

Optimizing Inventory and Enhancing Profitability: A Data-Driven Approach to Sustainable Retail Growth for VASHU COMMUNICATION

A Final Submission report for the BDM capstone Project

Submitted by

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1 Executive Summary and Title

This report, titled “*Optimizing Inventory and Enhancing Profitability: A Data-Driven Approach to Sustainable Retail Growth for VASHU COMMUNICATION*,” presents a comprehensive analysis of the business’s sales, purchase, and inventory data over a four-month period. The primary objective of the study was to uncover operational inefficiencies—particularly in inventory management and procurement—and recommend strategies to improve profitability and streamline retail operations. The data for this project was sourced from TallyPrime and included detailed sales and purchase registers, itemized vouchers, and manual inventory records. These datasets were cleaned, formatted, and reorganized into structured tables to facilitate meaningful analysis.

To understand the root causes of financial strain and inventory imbalance, several analytical methods were employed. Inventory turnover analysis provided insight into how effectively products were being sold and replaced, revealing areas of overstock and stock shortages. ABC analysis, conducted both on individual products and across brands, helped identify which items contributed most significantly to overall revenue and warranted priority attention. Demand forecasting was applied to high-impact (A and B category) products to predict future sales trends and guide smarter stocking decisions. Reorder point analysis was also explored to support proactive inventory replenishment.

The findings revealed that while VASHU COMMUNICATION achieved notable sales volume, profitability was hindered by disproportionate purchase costs, over-investment in slow-moving items, and understocking of popular products. Brands such as Vivo, Realme, and Xiaomi contributed heavily to sales but also presented mixed profitability outcomes depending on procurement efficiency. The analysis also highlighted misalignments between forecasted demand and available stock, signaling the need for more responsive inventory practices.

Based on these insights, the report recommends a shift toward data-driven inventory planning, greater focus on high-margin and fast-moving products, and the adoption of strategies such as bundling, clearance promotions, and dynamic pricing. Demand forecasting and reorder point strategies can help reduce stockouts and overstocking, ultimately leading to improved customer satisfaction and better use of working capital. Overall, the report lays out a clear roadmap for VASHU COMMUNICATION to transition from reactive stock management to a more proactive, sustainable, and profitable retail model.

2 Detailed Explanation of Analysis Process/Method

For this project, a structured and methodical, data-driven approach was adopted to thoroughly analyze the sales, purchase, and inventory patterns of **VASHU COMMUNICATION**, a retail mobile phone distributor. The primary objective was to uncover patterns in customer buying behavior, identify inefficiencies in stock management, and ultimately derive actionable insights to increase profitability and operational effectiveness. The analysis was conducted over a four-month period, with a focus on key performance indicators related to inventory flow, brand performance, and sales trends.

The entire process involved multiple interconnected stages: data extraction, cleaning and formatting, exploratory analysis, and targeted quantitative modeling. The aim was not only to interpret historical data but also to develop forecasting and decision-support tools that could assist the business in making better-informed future inventory and purchasing decisions.

Data Collection

The foundation of this analysis lies in the robust and systematic collection of relevant business data. The data used for this project was primarily sourced from **VASHU COMMUNICATION's internal records**, maintained through **TallyPrime 4.0**, and was personally recorded by the owner over a four-month period from **December 1, 2023, to March 31, 2024**.

➤ Primary Data Collection Involved:

- Accessing and extracting digital records directly from **TallyPrime 4.0**.
- Conducting **informal interviews with the business owner** to understand transaction processes and business practices.
- Collecting **manual inventory records** maintained by the owner on the first day of the analysis period.

➤ The following data files were obtained and used for analysis ([link of raw data](#)):

- **Sales Register**: Included Bill No., Date, and Total Sales Amount.
- **Purchase Register**: Included Bill No., Date, Seller Account, and Total Purchase Amount.

- **List of Sales Vouchers:** Detailed line-item data including Date, Bill No., Item Name, Units Sold, and Selling Price.
- **List of Purchase Vouchers:** Included Date, Bill No., Particulars, Item Name, and Units Purchased.
- **Inventory Stock Sheet:** Provided opening stock details for each product as on December 1, 2023. This data was manually provided and converted into Excel format.

By combining **digitally exported data** with **manually recorded inventory inputs** and contextual insights from the business owner, a comprehensive and reliable dataset was developed. This laid a strong foundation for the analyses conducted in the next stages of the project.

Data Preprocessing

The cleaning and formatting of the extracted data was done in the following manner to make it error free and accurate of analysis:

- Creating new Workbook
 - A new excel workbook was created and 5 sheets were created for all the table
 - The names of the sheets were changed for the sake of easy understanding(Sales Register, Purchase Register, List of sales voucher, List of purchase voucher and inventory)
- Data Formatting
 - The list of vouchers were stating the details of products sold and purchased on each day which was making it an unstructured data for the analysis. To solve this separate rows were made for each product mentioning the same dates for it.
 - The amount/price column was added to the list of vouchers to estimate the approximate price for each product.
- Handling missing values
 - There were no important values that were missing from the data.
- Inventory Dataset
 - The data of inventory of each day was calculated by adding and subtracting the purchased and sold products respectively from the total inventory at the end of 30 Nov. 2023.

Sales and Purchase Analysis and Trend Identification

A series of exploratory analyses were conducted to understand the business's operational trends over the span of four months. Pivot tables were used to summarize unit sales, gross profit margins, brand performance, and sales volumes. Several types of **data visualizations** such as bar charts, line graphs, and pie charts were generated to aid in this process.

The first step involved calculating the **average selling price** and **purchase price** for each product, which enabled the estimation of daily and monthly **profit margins**. Separate tables were created to calculate both **daily profitability** and **monthly profitability**, and line graphs were used to visualize trends in revenue, cost, and profit over time.

Given the high product diversity, it became necessary to group products by **brand** (e.g., Vivo, Xiaomi, Oppo, Samsung) in order to make the analysis more actionable. This grouping allowed for brand-wise comparisons in terms of total units sold, total revenue, and overall profitability. **Pareto charts** were used to highlight which brands contributed the most to sales and profits. Additionally, **pie charts** visually illustrated the brand-wise contribution to total sales, providing an intuitive snapshot of the business's market focus.

Customer Behaviour Analysis

Understanding customer behavior helped uncover key trends influencing sales and inventory decisions:

- **Price-Sensitive Buyers:** Customers prefer budget-friendly smartphones, especially from Xiaomi, Vivo, and Realme.
- **Low Purchase Frequency:** Most purchases are one-time, indicating limited repeat buying behavior.
- **Model-Specific Demand:** Certain models within a brand sell more than others.
- **Offers Drive Sales:** Promotions and discounts influence customer decisions significantly.
- **Accessory Sales Underperform:** Accessories are underutilized despite strong upselling potential.

SWOT Analysis

A strategic SWOT analysis was conducted to assess the business's internal strengths and weaknesses, along with external opportunities and threats:

➤ Strengths

- Well-established local reputation.
- Broad range of mobile phones and accessories.
- Prime location with steady foot traffic.

➤ Weaknesses

- Poor inventory turnover with overstocked items.
- Inconsistent profitability due to procurement inefficiencies.
- No online selling platform.
- Accessories remain an untapped revenue stream.

➤ Opportunities

- Expand to online marketplaces for wider reach.
- Introduce combo deals and product bundling.
- Leverage data for demand forecasting and optimized restocking.

➤ Threats

- Intense local competition from nearby stores.
- Rapid depreciation of tech inventory.
- Price-based competition affecting margins.

The reason behind conducting this SWOT analysis was to systematically understand the internal and external factors affecting VASHU COMMUNICATION. By identifying specific strengths to

leverage, weaknesses to address, opportunities to pursue, and threats to mitigate, this framework provides a structured foundation for strategic decision-making. It helps align the business's resources and market potential with practical solutions—especially in improving inventory turnover, enhancing profitability, and expanding reach through digital platforms.

Major Analytical Methods

To address the growing concern of **inventory overstock**, which was the main reason for the loss, the analysis was extended to include inventory-specific KPIs and predictive models. The goal was to help VASHU COMMUNICATION optimize stock levels, avoid product stagnation, and ensure timely reordering of fast-moving products. Four major analyses were undertaken in this section:

➤ Inventory Turnover Analysis

The inventory turnover ratio is a widely used metric to evaluate how efficiently a company converts its inventory into sales over a given period. In this project, the turnover ratio was calculated for each product using the formula:

$$\text{Inventory Turnover} = \text{Cost of Goods Sold (COGS)} / \text{Average Inventory}$$

This metric provided valuable insights into which products were actively contributing to revenue and which were lying stagnant on the shelves. Products with a **high turnover ratio** were identified as fast-selling items, while those with a **low or zero turnover** indicated overstocked or dead stock. This helped in isolating the items most responsible for locking up working capital.

➤ ABC Analysis (Product-Wise and Brand-Wise)

To prioritize inventory management efforts based on its sales value or importance, **ABC analysis** was performed both at the product level and the brand level. This technique involved ranking products by their contribution to total revenue and then categorizing them into three classes:

- **A items (Top ~80%)** – High-value products that contribute most to revenue
- **B items (~15%)** – Moderate-value contributors
- **C items (~5%)** – Low-value products with minor impact

For product-wise ABC, individual SKUs were assessed, which gave granular insights. For brand-wise ABC, the products were grouped by brand to offer a strategic overview of which brands deserved more inventory investment and promotional focus. The **cumulative percentage method** was applied to classify items, and **Excel formulas** and **Pie charts** were used for visualization.

➤ **Reorder Point Analysis**

To optimize the timing of inventory replenishment, a **Reorder Point (ROP) formula** was applied. The formula used was:

$$\text{Reorder Point} = (\text{Average Daily Demand} \times \text{Lead Time}) + \text{Safety Stock}$$

Here, average daily demand was calculated using past sales data, and a reasonable lead time (based on supplier delivery patterns) was assumed. Safety stock was added to prevent stockouts due to unexpected surges in demand or supply delays. This method helped in creating a proactive reorder mechanism, ensuring that stock is ordered just in time before depletion without causing overstock.

➤ **Demand Forecasting (for A & B Category Products)**

A basic yet effective **demand forecasting model** was employed to estimate the upcoming month's sales for high-priority products (specifically those in categories A and B). Excel's **FORECAST.LINEAR** function was used to predict demand based on previous months' sales data. The forecast allowed for better planning and alignment of inventory procurement with customer demand. This approach was especially useful for frequently sold models, where historical sales patterns were stable enough to enable short-term prediction.

This forecasting model enabled the business to identify which high-demand products might go out of stock and plan timely procurement to maintain uninterrupted sales.

3 Results and Findings

a. Overall Performance

- The total sales amount over four months was ₹1,521,232, but the total purchase amount was slightly higher at ₹1,525,384.29, leading to a net loss of ₹4,152.29.
- The profit margin fluctuated, with December and March being profitable months, while January and February had significant losses. This can be seen in the graph below (fig. 1).

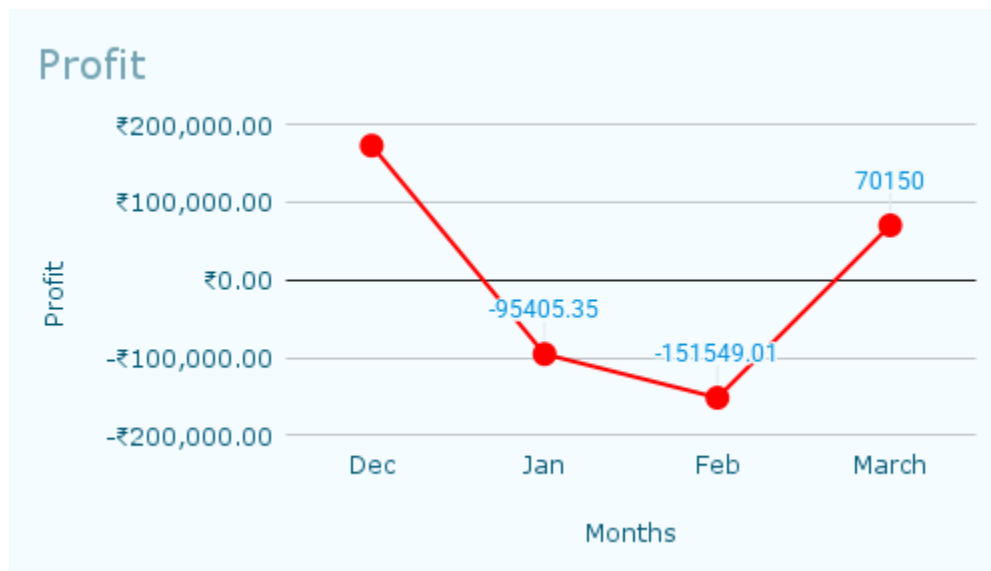


Fig. 1. Profit in each month

The graph illustrates monthly profit trends for VASHU COMMUNICATION over four months.

b. Monthly Performance

- **Best Month:** December had the highest profit (₹172,652.07) despite moderate sales (40 units).
- **Worst Month:** February had the highest sales (50 units) but resulted in a loss of ₹151,549.01, suggesting high purchase costs.
- January showed the weakest performance, with both low sales (30 units) and the highest loss (-₹95,405.35).

Month	Sales Unit	Total sales amount	Total purchase amount	Profit
Dec	40	₹363,298.00	₹190,645.93	₹172,652.07
Jan	30	₹310,697.00	₹406,102.35	-₹95,405.35
Feb	50	₹499,095.00	₹650,644.01	-₹151,549.01
March	33	₹348,142.00	₹277,992.00	₹70,150.00
Total	153	₹1,521,232.00	₹1,525,384.29	-₹4,152.29

Fig. 2. Sales unit & Profit in each month

The above table (fig. 2) displays month-wise data for sales units, total sales amount, total purchase amount, and resulting profit over four months.

c. Sales vs. Purchase Trends

- Sales and purchase trends don't always align—higher sales do not always lead to higher profits.
- February had the highest sales but the biggest loss, meaning either the purchase cost was too high or the selling price was too low. This can be seen in the graph below. (fig. 3)

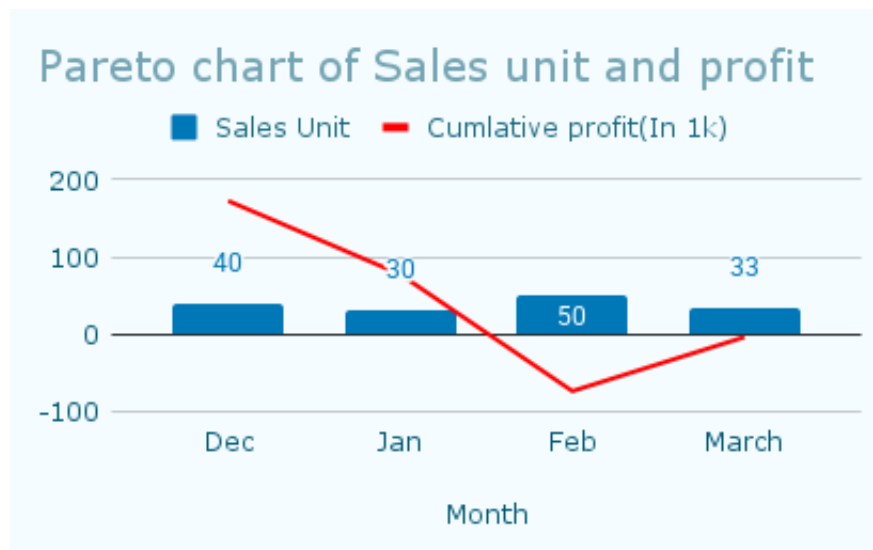


Fig. 3. Pareto chart of Sales unit and profit

The graph shows the monthly sales units and cumulative profit from December to March. While February had the highest sales, it resulted in the lowest cumulative profit, highlighting issues with pricing or procurement. In contrast, December had moderate sales but the highest profit. This indicates that strong sales volume alone doesn't guarantee profitability and cost control is equally crucial.

d. Brand-Wise Sales Insights

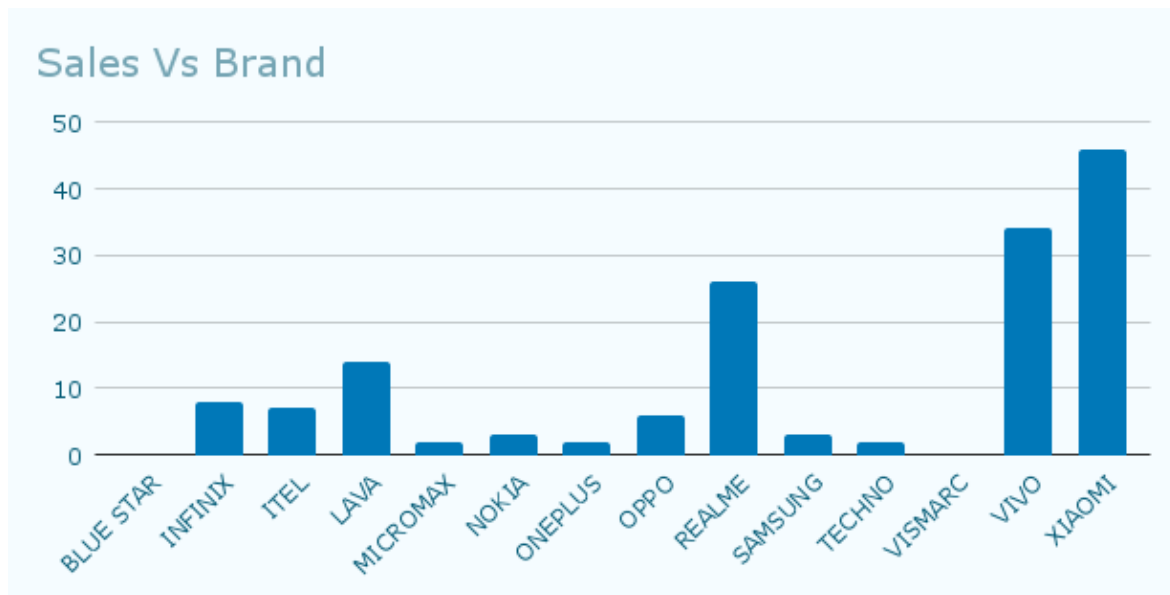


Fig. 4 Sales Vs Brand

From the above graph(fig. 4) we can easily figure out the following:

- **Best Selling Brands:**

- Xiaomi, Vivo, and Realme performed best in terms of units sold, accounting for a significant portion of sales.
- Xiaomi sold the most units (46 out of 153 total).

- **Worst Performing Brands:**

- Blue Star and Vismarc recorded zero sales despite purchases, leading to a loss.
- ITEL and Lava had low sales despite being purchased in significant numbers.

e. Profitability by Brand

Brand	Sales Amount	Purchase Amount	Profit
BLUE STAR	0	3814.666667	-3814.666667
INFINIX	80599	108900.5	-28301.5
ITEL	32400	79398.58333	-46998.58333
LAVA	15580	50261	-34681
MICROMAX	2500	0	2500
NOKIA	5250	13740	-8490
ONEPLUS	38300	29961.25	8338.75
OPPO	81599	0	81599
REALME	281900	200910.005	80989.995
SAMSUNG	24500	149018.16	-124518.16
TECHNO	17400	6199	11201
VISMARC	0	3600	-3600
VIVO	453172	282479.6283	170692.3717
XIAOMI(Redmi & MI)	488032	597101.4967	-109069.4967
Total	1521232	1525384.29	-4152.29

Fig. 5 Profitability by brand

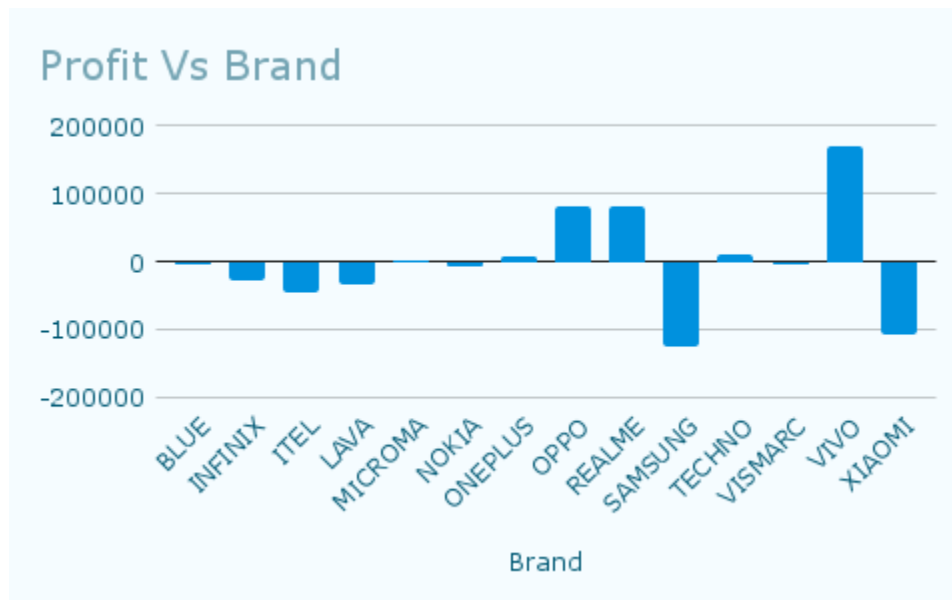


Fig. 6 Profit Vs Brand

From fig. 5 & 6, we understood that:

- Most Profitable Brand: Vivo and Xiaomi contributed the most to revenue, with Xiaomi generating ₹488,032 in sales.
- Biggest Losses:
 - Xiaomi, despite its high sales, faced a net loss of ₹109,069.49 due to high purchase costs.
 - Itel had a huge purchase cost (₹79,398.58) but contributed very little to sales.

f. Inventory Turnover Analysis

- The **inventory turnover ratio** was calculated for each product to determine how quickly inventory is being sold and replaced. The distribution can be seen in the pie chart below. (fig. 7)

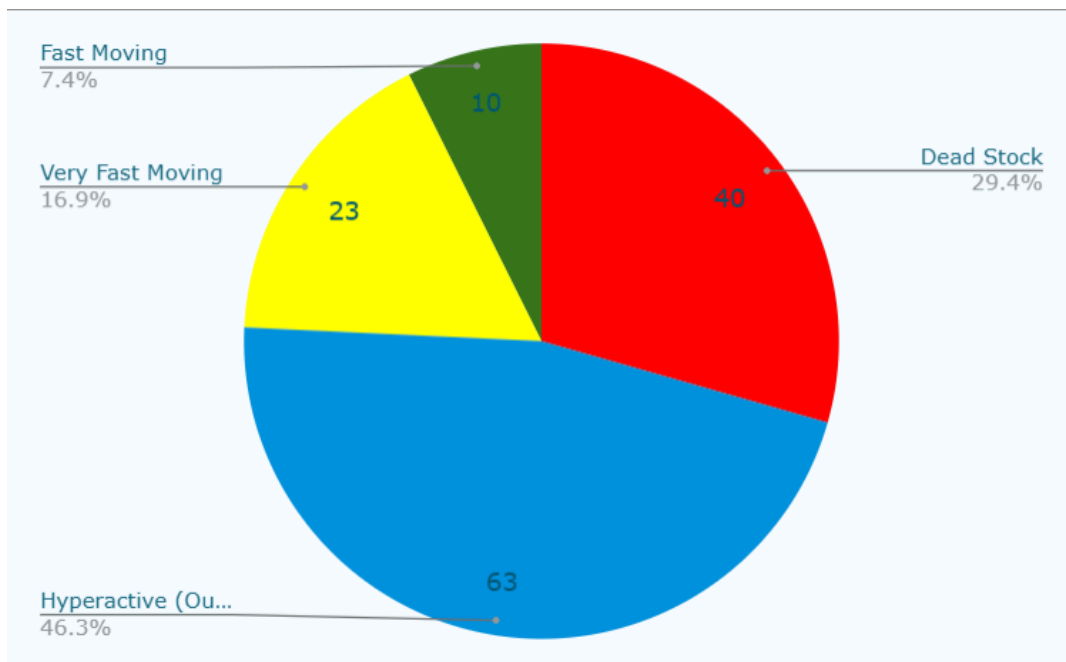


Fig. 7. Inventory turnover category pie chart

The chart revealed the following categorization:

- **Dead Stock** (0 turnover): 40 products ($\approx 29.4\%$)
 - **Fast Moving:** 10 products ($\approx 7.4\%$)
 - **Very Fast Moving:** 23 products ($\approx 16.9\%$)
 - **Hyperactive/Outlier Products:** 63 products ($\approx 46.3\%$) with exceptionally high turnover—often due to low average inventory.
- **Insight:** A large percentage of inventory either never moved or moved abnormally fast, indicating **inefficient stocking practices**.

g. ABC Analysis

➤ Product-Wise ABC Analysis:

- **A Category (Top ~80% of sales):** Comprised **35% of total products**, indicating that a relatively small group of items drives the majority of sales.
- **B and C Categories:** Accounted for the rest, representing items with either moderate or very low sales contributions.
- This insight stresses the need to **focus on high-performing products** and reconsider investment in slower movers.

➤ Brand-Wise ABC Analysis:

- **Xiaomi, Vivo, and Realme** contributed to over **80% of total sales**, yet they represent only **21% of the brand offerings** which is visible in the graph below.(Fig. 8)

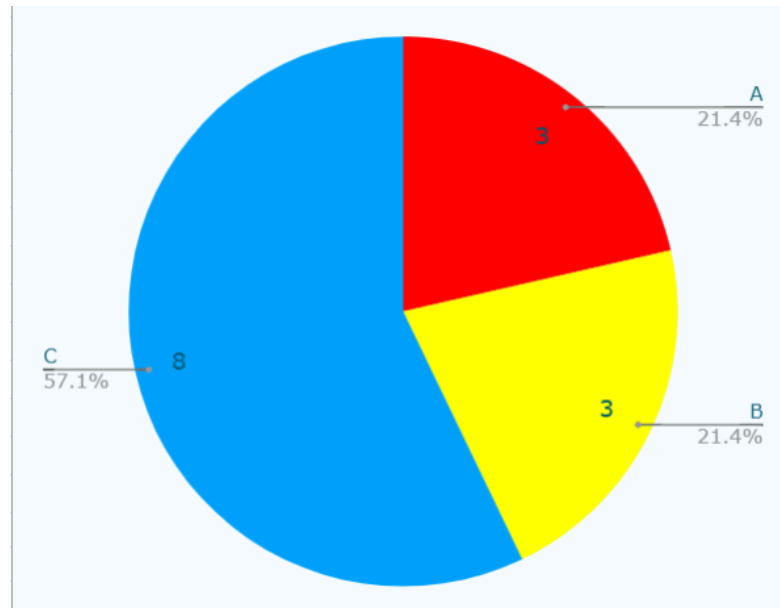


Fig. 8. Proportion for ABC category

- **Remaining brands**, accounting for nearly **79% of the variety**, contributed only marginally to revenue.
- This indicates a clear **80/20 principle**, where a small subset of brands drives most of the business.

h. Demand Forecasting for A & B Products

A forecasting model was applied to the top-selling A and B category products for the month of April using the last four months' sales data. The objective was to estimate short-term demand and compare it against current stock levels.

A bar chart(Fig. 9) was created to visualize **forecasted demand (in red)** versus **current stock (in blue)** for major selling items as an effort to predict the sales for the **next month(April)**.

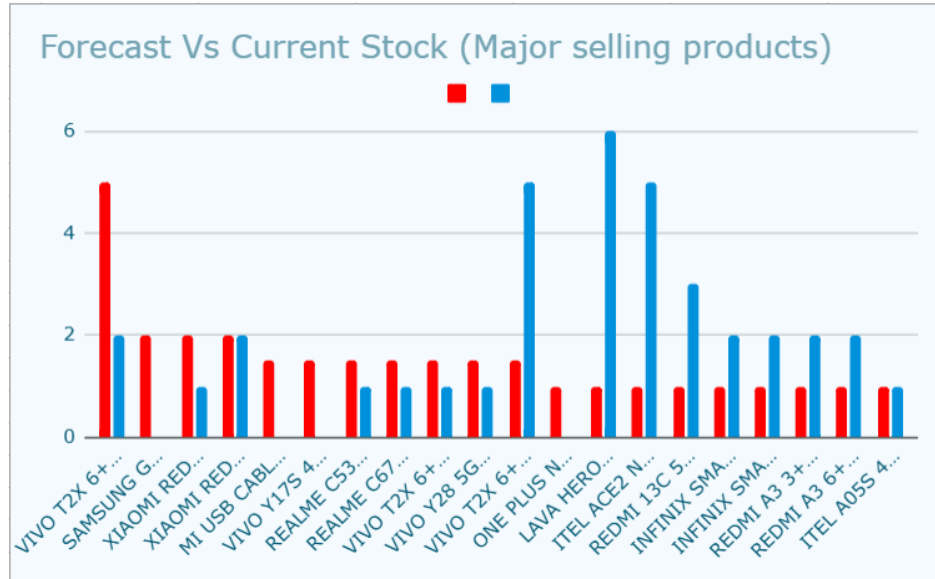


Fig. 9. Forecast Vs Current stock for major selling products for the next month(April)

➤ **Products Like**

- Items such as **VIVO T2X 6+**, **MI USB cable**, **REALME C53**, and **VIVO Y28 5G** show higher predicted demand than current stock levels, indicating an **immediate need for restocking** to avoid missed sales opportunities.

➤ **Balanced Inventory Products:**

- Products like **REALME C67**, **VIVO T2X 8+**, and **REDMI 12 5G** have stock levels that align closely with forecasted sales, reflecting **well-managed inventory**.

➤ **Overstocked Items:**

- Several products such as **LAVA HERO**, **ITEL ACE2**, and **REDMI 13C** have significantly **higher stock levels than forecasted sales**, suggesting **overstocking** or **declining demand** for these products.
- Overstocking leads to **capital lock-up and potential markdown losses**.

4 Interpretation of Results and Recommendations

Interpretation of Results

The comprehensive data analysis of VASHU COMMUNICATION's sales, purchases, and inventory reveals several underlying patterns impacting its financial health and operational efficiency.

Firstly, although the total sales amount reached ₹1,521,232 over four months, the overall profitability remained negative due to disproportionately high purchase costs and inefficient inventory turnover. The profit trends were inconsistent—while December emerged as the most profitable month, February, despite achieving the highest sales volume, incurred the steepest loss. This disconnect between sales volume and profit underscores the need to align procurement with actual demand and optimize pricing strategies.

Brand-wise analysis highlighted that while brands like Xiaomi, Vivo, and Realme contributed to over 80% of the total sales, not all of them were profitable. Xiaomi, despite being the top-selling brand, resulted in significant losses due to high procurement costs. This indicates that sales volume alone does not determine profitability, and brand-level cost control is essential.

The inventory turnover analysis further revealed that 30% of products remained in the dead stock category, signifying poor inventory movement and tying up working capital. On the other hand, a large portion of products moved either too quickly (hyperactive) or too slowly, suggesting either stock outs or overstocking.

The ABC analysis reinforced the classic 80/20 principle—just 35% of products contributed to 80% of the sales, and only 21% of brands drove the majority of revenue. This highlights the need for a focused product strategy, where more attention and resources are directed towards top-performing items while phasing out or discounting underperformers.

Lastly, demand forecasting of A and B category products exposed several mismatches between expected sales and existing stock. Some high-demand items showed insufficient stock, while others with low forecasted demand were overstocked. This imbalance reflects a need for improved planning based on predictive analytics.

Together, these insights point to operational inefficiencies, especially in procurement, pricing, and inventory management. Addressing these areas strategically will enable the business to minimize losses, streamline stock, and improve long-term profitability.

Recommendations

- Approximately 30% of the products fall under the dead stock category (as identified through inventory turnover analysis). These items should be cleared through targeted promotions or bundling and must not be repurchased unless specifically demanded by a customer.
- Products classified as Category C in the ABC analysis contribute minimally to overall sales and should be purchased only after forecasting.
- Clearance of dead stock and C-category products should be executed via flash sales, bundle offers with fast-moving items, or festival discounts to accelerate turnover.
- Although Xiaomi, Vivo, and Realme account for 80% of total sales, Xiaomi generates a net loss due to high procurement costs. Stricter negotiation with Xiaomi's supplier is essential, and new Xiaomi stock should only be ordered based on accurate demand forecasts.
- Demand forecasting must be strictly followed when reordering A and B category products, using monthly sales trends rather than relying on assumptions.
- Each month, identify the least-selling items and offer time-bound discounts on them to boost their sales and reduce accumulation
- Avoid restocking items that repeatedly appear in the "fast-moving but unprofitable" segment unless purchase costs are renegotiated or pricing is revised.
- Discontinue purchases from brands like Itel, Lava, and Vismarc, which consistently result in low sales or financial losses.
- It is strongly recommended to sell the products on platforms like Amazon, Flipkart, Meesho, etc.
- Launch loyalty programs or referral discounts to encourage repeat purchases and build customer retention.