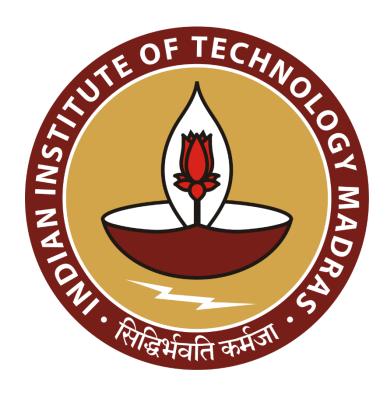
BUSINESS DATA MANAGEMENT MID-TERM SUBMISSION Case Study of Hindustan Enterprises



IITM Online BS Degree Program,
Indian Institute of Technology, Madras, Chennai
Tamil Nadu, India, 600036

Submitted by

Name: MOHAMMAD AFNAN SHAMSI

Email: 23f3004266@ds.study.iitm.ac.in

Roll No.: 23f3004266

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BDM Capstone Project- Analysis of Hindustan Enterprises

1) Executive Summary:

In the competitive wholesale business of molded plastic chairs, strategic planning and effective logistics are crucial for growth. Hindustan Enterprises, a wholesale distributor in this field, faces challenges in profit and inventory management that impact sales and profitability. This report aims to address these challenges through a detailed analysis that informs better decision-making.

The Proof of Originality section establishes the authenticity of the report, confirming its unique contribution to the business analysis. Metadata provides essential details about the dataset, including the source, time period, and key variables used for the analysis. The Descriptive Statistics Analysis summarizes the key numerical characteristics of the data, such as averages, standard deviations, and extreme values, to provide a foundational understanding of the sales and inventory patterns.

The Explanation of Analysis and Method Used outlines the analytical approach, including ABC analysis and the Pareto Principle, to classify SKUs based on revenue contribution and profitability. The Results and Findings section presents key insights, such as the identification of high and low-performing SKUs, trends in sales, and inventory management implications. Finally, a Link to the spreadsheet is provided for detailed examination and verification of the data. This report offers actionable insights aimed at optimizing inventory, boosting profitability, and improving overall business performance for Hindustan Enterprises.

2) Proof of originality:

Business Name: Hindustan Enterprises

Owner: Nazish Hussain

Established in 2018, Hindustan Enterprises is a wholesale store specializing in molded plastic furniture, offering a diverse range of products including chairs and tables. The top-selling SKUs include:

- Chair Dollar
- Chair Sunrise
- Chair King

Currently, the business generates monthly sales of approximately ₹15-20 lakhs. The store operates from a three-story godown and employs four staff members. Hindustan Enterprises sources its supplies from Metro Maharaja and is the only authorized distributor of their products in the area. Initially focused on Bareilly, the business has successfully expanded its reach to nearby cities such as Pilibhit, Fatehganj, and Shahi.

To substantiate these claims, the following visual documentation is included:

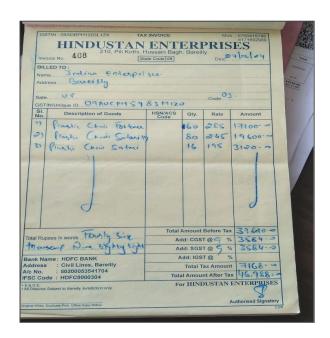
- Images showcasing the establishment and its interior
- A sample sales bill from the store
- A letter from the organization
- A video of an interaction with the owner can be accessed through this link:
 Click Here



Picture of the shop



Picture of the SKUs



Picture of a sales bill



17 June 2024

LETTER

Dear Afnan,

I am writing to acknowledge receipt of your request regarding the capstone project of Mr. Mohammad Afnan Shamsi (23F3004266), a student of the BS degree program at IIT Madras. We are pleased to extend our full cooperation and support for the project, which involves data collection and analysis from our establishment.

We understand the academic importance of this project and are committed to providing the necessary information and data, ensuring that it aligns with the academic objectives of your course. Rest assured, the data shared will be handled with confidentiality and will be used exclusively for the purposes outlined.

Please feel free to reach out if there are any specific requirements or further details needed. We look forward to contributing to the academic success and the valuable research being conducted in your program.

Thank you for your trust and collaboration.

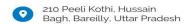
Sincerely,

Nazish Hussain

Owner of Hindustan Enterprises





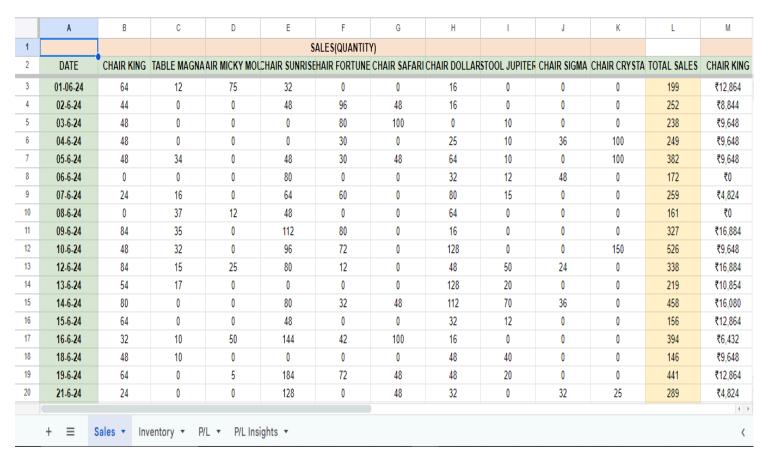


3)Metadata:

To analyze the business, I have gathered an extensive 30 day dataset from the 1st of June to the 30th of June 2024 of the top 10 SKUs. Throughout this period, my data collection approach involved a combination of daily visits to the shop and strategically timed alternate-day visits, allowing me to compile a comprehensive set of cumulative data encompassing the entire time span. The dataset includes

- **Sales**: It includes the daily sales and revenue of each SKUs over the period of 30 days.
- **Inventory**: It includes the initial stock and purchased stock over the period.
- P/L: It includes the cost prices and selling prices of each SKUs and the profit margins.
- **P/L Insights**: It includes all the costs(variable cost and fixed cost) and the overall Profit and Loss over the period.

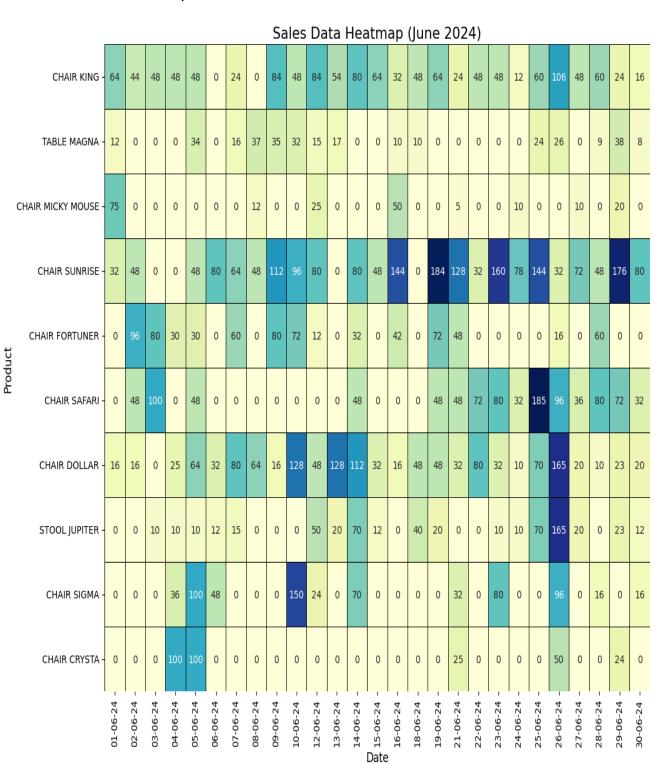
Below is the snapshot of the dataset I have collected.



Sales Dataset

4) Descriptive Statistics Analysis:

Here is the analysis based on the collected data.



175

- 150

- 125

Units Sold

- 75

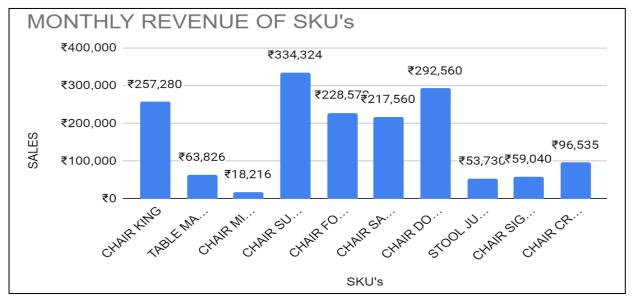
- 50

- 25

- 0

(4.1) Sales Heatmap

The sales heatmap provides a clear visualization of the performance of various SKUs across the months. High-performing products such as Chair Sunrise and Chair Fortuner are prominently highlighted in warm colors, indicating their significant contribution to revenue. Conversely, products like Chair Sigma, Stool Jupiter, and Chair Mickey Mouse appear in cooler shades, reflecting lower sales figures. This disparity in color intensity effectively illustrates the varying demand patterns across the product portfolio, enabling targeted decision-making for inventory and marketing strategies.



(4.2) Monthly Sales of SKUs

The monthly sales data provides insights into the performance of different SKUs. The highest revenue generator is Chair Sunrise at ₹334,324, followed closely by Chair Fortuner at ₹228,570, meanwhile, lower sales are observed for products like Chair Sigma (₹59,040), Stool Jupiter (₹53,730), and Chair Mickey Mouse (₹18,216), indicating varying demand across product lines.

PRODUCT	% OF TOTAL REVENU
CHAIR SUNRISE	20.62%
CHAIR DOLLAR	18.04%
CHAIR KING	15.87%
CHAIR FORTUNER	14.09%
CHAIR SAFARI	13.42%
CHAIR CRYSTA	5.95%
TABLE MAGNA	3.94%
CHAIR SIGMA	3.64%
STOOL JUPITER	3.31%
CHAIR MICKY MOUSE	1.12%

Class B	Class C
CHAIR CRYSTA	STOOL JUPITER
TABLE MAGNA	IAIR MICKY MOUS
CHAIR SIGMA	
	CHAIR CRYSTA TABLE MAGNA CHAIR SIGMA

(4.3) Classification of SKUs

The SKUs were categorized into three groups—A-Class, B-Class, and C-Class—using the ABC method, based on their contribution to the total revenue.

A-Class Products:

SKUs contributing the top 70-80% of the total revenue were grouped into A-Class. These are the high-performing products that are critical to the business. Chair Sunrise (20.62%), Chair Dollar (18.04%), Chair King (15.87%), collectively accounting for 82.04% of the revenue. Chair Fortuner (14.09%), and Chair Safari (13.42%) were identified as A-Class,

B-Class Products:

Products contributing the next 15-20% of the revenue were classified as B-Class. These SKUs show moderate performance. Chair Crysta (5.95%), Table Magna (3.94%), and Chair Sigma (3.64%) were in this group, contributing to a cumulative 13.58% of the revenue.

C-Class Products:

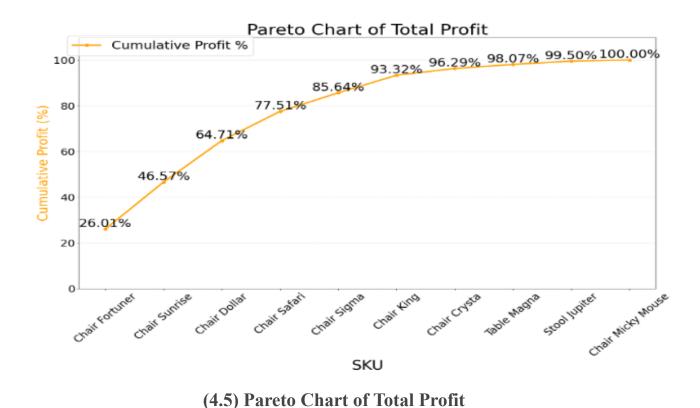
The remaining SKUs, contributing the last 5-10% of the total revenue, were grouped into C-Class. These products exhibit low sales performance. Stool Jupiter (3.31%) and Chair Micky Mouse (1.12%) were categorized as C-Class, accounting for 4.43% of the revenue.

This classification process ensures that SKUs are prioritized based on their impact on revenue, providing a foundation for targeted inventory management strategies.

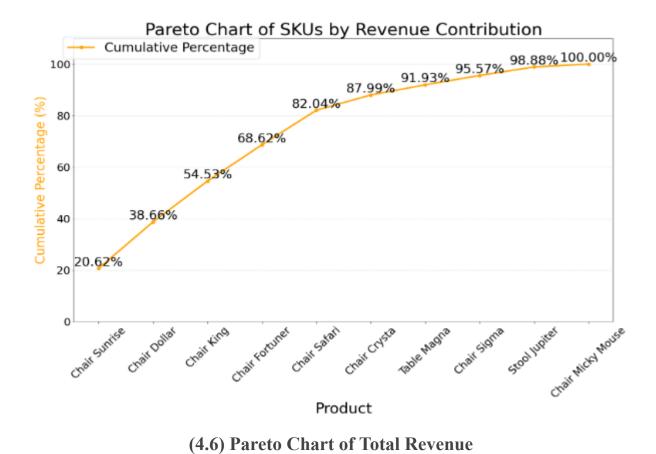
Standard Deviation	₹26,435
Average Daily Sales	₹60,061
Maximum Sale	₹118,686
Minimum Sale	₹23,028

(4.4) Analysis of Sales

These statistical measures standard deviation, average daily sales, maximum sale, and minimum sale are useful in analyzing the sales performance and understanding the variability in the data. It provides a deeper understanding of sales variability, performance peaks, and troughs. This helps in identifying opportunities for improvement, optimizing sales strategies, and making data-driven decisions for future planning.



The Pareto analysis of total profit reveals that a significant portion of the profit comes from a small number of SKUs, aligning with the 80/20 rule, where roughly 80% of effects come from 20% of causes.



The Pareto analysis was conducted to identify which products contribute the most to total revenue. This helps the business prioritize its products, streamline operations, and enhance profitability by focusing on the items that matter most.

5) Explanation of Analysis and Method used:

For this analysis, data was collected over 30 days and uploaded to Google Sheets, where it was thoroughly cleaned, organized, and analyzed. Initially, the data was carefully examined to ensure its structure and format were suitable for effective analysis. This step included checking for inconsistencies, missing values, and outliers that could impact the results.

Next, various descriptive statistical techniques were applied to summarize and explore the data. This included calculating metrics such as average sales, profit, and inventory levels to gain insights into the overall dynamics of the store. Visual representations, including column, bar, line, and pie charts, were utilized to illustrate revenue, SKU profits, purchase prices, and their respective proportions. These charts

provide a clear and concise way to understand performance and distribution of various metrics within the business, helping to identify trends, patterns, and key areas for improvement.

A heatmap was employed to visualize the daily sales of each SKU over the 30-day period. This allowed for the identification of patterns in sales performance, such as peak demand days for specific SKUs and periods of low activity. The heatmap provided valuable insights into product movement, helping to optimize stock levels and marketing strategies for high-demand days.

An ABC analysis was also conducted to categorize SKUs based on their revenue contribution. This technique helped classify items into three categories—A (high-revenue generators), B (moderate-revenue contributors), and C (low-revenue contributors)—allowing for focused inventory management and strategic planning to maximize profitability.

By employing these descriptive statistics, visualizations, and advanced analyses such as the heatmap and ABC classification, we gained a comprehensive understanding of the data and its implications for the business. This approach facilitates informed decision-making and the optimization of business strategies for enhanced performance and profitability.

To present the Pareto chart for revenue or profit across all SKUs, a combined line and bar chart was utilized (4.5 and 4.6). This approach effectively represents the cumulative contribution of each SKU to overall revenue or profit. The line chart overlays the cumulative percentage of revenue or profit on the graph. This representation serves as a visual tool to identify significant contributors to overall revenue and profit.

To better understand the business's sales performance throughout the month:

- Standard Deviation was calculated to assess the consistency of daily sales, indicating how much sales vary from the average.
- Average Daily Sales provides a baseline figure for typical daily sales, allowing for easier comparisons.
- Maximum Sale and Minimum Sale highlight the best and worst-performing days, offering insights into peak demand periods and potential issues during low sales days.

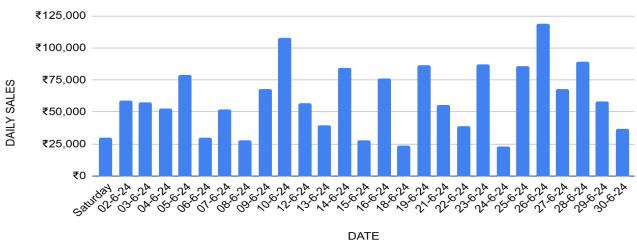
A bar chart is also employed to depict the monthly revenue of each SKU, providing a clear overview of sales performance.

6) Results and Findings:

The analysis of sales data for Hindustan Enterprises has revealed several key insights regarding SKU performance and overall business metrics.

1) Sales Pattern Analysis:





The heatmap and daily revenue analysis highlighted variability in demand across SKUs. Products like CHAIR KING and CHAIR SAFARI consistently generated high revenue, while others like CHAIR CRYSTA and STOOL JUPITER showed minimal or sporadic sales. While daily sales did not reveal significant trends, the final days of the month, such as Day 23, recorded higher sales, suggesting a need to focus on inventory readiness and promotional strategies for high-demand SKUs during this period.

2) Key Sales Statistics:

- The sales analysis revealed a standard deviation of ₹26,435 indicating significant variability in daily sales.
- Average daily sales stood at ₹60,061 serving as a benchmark for typical performance.
- The maximum daily sales reached ₹118,686 highlighting peak performance periods while the minimum of ₹23,028 suggested potential challenges in demand.

SKU	Cost Price	Selling Price	Profit	Profit %	Total Cost	Total Revenue	Profit (Total)	Profit % of Total
CHAIR KING	₹191.00	₹201.00	₹10	5.24%	₹244,480	₹257,280	₹12,800	7.69%
TABLE MAGNA	₹185.00	₹194.00	₹9	4.86%	₹60,865	₹63,826	₹2,961	1.78%
CHAIR MICKEY MOUSE	₹84.00	₹88.00	₹4	4.76%	₹17,388	₹18,216	₹828	0.50%
CHAIR SUNRISE	₹149.00	₹166.00	₹17	11.41	₹300,086	₹334,324	₹34,238	20.56%
CHAIR FORTUNER	₹231.00	₹285.00	₹54	23.38	₹185,262	₹228,570	₹43,308	26.01%
CHAIR SAFARI	₹221.00	₹245.00	₹24	10.86 %	₹196,248	₹217,560	₹21,312	12.80%
CHAIR DOLLAR	₹165.00	₹184.00	₹19	11.52 %	₹262,350	₹292,560	₹30,210	18.14%
STOOL JUPITER	₹86.00	₹90.00	₹4	4.65%	₹51,342	₹53,730	₹2,388	1.43%
CHAIR SIGMA	₹158.00	₹205.00	₹47	29.75 %	₹45,504	₹59,040	₹13,536	8.13%
CHAIR CRYSTA	₹204.00	₹215.00	₹11	5.39%	₹91,596	₹96,535	₹4,939	2.97%

Profit Leaders: Chair Fortuner contributes the most to net profit, generating ₹43,308 (26.01% of total profit). However, its sales are inconsistent, indicating potential challenges in demand or market positioning.

Profit Margins: Chair Sigma exhibits the highest profit margin at 29.75%, despite its low sales compared to other SKUs. This suggests that targeted marketing could increase its visibility and sales volume.

Inconsistent Sales: Chair Crysta shows very inconsistent sales. Although often ordered in bulk, it has a low profit margin of 5.39%, below the average of 11.2%, highlighting the need for better inventory management and sales strategies.

Revenue Contribution: The Pareto Principle indicates that Chairs Fortuner, Sunrise, Dollar, and Safari contribute approximately 80% of total profit. This concentration suggests focusing sales efforts on these products for higher returns and improved inventory turnover.

Sales Trends: While there is no clear pattern in the revenue trend throughout the period, sales are notably higher in the second half of the month.

3) Inventory Analysis:

		Purchasi	ng Dates			
SKU	Initial Inventory	03-6-24	21-6-24	End Inventory	Average Invente	Average Sales
CHAIR KING	256	960	400	336	1616	1280
TABLE MAGNA	30	250	200	151	480	329
CHAIR MICKY MOUSE	100	150	150	193	400	207
CHAIR SUNRISE	160	1500	1200	846	2860	2014
CHAIR FORTUNER	240	660	400	498	1300	802
CHAIR SAFARI	208	432	560	312	1200	888
CHAIR DOLLAR	176	1040	1200	826	2416	1590
STOOL JUPITER	60	300	300	63	660	597
CHAIR SIGMA	60	84	208	124	352	288
CHAIR CRYSTA	0	350	500	401	850	449

High Sales SKUs:

- CHAIR KING has average sales of 1,280 units making it a top seller.
- CHAIR SUNRISE and CHAIR DOLLAR have high average sales of 2,014 and 1,590 units, respectively.
- CHAIR SAFARI and CHAIR CRYSTA have moderate sales, averaging 888 and 449 units, respectively.

Low Sales SKUs:

- CHAIR SIGMA has low average sales of 288 units, indicating weaker demand.
- STOOL JUPITER has high initial inventory with lower average sales (597 units), suggesting potential overstock or a need for promotions.

Inventory Fluctuations Of SKUs:

- **CHAIR FORTUNER**: This SKU shows a substantial inventory increase from 240 to 498 units. This growth indicates strong demand, suggesting that the SKU should be stocked at higher levels to meet consumer interest. The increase in inventory should be carefully monitored to avoid stockouts and to ensure that inventory costs remain manageable.
- CHAIR CRYSTA: This SKU had no initial inventory and saw an increase to 401 units. This spike suggests that more stock was ordered to match demand, but it may not have been perfectly aligned with actual sales trends. This indicates a need for better inventory forecasting and management practices to avoid excessive stock that may not move quickly.

Improving Inventory Management:

ABC Analysis:

Class A	Class B	Class C
CHAIR SUNRISE	CHAIR CRYSTA	STOOL JUPITER
CHAIR DOLLAR	TABLE MAGNA	IAIR MICKY MOUS
CHAIR KING	CHAIR SIGMA	
CHAIR FORTUNER		
CHAIR SAFARI		
CHAIR SALAR		

- Class A (High Priority): Focus on maintaining optimal stock levels for top-selling SKUs like CHAIR KING and CHAIR SUNRISE to prevent stockouts and ensure a consistent supply.
- Class B (Moderate Priority): Adjust reorder points and inventory levels for SKUs like CHAIR FORTUNER to align with demand and avoid excess stock.
- Class C (Low Priority): Reassess stocking for low-demand SKUs like CHAIR SIGMA and STOOL JUPITER, considering reduced investment or targeted promotions to boost sales.

Key Formulas for Inventory Management:

Daily Safety Stock Calculation:

Daily Safety Stock =
$$Z \times \sigma_D \times \sqrt{L}$$

Daily Reorder Point (ROP):

 $Daily\ ROP = (Average\ Daily\ Demand\ imes\ L)\ +\ Daily\ Safety\ Stock$

Daily Economic Order Quantity (EOQ):

$$Daily EOQ = \sqrt{\frac{2DS}{H}}$$

Where:

- Z = Z-score for service level (e.g., 1.65 for 95% service level).
- σ_D = Standard deviation of daily demand.
- L = Lead time in days.
- D = Total daily demand.
- S = Ordering cost per order.
- H = Holding cost per unit per day.

Data for Daily Analysis:

SKU	Initial Inventor Y	(Restock) 03-6-24	(Restock) 21-6-24	End Inventory	Avg Daily Sales	Standard Deviation (Daily Sales)	Lead Time (Days)	Daily Safety Stock	Daily ROP	Daily EOQ
CHAIR KING	256	960	400	336	42.67	15.38	2	30.76	111.1 0	195.5 9
TABLE MAGNA	30	250	200	151	10.67	7.07	2	14.14	41.49	48.16
CHAIR MICKY MOUSE	100	150	150	193	6.67	6.00	2	12.00	33.34	40.20
CHAIR SUNRISE	160	1500	1200	846	67.47	21.82	2	43.64	155.5 8	317.8 9
CHAIR FORTUNER	240	660	400	498	26.73	10.95	2	21.90	74.52	119.9 6
CHAIR SAFARI	208	432	560	312	29.60	8.49	2	16.98	59.68	129.1 0
CHAIR DOLLAR	176	1040	1200	826	53.20	12.65	2	25.30	104.7 0	177.8 6
STOOL JUPITER	60	300	300	63	19.90	5.00	2	10.00	49.80	70.72
CHAIR SIGMA	60	84	208	124	9.60	3.41	2	6.82	25.42	39.04
CHAIR CRYSTA	0	350	500	401	16.97	7.07	2	14.14	49.96	83.87

- Average Daily Sales: The average number of units sold per day over the analysis period (30 days).
- **Standard Deviation (Daily Sales)**: Measures daily variability in sales, used to calculate the safety stock.
- **Lead Time (Days)**: The number of days required to receive an order after placing it (at most 2 days depending on the stock availability).
- **Daily Safety Stock**: The buffer stock needed to prevent stockouts, calculated based on sales variability and lead time.
- **Daily Reorder Point (ROP)**: The inventory level at which a new order should be placed to replenish stock before it runs out.
- Daily EOQ: The optimal order quantity for minimizing ordering and holding costs.

Conclusion:

- High-Demand SKUs (e.g., CHAIR SUNRISE, CHAIR DOLLAR, CHAIR KING):
 Recommend maintaining safety stock at higher levels and ensuring EOQ calculations are accurate to optimize costs and prevent stockouts.
- Low Sales SKUs (e.g., STOOL JUPITER, CHAIR SIGMA): Focus on promotions or strategic pricing to increase sales volume. Reconsider investment or space allocation if turnover remains low.
- Reorder Points and Safety Stock: Adjust based on lead time and variability in sales to maintain service levels and minimize risk of stockouts.

4) Strategies to Improve Sales Performance:

Target High-Demand SKUs:

 Increase Marketing Efforts: Focus on products like CHAIR SUNRISE and CHAIR DOLLAR, which show strong sales. Enhance visibility and reach through targeted advertising and promotions.

Promotions for Low-Selling SKUs:

 Boost Visibility and Sales: Run promotional campaigns for products such as STOOL JUPITER and CHAIR SIGMA to increase awareness and attract more customers.

Bundle Offers:

 Create Value Packages: Design product bundles that pair popular items with slower-moving SKUs to increase overall sales volume and drive interest in less popular products.

Discounts:

 Clear Excess Stock: Offer strategic discounts on slower-moving products to attract customers, clear out inventory, and make space for new stock.

E-commerce Optimization:

 Enhance Online Presence: Improve product listings on e-commerce platforms with compelling descriptions, high-quality images, and effective SEO techniques to boost product discoverability.

Social Media Marketing:

 Engage and Expand Reach: Utilize social media campaigns to connect with a wider audience, promote products effectively, and engage potential customers with interactive content.

Ensure Product Availability:

 Monitor and Adjust Stock Levels: Regularly review sales trends and stock levels to prevent stockouts or overstocking, ensuring that customer demand is met without disruptions.

Conclusion:

By implementing these strategies, you can enhance sales performance, improve customer satisfaction, and support long-term, sustainable business growth.

7) Link to spreadsheet: Click Here