

Perception of Males & Females on Organized Retailing: A Statistical Analysis

Dr. D. B Singh, Director, RSMT, U P College Varanasi

1.0 Introduction

The retail industry has played a vital role across the globe in enhancing the production level of goods and services. Indian retail industry has been one of the best performing industries represented by several big corporate houses and MNCs. The retail sector is classified into two groups: Organised and Non-organised sectors. Organised retailing is defined as the trading and commercial activities of licensed retailers. By licensed retailers we mean those who pay SGST, CGST. The organized retail may include the hypermarkets and retail chains that are corporate-backed. Non-organised retailing may refer to the traditional low-cost retail outlets such as *kirana* shops, privately controlled grocery and provision stores, beetle shops, departmental stores and roadside vendors. The organized retail market in India is rising at a very high pace due to growth in **India retail** as such. The size of Indian retail industry in 2005 was to the tune of Rs 10,000 billion that in turn accounted for approximately 10% of **GDP**. The size of organized retail, out of overall retail market stood approximately for Rs 350 billion that accounts for 3.5%. This perceptible and consistent growth in the Indian organized retail market is primarily due to the behavioural change of the consumers that is manifested because of following factors:

- 1. The dominant growth of middle class:** The ever rising demand and more disposable income have provided better opportunities to retail industries to grow. The organized retailers may offer wide range of products / services to the customers.
- 2. Increase in the number of working women:** Today Indian women are more literate, qualified and independent. They have become decision makers in certain category of products / services. The purchase behavior of women is different from the men.
- 3. The evolution of consumerism:** The consumerism may be the prime driver and cause for the rise of organized retail. Because of more incomes and improved infrastructure the consumer markets are gaining strength and in a way are giving fuel to consumerism.
- 4. Emergence and Evolution of rural market:** Indian rural market is changing at a fast pace. The rural customers have also become quality conscious. The retail industry has become the biggest employment provider after agriculture sector. Thus it intends to have strong penetration in the Indian rural market.
- 5. The Entry of Indian corporate sector:** Large corporate houses such as Reliance, Tata, RPG, Birla, and ITC etc. have invested in Indian retail market. Needless to say they are capable to offer quality products.
- 6. The Entry of foreign players:** The retail sector is grabbing the attention of foreign players as well. Because of liberalization, MNCs and TNCs have entered the retail sector through JVs, Licensing and franchising.
- 7. Technological developments:** The development and refinement of technology could be one of the factors responsible for the rise of organized retailing in India. The computers (or PCs), EDI, MIS etc. have transformed the retailing. Because of the introduction of Bar Codes more transparency is there. The Internet has further increased it.

8. Increase in income: Rising income levels and better education facilities have resulted in the evolution of organized retail set up. People are trying new things and want to look different.

9. Role of Media: The satellite TV and CATV has made the reach of TV possible to almost every household in India. As a result the expectations of the Indian consumers have been on the rising spree.

2.0 Objectives

The specific objectives of this paper are: to study the perception of Indian retail customer and to examine the emerging trends in Indian retailing. It has also been the main objective to see if there is remarkable difference between the responses of males and females with reference to organized retailing and the relevant parameters.

3.0 Research Methodology

Present paper is based on a survey on customer perception on organized retailing in Varanasi (Uttar Pradesh, India). The data is gathered by means of a structured questionnaire. This has helped significantly in recording the responses. However the responses have been taken from the respondents in open environment. There have been open ended and close ended questions in the questionnaire. We have conducted the survey in Varanasi. It is considered to be the ancient city of the world and has a spread from the banks of holy river Ganga to river Varuna. It is some 280 km away from Lucknow, the capital of Uttar Pradesh. We have contacted **100** respondents in Varanasi. The respondents were taken from various segments. The various segments that we considered are **Education, Gender, Age Group, Occupation, and Income** (in Rs.).

4.0 Hypotheses: The hypotheses that have been tested under the study are mentioned below.

Null Hypothesis H₀₀₁: Organized retailers have larger inventories of groceries than small grocery shops

Alternative Hypothesis H₁₀₁: Organized retailers don't have larger inventories of groceries than small grocery shops

Null Hypothesis H₀₀₂: Organized retailers have huge space and they are not crowded

Alternative Hypothesis H₁₀₂: Organized retailers don't have huge space and they are crowded

Null Hypothesis H₀₀₃: Customers visit organized retailer whenever they need some enjoyment.

Alternative Hypothesis H₁₀₃: Customers don't visit organized retailer for the enjoyment.

Null Hypothesis H₀₀₄: Customers visit only one organized retailer or bazaar.

Alternative Hypothesis H₁₀₄: Customers visit more than one organized retailer or bazaar

Null Hypothesis H₀₀₅: Customers visit the organized retailer because it works ethically about products/services.

Alternative Hypothesis H₁₀₅: Customers consider the organized retailer as unethical about their products/services.

Null Hypothesis H₀₀₆: Customers visit the organized retailer because of the freshness of grocery

Alternative Hypothesis H₁₀₆: Customers don't visit the organized retailer because the grocery items are not fresh

Null Hypothesis H₀₀₇: Customers visit organized retailer for the time pass.

Alternative Hypothesis H₁₀₇: Customers don't visit organized retailer for the time pass.

Null Hypothesis H₀₀₈: Customers visit the particular organized retailer because it gives discounts on MRP.

Alternative Hypothesis H₁₀₈: Customers don't visit the particular organized retailer for the discounts on MRP

Null Hypothesis H₀₀₉: Customers visit organized retailer because their prices are economical and affordable

Alternative Hypothesis H₁₀₉: Customers visit organized retailer because their prices are economical and affordable

Null Hypothesis H₀₁₀: Customers visit the organized retailer because of new price offers / discounts offered

Alternative Hypothesis H₁₁₀: Customers don't visit the organized retailer because of new price offers / discounts offered

Null Hypothesis H₀₁₁: Customers visit the organized retailer because it gives special discounts at the time of festival

Alternative Hypothesis H₁₁₁: Customers don't visit the organized retailer because of special discounts at the time of festival

5.0 Data Compilation

The respondents both males and females gave their opinions on different questions, as below.

Table 1: The Responses of Males and Females on Various Parameters

No.	Parameters	Males (35)		Females (65)		Total
		Yes	%age	Yes	%age	
1.	Organized retailers have larger inventories of groceries than small grocery shops	27	77	44	68	71
2.	Organized retailers have huge space and they are not crowded	29	83	39	60	68
3.	Customers visit organized retailer whenever they need some enjoyment	14	40	31	48	45
4.	Customers visit only one organized retailer or bazaar	18	51	33	51	51
5.	Customers visit the organized retailer because it works ethically about products/services	28	80	45	69	73
6.	Customers visit the organized retailer because of the freshness of grocery	31	88	44	68	75
7.	Customers visit organized retailer for the time pass	09	26	12	18	21
8.	Customers visit the particular organized retailer because it gives discounts on MRP	25	71	51	78	76
9.	Customers visit organized retailer because their prices are economical and affordable	33	94	48	74	81
10.	Customers visit the organized retailer because of	31	88	50	77	81

	new price offers / discounts offered					
11.	Customers visit the organized retailer because it gives special discounts at the time of festival	32	91	46	71	78

6.0 ANOVA

We have used ANOVA to find whether male and female have significant differences on various factors.

Sl. No.	Response Types	RESPONSES (In Percentage)		Mean Dev.	Dev Squared	Mean Dev.	Dev Squared
		Male	Female				
1	The retailers have larger inventories of groceries	77	68	5	25	6	36
2	The retailers have huge space and are not crowded	83	60	11	121	-2	4
3	Customers visit retailer for enjoyment	40	48	-32	1024	-14	196
4	Customers visit only one retailer or bazaar	51	51	-21	441	-11	121
5	The organized retailers work ethically	80	69	8	64	7	49
6	Customers visit retailer for freshness of grocery	88	68	16	256	6	36
7	Customers visit the retailer for the time pass	26	18	-46	2116	-44	1936
8	Customers visit retailers for discounts on MRP	71	78	-1	1	16	256
9	Retailers charge economical and affordable prices	94	74	22	484	12	144
10	Retailers announce new price offers / discounts	88	77	16	256	15	225
11	Retailers give special festive discounts	91	71	19	361	9	81
	Total	789	682	-3	5149	0	3084
	Average	72	62				
	Overall Average	65.50					
	Total Variation	8233					
	Diff between column av and overall average	6.5	3.5				
	Square of Diff	42.25	12.25				
	Square of Diff X No. of Rows	464.75	134.75				
	Variation between column means	599.5					
	Variation within each columns	7633					
	Total d.f.	22					
	Between Col. d.f.	1					
	Unexplained d.f.	21					
	Estimated Variance between columns	599.5					
	Unexplained Variance		363.5				

Thus the Calculated value of F statistic $F_{cal} (1, 20) = 599/363.5 = 1.649$

Tabulated value of F statistic at the same d.f. at 5% level $F_{tab.} = 4.35$

Thus, $F_{cal.} (1, 20) < F_{tab.} (1, 20)$

The differences between the columns are insignificant and they can be attributed to sampling errors only

Comments: Thus it can be inferred that the responses given by the males and females have same impact. The differences, if any, are attributed to sampling errors only.

7.0 Chi Square Test

The Chi Square Test has been used to see whether there is significant difference between the responses of Males and Females on various parameters.

1. Organized retailers have larger inventories of groceries than small grocery shops

Attributes	Responses		Total
	Males (B)	Female (b)	
The retailers have larger inventories of groceries (A)	27	44	71
The retailers don't have larger inventories of groceries (a)	8	21	29
Total	35	65	100

Attribute	Observed O	Expected E	O - E	(O-E) ²	(O-E) ² / E
AB	27	24.85	2.15	4.6225	0.2
Ab	44	46.15	-2.15	4.6225	0.1
aB	8	10.15	-2.15	4.6225	0.5
ab	21	18.85	2.15	4.6225	0.2
Total					1.0

Total degrees of freedom = $(r-1)(c-1) = (2-1)(2-1) = 1$

Thus the calculated value of $\chi^2_{cal.}$ at 1 degree of freedom is **1.0**

Tabulated value of $\chi^2_{tab.}$ at 1 d. f. at 5% level of significance is **3.841**, Therefore, $\chi^2_{tab.} > \chi^2_{cal.}$

The difference between the responses of males and females, that the organized retailers have larger inventories in comparison to smaller shops has been insignificant and the differences, if any, can be attributed to sampling errors only.

Comment 1: It can be inferred that the responses of males and females, on the issue of larger inventories maintained by organized retailers, do not differ. It can further be inferred that the males and females both have confirmed that organized retailers maintain larger inventories.

2. Organized retailers have huge space and they are not crowded.

Attributes	Responses		Total
	Males (B)	Female (b)	
The retailers have huge space and they are not crowded (A)	29	39	68
The retailers don't have huge space and they are crowded (a)	6	26	32
Total	35	65	100

Attribute	Observed (O)	Expected (E)	O - E	(O-E) ²	(O-E) ² / E
AB	29	23.8	5.2	27.04	1.1
Ab	39	44.2	-5.2	27.04	0.6
aB	6	11.2	-5.2	27.04	2.4
ab	26	20.8	5.2	27.04	1.3
Total					5.5

Total degrees of freedom = $(r-1)(c-1) = (2-1)(2-1) = 1$

Thus the calculated value of $\chi^2_{cal.}$ at 1 degree of freedom is **5.5**

Tabulated value of $\chi^2_{tab.}$ at 1 d. f. at 5% level of significance is **3.841**, Therefore, $\chi^2_{tab.} < \chi^2_{cal.}$

The difference between the responses of males and females, that the organized retailers have huge space and are not crowded, has been significant and the differences cannot be attributed to sampling errors.

Comment 2: It can be inferred that the responses of males and females, on the issue of huge space occupied by organized retailers, do differ. It can further be inferred that the males and females have different and significant difference that organized retailers have huge space and are not crowded.

3. Customers visit organized retailer whenever they need some enjoyment.

Attributes	Responses		Total
	Males (B)	Female (b)	
Customers visit organized retailer whenever they need some enjoyment (A)	14	31	45
Customers don't visit organized retailer for enjoyment only (a)	21	34	55
Total	35	65	100

Attribute	Observed O	Expected E	O - E	(O-E) ²	(O-E) ² / E
AB	14	15.75	-1.75	3.0625	0.2
Ab	31	29.25	1.75	3.0625	0.1
aB	21	19.25	1.75	3.0625	0.2
ab	34	35.75	-1.75	3.0625	0.1
Total	100	100			0.5

Total degrees of freedom = $(r-1)(c-1) = (2-1)(2-1) = 1$

Thus the calculated value of $\chi^2_{cal.}$ at 1 degree of freedom is **0.5**

Tabulated value of $\chi^2_{tab.}$ at 1 d. f. at 5% level of significance is **3.841**, Therefore, $\chi^2_{tab.} > \chi^2_{cal.}$

The difference between the responses of males and females, that they visit organized retailers for enjoyment only has been insignificant and the differences, if any, can be attributed to sampling errors only.

Comment 3: It can be inferred that the responses of males and females, on the issue that they visit the organized retailers, for enjoyment only has been same or similar. It can further be inferred that the males and females both have confirmed that they don't visit the organized retailers for enjoyment only.

4. Customers visit only one organized retailer or bazaar.

Attributes	Responses		Total
	Males (B)	Female (b)	
Customers visit only one organized retailer or bazaar (A)	18	33	51
Customers don't visit only one organized retailer (a)	17	32	49
Total	35	65	100

Attribute	Observed O	Expected E	O -E	(O-E) ²	(O-E) ² / E
AB	18	17.85	0.15	0.0225	0.0
Ab	33	33.15	-0.15	0.0225	0.0
aB	17	17.15	-0.15	0.0225	0.0
ab	32	31.85	0.15	0.0225	0.0
Total	100	100			0.0

Total degrees of freedom = (r-1) (c - 1) = (2-1) (2 -1) = 1

Thus the calculated value of $\chi^2_{cal.}$ at 1 degree of freedom is **0.0**

Tabulated value of $\chi^2_{tab.}$ at 1 d. f. at 5% level of significance is **3.841**, Therefore, $\chi^2_{tab.} > \chi^2_{cal.}$

The difference between the responses of males and females, that they visit only one organized retailers has been insignificant and the differences, if any, can be attributed to sampling errors only.

Comment 4: It can be inferred that the responses of males and females, on the issue that they visit only one organized retailer, has been same or similar. It can further be inferred that the males and females both have confirmed that they don't visit only one organized retailer

5. Customers visit the organized retailer because it works ethically about products/services.

Attributes	Responses		Total
	Males (B)	Female (b)	
The retailer works ethically about products/ services (A)	28	45	73
The retailer because does not work ethically (a)	7	20	27
Total	35	65	100

Attribute	Observed (O)	Expected (E)	O -E	(O-E) ²	(O-E) ² / E
AB	28	25.55	2.45	6.0025	0.2
Ab	45	47.45	-2.45	6.0025	0.1
aB	7	9.45	-2.45	6.0025	0.6
ab	20	17.55	2.45	6.0025	0.3
Total	100	100			1.3

Total degrees of freedom = $(r-1)(c-1) = (2-1)(2-1) = 1$

Thus the calculated value of $\chi^2_{cal.}$ at 1 degree of freedom is **1.3**

Tabulated value of $\chi^2_{tab.}$ at 1 d. f. at 5% level of significance is **3.841**

Therefore, $\chi^2_{tab.} > \chi^2_{cal.}$

The difference between the responses of males and females, that they visit the organized retailer because it works ethically about products/services, has been insignificant. The differences, if any, can be attributed to sampling errors only.

Comment 5: It can be inferred that the responses of males and females, on the issue that the organized retailer because it works ethically about products/services, has been same or similar. It can further be inferred that the males and females both have confirmed that organized retailers work ethically about their products and services.

6. Customers visit the organized retailer because it works ethically about products/services.

Attributes	Responses		Total
	Males (B)	Female (b)	
The retailer provides freshness of grocery (A)	31	44	75
The retailer does not provide freshness of grocery (a)	4	21	25
Total	35	65	100

Attribute	Observed O	Expected E	O - E	(O-E) ²	(O-E) ² / E
AB	31	26.25	4.75	22.5625	0.9
Ab	44	48.75	-4.75	22.5625	0.5
aB	4	8.75	-4.75	22.5625	2.6
ab	21	16.25	4.75	22.5625	1.4
Total	100	100			5.3

Total degrees of freedom = $(r-1)(c-1) = (2-1)(2-1) = 1$

Thus the calculated value of $\chi^2_{cal.}$ at 1 degree of freedom is **5.3**

Tabulated value of $\chi^2_{tab.}$ at 1 d. f. at 5% level of significance is **3.841**, Therefore, $\chi^2_{tab.} > \chi^2_{cal.}$

The difference between the responses of males and females, that they visit the organized retailer because of the freshness of grocery, has been insignificant. The differences, if any, can be attributed to sampling errors only.

Comment 6: It can be inferred that the responses of males and females, on the issue that they visit the organized retailer because of the freshness of grocery, has been the same or similar. It can further be inferred that the males and females both have confirmed that organized retailers provide fresh groceries.

7. Customers visit organized retailer for the time pass.

Attributes	Responses		Total
	Males (B)	Female (b)	
Customers visit organized retailer for time pass (A)	9	12	21
Customers don't visit for the time pass only (a)	26	53	79
Total	35	65	100

Attribute	Observed O	Expected E	O -E	(O-E) ²	(O-E) ² / E
AB	9	7.35	1.65	2.7225	0.4
Ab	12	13.65	-1.65	2.7225	0.2
aB	26	27.65	-1.65	2.7225	0.1
ab	53	51.35	1.65	2.7225	0.1
Total	100	100			0.7

Total degrees of freedom = (r-1) (c - 1) = (2-1) (2 -1) = 1

Thus the calculated value of $\chi^2_{cal.}$ at 1 degree of freedom is **0.7**

Tabulated value of $\chi^2_{tab.}$ at 1 d. f. at 5% level of significance is **3.841**

Therefore, $\chi^2_{tab.} > \chi^2_{cal.}$

The difference between the responses of males and females, that they visit organized retailers for time pass only has been insignificant and the differences, if any, can be attributed to sampling errors only.

Comment 7: It can be inferred that the responses of males and females, on the issue that they visit the organized retailers, for time pass only has been same or similar. It can further be inferred that the males and females both have confirmed that they don't visit the organized retailers for time pass only.

8. Customers visit the particular organized retailer because it gives discounts on MRP.

Attributes	Responses		Total
	Males (B)	Female (b)	
The particular retailer gives discounts on MRP (A)	25	51	76
The discounts on MRP only, is not the issue (a)	10	14	24
Total	35	65	100

Attribute	Observed O	Expected E	O -E	(O-E) ²	(O-E) ² / E
AB	25	26.6	-1.6	2.56	0.1
Ab	51	49.4	1.6	2.56	0.1
aB	10	8.4	1.6	2.56	0.3
ab	14	15.6	-1.6	2.56	0.2
Total	100	100			0.6

Total degrees of freedom = $(r-1)(c-1) = (2-1)(2-1) = 1$

Thus the calculated value of $\chi^2_{cal.}$ at 1 degree of freedom is **0.6**

Tabulated value of $\chi^2_{tab.}$ at 1 d. f. at 5% level of significance is **3.841**

Therefore, $\chi^2_{tab.} > \chi^2_{cal.}$

The difference between the responses of males and females, that they visit the particular organized retailer because it gives discounts on MRP, has been insignificant. The differences, if any, can be attributed to sampling errors only.

Comment 8: It can be inferred that the responses of males and females, on the issue that they visit the particular organized retailer because it gives discounts on MRP, has been the same or similar. It can further be inferred that the males and females both have confirmed that organized retailers give discounts on MRP.

9. Customers visit organized retailer because their prices are economical and affordable.

Attributes	Responses		Total
	Males (B)	Female (b)	
The prices are economical and affordable (A)	33	48	81
Economical and affordable prices are not the only issues (a)	2	17	19
Total	35	65	100

Attribute	Observed O	Expected E	O - E	(O-E) ²	(O-E) ² / E
AB	33	28.35	4.65	21.6225	0.8
Ab	48	52.65	-4.65	21.6225	0.4
aB	2	6.65	-4.65	21.6225	3.3
ab	17	12.35	4.65	21.6225	1.8
Total	100	100			6.2

Total degrees of freedom = $(r-1)(c-1) = (2-1)(2-1) = 1$

Thus the calculated value of $\chi^2_{cal.}$ at 1 degree of freedom is **6.2**

Tabulated value of $\chi^2_{tab.}$ at 1 d. f. at 5% level of significance is **3.841**, Therefore, $\chi^2_{tab.} < \chi^2_{cal.}$

The difference between the responses of males and females, that they visit organized retailer because their prices are economical and affordable, has been significant. The differences, if any, cannot be attributed to sampling errors only.

Comment 9: It can be inferred that the responses of males and females, on the issue that they visit organized retailer because their prices are economical and affordable, has been different or not the same. It can further be inferred that the males and females both have different level or degree of opinion on this issue.

10. Customers visit the retailer because the prices are economical and affordable.

Attributes	Responses		Total
	Males (B)	Female (b)	
New price / discounts are offered (A)	31	50	81
New price / discounts are offered are not the only issues (a)	4	15	19
Total	35	65	100

Attribute	Observed (O)	Expected (E)	O - E	(O-E) ²	(O-E) ² / E
AB	31	28.35	2.65	7.0225	0.2
Ab	50	52.65	-2.65	7.0225	0.1
aB	4	6.65	-2.65	7.0225	1.1
ab	15	12.35	2.65	7.0225	0.6
Total	100	100			2.0

Total degrees of freedom = (r-1) (c - 1) = (2-1) (2 -1) = 1

Thus the calculated value of $\chi^2_{cal.}$ at 1 degree of freedom is **2.0**

Tabulated value of $\chi^2_{tab.}$ at 1 d. f. at 5% level of significance is **3.841**, Therefore, $\chi^2_{tab.} > \chi^2_{cal.}$

The difference between the responses of males and females, that they visit the particular organized retailer because of new price offers / discounts offered, has been insignificant. The differences, if any, can be attributed to sampling errors only.

Comment 10: It can be inferred that the responses of males and females, on the issue that they visit the particular organized retailer because of new price offers / festive discounts offered, has been the same or similar. It can further be inferred that both the males and females have confirmed that organized retailers do offer new prices and festive discounts.

11. Customers visit the particular organized retailer because it gives special discounts at the time of festival.

Attributes	Responses		Total
	Males (B)	Female (b)	
Festive discounts are offered (A)	32	46	81
Festive discounts offers are not the only issues (a)	3	19	19
Total	35	65	100

Attribute	Observed (O)	Expected (E)	O - E	(O-E) ²	(O-E) ² / E
AB	32	27.3	4.7	22.09	0.8
Ab	46	50.7	-4.7	22.09	0.4
aB	3	7.7	-4.7	22.09	2.9
ab	19	14.3	4.7	22.09	1.5
Total	100	100			5.7

Total degrees of freedom = $(r-1)(c-1) = (2-1)(2-1) = 1$

Thus the calculated value of $\chi^2_{cal.}$ at 1 degree of freedom is **6.2**

Tabulated value of $\chi^2_{tab.}$ at 1 d. f. at 5% level of significance is **3.841**, Therefore, $\chi^2_{tab.} < \chi^2_{cal.}$

The difference between the responses of males and females, that they visit organized retailer because new price offers / discounts offered, has been significant. The differences, if any, cannot be attributed to sampling errors only.

Comment 11: It can be inferred that the responses of males and females, on the issue that they visit organized retailer because new price offers / discounts offered, has been different or not the same. It can further be inferred that the males and females both have different level or degree of opinion on this issue.

8.0 Correlation Coefficient (r)

The correlation coefficient between the response of males and females is to be calculated.

Attributes	Responses		$D_x = (X_i - \mu_x)$	$D_y = (Y_i - \mu_y)$	D_x^2	D_y^2	$D_x * D_y$
	Males (X)	Females (Y)					
The retailers have larger inventories of groceries	77	68	5	6	25	36	30
The retailers have huge space and are not crowded	83	60	11	-2	121	4	-22
Customers visit retailer for enjoyment	40	48	-32	-14	1024	196	448
Customers visit only one retailer or bazaar	51	51	-21	-11	441	121	231
The organized retailers work ethically	80	69	8	7	64	49	56
Customers visit retailer for freshness of grocery	88	68	16	6	256	36	96
Customers visit the retailer for the time pass	26	18	-46	-44	2116	1936	2024
Customers visit retailers for discounts on MRP	71	78	-1	16	1	256	-16
Retailers charge economical and affordable prices	94	74	22	12	484	144	264
Retailers announce new price offers / discounts	88	77	16	15	256	225	240
Retailers give special festive discounts	91	71	19	9	361	81	171
Total	789	682	-3	0	5149	3084	3522
Average (Total / 11)	$\mu_x = 72$	$\mu_y = 62$			468.09	280.36	320.18
	$\sigma_x = 21.63$	$\sigma_y = 16.74$			Cov. (X, Y) = 320.18		

Correlation Coefficient $r_{(x,y)} = \text{Cov}(x, y) / \sigma_x \cdot \sigma_y$

Whereas,

$\text{Cov}(x, y) = \sum N (x_i - \mu_x) (y_i - \mu_y) / N = \mathbf{320.18}$

Standard Deviation $\sigma_x = \sqrt{\sum (x_i - \mu_x)^2 / N} = \mathbf{21.63}$

Standard Deviation $\sigma_y = \sqrt{\sum (y_i - \mu_y)^2 / N} = \mathbf{16.74}$

Thus Correlation Coefficient $r_{(xy)} = 320.18 / 21.63 * 16.74$
 $= \mathbf{+0.88}$

Coefficient of Determination, $D_{xy} = (r_{(xy)})^2$
 $= \mathbf{0.77}$

Testing for the significance of the correlation coefficient, r

When the test is against the null hypothesis: $r_{xy} = 0.0$

What is the likelihood of drawing a sample with $r_{xy} = 0.0$?

The sampling distribution of r is

- Approximately **normal** (but bounded at -1.0 and +1.0) when N is **large**
- And distributes **t** when N is **small**.

The simplest formula for computing the appropriate **t value** to test significance of a correlation coefficient employs the t distribution:

$$t = r \sqrt{(n-2) / (1-r^2)}$$

$$t = 0.88 * \sqrt{(9.0 / .77)}$$

$$= .88 * 6.26$$

$$\mathbf{t_{cal} = 5.50}$$

The **degrees of freedom** for entering the t-distribution is $= N - 2$
 $= 11 - 2 = \mathbf{9}$

For 9 df and one-tailed test, critical value of $t_{tab} = \mathbf{1.83}$ (At 5% Level of Significance)

- We observe only $t_{cal} = \mathbf{5.5}$
- It lies **above** the critical t of 1.83
- So the null hypothesis of no relationship in the population of the same type ($r = 0$) **can** be rejected. Thus there is the strong relationship in the population as well as reflected in the sample.

9.0 The Findings and the Inferences Drawn From the Test Statistics:

We have applied Z Test Statistic, χ^2 Test, ANOVA and Correlation Coefficient to draw inferences. The Z Test have given a wide picture whereas other tests have examined whether the males and females have the same or different responses on various issues. The various Hypotheses and the inferences drawn out of different statistics are presented in the table below. The ANOVA and Correlation coefficient gives the overall picture. All the tests have been conducted at 5% level of significance. The ANOVA and Correlation Coefficient have established that the responses of Males and Females in the sample have the same impact and they are highly correlated. It was further inferred that the samples are true representation of the population. In the analysis we have used Student's t distribution, Fischer's F distribution, Standard Normal variate Z distribution and χ^2 distributions (All at 5% level of significance)

Hypothesis	Inferences Drawn			
	Z Test	χ^2 Test	ANOVA	Correlation Coefficient
The retailers have larger inventories of groceries	Organized retailers have larger inventories in comparison to grocery shops	Males and Females don't differ on this issue	The ANOVA test statistic establishes that the responses given by the males and females have same impact. The differences, if any, are attributed to sampling errors only.	There is strong relationship between the responses of males and females in the sample drawn from the population. It can be further inferred that the same relationship is there in the population as well. Thus the responses of males and females can be considered to be true representation of the population.
The retailers have huge space and are not crowded	The organized retailers have huge space and are not crowded	Males and Females differ on this issue		
Customers visit retailer for enjoyment	The customers don't visit the organized retail outlets for enjoyment	Males and Females don't differ on this issue		
Customers visit only one retailer or bazaar	The customers don't visit only one retail outlet or Bazaar	Males and Females don't differ on this issue		
The organized retailers work ethically	The organized retailers work ethically on their products or services	Males and Females don't differ on this issue		
Customers visit retailer for freshness of grocery	The organized retailers provide fresh grocery products	Males and Females don't differ on this issue		
Customers visit the retailer for the time pass	The customers don't visit organized retailers for time pass	Males and Females don't differ on this		
Customers visit retailers for discounts on MRP	The customers visit organized retailers because of discounts on MRP only	Males and Females don't differ on this issue		
Retailers charge economical and affordable prices	The organized retailers charge affordable and economical prices on their products and services	Males and Females differ on this issue		
Retailers announce new price offers/ discounts	The organized retailers because they get new offers and special discounts	Males and Females don't differ on this issue		
Retailers give special festive discounts	The organized retailers because they get festive offers	Males and Females differ on this issue		

10.0 Conclusion:

The retailing in India, especially the organized retailing has gained momentum in post liberalization era. The organized retailing has become more pronounced in last one decade. The policies of respective governments and local issues have been there. It was quite relevant to study the perception of customers on the organized retailing as the most of the retailing in India is in Non-Organized sector. Traditionally the *Kirana Stores* or beetles shops have been the major proponents of retailing. Even today the organized retailing has just 4% market share. This pronounces for great opportunities and the challenge at the same time. The perception of customers does indicate about the trend of retailing. However in the present study we tried to measure, statistically though the relationship and impact of perceptions of Men and Women for organized retailing. The findings have been tabulated in Section 9.0. The statistical analysis has also established that the samples have represented the population. Thus the study has further established that the findings can be extended to the population.

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