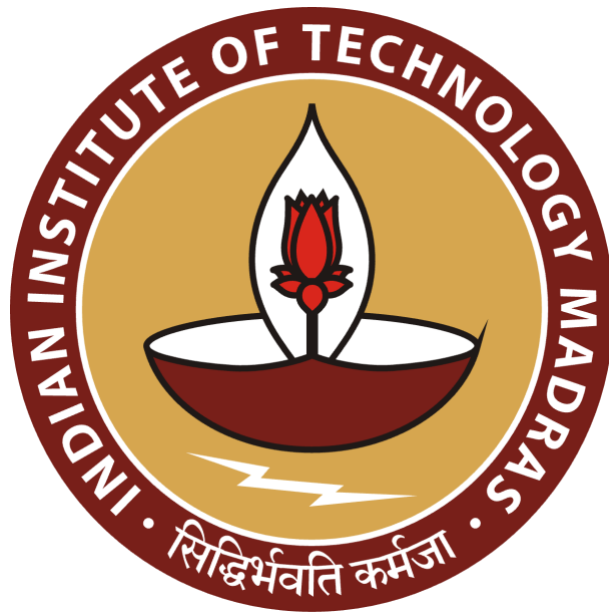# Business Data Management

Capstone Project

(Mid Term Report)

Title - *Revitalizing Sales Strategy and Improving Inventory Management: A Business Data Management Project for Quadri Mobile Communication*

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Declaration Statement

I am working on a Project titled ***Revitalizing Sales Strategy and Improving Inventory Management: A Business Data Management Project for Quadri Mobile Communication***. I extend my appreciation to ***Quadri Mobile Communication*** for providing the necessary resources that enabled me to conduct my project.
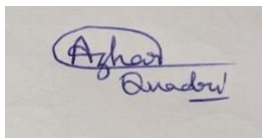
I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered from primary sources and carefully analyzed to assure its reliability.

Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through thorough analytical procedures.

I am dedicated to adhering to the principles of academic honesty and integrity, and I am receptive to any additional examination or validation of the data contained in this project report.

I understand that the execution of this project is intended for individual completion and is not to be undertaken collectively. I thus affirm that I am not engaged in any form of collaboration with other individuals, and that all the work undertaken has been solely conducted by me. In the event that plagiarism is detected in the report at any stage of the project's completion, I am fully aware and prepared to accept disciplinary measures imposed by the relevant authority.

I understand that all recommendations made in this project report are within the context of the academic project taken up towards course fulfillment in the BS Degree Program offered by IIT Madras. The institution does not endorse any of the claims or comments.

Signature of Candidate:

Name: Azhar Quadri

Date: 9th Nov 2024

1. Executive Summary

Quadri Mobile Communication, a local mobile shop in Dildarnagar, faces challenges that hinder its potential growth and profitability. Key issues include a limited product range, suboptimal pricing strategy, and inefficient inventory management. This report explores these challenges through data analysis to inform strategies that can improve revenue, customer satisfaction, and overall business performance.

The data collected thus far includes sales records, purchase records, and limited competitor pricing information, allowing us to analyze trends in product demand, inventory turnover, and pricing sensitivity.

2. Proof of originality of the Data

Data was collected through direct interaction with the shop owner, Mr. Azad Khan. Initially, the Owner provided bills and lists of mobile phones noted for their ordering purposes. During the interview, the Owner shared the problems he is currently facing in the business. He also provided verbal estimates, recorded in a table sheet for further data analysis. The following sources validate the originality of the data:

- **Sales Records**: The bill book containing daily sales records were provided by the shop owner, detailing each product sold, the customer name, quantity, and the price.

- **Purchase Records**: Inventory data, including product name, brand, purchase quantity, and cost, was obtained from the owner which was highly unorganised.

- **Interview**: One informal interview was conducted with Mr. Khan to understand problems faced by him, the products demand, pricing strategy he follows , and what the customer prefers.

Link to Interview video: https://shorturl.at/oDPtv

Link to other records: https://shorturl.at/xIlOq

Proofs includes photographs of records, a sample of bills, and interview notes, validating the data authenticity. This data forms the basis for identifying patterns and improving business operations.

2.1   Photographs with Owner and the Store

2.2 Letter from the organisation
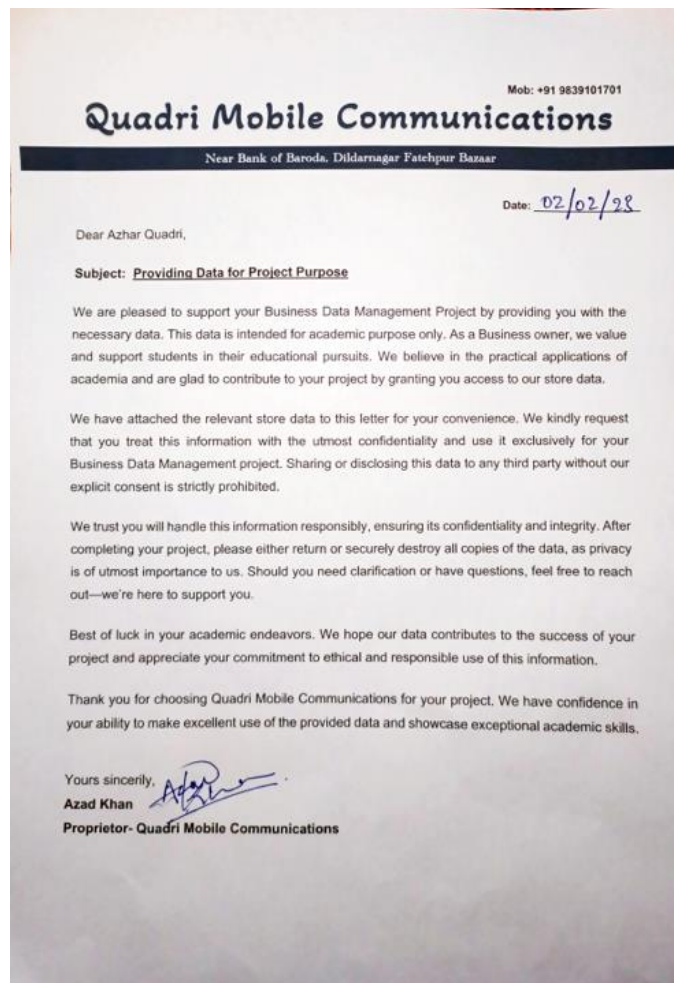
3. Metadata

To better understand the problems faced by the owner, it is important to collect relevent data and background information from the Owner and business operations. The following variables were collected during the data collection process:

- **Sales Data**:

  Sales Data were recorded for the period of July, 2022 to Dec, 2022

  - *Product Name*: The name of each mobile model sold.
  - *Date*: Date the sales occurred.
  - *Customer Name*: The name of the person buying the product.
  - *Brand*: Manufacturer of the mobile device (e.g. Samsung, Redmi).
  - *Model*: Specific model identifier for each product.
  - *Category*: Phone belongs to which category(e.g. SmartPhone, FeaturePhone)
  - *RAM/ROM*: RAM/ROM info about the product.
  - *Color*: Color of the product.
  - *Price*: Selling price of each unit.
  - *Total Revenue*: (Quantity Sold * Price)

- **Purchase Data**:
  - *Model*: Name of each product.
  - *Date*: Date of purchasing for stock.
  - *Category*: Phone belongs to which category(e.g. SmartPhone, FeaturePhone)
  - *Brand*: Manufacturer of each product.
  - *RAM/ROM*: RAM/ROM info about the product.
  - *Color*: Color of the product.
  - *Units*: Units ordered for stock.
  - *Cost*: Purchase cost per unit.
  - *Total Cost*: (Quantity Purchased * Cost)
- **Expense Data** :

  Since it was not tabulated or organised by the owner, he provided me the approximate monthly expenses and its breakout.
  - *Expense Type*: Category of operational expenses (e.g., rent, utilities, salaries, insurances, misc.).
  - *Total Expense Amount*: Monthly expense amounts for each category.

Each field was standardized to ensure consistency across datasets and to allow for easier analysis on sales trends, inventory turnover, and expense distribution.

4. Descriptive Statistics

Descriptive statistics were calculated to understand key metrics in sales and inventory. These details are used to look at trends in product demand, find out what causes costs to rise and fall, and judge how useful inventory is so that smart choices can be made about pricing, stocking, and managing costs.

- **Sales Data Statistics**:
  - *Top-selling Brands*: Xiaomi and Realmi are the highest-performing brands, collectively accounting for over 45% of sales volume as well as over 60% of sale revenue.
  - *Monthly Sales Trend*: Sales peak during festive seasons (e.g.,November and December), suggesting seasonal demand patterns.
- **Purchase Data Statistics**:
  - *Average Inventory Turnover*: High turnover in Xiaomi and Realme models; low turnover for certain Vivo models indicates potential overstock.
  - *Total Inventory Investment*: Calculated as the sum of total costs across products, providing insight into cash flow tied up in inventory.

- **Expense Data Statistics**:
  - *Major Costs*: Rent and utilities represent a significant portion of monthly expenses, with average expenses around ₹22,000 per month.

These statistics provide a quantitative overview of the shop's current sales performance, inventory management effectiveness, and cost structure.

5. Detailed Explanation of Analysis Process/Method

The analysis process involved several structured steps, beginning with data cleaning and structuring, then segmentation and categorization, and finally using of variety of analytical tools to gain insights into sales performance, inventory efficiency, and customer preferences. Each step was meant to ensure data accuracy, enable meaningful comparisons across products, and provide clear visuals for patterns and trends.

- **Data Cleaning and Structuring**

  Clean structured data is essential for accurate analysis. It eliminates potential discrepencies, ensuring the findings are reliable.

  - **Standardization**: Product names and brands were standardized to avoid inconsistencies, such as "Samsung Galaxy A12" vs. "Galaxy A12".
  - **Handling Missing Values and Duplicates**: Missing values in product info were replaced with most frequent for the Smart Phones, and duplicates were removed to ensure accurate records.

- **Segmentation and Categorization**

  Segmenting data enables a focused understanding of customer preferences, brand performance, and demand variations across product types.

  - **Brand and Model Segmentation**: To further understand client preferences, products were divided into three categories based on brand and the product price : SmartPhone, FeaturePhone.

- **Purchase and Sales Metrics**

  Inventory Turnover (Sales Quantity / Quantity Purchased) and *Profit Margin* were calculated to identify high-demand and profitable items. These metrics are directly tied to core business goals of reducing excess inventory and increasing profitability. Other metrics, such as total revenue alone, would not capture the efficiency of inventory movement or highlight profitability.

- **Analytical Tools**

  - **Excel**: For initial cleaning, data structuring, and descriptive statistics.
  - **Tableau**: Used for visualizing trends and patterns in sales and inventory.
  - **Python**: Used for statistical analysis and custom visualizations.

# 6. Results and Findings

6.1 Sales Performance Analysis

- **Top-Selling Products**:
  - **Finding:** Vivo T1 5G lead in revenue while Samsung Guru 1200 lead in sales volume, indicating a preference for budget models(Feature Phones).
  - **Visualization:** Bar chart showing the top 10 products by revenue.
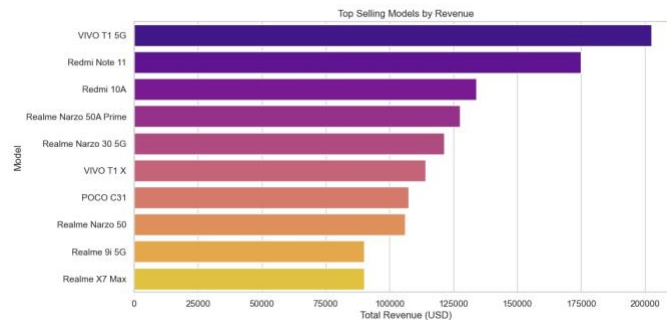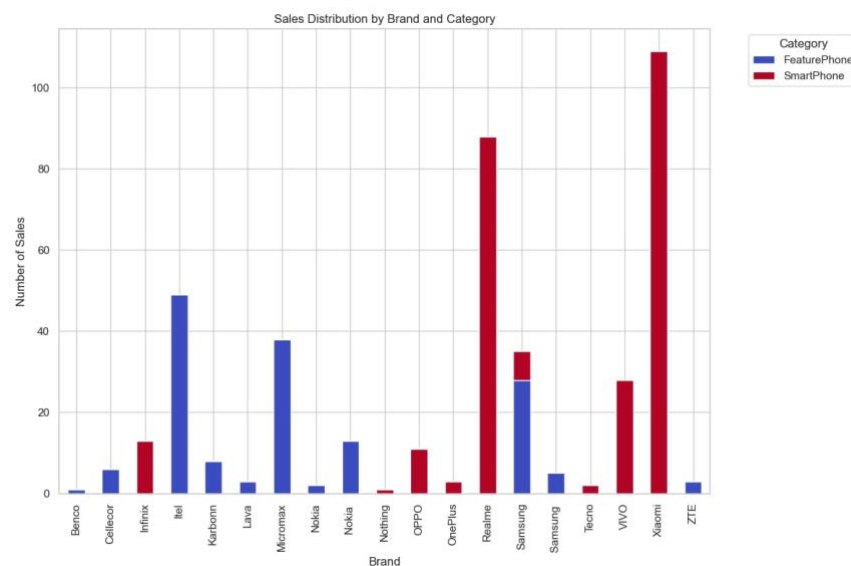

- **Brand Analysis**:
  - **Finding:** Xiomi and Realme dominate, collectively making up over 45% of total sales volume.
  - **Visualization:** 1. Pie chart of sales by brand.
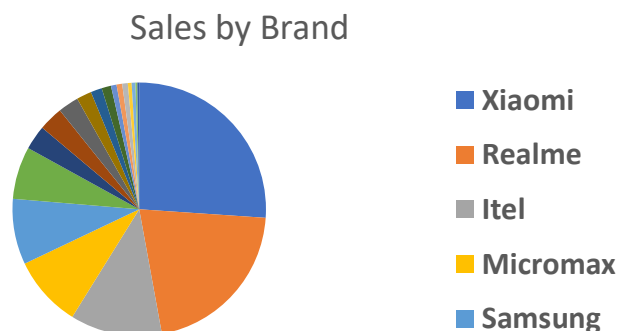
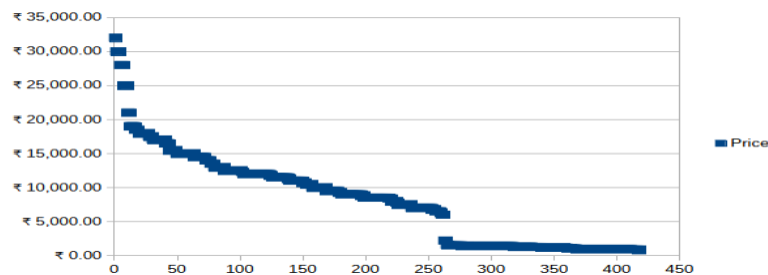2. Sales Distribution by Brand and Category

6.2 Pricing and Profitability Insights

- **Price Sensitivity**:
  - **Finding:** Higher-priced models tend to have lower sales, suggesting price sensitivity among customers.
  - **Visualization:** Scatter plot of price vs. quantity sold, highlighting a negative correlation.


- **Profit Margins**:
  - **Finding:** Certain low-demand models have higher margins, whereas high-demand items like Samsung Guru 1200 have average margins.
  - **Visualization:** Average profit margin by Product Model
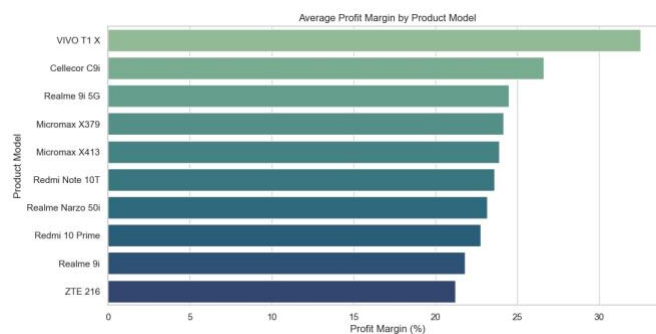

6.3 Inventory Management Insights

- **Inventory Turnover**:
  - **Finding:** High turnover in popular models like Samsung Galaxy A12, while low turnover for certain Vivo models suggests potential overstock.
  - **Visualization:** Turnover rates displayed in a bar chart, with high-turnover models prioritized for restocking.
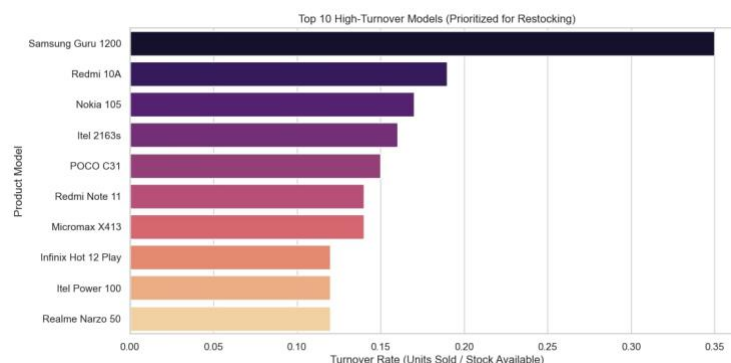

- **Stock-Out and Overstock Trends**:

- o **Finding:** Frequent stock-outs in high-demand models and overstock in low-demand models indicate a need for improved inventory management.
- o **Visualization:** Scatter plot comparing quantity sold and quantity purchased, identifying under- and over-stocked items.
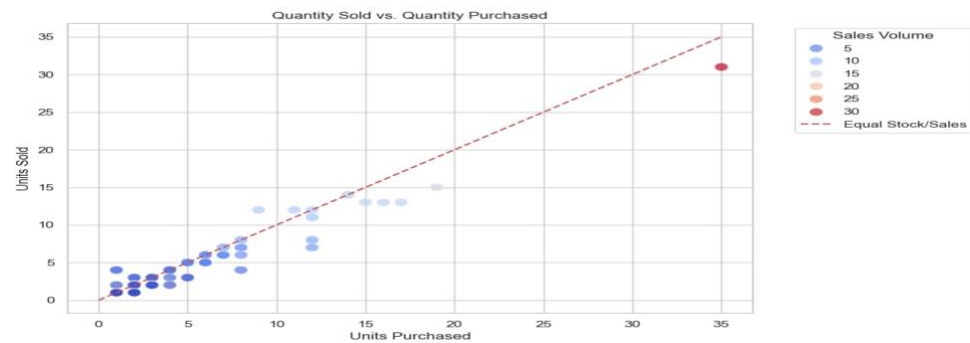
6.4 Customer Preferences

- **Preferred Specifications**:
  - o **Finding:** Budget models with basic specifications (e.g., 4GB RAM, 64GB ROM) and the colors having shade of blue have the highest sales, suggesting these features align with customer demand.
  - o **Visualization:**
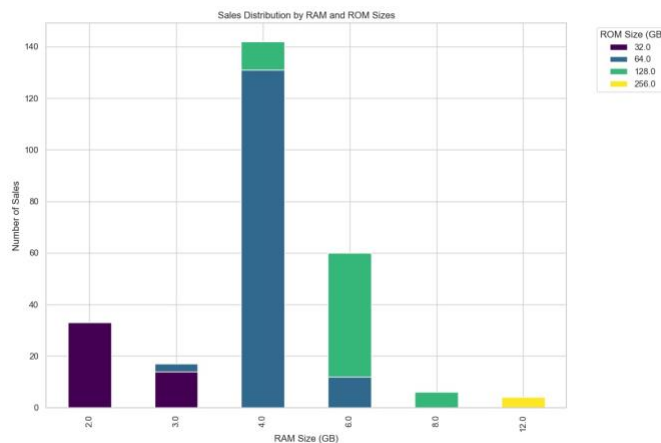
6.5 Expense Analysis

- **Cost Distribution**:
  - o **Finding:** Rent and Salary form the majority of monthly expenses, representing significant fixed costs.
  - o **Visualization:** Pie chart showing the breakdown of expenses.