5. Data Analysis & Interpretation

Introduction:

This chapter presents the analysis and interpretation of the data collected to address the objectives of the study on consumer behavior towards green cosmetics in the selected cities of Gujarat state. The main aim is to identify the key factors influencing consumer preferences, role of environmental awareness and the impact of social media on the purchase intentions. The findings of the study are structured on the basis of hypothesis and its objectives and are compared with the existing studies for providing a deeper understanding for academia and industry.

Data Sources:

The study employs both primary and secondary data sources:

- **Primary Data:** Collected using a structured questionnaire administered to a sample of 1,154 respondents across Ahmedabad, Surat, and Vadodara. The questionnaire covered demographic details, awareness levels, motivational drivers, and barriers to adopting green cosmetics.
- **Secondary Data:** Derived from industry reports, academic journals, and market analyses to support and compare findings.

Analytical Tools:

The following statistical techniques were used to analyze the data:

- Regression Analysis: To understand the relationship between demographic factors and purchase intentions.
- Analysis of Variance (ANOVA): To identify variations in behavior among different demographic groups.
- Cronbach's Alpha: Achieved a reliability score of 0.907, ensuring the internal consistency of the questionnaire.
- Descriptive Statistics: Used for summarizing demographic and behavioral data.

The analysis was performed using statistical software, ensuring precision and reliability.

Demographic Analysis:

Gender	Frequency	Relative Frequency
Female	739	64.04%
Male	415	35.96%
Grand Total	**1154**	**100.00%**

City	Frequency	Relative Frequency
Ahmedabad	580	50.26%
Surat	376	32.58%
Vadodara	198	17.16%
Grand Total	**1154**	**100.00%**

Distribution of city	Frequency	Relative frequency
Ahmedabad	**580**	**50.26%**
Female	391	33.88%
Male	189	16.38%
Surat	**376**	**32.58%**
Female	221	19.15%
Male	155	13.43%
Vadodara	**198**	**17.16%**
Female	127	11.01%
Male	71	6.15%
Grand Total	**1154**	**100.00%**

Education Qualification	Frequency	Relative Frequency
Graduate	546	47.31%
Others	16	1.39%
Postgraduate	441	38.21%
Professional	5	0.43%
Upto 12th	146	12.65%
Grand Total	**1154**	**100.00%**

Monthly Income	Frequency	Relative Frequency
21,000 to 40,000	207	17.94%
41,000 to 60,000	148	12.82%
61,000 to 80,000	53	4.59%
81,000 and above	192	16.64%
Upto Rs.20,000	554	48.01%
Grand Total	**1154**	**100.00%**

Occupation	Frequency	Relative Frequency
Business	81	7.02%
Home-Maker	77	6.67%
Other	11	0.95%
Service	42	3.64%
Student	551	47.75%
Working Professional	392	33.97%
Grand Total	**1154**	**100.00%**

Demographic Analysis Interpretation:

- **Gender:** From the data collected, 1154 valid responses were taken to analyze the final data. Out of the 1154, 739 were female and 415 males. As per the data, the percentage of female respondents is higher, so the marketing strategies for green cosmetic products should focus more on female consumers. However, the male respondents suggest an inclusive marketing strategy targeting males and females.

- **City:** The data collected shows that 580 respondents were of Ahmedabad, of which 391 were female and 189 were male. In Surat, from the total 376 respondents, 221 were female and 155 were male. Whereas in Vadodara, from the total 198, 127 were female and 71 were male respondents. Ahmedabad has the highest percentage of female respondents, followed by Vadodara and Surat. Surat has the most balanced gender distribution. The data suggests that female consumers are the primary demographic, but some notable male consumers should not be avoided.

- **Education Qualification:** The above data shows that most respondents are either graduates (47.3%) or post-graduates (38.21%), and marketing strategies can be more effective if they are targeted to higher educational qualifications for green cosmetic products. Overall, tailoring strategies to leverage educational insights can help improve marketing strategies' effectiveness.

- **Monthly Income:** The above data shows that half of the respondents (48%) earn up to Rs.20,000 per month, thus cost-effective and affordable products for attracting this consumer segment. The middle-income groups (Rs.21000 to 60,000) emphasize quality and value for money more. Whereas the respondents with income more than 60,000 are likely to purchase premium category products.

- **Occupation:** From the above data, Respondents' occupations are dominated by students and working professionals, with notable involvement from business owners and homemakers.

Basic Questionnaire Outline:

Q1	**Do you use Cosmetic Products?**	**Total**	**Frequency**
	Yes	1006	87.18%
	No	148	12.82%
		1154	**100%**
Q2	**What is the monthly expenditure you spend on cosmetic products?**	**Total**	**Frequency**
	Upto Rs.500	531	54.93%
	501- 2,000	452	38.78%
	2,000-3,500	128	3.77%
	More than 3,500	43	2.52%
		1154	**100%**
Q3	**What type of cosmetic products you purchase?**	**Total**	**Frequency**
	Skin care	848	-
	Hair care	772	-
	Body care	532	-
	Make up	403	-
	Fragrances	646	-
Q4	**Have you heard about the term "Green Cosmetics"**	**Total**	**Frequency**
	Yes	**757**	**65.60%**
	No	397	34.40%
		1154	**100%**
Q5	**If Yes, how did you get to know about the term "Green Cosmetics"**	**Total**	**Frequency**
	Friends/Family	279	-
	Social media	577	-
	Advertisement	261	-
	Newspaper	42	-
Q6	**According to you, what are green cosmetic products?**	**Total**	**Frequency**
	Sustainable	447	-
	Chemical free	620	-
	Renewable plant ingredients	392	-
	No animal testing	301	-
Q7	**Have you ever purchased Green Cosmetic products?**	**Total**	**Frequency**
	Yes	**477**	**41.33%**
	No	677	58.67%
		1154	100%

Details of the above table:

From the questionnaire circulated, respondents were asked if they use or have used cosmetic products. Of the total of 1154 respondents, 1006 replied that they use cosmetic products, and 148 do not use cosmetic products.

Monthly expenditure: Of the total of 1154 respondents, more than 50% of them spend up to Rs.500 monthly on cosmetic products. For this category, a variety of affordable products should be given.
Thus, though most of the respondents spend a relatively modest amount while purchasing cosmetic products, they are willing to spend some amount every month. Thus, understanding their spend patterns for better segmentation and target market strategies can help maximize the reach.

Type of cosmetic products: From the total respondents, when asked about what type of cosmetic products are used, most of the respondents use skin-care cosmetic (73%) products, followed by Haircare (67%), Body care (46%), Makeup (35%) and then fragrances (56%).

About the term green cosmetics: From the total respondents, 757 (65.6%) knew about green cosmetics when further asked if they had heard about green cosmetics. So, all the further questions were aligned and asked the respondents who did hear or are/were aware of the term green cosmetics.

Source of green cosmetics: In alignment with the above question, when asked where they heard the term green cosmetics, almost 76% of the respondents got to know from social media, followed by friends/family, via advertisement and newspaper.

Green cosmetics meaning: The respondents were asked about their perspective of green cosmetics and what, according to them, are green cosmetics. Most respondents replied to chemical-free products, followed by sustainability, renewable plant ingredients, and no animal testing.

Q7: Purchase of Green Cosmetics: After the basic questions, the respondents were asked if they had ever purchased green cosmetic products. To which 477 responded yes and 677 no.

Data Analysis and Interpretation:

Data Analysis aligned with objectives:

Objective-1: To assess the level of awareness among consumers regarding green cosmetics.

- **Explanation:** It evaluates the awareness levels of the consumers about green cosmetics and their key characteristics like sustainability and health benefits.
- **Findings:**
- A significant proportion of respondents demonstrated basic awareness of green cosmetics but lacked deeper knowledge about their certifications or specific benefits.
- Younger demographics and higher-educated groups exhibited higher levels of awareness.
- Awareness campaigns by brands were identified as a key factor in increasing consumer knowledge.
- When compared with the existing studies, the findings align with global research indicating awareness is a key driver for green product, there a need for localized educational campaigns to address the awareness gaps in Gujarat state.

Objective-2: To analyze the consumer buying behavior and the factors influencing their purchasing decisions including the 4P's- Price, Product, Place, Promotion along with motivation and barriers to adopting green cosmetic products.

- **Explanation:** This objective investigates the multifaceted influences on consumer decisions focusing on product attributes, pricing, availability, promotional efforts and psychological factors.
- **Findings:**
- Price: High prices of the green cosmetic products looks like a significant barrier for the middle and low-income groups.
- Product: It has been observed that consumers prioritized natural ingredients and sustainability certifications.
- Place: Limited availability in semi-urban and rural areas hinders the same.
- Promotion: Social media campaigns and influencer endorsements were identified as an effective promotional tool.
- Whereas motivational drivers included health benefits, environmental consciousness and social desirability. Barriers included skepticism about claims, lack of affordability and limited product accessibility.

- The study's findings reinforce the importance of the 4Ps in influencing consumer behavior, consistent with established marketing frameworks. Unique regional barriers, such as distribution gaps in Gujarat, were highlighted.

Objective-3: To examine the consumer expectations, satisfaction levels and quality perceptions regarding green cosmetic products.

- **Explanation:** This objective assesses how well green cosmetic products meet the consumers expectations and their perceptions of product quality.
- **Findings:**
- Expectations: Consumers expects that the green cosmetics should be eco-friendly, effective, and free from harmful chemicals.
- Satisfaction: Many respondents were satisfied with the quality of the products, but their main concerns were affordability and availability.
- Quality perception: Brands with certifications and transparent labeling were considered more reliable.
- This study aligns with prior studies emphasizing the role of quality perceptions and trust in driving consumer satisfaction. This study particularly focuses on consistent quality across price segments.

Objective-4: To study the influence of demographic factors including gender on consumer attitudes, intentions, and behavior towards green cosmetic products.

- **Explanation:** This objective analyzes the impact of demographic variables such as age, gender, education, income, occupation on consumer behavior.
- **Findings:**
- Female respondents exhibited a higher preference for green cosmetic products taking health and environmental benefits.
- Younger and higher-educated respondents were more likely to adopt green products.
- Professionals and higher income groups showed willingness to pay more for premium green cosmetic products.
- The findings are consistent with the global studies that highlights the influence of gender and education on green product adoption. The Gujarat specific context underscores the role of cultural and traditional values.

Objective-5: To explore consumer opinions on the use and non-use of green cosmetic products and its associations between environmental behavior and demographics.

- **Explanation:** This objective examines the reasons behind consumers choice to use or avoid green cosmetic and their correlation with environmental behavior and demographics.
- **Findings:**
- Users of green cosmetics cited environmental benefits, health considerations, and product effectiveness as primary reasons for adoption.
- Non-users highlighted high costs, limited availability, and skepticism about product claims as barriers.
- Positive environmental behavior, such as recycling and energy conservation, was associated with a higher likelihood of adopting green cosmetics.
- The findings support global research linking pro-environmental behavior with green product adoption but emphasize unique regional barriers in Gujarat.

Objective-6: To recommend strategic measures to encourage the adoption of green cosmetic products.

- **Explanation:** This objective provides actionable recommendations based on the findings to promote green cosmetic products in Gujarat.
- **Findings:**
- Cost Reduction: Develop affordable green product lines to cater to a broader consumer base.
- Awareness Campaigns: Implement targeted educational initiatives highlighting health and environmental benefits.
- Improved Accessibility: Enhance distribution networks to ensure availability in semi-urban and rural areas.
- Cultural Relevance: Incorporate traditional and Ayurvedic elements in marketing strategies.
- Trust Building: Promote certifications and transparent labeling to enhance consumer trust.
- The recommendations align with established best practices for green product promotion but provide specific insights for addressing regional challenges in Gujarat.

Data Analysis aligned with Hypothesis:

H_{01}: Gender has no direct relation with usage of Cosmetic Products (B2, Q1)

The hypothesis was to set the basis of the study with the most apparent but unproven indication of the relation of usage of cosmetics in females.

Gender (M/F) and Cosmetics usage (Y/N) data for 1154 individuals were taken to analyze the Hypothesis. Since data has binary variables, Chi-Square and Linear Regression analysis.

Chi-Square:

Observed:

Do you use Cosmetic Products?	Male	Female
Yes	307	699
No	108	40
	415	739

Expected:

Do you use Cosmetic Products?	Male	Female
Yes	361.7764	644.2235702
No	53.22357	94.77642981
	415	739

Chi-Square calculations:

Do you use Cosmetic Products?	Male	Female
Yes	8.293678	4.657478244
No	56.3746	31.65826428

Chi Square: **100.984** >3.841 (df=1,p=0.05)
Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (2-1)*(2-1) =1

Reference table for chi-square value:

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.706	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.605	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.251	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.779	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.236	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.645	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.017	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.362	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.684	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.987	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.275	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.549	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.812	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.064	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.307	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.542	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.769	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.989	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.204	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.412	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **reject the null hypothesis**. Here, the high chi-square value (100.984), compared to the critical value, shows a significant relationship between gender and the use of cosmetic products. Thus, gender has no direct relation with the use of cosmetic products.

Regression:

Regression was done taking Y = Usage of Cosmetics against X = Gender

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.295817196							
R Square	0.087507813							
Adjusted R Square	0.086715719							
Standard Error	0.319679864							
Observations	1154							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	11.29017618	11.29017618	110.4765634	9.73306E-25			
Residual	1152	117.7288879	0.102195215					
Total	1153	129.0190641						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.739759036	0.015692467	47.14102766	4.2284E-271	0.708970017	0.770548055	0.708970017	0.770548055
Gender	0.206113765	0.019609744	10.5107832	9.73306E-25	0.16763895	0.24458858	0.16763895	0.24458858

P value < 0.05

Conclusion: As the value of p is less than 0.05, **reject the null hypothesis**. Here, as the p-value is 9.733×10^{-25}, it is significant against the null hypothesis. It proves that the null hypothesis states that a significant relationship exists between gender and the use of cosmetic products.

Both Analyses indicate that Cosmetics Product usage is dependent on Gender. The conclusions can be used to understand further specific usage of the Cosmetics specific to Gender. Assumptions of analysis considering consumer behavior as Gender neutral may not be accurate, as observed in the above hypothesis conclusion.

H_{02}: Purchase of green cosmetic products does not have a direct relation with the income of the consumers. (Q7, B6)

The hypothesis was to set the basis of the study that, whether the consumers' income is related to the purchase of green cosmetic products.

Monthly income and purchase of green cosmetic products (Y/N) data for 1154 individuals were taken to analyze the Hypothesis since data has binary variables Chi-Square and Linear Regression analysis.

Chi-Square:

Observed:

Have you ever purchased Green Cosmetic products?	**21,000 to 40,000**	**41,000 to 60,000**	**61,000 to 80,000**	**81,000 and above**	**Upto Rs.20,000**	**Grand Total**
No	110	95	30	123	319	677
Yes	97	53	23	69	235	477
Grand Total	**207**	**148**	**53**	**192**	**554**	**1154**

Expected:

Have you ever purchased Green Cosmetic products?	**21,000 to 40,000**	**41,000 to 60,000**	**61,000 to 80,000**	**81,000 and above**	**Upto Rs.20,000**	**Grand Total**
No	121	121	121	121	121	677
Yes	86	61	22	79	229	477
Grand Total	**207**	**148**	**53**	**192**	**554**	**1154**

Chi-square calculations:

Have you ever purchased Green Cosmetic products?	**21,000 to 40,000**	**41,000 to 60,000**	**61,000 to 80,000**	**81,000 and above**	**Upto Rs.20,000**
No	1.08	5.76	68.85	0.02	321.41
Yes	1.53	1.09	0.05	1.35	0.16

Chi Square: **401** >9.488 (df=4,p=0.05)
Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (5-1)*(2-1) =4

Reference Table for Chi-Square

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.706	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.605	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.251	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.779	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.236	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.645	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.017	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.362	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.684	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.987	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.275	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.549	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.812	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.064	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.307	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.542	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.769	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.989	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.204	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.412	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **reject the null hypothesis**. Here, chi-square value is 401 which is higher than the critical value 9.488, which proves that there is a significant relationship between purchase of green cosmetic products and income of the consumers.

Regression:

Regression was done taking Y = Income X = Purchase of green cosmetics

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.050744055							
R Square	0.002574959							
Adjusted R Square	0.001709139							
Standard Error	1.493433699							
Observations	1154							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	6.633067907	6.633068	2.974011	0.084880076			
Residual	1152	2569.356533	2.230344					
Total	1153	2575.989601						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	2.302806499	0.05739732	40.12045	5.9E-221	2.190191501	2.415421497	2.190191501	2.415421497
Purchased Green Cosmetics	-0.153959539	0.089276124	-1.72453	0.08488	-0.32912156	0.021202482	-0.32912156	0.021202482

P value > 0.05

Conclusion: As the value of p is more than 0.05, **fail to reject the null hypothesis**. Here, the p-value is 0.08 which is higher than the significance value 0.05, which shows that the relationship between the purchase of green cosmetic products and the consumers' income is not statistically significant.

The result of the test indicated in chi-square were significant, but while evaluating regression, the value of P was 0.05, failing to reject the null hypothesis and concluding that the income of the consumers and the purchase of green cosmetic products do not have a relation.

H03: Impact of the promotional method of green cosmetics has no relationship on switching of the brands by the consumers. (Q37,Q42)

The hypothesis was to set the basis of the study of whether the impact of the promotional method of green cosmetics is related to the consumers who are switching brands.

From the questionnaire, promotional activities to increase awareness and loyalty towards the purchase of brand (Y/N) data of 477 individuals were taken to analyze the given Hypothesis. Since data has binary variables, Chi-Square and Linear Regression analysis.

Chi-Square:

Observed:

Observed	**According to you, are you loyal towards towards the brand you purchase?**		
Promotional activities can be used to increase the awareness of the green cosmetic products	**No**	**Yes**	**Grand Total**
Agree	42	236	278
Disagree	0	8	8
Neutral	8	43	51
Strongly Agree	31	105	136
Strongly Disagree	0	4	4
Grand Total	**81**	**396**	**477**

Expected:

Expected	**According to you, are you loyal towards towards the brand you purchase?**		
Promotional activities can be used to increase the awareness of the green cosmetic products	**No**	**Yes**	**Grand Total**
Agree	47	231	278
Disagree	1	7	8
Neutral	9	42	51
Strongly Agree	23	113	136
Strongly Disagree	1	3	4
Grand Total	**81**	**396**	**477**

Chi-square calculations:

Chi-Square Calculations:	**According to you, are you loyal towards towards the brand you purchase?**	
Promotional activities can be used to increase the awareness of the green cosmetic products	**No**	**Yes**
Agree	0.574453645	0.117502
Disagree	1.358490566	0.277873
Neutral	0.050355572	0.0103
Strongly Agree	2.706267727	0.553555
Strongly Disagree	0.679245283	0.138937

Chi Square: **6.466** <9.488 (df=4,p=0.05)
Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (2-1)*(5-1) =4

Reference Table for Chi-Square

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.70	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.60	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.25	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.77	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.23	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.64	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.01	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.36	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.68	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.98	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.27	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.54	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.81	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.06	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.30	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.54	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.76	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.98	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.20	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.41	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **fail to reject the null hypothesis**. Here, the chi-square value of 6.466 is less than the critical value of 9.488, which shows no significant relationship between the promotional method of green cosmetics and consumer switching of brands.

Regression:

Regression was done taking Y = Promotional activities for the use of green cosmetic products

X = Loyal towards the brand

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.10311146							
R Square	0.010631973							
Adjusted R Square	0.008549093							
Standard Error	0.718990438							
Observations	477							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	2.638735362	2.638735	5.104458	0.024316872			
Residual	475	245.5499439	0.516947					
Total	476	248.1886792						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	4.283950617	0.079887826	53.62457	1.2E-203	4.126973373	4.440927861	4.126973373	4.440927861
Q42	-0.198092031	0.087678316	-2.2593	0.024317	-0.370377361	-0.025806702	-0.370377361	-0.025806702

P value < 0.05

Conclusion: As the value of p is less than 0.05, **reject the null hypothesis**. Here, as the p-value is 0.02 below the significance value, it suggests a statistically significant relationship between the promotional method of green cosmetics and brands switching.

Thus, While using a chi-square test of independence and regression analysis, found a significant relation between the variables 6.466 >3.841 (df=1,p=0.05).

It can be concluded that the effectiveness of the promotional methods plays an essential role in influencing the brands switching behavior among the green consumers.

H04: Female don't believe gender impact purchase Behavior of Green Cosmetic Products (Q23, B2)

The hypothesis was to set the basis of the study on whether the female consumers have an impact while purchasing green cosmetic products.

Gender influence and their impact on purchasing green cosmetic products (Y/N) data for 477 individuals were taken to analyze the given Hypothesis. Since data has binary variables Chi-Square and Linear Regression analysis.

Chi-Square:

Observed:

Gender can influence the buying behavior of Green cosmetics by consumers preference and attitude	**Male**	**Female**	**Grand Total**
No	24	75	99
Yes	96	282	378
Grand Total	**120**	**357**	**477**

Expected:

Gender can influence the buying behavior of Green cosmetics by consumers preference and attitude	**Male**	**Female**	**Grand Total**
No	24.90566038	74.09433962	99
Yes	95.09433962	282.9056604	378
Grand Total	**120**	**357**	**477**

Chi-square calculations:

Gender can influence the buying behavior of Green cosmetics by consumers preference and attitude	**Male**	**Female**
No	0.034175863	0.010936276
Yes	0.008543966	0.002908584

Chi Square: **0.05** < 3.841 (df=1,p=0.05)

Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (2-1)*(2-1) =1 =1

Reference Table for Chi-Square:

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.706	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.605	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.251	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.779	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.236	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.645	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.017	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.362	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.684	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.987	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.275	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.549	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.812	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.064	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.307	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.542	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.769	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.989	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.204	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.412	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: Here, the chi-square value of 0.05 is much less than the critical value of 3.841, which shows that there is no significant relationship the belief that gender impacts the purchase behavior of green cosmetic products among the female. Thus, **fail to reject the null hypothesis**.

Regression:

Regression was done taking Y = Income X = Purchase of green cosmetics

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.010789356							
R Square	0.00011641							
Adjusted R Square	-0.001988608							
Standard Error	0.406379904							
Observations	477							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	0.00913271	0.009133	0.055301	0.814184151			
Residual	475	78.44369748	0.165145					
Total	476	78.45283019						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.8	0.03709724	21.56495	2.03E-72	0.727105008	0.872894992	0.727105008	0.872894992
Gender	-0.010084034	0.042881175	-0.23516	0.814184	-0.09434429	0.074176223	-0.09434429	0.074176223

P value > 0.05

Conclusion: As the value of p is more than 0.05, **fail to reject the null hypothesis**. Here, as the p-value is 0.81, which is above the significance level 0.05 and thus there is no significant relationship the belief that gender impacts the purchase behavior of green cosmetic products among the female.

H05: The female consumers are not loyal as compared to male consumers while purchasing the green cosmetic products (B2, Q42)

The hypothesis was to set the basis of the study that whether the female consumers are loyal towards the purchase of green cosmetic products when compared to male consumers.

Loyalty towards the brand (Y/N) and gender data for 477 individuals were taken to analyse the given Hypothesis. Since data has binary variables, Chi-Square and Linear Regression analysis.

Chi-Square:

Expected:

According to you, are you loyal towards towards the brand you purchase?	Male	Female	Grand Total
No	23	58	81
Yes	97	299	396
Grand Total	**120**	**357**	**477**

Observed:

According to you, are you loyal towards towards the brand you purchase?	Male	Female	Grand Total
No	20.37735849	60.62264151	81
Yes	99.62264151	296.3773585	396
Grand Total	**120**	**357**	**477**

Chi-square calculations:

According to you, are you loyal towards towards the brand you purchase?	Male	Female
No	0.299054282	0.118590491
Yes	0.070909778	0.023004176

Chi Square: **0.51** < 3.841 (df=1,p=0.05)

Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (2-1)*(2-1) =1 =1

Reference Table for Chi-Square:

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.70	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.60	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.25	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.77	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.23	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.64	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.01	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.36	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.68	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.98	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.27	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.54	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.81	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.06	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.30	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.54	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.76	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.98	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.20	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.41	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **fail to reject the null hypothesis**. Here, the chi-square value of 0.51 is less than the critical value 3.841, which clearly shows that there is no significant relationship between gender and loyalty while purchasing green cosmetic products.

Regression:

Regression was done taking Y = Loyalty X = Purchase of green cosmetics

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.033747568							
R Square	0.001138898							
Adjusted R Square	-0.000963967							
Standard Error	0.376042264							
Observations	477							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	0.07658554	0.076586	0.541594	0.46213632			
Residual	475	67.16869748	0.141408					
Total	476	67.24528302						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.808333333	0.034327805	23.54748	8.21E-82	0.7408802	0.875786467	0.7408802	0.875786467
B2	0.029201681	0.03967995	0.73593	0.462136	-0.048768261	0.107171623	-0.048768261	0.107171623

P value > 0.05

Conclusion: As the value of p is more than 0.05, **fail to reject the null hypothesis**. Here, the p-value is 0.46 which is more than the significance level 0.05, thus indicating that there is no significant difference in loyalty between female and male consumers. It implies that no

statistically significant evidence supports the idea that female consumers, compared to male consumers, are not loyal towards the brand while purchasing green cosmetic products. As a result, it can be concluded that females are less loyal than male consumers when purchasing green cosmetic products.

H06: Increase in Number of Female Family members has no relation of Male using Cosmetic Products (B7,B2,Q1)

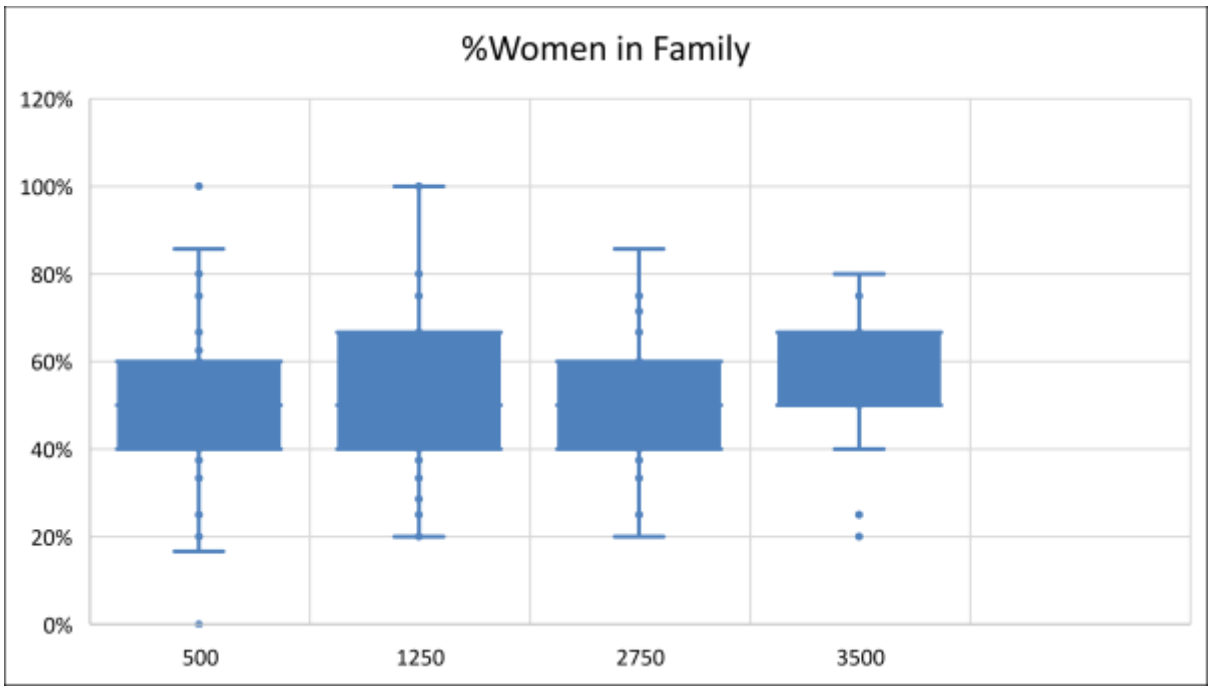
The Hypothesis was designed to understand the influence of female in the Family on usage of Cosmetics product by Male in the Family

Data on the Number of Females in Family and Number of total Members in Family were used to get the continuous data on %Women in Family acting as independent variable

The data was only considered for responses were gender of respondent was Male giving us a sample data size of 415 respondents.

To understand the General Trend of Data a candle stick analysis on the avg spend was done against the %women in family (ignoring outliers)

Candle-Stick:



Conclusion: From the above Trend, one can see a trend of avg increase in % women as there is increase in Spend. However, the data is not significant enough to draw any conclusions hence **fail to reject the Null Hypothesis**. If one puts a trendline on the averages of given data the p value for the analysis is ~0.17 (tan 10^0)

A general Sense of Avg Women where Male uses Cosmetics also shows no significant relation:

Male using Cosmetics	Average of Female in Family
No	52%
Yes	46%
Grand Total	**50%**

Continuous Average Analysis:

Analysis was done taking Y = %Male using Cosmetics against X = %Female in Family

%Female in Family	%Male using Cosmetic
Less than 10%	100%
10-20%	100%
20-30%	71%
30-40%	73%
40-50%	74%
50% above	74%

Conclusion: Fail to reject the null Hypothesis.

Assuming the first and Second rows as outliers the trend shows an increase in % males using cosmetics with an increase in % women in Family

Trying to take out p value = 0.1091 (assuming initial 2 lines as outliers)

P value > 0.05

If not the p value in negative, **fail to reject the null hypothesis.** Here, the relationship between % women in family and Male using Cosmetics was examined by using trend analysis of continuous averages and Candle Stick as no direct Regression or other standard tests were possible. However, it was still not able to establish any relations between the independent and dependent variable. This concludes that their is not enough evidence to reject null hypothesis, indicating that %Women in Family may or May Not impact the usage of Cosmetics by Male.

H07: The consumers of Vadodara city do not intend to pay more towards the purchase of green cosmetic products than the consumers of Ahmedabad city. (B3,Q43)

The hypothesis was to set the basis of the study that whether the consumers of Vadodara city are willing to pay more when compared to the consumers of Ahmedabad city while they purchase green cosmetic products.

From the questionnaire, whether the consumers are willing to pay more and the city for which data of 477 individuals were taken to analyze the given Hypothesis. Since data has binary variables, Chi-Square and Linear Regression analysis.

Chi-Square:

Expected:

Are you willing to pay more for better green cosmetic products?	Ahmedabad	Surat	Vadodara	Grand Total
Maybe	105	59	32	196
No	19	8	6	33
Yes	115	97	36	248
Grand Total	**239**	**164**	**74**	**477**

Observed:

Are you willing to pay more for better green cosmetic products?	Ahmedabad	Surat	Vadodara	Grand Total
Maybe	98.20545073	67.38784067	30.4067086	196
No	16.53459119	11.34591195	5.119496855	33
Yes	124.2599581	85.26624738	38.47379455	248
Grand Total	**239**	**164**	**74**	**477**

Chi-square calculations:

Are you willing to pay more for better green cosmetic products?	Ahmedabad	Surat	Vadodara
Maybe	0.439675236	1.192472392	0.079330547
No	0.319907399	1.399390847	0.129214298
Yes	0.745624552	1.419391243	0.169990541

Chi Square: **5.99** < 9.488 (df=4,p=0.05)

Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (3-1)*(3-1) =4

Reference Table for Chi-Square

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.70	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.60	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.25	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.77	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.23	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.64	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.01	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.36	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.68	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.98	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.27	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.54	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.81	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.06	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.30	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.54	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.76	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.98	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.20	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.41	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **fail to reject the null hypothesis**. Here, the chi-square value of 5.99 is less than the critical value 9.488, which shows that there is no significant relationship between the consumers of Vadodara and Ahmedabad city and their intention for paying more while purchasing green cosmetic products.

Regression:

Regression was done taking Y = Promotional activities for the use of green cosmetic products

X = Loyal towards the brand

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.099883779							
R Square	0.009976769							
Adjusted R Square	0.00789251							
Standard Error	0.619431993							
Observations	477							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	1.836645832	1.836646	4.786721	0.029166533			
Residual	475	182.2555974	0.383696					
Total	476	184.0922432						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	1.324469738	0.064303834	20.59706	7.85E-68	1.198114584	1.450824892	1.198114584	1.450824892
city	0.068518697	0.031317712	2.187858	0.029167	0.006980309	0.130057085	0.006980309	0.130057085

P value < 0.05

Conclusion: As the value of p is less than 0.05, **reject the null hypothesis**. Here, the p-value is 0.02, which is less than 0.05 significance value. It shows that there is a significant difference in the intention to pay more for green cosmetic products between consumers of Vadodara and Ahmedabad.

It clearly indicates that consumers' buying behavior when they purchase green cosmetic products hardly impacts their decision-making. It can be concluded that the consumers of Vadodara do not intend to pay more towards the purchase of green cosmetic products than the consumers of Ahmedabad.

H08: Quality of product has no Impact on the consumers of Ahmedabad city during purchase of Green Cosmetic Products (B3, Q29)

The hypothesis was to set the basis of the study whether the quality of the products has impact on the consumers of Ahmedabad city while they purchase green cosmetic products.

Quality and Performance (Scale) and city data for 477 individuals were taken to analyse the given Hypothesis. Since data has binary variables, Chi-Square and Linear Regression analysis.

Chi-Square:

Observed:

Quality and Performance	Ahmedabad	Surat	Vadodara	Grand Total
Agree	82	61	25	168
Disagree	3	4	3	10
Neutral	26	19	4	49
Strongly Agree	116	74	41	231
Strongly Disagree	12	6	1	19
Grand Total	**239**	**164**	**74**	**477**

Expected:

Quality and Performance	Ahmedabad	Surat	Vadodara	Grand Total
Agree	84.17610063	57.76100629	26.06289308	168
Disagree	5.01048218	3.438155136	1.551362683	10
Neutral	24.55136268	16.84696017	7.601677149	49
Strongly Agree	115.7421384	79.42138365	35.83647799	231
Strongly Disagree	9.519916143	6.532494759	2.947589099	19
Grand Total	**239**	**164**	**74**	**477**

Chi-square calculations:

Quality and Performance	Ahmedabad	Surat	Vadodara
Agree	0.012850974	0.014698736	0.043473561
Disagree	0.929812284	0.18470173	0.089138007
Neutral	0.034295028	0.04137922	0.902898367
Strongly Agree	0.008582406	0.015566097	0.018633699
Strongly Disagree	0.052447224	0.197562443	8.688281494

Chi Square: **11.23** < 15.507 (df=8,p=0.05)

Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (3-1)*(5-1) =8

Reference Table for Chi-Square:

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.70	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.60	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.25	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.77	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.23	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.64	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.01	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.36	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.68	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.98	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.27	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.54	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.81	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.06	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.30	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.54	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.76	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.98	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.20	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.41	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **fail to reject the null hypothesis.** Here, the chi-square value is 11.23, less than the critical value 15.507. It clearly indicates that there is no significant relationship between the quality of the product and the purchasing behavior of the consumers purchasing green cosmetic products.

Regression:

Regression was done taking Y = Quality & Performance impact X = City

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.003829313							
R Square	1.46636E-05							
Adjusted R Square	-0.002090569							
Standard Error	0.998227911							
Observations	477							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	0.006940665	0.006941	0.006965	0.933522093			
Residual	475	473.3180069	0.996459					
Total	476	473.3249476						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	4.225791239	0.103627004	40.77886	2.9E-157	4.022167205	4.429415273	4.022167205	4.429415273
B3	-0.004212083	0.050469162	-0.08346	0.933522	-0.103382512	0.094958346	-0.103382512	0.094958346

P value > 0.05

Conclusion: As the value of p is more than 0.05, **fail to reject the null hypothesis**. Here, the p-value is 0.93, more than the significance value 0.05. It indicates that there is no significant relationship between the quality of product and the purchasing behavior of the consumers purchasing green cosmetic products.

It implies that no statistically significant evidence supports the idea that the quality of the products of Ahmedabad city impact the consumers while they purchase green cosmetic products. As a result, it can be concluded that quality does not impact the consumers of Ahmedabad city.

H09: Environmental awareness of the consumer has no relation on the purchase of green cosmetic products (Q16,Q30)

The hypothesis was to set the basis of the study that whether the consumers' environmental awareness has any relation while they purchase green cosmetic products.

From the questionnaire, whether the consumers consider the environmental impact before they purchase green cosmetic products is compared with environmental impact (scale) which data of 477 individuals were taken to analyze the given Hypothesis. Since data has binary variables, Chi-Square and Linear Regression analysis.

Chi-Square:

Observed:

Observed:	**Environmental Impact and comparison**					
Do you consider the environmental impact before purchasing the Green cosmetic products?	**Agree**	**Disagree**	**Neutral**	**Strongly Agree**	**Strongly Disagree**	**Grand Total**
No	16	12	60	5	1	94
Yes	182	3	89	93	16	383
Grand Total	**198**	**15**	**149**	**98**	**17**	**477**

Expected:

Expected:	**Environmental Impact and comparison**					
Do you consider the environmental impact before purchasing the Green cosmetic products?	**Agree**	**Disagree**	**Neutral**	**Strongly Agree**	**Strongly Disagree**	**Grand Total**
No	39.01887	2.955975	29.36268344	19.31236897	3.350104822	94
Yes	158.9811	12.04403	119.6373166	78.68763103	13.64989518	383
Grand Total	**198**	**15**	**149**	**98**	**17**	**477**

Chi-square calculations:

Chi-square calculations	**Environmental Impact and comparison**				
Do you consider the environmental impact before purchasing the Green cosmetic products?	**Agree**	**Disagree**	**Neutral**	**Strongly Agree**	**Strongly Disagree**
No	33.11677	6.816199	15.6440861	40.96878112	5.522992673
Yes	2.911364	27.2648	10.5465749	2.202622641	0.345187042

Chi Square: **145.33** >9.48 (df=4,p=0.05)
Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (5-1)*(2-1) =

Reference Table for Chi-Square

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.70	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.60	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.25	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.77	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.23	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.64	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.01	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.36	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.68	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.98	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.27	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.54	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.81	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.06	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.30	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.54	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.76	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.98	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.20	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.41	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **reject null hypothesis**. Here, the chi-square value is 145.33, significantly more than critical value 9.488. It thus shows that there is a significant relationship between environmental awareness and the purchase of green cosmetic products.

Regression:

Regression was done taking Y = Purchase of Green Cosmetics Product, X = Environmental impact

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.313165669							
R Square	0.098072736							
Adjusted R Square	0.096173942							
Standard Error	0.896708214							
Observations	477							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	41.53102815	41.53102815	51.65000725	2.58714E-12			
Residual	475	381.94067	0.804085621					
Total	476	423.4716981						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	3.127659574	0.09248839	33.81678027	1.528E-128	2.945922591	3.309396558	2.945922591	3.309396558
Do you consider the	0.741792123	0.103216	7.186793948	2.58714E-12	0.5389757	0.944608546	0.5389757	0.944608546

P value < 0.05

Conclusion: As the value of p is less than 0.05, **reject the null hypothesis**. Here, the p-value is 2.58×10^{-12}, much less than the significance value 0.05. It thus shows a strong statistically significant relationship between environmental awareness and the purchase of green cosmetic products.

It can be concluded that the consumers do not consider environmental factors while they purchase green cosmetic products.

H010: Increase in Education level for person using Cosmetic Product has no impact on his awareness on Green Cosmetic Product (B4,Q4)

The hypothesis was to set the basis of the study that whether a person's qualification impacts their awareness while they purchase green cosmetic products.

From the questionnaire, whether the consumers have heard about the green cosmetics is compared with the qualification of the consumers, data of 1154 individuals were taken to analyse the given Hypothesis. Since data has binary variables, Chi-Square and Linear Regression analysis.

Chi-Square:

Observed:

Observed:	**Qualification**					
Have you heard about the term "Green Cosmetics"	**Upto 12th**	**Professional**	**Graduate**	**Post Graduate**	**Others**	**Grand Total**
No	72	3	184	134	4	397
Yes	74	2	362	307	12	757
Grand Total	**146**	**5**	**546**	**441**	**16**	**1154**

Expected:

Expected:	**Qualification**					
Have you heard about the term "Green Cosmetic	**Upto 12th**	**Professional**	**Graduate**	**Post Graduate**	**Others**	**Grand Total**
No	50.2270364	1.720103986	187.835355	151.713171	5.5043327	397
Yes	95.7729636	3.279896014	358.164644	289.28682	10.495667	757
Grand Total	**146**	**5**	**546**	**441**	**16**	**1154**

Chi-square calculations:

Chi-square calculations	**Qualification**				
Have you heard about the term "Green Cosmetics"	**Upto 12th**	**Professional**	**Graduate**	**Post Graduate**	**Others**
No	6.584193669	0.546044602	0.079945381	2.34146602	0.56575426
Yes	6.406242488	0.819066903	0.040635221	1.02200797	0.1885847

Chi Square: **18.59** >9.48 (df=4,p=0.05)
Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (5-1)*(2-1)=4

Reference Table for Chi-Square

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.706	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.605	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.251	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.779	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.236	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.645	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.017	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.362	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.684	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.987	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.275	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.549	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.812	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.064	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.307	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.542	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.769	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.989	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.204	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.412	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **reject the null hypothesis**. Here, the chi-square value is 18.59, higher than the critical value 9.488. It suggests a strong relationship between an increase in education level and awareness of green cosmetic products.

Regression:

Regression was done taking Y = Awareness X = Education

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.106432358							
R Square	0.011327847							
Adjusted R Square	0.010469625							
Standard Error	0.47275943							
Observations	1154							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	2.950040295	2.950040295	13.19919812	0.000292399			
Residual	1152	257.4737032	0.223501478					
Total	1153	260.4237435						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.530864198	0.037143489	14.29225459	8.82279E-43	0.45798773	0.603740665	0.45798773	0.603740665
Educational Qualification	0.145547093	0.040061736	3.633070068	0.000292399	0.066944951	0.224149235	0.066944951	0.224149235

P value < 0.05

Conclusion: As the value of p is less than 0.05, **reject the null hypothesis**. Here, the p-value is 0.0002, much less than the significance level 0.05. It shows a significant relationship between an increase in education level and awareness of green cosmetic products.

It can be concluded that impact on education does not have any impact when consumers purchase green cosmetic products.

H011: Person who hear about Green cosmetics from only Friends/Family has no relation to his likeliness to purchase Green Cosmetic product from departmental store (Q5,Q10, Q20)

The hypothesis was to set the basis of the study: whether the people who hear about green cosmetics from friends/family are more likely to purchase green cosmetics from a departmental store.

Since data has binary variables, Chi-Square and Linear Regression analysis.

Chi-Square:

Observed:

Observed		**Purchase GCP from Dept Store**		
Awareness (Family)	**Influence (Family)**	**No**	**Yes**	**Grand Total**
No	No	294	65	359
No	Yes	70	49	119
Yes	No	104	27	131
Yes	Yes	94	54	148
Grand Total		**562**	**195**	**757**

Expected:

Expected		**Purchase GCP from Dept Store**		
Awareness (Family)	**Influence (Family)**	**No**	**Yes**	**Grand Total**
No	No	266.5231176	92.477	359
No	Yes	88.34610304	30.654	119
Yes	No	97.25495376	33.745	131
Yes	Yes	109.8758256	38.124	148
Grand Total		**562**	**195**	**757**

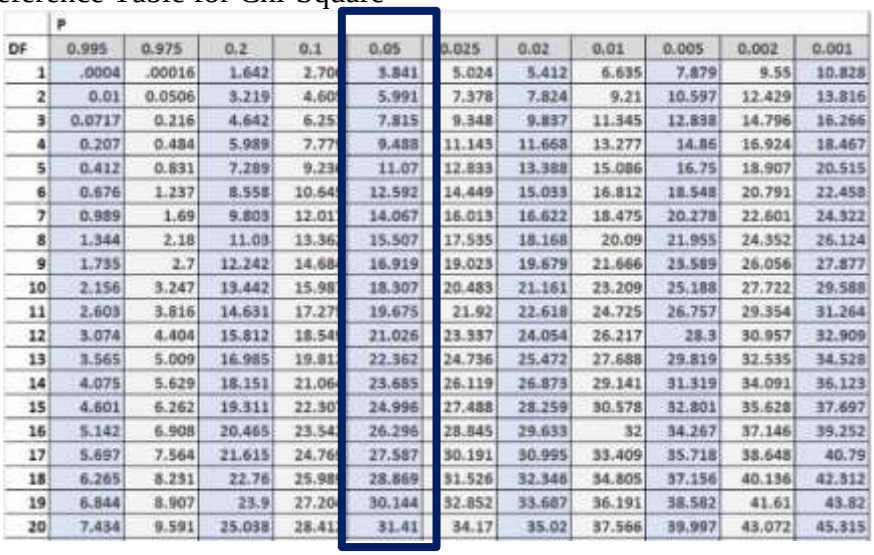
Chi-square calculations:

Chi-square calculations:		**Purchase GCP from Dept Store**	
Awareness (Family)	**Influence (Family)**	**No**	**Yes**
No	No	2.832696372	8.164
No	Yes	3.809783172	10.98
Yes	No	0.467797752	1.3482
Yes	Yes	2.293878912	6.6111

Chi Square: **36.51** >7.815 (df=3,p=0.05)

Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (4-1)*(2-1) =3 =1

Reference Table for Chi-Square



	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.70	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.60	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.25	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.77	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.23	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.64	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.01	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.36	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.68	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.98	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.27	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.54	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.81	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.06	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.30	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.54	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.76	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.98	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.20	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.41	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **reject the null hypothesis**. Here, the chi-square value is 36.51, higher than the critical value 7.815. It suggests a strong relationship who hear about Green cosmetics from only Friends/Family has to his/her likeliness towards purchasing Green Cosmetic product from departmental store.

Regression:

Regression was done taking Y = Awareness X = Influence

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.216399023							
R Square	0.046828537							
Adjusted R Square	0.044300231							
Standard Error	0.427796637							
Observations	757							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	2	6.779312245	3.389656123	18.52170269	1.40436E-08			
Residual	754	137.9895121	0.183009963					
Total	756	144.7688243						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.188893482	0.02131346	8.862638189	5.56446E-18	0.147052706	0.230734259	0.147052706	0.230734259
Awareness (Family)	-0.004258064	0.033617094	-0.12666366	0.899240378	-0.070252292	0.061736164	-0.070252292	0.061736164
Influence (Family)	0.199234583	0.033940837	5.870055105	6.52618E-09	0.13260481	0.265864356	0.13260481	0.265864356

P value < 0.05

Conclusion: As the value of p is less than 0.05, **reject the null hypothesis**. Here, the p-value is 6.52E-09, much less than the significance level 0.05. It shows a relationship who hear about green cosmetics from only Friends/Family has to his/her likeliness towards purchasing Green Cosmetic product from departmental store.

While analyzing regression analysis, the p-value is much less than the significance value of 0.05, showing a significant relationship and the null hypothesis is to be rejected.

H012: Person who hear about Green cosmetics from Social Media and has purchased Green Cosmetic product has no relation to increase spending on Cosmetic Products (Q5, Q2)

The hypothesis was to set the basis of the study that whether the consumers who know about green cosmetic products from social media and have purchased have any relation for their increase in expenditure of cosmetic products.

Average sampling, ANOVA single factor and Two sample t-test has been used:

Average Sampling:

Have you ever purchased Green Cosmetic products?	**Yes**

Row Labels	**Average of Spending**	**Count of From where do you purchase Green cosmetic products?**
None	872.4	145.0
Only Research	1041.3	109.0
Research & Purchase	1145.7	223.0
Grand Total	**1039**	**477**

ANOVA Single factor:

Anova: Single Factor						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Column 1	3	3059.438	1019.813	19022.57		
Column 2	3	477	159	3396		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1111498	1	1111498	99.15868	0.000571	7.708647
Within Groups	44837.13	4	11209.28			
Total	1156335	5				

Conclusion:

For ANOVA, the p-value is less than 0.05, **so reject the null hypothesis**, which means that there is a statistically significant difference in average spending between the two groups. Persons who hear about Green cosmetics from social media and have purchased Green

Cosmetic products are likely to have different (in this case, increased) spending on cosmetic products compared to those who do not.

Two-Sample t-test:

t-Test: Two-Sample Assuming Equal Variances		
	Variable 1	*Variable 2*
Mean	872.4137931	1111.446
Variance	429789.272	479989.4
Observations	145	332
Pooled Variance	464770.8657	
Hypothesized Mean Difference	0	
df	475	
t Stat	-3.522333169	
P(T<=t) one-tail	0.000234543	
t Critical one-tail	1.648067866	
P(T<=t) two-tail	0.000469086	
t Critical two-tail	1.964970773	

Conclusion:

For Two-sample t-test, p-value (both one-tailed and two-tailed) is significantly less than 0.05, therefore **reject the null hypothesis**. It concludes that social media's influence significantly impacts consumer spending on green cosmetic products.

H013: Gender Subjective norm has no relation on the purchase of premium products (Q24, Q2, B2)

The hypothesis was to set the basis of the study that whether gender impacted the consumers while they purchased premium cosmetic products.

Gender, their monthly expenditure and whether they are likely to purchase the premium category based on the gender data for 477 individuals were taken to analyse the given Hypothesis. Since data has binary variables, Chi-Square and Linear Regression analysis.

Chi-Square:

Observed:

Observed:		**What is the monthly expenditure you spend on cosmetic products?**				
Gender	**Women are more likely to purchase premium products than men**	**Upto Rs.500**	**501-2,000**	**2,000-3,500**	**More than 3,500**	**Grand Total**
Female	No	13	36	7	5	61
	Yes	106	131	42	17	296
Male	No	7	9	3	2	21
	Yes	45	34	14	6	99
Grand Total		**171**	**210**	**66**	**30**	**477**

Expected:

Expected:		**What is the monthly expenditure you spend on cosmetic products?**				
Gender	**Women are more likely to purchase premium products than men**	**Upto Rs.500**	**501-2,000**	**2,000-3,500**	**More than 3,500**	**Grand Total**
Female	No	22	27	8	4	61
	Yes	106	130	41	19	296
Male	No	8	9	3	1	21
	Yes	35	44	14	6	99
Grand Total		**171**	**210**	**66**	**30**	**477**

Chi-square calculations		**What is the monthly expenditure you spend on cosmetic products?**			
Gender	**Women are more likely to purchase premium products than men**	**Upto Rs.500**	**501-2,000**	**2,000-3,500**	**More than 3,500**
Female	No	3.6	3.1	0.2	0.4
	Yes	0.0	0.0	0.0	0.1
Male	No	0.0	0.0	0.0	0.3
	Yes	2.5	2.1	0.0	0.0

Chi Square: **12.5** < 16.919 (df=9,p=0.05)

Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (4-1)*(4-1)=9

Reference Table for Chi-Square:

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.70	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.60	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.25	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.77	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.23	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.64	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.01	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.36	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.68	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.98	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.27	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.54	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.81	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.06	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.30	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.54	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.76	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.98	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.20	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.41	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **fail to reject the null hypothesis**. Here, the chi-square value is 12.5, less than the critical value 16.99. It indicates that there is no relationship between gender subjective norm and the purchase of premium products.

Regression:

Regression was done taking Y = Monthly Expenditure X = Premium

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.006167077							
R Square	3.80328E-05							
Adjusted R Square	-0.00206715							
Standard Error	0.486262624							
Observations	477							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	0.004271798	0.004272	0.018066	0.893134601			
Residual	475	112.3143865	0.236451					
Total	476	112.3186583						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.622047244	0.024911989	24.96979	1.63E-88	0.573095914	0.670998574	0.573095914	0.670998574
Premium	-0.007463911	0.05553055	-0.13441	0.893135	-0.116579819	0.101651997	-0.116579819	0.101651997

P value > 0.05

Conclusion: As the value of p is more than 0.05, **fail to reject the null hypothesis**. Here, the p-value is 0.89 which is more than significance value 0.05. It indicates that there is no statistically significant relationship between gender subjective norm and the purchase of premium products.

It implies that no statistically significant evidence supports the gender norm has any relation with the purchase of premium category cosmetic products. As a result, it can be concluded from the analysis of chi-square as well as regression analysis, gender has no relation on the purchase of premium products.

H014: Person who used CP for Skin has no favouring likeliness to have purchased Green Cosmetic Product (Q7, Q3)

The hypothesis was to set the basis of the study that whether the consumer who uses skin care cosmetic products have likelihood towards green cosmetic products.

From the questionnaire, whether the consumers have purchased green cosmetics along with their preference in the purchase of cosmetic products (only skin care), data of 1154 individuals were taken to analyse the given Hypothesis.

Here, Chi-Square, Linear Regression analysis and Paired t-test.

Chi-Square:

Observed:

Observed:	**What type of cosmetic products you purchase? (Only skin care)**		
Have you ever purchased Green Cosmetic products?	**No**	**Yes**	**Grand Total**
No	257	49	306
Yes	420	428	848
Grand Total	**677**	**477**	**1154**

Expected:

Expected:	**What type of cosmetic products you purchase? (Only skin care)**		
Have you ever purchased Green Cosmetic products?	**No**	**Yes**	**Grand Total**
No	180	126	306
Yes	497	351	848
Grand Total	**677**	**477**	**1154**

Chi-square calculations:

Chi-square calculation	**What type of cosmetic products you purchase? (Only skin care)**	
Have you ever purchased Green Cosmetic products?	**No**	**Yes**
No	33	47
Yes	12	17

Chi Square: **110** >3.841 (df=1,p=0.05)
Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (2-1)*(2-1)= 1

Reference Table for Chi-Square

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.70	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.60	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.25	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.77	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.23	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.64	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.01	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.36	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.68	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.98	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.27	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.54	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.81	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.06	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.30	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.54	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.76	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.98	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.20	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.41	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **reject the null hypothesis**. Here, the chi-square value is 110, much higher than the critical value of 3.841. It shows that there is a significant relationship between the use of skincare cosmetic products and the purchase of green cosmetic products.

Regression:

Regression was done taking Y = Purchase of Green Cosmetic Product X = Usage of Skin Cosmetic Product

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.30888945							
R Square	0.095412692							
Adjusted R Square	0.09462746							
Standard Error	0.420198735							
Observations	1154							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	21.45446155	21.45446	121.5089	6.213E-27			
Residual	1152	203.4051572	0.176567					
Total	1153	224.8596187						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.620384047	0.016149549	38.41494	1.6E-208	0.588698222	0.652069873	0.588698222	0.652069873
Green Cosmetic Purchase	0.276890586	0.025119103	11.02311	6.21E-27	0.227606269	0.326174903	0.227606269	0.326174903

P value < 0.05

Conclusion: As the value of p is less than 0.05, **reject the null hypothesis**. Here, the p-value is 6.21×10^{-27} which is very less than the significance value of 0.05. It thus shows a strong relationship between using cosmetic products for skin and purchasing green cosmetic products.

t-Test: Two-Sample Assuming Equal Variances:

t-Test: Two-Sample Assuming Equal Variances		
	Variable 1	*Variable 2*
Mean	0.160130719	0.504717
Variance	0.134929819	0.250273
Observations	306	848
Pooled Variance	0.219735006	
Hypothesized Mean Difference	0	
df	1152	
t Stat	-11.02310817	
P(T<=t) one-tail	3.1065E-27	
t Critical one-tail	1.646177414	
P(T<=t) two-tail	6.213E-27	
t Critical two-tail	1.962025376	

Conclusion: As the p-value is **extremely small (3.1065E-27 for one-tail and 6.213E-27 for two-tail)** indicate that the observed data are highly unlikely under the null hypothesis. Thus, it has a strong evidence to **reject the null hypothesis**.

While calculating t-test of two-sample assuming equal variances, the p-value of one-tailed and two-tailed are much smaller than 0.05, whereas the absolute value of the t-statistic is greater than the critical value, so reject the null hypothesis.

It concludes that there is statistically significant difference in the likeliness of purchasing green cosmetic products between people who use CP for skin and those who do not. Specifically, the data suggest that using CP for skin does influence the likelihood of purchasing green cosmetic products.

H015: An Individual who has used Cosmetic Product for certain body part (Skin, hair, etc.) has no relation with the usage of Green cosmetic for same body part (Q3, Q9)

The hypothesis was to set the basis of the study that the consumers who use cosmetic products for certain body parts do not have relationship with the use of green cosmetic products.

From the questionnaire, type of cosmetic products is compared with the type of green cosmetic products.

Here, Paired t-test is used for analysing the data.

t-Test: Two-Sample Assuming Equal Variances:

t-Test: Paired Two Sample for Means		
	Count if same	*Count if Different*
Mean	0.967196819	0.095427435
Variance	1.739221388	0.122227827
Observations	1006	1006
Pearson Correlation	0.162179245	
Hypothesized Mean Difference	0	
df	1005	
t Stat	21.13302003	
P(T<=t) one-tail	1.30132E-82	
t Critical one-tail	1.646371222	
P(T<=t) two-tail	2.60264E-82	
t Critical two-tail	1.96232725	

Conclusion:

The null hypothesis is rejected because the p-values (both one-tailed and two-tailed) are much smaller than 0.05 and the t-statistic is much larger than the critical values.

Based on the paired t-test results, it can be concluded that there is significant relationship between the use of cosmetic products on specific body parts and the use of green cosmetics on those same body parts. The findings strongly suggest that people who use cosmetic goods in specific body areas are more likely to utilize green cosmetics in those same body regions. This insight can be helpful for marketers and product developers working on green cosmetics since it identifies a target demographic that already uses cosmetics and may be more open to green alternatives.

H016: Individual who gets motivated by Green Cosmetic product not causing harm to environmental has no relation on checking environmental impact while purchasing green cosmetic product (Q11, Q16)

The hypothesis was to set the basis of the study: Is there a relationship between individuals who are motivated by green cosmetic products not causing harm to the environment and their behavior of checking the environmental impact while purchasing green cosmetics?

From the questionnaire, whether the consumers consider the environmental impact before they purchase green cosmetic products along with the consumers who are motivated to purchase green cosmetic products, data of 477 individuals were taken to analyse the given Hypothesis. Here, Chi-Square and Linear Regression analysis.

Chi-Square:

Observed:

Observed:	**What motivates you to purchase Green cosmetic products? (Do not harm the environment)**		
Do you consider the environmental impact before purchasing the Green cosmetic products?	**0**	**1**	**Grand Total**
No	72	22	94
Yes	108	275	383
Grand Total	**180**	**297**	**477**

Expected:

Expected:	**What motivates you to purchase Green cosmetic products? (Do not harm the environment)**		
Do you consider the environmental impact before purchasing the Green cosmetic products?	**0**	**1**	**Grand Total**
No	35	59	94
Yes	145	238	383
Grand Total	**180**	**297**	**477**

Chi-square calculations:

Chi-square calculation	**What motivates you to purchase Green cosmetic products? (Do not harm the environment)**	
Do you consider the environmental impact before purchasing the Green cosmetic products?	**0**	**1**
No	37.61637896	22.79780543
Yes	9.232218336	5.59528384

Chi Square: **75.24** >3.841 (df=1,p=0.05)
Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (2-1)*(2-1)= 1

Reference Table for Chi-Square

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.70	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.60	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.25	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.77	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.23	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.64	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.01	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.36	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.68	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.98	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.27	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.54	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.81	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.06	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.30	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.54	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.76	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.98	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.20	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.41	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **reject the null hypothesis**. Here, the chi-square value is 75.24, more than the significance value 0.05. It indicates a significant association between being motivated by green cosmetic products that do not cause harm to the environment and checking the environmental impact while purchasing green cosmetic products.

Regression:

Regression was done taking Y = Environmental Impact X = Motivation to save enviornment

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.397164179							
R Square	0.157739385							
Adjusted R Square	0.155966205							
Standard Error	0.365831052							
Observations	477							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	11.90552061	11.90552061	88.95846067	1.79145E-19			
Residual	475	63.57037037	0.133832359					
Total	476	75.47589099						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.6	0.027267437	22.00426856	1.67314E-74	0.546420284	0.653579716	0.546420284	0.653579716
What motivates you to purchase Green Cosmetic Products?	0.325925926	0.034556144	9.431779295	1.79145E-19	0.258024112	0.393827739	0.258024112	0.393827739

P value < 0.05

Conclusion: As the value of p is less than 0.05, **reject the null hypothesis.** Here, the p value is 1.791 × 10-19, which is very low compared to significance level 0.05. It suggests a very strong and significant relationship between being motivated by environmental considerations and checking the environmental impact of purchasing green cosmetic products.

H017: Consumer who considers packaging as important factor to evaluate quality is not willing to pay more for Green Cosmetic Product (Q13, Q43)

The hypothesis was to set the basis of the study that whether the consumers who consider packaging as a significant factor impacts or have willingness to pay more while they purchase green cosmetic products.

Here, questions taken were how they evaluate the quality of green cosmetic products (only packaging) with if they are willing to pay more for better green cosmetic products, data of477 individuals were taken to analyse the given Hypothesis. Since data has binary variables, Chi-Square and Linear Regression analysis.

Chi-Square:

Observed:

Observed:	**Are you willing to pay more for better green cosmetic products?**			
How do you evaluate the quality of the Green cosmetic products? (Packaging)	**Yes**	**Maybe**	**No**	**Grand Total**
0	185	156	20	361
1	63	40	13	116
Grand Total	**248**	**196**	**33**	**477**

Expected:

Expected:	**Are you willing to pay more for better green cosmetic products?**			
How do you evaluate the quality of the Green cosmetic products?	**Yes**	**Maybe**	**No**	**Grand Total**
0	188	148	25	361
1	60	48	8	116
Grand Total	**248**	**196**	**33**	**477**

Chi-square calculations:

Chi-square calculations	**Are you willing to pay more for better green cosmetic products?**		
How do you evaluate the quality of the Green cosmetic products?	**Yes**	**Maybe**	**No**
0	0.0	0.4	1.0
1	0.1	1.2	3.1

Chi Square: **5.9** =5.9 (df=2,p=0.05)
Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (3-1)*(2-1)=2

Reference Table for Chi-Square:

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.70	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.60	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.25	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.77	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.23	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.64	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.01	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.36	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.68	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.98	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.27	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.54	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.81	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.06	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.30	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.54	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.76	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.98	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.20	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.41	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: **Fail to reject the null hypothesis**. The Chi-Square value of 5.9 is equal to the critical value of 5.991. There is no significant association between considering packaging as an important factor and willingness to pay more for green cosmetic products.

Regression:

Regression was done taking Y = Monthly Expenditure X = Premium

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.01797492							
R Square	0.000323098							
Adjusted R Square	-0.001781485							
Standard Error	0.429839607							
Observations	477							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	0.028364867	0.028365	0.153521	0.695368711			
Residual	475	87.76199153	0.184762					
Total	476	87.79035639						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.26119437	0.049996283	5.224276	2.62E-07	0.162953135	0.359435604	0.162953135	0.359435604
Pay More	-0.012412882	0.031680256	-0.39182	0.695369	-0.07466366	0.049837895	-0.07466366	0.049837895

P value > 0.05

Conclusion: As the value of p is more than 0.05, **fail to reject the null hypothesis**. Here, the p-value is 0.69 which is more than the significance value 0.05. It suggests that there is no statistically significant relationship between considering packaging as an important factor and willingness to pay more for green cosmetic products.

It implies that no statistically significant evidence supports consumers who considers packaging as an important factor for evaluating the quality are willing to pay more for green cosmetic products.

H018: Allergic Reaction don't impact the willingness of consumers to use Green Cosmetic Products (Q46,Q45)

The hypothesis states that allergic reactions do not impact the willingness of consumers to use green cosmetic products, indicating no significant relationship between experiencing allergic reactions and the decision to use green cosmetics.

From the questionnaire, the reason they have not purchased green cosmetic products and why they are not using cosmetic products are taken as variables, data of 1154 individuals out of which 43 were taken to analyse the given Hypothesis.

Here, Chi-Square and Linear Regression analysis.

Chi-Square:

Observed:

Observed:	**I have not purchased Green cosmetic products:**		
Why don't you use cosmetic products?	**0**	**1**	**Grand Total**
0	929	182	1111
1	26	17	43
Grand Total	**955**	**199**	**1154**

Expected:

Expected:	**I have not purchased Green cosmetic products:**		
Why don't you use cosmetic products?	**0**	**1**	**Grand Total**
0	919	192	1111
1	36	7	43
Grand Total	**955**	**199**	**1154**

Chi-square calculations:

Chi-square calculation	**I have not purchased Green cosmetic products:**	
Why don't you use cosmetic products?	**0**	**1**
0	0.1	0.5
1	2.6	12.4

Chi Square: **15.6** >3.841 (df=1,p=0.05)
Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (2-1)*(2-1)= 1

Reference Table for Chi-Square

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.70	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.60	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.25	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.77	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.23	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.64	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.01	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.36	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.68	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.98	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.27	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.54	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.81	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.06	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.30	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.54	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.76	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.98	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.20	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.41	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **reject the null hypothesis**. Here, the chi-square value is 15.6 which is higher than the critical value 3.841. It shows that there is a positive relationship between allergic reactions and the willingness of consumers to use green cosmetic products.

Regression:

Regression was done taking Y = use of cosmetic products X = Not purchased

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.116084681							
R Square	0.013475653							
Adjusted R Square	0.012619295							
Standard Error	0.188285128							
Observations	1154							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	0.557861677	0.557861677	15.73601	7.73198E-05			
Residual	1152	40.83988529	0.035451289					
Total	1153	41.39774697						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.027225131	0.006092764	4.468437059	8.66E-06	0.015270974	0.039179288	0.015270974	0.039179288
I have not purchased Green cosmetic products:	0.058202005	0.014672047	3.966863409	7.73E-05	0.029415077	0.086988933	0.029415077	0.086988933

P value < 0.05

Conclusion: As the value of p is less than 0.05, **reject null hypothesis**. Here, the p-value is 7.73×10^{-5}, much less than the significance value 0.05.

While analyzing regression analysis, given that the p-value is less than 0.05, reject the null hypothesis that suggests a statistically significant relationship exists between experiencing allergic reactions and the willingness of consumers to use green cosmetic products. In other words, allergic reactions impact consumers' willingness to use green cosmetic products.

H019: Consumers of Vadodara city when compared to Surat do not have direct relation with sustainable and environmental impact of Green Cosmetic Product (Q30, Q31, B3)

The hypothesis states that consumers of Vadodara city when they are compared with Surat they do not have a relationship when compared with sustainability and environmental impact.

Here, Two sample t-test has been used:

Environmental Impact and comparison		
t-Test: Two-Sample Assuming Equal Variances		
	Variable 1	*Variable 2*
Mean	3.707317073	3.878378
Variance	0.834056561	0.902814
Observations	164	74
Pooled Variance	0.855324682	
Hypothesized Mean Difference	0	
df	236	
t Stat	-1.320795512	
P(T<=t) one-tail	0.093924432	
t Critical one-tail	1.65133585	
P(T<=t) two-tail	0.187848865	
t Critical two-tail	1.970066853	

Here, taking Green cosmetic product impact:

- Mean for Vadodara consumers (Variable 1): 3.707
- Mean for Surat consumers (Variable 2): 3.878
- Pooled variance: 0.855
- t Statistic: -1.321
- Degrees of freedom (df): 236
- Two-tailed p-value: 0.188

Conclusion:

The p-value of 0.188 is greater than the standard significance level of 0.05, indicating that there is no statistically significant difference in the perceived impact of Green Cosmetic Products between customers in Vadodara and Surat. As a result, **fail to reject the null hypothesis** that there is no difference in perceptions of the impact of Green Cosmetic Products across the two cities.

Sustainability		
t-Test: Two-Sample Assuming Equal Variances		
	Variable 1	*Variable 2*
Mean	3.81097561	3.972973
Variance	0.74319168	0.656794
Observations	164	74
Pooled Variance	0.716466906	
Hypothesized Mean Difference	0	
df	236	
t Stat	-1.366655909	
P(T<=t) one-tail	0.086516873	
t Critical one-tail	1.65133585	
P(T<=t) two-tail	0.173033745	
t Critical two-tail	1.970066853	

Here, taking sustainability impact:

- Mean for Vadodara consumers (Variable 1): 3.811
- Mean for Surat consumers (Variable 2): 3.973
- Pooled variance: 0.716
- t Statistic: -1.367
- Degrees of freedom (df): 236
- Two-tailed p-value: 0.173

Conclusion:

The p-value is 0.173 which states that there is no significant difference in the perceived impact on sustainability between the consumers of Vadodara and Surat cities. Thus, **fail to reject the null hypothesis.**

H020: Brand Name has no relation on perception of quality of the Green Cosmetic product (Q13)

The study is to examine whether the brand name has any relationship from the perspective of quality of green cosmetic products.

Single factor ANOVA:

Anova: Single Factor						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Brand Name	477	200	0.419287	0.243997		
Ingredients	477	421	0.8826	0.103835		
Certification	477	263	0.551363	0.247882		
Packaging	477	116	0.243187	0.184434		
Place of Manufacturing	477	50	0.104822	0.094031		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	171.6268	4	42.90671	245.4116	1.2E-176	2.375667
Within Groups	416.109	2380	0.174836			
Total	587.7358	2384				

Conclusion:

Here, F-statistic tests if the means of the perception score across different brands are different. If the value of F is high, then the value of is extremely low, indicating the failure to accept the null hypothesis suggesting a significant relationship between the brand name and the perception of green cosmetic products.

Therefore, Brand Name has no relation on perception of quality of the Green Cosmetic product" is rejected based on the ANOVA analysis. Brand Name does indeed play a significant role in shaping how consumers perceive the quality of Green Cosmetic products. Thus, **reject the null hypothesis.**

H021: Consumer aware of Green cosmetic product do not have direct relation of perceiving green cosmetics as chemical free products (Q6, Q4)

The hypothesis was to set the basis of the study that whether the consumers awareness have a relationship while perceiving green cosmetic products as chemical free.

From the questionnaire, whether the consumers know what green cosmetic products are and whether it impacts chemical free products are taken.

Chi-Square and Linear Regression analysis.

Chi-Square:

Observed:

According to you, what are green cosmetic products?	No	Yes	Grand Total
No	148		148
Yes	364	642	1006
Grand Total	**512**	**642**	**1154**

Expected:

According to you, what are green cosmetic products?	No	Yes	Grand Total
No	65.66377816	82.33622184	148
Yes	446.3362218	559.6637782	1006
Grand Total	**512**	**642**	**1154**

Chi-square calculations:

According to you, what are green cosmetic products?	No	Yes
No	103.2419032	82.33622184
Yes	15.18866965	12.11308234

Chi Square: **212.87** >3.841 (df=1,p=0.05)

Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (2-1)*(2-1)= 1

Reference Table for Chi-Square

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.70	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.60	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.25	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.77	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.23	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.64	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.01	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.36	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.68	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.98	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.27	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.54	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.81	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.06	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.30	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.54	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.76	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.98	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.20	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.41	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **reject null hypothesis**. Here, the chi-square value is 211.87, which is much higher than the critical value 3.841. It shows that there is a significant relationship between the consumers awareness have a relationship while perceiving green cosmetic products as chemical free.

Regression:

Regression was done taking Y = Purchase of Green Cosmetic Product X = Usage of Cosmetic Product

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.429501219							
R Square	0.184471297							
Adjusted R Square	0.183763373							
Standard Error	0.449048217							
Observations	1154							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	52.5445869	52.54459	260.5806	5.31515E-53			
Residual	1152	232.2942346	0.201644					
Total	1153	284.8388215						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	3.33067E-16	0.036911536	9.02E-15	1	-0.07242137	0.07242137	-0.07242137	0.07242137
Do you use Cosmetic Products?	0.638170974	0.03953357	16.14251	5.32E-53	0.560605107	0.715736841	0.560605107	0.715736841

P value < 0.05

Conclusion: As the value of p is less than 0.05, **reject the null hypothesis**. Here, the p-value is 5.32E-53 which is very less than the significance value of 0.05.

It concludes that there is statistically significant difference in the likeliness of purchasing green cosmetic products between people who use CP for skin and those who do not. Specifically, the data suggest that using CP for skin does influence the likelihood of purchasing green cosmetic products.

H022: Consumers of Ahmedabad city when compared to Surat do not have any influence of social media while purchase of Green Cosmetic Product (Q21, B3)

The hypothesis was to set the basis of the study that the consumers of Ahmedabad city and consumers of Surat city do not have an impact of social media while they are purchasing green cosmetic products.

Here, Paired t-test is used for analysing the data.

t-Test: Two-Sample Assuming Equal Variances:

t-Test: Two-Sample Assuming Equal Variances		
	Abad	*Surat*
Mean	1.640167364	1.719512
Variance	0.718715938	0.66931
Observations	239	164
Pooled Variance	0.698633302	
Hypothesized Mean Difference	0	
df	401	
t Stat	-0.936186447	
P(T<=t) one-tail	0.174870327	
t Critical one-tail	1.648662397	
P(T<=t) two-tail	0.349740653	
t Critical two-tail	1.965897465	

Conclusion:

Here, p-value is greater than 0.05, and thus it falls under critical value, and **fail to reject the null hypothesis.** Based on the t-test results, no statistically significant difference was found between consumers of Ahmedabad and Surat regarding the influence of social media on their purchase behavior of Green Cosmetic Products.

Therefore, there is insufficient evidence to conclude that there is any difference in how social media influences consumers from these two cities in their purchase decisions related to Green Cosmetic Products.

H023: Consumers of Surat city when compared to Vadodara do not have any influence of Brand Reputation while purchasing Green Cosmetic Product (Q32, B3)

The hypothesis was to set the basis for whether the consumers of Surat city compared to the consumers of Vadodara city are impacted by the brand factor while they purchase green cosmetic products.

City and whether the brand reputation (scale) impacts, data for 477 individuals were taken to analyse the given Hypothesis. Since data has binary variables, Chi-Square and Linear Regression analysis.

Chi-Square:

Observed:

Observed:	**Brand reputation**					
City	**Agree**	**Disagree**	**Neutral**	**Strongly Agree**	**Strongly Disagree**	**Grand Total**
Ahmedabad	118	12	50	53	6	239
Surat	97	5	28	31	3	164
Vadodara	44	1	14	15	0	74
Grand Total	**259**	**18**	**92**	**99**	**9**	**477**

Expected:

Expected:	**Brand reputation**					
City	**Agree**	**Disagree**	**Neutral**	**Strongly Agree**	**Strongly Disagree**	**Grand Total**
Ahmedabad	129.77148	9.01886	46.09643	49.60377	4.50943396	239
Surat	89.048218	6.188679	31.631027	34.03773	3.09433962	164
Vadodara	40.18029	2.792452	14.272536	15.35849	1.39622641	74
Grand Total	**259**	**18**	**92**	**99**	**9**	**477**

Chi-square calculations:

	Brand reputation				
City	**Agree**	**Disagree**	**Neutral**	**Strongly Agree**	**Strongly Disagree**
Ahmedabad	1.174304583	0.740595704	0.304756229	0.217629318	0.370297852
Surat	0.651864294	0.28259167	0.470869961	0.297672229	0.002966655
Vadodara	0.331594494	3.212887148	0.005305446	0.008567699	0

Chi Square: **12.5** < 15.51 (df=8,p=0.05)
Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (5-1)*(3-1)=8

Reference Table for Chi-Square:

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.706	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.605	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.251	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.779	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.236	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.645	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.017	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.362	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.684	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.987	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.275	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.549	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.812	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.064	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.307	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.542	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.769	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.989	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.204	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.412	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **fail to reject the null hypothesis**. Here, the chi-square value is 12.5, less than the critical value of 15.51. Thus, there is no significant association between city of residence (Surat vs. Vadodara) and the influence of brand reputation while purchasing green cosmetic products.

Regression:

Regression was done taking Y = Impact X = City

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.039069857							
R Square	0.001526454							
Adjusted R Square	-0.000575596							
Standard Error	0.842190767							
Observations	477							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	0.515064532	0.515065	0.726174	0.394555603			
Residual	475	336.910512	0.709285					
Total	476	337.4255765						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	3.815734757	0.087428637	43.64399	2.5E-168	3.64394004	3.987529474	3.64394004	3.987529474
B3	0.036285007	0.042580118	0.852158	0.394556	-0.047383681	0.119953695	-0.047383681	0.119953695

P value > 0.05

Conclusion: As the value of p is more than 0.05, **fail to reject the null hypothesis**. While analyzing regression analysis, the value of p exceeds 0.05. Because this p-value is much higher than the conventional threshold of 0.05, it cannot reject the null hypothesis.
It implies that no statistically significant evidence supports that consumers of Surat city, compared with the consumers of Vadodara city, have any influence of brand reputation while purchasing green cosmetic products.
As a result, it can be concluded from the analysis of chi-square and regression analysis that the null hypothesis should be accepted.

H024: Influence via Word of Mouth has no relation in generating Positive emotions towards Purchase of Green Cosmetic Products (Q18, Q14)

The hypothesis was to set the basis that word of mouth has any relation in generating positive emotions among the consumers while they purchase green cosmetic products.

For the same, kind of research consumers do while they purchase green cosmetic products (Word of Mouth) and the emotions they have been compared for 477 individuals were taken to analyse the given Hypothesis. Since data has binary variables, Chi-Square and Linear Regression analysis.

Chi-Square:

Observed:

Observed:	**What kind of emotions affects the consumer's decision while purchasing Green cosmetic products?**		
What kind of research you do before purchasing Green cosmetic products? -WOM	**0**	**1**	**Grand Total**
0	32	209	241
1	37	199	236
Grand Total	**69**	**408**	**477**

Expected:

Expected:	**What kind of emotions affects the consumer's decision while purchasing Green cosmetic products?**		
What kind of research you do before purchasing Green cosmetic products? -WOM	**0**	**1**	**Grand Total**
0	35	206	241
1	34	202	236
Grand Total	**69**	**408**	**477**

Chi-square calculations:

Chi-square calculation	**What kind of emotions affects the consumer's decision while purchasing Green cosmetic products?**	
What kind of research you do before purchasing Green cosmetic products? -WOM	**0**	**1**
0	0.2	0.0
1	0.2	0.0

Chi Square: **0.6** < 3.841 (df=1,p=0.05)
Degree of Freedom (*df*) = (No of Variable in X - 1)*(No of Variable in Y - 1) = (2-1)*(2-1)=1

Reference Table for Chi-Square:

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.70	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.60	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.25	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.77	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.23	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.64	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.01	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.36	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.68	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.98	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.27	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.54	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.81	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.06	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.30	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.54	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.76	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.98	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.20	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.41	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Conclusion: From the above calculation, **fail to reject the null hypothesis**. Here, chi-square value is 0.6 which is less than the critical value 3.481. Thus, there is no significant association between influence via word of mouth and generating positive emotions towards the purchase of green cosmetic products.

Regression:

Regression was done taking Y = Influence (WOM) X = Emotions

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.034112496							
R Square	0.001163662							
Adjusted R Square	-0.000939151							
Standard Error	0.500732402							
Observations	477							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	0.138751495	0.138751	0.553384	0.457306262			
Residual	475	119.0981458	0.250733					
Total	476	119.2368973						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.536231884	0.060281097	8.895523	1.22E-17	0.41778129	0.654682479	0.41778129	0.654682479
What kind of emotions affects the consumer's decision while purchasing Green cosmetic products?	-0.048486786	0.065179385	-0.7439	0.457306	-0.176562372	0.0795888	-0.176562372	0.0795888

P value > 0.05

Conclusion: As the value of p is more than 0.05, **fail to reject the null hypothesis.** While analyzing regression analysis, the value of p exceeds 0.05. Because this p-value is much higher than the conventional threshold of 0.05, cannot reject the null hypothesis. It implies that no statistically significant evidence supports influence via word of mouth has any relation to generate positive emotions while they purchase green cosmetic products.

As a result, it can be concluded from the analysis of chi-square and regression analysis that the null hypothesis should be accepted.

Correlation Analysis:

Correlation Analysis:

The below analysis is correlation matrix. It was tested from questions 28 to 41, and the range of correlation coefficients lies between -1 and +1. The values close to one indicate a strong positive relation, which means that as one variable increases, the other also increases. A value that is close to -1 indicates a negative relation and around 0 indicates no relation.

Corelation	*Q28*	*Q29*	*Q30*	*Q31*	*Q32*	*Q33*	*Q34*	*Q35*	*Q36*	*Q37*	*Q38*	*Q39*	*Q40*	*Q40.5*	*Q41*
Q28	1														
Q29	0.374833	1													
Q30	0.287187	0.395521	1												
Q31	0.284175	0.417021	0.756132	1											
Q32	0.171076	0.411054	0.191803	0.228563	1										
Q33	0.238468	0.380129	0.362331	0.324048	0.292032	1									
Q34	0.262885	0.342836	0.502096	0.526544	0.206773	0.67562	1								
Q35	0.154973	0.277748	0.291663	0.258402	0.335531	0.577803	0.440645	1							
Q36	0.308679	0.33052	0.471631	0.520539	0.294666	0.536923	0.578523	0.490141	1						
Q37	0.281894	0.259568	0.468159	0.482934	0.334126	0.381841	0.437829	0.34418	0.634078	1					
Q38	0.351513	0.343476	0.361669	0.416176	0.197177	0.489166	0.532599	0.315623	0.52355	0.562014	1				
Q39	0.22622	0.323072	0.36174	0.369577	0.282758	0.401893	0.483573	0.392354	0.486311	0.531002	0.600549	1			
Q40	0.286804	0.315806	0.405656	0.406667	0.336899	0.431256	0.551104	0.384665	0.587998	0.609325	0.623657	0.658003	1		
Q40.5	0.261005	0.314378	0.412985	0.432185	0.304139	0.448393	0.579797	0.34498	0.635505	0.565676	0.564879	0.597974	0.67233	1	
Q41	0.221	0.15595	0.263432	0.373377	0.30586	0.344107	0.372717	0.381193	0.521533	0.55253	0.439848	0.379956	0.57315	0.541493	1

Q28	Price and affordability
Q29	Quality and Performance
Q30	Environmental Impact and comparison
Q31	Sustainability
Q32	Brand reputation
Q33	Green cosmetic products are made with natural, sustainable and are chemically free.
Q34	Green cosmetic products are better for environment and can help in the reduction of the carbon footprint
Q35	Green cosmetic products have higher quality ingredients and may offer better performance than traditional cosmetic products
Q36	Consumers should be made more educated about the benefits of using green products especially environment and health benefits
Q37	Promotional activities can be used to increase the awareness of the green cosmetic products
Q38	Products can be made available in the online and offline stores to increase the accessibility
Q39	Green cosmetic products should be tested to meet the quality standard

Q40	Good customer service should be provided after the purchase of green cosmetic products
Q40.5	Consumers should be provided with accurate and proper information regarding the green cosmetic products
Q41	Offers, Discounts and rewards should be given to the consumers purchasing green cosmetic products

Interpretation of Correlation:

Strong Positive Correlation	**Moderate Positive Correlation**	**Low Positive Correlation**	**No Correlation**
Q31 and Q30 (0.756132)	Q31 and Q34 (0.526544)	Q32 and Q29 (0.411054)	Q28 and Q35 (0.154973)
Q34 and Q33 (0.67562)	Q36 and Q34 (0.578523)		Q32 and Q28 (0.171076)
Q40 and Q40.5 (0.67233)	Q40 and Q36 (0.587998)		Q41 and Q29 (0.15595)
Q36 and Q37 (0.634078)	Q41 and Q37 (0.55253)		
Q39 and Q40 (0.658003)			

Detailed Explanation:

1. Strong Positive Correlations (≥ 0.6):

These variables show a significant interdependence, suggesting that they might measure similar underlying constructs or directly influence each other.

- Q30 (Environmental Impact) and Q31 (Sustainability) [0.756]-
  This strong correlation suggests that consumers who consider the environmental impact of green cosmetic products also value their sustainability.
  Implication: Brands emphasizing their products' sustainable and environmentally friendly attributes will likely appeal to these consumers simultaneously.

- Q33 (Natural, Sustainable, Chemically-Free Products) and Q34 (Environmental Benefits and Carbon Footprint Reduction) [0.676]-

  Consumers associate products labeled as natural, sustainable, and free of harmful chemicals with a positive environmental impact and reduced carbon footprint.

  Implication: Highlighting these attributes in marketing can strengthen the brand's appeal to environmentally conscious consumers.
- Q40 (Good Customer Service) and Q40.5 (Accurate Product Information) [0.672]-

  Accurate information about green cosmetics is closely tied to consumer satisfaction with post-purchase customer service.

  Implication: Brands should invest in clear, precise product information to build trust and improve customer experiences.
- Q36 (Consumer Education) and Q37 (Promotional Activities for Awareness) [0.634]-

  Educational efforts about green cosmetics are strongly aligned with promotional activities aimed at raising awareness.

  Implication: Integrating educational content into promotional campaigns can enhance awareness and understanding of green cosmetic benefits.
- Q39 (Quality Testing) and Q40 (Good Customer Service) [0.658]

  Ensuring quality standards is strongly associated with consumer satisfaction post-purchase.

  Implication: Rigorous quality testing builds customer trust, improving brand reputation and service satisfaction.

2. **Moderate Positive Correlations (0.5–0.6):**

These variables exhibit a noticeable but less pronounced relationship, indicating a moderate level of influence on each other.

- Q31 (Sustainability) and Q34 (Environmental Benefits and Carbon Footprint Reduction) [0.527]-

  Sustainability and environmental benefits moderately influence each other, as consumers see them as interrelated.

  Implication: Sustainability efforts that directly highlight environmental benefits are likely to resonate well with this consumer segment.

- Q36 (Consumer Education) and Q34 (Environmental Benefits and Carbon Footprint Reduction) [0.579]-
  Educating consumers about green products enhances their perception of these products' environmental benefits.
  Implication: Consumer education campaigns should focus on how green cosmetics contribute to environmental protection to drive adoption.
- Q41 (Offers, Discounts, and Rewards) and Q37 (Promotional Activities) [0.553]-
  Promotions, including discounts and rewards, moderately influence consumer awareness of green cosmetics.
  Implication: Combining promotions with educational or awareness campaigns can enhance their effectiveness.
- Q40 (Good Customer Service) and Q36 (Consumer Education) [0.588]-
  Educating consumers complements post-purchase satisfaction through good customer service.
  Implication: Educational initiatives must extend beyond the pre-purchase stage to support ongoing customer satisfaction.

3. Low Positive Correlations (0.3–0.5):

These variables show a weaker association, suggesting only partial or indirect relationships.

- Q32 (Brand Reputation) and Q29 (Quality and Performance) [0.411]
  While brand reputation and product quality are linked, this correlation indicates that other factors also significantly contribute to reputation.
  Implication: Brands need to consider additional elements like marketing, heritage, and social responsibility alongside quality to enhance reputation.

4. Very Low or No Correlation (< 0.3):

These variables exhibit minimal to no relationship, suggesting they are largely independent.

- Q28 (Price and Affordability) and Q35 (Higher Quality and Performance of Green Cosmetics) [0.155]-

Price and perceived quality have little connection, indicating that affordability does not significantly shape perceptions of quality.

Implication: Pricing strategies should focus more on consumer spending capacity than on perceived quality improvements.

- Q32 (Brand Reputation) and Q28 (Price and Affordability) [0.171]-
  Brand reputation does not strongly correlate with affordability, implying that reputation is built on factors other than price.
  Implication: High-quality products and effective marketing may outweigh the impact of pricing on brand reputation.
- Q41 (Offers, Discounts, and Rewards) and Q29 (Quality and Performance) [0.156]
  Discounts and rewards have little influence on consumers' perceptions of quality.
  Implication: Discounts should focus on attracting cost-conscious consumers rather than those prioritizing product quality.

5. Insights on Strong vs. Weak Correlations

Strong correlations (e.g., Q30 & Q31, Q33 & Q34) suggest these variables share overlapping constructs or directly influence each other, such as environmental benefits and sustainability.
Moderate correlations (e.g., Q36 & Q37, Q31 & Q34) show meaningful but less robust relationships, often due to partial overlaps or indirect influences.
Weak correlations (e.g., Q28 & Q35, Q32 & Q28) indicate distinct constructs with minimal interaction, representing independent phenomena.

This chapter analyzed the data to address the research objectives, providing insights into demographic influences, environmental awareness, and the role of social media. The findings underscore the importance of targeted marketing, cost reduction, and awareness campaigns to promote green cosmetics. The study contributes to the growing body of knowledge on sustainable consumer behavior and offers actionable recommendations for stakeholders in the green cosmetics industry.

Overall Analysis of Hypothesis:

Hypothesis	Analysis	Result	Accept or Reject the null hypothesis
H01	Regression Analysis	p-value= 9.733E-25 < 0.05	Reject
	Chi-square	100.984 >3.841 (df=1,p=0.05)	Reject
H02	Regression Analysis	p-value= 0.08> 0.05	Reject
	Chi-square	401 >9.488 (df=4,p=0.05)	Accept
H03	Regression Analysis	p-value= 0.02 < 0.05	Accept
	Chi-square	6.466 <9.488 (df=4,p=0.05)	Accept
H04	Regression Analysis	p-value= 0.81 > 0.05	Accept
	Chi-square	0.05 < 3.841 (df=1,p=0.05)	Accept
H05	Regression Analysis	p-value= 0.46 > 0.05	Accept
	Chi-square	0.51 < 3.841 (df=1,p=0.05)	Accept
H06	candle stick analysis	~0.17 (tan 10^0)	Accept
	Continuous Average Analysis	p value = 0.1091	Accept
H07	Regression Analysis	p-value= 0.03 < 0.05	Reject
	Chi-square	5.99 < 9.488 (df=4,p=0.05)	Accept
H08	Regression Analysis	p-value= 0.93	Accept
	Chi-square	11.23 > 5.99 (df=2,p=0.05)	Accept
H09	Regression Analysis	p-value= 2.587E-12 < 0.05	Reject
	Chi-square	145.33 >9.48 (df=4,p=0.05)	Reject
H010	Regression Analysis	p-value= 0.0003 < 0.05	Reject
	Chi-square	18.59 >9.48 (df=4,p=0.05)	Reject
H011	Regression Analysis	p-value= 6.52E-09 < 0.05	Reject
	Chi-square	36.51 >7.815 (df=3,p=0.05)	Reject
H012	Single factor ANOVA	p-value= 0.00057 < 0.05	Reject
	Two-sample t-test	p-value= 0.00023 < 0.05	Reject
H013	Regression Analysis	p-value= 0.89 > 0.05	Accept
	Chi-square	12.5 < 16.919 (df=9,p=0.05)	Accept
H014	Regression Analysis	p-value= 6.21E-27 < 0.05	Reject
	Chi-square	110 >3.841 (df=1,p=0.05)	Reject
	Two-sample t-test	3.11E-27	Reject
H015	Two-sample t-test	1.30E-82	Reject
H016	Regression Analysis	p-value= 1.7914E-19< 0.05	Reject
	Chi-square	75.24 >3.841 (df=1,p=0.05)	Reject

Hypothesis	Analysis	Result	Accept or Reject the null hypothesis
H017	Regression Analysis	p-value= 0.69 > 0.05	Accept
	Chi-square	5.9 =5.9 (df=2,p=0.05)	Accept
H018	Regression Analysis	p-value= 7.73E-05 < 0.05	Reject
	Chi-square	15.6 >3.841 (df=1,p=0.05)	Reject
H019	Two-sample t-test (Env)	p-value= 0.188 > 0.05	Accept
	Two-sample t-test (Sustainability)	p-value= 0.17> 0.05	Accept
H020	Single factor ANOVA	p-value= 1.2E-176 < 0.05	Reject
H021	Regression Analysis	p-value= 5.23E-53 < 0.05	Reject
	Chi-square	212.87 >3.841 (df=1,p=0.05)	Reject
H022	Two-sample t-test	p-value= 0.35 > 0.05	Accept
H023	Regression Analysis	p-value= 0.39 > 0.05	Accept
	Chi-square	12.5 < 15.51 (df=8,p=0.05)	Accept
H024	Regression Analysis	p-value= 0.45 > 0.05	Accept
	Chi-square	0.6 < 3.841 (df=1,p=0.05)	Accept

Hypothesis-Attributes Mapping: