Boosting Sales at A.R Furniture through Strategic Inventory Optimization and Customer Centric Design

A Mid-Term report for the BDM capstone Project

Submitted by:

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1. Executive Summary:

A.R Furniture is a small, unorganized furniture business in Ranchi, Jharkhand (834001), owned by Mr. Zahid Akhtar. The shop serves both B2B carpenters and B2C retail buyers, selling raw frames and limited ready-made items. Despite steady demand, the business faces issues such as unstructured inventory, inconsistent pricing, and a lack of data-driven decisions. This project aims to analyse four months of actual sales and purchase data to identify patterns that can improve stock planning, pricing, and overall product strategy.

For the mid-term, I collected primary data from the owner, including 4 months of raw sales, purchase bills, and reconstructed retail sales records. All datasets were cleaned and analysed in Excel using summary tables, pivot charts, and metadata tables describing variable types and dataset structure.

The analytical methods included descriptive statistics to study variation in cost and sales values, ABC classification to identify profit-dominant raw items, and retail profitability analysis comparing preparation cost with selling price. These methods directly address key business challenges such as inventory imbalance, unpredictable margins, and unclear fast-moving items.

Initial results show that sofa and bed frames (SSF-D, SSF-A, SSF-B, BSF-C) generate most profits, while several items have low contribution. Total sales amounted to ₹3,69,152 with ₹54,979.5 profit. Profit varied by month, with June highest (₹20,305.5) followed by July (₹14,787). ABC classification showed 7 A-category items contributing nearly 75% of total profit, led by Teak Sawn Timber (₹7,846.5) and SSF-D (₹8,960). Retail sales had higher margins (15–25%), while raw sales had higher volume but lower margins.

The final phase will convert these insights into practical recommendations for stock control, pricing, and customer-focused improvements.

2. Proof of Originality:

2.1 – Letter from the Organisation

2.2 – Video of Interaction with the Owner

2.3 – Images of The Firm

2.4 – DATA

3. Metadata and Data Description

3.1 Data Sources and Collection

This analysis is based on primary operational data obtained directly from A.R. Furniture's owner, Mr. Zahid Akhtar. The data represents real transactions from April to July 2025.

3.1.1 Data Collection Method:

1. Purchase Data: Manually extracted from supplier invoices (primarily Raja Leo Furniture, Hazaribagh).
2. Sales Data: Collected from handwritten bills and ledger entries maintained at the store. The records were taken from manual bills and later organized in Excel for analysis.
3. Retail Data: Constructed using cost components (raw materials, polishing, carpenter wages, miscellaneous costs) derived from verbal and ledger-based estimates provided by the owner. These values represent realistic business-level approximations rather than automated system data.

Time Period: April 1, 2025 - July 31, 2025 (4 months)

3.2 Variable Description and Dataset Summary

Table 3.2.1: Dataset Overview

DATASET	ROWS	COLUMNS	DESCRIPTION
PURCHASE	38	6	Records of raw material and furniture frame purchases from suppliers
RAW SALE	70	10	Transactions of furniture parts and timber sold to customers
RETAIL SALE	13	20	Sales of finished, assembled furniture products to end consumers
RAW SUMMARY	-	-	Aggregated calculations and analysis of raw material transactions
RETAIL SUMMARY	-	-	Aggregated calculations and analysis of retail transactions

Table 3.2.2: Column-wise Data Description

DATASET	COLUMN NAME	DATA TYPE	DESCRIPTION	EXAMPLE VALUES
PURCHASE	Date	Date	Purchase transaction date	2025-04-04
	Item Code	Text	Unique product identifier	BSF (A), SSF(B)
	Item Description	Text	Full product name	Bed Side Frame (A)
	Qty	Numeric	Quantity purchased	2, 12, 25.1
	Rate	Numeric	Unit price (₹)	2480, 2731
	Total Amount	Numeric	Qty × Rate (₹)	4960, 7812
RAW SALE	Date	Date	Sales transaction date	2025-04-02
	Item Code	Text	Unique product identifier	CTSF (A), DCF (B)
	Item Description	Text	Full product name	Centre Table Side Frame (A)
	Qty	Numeric	Quantity sold	6, 4, 1
	Rate	Numeric	Selling price per unit (₹)	985, 660
	Total Amount	Numeric	Qty × Rate (₹)	5910, 2640

	Customer Type	Text	Customer category	Carpenter, Retail, Not Available
RETAIL SALE	Retail Date	Date	Finished product sale date	2025-04-05
	Product Name	Text	Finished product name	Bed (A), Sofa (B)
	Components Used	Text	Raw materials used	BSF (A), SSF (B) + CTF (A)
	Raw Material Cost	Numeric	Cost of components (₹)	2923, 3975
	Total Preparation Cost	Numeric	Sum of all costs (₹)	14073, 20032
	Selling Price	Numeric	Final sale price (₹)	17100, 23500
	Profit	Numeric	Selling Price - Total Cost (₹)	3027, 3468
	Profit Margin	Percentage	(Profit/Total Cost) ×100	21.5%, 17.3%
	Customer Type	Text	Always "Retail"	Retail
	Ply Cost	Numeric	Plywood cost: Layered engineered wood sheet used in beds, cabinets, and structural components. Provides strong support while remaining lightweight and affordable.	3250, 3750
	Glass Top Cost	Numeric	Glass top cost**:** Smooth, flat tempered glass placed over dining/centre tables. Serves as protective surface and decorative enhancement.	2657, 2825
	Veneer Cost	Numeric	Veneer cost: Thin decorative layer of fine-quality wood applied over plywood base. Provides premium appearance with cost efficiency.	700
	Cushion Cost	Numeric	Cushion cost: Used primarily in sofas and seating furniture, created using customer-preferred fabric designs and colours.3200, 3500	3200, 3500
	Polisher Cost	Numeric	Polishing and finishing cost (₹)	3500, 4500
	Carpenter Cost	Numeric	Carpenter wages for assembly (₹)	2700, 3200
	Misc Cost	Numeric	Miscellaneous expenses (₹)	1000, 2500

	Selling Price	Numeric	Final sale price to customer (₹)	17100, 23500
	Profit	Numeric	Selling Price - Total Cost (₹)	3027, 3468

4. Descriptive Statistics:

This section presents the statistical summary of A.R. Furniture's transactional data from April to July 2025. All calculations are based on the consolidated data from the Purchase, Raw Sale, and Retail Sale sheets.

4.1 Overall Business Performance Summary

Table 4.1.1: Key Business Metrics Summary

Metric	Value	Calculation Basis
Analysis Period	4 months (Apr-Jul 2025)	-
Total Purchase Amount	₹3,28,929.5	Sum of Total Amount in Purchase sheet
Total Raw Sales Amount	₹3,69,152	Sum of Total Amount in Raw Sale sheet
Total Retail Sales Amount	₹2,13,100	Sum of Selling Price in Retail Sale sheet
Combined Total Sales	₹5,91,252	₹369,152 + ₹2,13,100
Total Business Profit	₹86073.5	₹54979.5 (Raw) + ₹31094 (Retail)
Number of Purchase Transactions	37	Count of rows in Purchase sheet
Number of Raw Sales Transactions	69	Count of rows in Raw Sale sheet
Number of Retail Sales Transactions	12	Count of rows in Retail Sale sheet

4.2 Product-wise Statistical Analysis

Table 4.2.1: Purchase Descriptive Statistics (Purchase Sheet)

STATISTIC	QUANTITY PURCHASED (QTY)	PURCHASE RATE (₹)	TOTAL PURCHASE AMOUNT (₹)
MEAN	5.72	1869	8889.99
MEDIAN	5	1275	6150
MODE	2	2731	4960
STANDARD DEVIATION	4.55	1274.04	6627.52
SKEWNESS	2.52	0.61	1.03
RANGE	23.10	3790	24,575
MINIMUM	2	540	1780
MAXIMUM	25.10	4330	26,355

Table 4.2.2: Raw Sales Descriptive Statistics (Sales Sheet)

STATISTIC	QUANTITY SOLD (QTY)	SALES RATE (₹)	TOTAL SALES AMOUNT (₹)
MEAN	3.35	2113.97	5350.03
MEDIAN	3	1200	3400
MODE	1	623	2492
STANDARD DEVIATION	2.70	1529.90	4181.95
SKEWNESS	1.79	0.74	1.37
RANGE	11.55	4827	17,250
MINIMUM	1	623	750
MAXIMUM	12.55	5450	18,000

4.3 Monthly Performance Trends

Table 4.3.1: Monthly Sales and Profit Analysis

Month	Raw Sales (₹)	Retail Sales (₹)	Total Sales (₹)	Raw Profit (₹)	Retail Profit (₹)	Total Profit (₹)
April	55581	40600	96181	8625	5511	14136
May	86578	35400	121978	11262	5465	16727
June	138214	50100	188314	20305.5	6314	26619.5
July	88779	86000	174779	14787	13804	28591
TOTAL	369,152	212100	581252	54,979.5	31094	86,073.50

4.4 Statistical Interpretation

Key Insights from Descriptive Statistics:

4.4.1: Highly Variable Purchase & Sales Quantities

- Purchase Qty: Mean = 5.72, Std. Dev = 4.55
- Sales Qty: Mean = 3.35, Std. Dev = 2.70
- Both datasets show right-skewness (Purchase skew = 2.51, Sales skew = 1.79)

Insight: Purchases are made in irregular bulk quantities (up to 25 units), while sales are much more stable. This indicates overstocking risk and inefficient purchase planning.

4.4.2: Right-Skewed Price Distribution (High-Value Products Dominating)

Purchase Dataset:

- Mean Rate = ₹1,869 > Median Rate = ₹1,275
- Std. Dev = ₹1,274, which is 68% of mean
- Skewness = 0.61 (positive skew)

Sales Dataset:

- Mean Rate = ₹2,113 > Median Rate = ₹1,200
- Std. Dev = ₹1,529, which is 72% of mean

- Skewness = 0.74 (positive skew)

Insight: A few high-priced items (e.g., ₹5450 sofa frames, ₹4540 bed frames) pull the average upwards. This confirms that high-value SKUs disproportionately influence revenue, validating ABC classification.

3. Profitability Behaviour (Indirect from Price Variation)

Although raw sales profit is not directly shown here, the price statistics demonstrate:

- High dispersion in prices → high variation in profit per item
- Positive skewness → large profits from few high-value frames
- Small ticket items → stable but low-margin revenue

Insight:

Retail (finished products) naturally offers stable margins, while raw sales are high volume but unpredictable.

4.5 Summary Statement:

The descriptive statistics clearly reveal that A.R. Furniture suffers from high revenue variability, irregular purchasing behaviour, and strong dependence on a few high-value SKUs. These insights quantitatively validate the business challenges identified earlier specifically inventory imbalance, inconsistent demand, and the need for structured product classification (ABC), pricing controls, and procurement optimization.

5. Analytical Approach and Justification:

The analysis for A.R. Furniture was conducted primarily using Microsoft Excel, chosen for its accessibility and versatility in handling structured and unstructured datasets. Two datasets were used the Raw Sales Data (furniture parts sold to carpenters and retail) and the Retail Sales Data (finished furniture sold to customers). The objective was to identify high-value products, analyze sales profitability, and derive insights for inventory optimization.

5.1 Data Collection and Pre-Processing

The dataset used consists of:

5.1.1 Raw Material Sales Data

Includes item code, item description, quantity sold, rate, and total amount.

- Cleaning involved correcting inconsistent item codes, converting numerical text fields to number format, and removing duplicates.
- Missing values were inspected and none required imputation.
- Date entries were standardized to DD-MM-YYYY format for time-series grouping.

5.1.2 Retail Sales Data (12 transactions)

Includes item name, raw material cost, labour cost, polishing cost, selling price, and profit.

- Processing steps involved calculating total preparation cost, profit, and profit margin for each item.
- Product combinations (e.g., Sofa + Centre Table) were treated as single composite entries.

5.1.3 Purchase Data (37 transactions)

Used to compute input cost behaviour and compare with sales volume for inventory planning.

Why this step is necessary:

Pre-processing ensures consistency and accuracy of downstream analytics. Improperly cleaned data can distort profit, ABC classification, or monthly growth patterns, leading to wrong managerial decisions.

5.2 Descriptive Statistical Analysis:

Descriptive statistics were performed on key variables such as Quantity Sold, Total Amount, and Profit (raw and retail).

Metrics computed: mean, median, mode, standard deviation, kurtosis, skewness, minimum, maximum, range, and total.

Justification:

Descriptive statistics help understand:

- the central tendency of sales (average performance)
- variability (uncertainty in demand)
- skewness (presence of extreme sales items),
- product stability vs. volatility, which is essential for stocking decisions.

For example:

- Raw sales show high skewness (1.37) and high variability, indicating that a few high-value items drive revenue
- Retail sales show consistent margins (15–25%), indicating price stability.

This insight is crucial for inventory optimization and pricing strategy.

5.3 ABC Classification

ABC analysis was applied on profit contribution for raw sales products.

Method Used:

1. Calculate total profit for each item.
2. Compute Profit Contribution of each item to total profit.
3. Sort in descending order.
4. Compute cumulative percentage.
5. Classify:
    - A-Category: Top ~70% contribution
    - B-Category: Next ~20% contribution
    - C-Category: Bottom ~10% contribution

Justification:

This method identifies:

- high-value items needing tight inventory control (A-Category),
- medium-value items requiring moderate control (B-Category),
- low-value items where stocking can be minimized to reduce working capital (C-Category).

This is the most appropriate technique because A.R Furniture faces inventory mismanagement and stockouts, which ABC directly addresses.

6. Results and Findings

The analytical results derived from four months of data (April–July 2025) provide a clear understanding of A.R. Furniture's operational and sales performance. Using Excel-based analysis, both raw furniture (frames

and materials) and retail ready-made furniture were examined for profitability, sales distribution, and inventory priority. The findings reveal key trends that can directly support data-driven decision-making.

6.1 Product-Wise Revenue and Profit Contribution (Raw Sales)

An item-wise pivot analysis of raw material sales entries shows substantial variation in revenue contribution across products.

Key Findings

- Teak Sawn Timber contributes the highest total revenue: ₹62,772 and a profit of ₹7,846.5.
- Sofa Side Frames (A–D) collectively contribute ₹161,850 and a profit of ₹27276, making them the top raw material category.
- Dining Chair Frames (DCF) show high volume (28 units for DCF-D) but relatively lower margin per unit.
- Items like BSF (B) and Chair Frame (B) contribute minimally, falling into the C-category of ABC classification.

Figure 6.1: Product-Wise Total Sales Amount (Raw Material Sales)

Interpretation

The chart shows a classic right-skewed distribution, where a few items generate disproportionately high revenue. This confirms the need for selective stocking, better procurement planning, and inventory prioritization for A-category items such as SSF (A–D) and Teak Timber.

6.2 ABC Classification Findings

ABC classification was performed using profit contribution percentage.

Results Overview

- Category A (Top 70%)

Includes SSF (A–D), BSF (C), DCF (D), and Teak Sawn Timber.

These items generate ~70% of total profit.

- Category B (Next 20%)

  Includes medium performers such as CTF (C), BSF (F), DCF (A–C).

  Moderate demand but essential for regular carpentry orders.

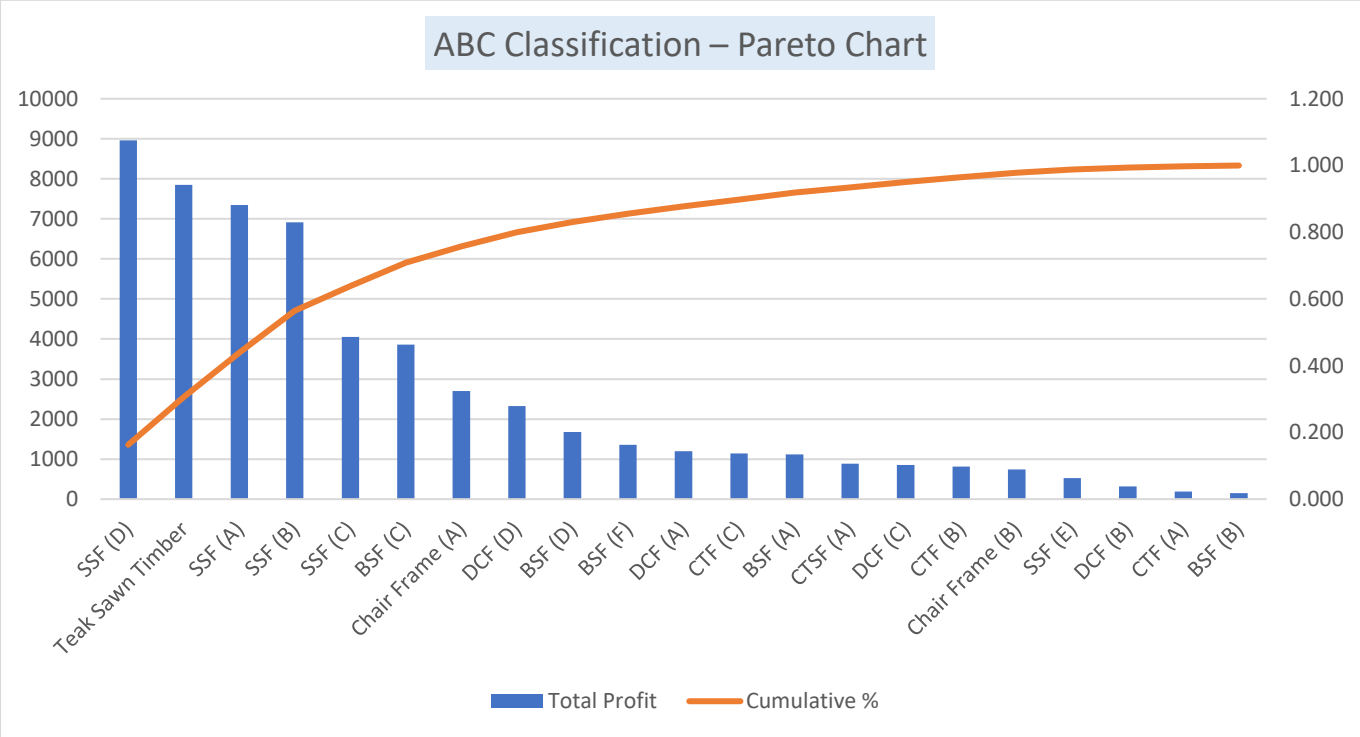
- Category C (Bottom 10%)

  Includes BSF (B), Chair Frame (B), CTF (A).

  Low sales + low margins → should be stocked minimally.

Interpretation: ABC analysis indicates that inventory mismanagement is mainly due to overstocking of low-value C-category items and irregular purchasing of high-performing A-category items. Focusing purchasing on A-items will improve cash flow and reduce stockouts.

Figure 6.2: ABC Classification – Cumulative Profit Contribution (%)



6.3 Monthly Profit Trend Analysis (Grouped by Month)

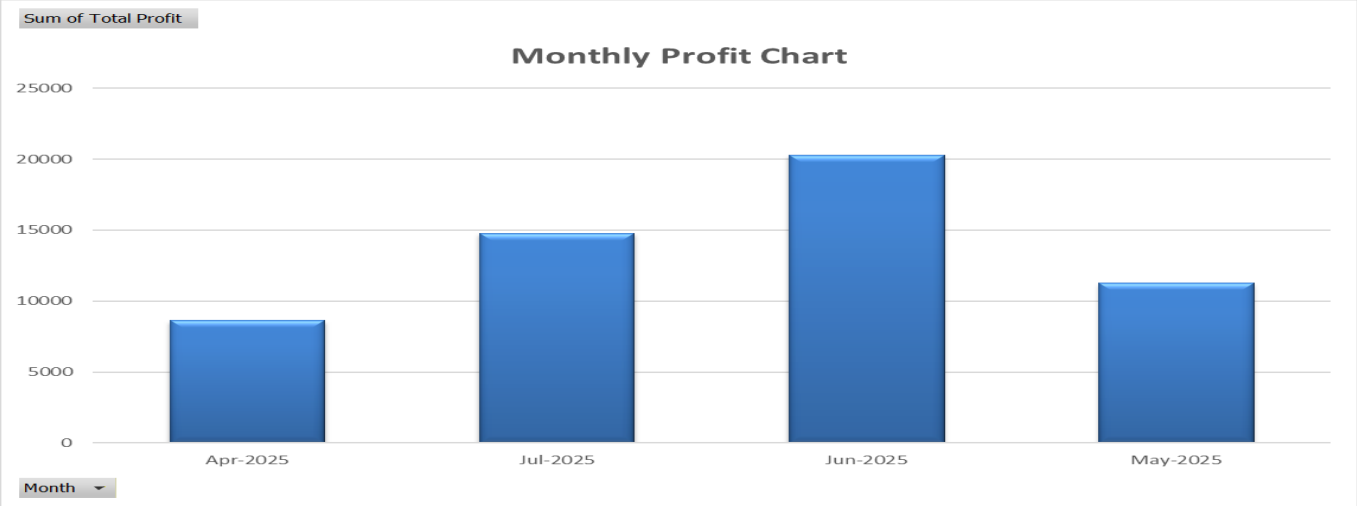
Using the grouped date pivot table:

Month	Total Profit (₹)
Apr 2025	14136
May 2025	16727
Jun 2025	26619.5
Jul 2025	28591

Interpretation

- June shows the highest profit, driven by high volume carpenter purchases and cluster sales of SSF, CTF, and DCF items.
- April has the lowest, indicating seasonal or operational inefficiencies at the start of the quarter.
- Consistent upward trend from April → June suggests growing demand, followed by stable sales in July.

Figure 6.3: Monthly Profit Trend (Apr–Jul 2025)



6.4 Retail Sales Findings (Prepared Product Sales)

Analysis of 12 retail sales entries shows:

Key Metrics

- Average Profit Margin: 20.46%
- Highest Profit Item: Sofa + Centre Table (₹4,885 profit)
- Lowest Profit Item: Chair Set (₹1,500 profit)
- Total 4-Month Retail Profit: ₹31,094
- Total Raw Material Profit: ₹54,979.5
- Combined Total Profit: ₹86,073.50

Interpretation

- Retail products have higher profit margins but lower frequency.
- Raw material sales dominate revenue due to consistent B2B demand.
- Retail sales depend on customer walk-ins and product displays; improving showroom layout could increase volume.