

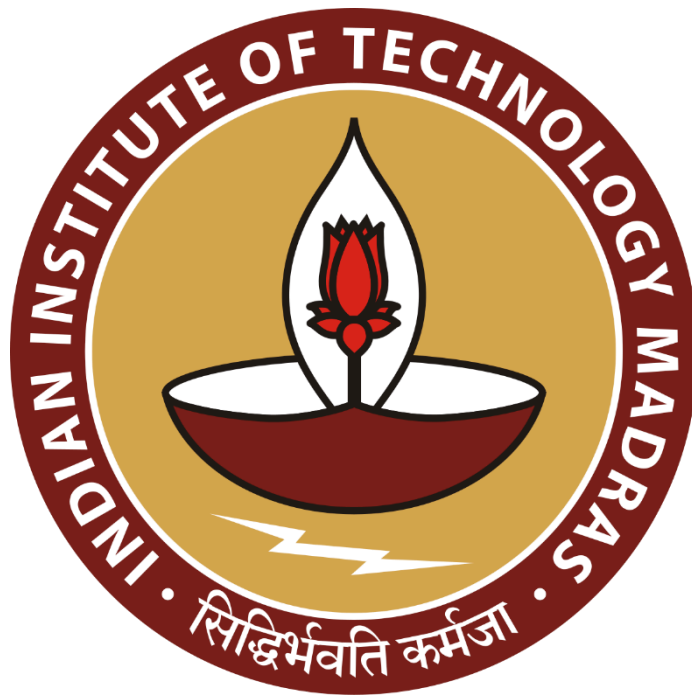
**Title : Navigating Challenges: A Data-Driven Boost for 99 Market Mall**

**A Final Submission report for the BDM capstone Project**

Submitted by

Name: RAJEEV KUMAR BHAGAT

Roll number: 21f3001527



IITM BS Degree Program,

Indian Institute of Technology, Madras, Chennai

Tamil Nadu, India, 6000361

## Contents

1. <b>Executive Summary</b>	2
2. <b>Detailed Explanation of Analysis Process/Method</b>	2-12
• Step 1 : Data Collection	3
• Step 2: Data Cleaning	6
• Step 3: Descriptive Statistics	6
• Step 4: Data Visualization	9
• Step 5: Sales Analysis	11
• Step 6: Customer Preference	11
• Step 7: Data Interpretation	11
• Step 8: Report Presentation	12
3. <b>Results and Findings</b>	12-15
4. <b>Interpretation of Results and Recommendation</b>	16-18
• Analysis on Product Categories	16
• Analysis on Sales by Months	16
• Analysis on Stock by Categories	16
• Analysis on Sales by Categories	16
• Recommendations to fix our Problems at 99 Market Mall	17-18

# 1 Executive Summary

This report provides a detailed analysis of 99 Market Mall's performance from November 2023 to January 2024. We began by collecting comprehensive data from the mall, including item details, stock amounts, and sales figures, which were organized into Google Sheets for ease of analysis. The data was then cleaned to remove any inconsistencies or duplicates.

We employed descriptive statistics to summarize key metrics and conducted data visualization using charts and graphs to reveal trends and patterns in stock and sales. Tools such as Google Colab were used for data cleaning and analysis, ensuring accuracy and reliability.

Our analysis highlighted Women's Wear and Backpacks as the most popular categories, with sales peaking in November due to festive shopping and declining in the winter months. We also identified that Personal Care items are less favored compared to other categories.

To address challenges such as limited resources and competition from larger retailers, we recommend optimizing resource use, forming strategic partnerships, enhancing customer experience, and improving technology adoption. Additionally, we suggest focusing on unique value propositions, local community engagement, and targeted marketing to strengthen the mall's market position.

This report aims to offer actionable insights and recommendations to enhance operational efficiency, improve customer satisfaction, and maintain a competitive edge.



## 2 Detailed Explanation of Analysis Process/Method:

To ensure a thorough and efficient analysis process, it is essential to break it down into well-defined steps that keep the analysis on track and yield effective outcomes for the organization. The following steps outline a professional approach to conducting a successful analysis:

Step 1: Data Collection

Step 2: Data Cleaning

Step 3: Descriptive Statistics

Step 4: Data Visualization

Step 5: Sales Analysis

Step 6: Customer Preference

Step 7: Data Interpretation

Step 8: Report Presentation

### Step 1 : Data Collection

**Duration of collected data :** November 2023 - January 2024 (3 months).

Initially we collected the data from our selected shop. The Data was then transferred into Google Sheets and based on the data, we created the following columns(described below) so that further tasks can be done based on this dataset provided by the shop owner of 99 Market Mall. (Table 2.1)

**Items:** Individual products listed.

**Items Category:** Classification of the items into respective categories.

**Rate:** Cost or price assigned to each item.

**Quantity:** Amount or number of items available.

**Price:** Total cost calculated based on the rate and quantity.

**Selling Price per Piece:** Price set for each individual item.

**Selling Price:** Total price for all items sold.

CLEANED DATASET							
99 MARKET MALL							
ITEMS, STOCK, PURCHASING PRICE AND THEIR SALES							
SNo	ITEMS	ITEM_CATEGORY	RATE	QUANTITY	PRICE	SELLING PRICE/PIECE	SELLING PRICE
1	SOAP	PERSONAL CARE	30	10	300	36	360

2	T-SHIRTS	APPAREL	320	30	9600	384	11520
3	JEANS	APPAREL	900	20	18000	1080	21600
4	SKIRTS	WOMENS WEAR	480	20	9600	576	11520
5	JARS	MASON JARS	300	30	9000	360	10800
6	SOCKS	UNDERGARMENTS	80	40	3200	96	3840
7	PURSE	HANDBAG	240	20	4800	288	5760
8	SHAMPOO	PERSONAL CARE	210	30	6300	252	7560
9	WALL WATCH	CLOCK	150	20	3000	180	3600
10	SCHOOL BAG	BACKPACK	450	20	9000	540	10800
11	FLOWER POT	PLANTERS	600	20	12000	720	14400
12	TOOTH BRUSH	DENTAL CARE	25	40	1000	30	1200
13	CHAIR	FURNITURE	320	30	9600	384	11520
14	TROLLEY	BACKPACK	1200	20	24000	1440	28800
15	LADIES KURTI	WOMENS WEAR	660	20	13200	792	15840
16	TOOTH PASTE	DENTAL CARE	20	20	400	24	480
17	SKIRTS	WOMENS WEAR	480	10	4800	576	5760
18	HAND WATCH	CLOCK	300	20	6000	360	7200
19	DUPATTA	WOMENS WEAR	280	30	8400	336	10080
20	BUCKET	HOME ACCESSORIES	150	40	6000	180	7200
21	LUNCH BOX	PLASTIC	180	50	9000	216	10800
22	NOTEBOOK	STATIONARY	40	100	4000	48	4800
23	WATER BOTTLE	ACCESSORIES	18	50	900	20	1000
24	HAIR OIL	ACCESSORIES	35	40	1400	42	1680
25	DETERGENTS	HOME ACCESSORIES	90	50	4500	108	5400
26	TONGUE CLEANER	DENTAL CARE	5	50	250		300
					<b>TOTAL</b>		<b>213820</b>

Table 2.1

We then find there are multiple categories present in our dataset. So we made a new dataset where our original data was filtered based on various categories. The filtered Data for 99 Market Mall is organized by categories and comprises five columns as shown below (Table 2.2) :

**Category Name:** Names of product categories.

**Stock Amount:** Amount for Quantity of items available in stock.

**Sale Amount:** Total value of items sold.

**Profit:** The monetary gain achieved from sales.

**Number of Variety:** Count of different types of products available across categories.

<b>CATEGORY WISE</b>					
<b>SNo</b>	<b>CATEGORY NAME</b>	<b>STOCK AMOUNT</b>	<b>SALE AMOUNT</b>	<b>PROFIT</b>	<b>NUMBER OF VARIETY</b>
1	MASON JARS	9000	10800	1800	1
2	PLASTIC	9000	10800	1800	1
3	PERSONAL CARE	6600	7920	1320	2
4	APPAREL	27600	33120	5520	2
5	CLOCK	9000	10800	1800	2
6	BACKPACK	33000	39680	6680	2
7	HOME ACCESSORIES	10500	12600	2100	2
8	DENTAL CARE	1650	1980	330	3
9	ACCESSORIES	6800	8080	1280	3
10	WOMENS WEAR	36000	43200	7200	4

Table 2.2

Similarly we have also taken the monthly Stock Data Amount for 99 Market Mall is given below and has 3 columns(Table 2.3).

**Months:** Particular month of whose stock amount has been given.

**Stock Amount:** Amount for Quantity of items available in stock for a particular month.

**Duration:** Dates covered in a particular month.

<b>OVERALL MONTHLY STOCK</b>		
<b>MONTHS</b>	<b>DURATION</b>	<b>MONTHLY_STOCK_AMOUNT</b>
November 2023	1-11-2023 to 30-11-2023	178000
December 2023	1-12-2023 to 31-12-2023	158600
January 2024	1-01-2024 to 31-01-2024	156016.8

Table 2.3

## Step 2 : Data Cleaning

The data now got cleaned using Google Colab. Upon observing all the rows and columns, we removed all the null or empty values. Also removed some of the mistyped data from our dataset that could have caused problems in doing our analysis. Another thing like removing duplicates was done while cleaning our dataset.

## Step 3 : Descriptive Statistics

Once our data is cleaned (null values and empty columns removed), we describe our data. The 'df.describe()' function is used to obtain the relevant statistics for the dataset.

- **Descriptive Statistics of Sales and stock by Amount of each category(Fig 2.1):**

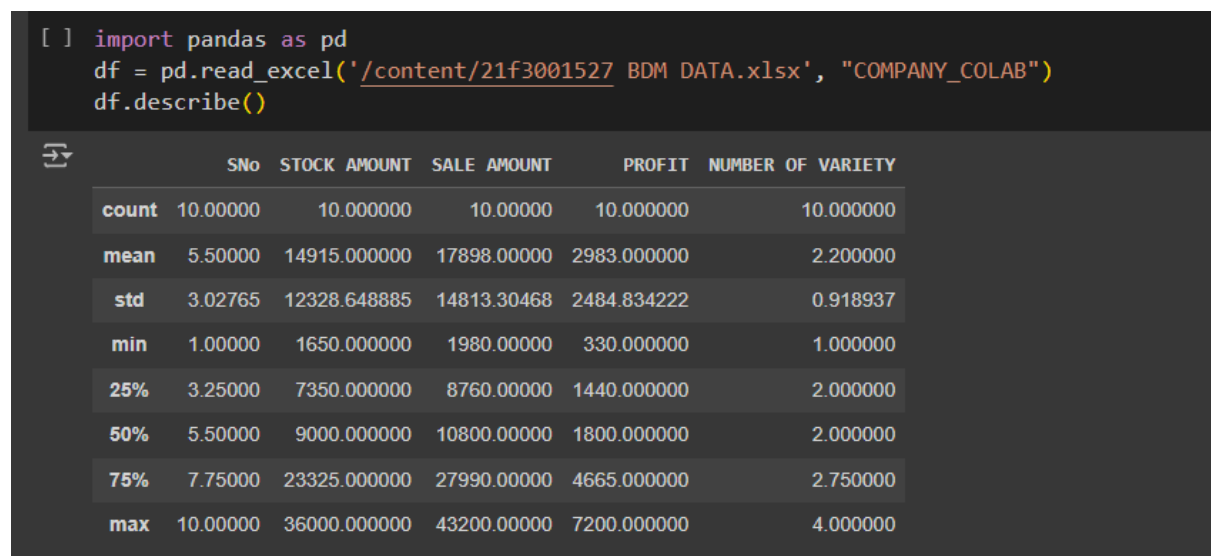


Fig 2.1

### Sales and Stock Overview:

- The average monthly stock amount stands at ₹14,915, representing the typical inventory level.
- Monthly sales average around ₹17,898 signifying the recurring revenue.
- Profit averages at ₹2983, showcasing the net gain category wise.
- The average number of items in the variety is 2.2, indicating the diversity of products available.

- Descriptive Statistics of the items(filtered by categories) for our monthly stock(Fig 2.2) :

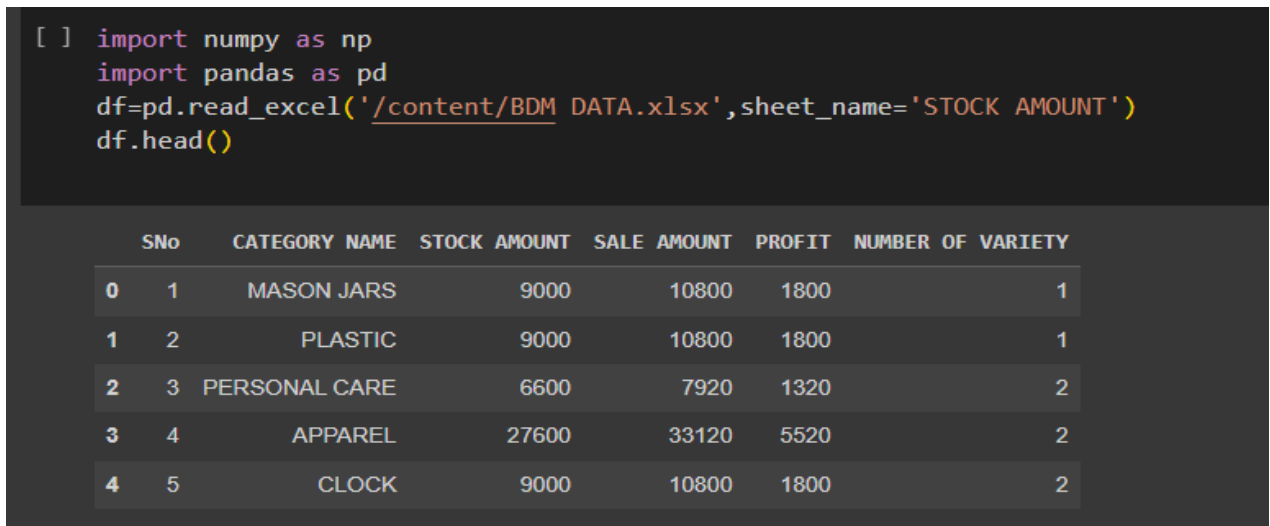


Fig 2.2

#### Category Variety Analysis:

- **Womens wear** stands out with an impressive variety score of 8, highlighting a diverse range of products they offer.
- Categories like **Mason Jars** and **Plastic** hold the lowest variety score of 1, suggesting a more restricted range of products available.
- Descriptive Statistics of the base product (including variety) monthly stock(Fig 2.3):

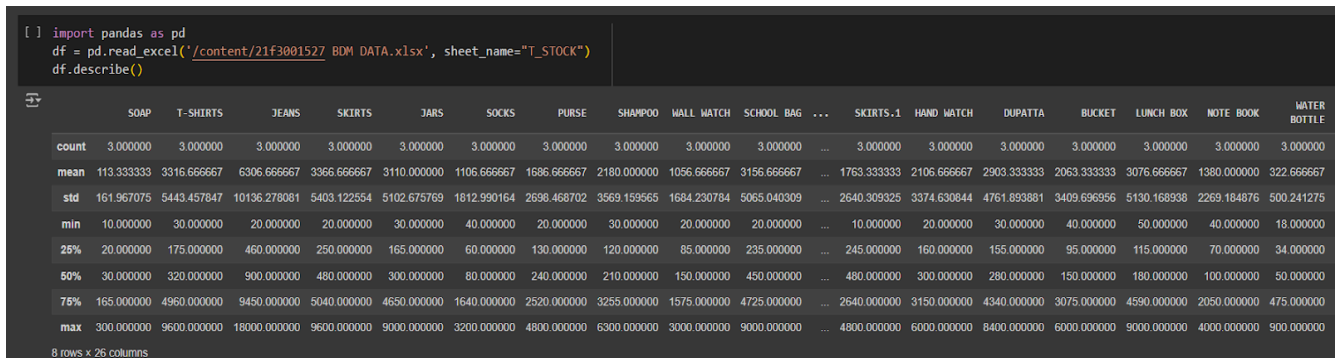


Fig 2.3

- 'JEANS', with the highest mean, signifies its popularity and dominance in stock.
- 'TONGUE CLEANER', having the lowest mean, implies comparatively lower popularity among other products.



- Descriptive Statistics of purchase and sales rate of each product(Fig 2.4):

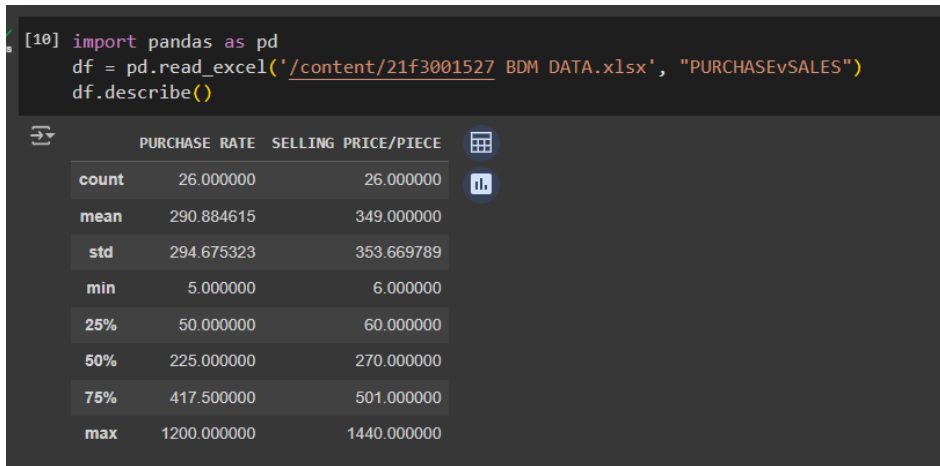


Fig 2.4

Upon analysis of the statistics, it was revealed that the product "**Tongue Cleaner**" has the lowest sale rate valued at Rs 06, while the product "**Trolley**" holds the highest sale rate of Rs 1440. Similarly, regarding the purchase rates, "**Tongue Cleaner**" has the minimum rate of Rs 5, whereas "**Trolley**" boasts the maximum rate of Rs 1200.

- Descriptive Statistics of Sales by Amount of three months (November, December, January)(Fig 2.5):

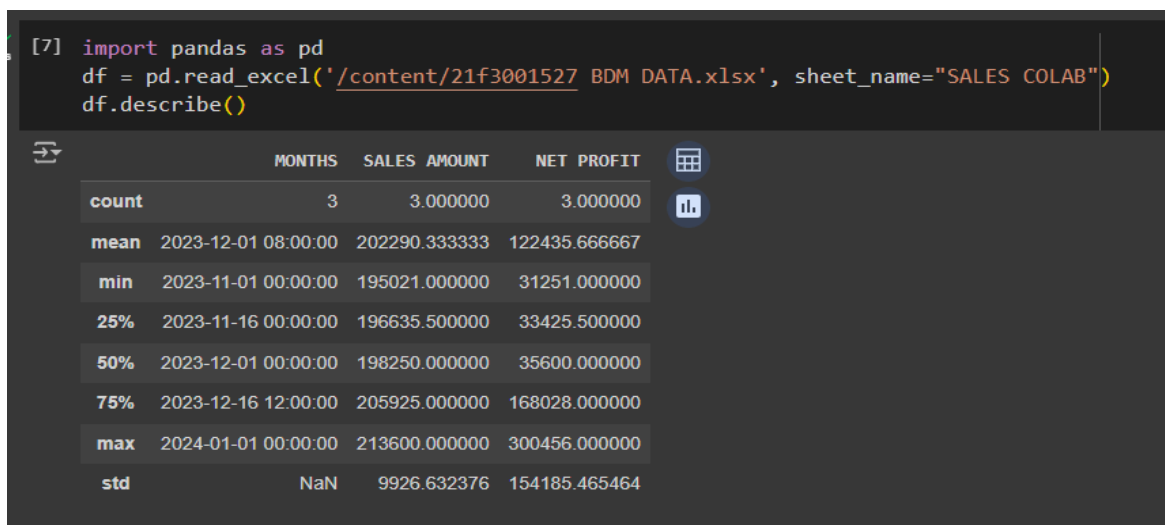


Fig 2.5

### Three-Month Sales Overview (November, December, January):

- The average monthly sales amount stands at ₹202290.33, representing the typical revenue for this period.
- Notably, in three months, the maximum sales amount, reaching 2,13,600, occurred specifically in November(festival seasons in Bihar).
- The lowest was in January, reaching 1,95,021 only(due to extreme cold).

### Step 4 : Data Visualization

After paying attention to the important statistics we tried understanding our data in a more convenient manner with the help of various charts and graphs.

MONTHLY\_STOCK\_AMOUNT vs MONTHS

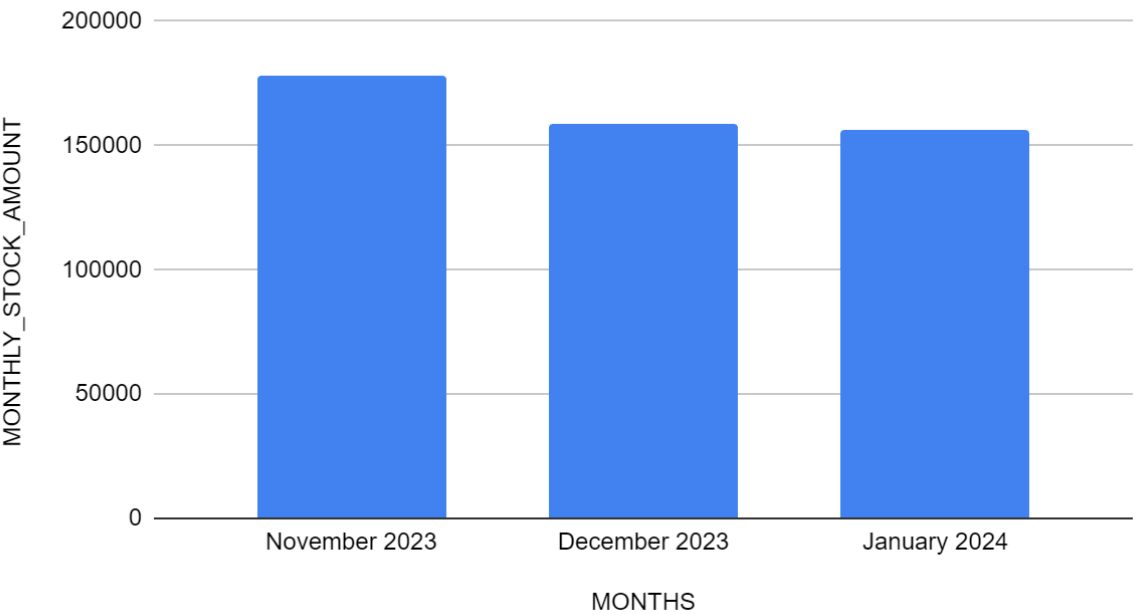


Fig 2.5

The Monthly Combined Stock Chart exhibits the stock quantities of different items across months. This visualization aids in recognizing trends and inventory imbalances, facilitating informed decisions regarding inventory management and sales strategies. The Y-axis denotes Stock Amount, while the X-axis represents months.(Fig 2.5)

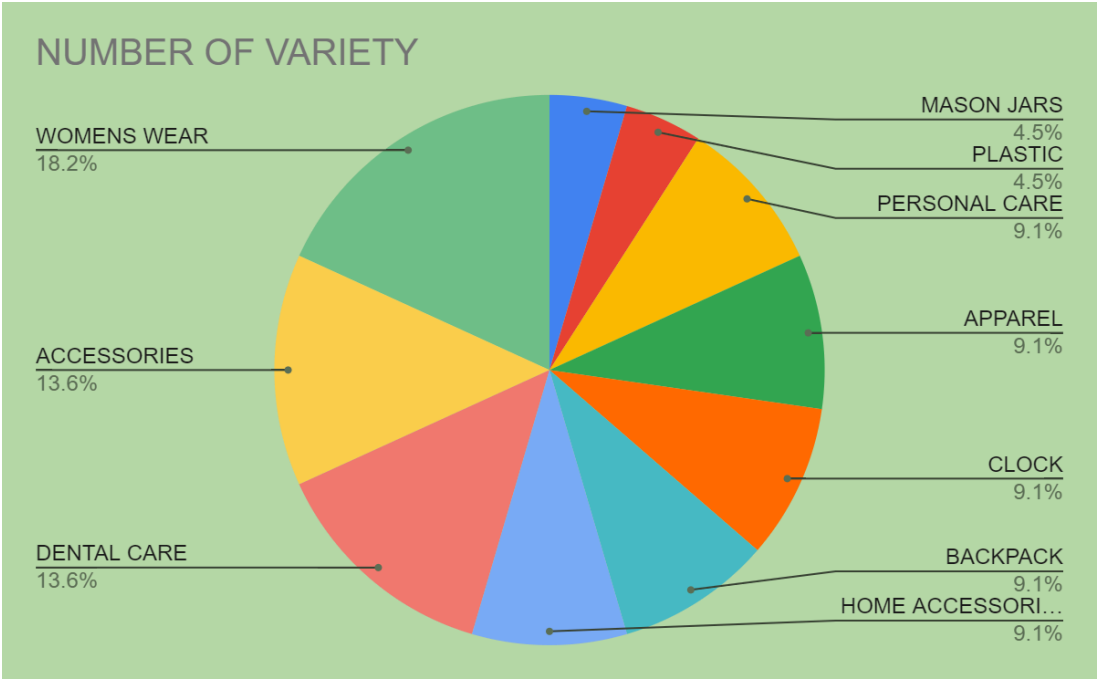


Fig 2.6

The Stock Amount Pie Chart visually displays how the total stock values are distributed among various items. It emphasizes each product's contribution to the overall inventory value, aiding in effective prioritization and resource allocation strategies. We can see, Women's wear has the highest number of varieties of products available while Mason Jars and Plastic has the lowest number of varieties for products in our shop.(Fig 2.6)

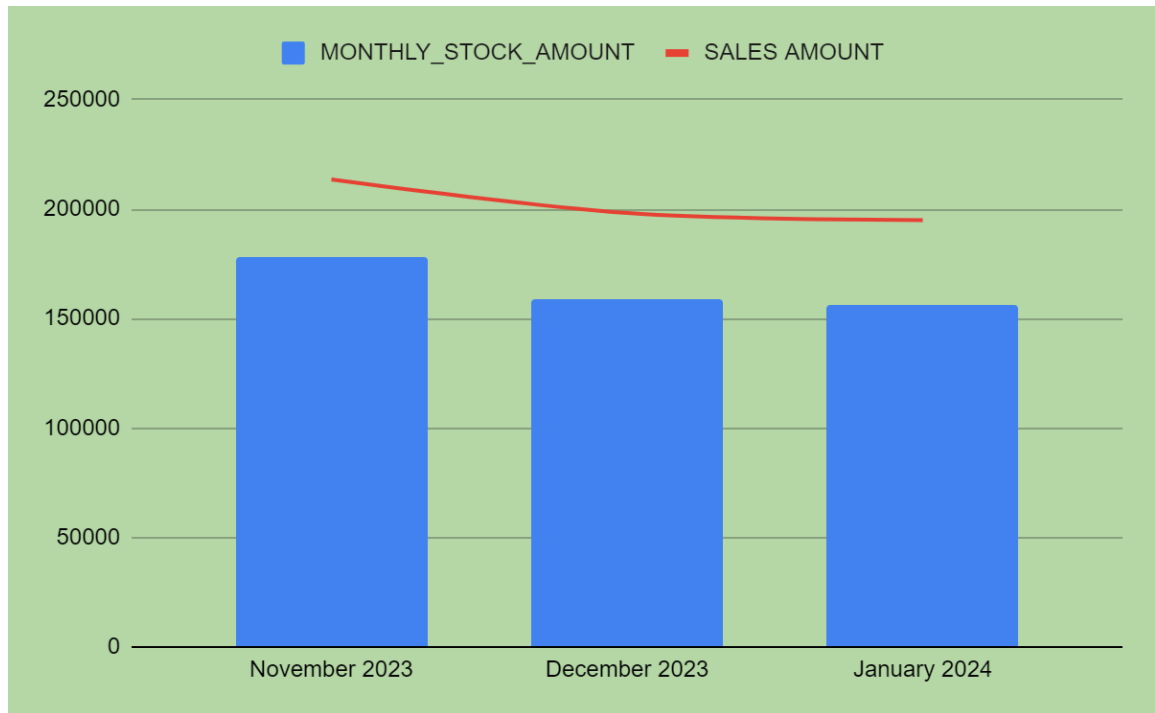


Fig 2.7

The next finding is about the stock amount we have spent vs the sale amount but this time, we are doing this for different months. We can see from the chart, the sale amount is always higher than the stock amount in each month. So again it ensures we are ordering the items in the correct amount. We can say, all our ordered items are being sold each month.(Fig 2.7)

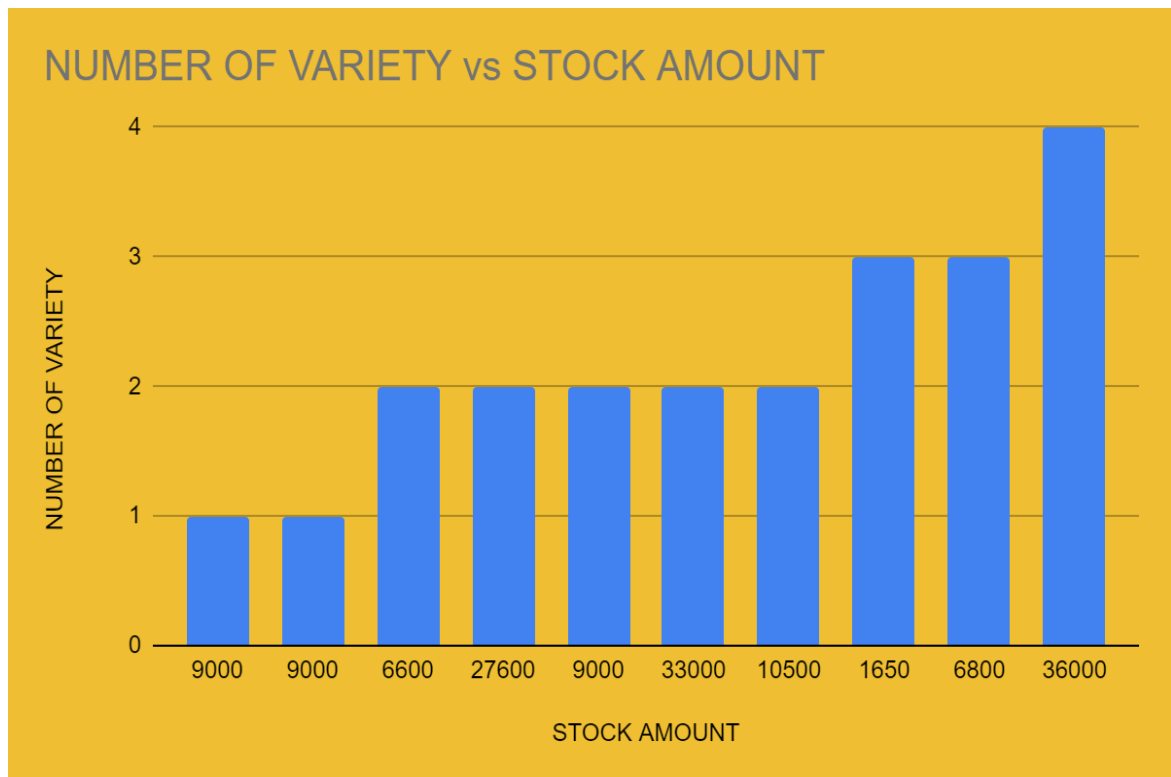


Fig 2.8

The above chart shows the amount which shop owners have spent on a certain category of items. Our items have been categorized based on their category and we can see, the category having the maximum number of variety are getting ordered by spending maximum amounts.(Fig 2.8)

### Step 5 : Sales Analysis

Based on the data we have seen above, our data went under analysis. We evaluated the sales trends and found some performance of the sales month wise. We can see, the sale was the highest in November. We can say, the sale was higher in festive seasons.

### Step 6 : Customer Preferences

The sales data will provide insights into customer preferences, encompassing the identification of preferred store items. It aims to understand variations in customer choices and recognize specific preferences, such as preferences for particular categories. Based on the data we have seen above, our data went under analysis but this time for the purpose of identifying the most preferred item in our shop. Based on the analysis we can say, “Women’s wear” category was the most preferred while “Personal Care” was least preferred in our shop.

### Step 7 : Data Interpretation

The insights derived from analyzing the **99 Market Mall** data will be meticulously interpreted to draw meaningful conclusions. These conclusions will serve as a vital connection to the identified challenges and objectives, aiding informed decision-making for the business. Recommendations will be formulated based on the analysis, aiming to address the challenges effectively. These

recommendations may involve optimizing inventory levels for popular items, aligning the product mix with customer preferences, rectifying stock imbalances, and improving overall stocking strategies. The objective is to implement changes that positively impact efficiency and profitability.

### Step 8 : Report Presentation

The comprehensive report will encompass the complete analysis process, detailing the methodologies utilized, key findings, and actionable recommendations. The report will be meticulously structured, incorporating visual aids like charts and tables to effectively convey insights. This presentation aims not only to offer a clear understanding of the current situation but also to steer future strategies for **99 Market Mall**.

## 3 Results and Findings:

ON PRODUCT CATEGORIES(Fig 3.1)

STOCK AMOUNT

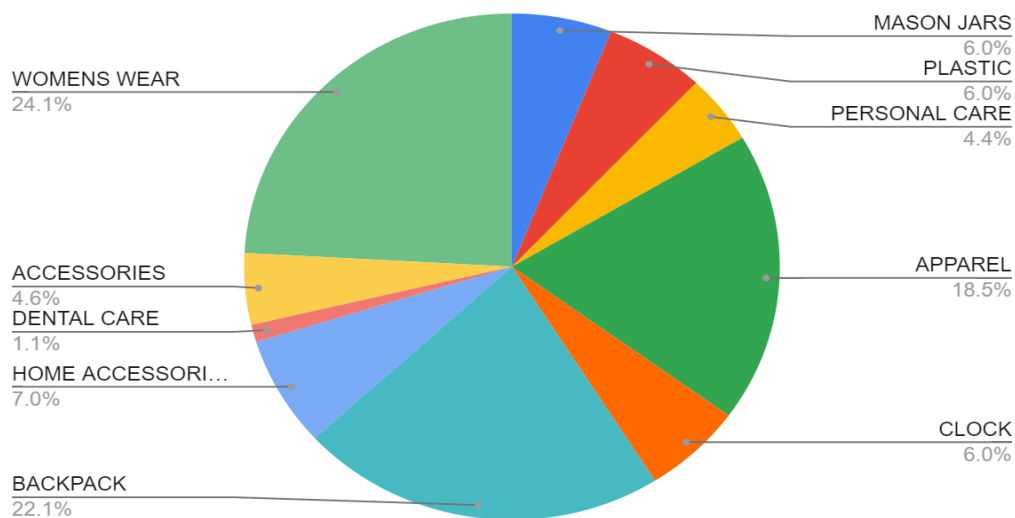


Fig 3.1

**Findings(Fig 3.1) :**

1. Customer preferences for purchasing items vary by Categories.
2. Women's wear and Backpack are the two most favorite categories among customers.
3. Personal care items are least favorite due to their availability on online platforms.

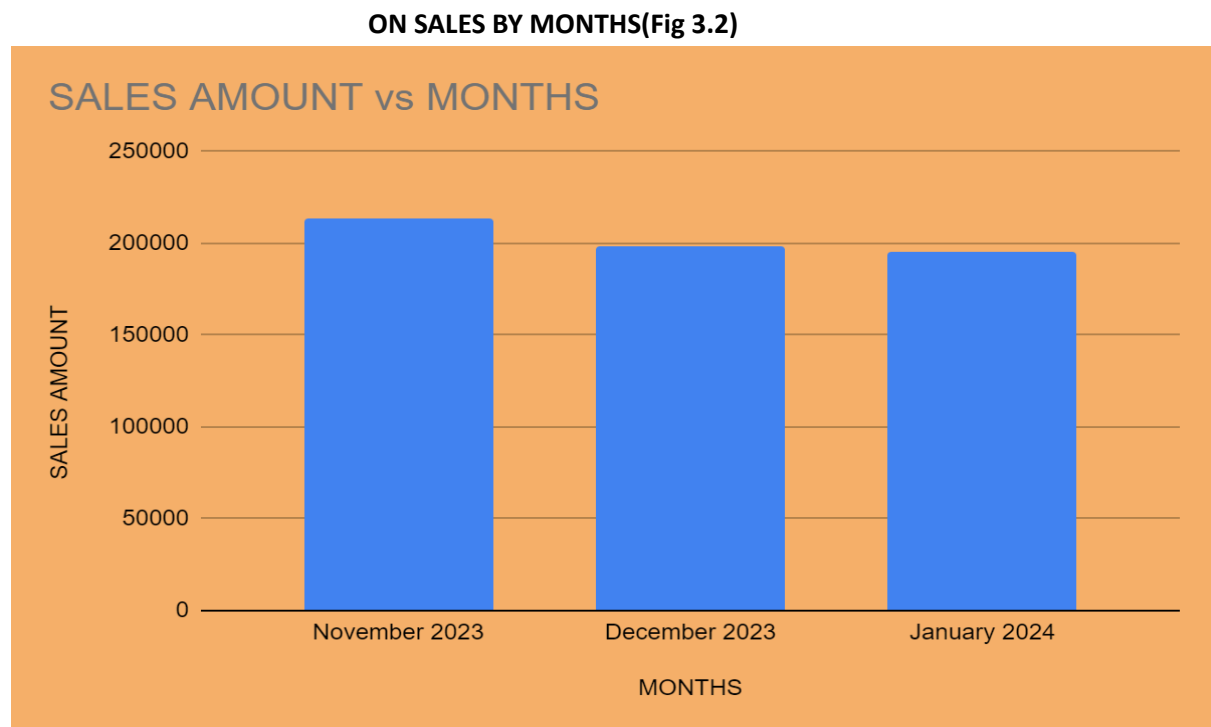


Fig 3.2

**Findings(3.2) :**

1. Sales for our shop varies with month.
2. The Sale was highest in the month of November while it kept decreasing in December and was slightly lower in January also.
3. The sales are fluctuating due to the festival season. November was the festive season. Therefore the sale was the highest. The winter season in North Bihar(where the shop is located), is affecting the number of customers in the market and therefore the sales are comparatively low in December and January.

### ON STOCK BY CATEGORIES(Fig 3.3)

#### STOCK AMOUNT and ACCUMULATED PERCENTAGE

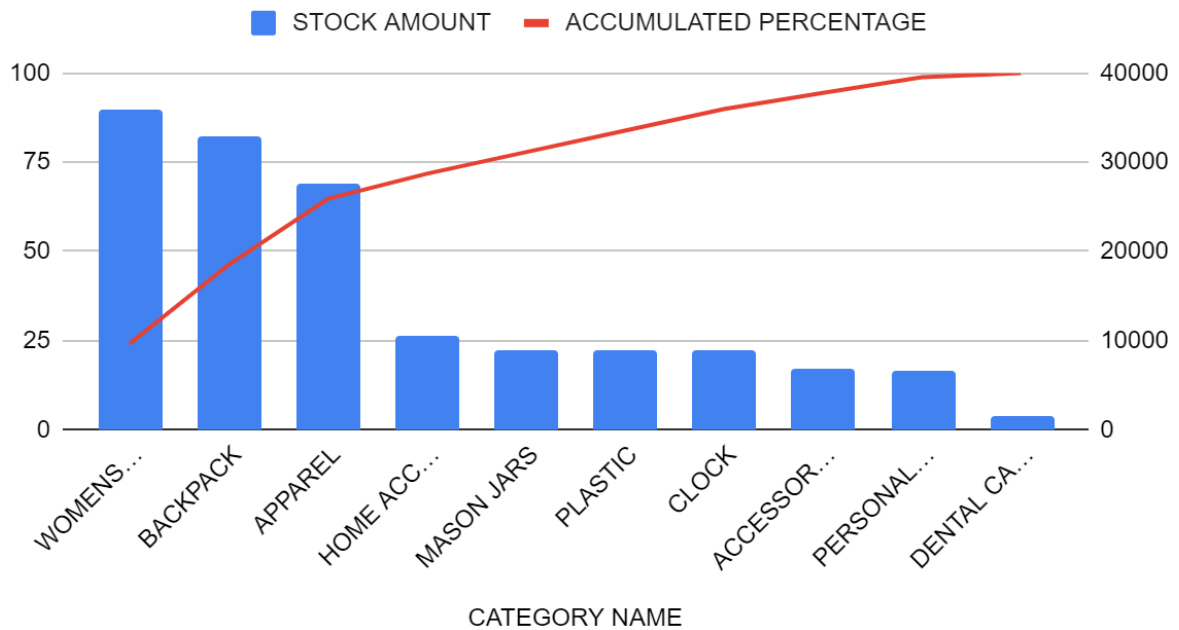


Fig 3.3

#### Findings(Fig 3.3) :

1. Stock for our shop varies largely with categories.
2. Women's wear has the highest stock percentage in our shop while Dental Care Products are in very less amount in our shop.
3. Approximately 65% of the items in stock originate from only three specific Categories:
  - a. Women's Wear
  - b. Backpack
  - c. Apparels

### ON SALES BY CATEGORIES(Fig 3.4)

#### SALE AMOUNT and ACCUMULATED PERCENTAGE

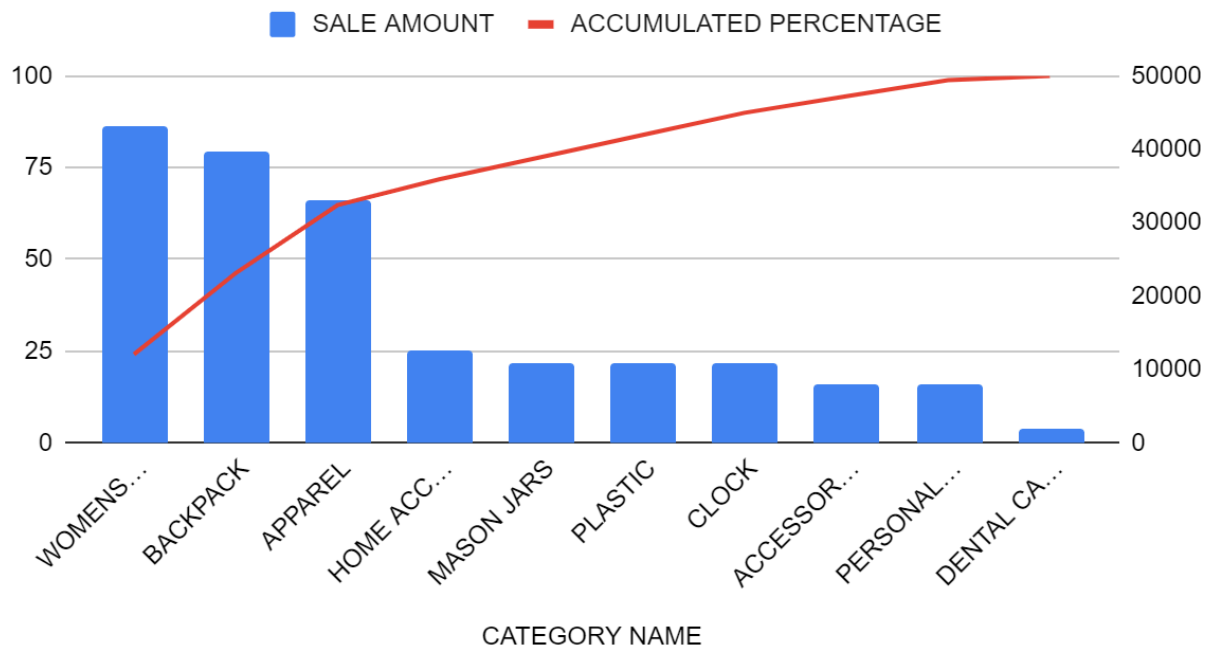


Fig 3.4

#### Findings(Fig 3.4) :

1. Sales for our shop varies largely with categories.
2. Women's wear has the highest sales percentage in our shop while Dental Care Products got sold in very less amount from our shop.
3. Approximately 60% of the items in sales originate from only three specific Categories:
  - d. Women's Wear
  - e. Backpack
  - f. Apparels

**MAJOR FINDING :** We can say, the reason for the versatility in our stock amount was due to their sales. The category which is largely getting sold in our shop is getting ordered in large quantities by the shop owner and the idea is completely justified.



## 4 Interpretation of Results and Recommendations:

### Analysis on Product Categories:

- It's clear that customers have strong preferences when it comes to shopping at our store. Women's wear and Backpacks are the hot favorites, suggesting that we should focus on expanding our offerings in these categories to meet the demand.
- Interestingly, Personal Care items seem to be less popular, possibly because people find them more conveniently available online. This insight tells us that while we can still offer these items, our main focus should be on the products that drive more foot traffic and sales.

### Analysis on Sales by Months:

- Looking at the sales figures, it's evident that our business fluctuates with the seasons and festivities. November sees the highest sales, likely due to the festive season excitement, while December and January witness a dip, possibly because of the onset of winter.
- To tackle these seasonal variations, we need to get creative. This might mean running special promotions or introducing new products to keep customers engaged, even during slower months.

### Analysis on Stock by Categories:

- Our inventory levels vary greatly across different categories. Women's wear seems to be the star of the show, with plenty of stock available. On the flip side, we're lacking in Dental Care Products.
- To keep things running smoothly, we should ensure we're stocking up smartly. This means keeping a close eye on sales trends and adjusting our inventory accordingly. It's all about striking that perfect balance to meet customer demand while minimizing waste.

### Analysis on Sales by Categories:

- The sales data reinforces what we suspected: Women's wear, Backpacks, and Apparels are our top sellers. Clearly, we're doing something right in these departments, and we should continue to invest our efforts there.
- It's also worth noting that our stocking strategy seems to be paying off. By ordering more of the items that are flying off the shelves, we're ensuring that we're always well-prepared to meet customer needs.

## Recommendations to fix our Problems at 99 Market Mall

### 1. Limited Resources

#### 1. Resource Optimization and Cost Management:

- Conduct a thorough audit of current resources and expenditures to identify areas for cost savings.
- Implement cost-effective solutions and prioritize spending on initiatives that directly enhance customer experience or drive growth.

#### 2. Strategic Partnerships and Collaborations:

- Form partnerships with local businesses or suppliers to share resources and reduce costs.

- Explore collaboration opportunities with technology providers or service partners to access advanced tools and innovations at a lower cost.
- 3. **Lean Operations and Efficiency Improvements:**
  - Adopt lean management principles to streamline operations and eliminate waste.
  - Invest in staff training to enhance productivity and ensure resources are used efficiently.
- 4. **Customer Experience Enhancement:**
  - Focus on improving the in-store experience with minimal investments, such as rearranging store layouts or enhancing customer service training.
  - Implement loyalty programs or special promotions to increase customer retention and satisfaction.
- 5. **Technology Adoption and Innovation:**
  - Utilize low-cost technology solutions, such as cloud-based tools or open-source software, to enhance operations without significant upfront investment.
  - Explore grants or subsidies available for small businesses to fund technological advancements.
- 6. **Data-Driven Decision Making:**
  - Leverage available data to make informed decisions about resource allocation and strategic investments.
  - Use data analytics to identify trends and opportunities for optimizing resource use and improving business performance.

## 2. Competition with Large Retailers

1. **Unique Value Proposition and Differentiation:**
  - Identify and emphasize unique aspects of 99 Market Mall that set it apart from larger competitors, such as personalized customer service or exclusive product offerings.
  - Develop a strong brand identity and market it effectively to build a loyal customer base.
2. **Local Community Engagement:**
  - Increase engagement with the local community through events, sponsorships, or partnerships with local organizations.
  - Highlight the benefits of shopping locally to attract customers who value community support and personalized service.
3. **Enhanced Customer Experience:**
  - Focus on delivering exceptional customer service that creates memorable experiences and fosters loyalty.
  - Implement customer feedback mechanisms to continuously improve and adapt to customer preferences.
4. **Targeted Marketing and Promotions:**
  - Develop targeted marketing campaigns that showcase the mall's unique offerings and appeal to specific customer segments.
  - Offer promotions and discounts that provide added value and encourage customers to choose 99 Market Mall over larger retailers.
5. **Exclusive Offerings and Events:**

- Host exclusive events, product launches, or special promotions that draw customers to the mall and create a sense of excitement.
  - Collaborate with local artists or businesses to offer unique products or services that differentiate the mall from larger competitors.
- 6. Investment in Online Presence:**
- Enhance the mall's online presence through a user-friendly website and active social media engagement.
  - Explore e-commerce options or online marketing strategies to reach a broader audience and drive traffic to the mall.
- 7. Customer Loyalty Programs:**
- Implement loyalty programs that reward frequent shoppers with discounts, exclusive offers, or special events.
  - Use these programs to encourage repeat business and build a strong customer base.

## **Conclusion**

In conclusion, our detailed analysis of 99 Market Mall's sales and inventory data from November 2023 to January 2024 provided crucial insights into operational challenges and opportunities. Through careful data collection, cleaning, and visualization using Google Sheets and Google Colab, we identified key trends and patterns. The findings highlight that women's wear and backpacks are the top-selling categories, while personal care items are less favored. To enhance performance, it is recommended to optimize inventory management, focus on high-demand categories, and implement cost-effective strategies to improve customer experience and differentiate from competitors. These actions are essential for achieving greater operational efficiency and sustained growth for 99 Market Mall.

## **Final Note**

Addressing the complex issues of resource constraints and competition requires a thorough and adaptive approach. Our use of business analytics and data-driven insights provides a foundation for implementing effective solutions. We appreciate your attention to this report and hope the recommendations will support 99 Market Mall in overcoming its current challenges and achieving long-term growth.

**Appreciation for your attention to this report is sincerely extended.**

END OF THE REPORT