Statistical Analysis of Shift of Trend from Local Kirana Stores to E-Commerce Sites Via Supermarkets

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Abstract: **Since early 1900's Indians depended on the local Kirana shops for fulfilling their grocery needs but in early 2000's with the emergence of supermarket stores like Dmart there was a shift in the consumer preference and this led to a decrease in the popularity of local Kirana stores. Lucrative offers, huge discounts and availability of a variety of range of products in a single store led to the increase in popularity of the Supermarket stores. However, in the pandemic due to easy returns, cashless payment options, convenient and safe home delivery e-commerce giants like Amazon and others have gained more popularity than ever before over these conventional methods of grocery shopping. The main aim of the research is to analyze the factors responsible for the popularity of e-commerce giants and shift in preference of consumers from supermarkets to online grocery stores, its impact on the local Kirana shops and a prediction of future consumer preference. The research also aims in analyzing the seasonal variation in the discount offers given by the shops and making the consumers aware of such strategies. The research aims at providing solutions to the Kirana store owners to boost their sales.**

Index Terms: **Chi-Square Test, E-commerce sites, Kirana, Supermarket, Regression.**

I. INTRODUCTION

With exponential growth in internet and network infrastructure in India the e-commerce market has experienced a boost. Government policies, increased accessibility to remote areas and the pandemic has increased the number of online buyers significantly. According to India Brand and Equity Foundation, the Indian e-commerce will reach to US $99 billion by 2024 growing at 24% CAGR over 2019-24 with grocery and fashion/apparel likely to be the key drivers. This clearly indicates the rise in

the level of adoption of these services by the Indian consumers who were formerly in favor of buying grocery items from local Kirana stores or supermarket stores. Due to the global pandemic the E-commerce sites were able to expand their customer base and grow to much higher rates as compared to supermarkets and local kirana stores. Thus, the research aims at analyzing the factors behind the growth of e-commerce sites, the downfall of the popularity of supermarkets and local kirana stores, a study of the overall consumer preference and a prediction of the future consumer preference.

II. LITERATURE REVIEW

1. Baheti, V., & Kaushal, L. A. (2015). The analysis of consumers' attitudes towards online grocery shopping - A case study in Indian context. Research Journal of Social Science & Management.
2. Kumar, S., & Kumar Timalsina, A. (2016). Consumer Attitudes Towards Online Grocery Shopping in Kathmandu Valley. Proceedings of IOE Graduate Conference, 4.
3. Aggarwal, M. (2014, November). Escalating Development of E-Commerce in India. International Journal of Scientific Research, 3(11), 78-79

III. OBJECTIVE OF RESEARCH

To analyze the shift of consumer's preference from local kirana stores and supermarket stores to e-commerce sites and a prediction of their future preference.

IV.   RESEARCH METHODOLOGY

Data Collection-Primary data collected through structured Questionnaire. Secondary data collected through Government reports, websites, etc.

V.   SCALE AND TOOLS FOR ANALYSIS:

Nominal, ordinal, interval and ratio scales were used in the study to import the collected responses. Pearson's Chi-square test, two-way Anova and Likert Scale analysis were found out to be the most appropriate statistical tools to find answer to the research objectives
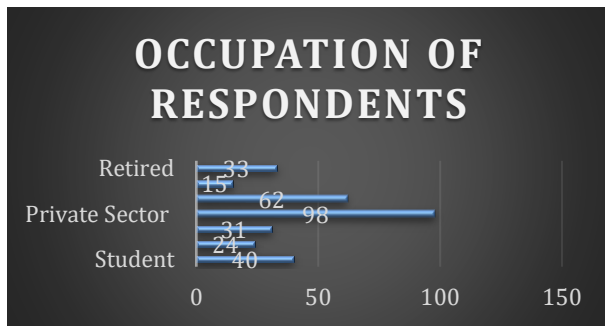
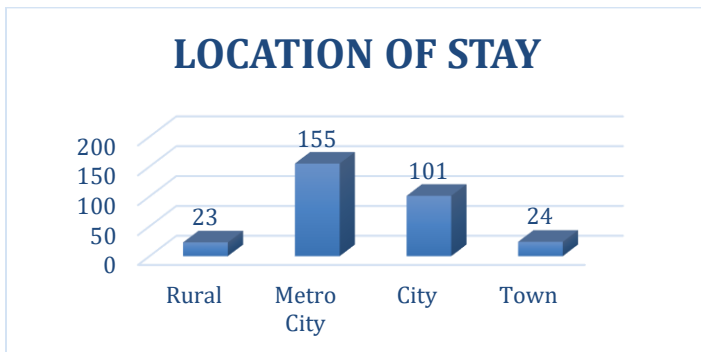## VI.   ANALYSIS AND RESULTS:

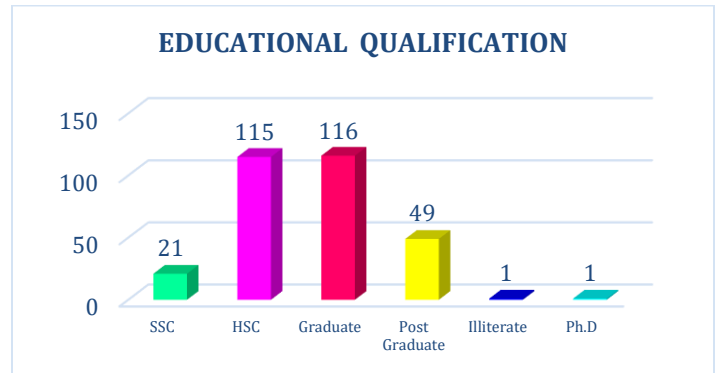**1)DEMOGRAPHIC ANALYSIS**
A)303 RESPONDENTS WERE SURVEYED.
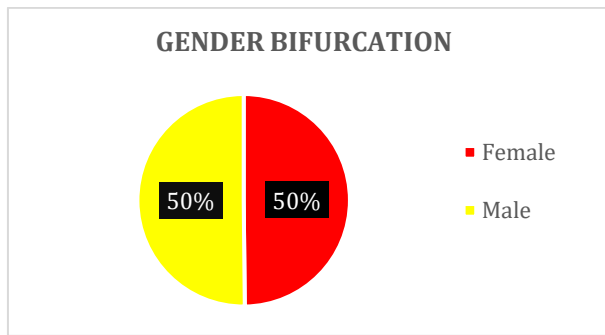
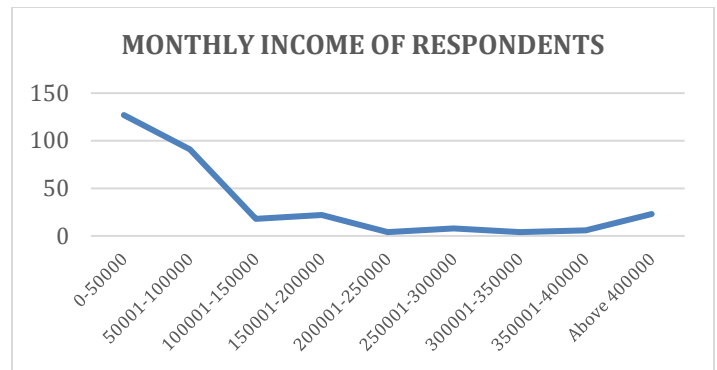**(fig. 1.1)**

(fig. 1.2)
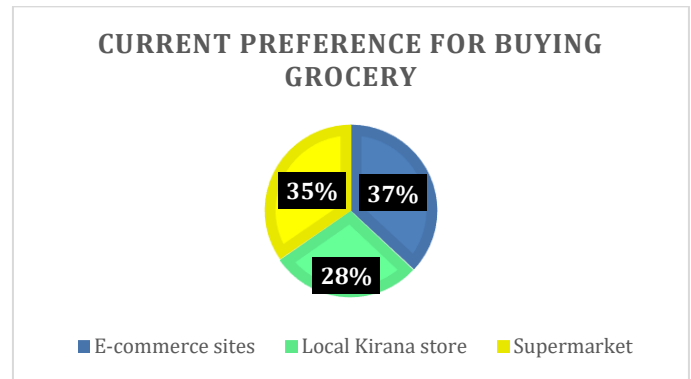

(fig. 1.3)

(fig. 1.4)

(fig. 1.5)

B) CURRENT PREFERENCE OF RESPONDENTS FOR BUYING GROCERY:

(fig. 1.6)

In the sample, a total of **35%** of respondents opted for Supermarket while **37%** opted for E-commerce sites and remaining **28%** opted for Local Kirana stores. This shows that how e-commerce sites are swiftly occupying the consumer space in a very short interval of time.

C) IS PREFERENCE OF SHOPPING METHOD DEPENDENT ON INCOME?

To answer we construct the following hypothesis:
Hypothesis:

H0-Preference Independent of Income

v/s

HI-Preference Dependent on Income

Pearson's Chi-squared test

(Table. 1.1)

Result Obtained : **X-squared** = 2.2099, **df** = 4, **p-value** =0.6972

As p value> 0.05 We Do Not Reject H0

Therefore, preference of shopping method is independent of income.

D) IS PREFERENCE OF SHOPPING METHOD DEPENDENT ON LOCATION OF STAY?

To answer we construct the following hypothesis:

Hypothesis:

Income/ Methods	E-commerce	Local Kirana	Supermarkets
0-50000	53	44	51
50001-100000	23	19	28
100001-above	36	23	26

H0-Preference Independent of Location

v/s

HI-Preference Dependent on Location

Pearson's Chi-squared test

| Location/ Methods	E-commerce	Local Kirana	Supermarkets
City	16	46	39
Metro City	67	29	59
Rural	19	3	1
Town	10	8	6

(Table. 1.2)

Result Obtained: **X-squared** = 52.366, **df** = 6, **p-value** = $1.574e^{-09}$

As p value<0.05 We Reject H0

Therefore, shopping preference is dependent on Location. That is why it is observed that the closer is a kirana store or a supermarket store from a person's house, more likely he is to purchase products from there. It is also observed that if these facilities are not available at close distances, it is likely for a consumer to opt for e-commerce sites to save time and transportation costs.

**E) CORRELATION BETWEEN INCOME AND EXPENDITURE ON GROCERY**
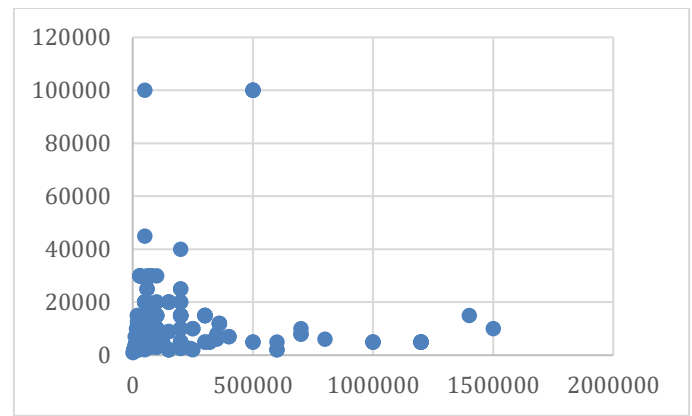
(fig. 1.7)

Correlation Coefficient=0.066724

We can conclude that there is a weak positive correlation between Income and expenditure on grocery. Therefore, higher the income the more likely a consumer is to spend more on grocery items.

**2)PERCEPTION OF RESPONDENTS TOWARDS LOCAL KIRANA STORES**

A) REASONS FOR OPTING KIRANA STORE BY 28% OF THE RESPONDENTS:
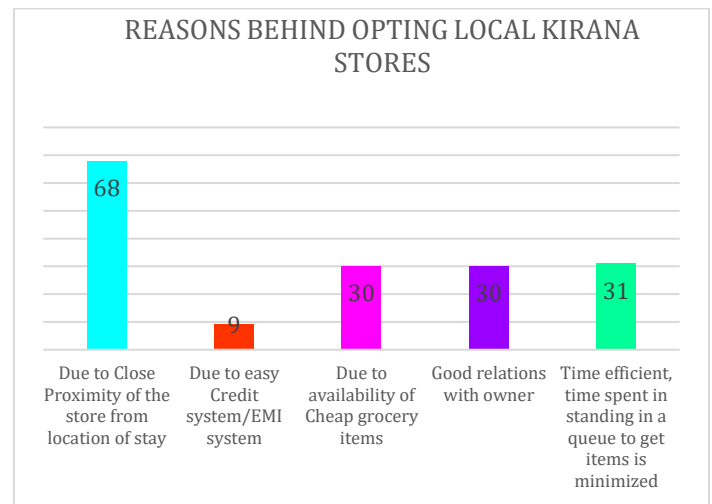

(fig. 2.1)

From the above graph it is evident that proximity of store from location of residence and time efficiency are the most important factors behind opting for local kirana stores by 28% of respondents.

B) ARE THE RESPONDENTS COMPLETELY DEPENDENT ON KIRANA STORES FOR THEIR GROCERY NEEDS?
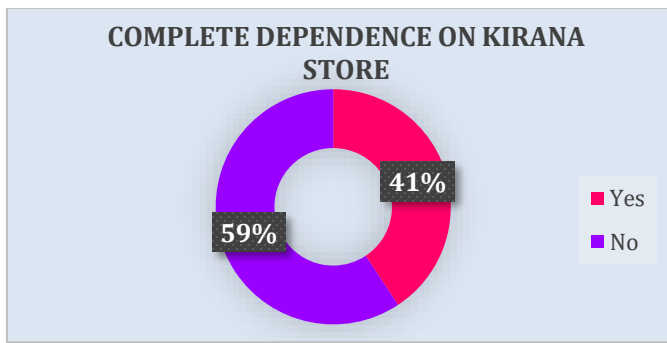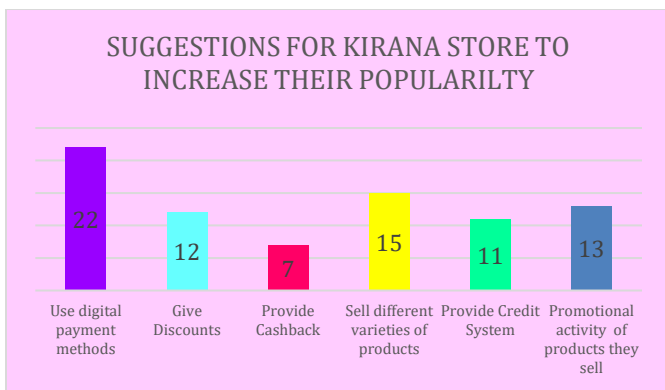
(fig. 2.2)

After the survey, we concluded that **59%** of the kirana shop users depend on other shopping methods to fulfil their needs. Few of the reasons for this are:
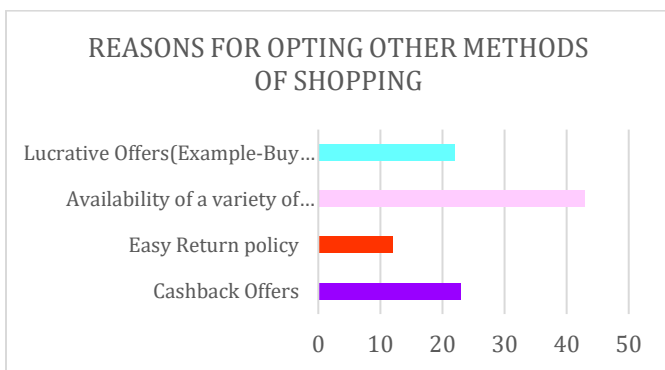
(fig. 2.3)

C) SUGGESTIONS FOR KIRANA STORES BY 59% OF RESPONDENTS WHO USE OTHER METHODS

(fig. 2.4)

Thus, we can conclude that using Digital Payments options is one of the key facilities that local kirana stores should opt to increase their popularity and be at par with the changing times apart from selling different varieties of products.

3)PERCEPTION OF RESPONDENTS TOWARDS SUPERMARKET STORES
A) MOST PREFERRED SUPERMARKET STORE:

(fig. 3.1)

Dmart is most preferred supermarket store followed by Reliance and Big Bazaar by **35%** of the respondents.

B) IS FREQUENCY OF VISITING SUPERMARKET STORE DEPENDENT ON THE LOCATION OF THE STORE FROM RESIDENCE?

To answer this, we construct the following Hypothesis.
Hypothesis:
H0-Preference Independent of Location
 v/s
 HI-Preference Dependent on Location
  Fisher's Exact Test for Count Data

|	1	2	3 and more
Within 5km	41	24	20
Within 10km	12	6	0
More than 10 km	2	0	0

(Table. 3.1)

Result Obtained: **p-value** = 0.07094
As p value> 0.05 We Do Not Reject H0
Thus, there is no association between frequency of visit and distance. Therefore, even if the supermarket store is located closer or is far respondents are more likely to visit it once or twice to buy monthly grocery.

C)IS THERE A VARIATION IN THE DISCOUNTS OFFERED BY SUPERMARKETS IN DIFFERENT PARTS OF THE MONTH?
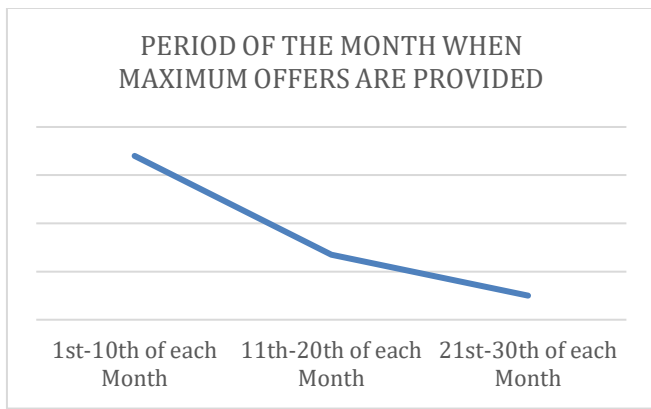
(fig. 3.2)

We can conclude that maximum offers are given in the beginning of the month to maximize the profit as the citizens are in better financial conditions. Least offers are observed during 11th -21st of each month. While again an increase in offers is observed at the month end.

D)ARE THE BUY 1 GET 1 FREE OFFERS A WAY TO ENTICE CUSTOMERS AND EARN MORE PROFITS?
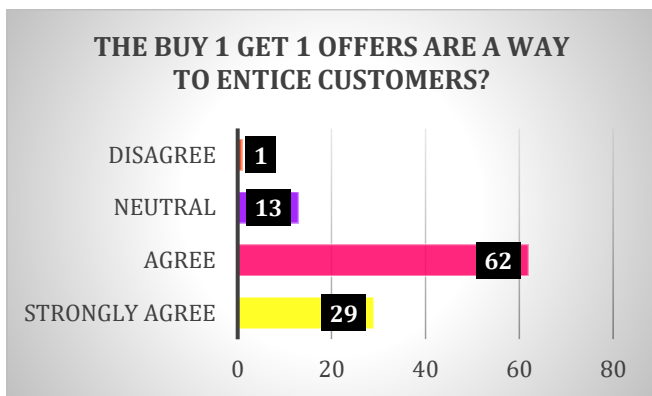
(fig. 3.3)

We can conclude that the Buy 1 Get 1 offers are a way to entice customers and lure them to buy more as majority of the respondents agreed with the notion. These are marketing tactics and consumer should be aware that it's a 50% off on the MRP of each of the two products and not buy 1 get 1 free.

E) CHOCOLATES AND OTHER ATTRACTIVE ITEMS OR ITEMS OF DAILY USE ARE PURPOSELY PLACED NEAR THE BILLING COUNTERS FOR ATTRACTING CUSTOMERS?
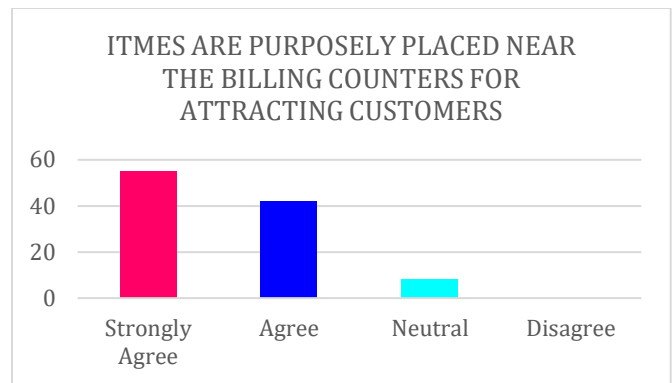
(fig. 3.4)

We can conclude that the respondents strongly agreed on this notion. Therefore, to increase sales, chocolates and other items of daily use are placed near the billing counters to increase the sales.

F) EFFECT OF COVID-19 ON SUPERMARKET STORES
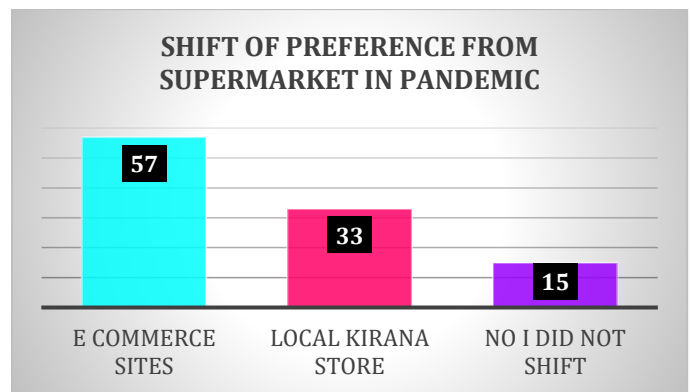
(fig. 3.5)

Due to Covid-19 a shift in preference is observed. Most of the supermarket customers shifted towards E-commerce sites and some shifted to Kirana stores. Safety issues and Avoiding Long queues were of the main reasons behind the sudden shift of preference.
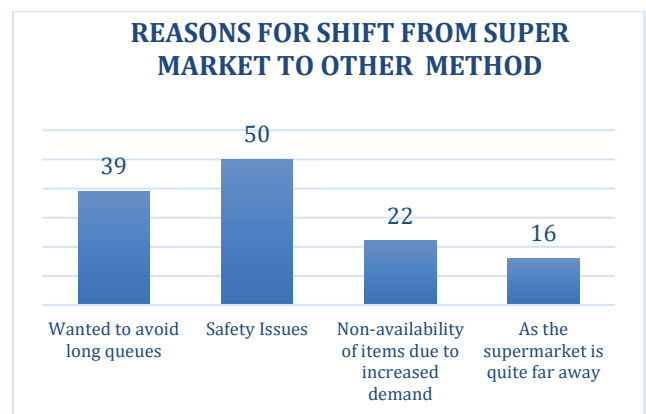
(fig. 3.6)

G) FACTORS FOR SHIFT OF CONSUMER PREFERENCE FROM SUPERMARKET STORES TO OTHER SHOPPING METHODS:

The factors considered are:

F1) Convenience (Close Proximity, Availability of different varieties of items in one place, Easy Returns)

F2) Value for Money (Cashback Offers, Lucrative Offers (Buy 1 get 1 free), High Quality Products)

F3) Impact of Covid-19(Inefficient in managing the crowd, especially during
Covid-19 protocols)

F4) Payment Discomfort (Non-availability of digital payment options, non-availability of cheap EMI options)

F5) Location (Store Location)

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.699
Bartlett's Test of Sphericity	Approx. chi-square	786.892
	df.	66
	Sig	.000

(Table. 3.2)

Variables	Factors				
	1	**2**	**3**	**4**	**5**
Close Proximity (Store located close to area of residence)	.783	.066	.093	.006	.078
Availability of different varieties of items in one place	.737	-.162	-.107	.283	.162
Easy Returns	.691	.104	.253	-.080	.058
Cashback Offers	-.034	.827	.029	.007	-.006
Lucrative Offers (Buy 1 get 1 free)	.151	.780	-.064	.030	.008
High Quality Products	-.245	.601	.204	.434	.036
Inefficient in managing the crowd, especially during pandemic	-.049	-.014	.853	.058	.086
Inefficiency in managing Covid-19 protocols	.300	.053	.738	.016	-.039
Non-availability of digital payment options	-.034	.124	-.003	.842	-.002
Non-availability of cheap EMI options	.314	-.007	.073	.587	.258
Located very far away	.069	.085	.048	.118	.901
Not available in rural and semi-rural areas	.469	-.119	.005	.056	.542

(Table. 3.3)

Conclusion: Hence we can conclude that the factors responsible for the shift of preference from Supermarkets are: Convenience, Value for Money, Impact of Covid-19, Payment Discomfort and Location.
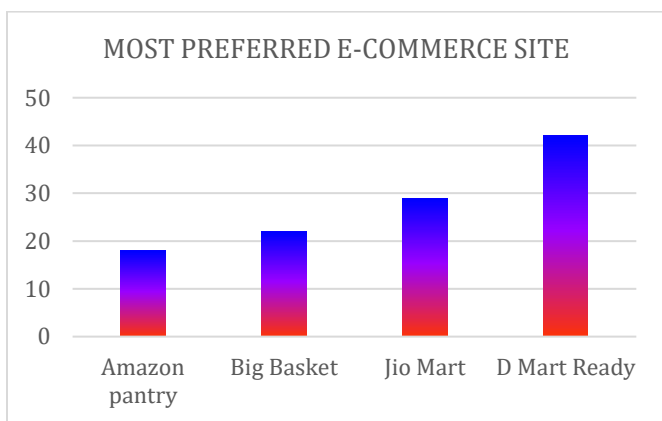
H) SUGGESTONS FOR SUPERMARKETS:

Managing Covid-19 protocols, managing crowd effectively and provide better offers are one of the key suggestions for improvement of supermarkets by the respondents.
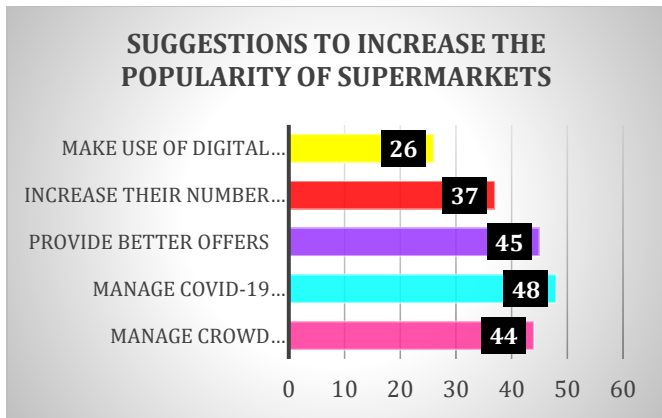
(fig. 3.7)

4)PERCEPTION OF RESPONDENTS TOWARDS E-COMMERCE SITES:

A) MOST PREFERRED E-COMMERCE SITE:

(fig. 4.1)

We conclude that DMart Ready and Jio Mart are the most preferred e-commerce sites followed by Big Basket and Amazon pantry.
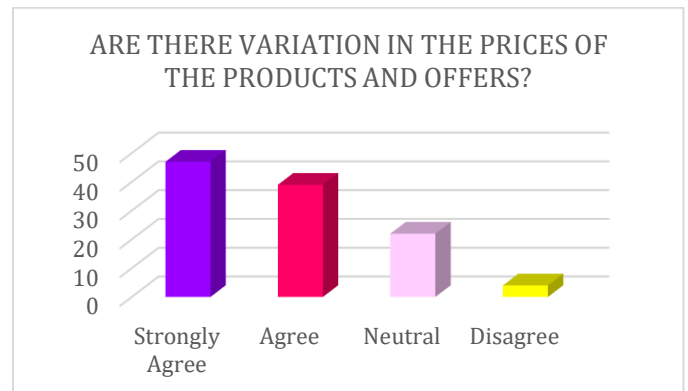
B) REASONS BEHIND OPTING E-COMMERCE SITES BY 37% OF THE RESPONDENTS:

(fig. 4.2)

Convenient Shopping, Better Offers and Easy Returns are one of the reasons behind opting e-commerce sites.

C) ARE THERE VARIATION IN OFFERS AND PRICE OF THE PRODUCTS DURING DIFFERENT PARTS OF THE MONTH?

(fig. 4.3)

To understand the variation better, a 2-way Anova was performed-
The following Hypothesis is constructed:
H_{oA}: There is no significant difference between Means of discount per week.
v/s
H_{1A}: There is a significant difference between Means of discount per week
H_{oB}: There is no significant difference between Means of offers by different e-commerce sites.
v/s
H_{1B}: There is significant difference between Means of offers by different e-commerce sites.

Source of Variation	SS	df	MS
Rows	5919.791667	3	1973.263889
Columns	1122.708333	5	224.5416667
Error	505.4583333	15	33.69722222
Total	7547.958333	23	

Ftab	P-value	F cal
58.55865139	1.63539E-08	3.287382105
6.663506718	0.001864779	2.901294536

(Table. 4.1)

As $F_{1\,tab} < F_{1cal}$ since 3.287382105<58.55865139 &
As $F_{2\,tab} < F_{2cal}$ since 2.901294536<6.663506718
Therefore, We Reject H_{oA} and H_{oB}.

Thus, there is a significant difference in discounts given by each e-commerce site per week. Also, there is a significant difference in the offers provided by different e-commerce sites.

D)COVID-19 AND SUDDEN BLOOM IN E-COMMERCE SITES FOR GROCERY SHOPPING:
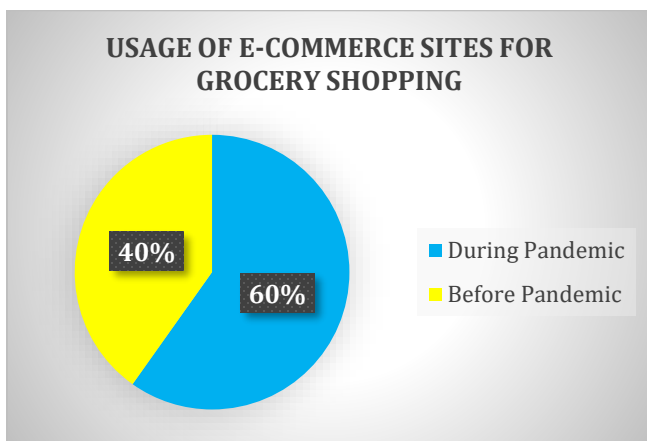

(fig. 4.4)

We can conclude that the usage of e-commerce sites for grocery shopping increased during the pandemic. Before the pandemic a total of 40% of respondents used e-commerce sites however during the pandemic, 60% of the respondents shifted towards e-commerce sites.
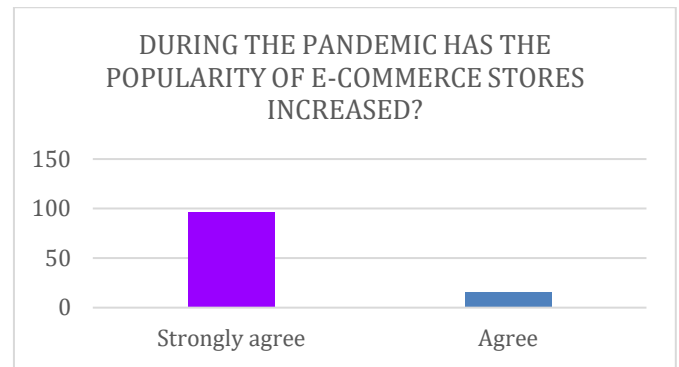
(fig. 4.5)

We can conclude that the popularity of e-commerce sites has increased during the pandemic due to safety reasons and consumer convenience. The graph below describes few of the key reasons behind the sudden shift of preference:
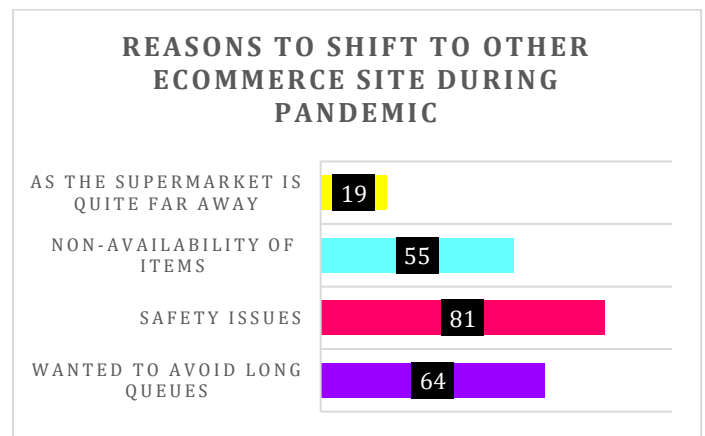
(fig. 4.6)

5)CONSUMER SATISFACTION FROM VARIOUS SHOPPING METHODS:

A) KIRANA STORES

	Likert scale value		
highly dissatisfied	4	1	4
dissatisfied	10	2	20
neutral	39	3	117
satisfied	28	4	112
highly satisfied	5	5	25
sum	86		278
		Likert	3.23255814

(Table. 5.1)

As the value obtained is greater than 3, we can conclude that the customers are satisfied by Local Kirana stores.

B) SUPERMARKET STORES

		Likert scale value	
highly dissatisfied	1	1	1
dissatisfied	2	2	4
neutral	25	3	75
satisfied	55	4	220
highly satisfied	22	5	110
sum	105		410
	Likert		3.904762

(Table. 5.2)

As the value obtained is greater than 3, we can conclude that the customers are satisfied by Supermarket stores.

C)E-COMMERCE SITES

|		Likert scale value	
highly dissatisfied	1	1	1
dissatisfied	2	2	4
neutral	30	3	90
satisfied	49	4	196
highly satisfied	30	5	150
sum	112		441
	Likert		3.9375

(Table. 5.3)

As the value obtained is greater than 3, we can conclude that the customers are satisfied by E-commerce sites.

CONCLUSION: From the Likert scale values it is evident that the customer satisfaction is highest for E-commerce sites followed by Supermarket stores and Local Kirana Stores.
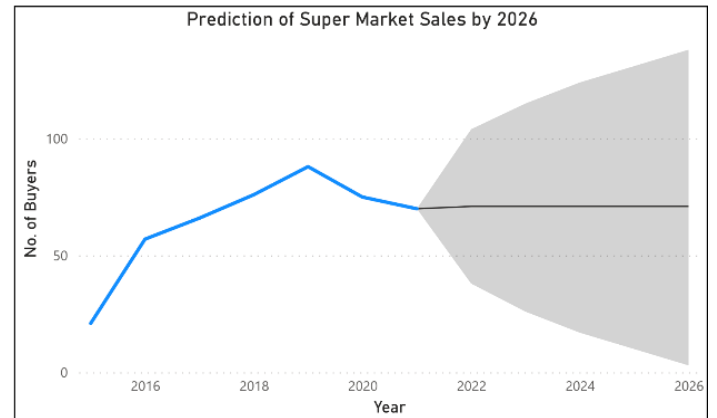
6)PREDICTION OF FUTURE PREFERENCE:

A study of the consumer preference was done and by applying the concept of Regression Analysis:

Kirana Stores:
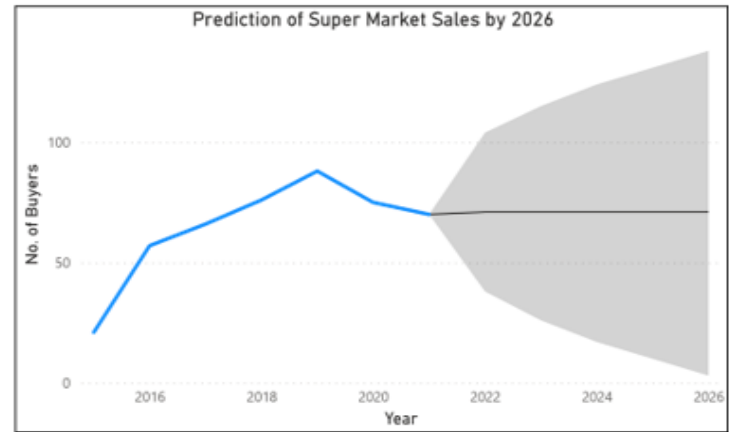
(fig. 6.1)

Supermarket Stores:

(fig. 6.2)

E-commerce Stores:

(fig. 6.3)

6)LIMITATIONS OF THE RESEARCH:

1) Small Sample size.

2) Lower representation of different economic sections of the society.

3) Lower representation of respondents from different geographical locations and rural areas.

4)Lack of previous studies on the topic.

5)Difficulties in data collection of senior citizens and citizens without technological devices due to the pandemic.

CONCLUSION

From the above regression analysis, it is evident that the E-commerce sites will grow spontaneously in the coming years. More and more consumers are likely to shift their preference from Kirana and Supermarket stores to E-commerce sites by 2026.

Therefore, Supermarket and Kirana stores should consider their limitations and act accordingly to stay in the competition.

Adopting Digital Payments options, providing better offers, providing convenient home delivery options are few of the key suggestions for increasing the growth of Supermarkets and local Kirana stores.

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  .

3)   https://www.caluniv.ac.in/dj/BS-Journal/vol-30/Impact_of_malls.pdf

4)   https://www.gartner.com/en/marketing/insights/daily-insights/the-rise-of-e-commerce-in-india#:~:text=The%20e%2Dcommerce%20sector%20has,rise%20of%2027%25%20annual%20growth%20.

5)   https://www.ibef.org/industry/ecommerce.aspx

6)   https://www.amazon.in/pantry-online-grocery-shopping-store/b?ie=UTF8&node=9574332031

7)   https://www.bigbasket.com/?utm_source=google&utm_medium=cpc&utm_campaign=Brand-MUM&gclid=Cj0KCQjw1dGJBhD4ARIsANb6Odk8G08eQRSG3vtzPqXSQazTg6wFaqu6tvuTaKbIMNBzSMTsjkXHz0QaAlxDEALw_wcB

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