



ISM6155.901F24.86696 - Enterprise Info Sys Management

by

Dr. Nasir. M. Uddin

FINAL INDIVIDUAL PROJECT REPORT

On

Furniture Store Sales

&

Inventory Optimization Using Tableau

by

Seshi Reddy Syamala

U57658232

Business Analytics and Information Systems

Table of Contents

I.	Introduction.....	3
II.	Dataset Overview.....	4
	Key Attributes:	4
III.	Business Challenges.....	5
IV.	Methodology.....	6
	Step 1: Data Collection Process.....	6
	Step 2: Data Preparation and Cleaning.....	6
	Step 3: Data Exploration and Visualization.....	6
	Step 4: Forecasting and Insights Generation	6
V.	Key Findings and Insights on Business Challenges	7
	1. Sub-Category Profitability.....	7
	2. Impact of Discounts on Profitability.....	8
	3. Regional Performance.....	9
	4. Sales and Profit Trends	10
	5. Inventory Management.....	11
	6. Sales-to-Profit Ratio.....	12
VI.	Strategic Recommendations and Implementation Plan	13
	1. Optimizing Discounts	13
	2. Enhancing Regional Performance.....	13
	3. Forecast-Driven Inventory Management	14
	4. Product Focus.....	15
	5. Aligning Sales and Profitability.....	15
VII.	Ethical Considerations	16
VIII.	Limitations	16
IX.	Future Work	17
X.	Summary of Challenges, Findings, and Recommendations	18
XI.	Conclusion	19
XII.	References.....	20

I. Introduction

The furniture retail industry operates in a highly competitive and constantly evolving marketplace. Retailers face numerous challenges, including maintaining profitability, optimizing operations, managing inventory efficiently, and ensuring customer satisfaction. In such a dynamic business environment, making informed, data-driven decisions is critical for achieving long-term success and staying ahead of competitors. This project focuses on addressing some of these pressing challenges faced by a U.S.-based furniture retailer by leveraging sales and operational data to uncover areas for strategic improvement.

The analysis is based on the publicly available Furniture Sales Dataset (2014–2018) sourced from Kaggle, which includes detailed records on sales, profit margins, product categories, discounts, shipping details, and customer demographics across different regions in the U.S. Using Tableau, a comprehensive data analysis was conducted to explore key metrics related to product performance, discount effectiveness, regional sales trends, and inventory management practices. The aim is to identify patterns, detect inefficiencies, and propose actionable solutions tailored to improve the retailer's overall profitability and operational efficiency.

Key areas of focus include identifying loss-making product sub-categories such as Tables and Bookcases, which continue to generate negative profit margins despite significant sales volumes. Similarly, the impact of excessive discounts on profitability was evaluated, as aggressive discounting strategies often result in reduced margins without corresponding increases in sales. Regional performance analysis was conducted to compare the profitability of various regions, revealing notable disparities between high-performing regions like the West and underperforming ones such as the Central and South regions. Additionally, inventory management issues, including

frequent stockouts and overstocking, were examined to recommend improvements through better demand forecasting and operational planning.

This report offers a well-rounded analysis of the furniture retailer's operations, supported by data visualizations generated in Tableau. Each key finding is linked to evidence-backed recommendations designed to improve the company's profitability, enhance sales performance, and streamline inventory processes. Through targeted strategies such as revising pricing models, optimizing inventory levels, applying region-specific promotions, and capping discounts, the retailer can build a more resilient and data-driven business model.

By using a combination of historical data analysis and predictive forecasting, this report highlights both immediate opportunities for operational improvements and potential long-term strategies for sustained growth. The findings underscore the importance of adopting a proactive, analytics-driven approach to retail management in today's rapidly changing marketplace.

II. Dataset Overview

The dataset is sourced from Kaggle, spans five years (2014–2018), and includes detailed information on sales, profitability, discounts, and customer demographics across multiple regions in the U.S.

Key Attributes:

- **Order Details:** Order Date, Ship Date, Ship Mode
- **Customer Information:** Customer Segment, Region, State, City

- **Product Details:** Category, Sub-Category, Sales, Profit, Quantity, Discount

This dataset was selected for its ability to provide comprehensive insights into operational inefficiencies and regional trends, enabling a holistic analysis to address the retailer's challenges.

III. Business Challenges

1. Which product sub-categories contribute to losses despite high sales?

- Losses in sub-categories such as Tables and Bookcases despite consistent sales.

2. How do discounts impact profitability?

- Excessive discounts, especially above 40%, erode profit margins.

3. Are we managing inventory efficiently to avoid overstocking or stockouts?

- Frequent stockouts in Tables and overstocking in other sub-categories increase costs.

4. Which regions need better focus for profitability improvement?

- The West region excels, while the Central and South regions struggle.

5. How can future trends guide strategic decisions?

- Forecasts highlight potential declines in profitability despite sales growth.

IV. Methodology

A structured methodology was employed to analyze business challenges and derive actionable insights. The process involved data preparation, visualization, and strategic recommendations.:

Step 1: Data Collection Process

- **Source:** [Kaggle's Furniture Sales Dataset \(2014–2018\)](#).
- **Content:** The dataset included detailed records of sales, profits, discounts, sub-categories, customer details, and regional performance.

Step 2: Data Preparation and Cleaning

- Removed irrelevant or duplicate entries and ensured data accuracy.
- Standardized fields like product sub-categories and regions.
- Prepared data for forecasting by ensuring time-series continuity.

Step 3: Data Exploration and Visualization

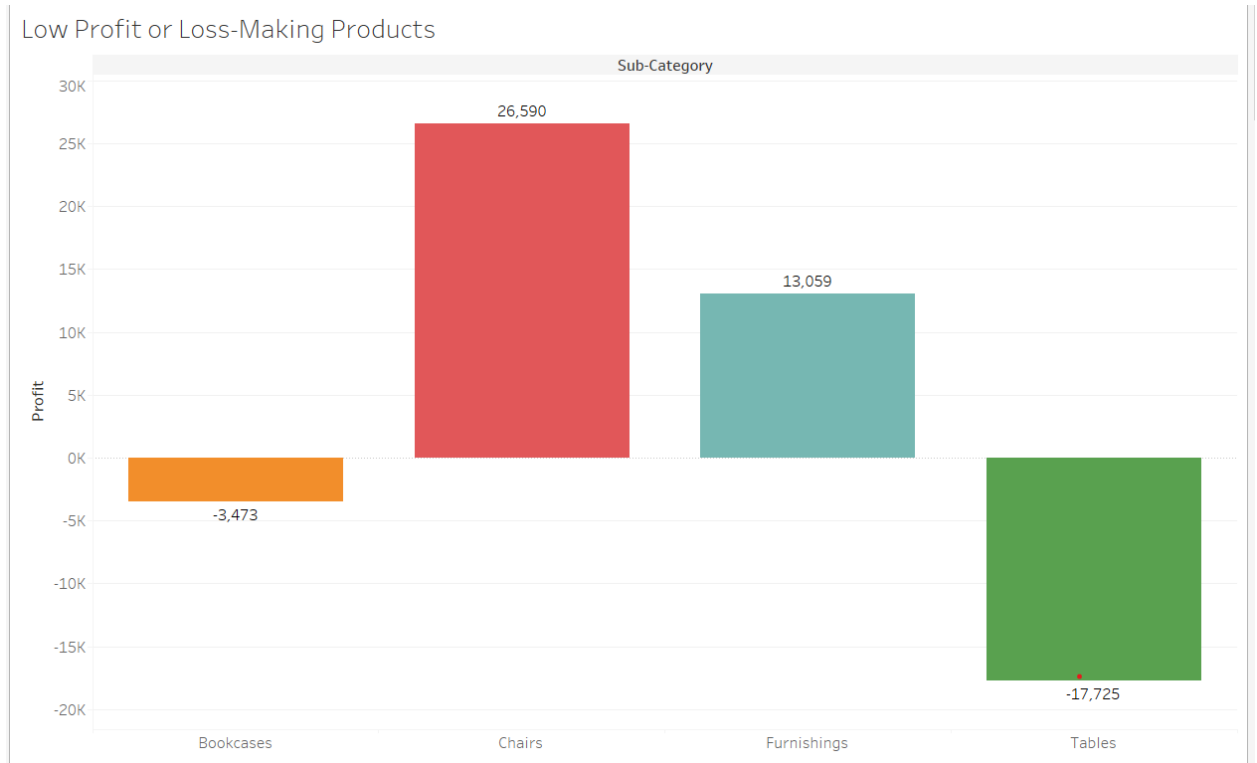
- Conducted exploratory data analysis (EDA) to identify key patterns and trends.
- Created Tableau visualizations, including bar charts, scatterplots, and line charts, to analyze profitability, discounts, and regional performance.

Step 4: Forecasting and Insights Generation

- Used Tableau's forecasting tools to project sales and inventory demand.
- Developed actionable strategies to optimize discounts, improve regional profitability, and streamline inventory management.

V. Key Findings and Insights on Business Challenges

1. Sub-Category Profitability



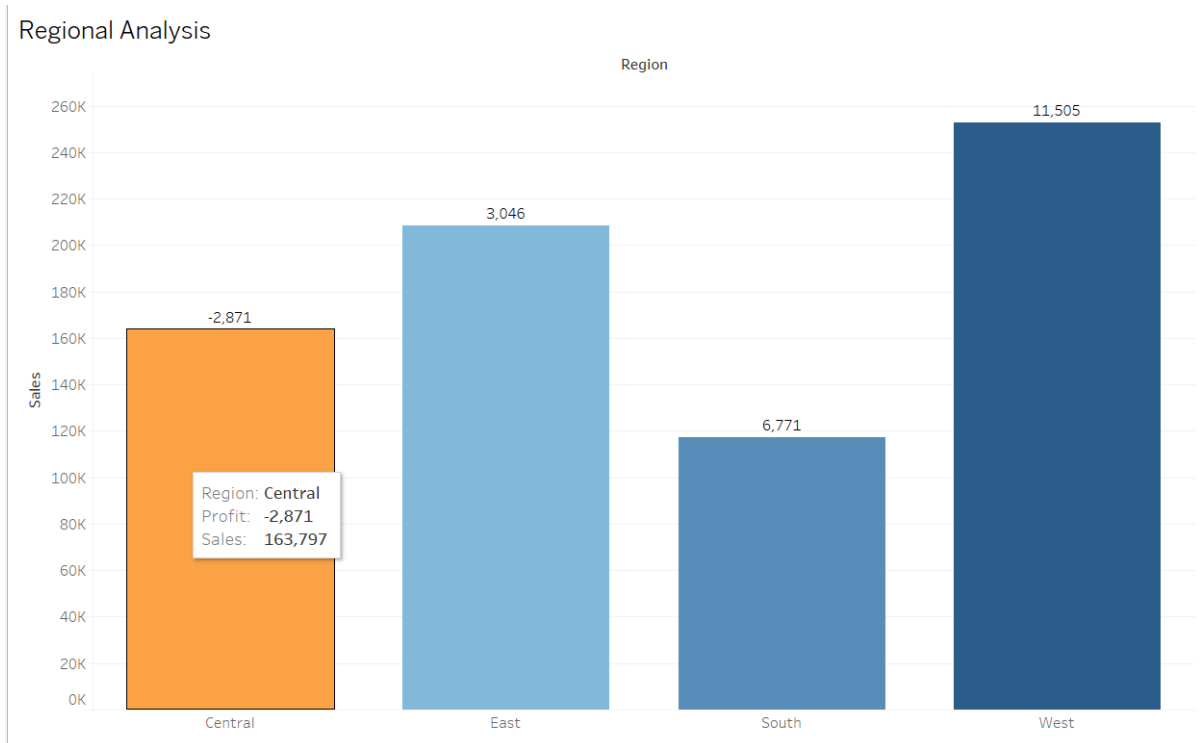
- **Finding:** Sub-categories like Tables and Bookcases generate significant losses, while Chairs contribute the highest profit.
- **Insight:** Losses are driven by excessive discounts and inefficient pricing strategies.
- **Visual Evidence:** Bar charts highlight Tables as the largest loss-making sub-category with \$17,725 in losses.

2. Impact of Discounts on Profitability



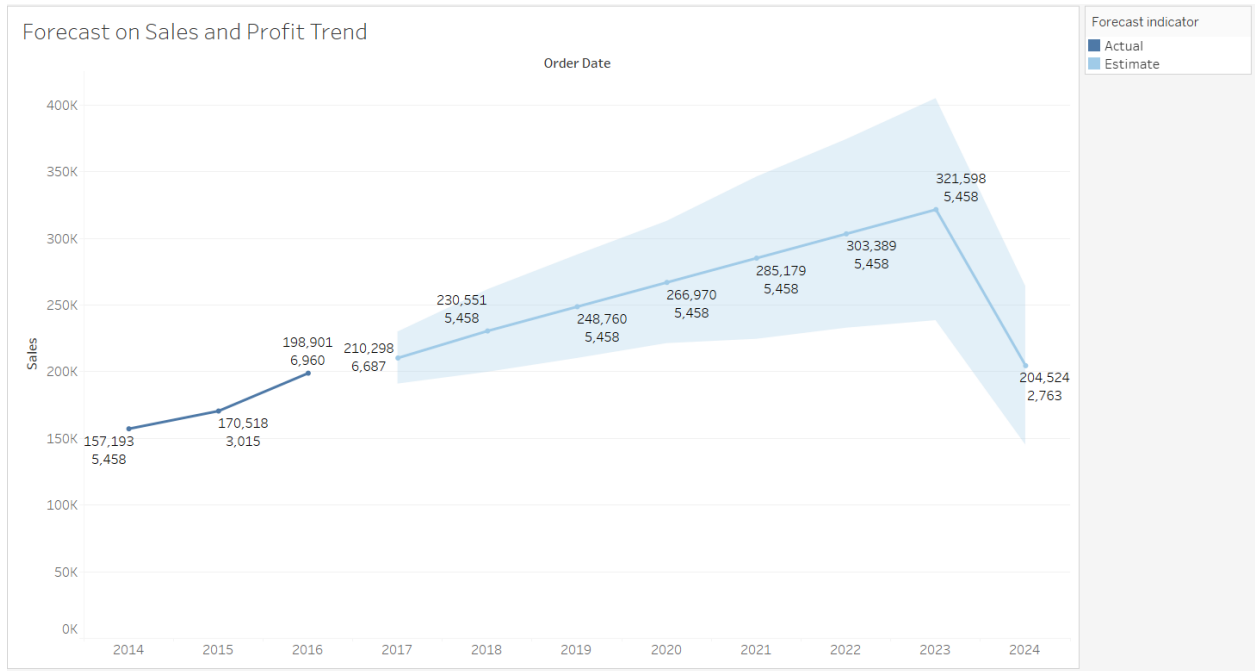
- **Finding:** Discounts exceeding 40% negatively impact profit margins, especially for **Bookcases**.
- **Insight:** Over-discounting reduces profit margins without significantly boosting sales.
- **Visual Evidence:** Scatterplots reveal a strong negative correlation between high discounts and profits.

3. Regional Performance



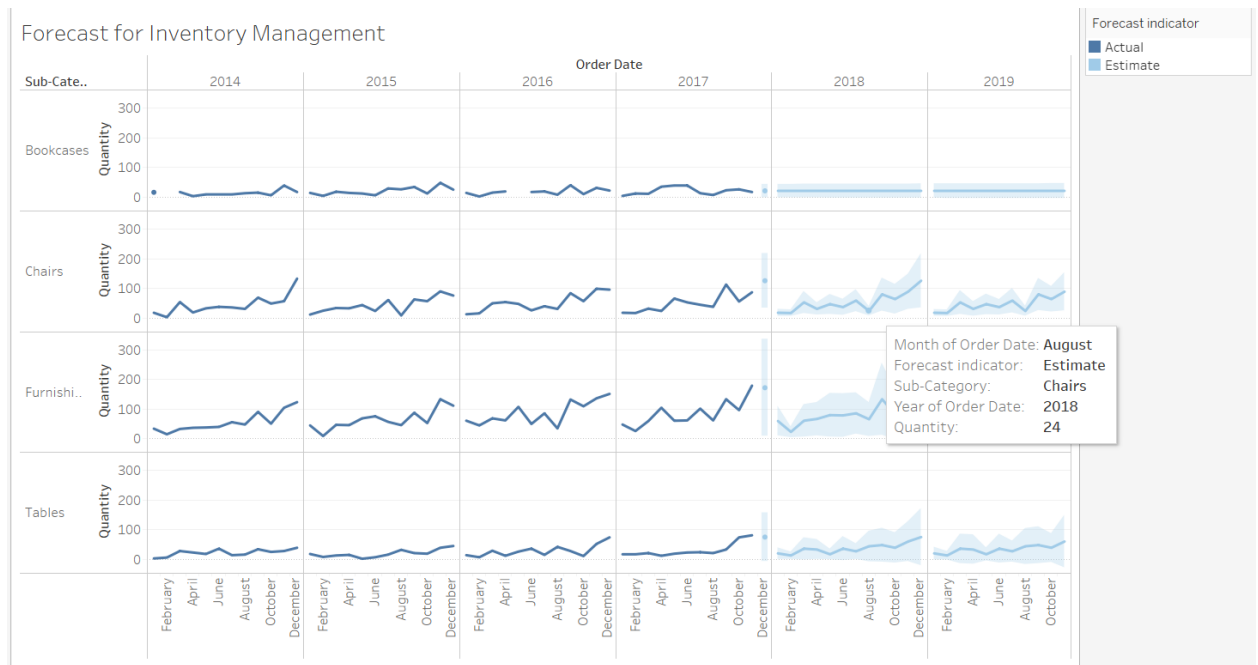
- **Finding:** The West region is the top-performing region, contributing \$11,505 in profit, while the Central region incurs a loss of \$2,871 despite strong sales of \$163,797.
- **Insight:** Profitability varies significantly across regions, requiring tailored strategies for underperforming regions.
- **Visual Evidence:** Regional bar charts highlight significant disparities in profitability.

4. Sales and Profit Trends



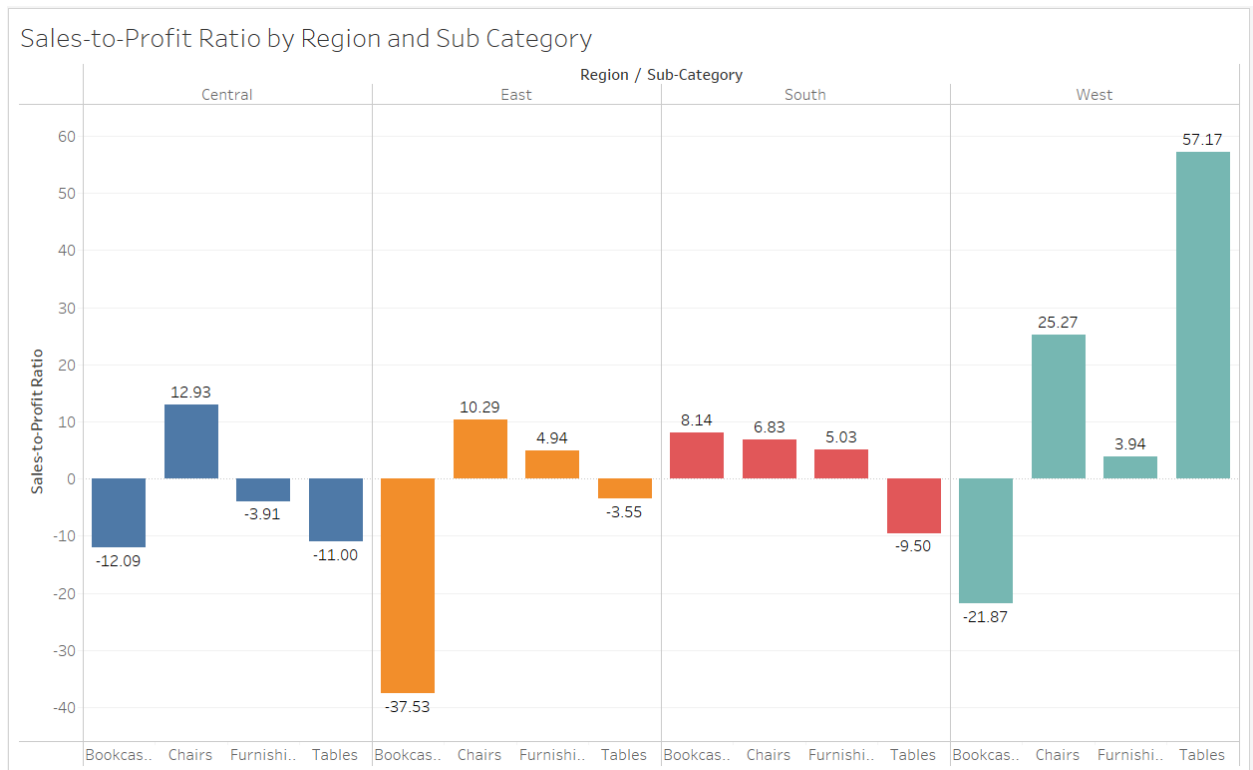
- **Finding:**
 - Historical trends indicate a steady growth in sales and profit, peaking in 2018.
 - Forecasting suggests a potential decline in profits post-2023 if no interventions are made.
- **Insight:** Misaligned trends highlight inefficiencies in cost and pricing strategies.
- **Visual Evidence:** Line charts reveal the widening gap between sales and profit trends.

5. Inventory Management



- **Finding:** Inventory data reveals significant seasonal fluctuations, particularly for Chairs and Tables, leading to risks of overstocking or stockouts.
- **Insight:** Inefficient inventory management raises costs and impacts customer satisfaction.
- **Visual Evidence:** Tableau forecasts show variability in stock levels for key sub-categories.

6. Sales-to-Profit Ratio



- **Finding:** The West region has the highest Sales-to-Profit ratio for Tables (57.17), while the Central region underperforms across all sub-categories, especially for Bookcases (-12.09) and Tables (-11.00).
- **Insight:** Variability in profit margins across regions suggests a need for tailored strategies to address inefficiencies in underperforming areas like the Central region.
- **Visual Evidence:** The bar chart clearly shows the disparity in the Sales-to-Profit ratio across regions and sub-categories, emphasizing the West's strength in Tables and the Central region's consistent underperformance.

VI. Strategic Recommendations and Implementation Plan

Actionable and data-driven solutions have been developed to address the challenges identified in this analysis. These recommendations focus on optimizing profitability, improving regional performance, refining discount strategies, and streamlining inventory management. Each solution directly addresses specific findings, ensuring practical implementation and measurable outcomes. By adopting these strategies, the furniture retailer can enhance operational efficiency, reduce costs, and secure sustainable growth in a competitive market.

1. Optimizing Discounts

Actions:

- Set discount caps (15–20%) for underperforming sub-categories like Tables and Bookcases.
- Launch customer-targeted promotions for high-performing products like Chairs.

Expected Impact: Reduces revenue loss and balances sales growth with profitability.

Timeline: Short-Term.

2. Enhancing Regional Performance

Actions:

- Introduce region-specific strategies for the Central region to improve Sales-to-Profit ratios.

- Expand successful practices from the West region, focusing on optimizing logistics and promotions.

Expected Impact: Achieves regional profitability balance, with Central region improvement within 6-12 months.

Timeline: Mid-Term.

3. Forecast-Driven Inventory Management

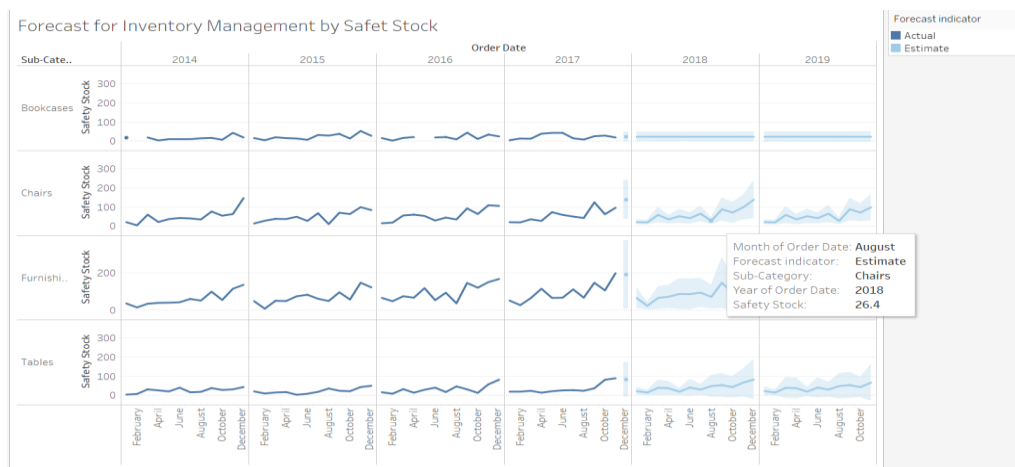
Actions:

- Implement Tableau forecasting tools to align inventory levels with demand patterns.
- Establish safety stock levels for high-demand sub-categories like Tables.

Expected Impact: Reduced stockouts and overstocking, lowering inventory holding costs by 10–15%.

Timeline: Mid-Term to Long-Term.

Example Tableau Implementation:



4. Product Focus

Actions:

- Prioritize high-margin and high-performing products (e.g., Chairs and Tables in the West) for region-specific promotions.
- Align inventory strategies for high-demand products like Tables to meet regional needs and avoid overstocking or stockouts.
- Reprice or phase out loss-making products like Bookcases, particularly in underperforming regions like the Central.

Expected Impact: Enhances profitability by targeting high-performing products while reducing inefficiencies with loss-making products.

Timeline: Short-Term.

5. Aligning Sales and Profitability

Actions:

- Conduct quarterly reviews of pricing strategies and operational budgets to sustain growth.
- Use insights from Tableau forecasts to design long-term marketing campaigns.

Expected Impact: Sustained alignment between sales growth and profitability, ensuring scalability.

Timeline: Long-Term.

VII. Ethical Considerations

This project was conducted using anonymized and publicly available data from Kaggle, ensuring no personally identifiable information (PII) was included. Ethical considerations were prioritized throughout the analysis to maintain data integrity and privacy.

Key points:

1. The dataset was handled responsibly to prevent misrepresentation of findings or biases in visualizations.
2. Insights and recommendations were derived solely from the data provided, avoiding speculative or misleading interpretations.
3. The focus was on actionable insights that align with ethical business practices, such as improving operational efficiency and reducing waste.

VIII. Limitations

Despite the comprehensiveness of the analysis, certain limitations should be acknowledged:

1. **Dataset Scope:** The dataset spans sales and operations data from 2014 to 2018. While valuable, it may not fully reflect current market dynamics or recent consumer behavior.
2. **External Influences:** The analysis does not account for external factors such as economic changes, competitor activities, or market disruptions, which could impact trends and profitability.
3. **Methodology Constraints:** The use of Tableau for forecasting relies on historical patterns, which may not accurately predict demand in the event of unforeseen circumstances.

4. **Focus on Specific Metrics:** The project primarily examines sales, profit, and inventory trends. Broader operational factors, such as supplier efficiency or marketing effectiveness, were outside the scope of this study.

IX. Future Work

To build on the insights and recommendations from this analysis, future work can explore the following areas:

1. **Real-Time Data Integration:** Incorporating real-time sales and inventory data could enhance forecasting accuracy and enable more dynamic decision-making.
2. **Customer Behavior Analysis:** Analyzing customer demographics and purchasing patterns could provide deeper insights into sub-category performance and regional trends.
3. **Advanced Predictive Models:** Leveraging predictive modeling techniques, such as regression or machine learning, could refine inventory management and pricing strategies.
4. **Market and Competitor Analysis:** Expanding the scope to include external market data and competitor benchmarks could provide a more holistic view of the retailer's performance.
5. **Scenario Analysis:** Conducting “what-if” scenario analysis using Tableau or other tools could help simulate the impact of different discount strategies or regional investments.

X. Summary of Challenges, Findings, and Recommendations

Challenge	Key Finding	Recommendation
Loss-Making Sub-Categories	Tables and Bookcases generate consistent sales but losses.	Reassess pricing strategies and optimize cost structures for loss-making products.
Discount Erosion on Profitability	Excessive discounts lead to profit margin reductions without proportional growth.	Cap discounts for underperforming products and balance sales growth with profitability.
Regional Performance Disparities	Central and South regions underperform significantly.	Replicate West region strategies in underperforming regions and optimize logistics.
Inventory Management Inefficiencies	Stockouts and overstocking increase costs.	Use forecasting tools to align inventory with demand and set safety stock levels.
Misaligned Sales and Profitability Trends	Positive sales growth but inconsistent profit trends.	Conduct quarterly pricing reviews and align operational budgets with sales growth strategies.

XI. Conclusion

This comprehensive analysis of the furniture store's sales, profitability, and inventory performance highlights critical operational challenges that hinder its financial success. The findings reveal inefficiencies such as losses in key sub-categories, aggressive discounting practices, regional performance disparities, and inventory mismanagement. By implementing the data-driven strategies outlined in this report, the retailer gains a clear roadmap to optimize operations, enhance profitability, and achieve sustainable growth.

Recommendations:

1. **Transform Loss-Making Products:** Revise pricing and discount strategies to turn sub-categories like Tables and Bookcases into profit generators.
2. **Achieve Balanced Regional Growth:** Address regional disparities by implementing the successful practices of the West region in underperforming areas like the Central and South regions.
3. **Streamline Inventory Management:** Use forecasting tools to reduce stockouts and overstocking, improving operational efficiency and customer satisfaction.
4. **Enhance Profitability Through Strategic Discounting:** Implement discount caps to balance sales growth and profit margins effectively.
5. **Align Profitability with Sales Growth:** Monitor and optimize operational costs to ensure profitability trends align with growing sales.

Integrating advanced analytics and forecasting capabilities into daily business processes will enable the furniture store to allocate resources more effectively, respond to customer demand with

precision, and foster a culture of continuous improvement driven by data insights. This proactive approach positions the business not only to overcome its current challenges but also to adapt seamlessly to changing market conditions.

In today's competitive retail industry, leveraging data insights is a key competitive advantage. By embracing the strategies outlined in this report, the retailer can evolve into a model of operational excellence, achieving higher profitability, improving customer satisfaction, and ensuring long-term business sustainability. This project demonstrates the critical role of data-driven decision-making in optimizing retail operations and building a solid foundation for continued success in a rapidly changing market environment.

XII. References

- **Kaggle:** Furniture Sales Dataset (2014–2018). Retrieved from [Kaggle](#).
- **Tableau Software:** Forecasting and Data Visualization Techniques. Accessed through Tableau Documentation.