

# **The Cafe Great Contest**

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# CONTENTS:

- *Products in the café*
- Total Sales and Billing Time
- The Contribution of a Category in Quantity Sold
- The Contribution of a Category in Revenue Generated
- Conclusion From Monthly Pattern in Quantity sold and Revenue Generated
- Total Number of Products Sold And Revenue Generated on Each week Day
- Number of Products of specific category Sold And Revenue Generated on Each weekday •
- Why Customers Visited cafe
- Categorizing Bill amount
- Spending Pattern in Beverage, Food, Liquor, tobacco, wine & its • combination
- Products and Price range
- Rate of products Vs. Number of Units sold for different products
- Best Selling products & Grading products Quantity sold wise.
- Best Selling products & Grading products Revenue Earned wise
- Best seller and Worst seller Product wise
- For Increasing Sale of Different Product

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## **EXECUTIVE SUMMARY**

- This report summarizes the statistical modeling and analysis results for Bangalore based Café. The purpose of this document is to present finding from the café's dataset to measures various trends in the café sales and use them to enhance the sales in coming future. Observational data is the Café's sales data collected for around 12 months. Dataset contains more than one lac of billing record for 5 quarters (from Jan 2010 to Mar 2011).
- Data has been analyzed to detect the different trends of sales and to get the best solution for increasing sales. SAS, MS excel has been used to analyze the trend in the 5 quarter of data with the help of graphs and charts. This report says there are various factors like peak hours, menu optimization and peak months in a year through which café sales can be increased.
- Bivariate Statistics used to summarize the association between total café sales with different variables like Billing Time, Date of billing, Item Desc, Billing ID and Product category. Also data has been analyzed to understand the menu preference from the customers.

# INTRODUCTION

The Report has been generated to analyze the Café data and come up with the best practice that can be followed to increase the Sales in future. Despite a lot of business potential like incredible spread menu items and prime location, Cafe is facing some issues in sales from last few quarters. So main purpose of this project was to analyze the café's data and to come up with best solution to improve the probability by either increasing sales or brought down cost by improving operational efficiency.

Dataset contains 145830 observations and 10 variables stating information like bill number, date and time of billing, total, item quantity, Item category, rate, total tax, discount value and total amount for that particular bill. Also data contains product and category wise sold item information.

In this report, analysis has been performed in different sections and each section contains analysis on different variables with total sales of café.

Section – 1:- Analysis has been performed to establish the relationship between time variable and total sales.

Section – 2:- Analysis has been performed to establish the relationship between category and total sales.

Section – 3:- Analysis has been performed to establish the relationship between Day of the week and total sales.

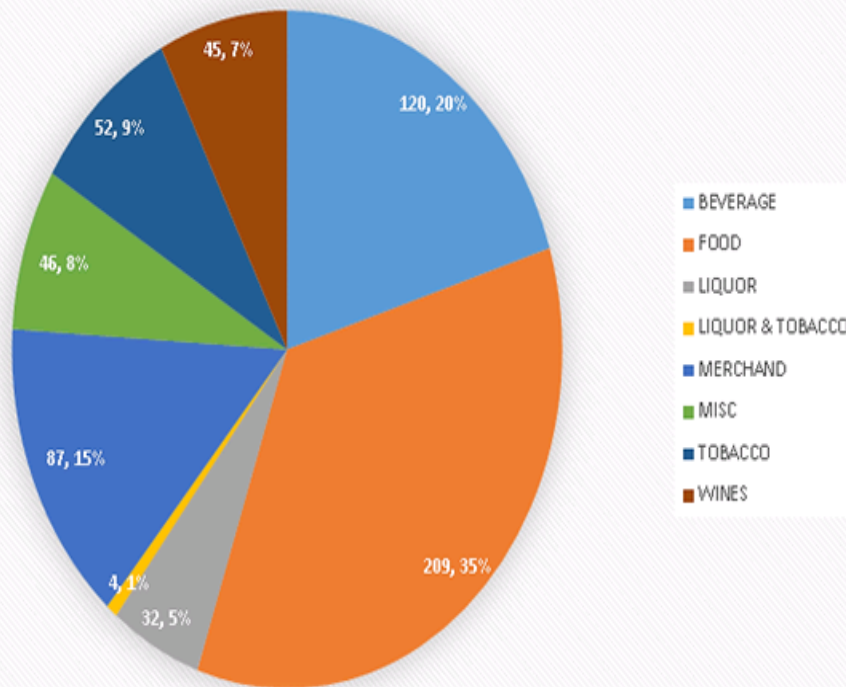
Section – 4:- Analysis has been performed to establish the relationship between Spending pattern and total sales

Section – 5:- Analysis has been performed to establish the relationship between date (month wise) and total sales.

Part 1st says there are some time slots which have more sales than others like 8 PM to 12 PM and few time slots have almost null sales like 6AM to 8 AM. Part 2 says few category like tobacco and food are more in demand than others. Third part tells us Saturday is the most productive day while Tuesday is the least. Fourth part explains the spending pattern of the Customer spending and in 5<sup>th</sup> part, variable that is used against total sales is date and according to it month like Dec, Jan are the most productive month with high sales while months like April, May and June are with low sales. Seasonality also helped in predictive target customers are from colleges. Products analysis has been done in last part for menu optimization.

## PRODUCTS IN THE CAFE

Number of products in each category



Category	Number of products
Food	209 (35%)
Beverage	120 (20%)
Merchandise	87 (15%)
Tobacco	52 (9%)
Miscellaneous	46 (8%)
Wines	45 (7%)
Liquor	32 (5%)
Liquor & Tobacco	4 (1%)

- Cafe has a total of 574 number of products
- As expected, the most number of products come under the category of food (35%) and least number of products come under the combined category of Liquor & Tobacco (1%).

## TOTAL SALES AND BILLING TIME

➤ Is there any relation between café sales and time of the day?

To find the relation between time of the day and café sale, we performed the analysis on two variables from the given dataset:-

### Billing Time and Total Sales

Purpose of this analysis was to understand the selling pattern at different time of the day (at what time of the day café usually has the highest sales and at what time sales is quite slow).

For this, firstly we divided time variable into 2 hours slots (Fig 1.1) and then applied various procedures in SAS like **Proc format**, **Proc mean**, **Proc freq**, **Proc gplot** & **Proc gchart**.

**Fig 1.1**

<u>Division of Time Interval</u>		
1	00:00:00 to 2:00:00	12 AM to 2 AM
2	2:00:01 to 4:00:00	2 AM to 4 AM
3	4:00:01 to 6:00:00	4 AM to 6 AM
4	6:00:01 to 8:00:00	6 AM to 8 AM
5	8:00:01 to 10:00:00	8 AM to 10 AM
6	10:00:01 to 12:00:00	10 AM to 12 PM
7	12:00:01 to 14:00:00	12 PM to 2 PM
8	14:00:01 to 16:00:00	2 PM to 4 PM
9	16:00:01 to 18:00:00	4 PM to 6 PM
10	18:00:01 to 20:00:00	6 PM to 8 PM
11	20:00:01 to 22:00:00	8 PM to 10 PM
12	22:00:01 to 00:00:00	10 PM to 12 AM

## Univariate Statistics

Here we have analyzed frequency of occurrence of each point of time in the divided 2 hours of time slot.

Table (Fig1.2) and Chart (Fig1.3) are showing the number of billing in its corresponding time interval. Time interval 6 PM to 8 PM has maximum number of billing across the day while 6 AM to 8 AM has the almost no billing (no item sold). It shows no customer shows up at this time of period.

Time Interval	Number of billings	Percent(%)
12 AM to 2 AM (1)	15857	10.94
2 AM to 4 AM (2)	137	0.09
4 AM to 6 AM(3)	65	0.04
6 AM to 8 AM(4)	1	0.00
8 AM to 10 AM(5)	10	0.01
10 AM to 12 PM(6)	3358	2.32
12 PM to 2 PM (7)	10974	7.57
2 PM to 4 PM (8)	16412	11.32
4 PM to 6 PM (9)	22129	15.26
6 PM to 8 PM (10)	25674	17.71
8 PM to 10 PM (11)	25215	17.39
10 PM to 12 AM(12)	25146	17.34

Fig 1.2

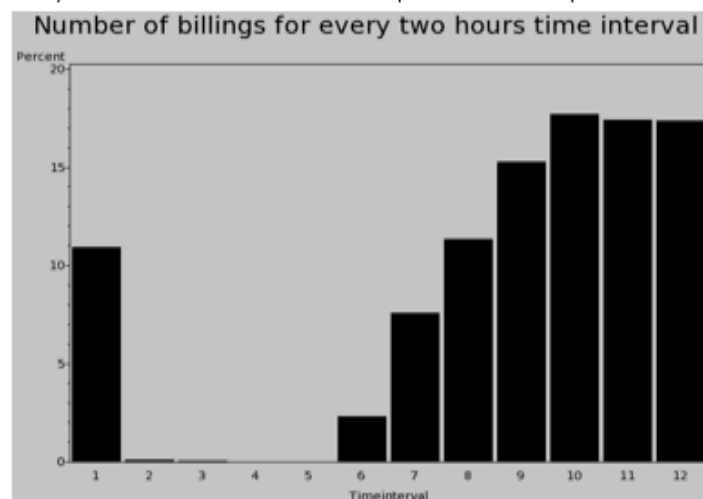


Fig 1.3

## Bivariate Statistics

To understand the relation of time period with sales, we performed analysis on two variables, time interval (independent variable) and Total Sales (dependent Variable).

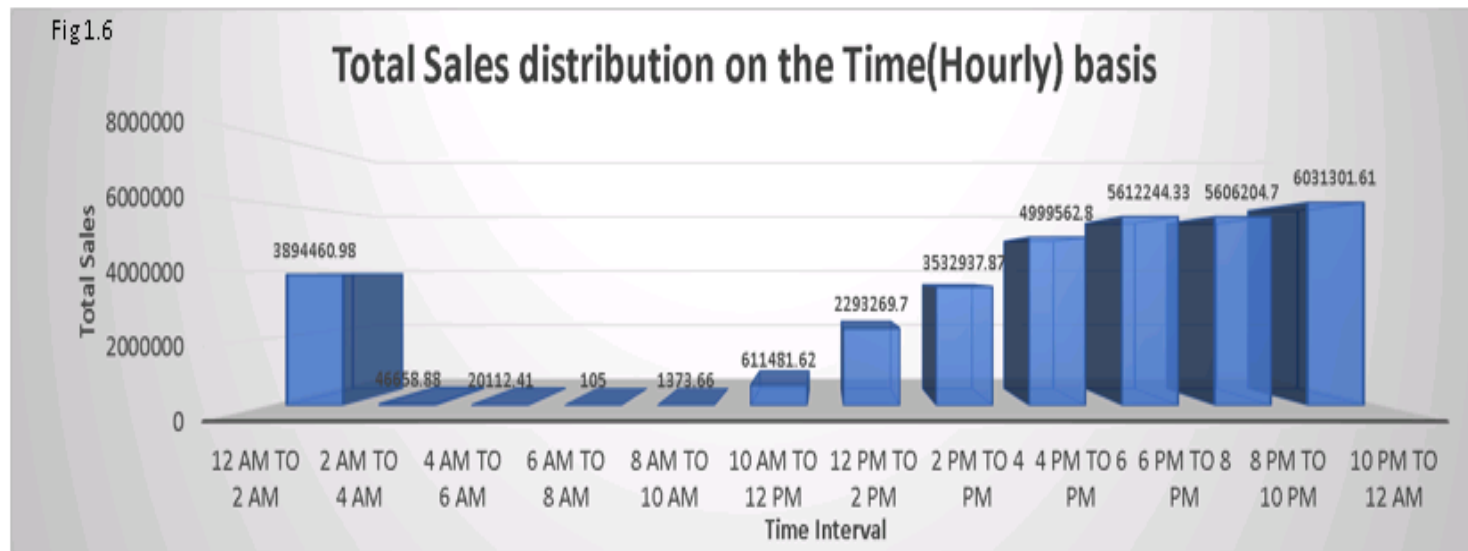
Pearson correlation has been used to understand the relation of two variables (time interval has used as quantitative variable with value of 1 to 12).

Simple Statistics							
Variable	N	Mean	Std Dev	Sum	Minimum	Maximum	Label
Time Interval	144978	8.826	3.176	1279660	1	12	
Total	145743	224.912	164.928	3.3E+07	0.01	14231	Total

Pearson Correlation Coefficients, N = 144919	
Prob >  r  under H0: Rho=0	
	Total
Time interval	-0.0134
	<.0001

Correlation coefficient value is negative shows the relation is not linear as time interval in actual is a time variable and there is no such thing like sales is increasing when time interval is increasing. However p value ( $<0.0001$ ) is highly significant (more than 0.05) shows that both variables are dependent on each other (99.99% confidence).

Graph (Fig1.6) below is to show the total sales for each 2 hours slot of time



According to data 10 PM to 12 AM is the peak time for café sale. Time between 6 PM to 12 PM is the good time for selling, 12 AM to 2 AM has average sale but time interval 10 AM to 12 PM, 12 PM to 2 PM has less sales. From 2 AM to 10 AM sales are very less.



## Conclusion and Suggestions (Based on Time Variable)

Happy hours scheme can be applied for less productive hours

- For less productive time slots like 10AM to 2PM and 12 PM to 2 PM, happy hours scheme (discount on items or buy one get one free) can be applied to attract the customers.

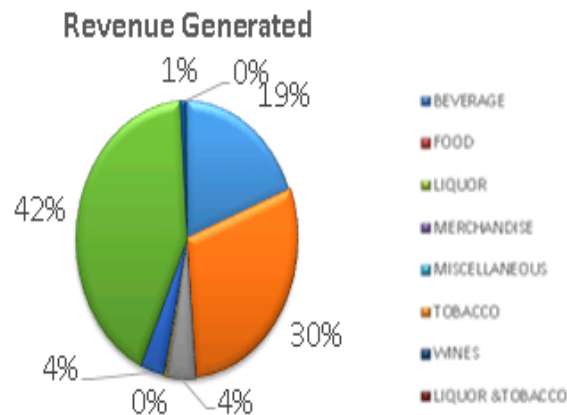
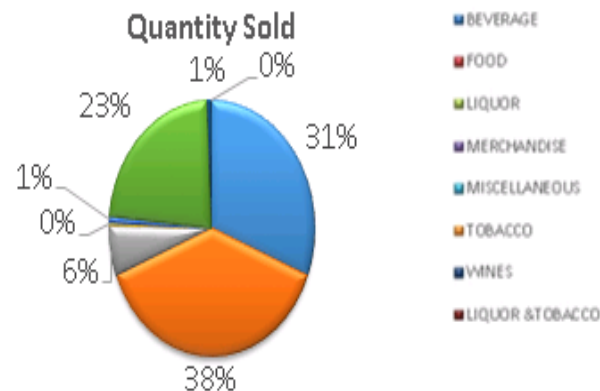
Staff management according to the productivity of the day.

- Highly efficient staff should be applied on peak hours so that customers can be easily handled, get satisfied and order fulfillment
- New employees or average efficient staff on less productive hours.
- Number of staff at a time (day and night) should also be applied on the basis of less and high sales time slots as idle workers are cost waste of money.

# TOTAL SALES AND PRODUCT CATEGORY

- Is there any relation between category and total sales?

Purpose : To understand the selling pattern category wise.



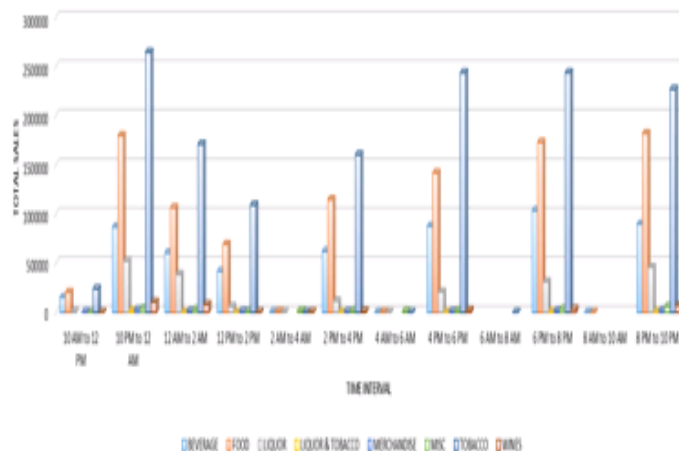
CATEGORY	QUANTITY SOLD	REVENUE GENERATED
BEVERAGE	31.02%	20.49%
FOOD	38.05%	31.54%
LIQUOR	6.27%	4.42%
MERCHANDISE	0.33%	0.42%
MISCELLANEOUS	0.85%	3.86%
TOBACCO	22.84%	45.09%
WINES	0.60%	0.88%
LIQUOR & TOBACCO	0.04%	0.12%

- Food beverages are the highest quantity sold categories and despite of it Tobacco has maximum selling across all categories more than 40%
- Second highest selling category is Food share of more than 30%. Food and tobacco together have more 70% of the café sales.
- Wine, MISC, Merchandise are the least selling categories with share of around 2% overall.

To understand the further role of category in sales, we performed the analysis, based on category sales in each **Time slot**.

Table of Time Interval by Category									
Timeinterval	Category								Total
	BEVERAGE	FOOD	LIQUOR	LIQUOR & TOBACCO	MERCHANDISE	MISC	TOBACCO	WINE	
10 AM to 12 PM	153004.32	204222.18	7361.79		4258.66	1596.37	240817.8	220.5	611481.62
10 PM to 12 AM	867937.76	1798479.57	523904.63	20432.75	27800.2	40290	2646887.16	104965.26	6030697.3
12 AM to 2 AM	605752.32	1064520.61	386913.27	1976.25	13576.2	27469.1	1712787.06	81466.19	3894460.98
12 PM to 2 PM	418214.12	693030.32	60682.09	984.38	11669.1	11493.6	1093746.82	3622.5	2293442.95
2 AM to 4 AM	6069.96	1059.31	4068.75			18326.3	3064.8	4536	46658.88
2 PM to 4 PM	621608.91	1149455.16	116553.26	2636.25	9105.69	14849	1605000.6	14017.76	3533226.62
4 AM to 6 AM	1707.76	3755.85	1312.5			12313.9	1022.4		20112.41
4 PM to 6 PM	875943.05	1418866.55	208461.65	2964.38	11553.2	20756	2437504.2	23121.76	4999170.78
6 AM to 8 AM							105		105
6 PM to 8 PM	1035311.84	1730495.11	312019.33	6975.01	19362.7	35670.9	2439138.9	33707.52	5612681.31
8 AM to 10 AM	1237.53	136.13							1373.66
8 PM to 10 PM	897525.54	1820323.42	460761.71	6592.5	21604.2	59653.4	2271361.2	68480.13	5606302.05
Total	5494313.11	9893878	2082038.98	42561.52	118930	242419	14451435.94	334137.62	32649713.56

Product category sales distribution in each 2 hour of Time intervals



- Tobacco is the highest selling category for each time slot and food is the second highest. It means there is no time dependency on category sale.
- Buyer for each category are visiting in all the slots except 6 AM to 8 AM when there is no buyer and 8 AM to 10 AM when there is no buyer for liquor and tobacco related categories.

# MOST PREFERRED CATEGORY BY CUSTOMERS

To understand the customer preferred category, we analyzed the bill ID Variable with Total Sales.



Category of Products Purchased	No. of Customers	Percentage of Customers
BEVERAGE	3901150	16.62%
FOOD	7400515.55	31.52%
LIQUOR	1039137	4.43%
LIQUOR & TOBACCO	27800	0.12%
MERCHAND	97776.5	0.42%
MISC	134333	0.57%
TOBACCO	10672792.2	45.46%
WINES	205721	0.88%

On the basis of Analysis of bills, we observed that :-

- Maximum Customers (45%) visit cafe for purchasing Tobacco products.
- Food and Beverage products are purchased secondly by customers.
- Only 4% of customers purchase Liquor products.
- Very less customers buy Merchandise.

# Conclusion and Suggestions (Based on

## Inventory Management on the basis of category demand

- After knowing the category in demand inventory can be easily maintained according to demand. Items should be stocked as per the demand (more inventory for category that is high in demand) like tobacco and Food.
- Most preferred category by customers Tobacco should have good inventory.

## Large Menu for highly demand categories

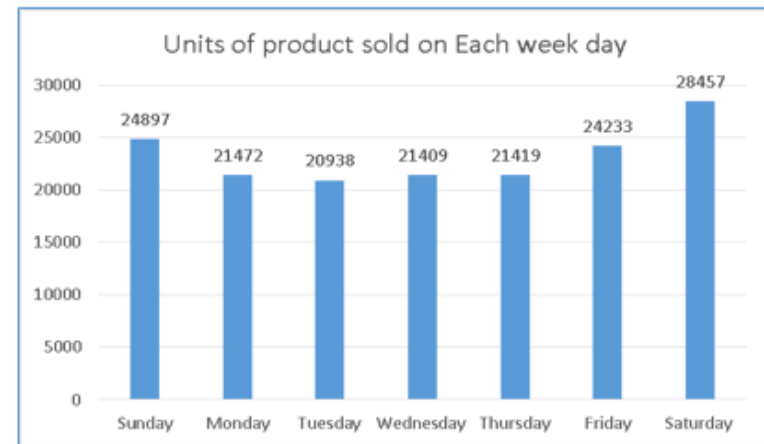
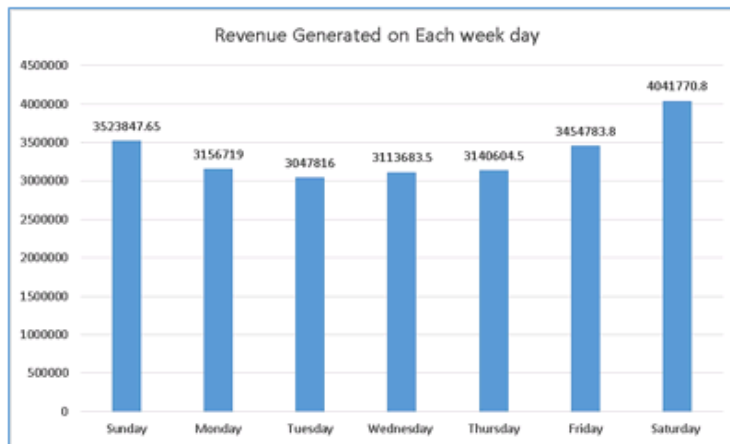
- Adding more items in Categories like tobacco and Food will increase more options for category of his choice. Also helps in attracting more customers.

## TOTAL SALES ON WEEKLY BASIS

- Is any day of the week has more sales than other?

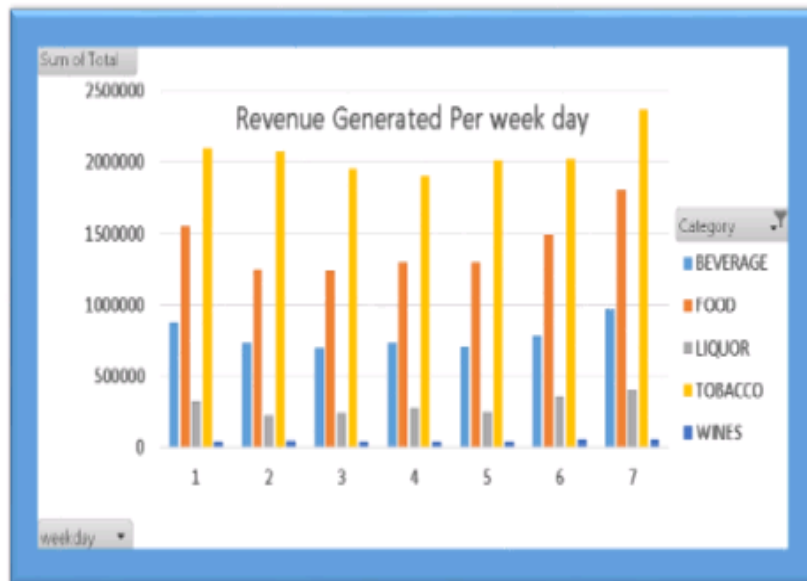
Purpose: To understand the sales pattern on each day of the week.

Total quantity sold and total sales on each day of week .



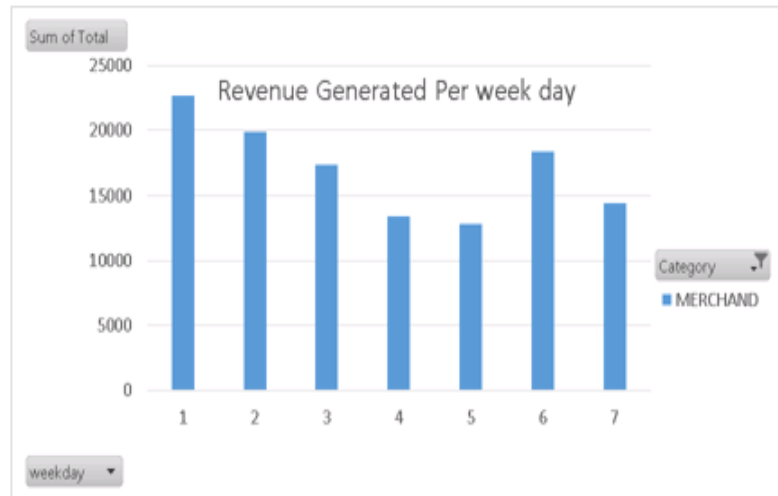
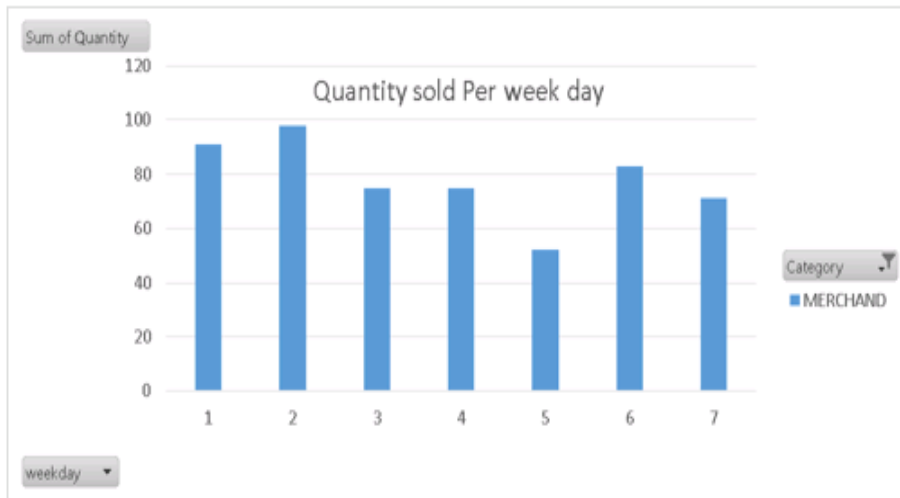
- Saturday is the highest quantity of product sold and revenue generated day of the Week.
- Least productive day is Tuesday with lowest number of products sold and lowest revenue generated.

To understand further, we analyzed the total sales data category wise for each day of the week. Total sales and Product sold for each day of week on category basis.



As per the data shown in graphs, conclusion says Product of all category has same pattern for sale and quantity sold like total café sales for each day of week (Sunday to Saturday).

- Highest number of products sold and Highest revenue generated on Saturday.
- Lowest number of Products sold and Lowest revenue Generated on Tuesday.



- Deferent Pattern is observed in Merchandise products.
  - Number of Product sold is maximum on Tuesdays , Minimum on Thursday.
  - Revenue generated is maximum on Monday and Minimum on Thursday.
- ❖ Since Minimum sale of Merchandise observed on Thursday it is Recommended to use strategy or to give discount or combo etc. On merchandise on Thursday to increase sale on that day



Discounts and others for less productive days.

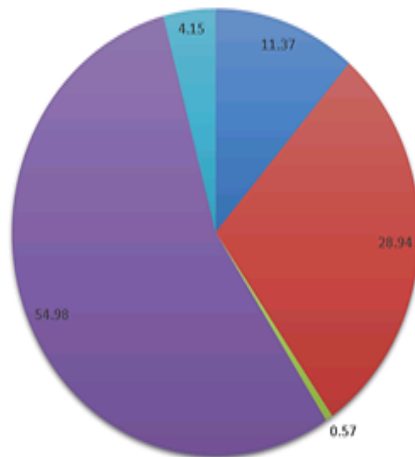
- Many offers like happy hours and discounts can be offered on the less productive days like Tuesday to attract more customers.

Staff Management on the basis more and less busy days

- More and efficient staff on busy days like Saturday, so that heavy customer crowd can be easily managed
- Operational cost can be reduced by using new and less number of staff on less productive days like Tuesdays

## BILLING INFO AND TOTAL SALES

- Total sales generated from each bill.
- Purpose: To understand the billing pattern for total sales.



■ High ■ low ■ luxury ■ medium ■ Very low

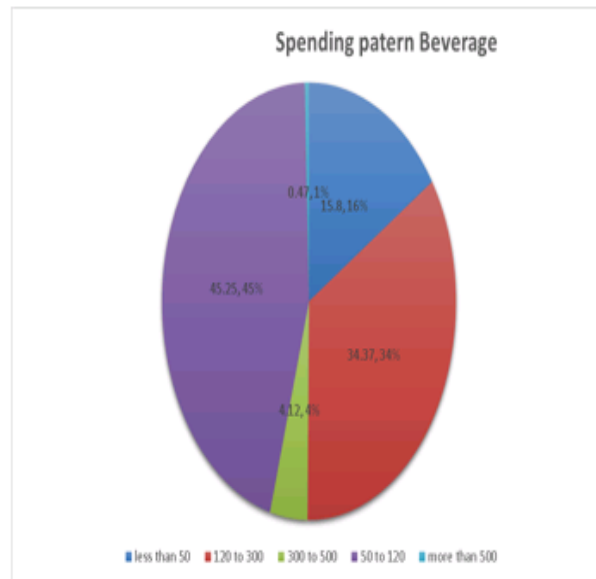
Category	Bill Amount
Luxury	More than 2000
High	800 to 2000
Medium	300 to 800
Low	100 to 300
Very low	Less than 100

Spend	Frequency	Percent
High	7911	11.37
Low	20144	28.94
Luxury	394	0.57
Medium	38269	54.98
Very low	2887	4.15

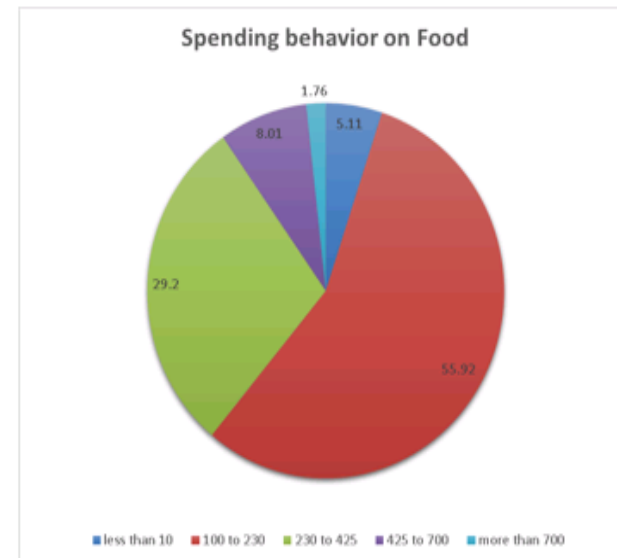
- Total 69605 Bills were generated during April 2010 – March 2011
- Customers spent Rs. 469 on an average. Maximum Bill Amount was Rs.14231.25, Minimum was Rs.18.56.
- Maximum customer spends between 300 to 800. There are only 0.57% i.e. 394 customers who spent more than 2000.

## CATEGORY WISE SPENDING DISTRIBUTION

To understand the billing pattern for total sales more, we bifurcated the billing sales data category wise.



- 30626 customers purchased Beverage in the period.
- Average amount spent on Beverage is Rs. 127.
- Maximum Bill of beverage is Rs. 1095 Minimum 20.
- Maximum customers Buy total Beverages of cost between 50 to Rs.120.



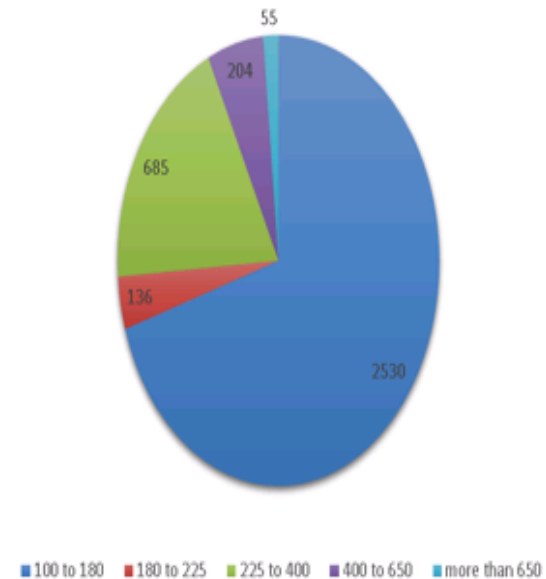
- 32306 customers purchased food in the last 12 months.
- Average Bill on the Food is Rs. 229.
- Maximum Rs.2095 was spent on food.
- Maximum customer buy food worth Rs. 100 to 230.
- Very less customers spent more than Rs. 700 on food.

Spending pattern Tobacco



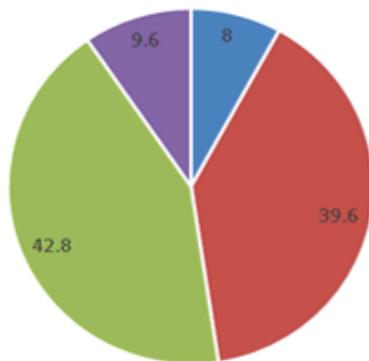
- 33537 customers bought tobacco products.
- Average Bill of Tobacco product is Rs.318.23.
- Maximum Bill Rs.1950 and Minimum Rs.100.
- Maximum customers buy Tobacco products worth between Rs.225 to Rs.320.
- Very less customers spent More than Rs. 750 of Tobacco.

Spending Pattern Liquor



- 5590 customers had Liquor last year.
- Average Bill of Liquor was Rs.186.
- Maximum Bill of Liquor was Rs.1950 and Minimum Rs.100.
- Maximum customer spend between Rs. 100 to 180 on Liquor.
- There are only 55 Customers who spent more than 650 Rs on Liquor.

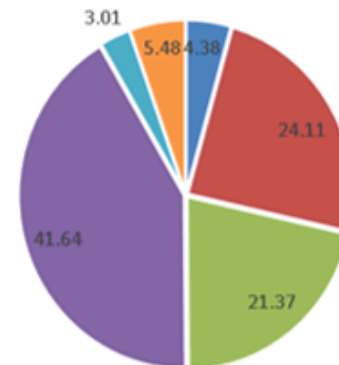
spending pattern on Wine



■ 125 to 175 ■ 175 to 300 ■ 300 to 900 ■ more than 900

- 671 customers had Wine last year.
- Average Bill of Wine was Rs.306.
- Maximum customer spend between Rs. 300 to 900 on Wine.
- There are only 9.6% Customers who spent more than Rs. 900 on Liquour.

Spending pattern in Merchandise



■ 490 to 700 ■ 270 to 490 ■ 60 to 90 ■ 90 to 270 ■ less than 60 ■ more than 700

- 366 customers bought Merchandise.
- Avarage spend on merchandise was Rs.267.
- Maximum customer spend between 300 to 900 Rs on Merchandise
- There are only 9.6% Customers who spent more than 900 Rs on Merchandise.
- Very less customers spend less than Rs. 60 on Merchandise.

## SPENDING PATTERN ON COMBINATION

### Observations:-

- After looking at statistics of the Bills produced we found that:-
- 136 customers bought products from all Food Beverage Merchandise and Tobacco category.
- 4826 Customers bought Products from all Food, Beverage and Tobacco.
- 15737 Customers spent on both Food and Beverages.
- 11665 Customers spent on both Food and Tobacco.
- 223 on Liquor and Wine.

## Conclusion and Suggestions (Based on Bill Information)

Loyalty programs for the customers.

- Customer who spend good can be given points on there bill amount or coupons which can be redeem in future to make sure such customers visit the cafe more often. Also such customers can be targeted for Loyalty programs.
- Customer spending upper limit of any category like beverages, tobacco etc. can be given points that can be redeemed in future. It will help in retaining good customers.

Combo packs of Products from different categories as per the customer choices.

- We can combine products from Food, Beverage, Merchandise and Tobacco to form a Combo pack And also Liquor and Wine Products in Combo pack.

# PRODUCTS AND TOTAL SALES

- Relation between Menu Items (products) and Total sales

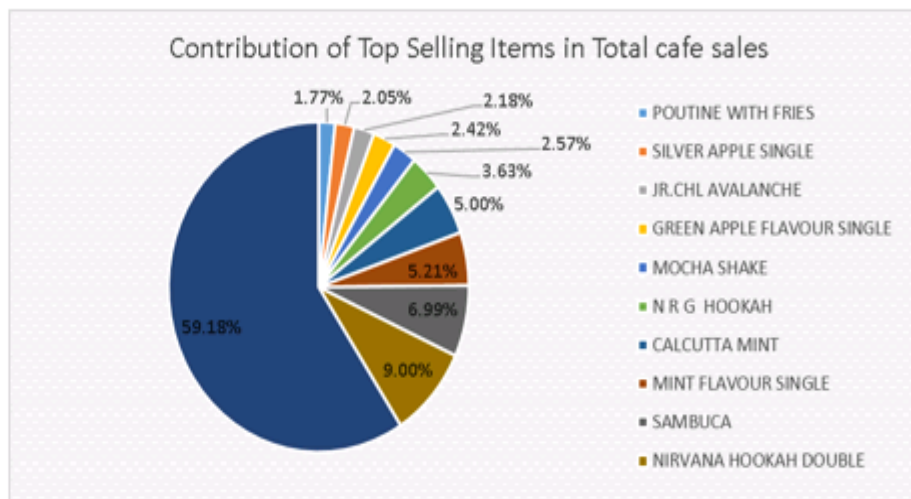
In this section, analysis has been performed to find the top selling items of café and menu optimization.

Purpose of this analysis is to understand the products selling pattern and what best can be done with menu to maximize the sales and profit.

Excel pivot table and chart has been used to analyze the product selling data.

**Top 10 products** on the basis of their total sales

<u>Top 10 most selling products</u>
POUTINE WITH FRIES
SILVER APPLE SINGLE
JR.CHL AVALANCHE
GREEN APPLE FLAVOUR SINGLE
MOCHA SHAKE
N R G HOOKAH
CALCUTTA MINT
MINT FLAVOUR SINGLE
SAMBUCA
NIRVANA HOOKAH DOUBLE



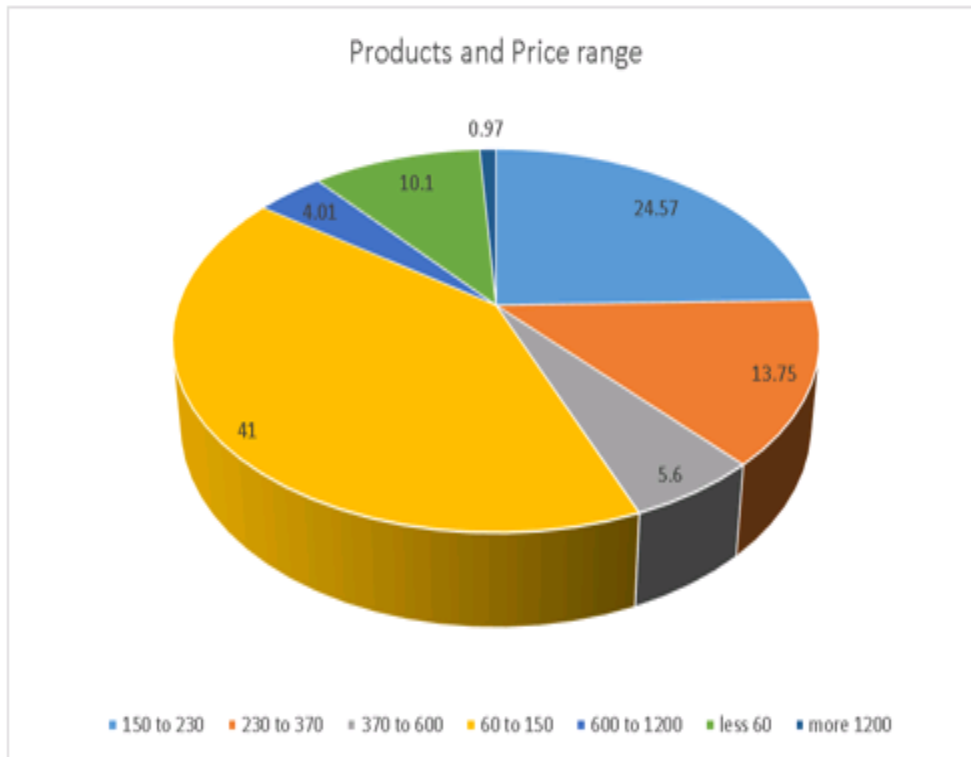


Top 10 products (fig 4.1 and 4.2) are café's best seller products. Overall share of these products in total sales is more than 40%. All these products are from Tobacco and Food categories.

### Top 5 Products from each category

TOBACCO		FOOD		BEVERAGES		LIQUOR		WINES		Merchandise		MISC	
Products	% of category sales	Products	% of category sales	Products	% of category sales	Products	% of category sales	Products	% of category sales	Products	% of category sales	Products	% of category sales
NRG HOOKAH	8.24%	B.M.T. PANINI	3.93%	BERRY BLAST	4.65%	KF DRAUGHT (1/2LTR)	11.73%	VLN CHIMIN BLANC (GLS)	6.64%	CH TINS	4.89%	PLAIN JANE (STRAW BERRY) ROSE FLAVORS SINGLE	6.27%
CALCUTTA MINT	11.35%	ORIO COOKIE SHAKE	4.08%	LEMON ICED TEA	5.01%	KF DRAUGHT (1LTR)	15.32%	RED SANGRIA (GLS)	7.23%	CH COFFEE MUGS	5.06%	PARTY CHARGES @ 500/-	7.21%
MINT FLAVOUR SINGLE	11.81%	POUTINE WITH FRIES	5.83%	RED BULL ENERGY DRINK	6.72%	KF DRAUGHT PITCHER (2LTR)	15.37%	SOLA BLUSH ZINFANDEL (GLS)	7.97%	FLAVOUR 500 GMS	5.33%	PLAIN JANE (CHOCO LATE) RED BULL SHIFFSH	11.41%
SAMBUCA	15.85%	JR.CHL AVALANCHE	7.17%	RED BULL 2+1	6.82%	TUBORG	17.64%	RED SANGRIA (CARAFE)	8.52%	SANDASS	7.82%	RED BULL SHIFFSH	30.99%
NIRVANA HOOKAH DOUBLE	20.42%	MOCHA SHAKE	8.47%	CAPPUCINO	9.83%	CARLSBERG	25.04%	VLN CAB SAUV (GLS)	13.94%	MOCHA T-SHIRTS	11.17%	Rest of products	37.51%
Rest of products	32.33%	Rest of products	70.53%	Rest of products	66.97%	Rest of products	14.90%	Rest of products	55.69%	Rest of products	65.74%	Rest of products	37.51%

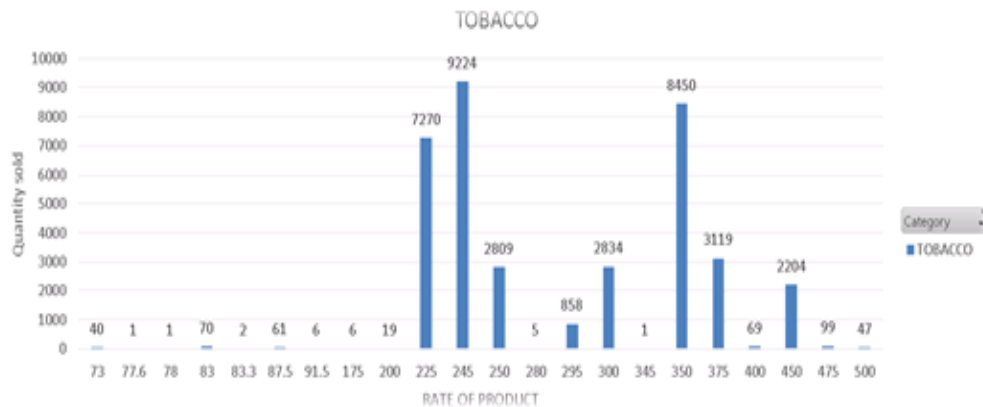
## PRODUCTS AND PRICE RANGE



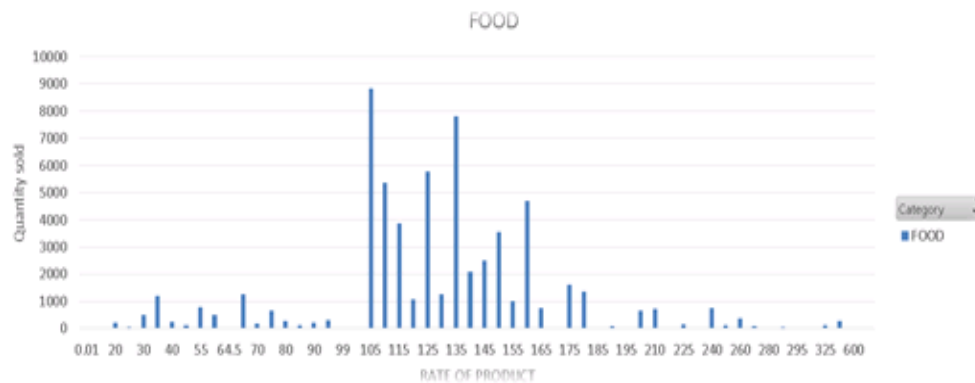
Price Range	Number OF products	Product %
150 to 230	202	24.57
230 to 370	113	13.75
370 to 600	46	5.60
60 to 150	337	41.00
600 to 1200	33	4.01
less 60	83	10.10
more 1200	8	0.97

- Price of product sold in cafe varies from 20 to 2100.
- Average price of product is 211 Rs.
- Maximum products (total 337, 41%) are of price range 60 -150.
- Cafe have less number of Expensive products having price range more than 2100.
- Above charts shows Number and percentage of products of various price range.

## RATE OF PRODUCTS VS NUMBER OF UNITS SOLD OF TOBACCO PRODUCTS & FOOD PRODUCTS



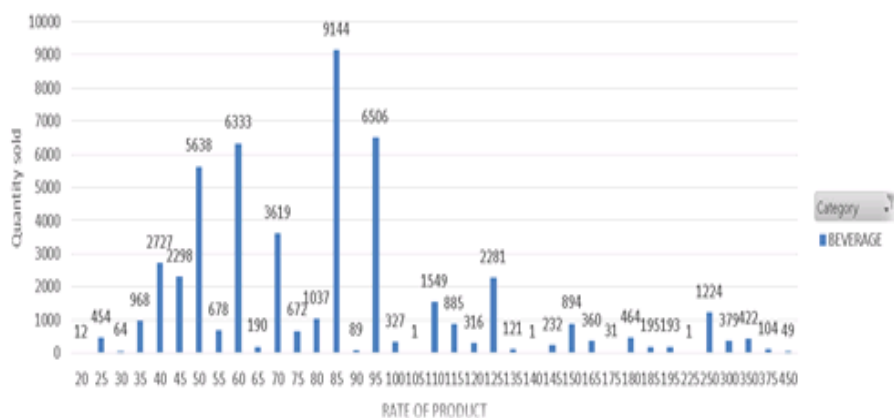
- Rate of Tobacco products varies from 73 to 500
- Average rate of tobacco products is Rs. 247.
- Maximum Number of customers purchase tobacco product near to mean price.



- Rate of Food products varies widely from Rs. 15 to 1700.
- Maximum Number of customers purchase Food product near to mean price.

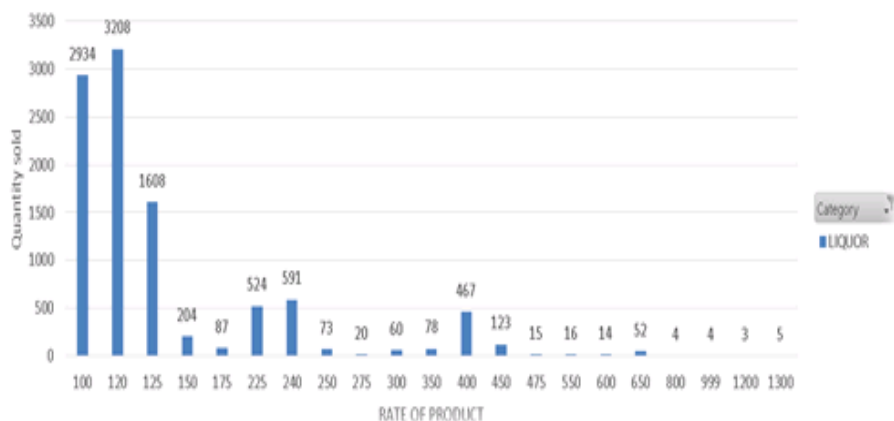
## RATE OF PRODUCTS VS NUMBER OF UNITS SOLD OF BEVERAGE PRODUCTS & FOOD PRODUCTS

BEVERAGE



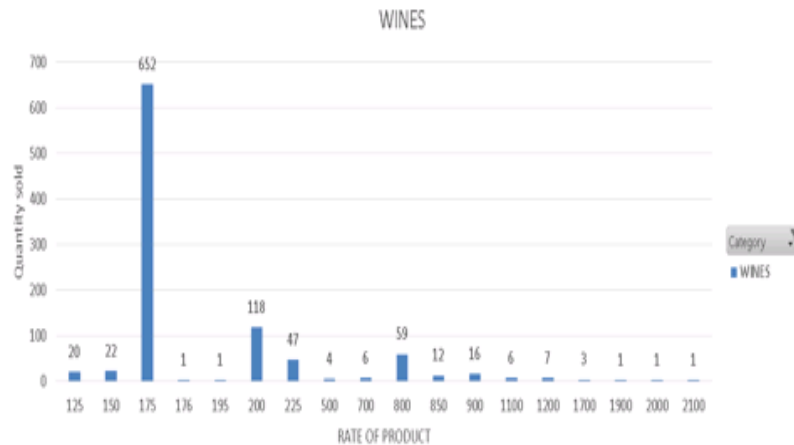
- Rate of Beverage products varies from 20 to 450
- Average rate of tobacco products is 135 Rs.
- Maximum Number of customers purchase tobacco product of lower price range.

LIQUOR

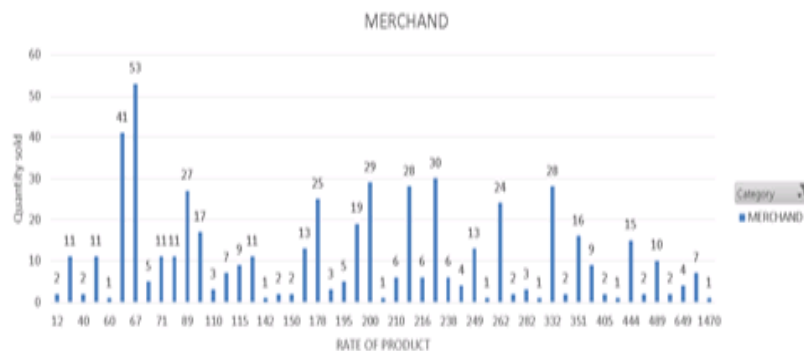


- Rate of Liquor products varies widely from 100 to 1300 Rs.
- Average rate of Food products is 463.52 Rs.
- Maximum Number of customers purchase Liquor product of lower price range.

### RATE OF PRODUCTS VS NUMBER OF UNITS SOLD OF WINE & MERCHANDISE PRODUCTS



- Rate of Tobacco products varies from 125 to 2100
- Average rate of Wine products is 833 Rs.
- Maximum Number of customers purchase Wine product of lower price range.



- Rate of Merchandise products varies widely from 12 to 1470 Rs.
- Average rate of Food products is 254 Rs.
- Customer purchase more merchandise of lower and middle price range

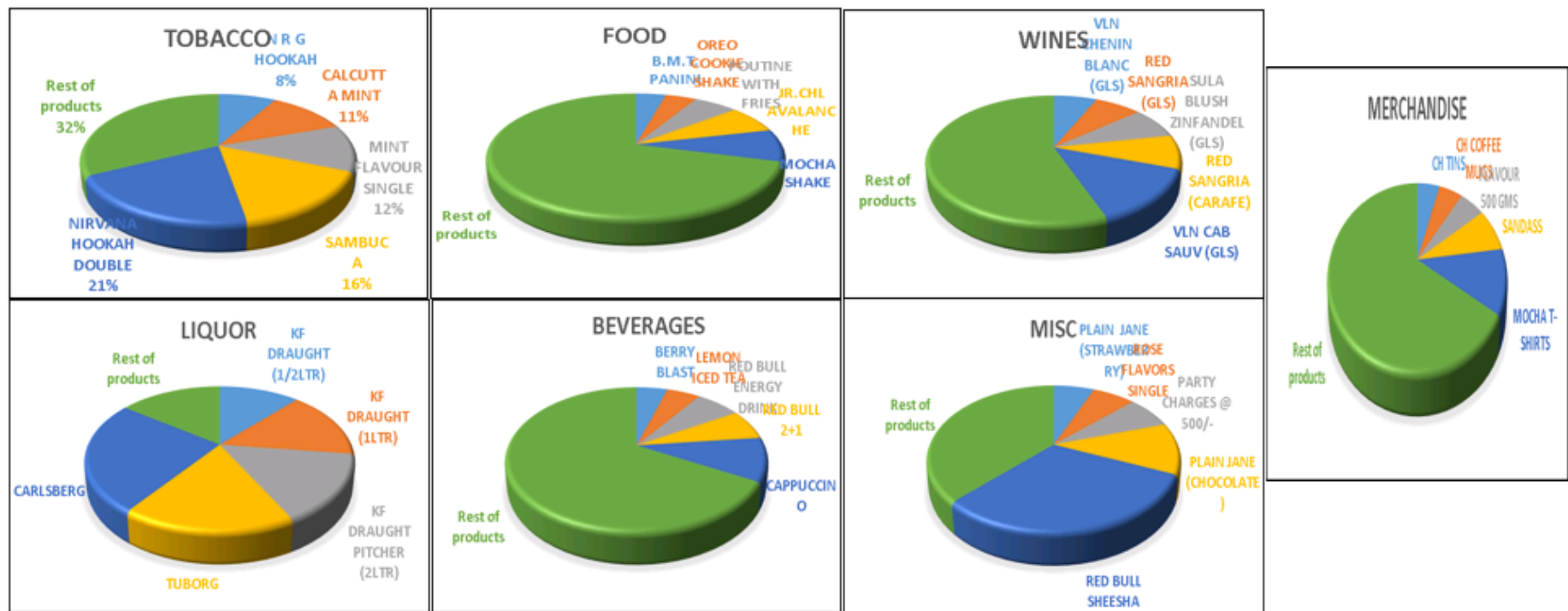


Fig4.4

Table and graphs are showing the top 5 products from each category with percent of their share in category they belongs.

## Products with less sales but high unit price

These are the products which have less Sales but high unit price(Rate) in each category.

WINES
2 OCEAN PINOTAGE (BTL)
GOSSIPS CHARD AUS (BTL)
MATEUS ROSE PORTUGAL(BTL)
MAISON PIERRE SAUV MARSAN
BIG14SEASON CLAS SAUV(BTL)

LIQUOR
STELLA 1LTR 2+1
BROOKLYN BUCKET - 4
SCHNEIDER BUCKET - 6
UNLIMITED BEER
WHITE SANGRIA (CARAFE)

FOOD
SCHNEIDER 2+1
VEGETABLE PASTA
3COURSE NON-VEG MEAL
JPCHENET SPARKLING ROSE (BTL)
ANDALUSIAN SAUSAGES

TOBACCO
SPICE SHEESHA
BLUE LAGOON SHEESHA
LATE HARVEST SULA CHENIN (BTL)
VALENTINE SPECIAL SHEESHA

MERCHANDISE
BODHI PLANTER CUM CANDLE STAND
FLAVOUR 500 GMS
FLAVOR 1000 GMS
FLAVOR 250 GMS
AVALANCHE BOWL

MISC
HOEGAARDEN GLS (2+1)
HOEGAARDEN LTR MUGS (2+1)
BEVERAGES
WHAT A MELON
NR GHOOKAH

## Products with less sales and less unit price

These are the products which have less Sales and less unit price(Rate) in each category.

### WINES

MANDALA VALLEY CHENIN  
BLANC(GL  
BIG14SEASON CLAS  
SAUV(GLS)  
BIG14SEASON CLAS  
SYRAH(GLS)  
MANDALA VALLEY RED  
ZINFANDEL(G  
4 SEASONS CLAS SAUV(GLS

### LIQUOR

WHISKEY (SM)  
STELLA ARTOIS  
SCHNEIDER WEISSE  
WHITE RUM (SM)  
BROOKLYN

### FOOD

ADD BUTTERED TOAST  
MUSHROOM & CORN  
CHICKEN HAM  
SUNNY SIDEUP + BEVERAGE  
TOAST CIABATA

### TOBACCO

GOLD FLAKE ULTRA  
LIGHTS(20)  
CLASSIC REGULAR  
INDIA KINGS OCEAN BLUE  
CLASSIC MENTHOL RUSH  
GOLD FLAKE LIGHTS-BIG

### MERCHANDISE

CUTTING GLASS  
DIP BOWL  
MUGS - PLAIN COLOUR  
CH WRAPPING PAPER  
MOCHA MUG SINGLE

### BEVERAGES

MOCAFE HOT CHOCOLATE(SF)  
DECAFFINATE COFFEE FRAPPE  
BOTTLED WATER (1LITRE)  
NEW ORLEANS BLUE (REG)  
2 AXE TWIST

### MISC

ADD GROUND MEAT  
ADD CHICKEN BACON



### Products with high sales and high unit price

These are the products which have high Sales and high unit price(Rate) in each category.

WINES
RED SANGRIA (CARAFE)
SULA BRUT (BTL)
SULA BLUSH ZINFANDEL (BTL)
SANGRIA ROSE (CARAFE)
VLN CHENIN BLANC (BTL)

LIQUOR
HOEGAARDEN MUG (1 LITRE)
BEER TANK 3.5 LITRE
STELLA ARTOIS MUG (1 LTR)
BEER HOOKAH
BEER TANK 3.5 LITRE

FOOD
CHEESE FONDUE
LINDT CHOCOLATE SHAKE
CHOCOLATE FONDUE
SR.CHL AVALANCHE
JR.CHL AVALANCHE

TOBACCO
N R G HOOKAH
CALCUTTA MINT
SAMBUCA
ARABIAN MIST
NIRVANA HOOKAH DOUBLE

MERCHANDISE
SANDASS
MOCHA T-SHIRTS

BEVERAGES
RED BULL 3+2
GRENADINE
3 RED BULL
RED BULL 2+1

MISC
RED BULL SHEESHA
PARTY CHARGES @ 500/-

## **Products with high sales and less unit price**

These are the products which have high Sales but less unit price(Rate) in each category.

WINES
VLN CAB SAUV (GLS)
VLN SAUV BLANC (GLS)
VLN CHENIN BLANC (GLS)
RED SANGRIA (GLS)
SULA BLUSH ZINFANDEL(GLS)

LIQUOR
TUBORG
CARLSBERG
KF DRAUGHT (1/2LTR)
BUDWEISER
1+1 KF 1/2 LITER

FOOD
GOOEY CHOCOLATE FUDGE
BUN MASKA & CHAI
SCRAMBLED EGGS
CLASSIC BELGIAN WAFFLE

TOBACCO
AL SIKANDARI HOOKAH DOUBLE
SPICE SHEESHA
BLUE LAGOON SHEESHA
LATE HARVEST SULA CHENIN (BTL)
AL SIKANDARI HOOKAH DOUBLE

MERCHANDISE
MUGS - PATTERN
CH NOTE BOOKS

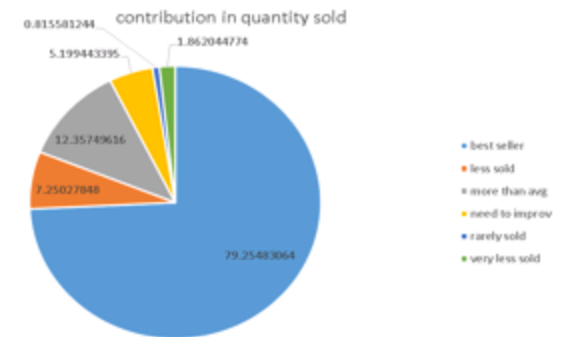
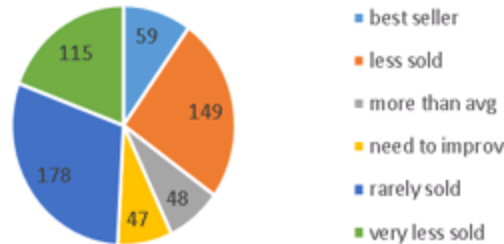
MISC
ADD ON S
ADD HERB ROAST CHICKEN

BEVERAGES
CAPPUCCINO
QUA MINERAL WATER(1000ML)
MASALA CHAI CUTTING
CAFFE LATTE
MOROCCAN MINT TEA

## Grading products Quantity sold wise.

Grade(Quantity sold wise)	Quantity sold
best seller	More than 624 units
more than <u>avg</u>	284 To 625 units
need to improve(Medium)	174 To 285 units
very less sold	11 To 41 units
Rarely sold	Less than 10 unit

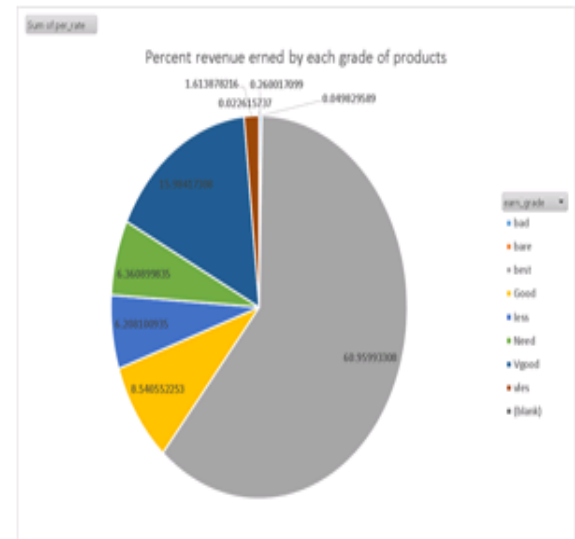
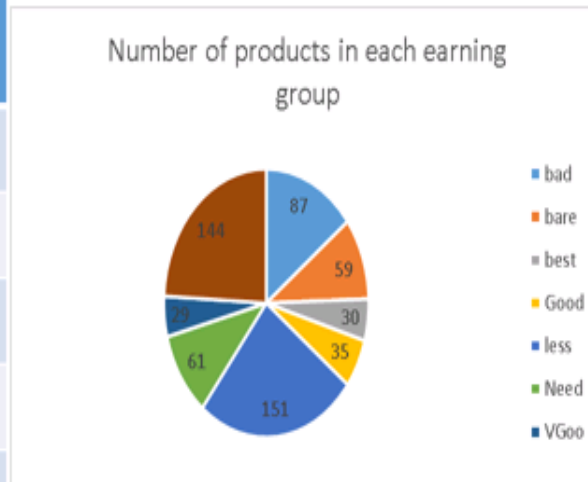
Number of products Of each Grade



- We grade products according to No of units sold in Different grades as given in the table.
- All the grades are provided in document best\_sell.xlsx for reference.
- We have 59 products having no of units sold more than 624 graded as 'best seller'.
- This 59 products have meiority (79%) share in total quantity of all products sold.

## Grading products revenue Earned wise.

Grade (Revenue wise)	Revenue Earned (Rs)
best	More than 176310
<u>Vgood</u> (very good)	79150 To 176311
Good	40975 to 79151
<u>NeedToImprove</u>	19550 To 40976
less	4950 To 19551
bad	360 to 1051
Barely earned	<u>Leess</u> than 360



- We grade products according to No of units sold in Different grades as given in the table.
- All the grades are provided in document best\_sell.xlsx for reference.
- There are 30 products earning revenue more than 176320 Rs individually and having huge ( 61 %) share in the revenue earned.

**FOR INCREASING SALE OF DIFFERENT PRODUCT**

<b>Quantity Sold Grade</b>	<b>Revenue Earned Grade</b>	<b>Strategy to be used</b>
Best Seller	Best	<ul style="list-style-type: none"> <li>• Don't let supply to fall short of</li> </ul>
Best Seller	Vgood, Good, Need to Improve	<ul style="list-style-type: none"> <li>• See if the products can be sale for slightly higher cost( as quantity sold is good but lesser revenue earned)</li> </ul>
More than Avg.	Best, Vgood	<ul style="list-style-type: none"> <li>• Suggest customers this products when they don't ask for to up sell(since quantity sold is lesser compared to revenue)</li> </ul>
More than Avg.	Need to improve	<ul style="list-style-type: none"> <li>• See if this products can be included in happy hrs of other discounts</li> <li>• Since are less recognize products suggest customer to buy them to upsell</li> <li>• Spend on advertising them as customer can recognize them more.</li> </ul>
Less sold, very less sold, need to improve	Less	<ul style="list-style-type: none"> <li>• Combo with better selling products, so more quality can be sold.</li> </ul>
Less sold, very less sold	Vless, Bad	<ul style="list-style-type: none"> <li>• Try to upsell with recommending</li> <li>• Include in combos</li> <li>• Try to create recognition</li> </ul>
Rarely sold	Barely earned	<ul style="list-style-type: none"> <li>• Think if can be removed from shelf to make place better for selling products.</li> </ul>

# Conclusion and Suggestions (Based on Products information)

## Marketing using TOP seller products

- Top 10 seller products are the star products of the café and that can be used for café marketing.
- Top 5 seller products category wise can be used for campaigning in the time of high demand of their category to attract customers

## Menu Optimization can be done using product rate and popularity

- Products with less sales and high rate should be promoted by employers and feedback should be collected on them as they are most profitable products.
- Products with less sales and less rate can be omitted from the menu as they are less popular and less profitable also.
- Products with high sales and high rate are the star of the menu. They always be kept on top of the menu as they give more profit and also in demand and always be used for upselling.
- Products with high sales and less rate can be offered in the combination with other products to make them more profitable. As they are in demand, can be useful to sell other non demanded products

# TOTAL SALES AND MONTH OF THE YEAR

- Is there any relation between café sales and month of the year?

In this section we have analyzed the months and total sales.

Purpose: To find is there any seasonality in the sales data. Is there any specific time of the year when café has more sales than other months.

Month	Month Sales
Jan	3160894.61
Feb	2839305.01
Mar	2801709.79
Apr	2402157.76
May	2360411.46
Jun	2354925.93
Jul	2734469.03
Aug	2833205.87
Sep	2498613.01
Oct	2704746.52
Nov	2654877.1
Dec	3473934.35

Fig 3.1

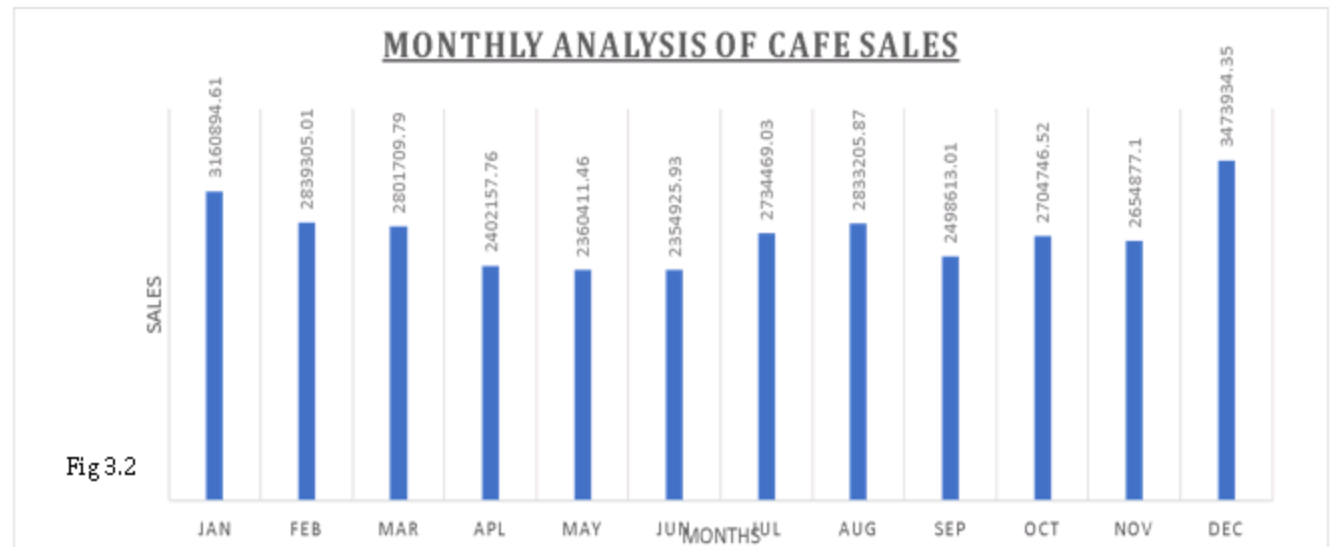


Fig 3.2

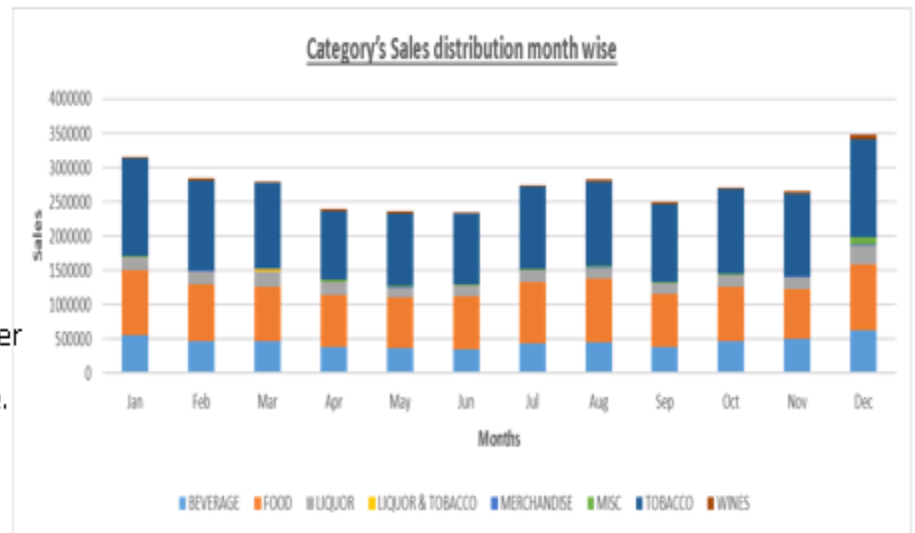
Table (Fig 3.1) and chart (Fig 3.2) used to represent the sales pattern for each of the 12 months in the given dataset (months with high sales, average sales and very less sales).

There is a pattern in sales where sales is going down while approaching high summers. December (end of the year) has high sales than other months while months like April, May and June have low sales.

To understand the sales pattern more we have further bifurcated data into category sales.

MONTH	BEVERAGE	FOOD	LIQUOR	LIQUOR & TOBACCO	MERCHANDISE	MISC	TOBACCO	WINES
Jan	557069.69	955174.1	175810.3		9374.2	15771.96	1422998	24696
Feb	472730.14	830656.9	179317	8268.77	16047.52		1308124	24160.5
Mar	468938.01	799857.2	214613.4	34292.75	16470.52	2625	1234956	29956.5
Apr	380017.83	765268.1	183952.2		10581.66	23066.89	1006291	32980.5
May	368945.81	739285	144074.4		10677.84	10721.76	1057238	29468.25
Jun	357034.95	773830.4	141781.5		11288.65	13347.9	1031435	26208
Jul	430847.82	907434.8	158181.3		7240.33	15799.68	1198491	16474.5
Aug	461703.5	926697.5	152906.3		9801.7	15049.15	1230823	36225
Sep	391027	774512.7	142480.9		9732.19	10372.69	1146639	23848.97
Oct	477216.82	794462.1	163360.1		5364.96	11783.2	1231897	20661.9
Nov	512416.21	720907.2	170846.1		6692.27	6845.57	1208473	28696.5
Dec	631022.85	964722.1	274573.6		6802.18	117034.8	1423520	56259

- There is a decline of each category during April, May, June which could be because of summer vacation and increase in sales after that in month of July and August. Also tobacco can only be used by 18+ age, so both the points shows our **majority of daily consumers are from colleges.**
- Tobacco, Liquor and MISC major sale is in month of December and that could be because of the Christmas and New Year time.





Dataset contains sales from Jan 2010 to Mar 2011, so to understand the trend we performed the time series analysis on excel using pivot table and chart.

Year	Quarter	Month(t)	Sales
2010	First	1	50152.28
		4	2402157.76
	Second	5	2360411.46
		6	2354925.93
	Third	7	2734469.03
		8	2833205.87
		9	2498613.01
		10	2704746.52
	Fourth	11	2654877.1
		12	3473934.35
2011	First	1	3110742.33
		2	2839305.01
		3	2801709.79

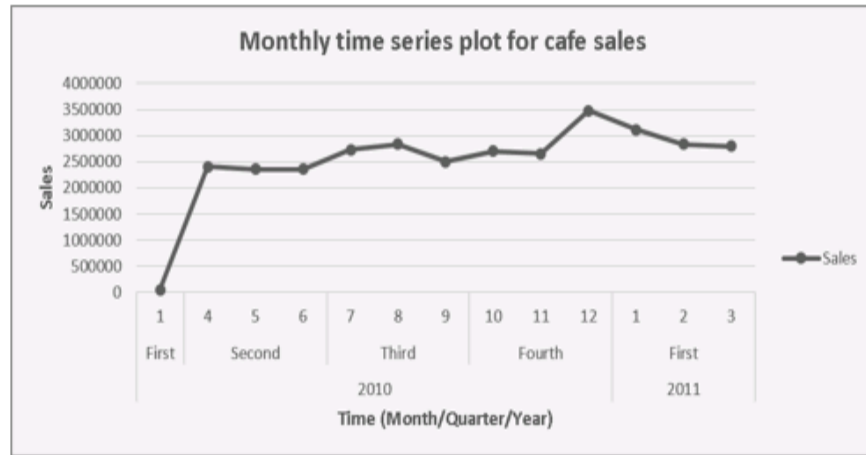


Table and graph are describing the time series pattern for the sales data through out the 5 quarters (Jan 2010 to Mar 2011). Fig 3.5 table is showing the sales value for each months since Jan 2010 to Mar 2011 and Fig 3.6 graph is to show the sales pattern of this time.

# Conclusion and Suggestions (Based on Month of the Year)

## Inventory Management based on Seasonal demand

- More stock for the high sales months for fulfillment of the customer demand while less inventory for the low sales months to minimize the inventory cost. Category based Inventory management (more product for the category more in demand) for seasonal demand will help in improving sales. E.g more liquor for month of December

## Focusing on target customer and Improving Menu Items for Categories based on Seasonality

- After analyzing seasonal trend and category demand, it seems our target customers are from College. So menu should be customized considering target customer like variety of menu items, variety of flavors. Various marketing strategies like discount coupons for non productive hours can be applied. Social media marketing also works wonder to attract these customers.
- Increasing Menu size with top selling items in market for categories more in demand in peak sales months will attract more customers by providing more and best choices.

## **MODEL – LINEAR REGRESSION FOR RESPONSE VARIABLE (TOTAL)**

- To increase Profit of the cafe we need to increase Amount (Bill) payed by customer to the cafe ie. Total.
- Hence we need to know How different factors could possibly affect the amount in the bill ie. Total.
- Hence Linear regression model built with Response variable total.
- Response variable : - Total
- Independent variable:-
  - Quantity( Number of units of product bought by customer)
  - Rate( cost of the product bought)
  - Tax
  - Category of product ( Dummy variable of each category )
- Aim :- Is to see how above all parameters affect the Total and hence the Bill amount and hence profit

- Variables used:-

1. Total ( DV):- amount to pay by customer afeter purchase of perticular product.
1. Quantity(Iv):- Units of that products purchased by the customer.
2. Rate (Iv) :- Rate of the Product.
3. Tax (Iv):- Total tax to pay on purchase of that product.

Some variables was generated.( Dummy for diffrent catagory of products)

1. bev\_dum :- If product belong to Bevorage catagory (if yes 1 else 0)
2. liq\_dum :- If product belong to Liquor catagory (if yes 1 else 0)
3. food\_dum :-If product belong to Food catagory (if yes 1 else 0)
4. mer\_dum :-If product belong to Merchandise catagory (if yes 1 else 0)
5. misc\_dum :- If product belong to Miscellaneous catagory (if yes 1 else 0)
6. Tob\_dum :-If product belong to Tobacco catagory (if yes 1 else 0)
7. Wine\_dum :- If product belong to Wine catagory (if yes 1 else 0)

## **RESULTS PRODUCED AND INTERPRETATION:-**

Root MSE	25.295814	R-Square	0.976755
Dependent Mean	225.107612	Adj R-Sq	0.976754
Coeff Var	11.237210		

☐ All variables are significant.

☐ **Rate:-** Rate of the product is directly proportional to the Total.

☐ As rate of the product increase by 1 unit(keeping all other values constant) the Total increases by **0.123 units**.

❖ Hence by sell of Higher range products chance of earning higher revenue are increased.

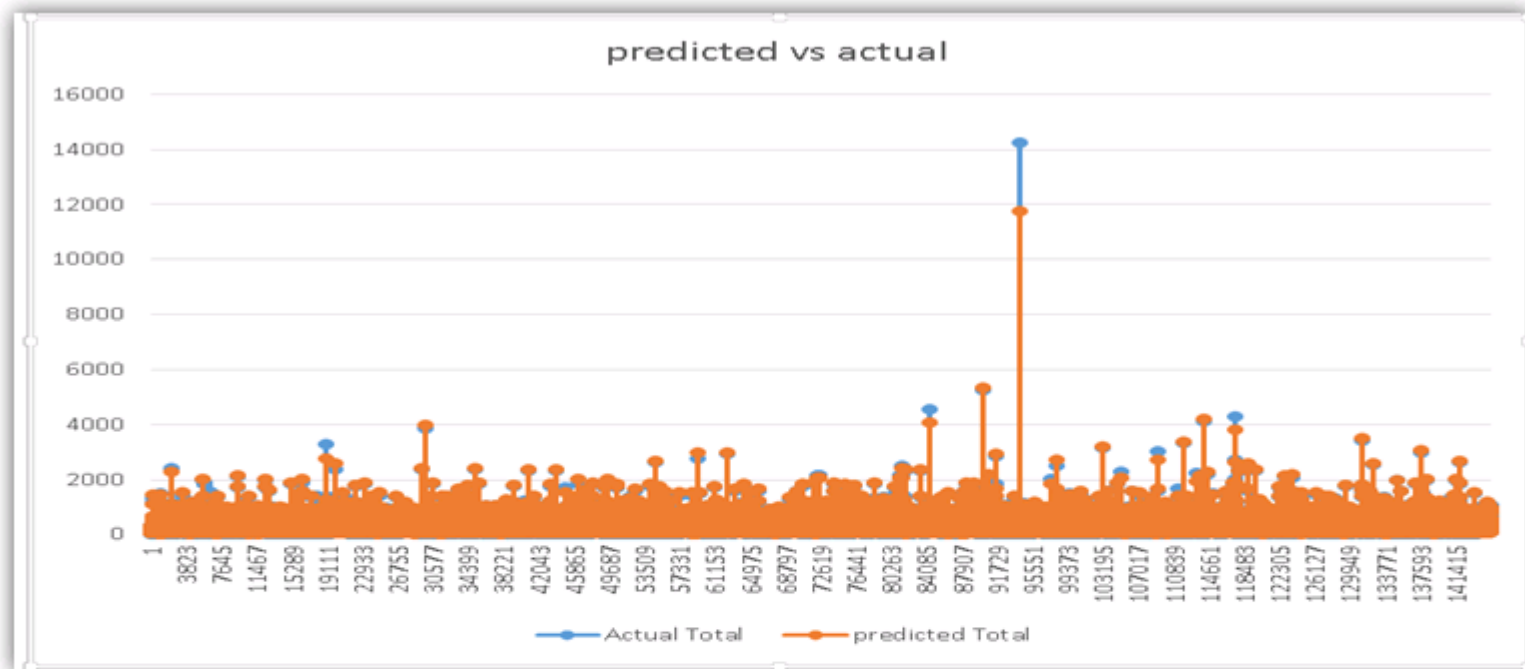
☐ **Tax:-** Is directly proportional to the total

☐ As tax increase by 1 unit Total increases by **4.12 units**(keeping all other values constant)

Parameter Estimates							
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr >  t	Variance Inflation
Intercept	Intercept	1	-78.66695	3.34141	-23.54	<.0001	0
Quantity	Quantity	1	17.54039	0.22898	76.60	<.0001	2.70999
Rate	Rate	1	0.12306	0.00199	61.92	<.0001	9.35889
Tax	Tax	1	4.12631	0.00541	762.83	<.0001	10.76114
bev_dum		1	72.36280	3.32912	21.74	<.0001	527.42990
liq_dum		1	35.28956	3.32903	10.60	<.0001	102.00447
food_dum		1	79.85293	3.32391	24.02	<.0001	597.27431
mer_dum		1	186.84067	3.52500	53.00	<.0001	9.30948
misc_dum		1	91.12961	3.40220	26.79	<.0001	21.29648
Tob_dum		1	24.60968	3.30555	7.44	<.0001	464.97571
Wine_dum		1	86.37968	3.43713	25.13	<.0001	13.30034

- ❑ **Quantity** :- Quantity of the product purchased is directly proportional to bill generated.
- ❑ If Quantity of product bought increases by 1 unit (other constant) total increases by **17.54** units.
- ❖ Hence cafe should build strategy to sell more units of the product

- ❑ **Bev\_dum**:- If customer purchases product from **Beverage** category Total increases by **72.36**
- ❑ **Food\_dum**:- If customer purchases product from **Food** category Total increases by **79.85**
- ❑ **Wine\_dum**:- If customer purchases product from Wine category Total increases by **86.37**
- ❑ **Mer\_dum**:- If customer purchases product from **Merchandise** category Total increases by **186.86**.
- ❑ **Misc\_dum**:- If customer purchases product from **Miscellaneous** category Total increases by **91.12**.
- ❑ **Liq\_dum**:- If customer purchases product from Liquor category Total increases by **35.28**.
- ❑ **Tob\_dum**:- If customer purchases product from Tobacco category Total increases by **24.60**
- ❖ Hence we should sale more products of on Merchandise, Wine, Beverage and Food category
- ❖ Merchandise Products will lead to the maximum revenue increase.



➤ Our model guesses the value of total correct most of the times with good R2 of 97%

➤ Hence Total can be predicted as

➤ **Predicted Total**

$$=(17.54 * \text{Quantity}) + (0.12 * \text{Rate}) + (4.12 * \text{Tax}) + (75.36 * \text{Bev\_dum}) + (35.28 * \text{liq\_Dum}) + (79.85 * \text{food\_dum}) + (189.84 * \text{mer\_dum}) + (91.12 * \text{Misc\_dum}) + (24.60 * \text{Tobb\_Dum}) + (86.37 * \text{winedum}) - 78.66$$

## **CONCLUSION**

- Café dataset has been used to analysis sales pattern from different aspects to give best suggestion for future sales enhancement. We analyzed different variables like time, product category, date, product rate to understand the total sale variable dependency and factor influencing it. So, after the completion of this analysis report we drawn the conclusion that Total Sales variable has dependent upon Time duration in a day, Category of the Product, Seasonality (summer/winter) and Specific product brand.

### **Recommendations for sales improvement from the report are:**

- Inventory Management can be done on the basis of seasonality (More in peak season time like December and less in low sales time like April, May and June) and Product category (like more for tobacco that has more sales than others).
- More customers are expected on Saturdays and less on Tuesdays hence to handle more customers on Saturday more staff can be assigned, On Tuesdays discount can be given to attract more customers.
- Since Minimum sale of Merchandise observed on Thursday it is Recommended to use strategy or to give discount or combo etc. On merchandise on Thursday to increase sale on that day
- Bigger Menu for category more in demand. Menu optimization can be performed with the help of high and less sales/ rate products.
- Happy hours scheme can be applied on the less productive time interval ie .4 Am- 8 Am to attract customers and also staff can be management by the knowing the high and low sales time interval(more and efficient staff on peak hours while new or average and less staff during low sales time periods.



## **CONCLUSION CONTINUED**

- Marketing strategy like coupons for non productive hours and loyalty program can be run to retain the target customers  
Social media is a good medium to attract our young target crowd.
- Top selling products can be used as star products to promote café sales
- Products not recognized by customers can be suggested for upsell.
- Products not recognized ie. bought less by customers can be suggested for upsell.
- Since Tobacco is most favorite category of customer can be used to creating brand value for café. As well as marketing.
- Customers spending High amount ( Bill amount ) can be given coupons to redeemed in the next visit applicable for limited time to insure that such customers visit more often .
- More Customer spend less than average on the Liquor hence we Should see Customer buy liquor more frequently by combining them with food or Tobacco or frequent selling products.
- Is observed that customer tend to buy Liquor and Wine of lower price we should recommend customer to buy wine and liquor of higher price range to get more revenue.
- We need to see supply of best selling product is optimum so no shortage occurred on the pick hr.