Amazon Customer Survey Analysis

This survey was taken to help the E-commerce giant Amazon, understand the kind of customers making purchases from their website. The data gathered was used for the descriptive analysis to get a clear picture of how the business processes are doing and to effectively increase the conversion rate of customer leaving the sales funnel in between. This survey was sent to customers on their registered email address. The survey was taken by the customers of age group 22-30 years.

The below analysis mainly focuses on drawing inference about the population parameters. This analysis has been done to estimate the population parameters based on the sample data.

Following analysis were done on the population parameters:

1) One Sample hypothesis test on the Average Monthly expenditure of a customer on Amazon
2) Two Sample hypothesis test on the Average Monthly expenditure of a customer on Amazon based on gender
3) ANOVA to determine whether any significant difference exist in the browsing experience among individuals of different gender
4) Chi-Square test to determine whether price effects the recommendation of Amazon by women

Analysis:

1) **One Sample Hypothesis test on Average Monthly Expenditure**
   This test estimates the Average Monthly Expenditure of a Customer on Amazon.
   Procedures used:
   a) We determined the hypothesised mean for the Monthly expenditure of a customer on Amazon. ($\mu_0 = 201$)
   b) We determined the mean of the sample to be 134.39.
   c) We devised the hypothesis as follows: H0: Average Monthly expenditure is greater than 201; H1: Average Monthly Expenditure is less than 201
   d) We then calculated the sample standard deviation
   e) Since the population standard deviation is unknown, we chose t distribution and hence calculated the t-statistic choosing alpha as 0.05
   f) We calculated the critical value and p value for this sample

H0: Average Monthly expenditure is greater than 201	
H1: Average Monthly Expenditure is less than 201	
Sample Mean	134.39
Hypothesised Mean	200
Standard Deviation of sample	232.2941
Total Observation	49
Test Statistic	-1.97711
Critical Value	1.677224
Since it's a lower tail test, we will change the sign of the critical value	
p value	0.026667

Conclusions: Since the **test statistic is less than critical value or p < alpha**, we will reject the null hypothesis(H0) and will conclude that the average monthly expense of customer on Amazon will be less than 201.

Notes: Refer One Sample Analysis worksheet of the attached workbook.

2) **Two Sample hypothesis test on the Average Monthly expenditure of a customer on Amazon based on gender**

This test was done to determine whether on an average, in a month, female spend more than males on Amazon.

Procedures used:

a) We devised the hypothesis as follows: H0: Average expenditure of Women is less than that of Men; H1: Average expenditure of Women is greater than that of men

b) We then applied the t-test: Two Sample Assuming Unequal Variances choosing alpha as 0.05

c) For variable one, we selected the data for female's monthly expenditure. For variable two, we selected the data for male's monthly expenditure

	Female	*Male*
Mean	234	81.47656
Variance	102630.6	22249.85
Observations	17	32
Hypothesized Mean Difference	0	
df	20	
t Stat	1.858881	
P(T<=t) one-tail	0.038911	
t Critical one-tail	1.724718	
P(T<=t) two-tail	0.077823	
t Critical two-tail	2.085963	

Conclusions: Since **t Stat is greater than t Critical for one tail or p < alpha,** we will reject H0 and will conclude that the average expenditure of Women is more than that of Men.

Notes: Refer Two-Sample Analysis worksheet of the attached workbook.

3) **ANOVA to determine whether any significant difference exist in the browsing experience among individuals of different gender**

This test was done to determine whether the browsing experience is different for different genders.

Procedure Used:

a) First we segregated the response of males and females in the different columns

b) We devised the hypothesis as: H0: Average browsing experience is same for both males and females, H1: Average browsing experience of males and females differ

c) We then applied the ANOVA Single Factor Analysis by setting alpha as 0.05

SUMMARY				
Groups	*Count*	*Sum*	*Average*	*Variance*
Males	32	84	2.625	0.241935
Females	17	43	2.529412	0.389706

ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.101441	1	0.101441	0.347114	0.558573	4.0471
Within Groups	13.73529	47	0.29224			
Total	13.83673	48				

Conclusions: Since **F crit > F or p > alpha, we can't discard the null hypothesis** and will conclude that the browsing experience for males and female doesn't differ much.

Notes: Refer ANOVA worksheet of the attached workbook.

4) **Chi-Square test to determine whether price effects the recommendation of Amazon by women**

This test was done to determine whether the prices effects the recommendation of Amazon by women.

Procedure Used:

a) Firstly, we devised the hypothesis; H0: Product fairly priced is independent on Recommendation, H1: Product fairly priced is dependent on Recommendation
b) Then we found the observed frequency of variables
c) Next the expected frequencies were calculated
d) From the observed and expected frequencies Chi Square test statistic was calculated
e) Next the critical value for Chi Square was calculated by selecting alpha as 0.05
f) Also the p value for this test is calculated

Observed Frequency			
Count of Products fairly priced	**Column Labels**		
Row Labels	**No**	**Yes**	**Grand Total**
No	8	2	10
Yes	0	7	7
Grand Total	**8**	**9**	**17**

Expected Frequency			Chi Square stats		
	Recommendation			**Recommendation**	
Product Fairly Priced	**No**	**Yes**	**Product Fairly Priced**	**No**	**Yes**
No	4.70588235	5.294118	No	2.30588235	2.049673
Yes	3.29411765	3.705882	Yes	3.29411765	2.928105
Grand Total			**Grand Total**		

Chi Square test stat	**10.57778**
p Value	**0.001145**
Critical Value	**3.841459**

Conclusions: Since the **test stat is greater than the critical vale or p value<alpha,** we will reject the null hypothesis and will conclude that the way products are priced affect the recommendations of Amazon done by women.

Notes: Refer Chi-Square Analysis worksheet of the attached workbook.

Final Conclusions:

a) **Average monthly expenditure of a customer is less than $201**
b) **Average monthly expenditure of women is greater than that of men**
c) **Browsing experience for both men and women doesn't differ**
d) **Prices of products affect the recommendations of Amazon done by women**

Workbook:

Amazon - Customer-Survey (Re