Weaving Business Insights: An Analytical Approach to a Retail Saree Store

Final Term Report for the BDM capstone Project

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1 Executive Summary

The analysis of Ranis Collection's sales data from the garment industry involved comprehensive data cleaning, statistical analysis, and financial performance evaluation. Key metrics like mean, median, mode, standard deviation, range, and sum were calculated for variables such as profits, revenue, and margin. This provided a holistic view of sales patterns and profitability, enabling the development of strategic recommendations for enhancing revenue and growth. The analysis also focused on key performance indicators like ROI from discount strategies, offering insights into the effectiveness of marketing and promotional campaigns. Data visualization techniques were employed to communicate trends and key findings clearly. Continuous improvement and adaptation to market conditions were emphasized to ensure sustainable growth.

The sales data revealed valuable insights into the performance of different garment categories. Seasonal variations and discount strategies were found to significantly impact sales volume and profitability. While high performing categories like Fancy Art Silk, Cotton, and Ghagras showed higher margins, other categories such as Bed Sheets and Kurtis performed with lower margins. The findings highlighted that while aggressive discounts drove sales, they had a negative impact on profitability. The analysis also uncovered trends in consumer preferences, with traditional garments like sarees remaining consistently popular.

Based on the analysis, Ranis Collection can improve its operational efficiency by refining pricing strategies, optimizing discounts, and focusing on high-margin products. Diversifying marketing approaches, and leveraging data-driven decision-making can help the business adapt to market dynamics, improve profitability, and ensure long-term growth.

2 Detailed Explanation of Analysis Process and Methods

2.1 Company Background and Data Collection :

Rani’s Collection is a renowned retail saree showroom, specializing in designer and fancy sarees, ghagras, and silk garments. For this analysis, I utilized a comprehensive dataset provided directly by the store owner, which was extracted from the store's billing system over a three-month period. The data, stored in an Excel format, included critical metrics such as customer and billing details (e.g., bill number, bill date), product costs, sales (both including and excluding taxes), various types of discounts applied, and information about distributors, including their names and locations. Over the three months, the dataset encompassed approximately 965 orders, generating total revenue of ₹18,71,58,20.15. The primary objective of this analysis was to evaluate the store's sales performance, profitability, and margin trends, with the aim of generating actionable insights and strategic recommendations to enhance business performance.

2.2 Data Cleaning and Preprocessing :

- **Irrelevant and Redundant columns were dropped** : To streamline the analysis and improve clarity, I removed irrelevant and redundant columns that did not add significant value to the core objectives. Specifically, columns such as Distributor Name, Distributor Location, Item Alias, HSC Code, EAS Code were excluded, as they were not directly relevant to the analysis of sales trends, profitability, and margin performance. This allowed for a more focused and efficient evaluation of the key metrics.

- **Consolidation of Saree Categories** : The dataset included over 25+ different saree categories, as classified by the store owner. However, many of these categories were highly similar in terms of design, fabric, or style, leading to potential redundancy. To simplify the analysis and make it more meaningful, I merged several closely related categories. This consolidation helped to reduce complexity while ensuring that distinct product types were still adequately represented.

- **Merging of Metrics for Streamlined Analysis** : To improve the clarity and effectiveness of the analysis, I merged several key financial metrics, including net sales and net cost (both including and excluding taxes). By combining these figures into unified metrics, I was able to better assess overall profitability without unnecessary fragmentation. Additionally, various types of discounts applied across

different transactions were consolidated into a single discount category.

2.3 Methods :

To effectively tackle the challenge of delivering a thorough financial and operational overview and conducting a detailed turnover analysis for *Rani's Collection*, a structured and methodical approach was adopted. This approach involved identifying and calculating a range of essential financial metrics and performance indicators to provide a comprehensive understanding of the business's financial health. By analyzing these metrics, valuable insights into profitability trends, operational efficiency, and overall performance were gained, offering a clear and accurate picture of the company's financial position and market standing amidst trying to dig deeper into the root causes of the problems faced by the store. Simultaneously, by ROI estimation we can assess the return on investment for particular plans or initiatives that are put into action depending on the analysis results.

- **Statistical Examination and Insights :** Statistical analysis was performed on the organized data to uncover valuable insights into the distribution and characteristics of Rani's Collection's sales performance. For sales value variables, key metrics were calculated, including mean, median, mode, standard deviation, range, minimum, maximum, sum, and count. These statistics provided a comprehensive overview of the sales patterns and performance trends over the analyzed period.

- **Daily and Monthly Sales Analysis :** To assess Rani's Collection's performance, a detailed daily and monthly sales analysis was conducted. The daily analysis focused on tracking revenue, sales volume, and customer activity to identify fluctuations and peak days, influenced by factors like promotions or external events. The monthly analysis provided a broader view, highlighting trends, seasonal patterns, and overall sales performance. By comparing monthly figures, the analysis revealed insights into profitability, inventory needs, and the effectiveness of sales strategies. This helped pinpoint areas for improvement and informed future decisions to optimize sales and operational efficiency.

- **Marginal analysis** : The margin and profit analysis focused on evaluating the profitability of individual products, categories, and overall sales performance. I was able to assess how effectively the store was managing costs in relation to its sales. This analysis provided a clear picture of which saree categories and products were yielding the highest profit, helping to identify areas of strength.The analysis also highlighted the

impact of **discounting strategies** and **pricing decisions** on overall profit. By examining how the discounts affect sales volume and profitability, I could determine whether the discounts were driving sufficient revenue to offset the reduced margins. Ultimately, this analysis guided decisions to optimize pricing, improve cost efficiency, and maximize overall profit.

- **SKU Performance Classification** : The aim was to identify the key SKUs (products) driving the business and contributing significantly to its growth. The widely used ABC analysis was conducted to identify which SKUs have the most significant impact on sales. The ABC analysis categorizes products into three groups: 'A' for high-performing items that drive the majority of sales, 'B' for moderately performing products, and 'C' for those with lower sales volumes. This classification was applied to both **sales data** and **quantity purchased**, providing a comprehensive view of which products were generating the most revenue and which ones were being bought in the highest volumes This analysis helps the business optimize inventory management by focusing on high-performing products, while also enabling the development of targeted strategies to promote these top sellers. The classification was carried out on the entire dataset as well as on a month-by-month basis, considering both sales data and quantity purchased to provide a comprehensive understanding of product performance.

3 Results and Findings

- **Descriptive statistics**

The descriptive analysis of sales data for September, October, and November as well as overall data provides key insights into the performance of sales over time. By examining metrics such as mean, median, standard deviation, and range, we can assess trends, variability, and central tendencies in both quantity sold and revenue generated. This analysis helps identify fluctuations in sales, compare monthly performance, and understand typical sales figures. The accompanying net sales and net cost graphs visually enhance the understanding of these trends.

- **Descriptive Analysis for September Sales Data :**

	Quantity	**Revenue**
Sum	**749**	**802644.09**
Mean	**1.62**	**1741.09**
Standard Error	**0.1366**	**70.7695**

Median	**1**	**1314.72**
Standard Deviation	**2.9348**	**1519.48611**
Maximum	**39**	**18232.50**
Minimum	**1**	**374.14**

A total of 749 Sarees were sold this month collecting a revenue of ₹802466.09. The mean sale was ₹1741.00 per day whereas the median was about ₹1314.72. This month had the largest contribution to the total revenue and most quantity of sarees were also sold in this month. Due to seasonal spike and store sale, this could be the possible reason for higher sale figures.

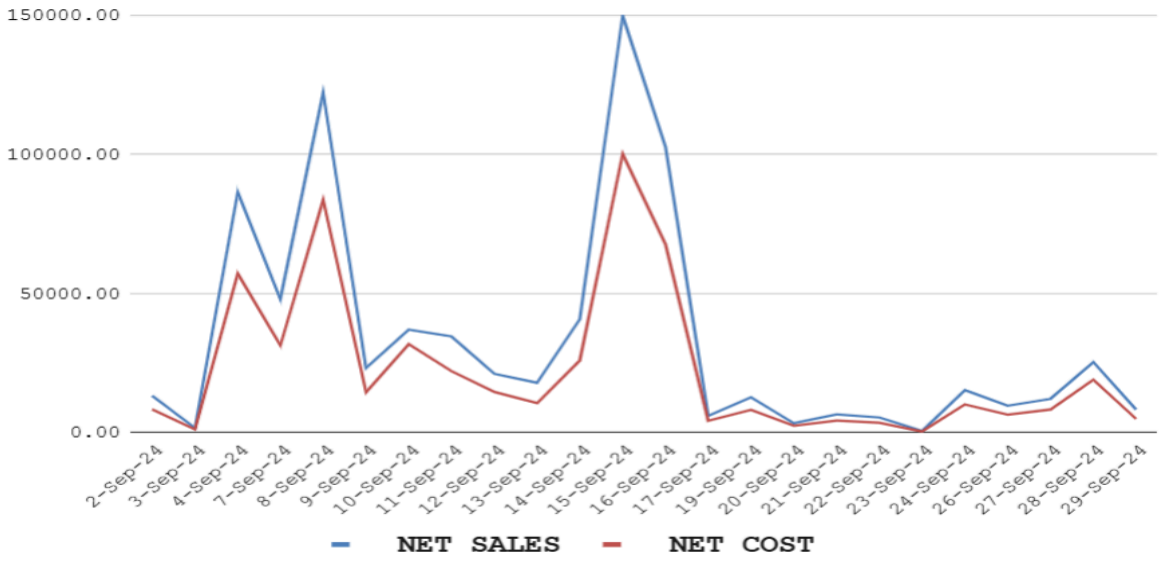

Fig 1. Net sales and Net cost graph for the month of September

- **Descriptive Statistics for October Sales Data :**

	Quantity	**Revenue**
Sum	**406**	**655108.09**
Mean	**1.26**	**2034.50**
Standard Error	**0.0533**	**68.4687**
Median	**1**	**1700**
Standard Deviation	**0.9571**	**1228.628**
Maximum	**10**	**9134.79**

Minimum	**1**	**381.15**

A total of 406 Sarees were sold this month collecting a revenue of ₹655108.09. The mean sale was ₹2034.50 per day whereas the median was about ₹1700. This month was second highest in terms of total revenue contribution.

Fig2. Net sales and Net cost graph for the month of October

- **Descriptive Statistics for November Sales Data :**

	Quantity	**Revenue**
Sum	**218**	**412852.13**
Mean	**1.20**	**2280.95**
Standard Error	**0.0625**	**95.67832**
Median	**1**	**1813.94**
Standard Deviation	**0.8414**	**1287.220**
Maximum	**10**	**6707.52**
Minimum	**1**	**522.92**

A total of 218 Sarees were sold this month collecting a revenue of ₹412825.13. The mean sale was ₹2280.95 per day whereas the median was about ₹1813. This month was least in terms of total revenue contribution. The higher mean and median revenue indicate sarees having higher value were sold in this month, as confirmed by the owner as this month has more wedding buyers.

Fig3. Net sales and Net cost graph for the month of November

- **Descriptive Statistics for Overall Sales Data**

	Quantity	Revenue
Sum	**1374**	**1871520.15**
Mean	**1.42**	**1939.40**
Standard Error	**0.0689**	**45.05113**
Median	**1**	**1500**
Standard Deviation	**4.2047**	**1399.49**
Maximum	**39**	**18232.50**
Minimum	**1**	**374.14**

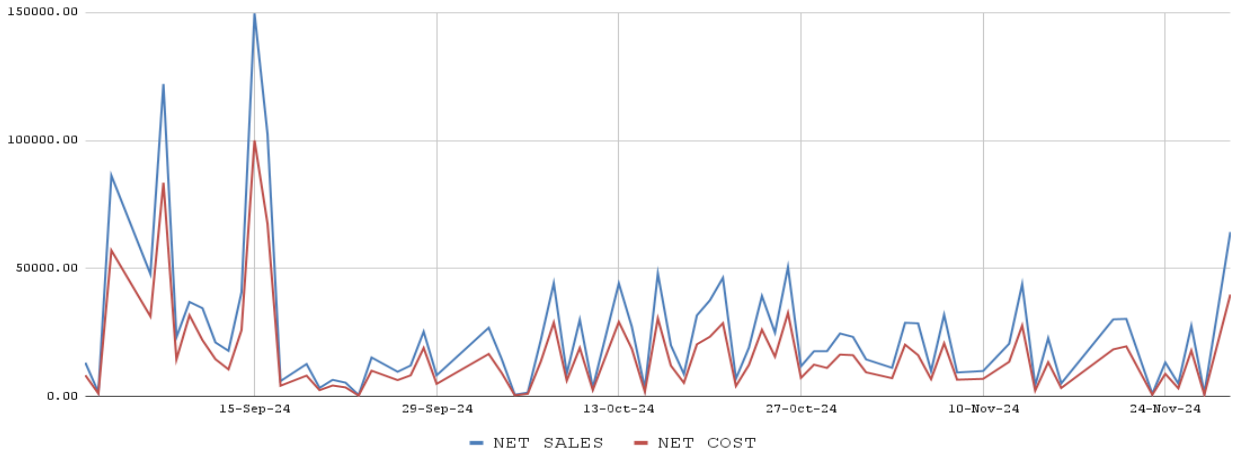

Fig 4. Net sales and Net cost graph for the overall dataset

- **SKU Performance Classification :**

  Products are classified as per Quantity sold and Revenue for the performance classification.

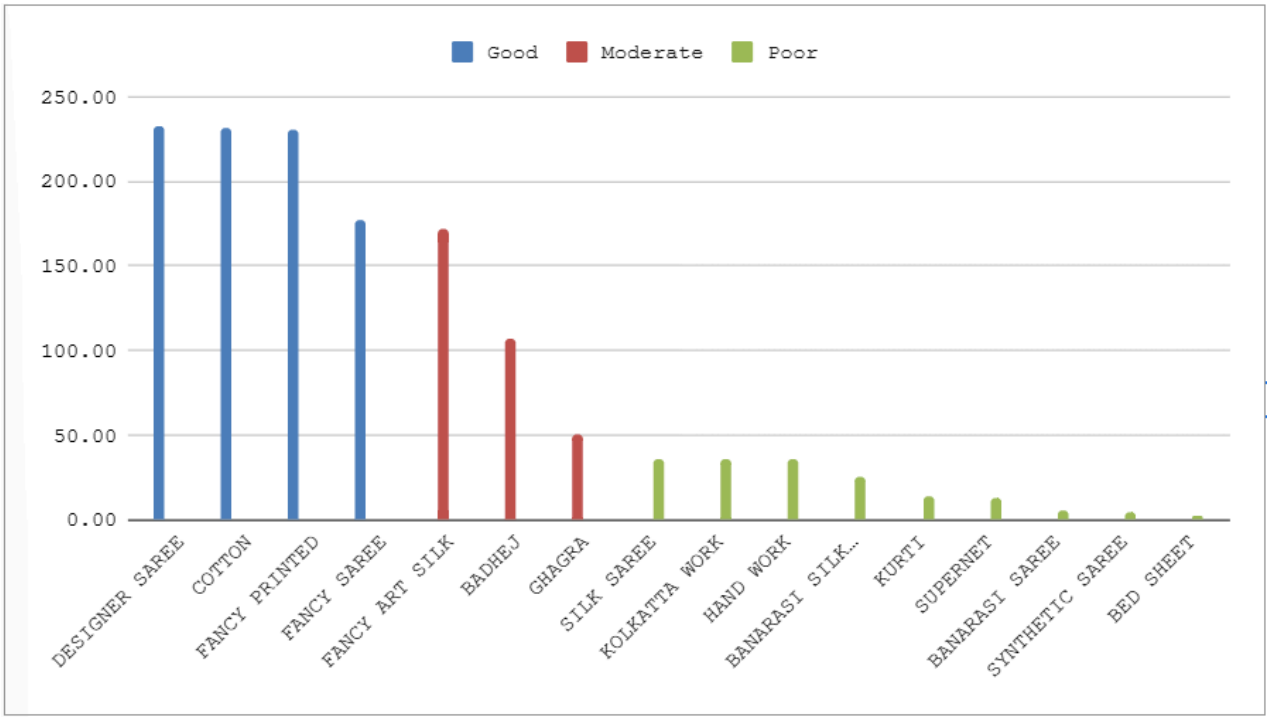

Fig 5. Overall classification of Products on the basis of Quantity

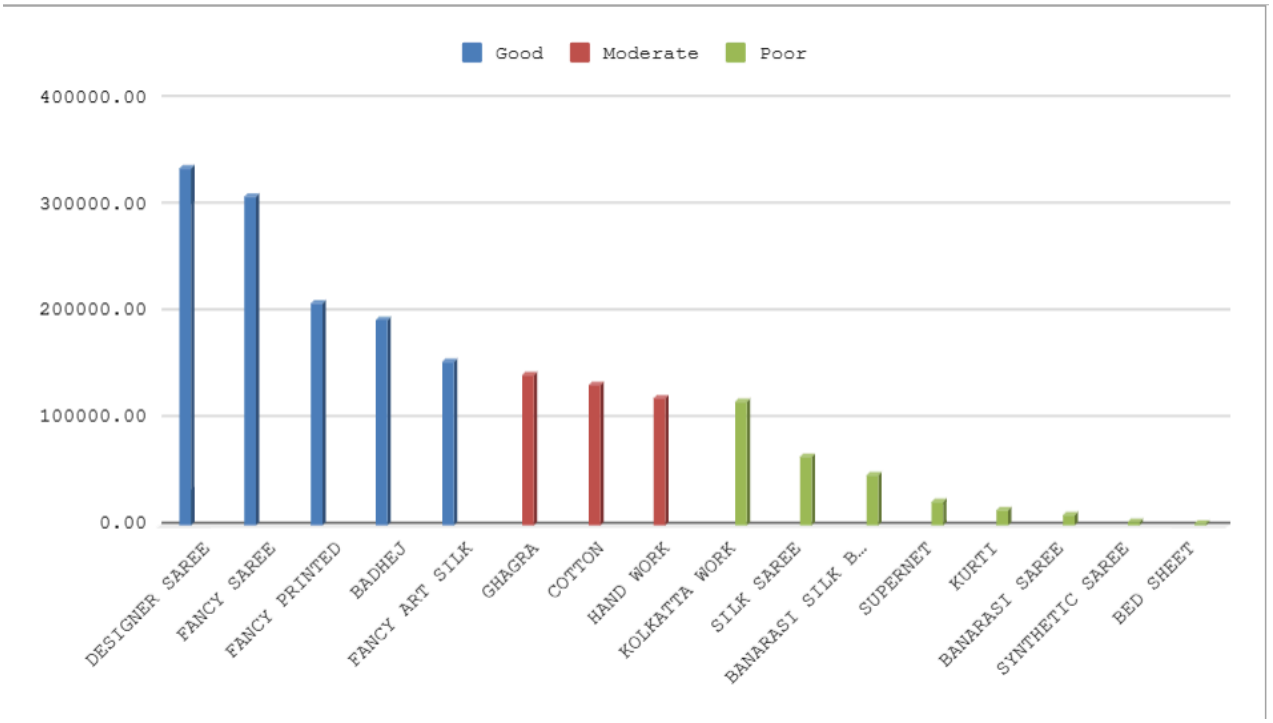

Fig 6. Overall classification of Products on the basis of Revenue

Explanation:

- The ABC analysis involves categorizing Stock Keeping Units (SKUs) into three distinct groups based on two main factors: total sales and purchase quantity. These groups are: Good Performers, which account for 70% of total sales; Moderate Performers, representing 10% of the remaining sales; and Poor Performers, which make up the rest. In addition to the overall classification, monthly evaluations are conducted to capture performance trends.
- This classification system is crucial for inventory management, enabling targeted promotions for Good and Moderate Performers, while providing actionable insights for Poor Performers. However, it's important to note that analyzing sales and quantity separately may not yield the most actionable insights. The real value comes from integrating both classifications into a unified approach.
- To maximize effectiveness, the analysis combines the nine classifications into three overarching categories: *Core Products* (Good Sales and Good Quantity), *Luxury Products* (Good Sales but Moderate Quantity), and *Bulk Selling Products* (Moderate Sales but Good Quantity). This combined approach helps optimize business decisions, from inventory planning to marketing strategies.

Findings :

- Firstly, an overall classification of the entire dataset was conducted. This would help us understand evergreen products.

Overall Classification [September - October 2024]	
GS-GQ	Designer Sarees, Fancy Printed, Fancy Saree
GS-MQ	Badhej, Ghagra
MS-GD	Cotton, Fancy Art Silk

- These classifications were also calculated on a monthly basis, providing a deeper insight into the performance of each SKU. The same combined classification approach was applied to this analysis as well.

Month	GS-GQ	GS-MQ	MS-GD
September	Cotton, Designer Saree, Fancy Printed	Badhej, Fancy Saree	Kolkata Work
October	Designer Saree, Fancy Printed, Fancy Saree	Badhej, Cotton, Ghagra	Fancy Art Silk, Hand Work
November	Designer Saree, Ghagra	Handwork, Kolkata Work, Fancy Printed	Badhej

- **Margin and Profit Analysis :**

  Feature importance in machine learning indicates the relevance of each feature in making predictions. For margin prediction using Random Forest, it quantifies how much each feature contributes to reducing impurity in decision trees. Higher importance values suggest that a feature has a stronger influence on the model's predictions. According to the graph below Discount and Net Cost have a strong influence on margin prediction.

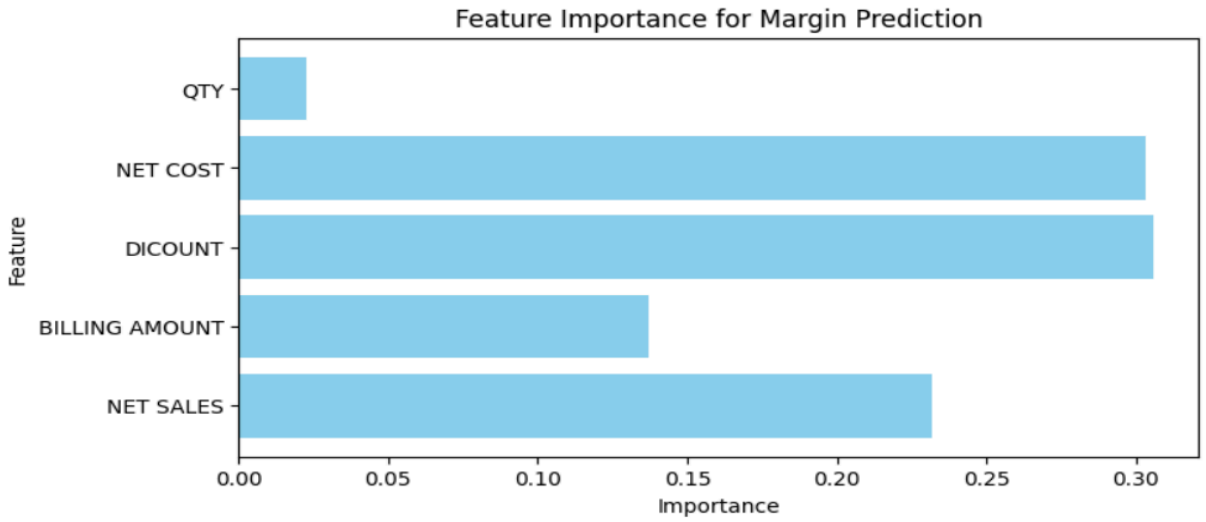

Fig 7. Importance of Feature for Margins

The formula for calculating the margin is:

Margin = { (Net Sales - Net Cost) / Net cost } * 100

Where:

- Net Sales is the final price at which the garment is sold.
- Net Cost is the cost incurred to acquire or produce the garment.

This formula gives you the margin percentage, which indicates how much profit is made from the sale of each item relative to its selling price.

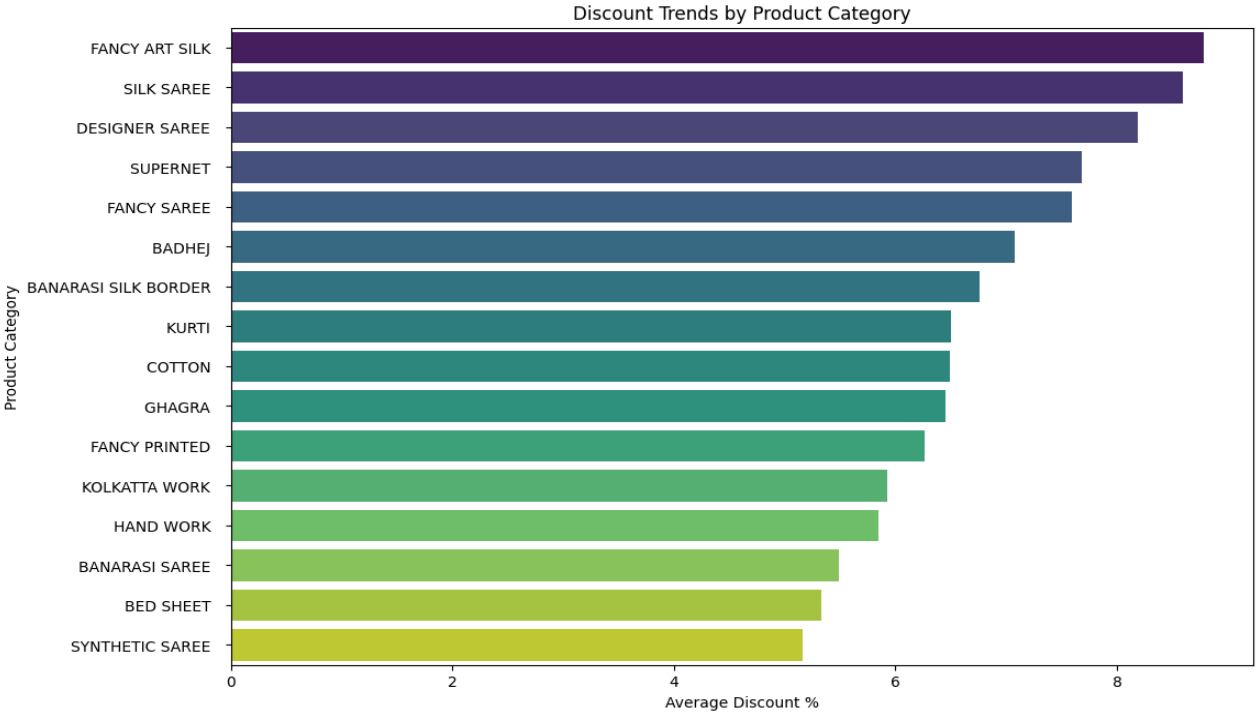

Fig8. Average discount trends by product category

I have calculated the average discounts offered on each category, keeping in mind that sometimes no discount is also offered. The product category with the highest average discount percentage is Fancy Art Silk at around 8%.The next highest discount categories are Silk Saree and Designer Saree both at around 7% average discount. Supernet and Fancy Saree categories have average discounts around 6%. The discount percentages generally decrease as you move from the top categories down to the lower ones. For example, Badhej, Banarasi Silk Border, and Kurti are in the 4-5% discount range. The lower end of the discount range includes categories like Cotton, Ghagra , Fancy Printed, and Kolkata Work which are all around 2-3% average discount. The product categories with the lowest average discounts are Hand Work, Banarasi Saree, Bed Sheet, and Synthetic Saree which are all below 2% discount.

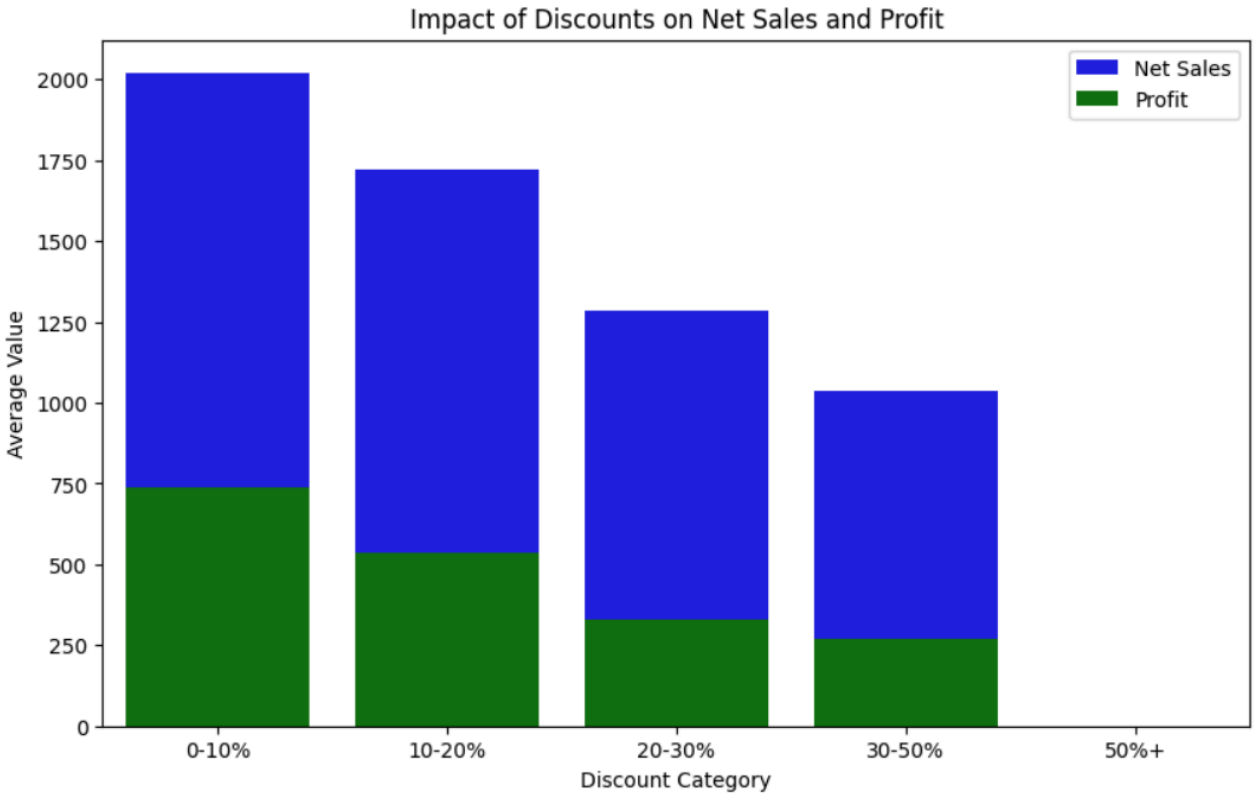

Fig 9. Discount Category vs Average Profit and Revenue

I also bracketed each discount category as 0-10%, 10-20%, 20-30% and 30-50% and 50+%, where we can see how the profit(green) gets affected by the discount offered. We can see that higher discounts lead to decreased net sales and profit as a declining trend is observed. This suggests that while discounts may drive some sales, their overall value (in terms of net sales and profit) decreases significantly as discounts grow larger.

I have also done the analysis of average margins for each product for the span of 3 months and some insights are :

Optimize Discounts: Focusing on offering higher discounts on products with low margins to drive sales, while minimizing discounts on high-margin products to preserve profitability. Store can give discounts on products like Kurti, Synthetic Saree and Bedsheets to clear up their stock and make informed decisions about new inventory.

Pricing Strategy: Reevaluating the pricing strategy for products with low margins, possibly increasing prices or reducing costs to improve profitability. Based on the results above, store can change the pricing strategy based on the previous product performance.

Marketing Efforts: Major marketing and promotions towards high-margin products to maximize profit per sale, as we know our high margin products we can use this to our advantage .

1. **Highest Profit Margins**:
    - **Fancy Art Silk** (43.24%) leads with the highest profit margin, indicating strong profitability.

- **Cotton** (39%), **Ghagra**(36.62%) and **Badhej**(36.12%) also have high profit margins, making them lucrative product lines.

2. **Moderate Profit Margins**:
   - **Banarasi Silk Border**, **Banarasi Saree**, **Designer Saree, Fancy Printed, Hand Work, Silk Saree** categories fall in the mid-range, with margins between 32% and 34%.
3. **Lower Profit Margins**:
   - Categories such as **Supernet, Synthetic Saree, Kolkata Work** have margins between 32 and 30%, indicating relatively lower profitability.
4. **Lowest Profit Margins**:
   - **Bed Sheet** and **Kurti** are the least profitable, with margins below 30%.

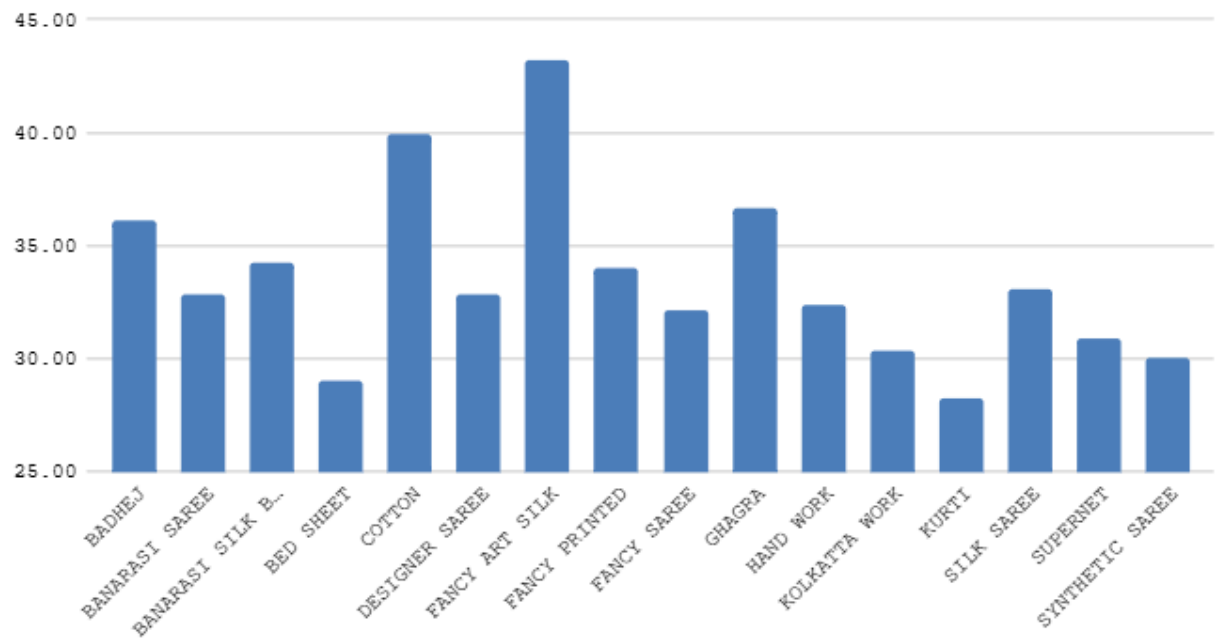

Fig 10. Product Wise Average Margins

- **ROI**

ROI (Return on Investment) is a financial metric used to assess the profitability of an investment by comparing the return to the cost. It helps businesses determine whether an investment has generated a worthwhile profit. It is calculated as :

ROI = (Profit Generated / Total Investment) * 100

ROI is crucial for decision-making, enabling businesses to compare different investments, evaluate performance, and optimize resource allocation for better returns.

To analyze the ROI for Ranis Collection's marketing campaign in local channels and boosting online advertisements and presence on Facebook and Instagram, we calculate the return on investment relative to the costs incurred for each initiative.

Marketing Campaign ROI Calculation:

- Assume the marketing campaign for Ranis Collection cost ₹75,000.
- The campaign will result in an additional revenue of ₹1,50,000.
- **Net Profit** = Additional Revenue - Marketing Campaign Cost
  = ₹1,50,000 - ₹75,000
  = ₹75,000
- **Total Investment** = Marketing Campaign Cost = ₹25,000
- **ROI** = (₹75,000 / ₹75,000) × 100% = **100%**

5 Interpretation of Results

The comprehensive analyses conducted provide us with a unique opportunity to explore the vast sea of data, uncovering valuable insights that not only deepen our understanding of the business but also empower us to make more informed, data-driven decisions for future growth and success.

1. Sales and Revenue Trends

- The descriptive statistics for September, October, and November show fluctuations in key metrics like quantity sold and revenue. For instance, the average revenue per transaction decreased slightly from September to November (from ₹1741.09 in September to ₹1939.40 in November). However, the standard deviation values indicate that there was significant variability in individual sales transactions, suggesting a mix of both high-value and low-value purchases across the months.
- Maximum sales values across all months (for example, ₹18,232.50 in September) suggest the occurrence of occasional high-ticket sales, which was due to seasonal sale and forthcoming festive season.

2. Margin and Profit Analysis

- The analysis of profit margins across different product categories shows that products like

Fancy Art Silk (43.24%) and **Cotton Sarees (39%)** have high profit margins, suggesting they contribute significantly to profitability. These should be prioritized in marketing and inventory management strategies to drive revenue.

- Conversely, Kurti, Synthetic Saree, and Bed Sheet categories have the lowest margins, which suggests they may not be as profitable. As these are newer products that the store is currently experimenting with, offering discounts on these products could clear up stock, but care should be taken to ensure these discounts do not erode margins further. Their performance in this way can help us determine their future while purchasing.

3. Discount Impact on Profitability

- The analysis shows that while discounts can increase sales, offering too many discounts, especially on low-margin products, can hurt profitability. Discounts in the **30-50%** range significantly impact both sales and profit margins. This highlights the need for a more thoughtful discount strategy—one that clears lower-margin items like Kurtis and Bed Sheets, while protecting the price integrity of higher-margin products like Fancy Art Silk and Designer Sarees.
- By offering discounts selectively based on product margins, the business can increase sales without heavily compromising profits. Additionally, products with larger discounts, like **Fancy Art Silk** and **Designer Sarees**, are drawing more attention and could be ideal candidates for special promotions. On the other hand, products like **Hand Work** and **Banarasi Sarees**, which benefit from minimal discounts, should maintain their current pricing to preserve profit margins.

4. ABC Analysis and Product Classification

- The ABC analysis classifies products into three categories based on their sales volume and revenue contribution. Products in the ‘GS-GQ’ category (like **Designer Sarees** and **Fancy Sarees**) are identified as high-performing, contributing significantly to sales and revenue. These products should be prioritized in inventory management and marketing strategies.
- The analysis also identifies certain ‘GS-MQ’ and ‘MS-GD’ categories, such as **Badhej** and **Ghagra**, as moderate performers. These can be targeted with promotions or adjusted pricing to improve their sales performance.
- The analysis emphasizes the importance of categorizing products based on both quantity and revenue, as it provides a more nuanced view of performance. Core Products (high sales and quantity) should be maintained in large stock, while Luxury Products (high sales but moderate quantity) should be marketed to high-value customers.

5. ROI Analysis

- As per the assumption the ROI of the marketing campaign stands at an impressive **100%**, with an investment of ₹75,000 yielding an additional ₹1,50,000 in revenue, resulting in a profit of ₹75,000. This signals the success of the marketing strategy and indicates that further investments in targeted marketing campaigns could yield similar or even better returns. By continuing to invest in strategic marketing, particularly for high-margin or high-performing products, the business can continue to generate profitable returns.

Recommendations

- **Implementing Dynamic Pricing Strategy** : Rani's collection should adopt dynamic pricing strategy where prices are adjusted in real-time or periodically based on various factors like demand, market conditions, competitor pricing, customer behavior, and inventory levels. This strategy allows businesses to maximize profits, improve sales, and stay competitive by tailoring prices to different circumstances.
- **Focus on High-Performing Products and Refine Inventory Management :** Based on the ABC analysis, Designer Sarees and Fancy Sarees should be prioritized for restocking and marketing efforts, as they drive the majority of sales. Similarly, Ghagras and Cotton Sarees with higher margins should be promoted. Whereas, low performing products should be restocked based on the customer response.
- **Optimize Digital Channels and Social Media Marketing :** To further capitalize on this, Ranis Collection should consider **expanding its social media presence**, particularly through **influencer partnerships**, targeted **Instagram and Facebook ads**, and organic content creation. **Video content** showcasing product quality or offering styling tips can further engage customers and increase conversion rates. Additionally, **retargeting** strategies can help bring back users who have shown interest but have not made a purchase, further boosting ROI.
- **Collection more Customer Data for Personalized Catering :** The customer data collected had a lot of irregularities and blank information. The store needs to focus on collecting this data to provide personalized catering and improve customer experiences. By gathering valuable insights from customer interactions, preferences, and behaviors, store can tailor the offerings and make better marketing strategies to meet individual needs.

Cleaned Dataset Link with Relevant Diagrams : IIT MADRAS BDM

Python Colab Link : BDM_Analysis.ipynb