability can exponentially accelerate zero-waste adoption.

7. RECOMMENDATIONS

- **Reduce Costs:** Leverage subsidies, local sourcing, and reuse models.
- **Digital Engagement:** Focus on Instagram reels, eco-influencer partnerships, and campaigns.
- **Increase Reach:** Distribute products across semi-urban and online marketplaces.
- **Educate:** Run zero-waste workshops in educational institutions.
- **Transparency:** Share impact metrics, sustainability reports, and sourcing data openly.

8. CONCLUSION

Eco-friendly startups are central to mainstreaming zero-waste habits among Gen Z. Their values, when aligned with transparent business practices and accessible green solutions, can fuel long-term sustainable change. While cost and availability remain hurdles, Gen Z's eco-activism, when paired with genuine startup innovation, is a powerful force toward achieving sustainable development goals.

9. REFERENCES

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