"Leveraging Sales Data for Demand Forecasting in Mobile Retail Businesses"

Final report for the BDM capstone Project

Submitted by

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1. Executive Summary

Aradhya Enterprises, a mobile retail store located in Unnao, Uttar Pradesh, caters to a diverse customer base with a range of smartphones and mobile accessories. While the shop has built a steady customer base, its operations have been constrained by manual record-keeping, limited use of structured data, and reactive inventory management. These challenges have resulted in overstocking of low-demand items, missed sales opportunities during peak seasons, and suboptimal utilization of retail space.

This project undertook a detailed data-driven analysis of 15 months of sales transactions, covering the period from **January 2024 to April 2025**. The dataset includes over 2,000 digitized entries spanning both mobile devices and accessories.

The analysis employed descriptive statistics, trend analysis, brand and category performance evaluation, correlation checks, inventory classification, and ABC analysis using Microsoft Excel. Visualizations such as combo charts, scatter plots, and Pareto diagrams provided further clarity on sales dynamics.

Key findings revealed that although accessories dominate transaction volume (84%), mobile devices contribute over 90% of total revenue, underscoring the need to treat each category with distinct inventory strategies. Brands like Realme, Vivo, and Oppo emerged as top revenue contributors, while POCO, Motorola, and Nokia showed limited demand. Seasonal sales spikes during October, December, and February highlighted the necessity of forward planning, especially for fast-moving SKUs. ABC classification further segmented products by revenue contribution, helping identify high-priority items for inventory focus.

Based on these insights, recommendations include implementing structured digital tracking of sales, aligning procurement cycles with seasonal demand, focusing inventory on top-performing brands, and bundling or discounting low-demand products. These strategies can help Aradhya Enterprises optimize stock levels, minimize carrying costs, and improve responsiveness to market trends.

By leveraging even basic analytical tools, this project demonstrates how small retail businesses can gain actionable insights from historical sales data to enhance decision-making, reduce inefficiencies, and drive sustainable growth.

2. Detailed Explanation of Analysis Process/Method

The analysis of sales data for *Aradhya Enterprises*, a mobile retail and service shop, was conducted using Microsoft Excel. The process involved multiple analytical methods to extract meaningful insights from transactional data spanning over 15 months (January 2024 to April 2025). The dataset included product names, quantities sold, unit prices, total sales per entry, and categorized products into either devices or accessories. The objective was to identify key performance trends, product contributions, inventory efficiency, and customer purchase behaviour.

The analysis process was divided into the following major steps:

2.1 Data Cleaning and Preprocessing

The raw sales data collected from daily transactions required initial formatting to ensure consistency and analytical readiness. The following preparatory steps were taken:

- **Date Formatting**: Sales dates were formatted into a standardized dd-mm-yyyy format. An additional "Month-Year" column was created using the TEXT() function for monthly aggregation: = TEXT(A2, "mm-yyyy")
- **Product Categorization**: All products were manually classified into two main categories: **Device** and **Accessory**. A helper column using nested `IF()` statements was used to automate the process based on keywords in the product name (e.g., "cover", "charger", "cable").
- **Standardizing Product Names**: Inconsistent naming (e.g., "Realme Narzo N53" and "Narzo N53 Realme") was corrected using Find & Replace and filters. This step ensured accuracy in grouping and summary operations.

Purpose & Problem Link:

This step lays the foundation for Problem 2: Lack of Structured Sales Insights by ensuring the dataset is consistent, accurate, and ready for analysis. Clean, standardized data is critical for generating reliable insights that guide decision-making.

2.2 Descriptive Statistical Analysis

To understand the overall structure and contribution of products, basic descriptive statistics were calculated:

- **Total Revenue**: The total revenue generated over the period was ₹64,81,916.06.
- **Total Quantity Sold**: A total of 2,782 items were sold.
- **Category-Wise Contribution**:
    - Devices contributed **₹58,78,603.73** (≈90.69%) to the total revenue from 459 units.
    - Accessories contributed **₹6,03,312.33** (≈9.31%) from 2,323 units.

These statistics were visualized using:

- A **pie chart** showing the revenue % by category.
- A **summary table** listing each category's share in both revenue and quantity.

Purpose & Problem Link:

Addresses Problem 2: Lack of Structured Sales Insights by providing a clear overview of revenue and quantity contributions by category, helping the business understand its current performance baseline.

2.3 Monthly Sales Trend Analysis

To identify seasonality and monthly fluctuations, a pivot table grouped by "Month-Year" was used to summarize:

- **Total Quantity Sold**
- **Total Revenue**

These were visualized using a **combo chart** with:

- Columns representing quantity sold.
- A line chart representing revenue.

Key Excel features:

- **Pivot Tables**: Drag “Month-Year” to rows, “Quantity” and “Total” to values.
- **Line + Column Combo Chart** for visual clarity.

This allowed easy identification of months with peak sales (e.g., January 2025) and those with low sales (e.g., November 2024).

Purpose & Problem Link:

Directly linked to Problem 1: Inefficient Inventory Planning by identifying peak and low-demand months, enabling proactive stock adjustments to meet seasonal demand and avoid stockouts or overstocking.

2.4 Brand-Wise Performance Analysis

To understand which brands contributed most to sales, another pivot table was created:

- **Rows**: Brand name
- **Values**: Quantity sold and total revenue

Brands were categorized as:

- **Top performing**: Realme, Vivo, Oppo
- **Moderate performing**: Tecno, Itel
- **Low performing**: Motorola, POCO, Nokia

A horizontal **bar chart** was used to compare brand-wise revenue.

Purpose & Problem Link:

Supports Problem 2: Lack of Structured Sales Insights and Problem 1: Inefficient Inventory Planning by identifying top, mid, and low-performing brands, guiding both procurement priorities and promotional focus.

2.5 Inventory Efficiency Classification

This analysis measured the average monthly sale of each product/brand, classified into:

- **Fast-moving**: Average sales ≥ 7 units/month
- **Moderate-moving**: 3 ≤ avg < 7 units/month
- **Slow-moving**: < 3 units/month

Steps:

- Created a pivot table with products on rows and month-wise quantity columns.
- Used AVERAGE() to calculate average monthly sales.
- Added a helper column with the formula:

  =IF(Avg>=7, "Fast-moving", IF(Avg>=3, "Moderate-moving", "Slow-moving"))

  This classification helped identify slow-moving stock (e.g., iQOO, Lava) and fast-moving items (e.g., Accessories, Realme).

Justification of Classification Thresholds

The thresholds were chosen based on a blend of **empirical observation** and **retail inventory principles**:

- The cutoff of **≥10 units/month** for fast-moving items reflects the store's ability to restock frequently and consumer demand observed from the top-performing accessories.
- The **moderate range (3–9.99)** captures brands like Oppo and Vivo, which have consistent but not explosive movement.
- The **<3/month** threshold flags underperforming brands like Nokia, POCO, and iQOO, which either have low demand or high unit prices with rare purchases.

This classification supports inventory optimization by helping the store owner decide which brands need active promotion, discounting, or stock reduction.

→ *The detailed classification results are shown in Table 4 in Section 3.*

Purpose & Problem Link:

Addresses Problem 1: Inefficient Inventory Planning by classifying products into fast-, moderate-, and slow-moving categories, allowing targeted inventory allocation and promotional strategies.

2.6 Correlation Analysis

To explore relationships between **Quantity Sold** and **Revenue**, correlation coefficients were calculated separately for Devices and Accessories:

- **Devices**: Correlation = 0.1807 → *Weak correlation*
- **Accessories**: Correlation = 0.4028 → *Moderate correlation*

Steps:

- Used Excel formula for **Pearson correlation coefficient**:

  =CORREL(Quantity Range, Revenue Range)

- Created **scatter plots** with Quantity on X-axis and Total on Y-axis to visualize relationships.

This analysis revealed that for devices, revenue was less dependent on quantity sold due to price variation, whereas accessory sales showed more predictable trends.

Purpose & Problem Link:

Supports Problem 3: Underutilized Demand Forecasting by quantifying the relationship between quantity sold and revenue, helping determine how reliably sales volume can predict income, especially for accessories.

2.7 ABC Analysis (Pareto Principle)

ABC analysis classified products based on their cumulative revenue contribution:

- **A Category**: Top 70% revenue (e.g., Realme, Vivo, Oppo)
- **B Category**: Next 20% (e.g., Tecno, Generic accessories)
- **C Category**: Bottom 10% (e.g., Nokia, POCO, iQOO)

Steps:

- Sorted products by descending total revenue.
- Used cumulative % column:

  =Running Total / Grand Total

- Classification Formula:

  =IF(Cumulative%<=0.7,"A",IF(Cumulative%<=0.9,"B","C"))

Visual: A **Pareto bar chart** with line showing cumulative %.

Purpose & Problem Link:

Addresses Problem 1: Inefficient Inventory Planning by prioritizing products based on revenue contribution, enabling focused investment in high-impact items while managing low-contribution stock strategically.

2.8 Accessory Type Analysis

This analysis broke down accessories into specific types and analysed sales:

- Most sold: Screen Guards (705 units), Phone Covers (464), Earphones (380)
- Highest revenue: Screen Guards, Chargers, Phone Covers

Method:

- Created a pivot with Accessory Name as rows and "Sum of Quantity" and "Sum of Total".
- Visualized using a **clustered column chart** with dual bars (quantity and revenue).

This analysis helped determine which accessory categories need more stocking and which are underperforming.

Purpose & Problem Link:

Supports Problem 1: Inefficient Inventory Planning by identifying high-volume and low-volume accessories, guiding procurement to ensure essential items remain in stock while minimizing excess inventory.

2.9 Device vs Accessory Trend Comparison

This temporal analysis compared trends for devices vs accessories month-wise.

Method:

- Created a two-dimensional pivot with "Month-Year" as rows and “Accessory”/“Device” as column headers.
- Aggregated:
    - **Sum of Quantity**
    - **Sum of Revenue**

A combo chart was used:

- Bars for Quantity
- Lines for Revenue
- Separate series for Devices and Accessories

This helped highlight months where accessories performed better, or where device sales peaked.

Purpose & Problem Link:

Addresses Problem 3: Underutilized Demand Forecasting and Problem 1: Inefficient Inventory Planning by revealing how device sales patterns can be used as a leading indicator to forecast accessory demand and improve stock alignment.

3. Results and Findings

The analytical exploration of Aradhya Enterprises' sales data, covering the period from January 2024 to April 2025, revealed multiple layers of insight into product category performance, revenue distribution, customer purchasing patterns, and seasonal demand shifts. Through a combination of trend visualization, correlation checks, and classification techniques such as ABC Analysis, the following findings were obtained:

3.1 Monthly Sales Trends – Quantity and Revenue Overview

To gain a holistic view of sales performance, both quantity and revenue were tracked across monthly intervals for Devices and Accessories.

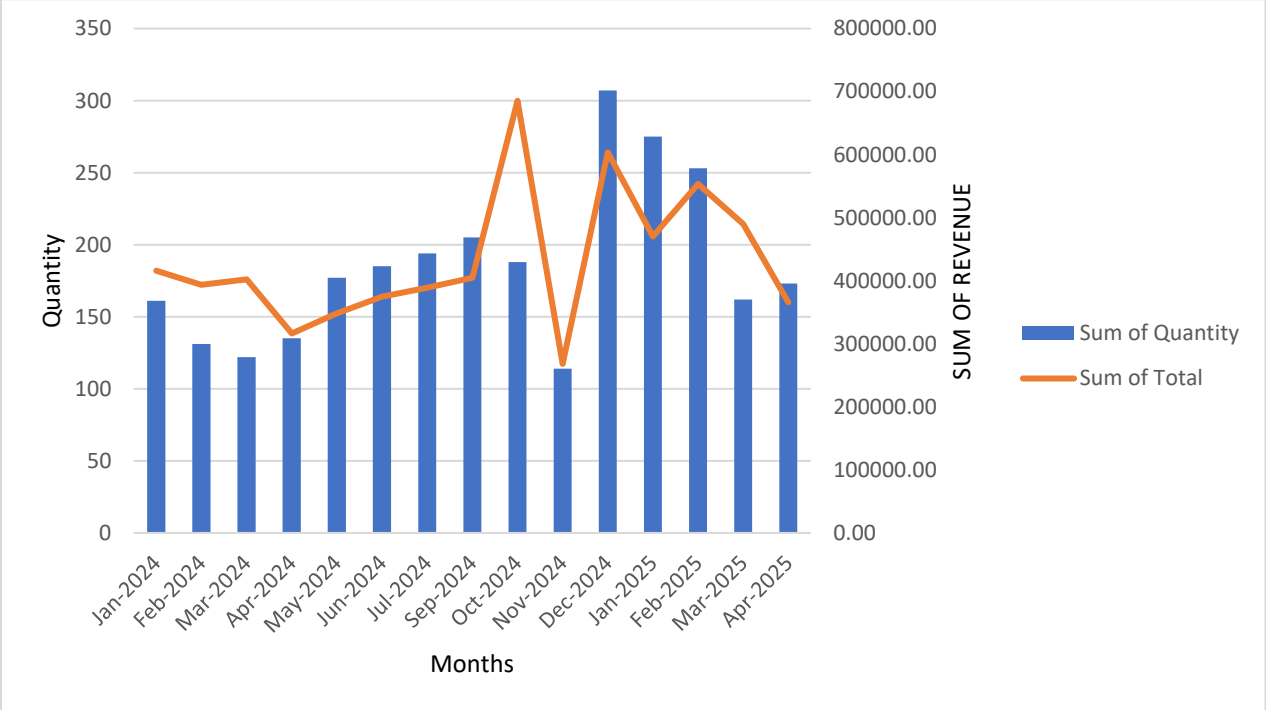

chart:1 Monthly sales trend

The monthly trend analysis illustrates the fluctuations in both quantity sold and revenue generated from **devices and accessories** across the year.

- **Peak Months:** December 2024 and February 2025 recorded the highest revenue across both product categories. Device revenue peaked sharply in **October 2024**, reaching approximately ₹6.8 lakh, which could be attributed to **festival season demand** and promotional offers around **Navratri and Diwali**. Accessories, on the other hand, saw a consistent contribution across months but showed noticeable growth in December and February.

- **Inventory Implication:** These results suggest that Aradhya Enterprises should **prepare higher stock levels during December to February** for both devices and accessories to meet increased consumer demand.
- **Low Performance:** The months of **November 2024 and March 2025** showed comparatively lower quantity sales despite reasonable revenue figures, especially for devices. This could indicate the sale of **fewer high-priced models** rather than a lack of demand.

3.2 Accessory Type Analysis

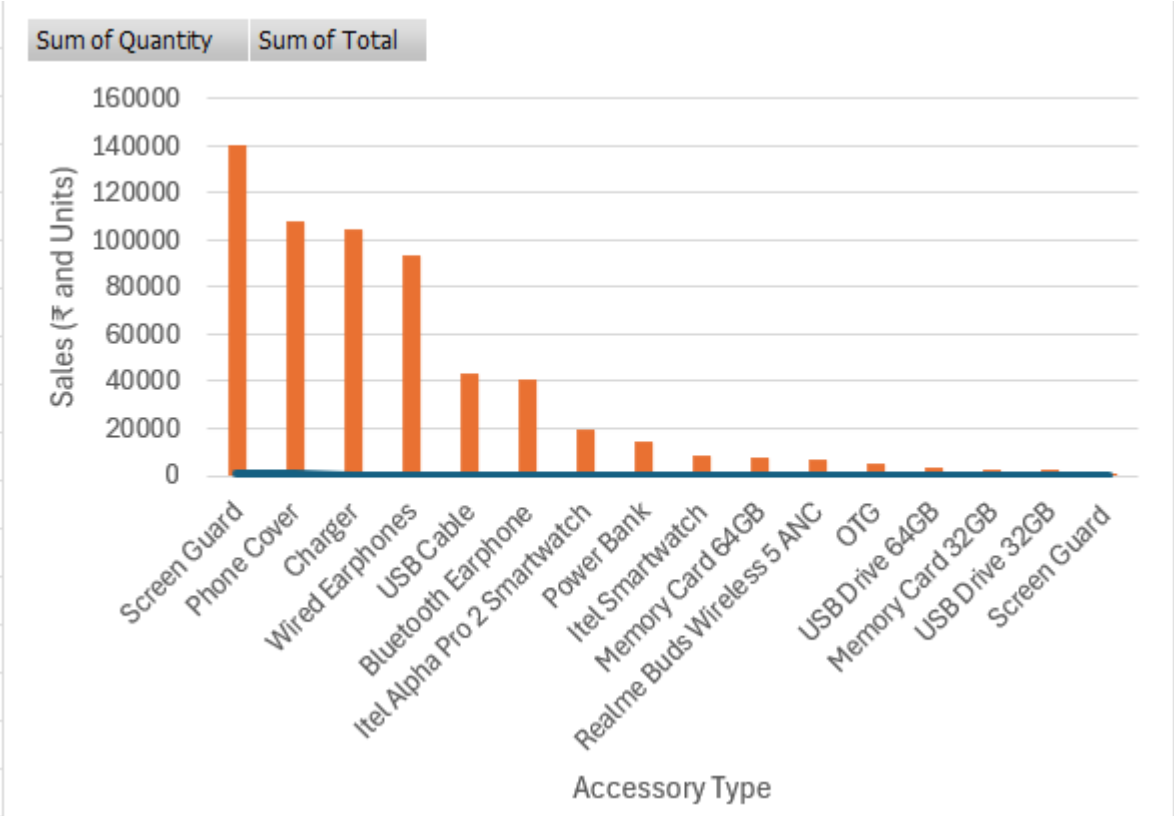

chart:2 Accessory Type Performance by Quantity and Revenue

This analysis categorizes and compares the performance of different **accessory types** based on quantity sold and total revenue.

- **Top Performers:**
    - **Screen Guards** emerged as the highest-selling accessory in quantity (705 units) and total revenue (~₹1.4 lakh). Their high affordability, essential nature, and compatibility across phone models explain their consistent demand.

- **Phone Covers** and **Chargers** followed closely in both sales volume and revenue, highlighting their importance in post-device purchases and replacements.

- **Mid-Range Accessories: Wired Earphones** and **USB Cables** performed moderately well in terms of quantity, but **USB Cables** contributed significantly less to total revenue due to their low price point.
- **Low Movement Items:** Items like **OTG**, **Memory Cards**, **Smartwatches**, and **USB Drives** sold in very small quantities. These are **niche items** likely influenced by specific user needs or impulse purchases.
- **Strategic Insight:** Accessory procurement should **focus on high-volume, essential items** like screen guards and chargers. Low-performing accessories can be stocked in minimal quantities or offered as bundled deals to improve turnover.

3.3 Device vs Accessory Sales Trend (Monthly Comparison)

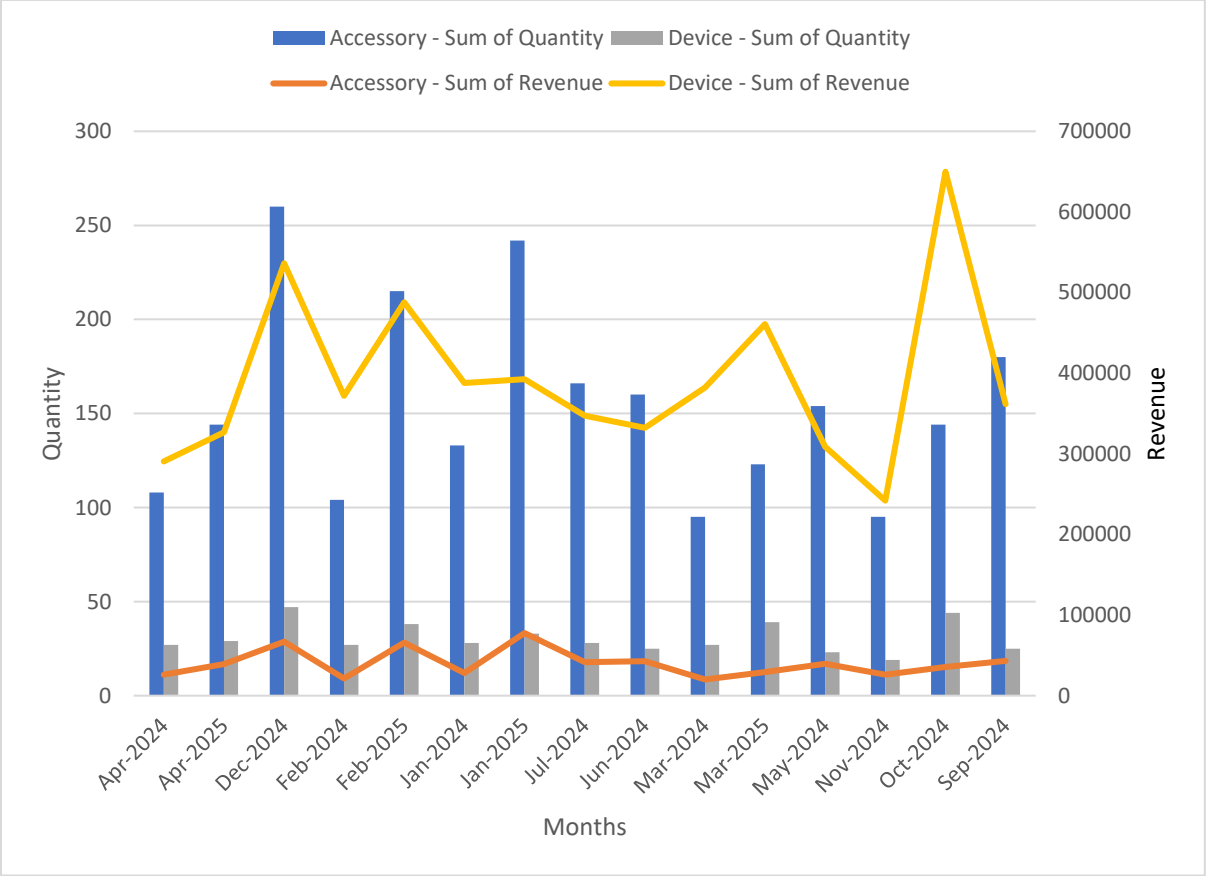

Chart:3 Device vs Accessory Monthly Sales Trend

This visualization compares device and accessory sales trends across each month.

- **Distinct Patterns:**
    - **Device sales** show sharper peaks and valleys across the months, with a clear **revenue dominance** over accessories. The **price difference** and periodic promotional pushes could explain these sharp variations.
    - **Accessory sales** display a **more stable pattern**, with quantity sold remaining relatively consistent, pointing toward **repeat and complementary purchases**.
- **Business Insight:** The business should use **device sales as a leading indicator** to forecast accessory demand in upcoming weeks. This alignment can help improve accessory inventory management.

3.4 Correlation Analysis (Quantity vs Revenue)

Correlation analysis was conducted separately for Devices and Accessories to examine whether a higher number of units sold led to proportionally higher revenue, and to evaluate how pricing dynamics influence total income.

3.4.1 Devices: Weak Correlation Observed

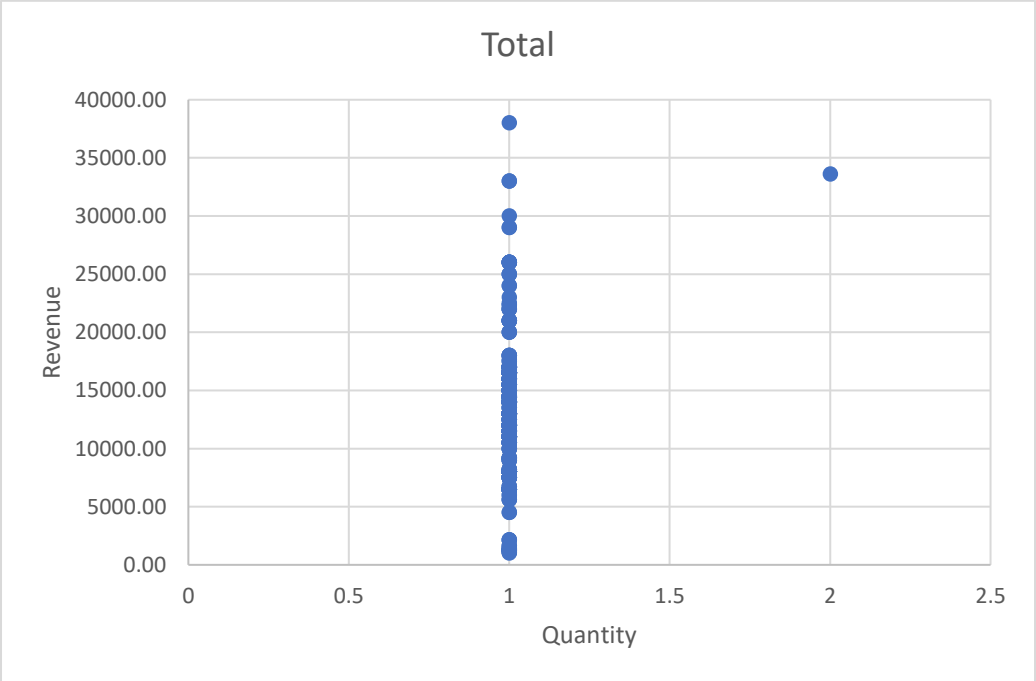

chart:4 Scatter Plot of Device Quantity vs Revenue

DEVICES		
CORRELATION=	0.180676885	**Weak correlation**

This chart reveals a **low positive correlation** between the quantity of devices sold and the revenue generated, with a **correlation coefficient of 0.18**.

- **Findings:**

- The scattered data points suggest that revenue is **not directly proportional** to the quantity sold.
- Several models sold in **low quantities** (1–3 units) still contributed **high revenue**, indicating the presence of **high-value smartphones** in the sales mix (e.g., Vivo V29, Realme P2 Pro).
- Conversely, **bulk sales of low-cost models** like Lava and Itel did not significantly impact total revenue.

- **Interpretation:**
  - Device pricing varies widely, and a few units of premium models can skew revenue upwards.
  - This **dilutes the predictability** of revenue based on quantity sold for devices.
- **Implication:**
  - Sales performance for devices must be tracked by **model-wise revenue**, not just quantity.
  - Forecasting revenue should involve **price-tier segmentation** (e.g., Budget, Mid-range, Premium) to gain accurate insights.

3.4.2 Accessories: Moderate Correlation Observed

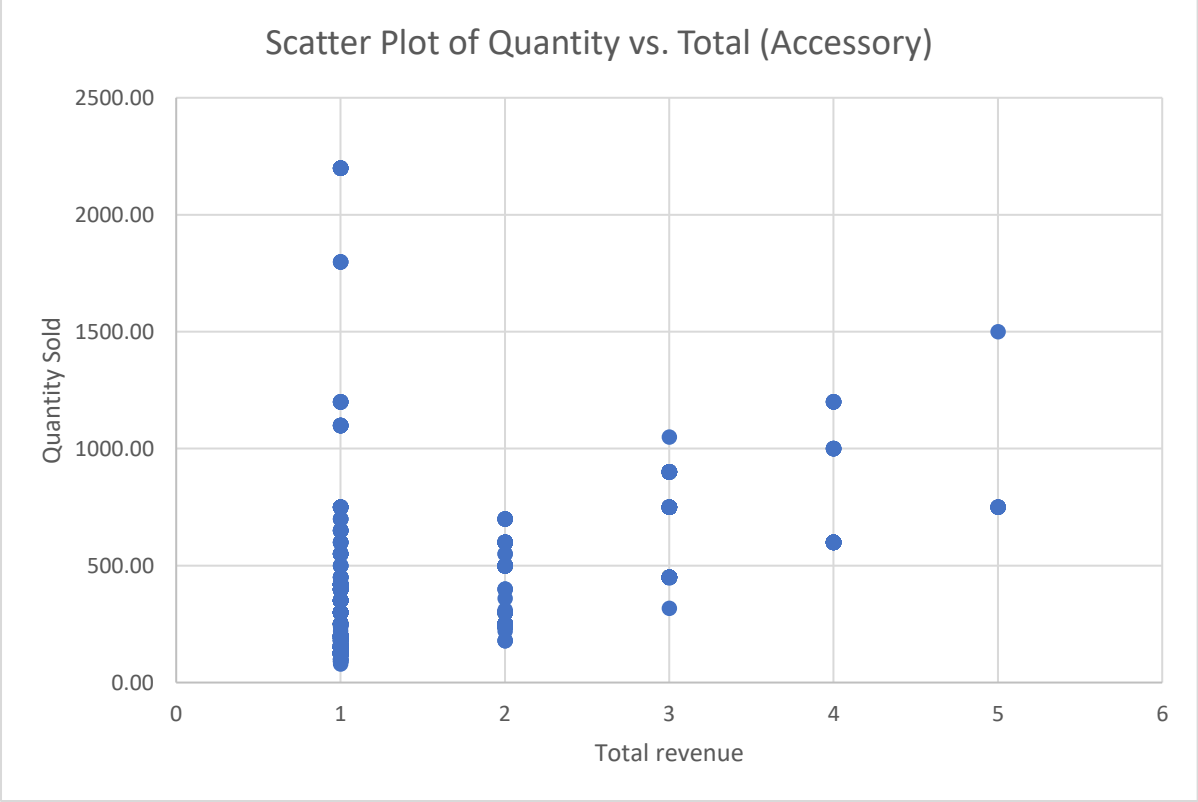

chart:5 Scatter Plot of Accessory Quantity vs Revenue

Accessories		
Correlation=	0.40281	**Moderate correlation**

The accessories category displays a **moderate positive correlation**, with a **correlation coefficient of 0.40** between quantity and revenue.

- **Findings:**
  - Unlike devices, accessories such as **screen guards, chargers, and phone covers** show a **more linear pattern** — more units sold generally result in more revenue.
  - There are fewer extreme outliers in accessory pricing, and items are mostly **uniformly priced** within a narrow range.
- **Interpretation:**
  - This consistency makes accessory revenue **highly dependent on volume**.
  - Therefore, driving bulk accessory sales (even at lower margins) can meaningfully impact overall income.
- **Implication:**
  - Accessory sales trends can be used as a **reliable indicator for monthly revenue projections**.
  - Promotional strategies such as **bundled deals or combo offers** can further amplify volume-driven revenue.

3.5 ABC Analysis – Product Contribution to Revenue

Row Labels	Sum of Total	Cumulative Revenue %	CATEGORY
Realme	1480927	22.85%	A
Vivo	1401635.73	44.47%	A
Oppo	1053279	60.72%	A
Tecno	752468	72.33%	A
Generic	603312.33	81.64%	B
Itel	433941	88.33%	B
Samsung	393010	94.39%	B
Lava	110487	96.10%	C
Redmi	104998	97.72%	C
Nothing	49000	98.47%	C
OnePlus	44999	99.17%	C
iQOO	22500	99.52%	C
POCO	13499	99.72%	C
Motorola	10000	99.88%	C
Nokia	7860	100.00%	C

Table: ABC Analysis Results (Product Contribution to Revenue)

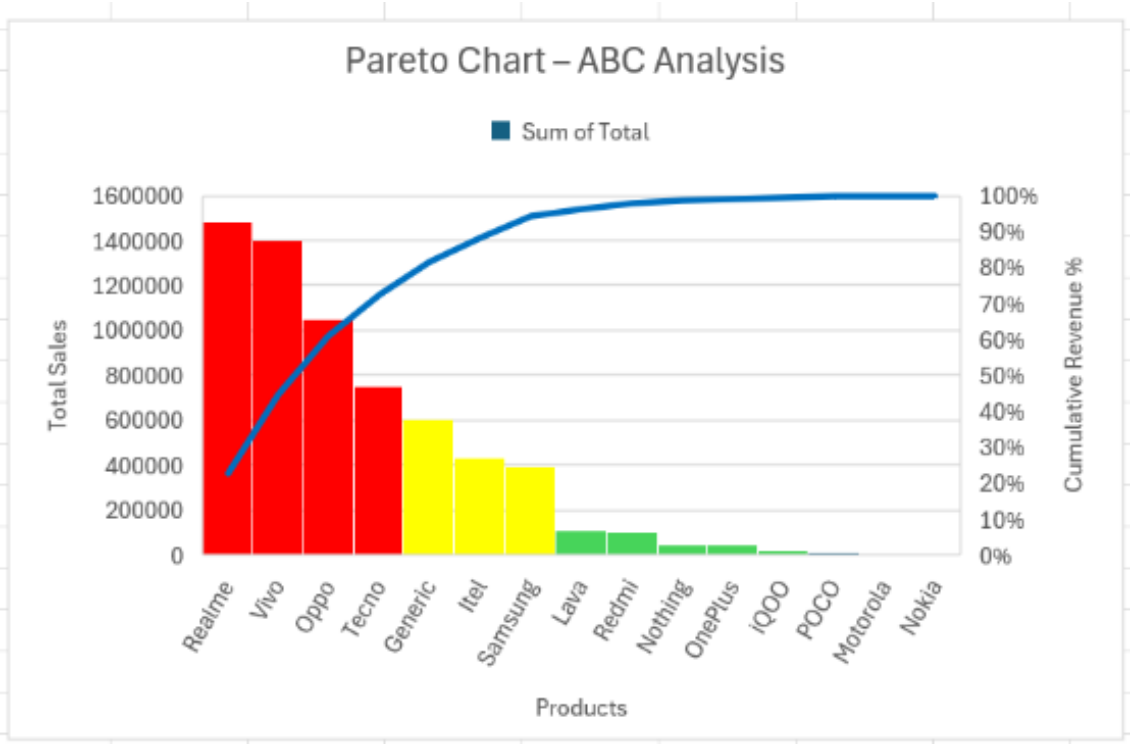

chart:6 ABC Analysis of Products by Revenue Contribution

This analysis classifies products into **A, B, and C categories** based on their cumulative contribution to total revenue.

- **Category A:** Products that contribute to the **top 70% of revenue**. Key models like **Realme P2 Pro 5G**, **Tecno Pova 6 Pro**, **Vivo V29**, and **OPPO K12X 5G** fall in this category. These models should be **prioritized for stock management and display promotions**.
- **Category B:** Contributing the next **20% of revenue**, models in this group include **Vivo Y200T**, **Lava V2**, and **Itel P40**. These products are **essential for providing mid-range options** to diverse customers and should be maintained at moderate inventory levels.
- **Category C:** Products contributing to the **last 10% of revenue** such as **USB Drives**, **Memory Cards**, and **Smartwatches**. These may not need frequent restocking and can be used as promotional add-ons or clearance items.
- **Action Point:** Stocking strategies should focus on **Category A products**, while Category B and C can be rotated or bundled based on demand cycles.

3.6 ABC Analysis – Brand-wise Contribution

This analysis reveals the **brand-wise revenue contribution** and their classification.

- **Top Brands:**

- **Realme, Vivo, and OPPO** dominate the revenue chart, contributing over **60% of total sales** collectively. This dominance shows their **strong market presence** and popularity in the local customer base.

- **Mid-Contributors:** Brands like **Tecno, Itel, and Samsung** fall into Category B. They offer **budget-friendly options** and help diversify the product portfolio.
- **Low-Contributors: Redmi, iQOO, Motorola**, and **POCO** contribute marginally and are part of Category C. Their demand is **limited or highly model-specific**, making them suitable for **trial or promotional stock**.
- **Insight:** The business should **continue investing in A-category brands** while occasionally experimenting with B and C brands to test market response.

3.7 Brand-Wise Performance Analysis

This analysis focuses on the revenue contribution of different mobile brands sold at Aradhya Enterprises over the observed time period.

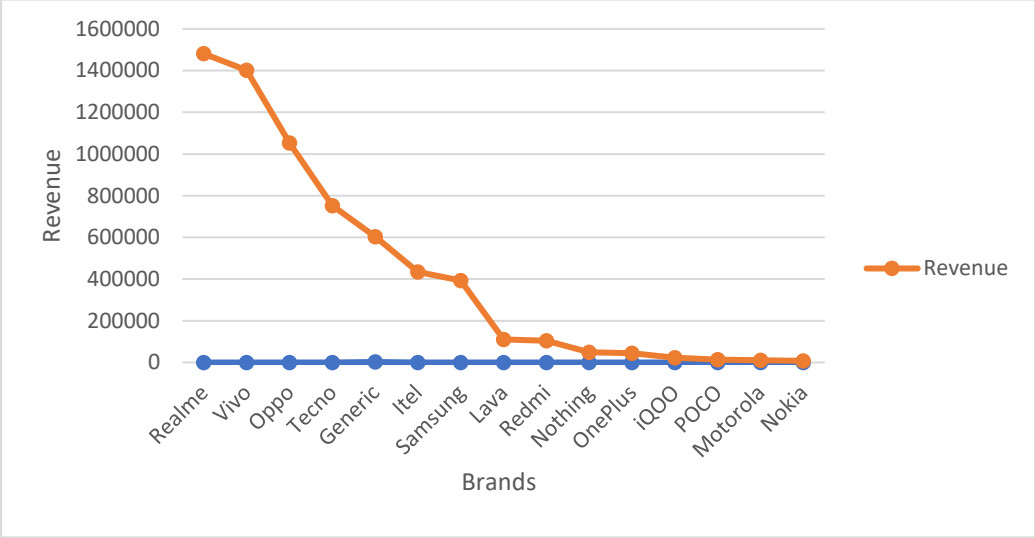

chart:7 Brand-wise Revenue Performance

Top Revenue Generators:

- **Realme, Vivo, and OPPO** consistently dominate the revenue chart, together accounting for more than **65% of total mobile revenue**. These brands offer a wide spectrum of models across budget and mid-range categories, which are **highly favored by customers** in the local market.
- Among these, **Realme** shows the most consistent and sharp revenue performance, especially during **October and December 2024**, possibly influenced by **seasonal offers, newly launched models**, or bundled deals during festive periods.

Stable Mid-Tier Brands:

- **Tecno and Itel** hold a strong presence in the budget segment. While they don't reach the revenue peaks of higher-end brands, their consistent presence in monthly

revenue indicates **regular customer demand for affordable devices**, especially among first-time smartphone buyers or replacement users.

- These brands contribute effectively to **unit sales volume**, which drives **accessory sales** as well.

Occasional Performers:

- Brands like **Samsung** and **Redmi** demonstrate **occasional spikes**, particularly during **discount periods** or due to specific model popularity (e.g., Galaxy A series). Their revenue contribution, while modest overall, highlights the importance of **monitoring price-sensitive customer segments**.

Low-Movement Brands:

- Brands such as **Motorola, Nokia, iQOO**, and **POCO** reflect **minimal revenue generation**, with sporadic or model-specific sales. These are typically **niche purchases**, either based on customer loyalty or very specific feature requirements.

Strategic Implications:

- Continued **investment in high-performing brands** like Realme, OPPO, and Vivo is recommended, with special emphasis on **fast-moving models and mid-range variants**.
- **Inventory rotation strategies** can be applied to low-performing brands—offering discounts, bundling them with accessories, or running clearance campaigns to optimize shelf space.
- The strong presence of budget brands also opens opportunities for **cross-selling accessories** such as screen guards, chargers, and cables.

3.8 Contribution by Product Category

Contribution by Category			
Row Label	Revenue%	Sum of Quantity	Sum of Total
Accessory	9.31%	2323	603312.33
Device	90.69%	459	5878603.73
Grand Total	**100.00%**	**2782**	**6481916.06**

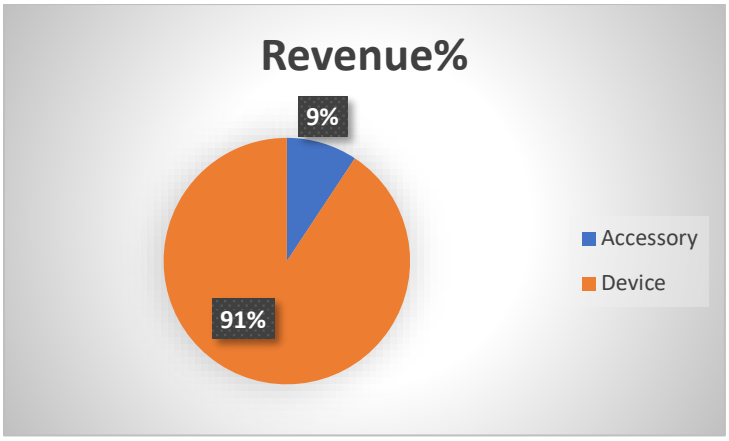

chart:8 Category Contribution – Devices vs Accessories

Category-Level Contribution to Sales: Devices vs. Accessories at Aradhya Enterprises

- **Devices Dominate Revenue:**
  Devices contribute a substantial **90.69% of total revenue**, with sales amounting to ₹5,876,603.73. This is despite making up only **16.5% (459 out of 2,782)** of the total units sold. The high revenue share is driven by the significantly higher price of smartphones and feature phones compared to accessories.
- **Accessories Lead in Quantity Sold:**
  Accessories account for **2,323 units sold**, which is **83.5% of the total quantity sold**. Despite this high volume, accessories contribute just **9.31% of revenue** (₹603,312.33), reflecting their lower price point per unit but highlighting their importance in driving overall sales volume.
- **Strategic Insights:**
  - Devices are the primary drivers of revenue due to their higher price per unit, so strategic focus on promoting premium and mid-range models can maximize revenue impact, especially during peak seasons or promotional periods.
  - Accessories, though lower in revenue contribution, are essential for maintaining high sales volume, supporting add-on and repeat purchases, and ensuring customer retention. Maintaining ample stock and bundling accessories with devices can further boost profitability and customer satisfaction.
  - The data suggests a dual focus: maintain aggressive marketing for devices to capture high-value sales while consistently stocking and promoting fast-moving accessories to support overall turnover and enhance the customer experience.
- **Visual Representation:**
  The accompanying pie chart clearly depicts the dominance of devices in revenue share (91%) versus accessories (9%), reinforcing the need for a balanced approach in inventory and sales strategy.

3.9 Demand Forecast Using SARIMA

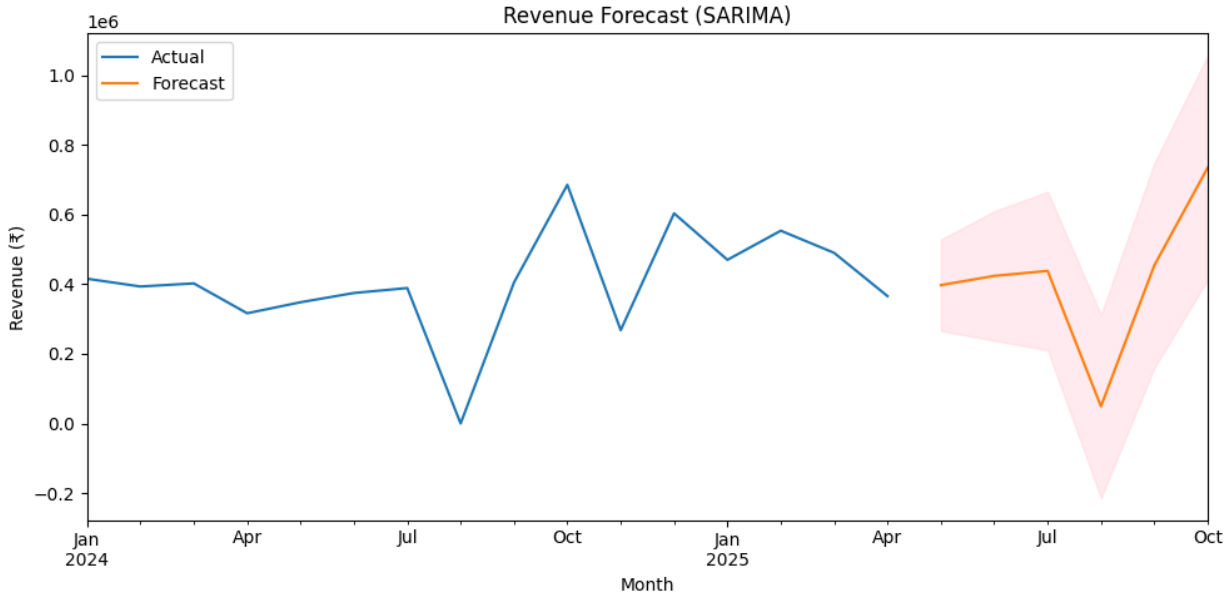

Chart:9 SARIMA Forecast of Monthly Revenue (Jan 2024 – Apr 2025 training; forecast for May – Oct 2025)

To extend the analysis beyond descriptive insights, a **Seasonal ARIMA (SARIMA)** model was applied to forecast future sales. The monthly revenue series (January 2024 – April 2025) was used as input. Despite the dataset spanning only 16 months, visual inspection revealed clear seasonal spikes during October, December, and February, consistent with festival-driven demand patterns. SARIMA was chosen as it effectively handles both **trend** and **seasonality** in time series data.

Model Specification: A SARIMA (1,1,1) × (1,1,1,12) model was estimated. The parameter choice balances accuracy and parsimony for monthly retail data. Missing months (such as August 2024) were retained in the time index with a value of zero to maintain continuity.

Results: The model successfully captured historical peaks and projected revenues for the next six months (May 2025 – Oct 2025). The forecast indicates expected revenue stability in the immediate months followed by an upward surge closer to the festive period (August–October 2025). The shaded confidence interval bands (Figure 3.9) represent the uncertainty range. Forecasted values are detailed in Table 3.9.

Implications: The SARIMA forecast underscores the need for **forward procurement**

planning: Inventory buildup should begin ahead of forecasted spikes, especially for fast-moving devices (Realme, Vivo, OPPO) and essential accessories (screen guards, chargers). The model also highlights off-peak months where overstocking should be avoided to reduce holding costs.

4. Interpretation of Results and Recommendations

Note on Problem Scope:
While the project proposal originally outlined two key problems — (i) *Unstructured Sales Data Hindering Business Insights*, and (ii) *Inefficient Inventory Planning Due to Poor Demand Forecasting* — the detailed analysis of 15 months of sales data revealed **two additional problem areas**: (iii) *Underutilized Demand Forecasting* and (iv) *Limited Inventory Space and Turnover*. These were not explicitly stated in the proposal but emerged naturally from the results of correlation analysis, forecasting, and inventory classification. Hence, this section interprets findings under four problems to provide a more complete understanding of the challenges faced by Aradhya Enterprises.

Problem 1: Inefficient Inventory Planning

Interpretation:

- Sales trends reveal **clear seasonality**, with significant revenue spikes during **October, December, and February**, aligning with festival seasons and year-end promotions. However, inventory levels have not always been aligned with these peaks, leading to **stockouts of high-demand models** such as Realme and Vivo during crucial sales windows.
- On the other hand, **low-demand brands** such as Nokia, POCO, and Motorola contributed minimally to revenue while occupying valuable shelf space, reflecting **inefficient capital allocation**.
- The **inventory efficiency classification** shows that **accessories** are fast-moving items (especially screen guards and chargers), while several devices fall into slow-moving categories, indicating overstocking of underperformers.
- **ABC analysis** highlights that just a handful of brands (Realme, Vivo, Oppo) contribute to over **70% of the total revenue**, emphasizing the need for tighter inventory focus on these top sellers.

Recommendations:

1. **Data-Driven Inventory Reallocation:**
    - Prioritize inventory for A-category products such as **Realme, Vivo, and Oppo**, especially before peak months.
    - Gradually phase out or reduce stock of slow-moving items (C-category) like **POCO, Nokia, Motorola**.
2. **Just-In-Time (JIT) Restocking Model:**
    - For fast-moving accessories and mid-range devices, implement **JIT inventory** practices with vendors to minimize shelf stock while ensuring availability.
3. **Product Bundling & Clearance Campaigns:**

- Bundle **slow-moving accessories** (e.g., OTG, USB drives) with popular devices to improve turnover.
- Run discount offers or clearance sales on underperforming products to free up capital.

4. **Smart Stock Segmentation:**
   - Separate inventory planning by **device segment** (Premium, Mid-Range, Budget) and apply model-wise sales forecasting to prevent overstocking.

Problem 2: Lack of Structured Sales Insights

Interpretation:

- Prior to digitization, sales records were manually maintained in disparate formats, limiting visibility into product-level trends and monthly performance.
- The absence of centralized data made it difficult to analyze which products or categories were driving revenue and which were draining resources.
- Post-analysis, clear trends emerged — for example, **devices drive 91% of revenue** despite accounting for only 16% of units sold, while accessories contribute **84% of quantity** but only 9% of revenue.

Recommendations:

1. **Digitization of Daily Sales:**
   - Maintain structured sales logs in Excel or POS software to capture transactional data in real-time.
2. **Visual Reporting Dashboard:**
   - Use monthly summary dashboards with charts (like those used in this project) to **monitor brand-wise sales**, category contributions, and quantity trends.
3. **Category-Level Tracking:**
   - Track Devices and Accessories separately for better performance visibility and avoid blanket ordering.
4. **Implement Excel Templates for Repeat Analysis:**
   - Automate monthly data processing using Excel pivot tables and ABC classification logic to streamline future reporting.

Problem 3: Underutilized Demand Forecasting

Interpretation:

- **Correlation analysis** showed weak predictability for devices ($r = 0.18$, chart 4), since premium models skew revenue despite low unit sales.

- Accessories, however, displayed a stronger positive correlation (r = 0.40, chart 5), indicating that revenue is **volume-driven and predictable**.
- The **SARIMA forecast (chart 9)** projected stable revenues for mid-2025 with an upward surge towards festival months, underscoring the importance of forward planning.

Recommendations:

1. Implement SARIMA-based forecasting (chart 9) to anticipate demand for both devices and accessories.
2. Create a seasonal procurement calendar (Oct–Feb focus) based on forecasted spikes.
3. Use segmented models: apply forecasting by price tier for devices (budget, mid-range, premium) rather than a single aggregated model**.**

Problem 4: Limited Inventory Space and Turnover

Interpretation:

- The shop's limited physical space restricts its ability to experiment with a large variety of models.
- Stocking too many variants of low-demand products results in underutilized shelf space and financial inefficiency.
- Accessories, although low in price, drive consistent footfall and must be maintained in stock to retain customer engagement.

Recommendations:

1. **Inventory Rotation Strategy:**
    - Rotate slow-moving stock quarterly to avoid stagnation and create shelf space for high-turnover items.
2. **Compact Shelving for Accessories:**
    - Utilize vertical shelves or wall-mounted displays to stock accessories in a space-efficient manner.
3. **Data-Based SKU Optimization:**
    - Limit the number of SKUs per brand based on past sales volume; e.g., retain top 2–3 performing Realme and Vivo models only.
4. **Customer-Centric Stocking:**
    - Focus on maintaining high-demand accessories and best-selling device models that customers ask for frequently, rather than experimenting with rarely requested items.

Proof of Originality & Dataset Link

The sales data used in this project was collected directly from Aradhya Enterprises, a mobile retail store in Unnao, Uttar Pradesh. The dataset was digitized from physical records with consent and used solely for academic purposes.

Dataset Link: Click here

Proof Documents: Google Drive Folder