Hyper market Sales Analysis

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Data Inputs, tools & Business Questions

- Inputs :
  - Hyper Retail Analysis
- Tools used :
  - SPSS
  - R
  - Excel
- Technics used :
  - One-way ANOVA(analysis of variance)
  - T test
    - Single T-test
    - Paired T-test
    - Independent T-Test
  - Cross Tabulation

- Business Questions:
  - Q1 All the Store Brand Total Weight in Kgs significance to Gender Towards buying behavior is equal or nor equal ?
  - Q2 All the Branded Total weight in Kgs significance to Gender Towards buying behavior is equal or nor equal ?
  - Q3 All the Loose Total weight in Kgs significance to Gender Towards buying behavior is equal or nor equal ?
  - Q4 repeat the same analysis to Age Group ,Amount spent per month, Family Size, Income Level, Profession, Education qualification
  - Q5 Apply Paired T Test for :
    - Store Brand Total Weight in Kgs
    - Branded Total weight in Kgs
    - Loose Total Weight in Kgs
    - Total Price
    - Store Brand Total Price in Rs
    - Branded Total Price in Rs
    - Loose Total Price in Rs

Business Q1- Store Brand Total Weight vs Gender

Techniques :Descriptive Stats, Hypothesis, ANOVA table and

All the Store Brand Total Weight in Kgs significance to Gender Towards buying behavior is equal or nor equal ?

Hypothesis:

- H0
  - Store Brand Total Weight in Kgs Male= Store Brand Total Weight in Kgs Female
- H1
  - Store Brand Total Weight in Kgs Male != Store Brand Total Weight in Kgs Female

ANOVA Table: (Analysis of variance)

ANOVA : Store Brand Total Weight in Kgs					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.093	1	.093	.001	.974
Within Groups	77606.586	898	86.422		
Total	77606.679	899			

Insights :

- F-Value is .001 and The significance value is .974
- Based on the Anova table there is no significance for Store Brand Total Weight Vs Gender
- Buying behavior of Store Brand is equal for Gender “Male” Store Brand Total Weight = Gender “Female” Store Brand Total Weight
- Alternative Hypothesis is **rejected** (H1)

Business Q2- Branded Total weight in Kgs Vs Gender

Techniques :Descriptive Stats, Hypothesis, ANOVA table and

All the Branded Total weight in Kgs significance to Gender Towards buying behavior is equal or nor equal ?

Hypothesis:

- H0
  - Branded Total weight in Kgs Male = Branded Total weight in Kgs female
- H1
  - Branded Total weight in Kgs Male != Branded Total weight in Kgs female

ANOVA Table: (Analysis of variance)

ANOVA: Branded Total weight in Kgs					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.281	1	7.281	.501	.479
Within Groups	13038.031	898	14.519		
Total	13045.312	899			

Insights :

- F-Value is .501 and The significance value is .479
- Based on the Anova table there is no significance for Branded Total weight in Kgs Vs Gender
- Buying behavior of Branded Total weight in Kgs is equal for Gender "Male" Branded Total weight = Gender "Female" Branded Total weight
- Alternative Hypothesis is **rejected** (H1)

Business Q3- Loose Total weight Vs Gender

Techniques :Descriptive Stats, Hypothesis, ANOVA table and

All the Loose Total weight in Kgs significance to Gender Towards buying behavior is equal or nor equal ?

Hypothesis:

- H0
  - Loose Total weight in Kgs Male = Loose Total weight in Kgs female
- H1
  - Loose Total weight in Kgs Male != Loose Total weight in Kgs female

ANOVA Table: (Analysis of variance)

ANOVA : Loose Total Weight in Kgs					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.741	1	2.741	.085	.771
Within Groups	29068.447	898	32.370		
Total	29071.188	899			

Insights :

- F-Value is .085 and The significance value is .771
- Based on the Anova table there is no significance for loose total weight in kgs vs gender
- Buying behavior of loose total weight in kgs is equal for gender “male” loose total weight = gender “female” loose total weight
- Alternative hypothesis is **rejected** (H1)

Business Q4(a)- SB, BT and LT in Kgs Vs Age Group

Techniques :

Descriptive Stats, Hypothesis, ANOVA table and Crosstabulation

All the Store brand total weight in Kgs significance to Age Group Towards buying behavior is equal or nor equal ?

Hypothesis:

- H0
  - Total weight (SB, BT and LT) in Kgs Age Group = Total weight (SB, BT and LT) in Kgs Age Group
- H1
  - Total weight (SB, BT and LT) in Kgs Age Group != Total weight (SB, BT and LT) in Kgs Age Group

Insights :

- Based on the population Age group is not similar
- In total population 50% people Age groups is 31-40
- Based on the Anova table there is a significance Age Groups and buying behavior
- Buying behavior is not similar on all the tests in Age Group
- Alternative hypothesis is Accepted (H1) for Age group

ANOVA Table: (Analysis of variance)

ANOVA : Store Brand Total Weight in Kgs

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14687.703	4	3671.926	52.232	.000
Within Groups	62918.976	895	70.301		
Total	77606.679	899			

ANOVA : Branded Total weight in Kgs

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1697.708	4	424.427	33.475	.000
Within Groups	11347.604	895	12.679		
Total	13045.312	899			

ANOVA : Loose Total Weight in Kgs

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5100.522	4	1275.130	47.610	.000
Within Groups	23970.666	895	26.783		
Total	29071.188	899			

Cross tabulation:

Age Group	Store Brand Total Weight in Kgs		
	Count	Mean	Column N %
Below 30	223	15.66	24.8%
31-40	497	23.48	55.2%
41-50	152	27.20	16.9%
51-60	21	24.19	2.3%
61 Above	7	30.14	.8%

Business Q4(b)- SB, BT and LT in Kgs Vs Amount spent per month

Techniques :

Descriptive Stats, Hypothesis, ANOVA table and Crosstabulation

All the total weight (SB, BT and LT) in Kgs significance to Amount spent per month Towards buying behavior is equal or not equal ?

Hypothesis:

- H0
  - Total weight (SB, BT and LT) in Kgs Amount spend for month = total weight (SB, BT and LT) in Kgs Amount spend for month
- H1
  - Total weight (SB, BT and LT) in Kgs Amount spend for month != total weight (SB, BT and LT) in Kgs Amount spend for month

Insights :

- Based on the population Amount spend for month is not similar
- In total population 74% people spending the money is 1500-3500
- Based on the Anova table there is a significance for Amount spend per month and buying behavior
- Buying behavior is not similar on all the tests in Amount spend for month
- Alternative hypothesis is Accepted (H1)

ANOVA Table: (Analysis of variance)

ANOVA : SB, BT and LT in Kgs Vs Amount Spend for month						
		Sum of Squares	df	Mean Square	F	Sig.
Store Brand Total Weight in Kgs	Between Groups	58589.204	4	14647.301	689.331	.000
	Within Groups	19017.474	895	21.249		
	Total	77606.679	899			
Branded Total weight in Kgs	Between Groups	6153.439	4	1538.360	199.776	.000
	Within Groups	6891.873	895	7.700		
	Total	13045.312	899			
Loose Total Weight in Kgs	Between Groups	25359.794	4	6339.949	1528.874	.000
	Within Groups	3711.393	895	4.147		
	Total	29071.188	899			

Cross tabulation:

Branded Total weight in Kgs				
Amont spent per month	Count	Mean	Column N %	Total N
1500- 2500	311	6.98	34.6%	311
2501- 3500	355	10.50	39.4%	355
3501-4500	82	12.09	9.1%	82
4501-5500	126	12.82	14.0%	126
5501 Above	26	18.50	2.9%	26

Business Q4(c)- SB, BT and LT in Kgs Vs Family Size

Techniques :

Descriptive Stats, Hypothesis, ANOVA table and Crosstabulation

All the total weight (SB, BT and LT) in Kgs significance to Family Size Towards buying behavior is equal or not equal ?

Hypothesis:

- H0
  - Total weight (SB, BT and LT) in Kgs Family Size = total weight (SB, BT and LT) in Kgs Family Size
- H1
  - Total weight (SB, BT and LT) in Kgs Family Size != total weight (SB, BT and LT) in Kgs Family Size

Insights :

- Based on the population Family Sizes are not Similar
- In total population 46% of Family size is 3-4
- Based on the Anova table there is a significance for Family size and buying behavior
- Buying behavior is not similar on all the tests for Family sizes
- Alternative hypothesis is Accepted (H1)

ANOVA Table: (Analysis of variance)

ANOVA : SB, BT and LT in Kgs Vs Fimily Size						
		Sum of Squares	df	Mean Square	F	Sig.
Store Brand Total Weight in Kgs	Between Groups	11072.533	3	3690.844	49.704	.000
	Within Groups	66534.146	896	74.257		
	Total	77606.679	899			
Branded Total weight in Kgs	Between Groups	1113.300	3	371.100	27.867	.000
	Within Groups	11932.012	896	13.317		
	Total	13045.312	899			
Loose Total Weight in Kgs	Between Groups	5160.240	3	1720.080	64.455	.000
	Within Groups	23910.947	896	26.686		
	Total	29071.188	899			

Cross tabulation:

Family Size	Count	Mean	Column N %	Total N
up to 2	136	7.66	15.1%	136
3-4	419	9.96	46.6%	419
5-6	229	10.62	25.4%	229
7 above	116	11.56	12.9%	116

Business Q4(d)- SB, BT and LT in Kgs Vs Income Level

Techniques :

Descriptive Stats, Hypothesis, ANOVA table and Crosstabulation

All the total weight (SB, BT and LT) in Kgs significance to Income Levels Towards buying behavior is equal or not equal ?

Hypothesis:

- H0
  - Total weight (SB, BT and LT) in Kgs Income levels = total weight (SB, BT and LT) in Kgs Income levels
- H1
  - Total weight (SB, BT and LT) in Kgs Income levels != total weight (SB, BT and LT) in Kgs Income Levels

Insights :

- Based on the population Income levels are not Similar
- In total population 60% of income levels is 35000-45000 and above
- Based on the Anova table there is a significance for Income Levels and buying behavior
- Buying behavior is not similar for all the tests in income Levels
- Alternative hypothesis is Accepted (H1)

ANOVA Table: (Analysis of variance)

ANOVA : SB, BT and LT in Kgs Vs Income Levels

		Sum of Squares	df	Mean Square	F	Sig.
Store Brand Total Weight in Kgs	Between Groups	13107.825	4	3276.956	45.472	.000
	Within Groups	64498.854	895	72.066		
	Total	77606.679	899			
Branded Total weight in Kgs	Between Groups	1684.373	4	421.093	33.173	.000
	Within Groups	11360.939	895	12.694		
	Total	13045.312	899			
Loose Total Weight in Kgs	Between Groups	5622.987	4	1405.747	53.656	.000
	Within Groups	23448.200	895	26.199		
	Total	29071.188	899			

Cross tabulation:

Income Level	Count	Mean	Column N %	Total N
Rs.5,001-15,000	146	7.30	16.2%	146
Rs.15,001-25,000	130	10.43	14.4%	130
Rs.25,001-35,000	72	12.77	8.0%	72
35,001 -45,000	211	10.01	23.4%	211
45,001 Above	341	10.36	37.9%	341

Business Q4(e)- SB, BT and LT in Kgs Vs Profession

Techniques :

Descriptive Stats, Hypothesis, ANOVA table and Crosstabulation

All the total weight (SB, BT and LT) in Kgs significance to Profession Towards buying behavior is equal or not equal ?

Hypothesis:

- H0
  - Total weight (SB, BT and LT) in Kgs Profession = total weight (SB, BT and LT) in Kgs Profession
- H1
  - Total weight (SB, BT and LT) in Kgs Profession != total weight (SB, BT and LT) in Kgs Profession

Insights :

- Based on the Anova table there is no significance for Profession and buying behavior
- Buying behavior is similar for all the tests in Professions
- Alternative hypothesis is rejected (H1)
- Total population 64% people are working in Private services but all the buying behavior is same.
- Please review the ANOVA and cross tabulation tables for reference purpose

ANOVA Table: (Analysis of variance)

ANOVA : SB, BT and LT in Kgs Vs Profession						
		Sum of Squares	df	Mean Square	F	Sig.
Store Brand Total Weight in Kgs	Between Groups	119.588	4	29.897	.345	.847
	Within Groups	77487.091	895	86.578		
	Total	77606.679	899			
Branded Total weight in Kgs	Between Groups	47.011	4	11.753	.809	.519
	Within Groups	12998.302	895	14.523		
	Total	13045.312	899			
Loose Total Weight in Kgs	Between Groups	92.737	4	23.184	.716	.581
	Within Groups	28978.450	895	32.378		
	Total	29071.188	899			

Cross tabulation:

Profession	Count	Mean	Column N %	Total N
Govt Service	180	10.03	20.0%	180
Private Service	578	9.99	64.2%	578
Business	79	9.68	8.8%	79
Student	21	9.05	2.3%	21
Others	42	10.69	4.7%	42

Business Q4(f)- SB, BT and LT in Kgs Vs Education Qualification

Techniques :

Descriptive Stats, Hypothesis, ANOVA table and Crosstabulation

All the total weight (SB, BT and LT) in Kgs significance to Education Qualification Towards buying behavior is equal or not equal ?

Hypothesis:

- H0
  - Total weight (SB, BT and LT) in Kgs Education Qualification = total weight (SB, BT and LT) in Kgs Education Qualification
- H1
  - Total weight (SB, BT and LT) in Kgs Education Qualification != total weight (SB, BT and LT) in Kgs Education Qualifications

Insights :

- Based on the population Education Qualification are not Similar
- In total population 44% of people is professionals and 36% people are post graduates
- Based on the Anova table there is a significance for Education Qualification and buying behaviours
- Buying behavior is not similar for all the tests in Education Qualifications
- Alternative hypothesis is Accepted (H1)

ANOVA Table: (Analysis of variance)

ANOVA : SB, BT and LT in Kgs Vs Education Qualification

		Sum of Squares	df	Mean Square	F	Sig.
Store Brand Total Weight in Kgs	Between Groups	10201.702	3	3400.567	45.203	.000
	Within Groups	67404.977	896	75.229		
	Total	77606.679	899			
Branded Total weight in Kgs	Between Groups	804.938	3	268.313	19.641	.000
	Within Groups	12240.374	896	13.661		
	Total	13045.312	899			
Loose Total Weight in Kgs	Between Groups	3340.872	3	1113.624	38.779	.000
	Within Groups	25730.316	896	28.717		
	Total	29071.188	899			

Cross tabulation:

Education qualification	Count	Mean	Column N %	Total N
Professional	400	8.94	44.4%	400
Post Graduation	320	10.72	35.6%	320
Graduation	150	10.92	16.7%	150
Inter/SSC	30	11.43	3.3%	30