Sales Analytics for a Computer Parts Retailer

An End Term report for the BDM capstone Project

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EXECUTIVE SUMMARY :

This report marks the final installment of a three-part series for the BDM Capstone Project, focused on optimizing WebTech Systems' business operations through detailed data analysis. The project aimed to deliver actionable insights on sales performance, inventory management, and pricing strategies to help improve WebTech's overall profitability. In this final report, six key analytical methods were employed to provide a comprehensive understanding of the company's product and service trends.

We began by conducting a **Sales vs. Price Analysis**, which revealed how pricing impacts sales volume. For instance, products like **Foxin Key Board** showed significant price sensitivity, indicating that small price reductions could potentially drive sales growth. This was followed by a **Top Products Analysis**, which identified high-demand items such as the **Exide Inverter Battery 1200 mh** and **CPU 3.7 GHz** as critical contributors to revenue. These top-selling products should be prioritized in inventory planning, especially during high-demand periods like festivals and back-to-school seasons.

The **ABC Classification** further segmented products into categories based on their contribution to total sales. Category A products, which account for the majority of revenue, should be closely managed to ensure stock availability, while Category C products, which contribute less, could either be stocked minimally or discontinued. This classification helps WebTech allocate resources effectively and optimize its inventory. Additionally, the **Moving Average Trend Analysis** helped smooth out the monthly sales fluctuations, showing that despite occasional sales peaks, a slight downward trend was evident in late 2023. This suggests a need for proactive marketing efforts during low-demand periods.

Lastly, the **Service Sales Trend Analysis** uncovered significant fluctuations, with noticeable spikes in **November 2022** and dips in **March 2023**, hinting at seasonal demand patterns. Aligning service promotions with key events and holidays could help stabilize sales during these volatile periods.

DETAILED ANALYSIS METHODS :

PRICE AND RETENTION ANALYSIS :

For pricing and retention, the analysis will focus on understanding the relationship between pricing strategies and customer behavior using **Revenue Contribution Analysis** and **Price Elasticity of Demand (PED)**. The first step is to calculate the **total revenue** for each SKU, which can be done using the formula:

$$\textbf{Total Revenue} = \textbf{Price per Unit} \times \textbf{Quantity Sold}$$

- Price per Unit is provided in Rate with Tax column and Qty contains quantity sold.

This helps identify high-revenue SKUs, where pricing adjustments may have a significant impact on overall sales.

Next, to understand how sensitive customers are to price changes, we will use the **Price Elasticity of Demand (PED)**, which is expressed as:

$$\textbf{PED} = \frac{\textbf{\% Change in Quantity Demanded}}{\textbf{\% Change in Price}}$$

- If PED > 1, demand is elastic, meaning lowering prices can increase sales significantly.
- If PED < 1, demand is inelastic, so the product can withstand price increases without large drops in sales.

This analysis will guide whether WebTech should implement price reductions for elastic products to boost volume or price hikes for inelastic products to increase profit margins.

Finally, **Customer Retention Rate** will be evaluated to measure the company's ability to retain customers. This is calculated as:

$$\textbf{Retention Rate} = \frac{\textbf{Number of Repeat CustomersTotal}}{\textbf{Number of Customers}}$$

Analyzing this retention data helps optimize pricing strategies for long-term customer loyalty, complementing the findings from PED.

INVENTORY MANAGEMENT ANALYSIS :

For managing inventory in a WebTech System, we will apply **ABC Analysis**, which prioritizes SKUs based on their contribution to the overall revenue. To implement this, we first compute the **Annual Consumption Value (ACV)** for each product, which is the product of the demand and the unit price:

$$\textbf{ACV} = \textbf{Annual Demand} \times \textbf{Unit Price}$$

This allows us to classify products into three categories:

- **A-items**: high-revenue items that may be stocked in lower quantities.
- **B-items**: moderate-revenue items that require moderate attention.
- **C-items**: low-revenue, high-volume items that may need more frequent replenishment.

This categorization helps WebTech optimize inventory stocking by focusing on high-value items while minimizing overstocking low-value products, improving storage space utilization.

Additionally, **Reorder Points** for high-demand items will be calculated to avoid stockouts. The formula for calculating reorder points is:

$$\textbf{Reorder Point} = (\textbf{Average Daily Demand} \times \textbf{Lead Time}) + \textbf{Safety Stock}$$

Implementing this ensures that fast-moving products are always in stock, preventing customer dissatisfaction while reducing the holding cost of overstocked items. For less frequently sold items, a **Just-in-Time (JIT)** inventory strategy will be applied to avoid unnecessary storage of low-demand SKUs.

OPERATIONAL EFFICIENCY AND MARKET ANALYSIS :

For WebTech System, improving **operational efficiency** and understanding **market trends** can be effectively done using **trend analysis** to find patterns of seasonality and demand variations over time. Since WebTech System caters not only to product sales but also to service-related needs, it becomes crucial to optimize the operations surrounding both these facets.

Trend analysis will allow us to explore the sales and service patterns throughout the year. By plotting sales dataagainst product sales ('Qty' and 'With Tax Amount'), we can identify any seasonal fluctuations in demand. For instance, products like **Bluetooth Speakers** may experience higher sales during certain festive periods, while other products may have a steady, year-round demand. This can be visualized using a **line graph** showing monthly or quarterly sales, providing a clear picture of when product demand spikes or dips.

In addition to product sales, WebTech System has a significant number of customers visiting for **servicing** instead of buying new products. This shifts the focus from inventory management to service-related operations. Unlike product sales, servicing doesn't directly involve the movement of stock, but it requires **staff availability** at the right time to ensure customer satisfaction and service quality. Therefore, **timing** and **efficiency** in handling customer flow become vital.

Through trend analysis, we can also observe the frequency and timing of service-related transactions. If the analysis reveals that customers typically come for servicing at certain times of the year or during specific periods of the day, it allows WebTech to allocate staff more effectively. For instance, if servicing requests peak during weekends or after major festivals (when customers may need repairs for electronics purchased earlier), the staff can be scheduled accordingly to handle the rush efficiently.

Moreover, **predictive analysis** can be employed by identifying past trends to forecast future service demand. By understanding seasonal patterns in servicing, WebTech System can ensure that technicians and support staff are available when needed the most, without overstaffing during low-demand periods. This not only boosts operational efficiency but also improves the

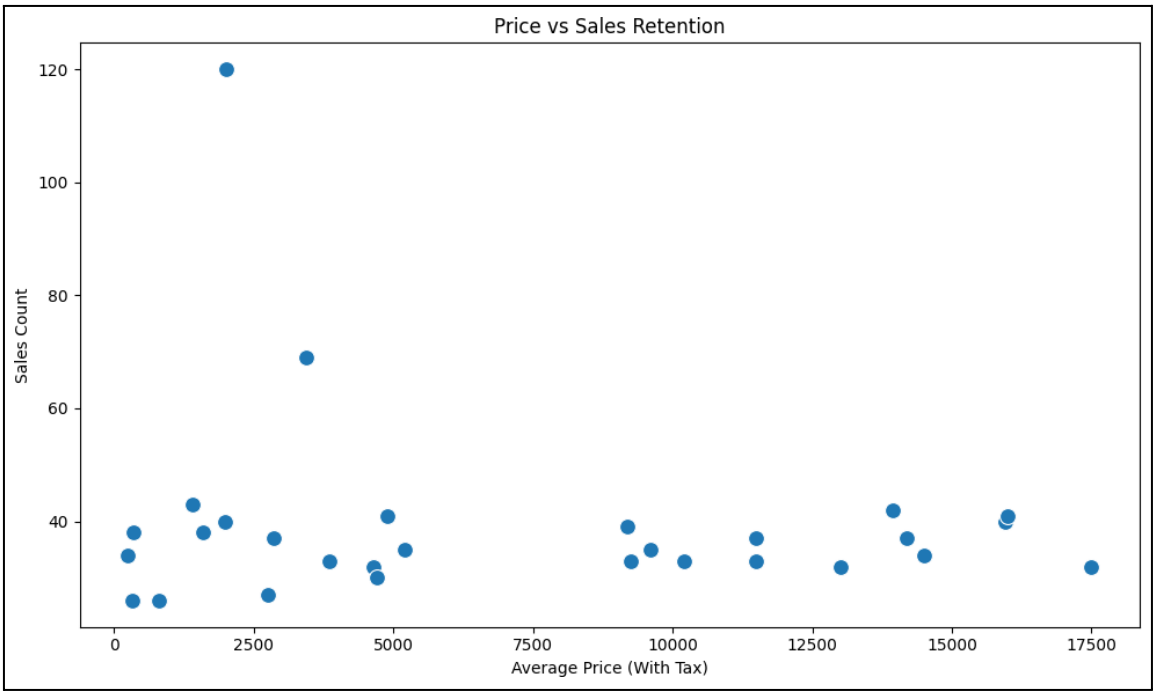
overall customer experience by reducing wait times and ensuring quick service turnarounds.

RESULTS AND FINDINGS :

PRICE VS SALES RETENTION :

The scatter plot represents the relationship between the average price (with tax) of products and their respective sales count. This visualization helps in understanding how product pricing might influence its demand and retention in the market.

1. **Bluetooth Speakers (Price: ~₹2,500, Sales: 120 units):**
    - The most sold product is Bluetooth Speakers, with a significant sales count of 120 units at an average price of around ₹2,500. This suggests that Bluetooth speakers have high demand, likely due to their price being in an affordable range, making them attractive to a wide customer base.
2. **Hicvision DVR-4CH (Price: ~₹5,000, Sales: 60 units):**
    - The next most sold product is Hicvision DVR-4CH, with about 60 units sold at an average price of approximately ₹5,000. It shows that even mid-priced items can perform well in terms of sales, especially if there is a clear need for such products.
3. **Clustered Low Sales Counts:**
    - A majority of products have low sales (below 40 units) across a range of price points. Products in the range of ₹0 to ₹17,500 have scattered demand, indicating that a higher price doesn't necessarily guarantee low sales and vice versa.
4. **Few Products in High Price Range:**
    - Products priced above ₹10,000 generally have a lower sales count (between 10 and 20 units). These may represent premium or niche items that are purchased less frequently but possibly offer higher profit margins.



Plot 1 : A scatter plot showing unit sold vs average price.
(Labels of products are dropped to avoid clutter in the plot)

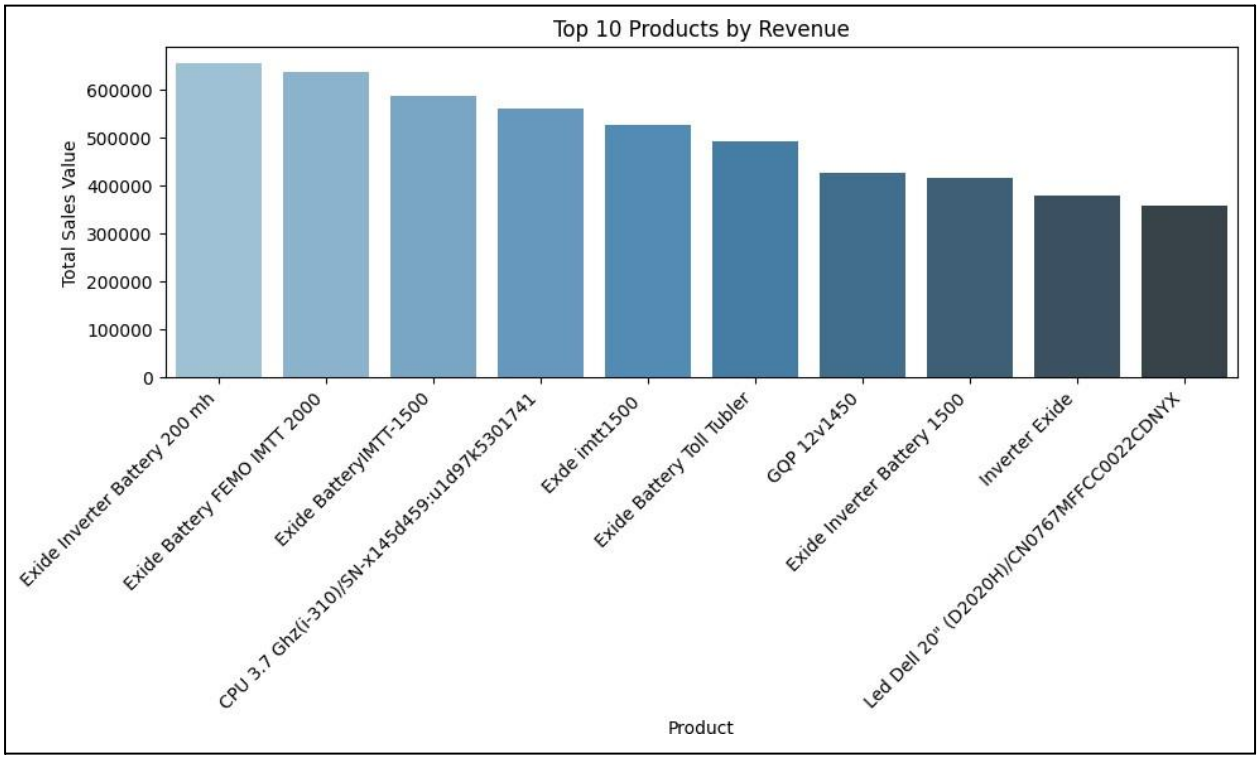
5. **Price Sensitivity:**
    - The chart highlights that most sales are concentrated at lower price points, particularly under ₹5,000, which suggests price sensitivity in the customer base. Products priced in this range tend to perform better in terms of volume, as evidenced by the concentration of higher sales counts in this segment.

TOP 10 PRODUCTS BY REVENUE :

The bar chart visualizes the top 10 products by total sales value, offering insights into which products generate the most revenue for the business, irrespective of their unit sales.

1. **Exide Inverter Battery 200 AH (Revenue: ₹600,000+):**
    - This product generates the highest revenue, despite not having the highest sales count. Its high price point compensates for a relatively lower sales count. This is a prime example of a premium product contributing significantly to the business's revenue.

2. **Exide Battery FMIO MTT 200 (Revenue: ₹580,000):**
    - Another high-revenue product is Exide Battery FMIO MTT 200, showing a similar trend of being a high-priced item with solid sales, resulting in high revenue generation.
3. **Exide Battery IMTT-1500 and GQP 12v1450 (Revenue: ₹450,000+ each):**
    - Both these products are in the mid-high price range and generate considerable revenue. Their combination of moderate sales and higher price points makes them important contributors to overall sales value.



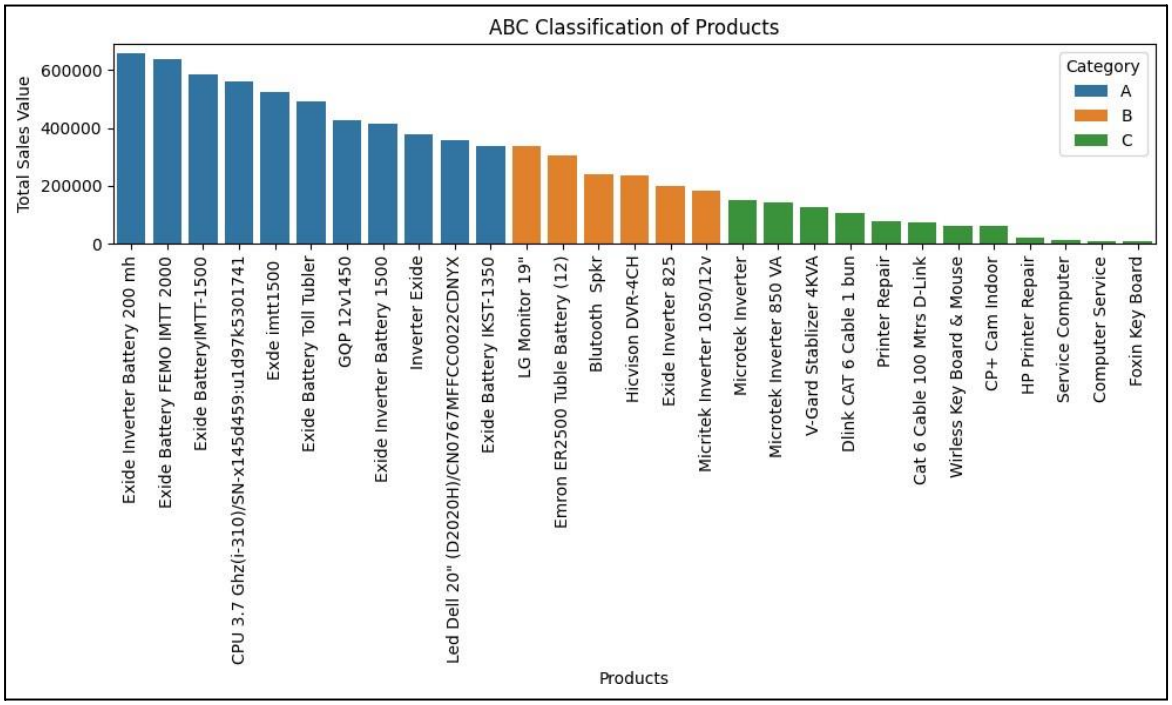
Plot 2 : Bar graph showing top 10 products based on revenue

4. **Lower-Revenue Products in Top 10:**
    - Products like Led Dell 20", CP+31 Ghz(i-3), and Exide Inverter Battery 1500 are part of the top 10 by revenue but generate relatively less compared to the top performers. This is likely due to lower sales volumes or pricing in the mid-range category.
5. **Exide Dominance:**
    - Exide-branded batteries occupy a significant portion of the top 10 products by revenue, showcasing their dominance in the product mix. This suggests that Exide products are

crucial to the business's financial performance and likely enjoy customer trust and demand.

ABC CLASSIFICATION OF PRODUCTS :

The bar chart provides a clear visual breakdown of the store's products into three distinct categories based on their contribution to total sales value—Categories A, B, and C. The key insight here is that **Category A products**, represented by the blue bars, are the most valuable to the business. They account for a small portion of the total product portfolio but contribute approximately 70% of the store's total sales revenue. Items such as "Exide Inverter Battery 200 mh" and "Exide Inverter Battery 1500" dominate sales, indicating that these products generate significant revenue per unit sold. This suggests that the business should prioritize inventory management, stock levels, and promotional efforts around these Category A products, as they drive the majority of the store's revenue.



Plot 3 : Bar graph showing products categorized into A, B and C based on revenue generation

Moving on to **Category B** products (in orange), these contribute to around 20% of the store's total sales, representing a moderate portion of revenue. These items, such as "Emron ER2500 Tuble Battery" and "Hicvision DVR-4CH," play a supporting role in the product mix, meaning that while they don't generate the same high sales figures as Category A items, they are still essential to the store's overall profitability. It would be important for the store to maintain a balanced stock of Category B products to ensure availability but avoid overstocking, as their contribution to revenue is less critical compared to Category A.

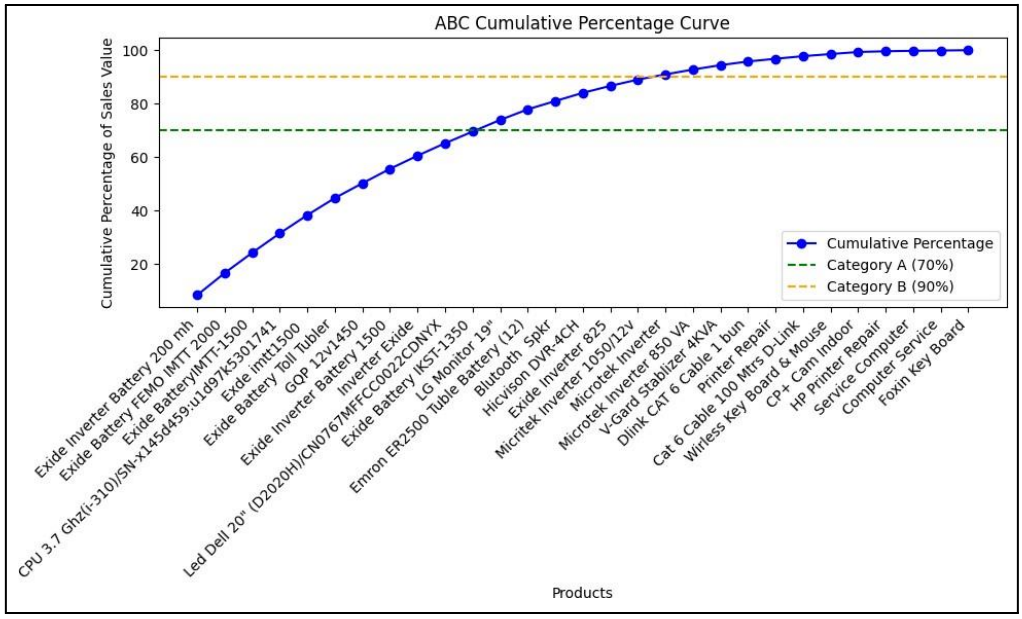
Lastly, **Category C products** (in green) contribute the least to sales, around 10%, despite possibly representing a large portion of the total SKU count. These products, including items like "Foxin KeyBoard" and "CPU 3.7 GHz Intel," have minimal impact on overall revenue. They are typically slower-moving products or low-ticket items. Therefore, the store should focus on minimizing inventory levels for Category C products to avoid tying up capital in products that are not generating significant returns. This approach could free up resources to invest in higher-performing items.

ABC CUMULATIVE CURVE :

The cumulative percentage curve adds another layer of depth to the ABC analysis by visualizing the cumulative sales contribution of products. The blue line on the curve starts steep, indicating that a few top-performing products (Category A) are responsible for a significant portion of the store's total sales. This insight highlights the importance of a **small set of high-value items** that are disproportionately driving the business's revenue. The cumulative sales value reaches around 70% very quickly, indicating that these Category A products (such as "Exide Inverter Batteries" and other high-performing items) are critical to the business's financial success.

The **green line** marks the threshold where Category A products end and Category B products begin. As more products are added beyond this point, the slope of the cumulative curve begins to flatten, suggesting that additional products contribute less to the overall sales. **Category B products**, although not as crucial as Category A, still play a vital role, contributing around 20% of total sales. The insight here is that the store should maintain a steady but cautious supply of

Category B products. They are important to the overall business but should not be overemphasized compared to the high-performing Category A items.



Plot 4 : Graph showing cumulative distribution of revenue in each category

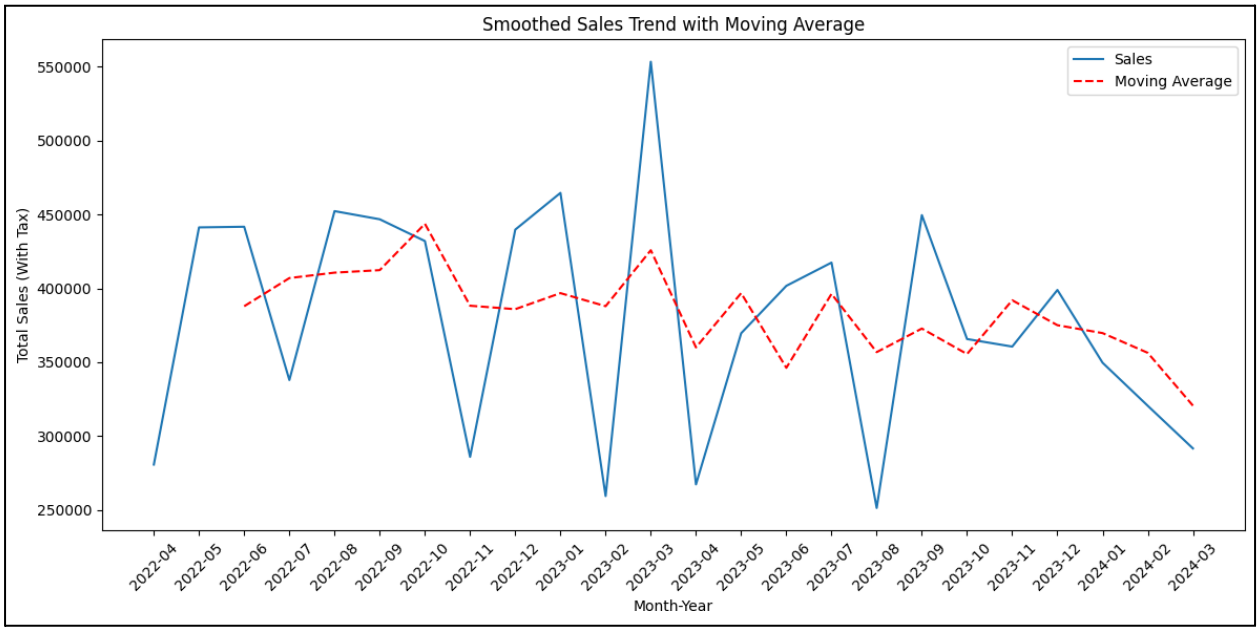
Finally, beyond the **orange line**, which marks the transition to **Category C products**, the curve flattens even further. This flattening indicates that these products have minimal impact on overall sales. **Category C products** contribute the least to revenue, reinforcing the idea that they are not significant drivers of profitability. The insight here is that the store should consider whether these products are worth stocking in large quantities or if they could even be removed from the inventory if they are not essential to customer needs.

TREND ANALYSIS WITH MOVING AVERAGE :

The sales trend plot presents a detailed view of monthly sales from April 2022 to March 2024, revealing both significant fluctuations and underlying patterns. The blue line, representing actual sales, demonstrates considerable monthly volatility, with sales generally ranging between ₹300,000 and ₹500,000. There are distinct peaks, such as a sharp rise in **February 2023**, where sales exceed ₹550,000, and other notable surges in **July 2022**, **January 2023**, **April 2023**, and **August 2023**. These peaks could indicate seasonal demand spikes, promotional campaigns, or

other external factors influencing short-term sales boosts. However, the plot also shows periods of decline, with troughs in **May 2022**, **November 2022**, and **June 2023**, where sales dip closer to ₹300,000, suggesting irregular demand patterns.

The red dashed line, showing the moving average, offers a smoothed view of the overall sales trend by filtering out short-term fluctuations. Initially, there is a slight upward movement from **April to August 2022**, which corresponds to a period of relative sales stability. However, after **September 2022**, the trend dips and becomes more stable, with a slight downward trajectory becoming apparent as the plot moves into 2023 and 2024. While the moving average smooths over sharp peaks like the one in **February 2023**, it reveals a subtle but persistent decline in sales performance, particularly from **mid-2023** onward.



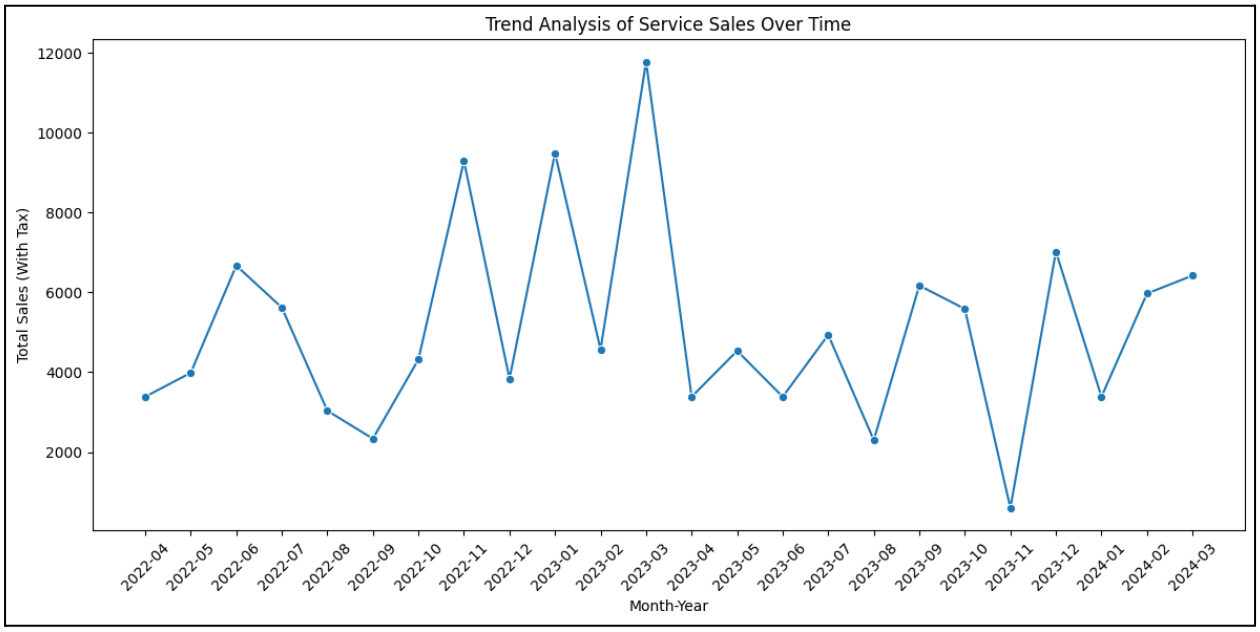
Plot 5 : Graph showing trends of sales along with smoothed moving average

This declining trend toward the end of the time frame, especially from **October 2023 to March 2024**, could be cause for concern, signaling weakening demand or market challenges. Overall, the plot suggests that while there are occasional spikes in demand, likely tied to seasonal or promotional factors, the store is experiencing a gradual decline in sales. This downward movement, especially in the later months, warrants further investigation to identify and address

any underlying issues affecting sales performance.

TREND ANALYSIS FOR SERVICES :

This graph presents the **service revenue trend** over time, depicting the fluctuating nature of monthly service sales between **April 2022 and March 2024**. Unlike inventory-based sales, service revenue typically reflects demand fluctuations without the complexities of stock management. The chart shows that service sales are highly volatile, with frequent peaks and troughs throughout the period. A sharp rise can be observed in **November 2022**, where service revenue reached nearly ₹12,000, marking the highest point on the graph. Other significant peaks include **October 2022**, **January 2023**, and **October 2023**, suggesting potential seasonal effects that could be related to increased demand for services during specific months or events. However, these peaks are followed by sharp declines, such as the low points in **March 2023** and **November 2023**, where revenue dropped to nearly ₹2,000, indicating fluctuating customer interest or demand.



Plot 6 : Graph showing trends of revenue generated from services

Interestingly, there is a noticeable recovery in service revenue toward the end of 2023 and early 2024, where revenue begins to increase again, reaching around ₹7,000 by **March 2024**. This

suggests that while service demand is irregular, there are patterns of recovery after periods of decline.

When comparing this service trend with the earlier sales trend (inventory-based sales), some key differences and insights can be drawn. For instance, the **inventory sales peaks** seen in **February 2023** and **April 2023** do not align directly with the service revenue peaks in **November 2022** and **October 2023**. This indicates that customer demand for services does not necessarily correlate with the same periods of high demand for products. However, both graphs exhibit volatility, with neither showing a sustained upward or downward trend over time.

This difference in peak times could be strategically leveraged. For example, during periods when product sales are lower (like **March 2023**), focusing on driving service revenue may help maintain overall business stability. Similarly, understanding these different peak times enables WebTech System to plan promotions and allocate resources more efficiently, ensuring that during quieter months for inventory sales, services are emphasized to balance revenue streams.

INTERPRETATION OF RESULTS AND RECOMMENDATIONS :

1. Dynamic Pricing Strategy Based on Sales vs. Price Analysis

Findings:

The analysis shows that there is an inverse relationship between sales volume and price for several products. Some items see a sharp drop in sales as their price increases, while others maintain steady sales despite price fluctuations.

Recommendations:

- **Price Sensitivity Adjustment:** For highly elastic products (where a small price increase leads to a large drop in sales), consider reducing prices slightly or offering discounts during off-peak periods to boost demand. For inelastic products, continue to capitalize on higher pricing without significantly impacting sales volume.

- For "Foxin KeyBoard", which shows high price sensitivity, reduce the price by 5-10% during slower months such as February and March. You could also introduce flash sales or bundle these with popular products like "Power Bank 20000mAh" to increase overall purchase value.

2. Leverage High-Performing Products from the Top Products Analysis

Findings:

The analysis highlights that a small set of products, primarily Category A items, drives the bulk of WebTech Systems' revenue. These products include high-demand items like "Exide Inverter Battery 2300 m" and "Exide battery FEMO 2000 mh".

Recommendations:

- **Prioritize Inventory for Bestsellers:** Ensure that these top-performing products are always in stock, especially during high-sales periods like school openings or festival seasons like Diwali. Overstocking these products could result in more sales opportunities during peak demand.
- **Promote Bestsellers Aggressively:** Allocate a larger share of your marketing budget to these items. Run targeted digital campaigns highlighting their utility, durability, or any unique features, especially during key events.
- Offer a "School Opening Special" in July/August where you promote "Exide Inverter Battery 230 mh" bundled with related Dell LED screens and printers. This can cater to students and families preparing for the new school year, driving higher sales during this critical period.

3. Inventory Optimization Based on ABC Classification

Findings:

The ABC analysis shows that Category A products contribute the most to sales, Category B items moderately contribute, while Category C products have minimal impact and occupy

valuable inventory space.

Recommendations:

- **Focus on Category A Products:** Stock high volumes of Category A products like "Exide Inverter Battery 1200" and “Power backup System" to maximize revenue. Ensure these items have high visibility both in-store and online.
- **Control Overstocking of Category B Products:** For products in Category B, like "Emron EPF230 Tube," maintain optimal stock levels to avoid overstocking, while still having enough inventory to meet moderate demand.
- **Consider Dropping or Minimizing Category C Products:** Products like "Foxin KeyBoard" and "Generic Earphones" are in Category C, which contributes the least to sales. Evaluate whether these products are necessary or if they can be replaced with higher-demand SKUs.
- For Category C products like "Foxin KeyBoard," initiate a "Clearance Sale" during off-peak months like November to free up inventory space. If demand remains low after discounts, consider discontinuing the product or stocking fewer units to avoid carrying deadweight inventory.

4. Target Seasonal Peaks Based on Sales Trend Analysis with Moving Averages

Findings:

The moving average analysis shows significant sales peaks in February and August, likely due to seasonal factors such as festivals, holidays, or school openings. However, the trend indicates a slight decline in overall sales after mid-2023, suggesting weakening demand.

Recommendations:

- **Prepare for Seasonal Peaks:** Ensure high stock levels and launch targeted marketing campaigns during identified peak months, such as Diwali in October/November and the school opening season in July/August. These periods can significantly drive sales if

inventory is managed well.

- **Address the Downward Sales Trend:** Investigate the causes behind the decline in late 2023 (e.g., market competition or economic conditions). Introduce loyalty programs or flash sales to re-engage customers during slower months.
- Ahead of Diwali, create special promotional bundles such as "Diwali Power Combo" featuring "Exide Inverter Battery 1200 mh" and "Emron Inverters". Offer discounts or free delivery during this period to capitalize on the festive buying mood. Similarly, prepare for the school season by focusing on products like laptops or study-related electronics.

5. Service Trend Recommendations

Findings:

Service sales have shown significant volatility with a noticeable peak in November 2022 and sharp dips in March 2023 and November 2023. This indicates inconsistent demand, likely due to seasonal effects or external factors.

Recommendations:

- **Capitalize on Peak Service Demand:** Offer additional services like installation, maintenance, or after-sales support during months where services typically spike. Use promotional packages to increase service uptake.
- **Promote During Low-Demand Periods:** To mitigate the dip during low-demand months, consider offering bundled services or discounts to incentivize purchases. For example, offer free installation or extended warranties for products purchased in March or November when service sales are typically low.
- Offer a "Post-Diwali Service Special" in November, where customers purchasing high-end products like "Hicvision System" can get a discounted installation service. This will attract more service-related revenue during what would otherwise be a slow period.

6. Elasticity of Demand Strategy for Price-Sensitive Products

Findings:

Elasticity analysis indicates that products with low unit price value but high sales are highly price-sensitive, meaning customers respond sharply to price changes. On the other hand, inelastic products show stable demand regardless of price.

Recommendations:

1. **Promotions for Elastic Products:** For highly elastic products, implement price promotions to drive volume during low-sales months. Bundle these products with more popular items to increase overall sales and create a value-for-money perception.
2. **Leverage Inelastic Products:** Since demand for inelastic products remains stable, consider maintaining or slightly increasing their prices without sacrificing sales. This allows for better profit margins.
3. For "Foxin KeyBoard," offer a "Back-to-School Combo" in August that includes the product bundled with "Mi Power Bank" or "Speaker" at a discount. This can attract customers looking for affordable tech products for their children, thus driving volume during a high-sales season.

End Note : These recommendations have been made based on my knowledge and the data provided by WebTech System. While some suggestions may be immediately applicable, others might require further adjustments in consultation with Mr. Ravi to ensure optimal implementation.