Enhancing Profits through Demand Forecasting and Strategic Inventory Management

A Midterm report for the BDM capstone Project

Submitted by

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Executive Summary

Located at E-108/1, Munirka Village, New Delhi, SRJ Enterprises is a stationary shop which operates in B2C segment, selling quality and affordable stationary supplies to students and professionals. Even having steady customer base, the shop has recently faced sales issues due to inadequate prediction of seasonal demands and inefficient stock management. Due to these problems there is overstocking of slow-moving items and stockouts during peak seasons, effecting the revenue, increased holding costs, missing sales opportunities and overall profitability of business.

The analysis is performed using six months sales data of SRJ Enterprises (January-June 2024) which includes 64 SKUs grouped by different categories. The Metadata key includes Product Name, product type, opening stocks, purchases, total cost, total revenue and total profit. The descriptive statistics revealed various seasonal trends with June having highest sales compared to February with the lowest. The analysis established corelation with demand patterns during school reopening periods.

The analysis of sales data was done using ABC analysis, which identified that pens and notebooks contributed to 80% revenue generation. Seasonal analysis revealed demand spike patterns during season reopening season and highly overstocked items despite moderate sales, high value products such as Cello Colorup that generate revenue of ₹14,450 from just 24 units were identified by inventory analysis using revenue-to-inventory calculations. These methods help to create practical solutions and strategies to overcome the sales difficulties faced by SRJ Enterprises.

Proof of Originality

To showcase the originality of this project, I have provided with some necessary documentations below to prove the authenticity of my research work:

Letterhead from the Organization: The owner of the business, Mr. S.K Jain has provided me a signed letterhead allowing the use of past sales data. [Image present at appendix section]

https://drive.google.com/file/d/1TyL6bhj-31swJDcNt-kSydd47gpMviyG/view?usp=sharing

Images of the Business: The pictures below are the images of the business. [image present at appendix section]
https://drive.google.com/drive/folders/1ouI0ePLlj772FpROKOguiYjWeMEOrhJf?usp=sharing

Interaction video with the business owner: I have recorded a short video, while discussing the business problem with the business owner

https://drive.google.com/file/d/1BlT-sh4Irzn4_kqAjFS3Arx1gpReOre_/view?usp=sharing

Field notes: Handwritten insights made during discussion with business owner.

https://drive.google.com/file/d/12A6pJ5nm_UGYVEFk_t0VXgGOmt67m4Jv/view?usp=sharing

Metadata and Descriptive Statistics

Metadata:

The owner of business, Mr S.K Jain has granted me the access to last year's first half sales data, to analyse and create strategic solutions to improve the sales in 2025, by solving issues related to stock inventory mismanagement and inaccurate demand forecasting.

Metadata Overview:

Dataset Name: Main Inventory Data

Time Period Covered: January 2024 - June 2024

Data Source: 2024 first half sales record of SRJ Enterprises.

Purpose of Collection: The main objective of data collection is to improve efficiency of stock management, demand forecasting and reduce inventory holding costs by analysing past sales data.

Number of Sheets: 6 (one for each month)

Dataset Link:

https://docs.google.com/spreadsheets/d/11SjHcD0IGv_tUeF66YRpbxJAivr13jzl/edit?usp=sharing&ouid=114290423234172751812&rtpof=true&sd=true

Metadata Keys:

Key	Description
Product Name	The brand and name of the items.
Product Type	Sorting products based on different categories.
Opening Stock	Initial quantity available in stock at the start of a month.
Purchases	The total number of units purchased in a month.
Closing Stock	Final quantity remaining in stock at the end of a month.
Units Sold	The total number of units sold in a month.
Purchase Price	The unit price at which the item was purchased.
Selling Price	The unit price at which the item was sold.
Total Revenue	The overall amount generated by the sales of a product.
Total Cost	The total procurement cost of each product.
Profit	The net profit of each product.

Descriptive Statistics:

The following analysis provides a brief overview and summarizes the key sales and inventory metrics, which would help to identify the inefficiencies in the inventory and better forecasting of upcoming demand patterns.

Descriptive Statistics Measure & Definition:

Measure	Definition

Sum	Total value of a particular metric.
Mean	Average of the values of a given metric.
Standard Deviation	Measures how are the values spread out.
Minimum	The lowest value.
1st Quartile (Q1)	The value below which 25% data falls.
Median (Q2)	The middle most value after arranging in ascending order.
3rd Quartile (Q3)	The value below which 75% data falls.
Maximum	The highest value.

Overall Sales Data (Jan 2024 – June 2024):

Measure	Opening Stock	Purchases	Closing Stock	Units Sold	Purchase Price	Total Revenue	Total Cost	Profit
Sum	15,112	9,305	16,589	7,828	26,250	590,219	448,377	141,842.
Average	39.35	24.23	43.20	20.39	₹68.36	₹1,537.03	₹1167.65	₹369.38
Std. Deviation	14.92	12.56	16.30	11.92	₹62.84	₹1380.57	₹1167.52	₹258.43
Minimum	11	0	10	2	₹2.00	₹75.00	₹30.00	₹40.00
Q1	29.00	15.00	32.00	12.00	₹21.50	₹536.25	₹328.75	₹180.00
Median	39.00	22.50	43.00	18.00	₹45.00	₹1,245.00	₹905.00	₹315.00
Q3	49.25	32.00	54.00	26.00	₹93.75	₹2,085.00	₹1605.00	₹495.00
Maximum	91	72	93	70	₹300.00	₹9,065.00	₹8085.00	₹1860.00

The sales data contains various categories of products. There are 18 product categories in total. But still categories like Pens and pencils are specifically chosen for further analysis due to their significant consistent contribution to sales movement. The below descriptive statistics tends to give more clear insights regarding the distribution and trends of these categories.

Pens:

Measure	Opening Stock	Purchases	Closing Stock	Units Sold	Purchase Price	Total Revenue	Total Cost	Profit
Sum	2127	1408	2222	1313	---------	105270	81875	23395
Average	38.71	16.24	32.24	22.71	76.18	1844.12	1408.82	435.29
Std. Deviation	13.52	7.33	11.68	8.96	63.36	619.90	557.10	111.77
Minimum	13.00	0.00	11.00	7.00	25.00	650.00	450.00	200.00
Median	44.00	18.00	34.00	26.00	65.00	1860.00	1305.00	435.00
Maximum	57.00	28.00	51.00	34.00	300.00	2700.00	2210.00	620.00

Pencils:

Measure	Opening Stock	Purchases	Closing Stock	Units Sold	Purchase Price	Total Revenue	Total Cost	Profit
Sum	1182	802	1240	744	----------	43680	31545	12135
Average	33.56	12.22	26.78	19.00	87.78	1581.11	1186.67	394.44
Std. Deviation	16.84	7.08	12.44	10.94	85.52	607.44	542.86	126.95
Minimum	13.00	0.00	11.00	7.00	25.00	650.00	450.00	200.00
Median	27.00	10.00	27.00	13.00	65.00	1740.00	1240.00	405.00
Maximum	57.00	22.00	45.00	34.00	300.00	2520.00	2100.00	620.00

The descriptive statistics shown above gives important insights regarding inventory and sales pattern across a time period of 6 months from January 2024 to June 2024. These measures help to identify significant stock movement patterns and profitability, which would eventually help to create data-driven strategies to increase the overall performance of business.

Analysis processes and methods

The project aims to create data-driven strategies to address and solve SRJ Enterprise's issues regarding inventory level mismanagement and inaccurate forecasting of seasonal demands. The analysis begins with the data collection of past sales data of 6 months, from January 2024 to June 2024. After extracting the raw sales data, it was made more structured dataset for the ease of analysis and study of sales pattern. The process involved cleaning and categorizing similar products into a single category before using techniques for analysis. The dataset contains 64 unique SKU's classified into different categories. For the analysis part, below mentioned analysis techniques were used to find sales pattern and generate important insights.

- **ABC Analysis** was used to categorize items based on their contribution to value, which will help to create strategies to optimize the 20% products which account for the 80% sales. The main objective of performing this method was to prioritize efficient stocking of high-value products.
- **Seasonal Trend Analysis** has been done using pivot tables to get insights regarding sales trends and patterns which are seasonal by comparing sales of each month. After performing this analysis, a very crucial information regarding the seasonal fluctuations in sales were found.
- **Inventory Management Analysis** was used to solve inventory related problems, various analysis methods like the **stock-to-sales ratios** of every product across different months, revealed signs of potential overstocking of certain product categories even after having making moderate sales. Calculations for **safety stock** were also done to find the optimal levels of safety stocks and avoid overstocking.
- **Revenue-to-Inventory Ratio (RIR)** was used to get insights regarding relation between revenue generated and sales made. This revealed difference in many products generating significantly high revenue despite having low sales volume. By using this analysis method, high-RIR products can be optimised during high sales demand season and reduce stock levels for low-RIR products.

Powerful tools like Microsoft Excel and its functions like pivot tables were used for organization and analysis of data. Visualization tools like Tableau were used for transforming complex data into visually pleasing seasonal patterns and trends for better understanding for results and findings.

Results and Findings

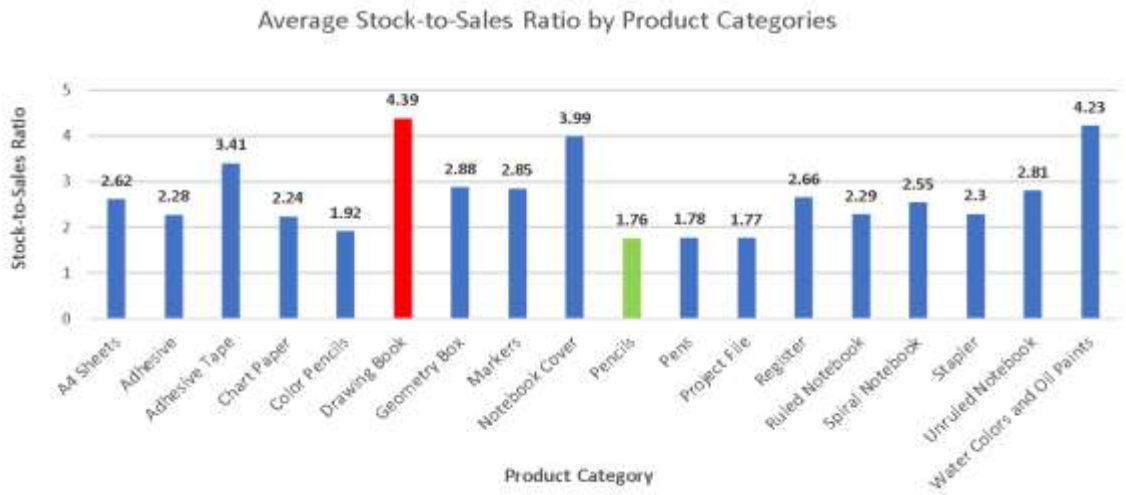
From analysis of the previous sales collected. The following results and findings have been gathered.

- Based on the ABC Analysis, writing instruments (pens, pencils) and notebooks contributed to nearly 80% of revenue, especially during the school reopening season. These items are Category A products, should be restocked on-time during peak sales period.
- Category B includes mid-range items like art supplies and premium stationery, which have moderate sales but still has significant contribution to the revenue. Category C comprises low-demand products, such as specialized stationery and niche items, which should be stocked cautiously to avoid overstocking.

- By the analysis of items sold in each months showed a crucial finding that highest sales (2,201 units) were made in the month of June, followed by April (1,651 units) and May with sales of 1,298 units.

The lowest performing month was February with sales of just 708 units, almost around 1/3rd of the overall sales made in the peak month June.

- From the analysis it is pretty much evident that there's a sales rise from the month of April to June, which may indicate the seasonal demand increase due to school reopening and back to school purchases. Writing Instruments like pen and pencil dominate the sales, followed by notebooks due to their high demand among school and college students.
- The most-selling product was **Cello Finegrip**, with a overall sales of 217 units. Similar high demand products include **Nataraj 621 Writing Pencils** (208 units), Apsara Matt Magic 2.0 (195 units), Classmate Pulse Spiral Notebook (191 units) and Pentonic 0.7mm Pens (186 units).
- There were many products which showed signs of overstocking in the inventory, even having significant amount sales. Such pattern is generally observed in stationery and paper-based products due to trend fluctuation based on seasonal patterns.
- For instance, Yashwin Laminated Transparent Cover sold only 5 units in the month of February with 54 units left in the stock, Edet A4 White Sheets (150 gm) also had 54 units left in the inventory after closing sales of 14 units. The possible explanation to this behaviour could be due to less demand on Paper supplies before the school re-opening season.



- When the academic season ends in June, notebooks and stationary supplies again show increased stock levels compared to the sales made. Navneet Notebook (172 pages) was left with 93 units in the stock despite selling 61 units, which shows a decline in the demand of stationary supplies after school season ends.
- Products with **high revenue-to-inventory** efficiency included Cello Colorup (24 pencils), which generated ₹14,450 in revenue from just 24 units sold and Classmate LongBook (384 pages) sold only 118 units but generated ₹25,660 in revenue representing significant profit potential despite lower sales volume.
- On the other hand, there are some products having **low revenue-to-inventory** efficiency Like, Classmate Notebook Single Line (120 pages) sold 164 units but only made ₹1,640 in profits, Navneet LongBook (76 pages) sold 163 units still only manged to generate ₹1,956.

Appendix : Proof of Originality

The below attached are some of the pictures of SRJ Enterprises, Mr. S.K Jain(Owner) and signed letterhead for the permission of sales data usage for data analysis.

Images of SRJ Enterprises and owner of the business Mr. SK Jain.

SRJ ENTERPRISES

Address: E-108/1, Munirka
New Delh, 110067
Mob: 9312682241

Dear Samarth S,

14 January, 2025

This is to confirm that, SRJ Enterprises has granted you permission to collect and utilize data from our shop for your academic project.

We understand that the data collected will be used exclusively for educational purposes, not shared publicly, or used for other commercial purposes. We trust you will handle the information responsibly and maintain the confidentiality of any sensitive details.

We appreciate your initiative in analysing our business operations, your insights and findings will be valuable in helping us understand sales trends and optimize our processes. We believe that your analysis will contribute to meaningful improvements in our future growth.

Sincerely,

Ramesh Chand Jain
SRJ ENTERPRISES OWNER

SRJ ENTERPRISES
E-108/1, Baba Gang Nath Mkt.,
Munirka, New Delhi-67

Letterhead giving permission for Data Collection signed by the owner of business.