Resolving Inventory Strain and Profitability Gaps in Gift Retail

Final Submission for the BDM capstone project

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1 Executive Summary and Title

Gupta Gift Shop, a retail business specializing in gift items, has been facing declining profitability despite maintaining steady sales volumes. The primary challenge identified was a lack of strategic margin control and inefficient inventory management. High-volume products such as bubble heads had low profit margins, while certain low-volume items occupied significant inventory space without proportional revenue return. The business lacked data-driven decision frameworks for pricing, stocking, and promotional strategies.

To address these issues, sales data from April to November 2024 was collected and analyzed. The dataset included daily sales, cost prices, quantities, and profit figures. A structured methodology was applied, including Revenue-Based and Quantity-Based ABC classification, trend analysis, and category-wise profit simulations. Key descriptive insights revealed that 70% of revenue came from only 30% of items, and that items like key holders and bubble heads drove the majority of volume but varied sharply in margin.

The analysis led to a revised margin policy where select product prices were adjusted based on demand and profitability. Simulated results projected an increase in total profit from ₹465,644 to ₹543,775.60, marking a **16.78% gain** without increasing unit sales. Inventory focus was restructured toward high-margin, high-volume items.

Interpretation of results affirmed that targeted price adjustments, promotion scheduling, and differentiated inventory management were essential levers for profitability. As a result of implementing these data-driven changes, Gupta Gift Shop is now positioned for better capital efficiency, profit scalability, and long-term operational stability.

2 Detailed Explanation of Analysis Process/Method

2.1 Data Collection:

After extensive discussions with the store owner, Mr. Dalip Gupta, it was determined that a thorough analysis of sales and inventory data is essential for evaluating the business's performance. The dataset compiled includes key metrics such as daily sales figures, revenue generated, profit margins, and quantities of items sold. Data collection commenced on April 1, 2024, and continued through November 30, 2024. This data set offers a comprehensive overview of the business's daily sales performance throughout the specified period.

2.2 Data Cleaning:

The data cleaning process involves applying standard techniques to enhance the accuracy and usability of the dataset. Initially, redundant or duplicate records were identified and removed to avoid skewed results. Missing values were addressed using appropriate imputation methods or were excluded based on relevance and impact. Data types were reviewed and corrected to ensure consistency across all columns, aligning with their respective formats. Additionally, outliers were carefully detected and treated to maintain the integrity of the data and prevent distortion in trend analysis.

2.3 Data Description:

The sales and inventory data are accessible via the provided link (Dataset). This dataset encompasses daily sales records for various products at Gupta Gift Shop over an eight-month period. The primary objective of utilizing this dataset is to analyze daily sales trends and evaluate profitability. Insights derived from this analysis will support informed decision-making aimed at optimizing both sales and profits. Additionally, the dataset will be instrumental in formulating a new pricing and margin policy designed to maximize profits and drive sales growth.

2.4 Data Analysis:

1. **Top Selling Product and Category Analysis:** The analysis is centered on identifying and evaluating the top-performing products and categories in terms of sales volume and revenue generation. Key areas of focus include:

   - **Sales Volume Analysis:** Identifying products that consistently exhibit high sales volumes throughout the analysis period.
   - **Revenue Contribution:** Assessing products that generate the highest revenue, thereby pinpointing opportunities for maximizing profitability.

- **Margin Policy Development:** Formulating an updated margin strategy based on insights from sales and revenue data to enhance overall profit margins.

2. **Revenue-Based ABC analysis:** The Revenue-Based ABC Analysis classifies inventory items according to their contribution to overall business revenue. This approach involves:

   - **Categorization:** Grouping products into three categories—A, B, and C—based on their percentage contribution to total revenue.
   - **Profitability Insights:** Highlighting high-revenue items (Category A) that significantly influence profitability, as well as identifying moderate (Category B) and low-revenue **(Category C) products.**
   - **Strategic Prioritization:** Recommending resource allocation and inventory management strategies that focus on high-revenue items to drive profitability and operational efficiency.

3. **Monthly Sales Trend Analysis:** The monthly sales Trends analysis focuses on examining the timeline of sales for different product categories over a eight-month period. This analysis provides insights into sales patterns and helps identify trends that can inform strategic decisions. Key elements include:

- Timeline Analysis: Reviewing the line graphs depicting sales trends for each product category month-by-month.
- Identifying Peaks and Troughs: Noting any recurring patterns of peak sales or dips in sales at specific times within each month.
- Category-Specific Insights: Observing how sales fluctuate within each category, highlighting which categories consistently show higher sales at the beginning, middle or end of each month.

3 Results and Findings

3.1 ABC Analysis

3.1.1 Revenue-Based ABC Classification of Inventory Items:

No.	Item	Revenue	Cumulative Revenue	% of Cumulative Revenue	ABC
1	bubble head	407200	407200	27.24511234	A
2	rain coat	253950	661150	44.23650792	A
3	key holder	218000	879150	58.82254546	A
4	hand bag	174160	1053310	70.47531748	B
5	Hemp bag	156750	1210060	80.96321375	B
6	action figure	68400	1278460	85.5397503	B
7	wallet	67400	1345860	90.04937842	C
8	wooden bag	62000	1407860	94.19770103	C
9	Key chain	49520	1457380	97.51100644	C
10	umbrella	37200	1494580	100	C

3.1.1.1 Table: Revenue-Driven ABC Analysis Overview

The ABC classification method categorizes inventory items based on their contribution to total revenue, helping in effective inventory management and strategic decision-making. This method divides items into three categories: A, B, C.

- **Category A (High Priority):**
  - These are the most important items that contribute to most of the revenue (typically top 70%). They require tight control, accurate forecasting and regular monitoring.
  - Examples from this dataset include bubble head, raincoat and key holder, which together contribute approximately
  - Effective management of A items is crucial as they are high-priority products. This involves ensuring their availability, preventing stocks and maintaining optimal inventory levels.
- **Category B (Medium Priority):**
  - Items in the category have a moderate impact on revenue.
  - Examples include handbag, hemp bag, action figures. These items contribute to the next 20% of revenue.
  - B category items require balanced inventory control strategies, focusing on efficient stock management to minimize holding costs while ensuring availability.
- **Category C (Low Priority):**
  - Items in the category have the least impact on revenue.
  - They make up most of the inventory, but they contribute the remaining 10% to the total revenue.

- Examples include wallet, wooden bag, key chain, umbrella.
- Managing C category items involves cost-effective strategies, such ab bulk ordering and minimizing handling efforts to reduce overall costs.

This classification aids in identifying the most and least profitable inventory items, thereby enabling better inventory management and strategic decision making.

3.1.2 Quantity-Based ABC Classification of Inventory Items:

NO.	Item	Quantity	Cumulative_Quantity	%_Cumulative_Quantity	ABC
1	Key chain	502	502	22.36080178	A
2	key holder	396	898	40	A
3	wallet	396	1294	57.63919822	A
4	action figure	201	1495	66.59242762	A
5	bubble head	201	1696	75.54565702	B
6	wooden bag	201	1897	84.49888641	B
7	Hemp bag	151	2048	91.22494432	C
8	hand bag	151	2199	97.95100223	C
9	umbrella	31	2230	99.33184855	C
10	rain coat	15	2245	100	C

3.1.2.1 Table: ABC Classification Based on Sales Volume

The Quantity-based ABC classification categorizes inventory items based on the quantity of units sold or stocked, providing insights into inventory management and operational priorities.

- **Category A (Green): High Quantity Items**
  - Items in this category represent a significant portion of the total quantity stocked or sold.
  - While they may not contribute as much to revenue individually, their high volume makes them critical for operational efficiency.
  - Examples include Key chain, key holder, wallet action figure which collectively account for approximately 66.5% of the total quantity sold.
  - Efficient management of category A items involves ensuring adequate stock levels to meet demand without overstocking, thereby optimizing storage and handling costs.
- **Category B (Yellow): Moderate-Quantity Items**
  - Items in the category have a moderate impact on quantity but still contribute significantly to overall operations.
  - They strike a balance between volume and importance, making them integral to daily operations.
  - Examples include bubble head, wooden bag. These items collectively account for next 18% of the total quantity, highlighting their operational importance.
  - Category B items require consistent monitoring and replenishment strategies to maintain availability and prevent stockouts.

- **Category C (Red): Low-Quantity Items**
  - Items in the category have the lowest impact in items of quantity stocked or sold.
  - While they make up the majority of the inventory in terms of variety, they contribute less to overall operational needs.
  - Examples include hemp bag, hand bag, umbrella, rain coat. These items collectively account for next 15.5% of the total quantity.
  - Managing C items involves cost-effective inventory strategies such as batch ordering or periodic reviews to minimize handling costs.

3.1.3 Insights & Observations

- **Different Priorities:** Revenue-based focuses on financial impact, while quantity-based focuses on operational impact.
- **Product Overlap:** Some products may appear in Category A for both analyses, indicating they are both high volume and high revenue. Examples include keyholder.
- **Resource Allocation:** Revenue-based analysis suggests where to invest marketing dollars, while quantity-based suggests where to invest in inventory management.
- **Pricing Strategy:** Revenue-based analysis can reveal high-margin products that should be promoted more.
- **Inventory Risk:** Quantity-based analysis helps identify products that require careful inventory control due to high turnover.

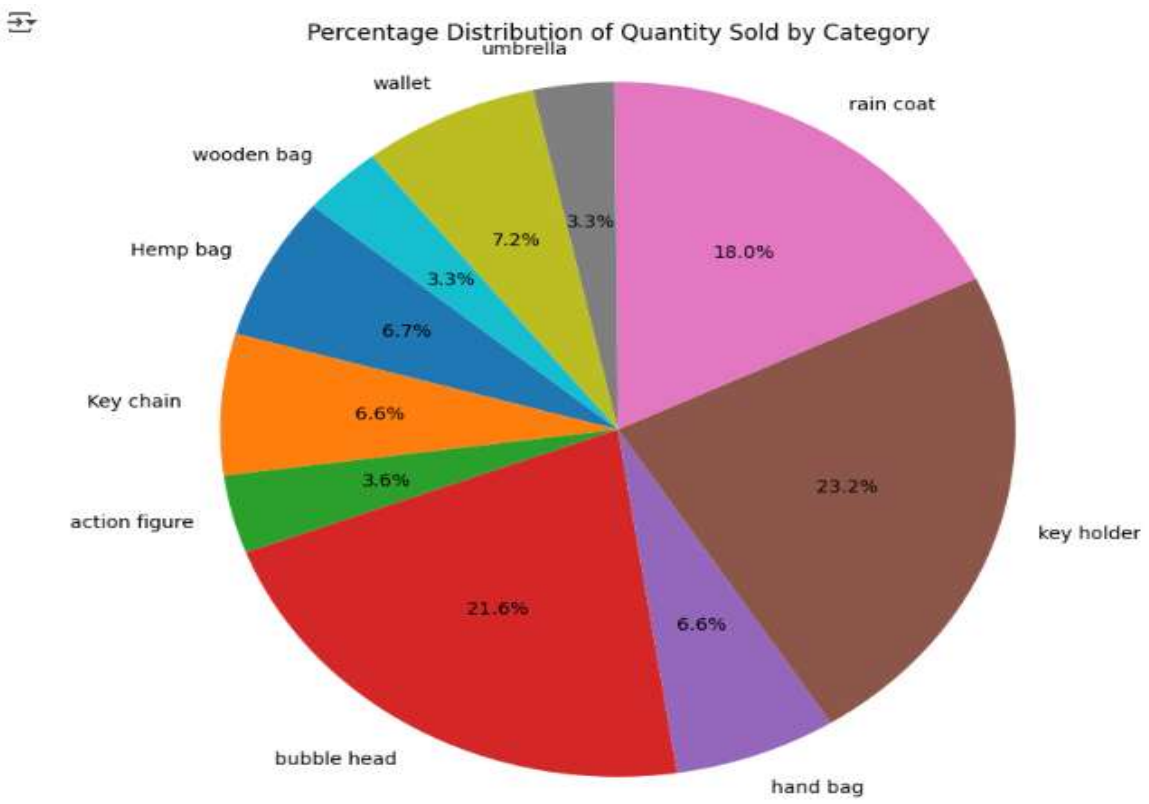
3.1.4 Summary of ABC Analysis

Use **Revenue-Based ABC** for financial planning, sales forecasting, and marketing strategies whereas we use **Quantity-Based ABC** for inventory control, supply chain management and operational planning.

Combining each analysis provides a comprehensive view of product, helping balance financial goals with operational efficiency and helps the business owner to invest in them.

3.2 Insights Through Visualizations

3.2.1 Percentage Distribution of Quantity Sold by Category



3.2.1.1 Figure: Percentage Share of Units Sold per Category

The pie chart illustrates the percentage distribution of quantity sold across different categories of inventory items. This analysis provides insights into the relative contribution of each category to the total quantity sold.

Observations:

- **Key Holder (23.16%)**
  - Top-selling category by quantity.

- Likely a low-cost, fast-moving item—ideal for promotions or bundling.
- It indicates strong customer demand or utility.

➢ **Bubble Head (21.63%)**

- Close second in quantity sold.
- Popular novelty item; could benefit from seasonal marketing or collectible editions.

➢ **Raincoat (17.99%)**

- Strong sales, possibly influenced by seasonal weather trends.
- Opportunity to introduce variations in size, color, or waterproof grade.

➢ **Wallet (7.16%)**

- Moderate sales, suggesting either price sensitivity or niche appeal.
- May benefit from improved visibility or discount offers.

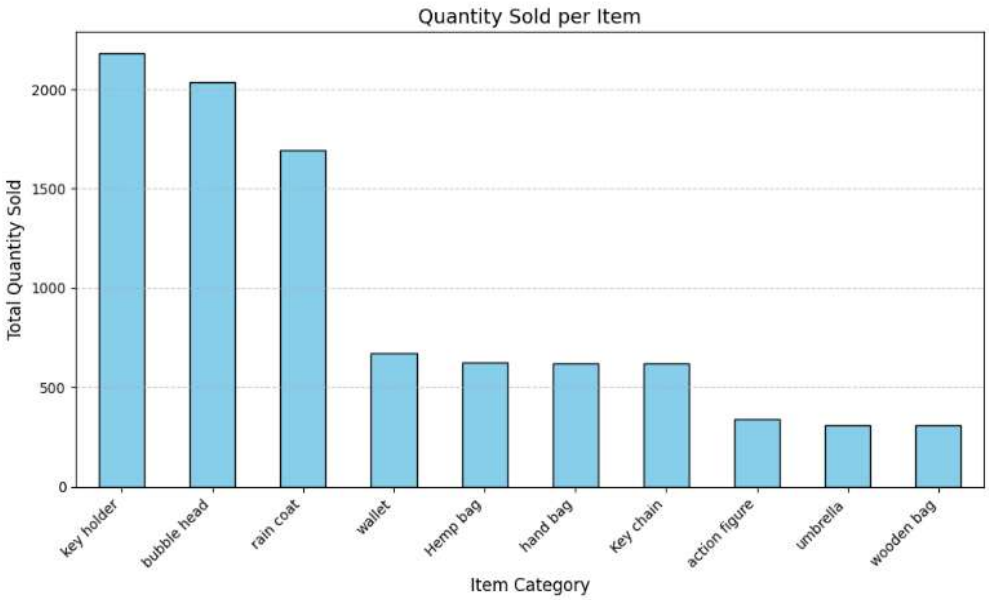
➢ **Hemp Bag (6.66%)**

- Lower quantity sold compared to others.
- Could be a premium item with higher unit price, appealing to a niche market.
- Opportunity to highlight eco-friendly aspects to boost appeal.

Strategic Insights:

- Focus inventory and marketing on Key Holders and Bubble Heads, they collectively make up nearly 45% of all units sold.
- Consider seasonal demand planning for Raincoats to prevent stockouts or overstocks.
- Investigate price points, placement, or design improvements for Wallets and Hemp Bags to increase movement**.**

3.2.2 Quantity Sold Per Item



3.2.2.1 Figure: Quantity sold per item

Insights:

- **Highest Selling Item(s):** The item(s) with the highest quantity sold stands out clearly at the top of the bar graph. These are

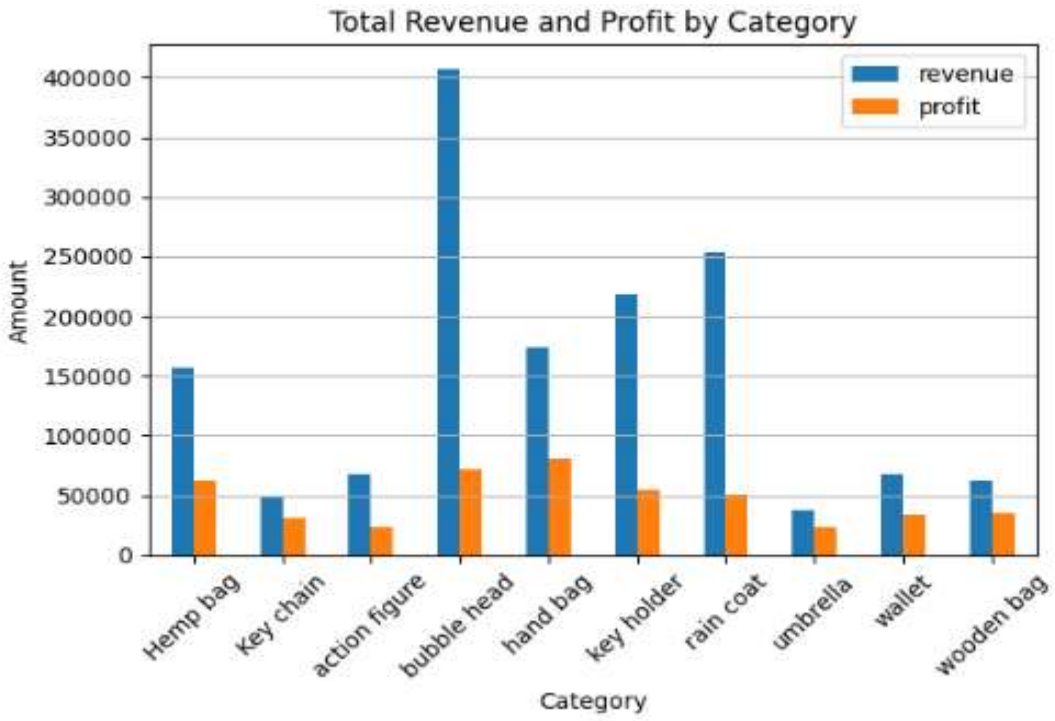
your best-performing products in terms of volume and likely popular among customers.

- **Moderate Selling Items:** Several items have **moderate sales** quantities, forming a mid-range cluster in the bar graph. These items may have consistent demand but still offer room for improvement in promotion or pricing.
- **Low-Selling Items:** A few categories show very low quantities sold, suggesting: Lower customer interest, Potential issues in pricing, availability, or visibility.

Observations:

- **Demand Trends:** The bar graph reveals clear demand patterns across product categories. Popular items may benefit from increased inventory, bundling, or featured promotion.
- **Inventory Optimization:** Low selling items may need a review:
  - Consider discounting or phasing out underperformers.
- **Sales Strategy**:
  - Focus on **cross-selling or upselling** related to high-volume items.
  - We can also use high-demand items as **lead magnets** to draw in traffic.

3.2.3 Total Revenue and Profit by Category



3.2.3.1 Figure: Total revenue v/s Profit by Category

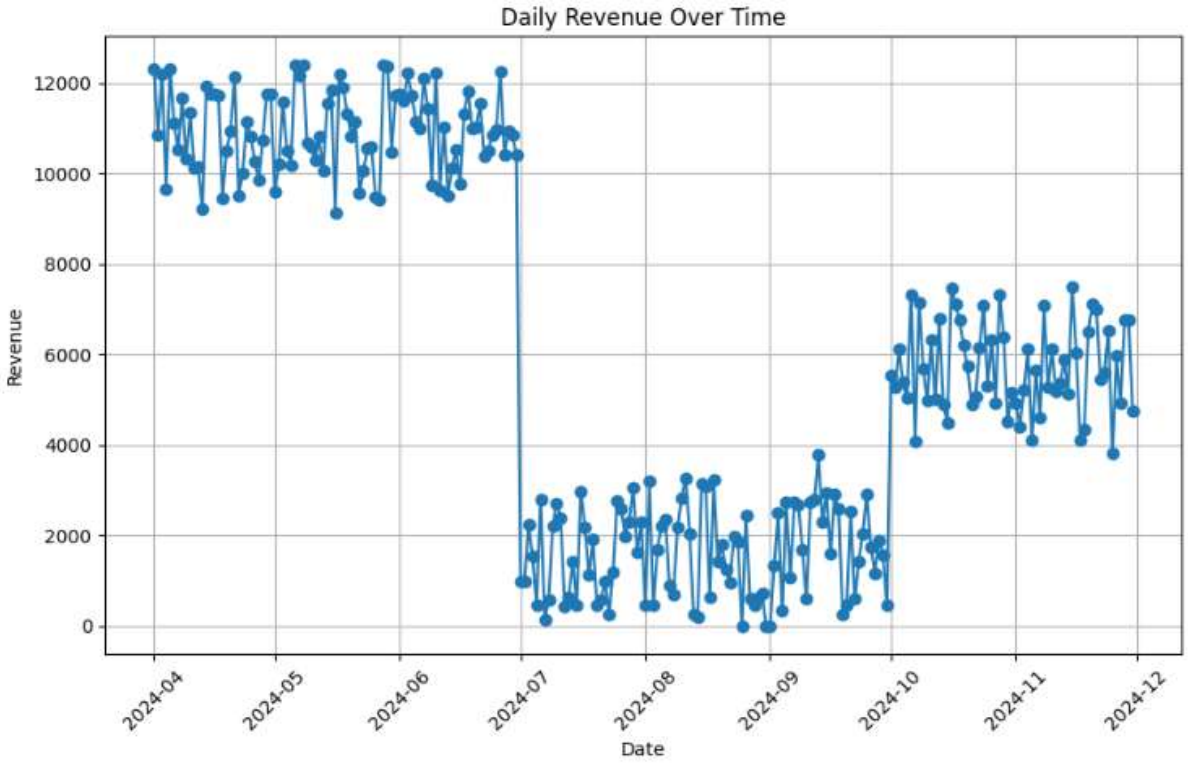
Insights & Observations:

- **High-Performing Categories:** Hemp Bag and Wooden Bag stand out with both high revenue and high profit, indicating strong sales and healthy margins. These items likely contribute the most to overall business performance.
- **Moderate Performers:**
  - Wallet and Key Chain generate moderate revenue but still show good profitability.
  - **Low Revenue & Profit Categories:** Umbrella shows the lowest revenue and profit, suggesting: Low sales volume, possibly narrow profit margins,

Strategic Insights:

- Hemp Bags and Wooden Bags could be prioritized for: marketing campaigns, inventory removal, potential price optimization to further increase profitability
- **Umbrellas** might need:
  - Promotion or bundling strategies
  - Better positioning or a price adjustment
  - Or could be considered for **phase-out** if performance doesn't improve.

3.2.4: Daily Revenue Over Time



3.2.4.1 Figure: Daily revenue over time

Insights & Observations:

- **Revenue Fluctuates Significantly:** Daily revenue does not follow a flat or consistent trend — it fluctuates noticeably. This suggests that your sales are highly variable, likely influenced by day-of-week patterns, promotions, footfall, or external factors (e.g., holidays).
- **Potential Weekly Patterns:** If you look closer at the time intervals (e.g., every 7 days), you may notice spikes or dips recurring on specific days, such as:
  - Higher sales on weekends (Saturday/Sunday).
  - Lower sales on Mondays or mid-week.
- **Revenue Spikes:** There are specific days with significant revenue peaks.
  - These could be due to bulk purchases, events, or promotions.
  - Investigating what happened on those dates can help **replicate success**.
- **Revenue Dips:** Some days show very low or zero revenue.
  - **Identify best-performing days** and align campaigns, restocking, or staff shifts accordingly.
  - Consider running **mid-week promotions** to stabilize dips.
  - Use this trend data to build **weekly sales forecasts** and optimize inventory planning.

3.3 New Margin Policy

The business owner Mr. Dalip Gupta was facing the challenge of low profitability primarily due to narrow profit margins on products. After analyzing the pricing structure and cost components, we identified that the existing margin policy limiting the overall revenue potential. To address this, we proposed a revised margin strategy aimed at optimizing pricing without compromising competitiveness. The new policy focuses on adjusting margins based on product demand, category, and market trends. This strategic shift is designed to enhance the overall profit margins while maintaining customer satisfaction, ultimately enabling the business to achieve sustainable growth and improved financial performance.

To Create a New Margin Policy. We'll analyze:

- Profit margins by category
- Identify underperforming products
- Propose new selling prices to optimize profits

3.3.1 Key Observations:

- **Key chains** have extremely high margin (~167%) and sell well.
- **Bubble heads** sell the most but have **lowest margin (~21%)**.
- **Hemp bags, wallets, and handbags** have good margins and healthy volume.

Category	Current Margin	Suggested Action	New Target Margin	Reasoning
Bubble head	~21%	Increase price by 15–20%	~35–40%	High volume but low margin; room for profit growth
Action figure	~50%	Slight increase (10%) in price	~60%	Moderate margin, moderate volume
Key chain	~167%	No change / Experiment with bundles	150–170%	High margin already; bundling may increase volume
Hemp bag	~67%	Slight increase	~75–80%	Good margin; price increase won't hurt sales much
Hand bag	~87%	Keep same or try premium variant	85–90%	Strong performer; test premium SKUs

3.3.1.1 Table: New Margin Policy

3.3.2 Profit Impact of the New Margin Policy

- Current Total Profit: ₹465,644
- New Total Profit (Projected): ₹543,775.60
- Profit Increase: ₹78,131.60
- Percentage Increase: ~16.78%

4 Interpretation of Results and Recommendation

4.1 Interpretation of Results

The analysis of sales, inventory, and profit metrics from April to November 2024 revealed a significant misalignment between product popularity, pricing strategy, and profit contribution at Gupta Gift Shop. Using Revenue-Based and Quantity-Based ABC analysis,

high-volume items such as **bubble heads** and **key holders** were identified as critical to overall sales, yet products like **bubble heads** had disproportionately low margins (21%). Conversely, **key chains** exhibited very high margins (167%) and strong volume, suggesting underutilized potential for promotional bundling.

Further visualization confirmed that **revenue and profit were highly concentrated** in select categories like **hemp bags** and **wooden bags**, whereas others like **umbrellas** had low revenue and profit contribution. A major finding from the proposed margin policy showed that **strategically adjusting selling prices based on product category performance** could raise total profit by ₹78,131.60 — a **16.78% increase**, without increasing sales volume or cost base. This indicates that optimized pricing, informed by detailed category-level performance, is a key lever for unlocking profitability.

Moreover, **sales trends by day** revealed significant fluctuation, with higher revenue on weekends and drops mid-week, indicating scope for **targeted promotions and inventory alignment**. These patterns confirm that data-backed decisions on pricing, promotion, and product prioritization can effectively address the profitability and inventory strain the business faces.

4.2 Recommendations for Business

The following SMART (Specific, Measurable, Achievable, Relevant, Time-bound) recommendations are directly derived from the data analytics:

- **Revised Selling Prices Based on Category Performance:**
  - Increase prices of bubble heads by 15–20% to align with revised margin targets (~40%).
  - Keep prices of key chains constant but use them in bundled offers to drive sales volume.
  - Measurable Impact: Expected ₹78,000+ profit increase, based on projected simulations.
- **Reallocate Inventory Resources to High Margin & Volume Items:**
  - Prioritize restocking and promotion of hemp bags, wooden bags, and key holders.
  - Reduce procurement of umbrellas unless repositioned or bundled.
  - Reallocation to be monitored bi-weekly based on sales data.
- **Implement Mid-Week Promotions:** Offer targeted discounts or bundled deals every Wednesday to counteract mid-week revenue dips observed in the timeline analysis.
- **Dynamic Margin Review Policy:** Review and recalibrate product margins quarterly based on updated cost, volume, and

profit data to stay aligned with market responsiveness and seasonal trends.

- **Strategic Inventory Management Using ABC Insights:**
  - Use Revenue-Based ABC for marketing expenses and Quantity-Based ABC for warehouse/inventory control.
  - Automate this dual-priority system in inventory software by Q1 2025.
- **Introducing Premium SKUs with Existing High-Margin Categories:** Launch premium variants of key chains and wallets to capitalize on existing margin strength and brand familiarity.

4.3 Implementation Impact Summary

If these recommendations are followed, the business stands to realize a direct profit improvement of ~17%, improved inventory turnover, and better capital allocation. All recommendations are derived purely from historical transaction-level data, ensuring evidence-based execution with clear, measurable results. This will not only stabilize current operations but build a scalable, analytics-driven foundation for future expansion.

Link for Colab File: Colab File