

Sales Optimization and Inventory Insights in a B2C Clothing Retail Business: A Data-Driven Approach

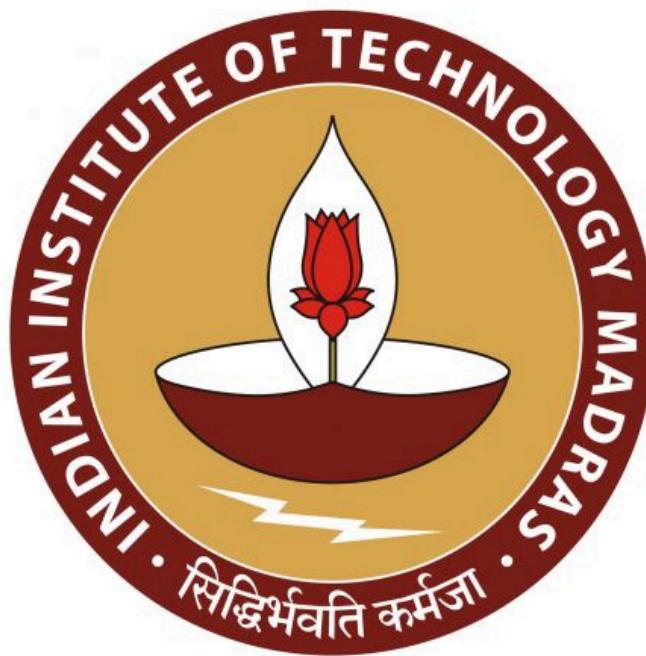
Mid Term report for the BDM capstone Project

Submitted by :-

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Executive Summary :

Building on the foundation laid in the initial proposal, this midterm report presents a detailed analysis of 12 weeks of sales data from **Tiwari Vastralaya**, a family-run B2C clothing store located in **Tinpheria Bazar, Tamkuhi Road, Kushinagar, Uttar Pradesh**. The dataset includes weekly sales performance for over 70 SKUs across major categories such as **sarees, suits, lehengas, and bed sheets**, covering the period from **February to April 2025**.

The sales data was manually collected and digitized in Excel. It was then cleaned, standardized, and prepared for category-wise analysis. Early insights confirm that **sarees consistently drive the highest volume of sales**, particularly during festive weeks like Vasant Panchami, Maha Shivaratri, and Holi. **Lehengas recorded the lowest sales**, while **suits and bed sheets showed moderate but steady performance**. Trends also suggest a strong correlation between sales and local events or festivals.

This report focuses on understanding **short-term demand patterns**, identifying high- and low-performing items, and highlighting gaps in space and inventory planning. These insights are being used to shape practical recommendations for smarter stocking decisions, category prioritization, and space utilization—especially critical given the shop's limited physical space and fully manual operations.

Challenges such as the **short data timeframe**, absence of historical sales trends, and lack of automated tools have been acknowledged. However, as discussed with the owner, the consistency in sales variation across weeks remains more or less the same throughout the year. This observation reinforces that even short-term sales tracking can provide useful direction when paired with local business knowledge.

In the next phase, the project will deepen its analysis by comparing revenue trends, brand-wise performance, and seasonal sales spikes, while continuing to refine data-backed suggestions based on emerging trends. The ultimate goal remains to help **Tiwari Vastralaya** use simple, data-driven insights to modernize its traditional setup without losing the personalized touch that makes it a trusted name in the local market.

Proof Of Originality :



image 1 : Tiwari Vastralaya



image 2 : Mr. Brajesh Tiwari

Shop Details :

Shop Name	:	Tiwari Vastralaya
Type of Organisation	:	B2C (Business - to - Consumer)
Shop's Address	:	Tinpheria Bazar, Tamkuhi Road, Kushinagar, Uttar Pradesh(274409)
Shop Owner's Name	:	Mr. Brajesh Tiwari
Contact Number	:	+91 70049 36123
Number of Employee	:	1
Working Time	:	08:00 AM to 9:00 PM

Proof Links :

Interview Video : [Recorded G - meet with shop owner](#)

Drive : [More shop related files](#)

Consent Letter :



Data Usage Consent Form
Business Data Management Project

This project involves analyzing business data from your store to help optimize inventory and sales management for academic purposes.

The data will be used exclusively for this academic project to:

- Analyze product sales and stock levels.
- Improve operational insights.

Your data will be kept confidential and used only within the scope of this project. It will not be shared with any third parties or used for commercial purposes.

You retain full ownership of the data. It will only be used for the purposes mentioned above during the project period.

By signing below, you grant permission to use the data for the specified purpose.

(Signature of Brajesh Kumar Tiwari)
Shop Owner's Signature
Mr. Brajesh Tiwari,
Owner, Tiwari Vastralaya

Guddu mishra
Student's Signature
Guddu Kumar Mishra,
Student, IITM BS

image 3 : Authorization of Mr. Brajesh Tiwari to use the data for Project

Meta Data :

The sales data for Tiwari Vastralaya was collected through multiple **in-person discussions** with the shop owner. The data was shared informally over phone and messaging apps, often in the form of printed slips or verbal updates. All the information was manually entered into Excel, cleaned, and organized carefully. In total, sales data for three months was gathered.

To make the analysis more straightforward, the weekly sales were combined so that each row represents the performance of an individual SKU across 12 weeks. This helped create a clear and manageable dataset for deeper analysis.

Google Sheet Link of Data	:	 Tiwari Vastralaya Shop data
Data collection duration	:	3 Months
Data collection dates	:	3 February - 27 April 2025
Shape of The Dataset	:	Collected (71,15) and Operation ready(71,16)

Item Name	Brand/Make	Rate	Sale in Week-1 (Feb 03–Feb 09, 2025)	Sale in Week-2 (Feb 10–Feb 16, 2025)	Sale in Week-3 (Feb 17–Feb 23, 2025)	Sale in Week-4 (Feb 24–Mar 02, 2025)	Sale in Week-5 (Mar 03–Mar 09, 2025)	Sale in Week-6 (Mar 10–Mar 16, 2025)	Sale in Week-7 (Mar 17–Mar 23, 2025)	Sale in Week-8 (Mar 24–Mar 30, 2025)	Sale in Week-9 (Mar 31–Apr 06, 2025)	Sale in Week-10 (Apr 07–Apr 13, 2025)	Sale in Week-11 (Apr 14–Apr 20, 2025)	Sale in Week-12 (Apr 21–Apr 27, 2025)
MARIYO	ANMOL SARE (11013)	₹ 2112.00	21	23	21	29	14	39	13	22	16	30	47	11
RUBY	ANMOL SARE (11013)	₹ 1792.00	41	28	27	44	31	49	33	18	21	55	36	32
MALAI SILK	ANMOL SARE (11031)	₹ 1424.00	51	19	33	42	20	31	21	24	19	51	45	18
RADHEY SILK-270	ANMOL SARE (11087)	₹ 2486.00	33	14	21	33	8	24	14	8	17	22	28	23
KISMIS	SILK MANDIR	₹ 644.00	112	73	69	123	72	104	69	71	71	121	111	72
SANGAM	SHYAM	₹ 436.00	134	81	83	138	69	124	69	80	68	139	134	88
EKTA	SHYAM	₹ 249.00	118	67	70	116	75	129	73	65	88	126	120	77
MONALISA	SHYAM	₹ 452.00	114	68	74	109	70	151	66	85	79	122	132	79

image 4 : Screenshot of the collected data

Columns of This Dataset :

Item Name :

This column lists the names of individual products (SKUs), such as specific sarees, suits, lehengas, or bed sheets. It helps identify the unique selling items for analysis.

Brand / Make :

This specifies the manufacturer or label associated with each item, which is useful for analyzing brand-wise sales performance.

Rate :

The listed selling price of each item. This helps calculate revenue and understand price-performance relationships.

Columns(week 1 to week 12) :

These columns represent the number of units sold in each respective week from February 3 to April 27, 2025. They form the core time-series data for the analysis, used to track weekly demand, observe patterns, and evaluate performance trends.

Descriptive Statistics :

Top 20 Item Sales Descriptive Statistics									
Item Name	Category	Avg Sales	Median Sales	Min Sales	Max Sales	Range	Std Dev	CV	Skewness
TOHFA	SUIT	101.83	85.50	70.00	157.00	87.00	29.70	0.29	0.59
MAKHAN	SUIT	100.83	84.50	70.00	140.00	70.00	29.15	0.29	0.34
SANGAM	SAREE	100.58	85.50	68.00	139.00	71.00	30.13	0.30	0.26
AANGAN	SAREE	100.33	82.50	67.00	149.00	82.00	32.59	0.32	0.42
SARLA	SAREE	100.25	84.00	65.00	138.00	73.00	29.11	0.29	0.27
MAULI	SUIT	99.67	86.00	73.00	148.00	75.00	26.85	0.27	0.65
WORLD CUP	SAREE	99.50	86.00	65.00	139.00	74.00	27.17	0.27	0.37
I-PHONE	SAREE	99.42	82.50	68.00	139.00	71.00	29.89	0.30	0.35
SUCHI	SAREE	99.00	83.00	68.00	145.00	77.00	31.23	0.32	0.42
PANIPURI	SAREE	97.83	83.50	71.00	135.00	64.00	27.19	0.28	0.37
LALLAN TOP (MEZ	SAREE	97.42	78.50	67.00	153.00	86.00	31.74	0.33	0.52
BED SHEET 7	BED SHEET	97.08	79.00	71.00	136.00	65.00	28.27	0.29	0.34
BED SHEET 6	BED SHEET	96.58	78.50	68.00	136.00	68.00	29.22	0.30	0.44
HHI CHOICE	SUIT	96.58	76.50	68.00	140.00	72.00	27.92	0.29	0.45
BED SHEET 2	BED SHEET	96.33	74.00	68.00	138.00	70.00	31.31	0.33	0.38
DOLLY	SAREE	96.17	77.00	71.00	140.00	69.00	29.18	0.30	0.51
MONALISA	SAREE	95.75	82.00	66.00	151.00	85.00	28.66	0.30	0.63
ABHILASHA	SAREE	95.58	77.50	69.00	139.00	70.00	27.53	0.29	0.41

image 5 : Statistics values of top items from the dataset

Given the store's wide inventory of over 70 unique items, this section focuses on the top-performing products based on their average weekly sales. These descriptive statistics provide insights into each item's sales behavior, highlighting those that are consistently popular or show occasional spikes.

TOHFA (SUIT) :

Stands out as a leading performer among suit items, with an average weekly sales volume of 101.83 units. The sales figures for TOHFA fluctuate between a minimum of 70 and a maximum of 157 units per week. The distribution of sales is right-skewed, with a skewness of 0.59, which indicates that there are occasional weeks of unusually high demand, likely driven by promotions or seasonal events. The standard deviation of 29.70 suggests moderate variability in weekly sales, pointing to a pattern where strong sales are punctuated by occasional spikes.

MAKHAN (SUIT) :

Maintains a robust weekly sales average of 100.83 units, with weekly sales ranging from 70 to 140 units. The skewness of 0.34 places its sales distribution on the borderline between symmetric and right-skewed, suggesting that while most weeks are stable, there are some periods of heightened demand. The standard deviation of 29.15 further supports the observation of moderate consistency, making MAKHAN a reliable choice for inventory planning.

MAULI (SUIT) :

This is another strong suit item, averaging 99.67 units per week. The right-skewed nature of its sales (skewness 0.65) highlights frequent weeks of above-average sales, possibly tied to successful marketing or recurring events. The standard deviation of 26.85 suggests a moderate level of weekly variation, with a minimum of 73 and a maximum of 148 units.

KISHAN (SUIT) :

It rounds out the top 20, with an average weekly sales volume of 95.00 units. Its sales range from 68 to 132 units, and the right-skewed distribution (skewness 0.35) points to occasional higher-than-usual demand. The standard deviation of 26.43 suggests moderate consistency, making KISHAN a stable and reliable choice for inventory planning.

SANGAM (SAREE):

demonstrates steady popularity among saree items, averaging 100.58 units sold per week. Its sales range from 68 to 139 units, and the skewness of 0.26 indicates a distribution that is approximately symmetric. This means that SANGAM's demand is well-balanced, without extreme outliers, although the standard deviation of 30.13 reveals a relatively wide spread, suggesting that while the item is popular, sales can vary significantly week to week.

AANGAN (SAREE):

achieves an average of 100.33 units per week, with sales ranging from 67 to 149. The right-skewed distribution, with a skewness of 0.42, points to occasional surges in demand, likely coinciding with festivals or special occasions. The standard deviation of 32.59 is relatively high, indicating that while AANGAN is generally popular, its sales are subject to considerable fluctuations.

SARLA (SAREE):

records an average weekly sale of 100.25 units, with a minimum of 65 and a maximum of 138 units. The skewness of 0.27 shows an almost symmetric distribution, suggesting a balanced demand pattern. With a standard deviation of 29.11, SARLA's sales are moderately consistent, with occasional boosts but no extreme outliers.

WORLD CUP (SAREE):

enjoys an average weekly sale of 99.50 units, with sales spanning from 65 to 139 units. The skewness of 0.37 indicates a right-skewed distribution, and the standard deviation of 27.17 points to moderate week-to-week variability. This pattern suggests that WORLD CUP is a dependable seller, with occasional high-demand weeks.

From the bed sheet segment, BED SHEET 6, BED SHEET 7, and BED SHEET 2 consistently rank among the top 20. Their average sales hover around 96 units per week, with right-skewed distributions suggesting occasional bursts in demand, possibly tied to seasonal purchases or promotions.

Products like HHI CHOICE (SUIT), DOLLY (SAREE), MONALISA (SAREE), ABHILASHA (SAREE), and UMA (SAREE) round out the list with reliable performance, moderate variability, and visible upward sales spikes in certain weeks. These patterns underline the importance of monitoring their inventory closely while preparing for high-demand periods.

Overall, this descriptive analysis offers valuable signals about which items need more attention in procurement and restocking. Recognizing items with stable sales versus those with peak-driven demand will help Tiwari Vastralaya better manage shelf space and optimize stock allocation across categories.

Methods of Analysis with Justification :

1. Data Cleaning and Consolidation :

Process :

Sales data from Tiwari Vastralaya was collected through several rounds of discussions with the shop owner and digitized manually in Excel. The records spanned 12 weeks (February–April 2025) and included over 70 SKUs across sarees, suits, lehengas, and bed sheets. During digitization, inconsistencies such as duplicate entries, spelling variations in item names, and missing values were resolved. Once cleaned, the data was consolidated such that each item's weekly sales were organized into a structured format across 12 weeks. This transformation made the dataset ready for time-series and statistical analysis.

Justification :

Manual record-keeping in small retail setups often leads to fragmented data. Cleaning ensures uniformity and accuracy, while consolidation enables easy tracking of performance over time. For a space-constrained, family-managed store like Tiwari Vastralaya, this structured data was essential to simplify analysis and extract useful trends without being overwhelmed by noise.

2. Descriptive Statistical Analysis :

Process :

Descriptive statistics were calculated for each item based on weekly sales data. These included metrics such as average (mean) sales, median, standard deviation, range (max-min), skewness, and coefficient of variation (CV). These values were computed using the 12-week period to understand the consistency and volatility in sales across items. For Computations mostly pandas and numpy were used.

Justification :

This method helped identify top-performing items (e.g., TOHFA Suit with an average of over 100 units/week) and assess their stability. Items with high standard deviation or right-skewed distributions (like LALLAN TOP and PANIPURI Saree) showed occasional demand spikes, possibly due to festivals or local events. These insights support stocking decisions, space allocation, and demand forecasting for each product.

3. Trend and Seasonality Analysis :**Process :**

Weekly sales patterns were visually and statistically examined to identify the impact of events like Vasant Panchami, Maha Shivaratri, and Holi. Categories such as sarees showed clear sales peaks during these festival weeks. Sales charts and correlation analyses were used to highlight such time-bound demand fluctuations.

Justification :

For Tiwari Vastralaya, which sees varying footfall based on festive seasons, understanding such trends is critical. This enables the owner to plan inventory and promotions in advance. The data, though limited to 12 weeks, was sufficient to capture early patterns of festival-driven demand, especially relevant for a business heavily reliant on occasion-based shopping.

4. ABC Segmentation Analysis :**Process :**

ABC classification was applied using total sales volume over 12 weeks.

- Category A: Items like TOHFA Suit, MAKHAN Suit, and SANGAM Saree contributed the most to cumulative sales despite being fewer in number.
- Category B: Moderately selling items like SUCHI, HHI CHOICE, and BED SHEET 7 showed steady but non-peak contributions.
- Category C: Low-selling items such as JAAYDAAD or DUMAS Lehenga had minimal impact on total sales.

Justification :

This classification allows the store to prioritize storage, shelf space, and procurement efforts. A-category items are critical and should be prioritized for stocking and festival promotions. B-category items offer growth opportunities through targeted marketing, while C-category items can be reviewed for clearance or reduced procurement. This segmentation helps the owner handle inventory more strategically despite space and budget limitations.

Results and Findings :

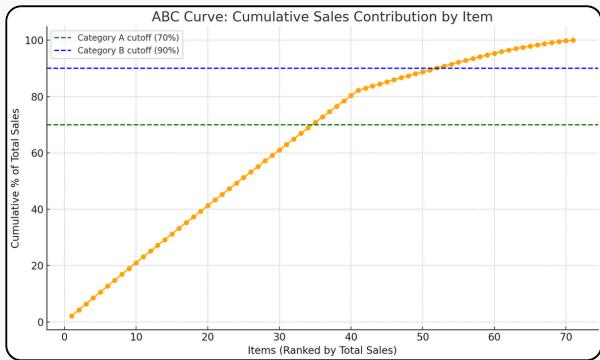


image 6 : ABC Curve

This graph visualizes the cumulative contribution of each item to the total sales at Tiwari Vastralaya. Items are sorted by total sales, and segmented into:

- Category A: The top ~70% of sales, covering high-priority items that generate the most revenue.
- Category B: The next ~20%, representing moderately important items.
- Category C: The remaining ~10%, usually low-priority or slow-moving items.

Weekly Trend of Units Sold by Category :

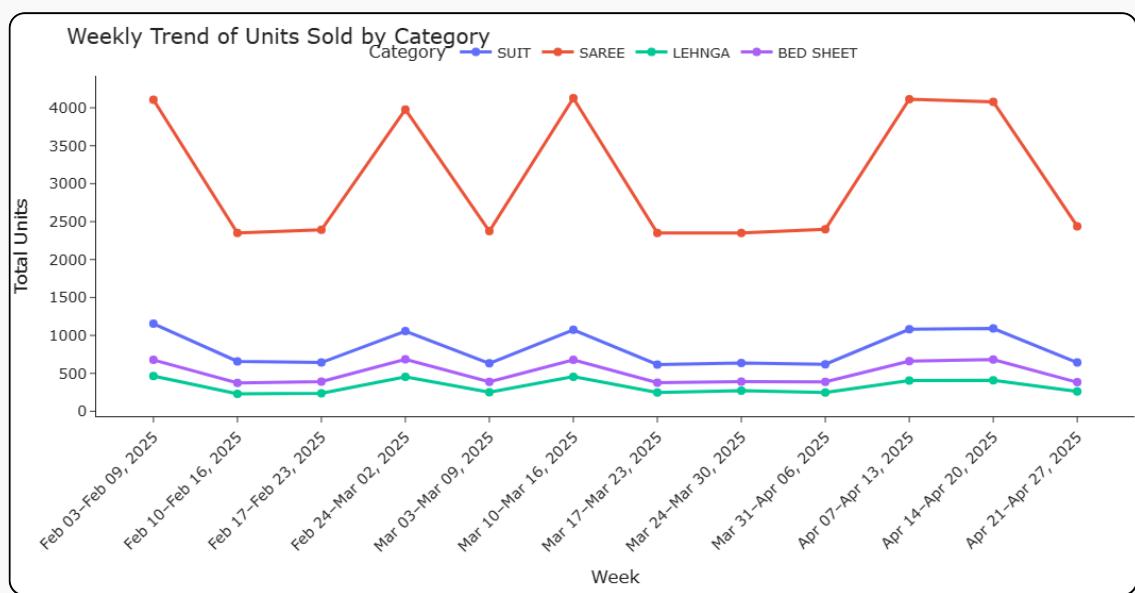


image 7 : Line graph plot for Weekly Trend of Units Sold by Category

The line graph illustrates the weekly sales trend across four major product categories—Sarees, Suits, Lehengas, and Bed Sheets—over a 12-week period from February to April 2025. Each point on the graph represents the total number of units sold in a given category during that week.

From the visual, **Sarees clearly dominate the sales volume**, consistently outperforming other categories each week. Sharp peaks in saree sales during weeks corresponding to festive periods like Vasant Panchami, Maha Shivratri, and Holi indicate a strong seasonality and cultural influence on purchasing patterns. These spikes reflect the high demand for ethnic wear during traditional celebrations.

Suits and Bed Sheets maintain moderate but steady performance, suggesting a more consistent demand that is less sensitive to seasonal fluctuations. On the other hand, Lehenga sales remain the lowest throughout, reflecting their niche nature and possibly higher price point or limited customer base.

This plot confirms that **sarees are the core revenue drivers**, and they require focused inventory planning to meet peak seasonal demand. The consistent performance of suits and bed sheets highlights their importance in maintaining baseline sales, while lehengas may serve as a supplementary or special-occasion category.

Distribution of Price by Category (Violin Plot) :

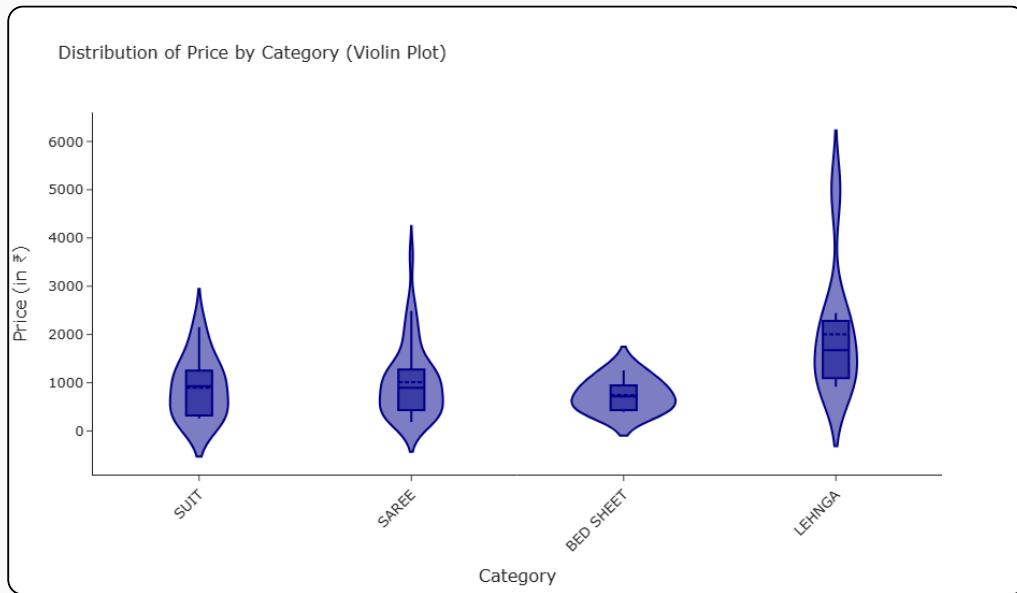


image 8 : Violin plot showing distribution of price by category

The violin plot provides a visual representation of the price distribution across the same four product categories. Each violin shape shows the spread and density of item prices within that category. The wider sections of each violin represent price ranges where most products are concentrated, while the box inside indicates the interquartile range (IQR), median, and average price levels.

From the plot, it's evident that Lehengas have the highest price spread, with some items priced well above ₹5000, reflecting their premium nature. This broad range suggests that lehengas cater to a more selective, possibly festive or bridal market segment.

Sarees and Suits display a moderately wide distribution, with most items falling within a mid-range price bracket (₹500–₹1500). Their pricing pattern indicates a balance between affordability and variety, making them more accessible for regular and festive purchases.

Bed Sheets are the most consistently priced, with a narrow price spread concentrated mostly between ₹500 and ₹1200. This consistency may reflect standardized pricing and lower variation in quality or brand differences.

This visual insight supports pricing strategy decisions. For instance, the store can maintain a wide range of lehenga options at different price points for variety, while focusing on price consistency and margin optimization for bed sheets. Sarees and suits, being mid-range and high-volume sellers, can benefit from tiered pricing based on quality and brand to target different customer segments.