# SALES FORECASTING USING MOVING AVERAGES AND TRENDLINES IN EXCEL FOR A MULTI-OUTLET RETAILER

## 1. Background and Problem Statement:

A regional retailer with 6 outlets across Tier-2 cities in India faced challenges in inventory planning due to inconsistent monthly sales volumes. Stockouts and overstocking resulted in lost revenue and increased holding costs. The management team required a **simple, Excel-based forecasting method** to predict monthly sales and use those insights for informed inventory decisions—without relying on external tools or programming knowledge.

## 2. Objectives:

- Analyze 24 months of historical monthly sales data for each outlet
- Apply moving average methods and Excel trendlines to forecast sales for the next quarter
- Compare model results and generate a forecast dashboard
- Provide actionable recommendations for inventory buffer planning

## 3. Methodology:

### 3.1 Dataset Overview

- **Time Period:** Jan 2022 to Dec 2023
- **Variables:**
    - Month
    - Outlet name (6 locations)
    - Total monthly sales (INR)
- Dataset was organized into a single Excel table with dynamic named ranges

### 3.2 Forecasting Techniques

- Applied **3-month and 6-month moving averages** using Excel formulas:
    - =AVERAGE(B2:B4) with dynamic referencing for each outlet
- Added **linear trendlines** using Excel chart tools to project future values

- Created a **comparative forecast table** using:
    - Actual Sales
    - 3-Month MA Forecast
    - 6-Month MA Forecast
    - Trendline Forecast (using slope and intercept from LINEST)

**3.3 Dashboard and Visualization**

- Designed an Excel dashboard with:
    - Line charts showing actual vs. forecasted sales
    - Outlet-wise slicer for filtering
    - Summary cards showing error metrics (e.g., MAD, MAPE) for each method

# 4. Results and Insights:

**4.1 Forecast Accuracy (Q1 2024 Projection Performance)****

| Outlet | Best Model | MAPE (%) | Trend Identified |
|---|---|---|---|
| Raipur | 6-Month MA | 7.4 | Mild upward trend |
| Indore | Trendline | 5.1 | Consistent growth |
| Gwalior | 3-Month MA | 8.6 | Seasonal spikes |
| Ujjain | Trendline | 5.3 | Stable linear |
| Bhopal | 6-Month MA | 6.9 | Gradual growth |
| Jabalpur | 3-Month MA | 7.2 | Holiday-dependent |

- Trendlines performed well for **stable outlets**, while 3-month MA captured short-term shifts
- Gwalior and Jabalpur showed **seasonality** linked to festival periods

# 5. Recommendations:

**5.1 Inventory Planning Strategy**

- Use **3-month MA for volatile stores** (e.g., Gwalior, Jabalpur) with rolling safety stock
- Use **trendline forecast for stable outlets** (e.g., Indore, Ujjain) with fixed reorder points

- Maintain a **10–15% buffer stock** during festival seasons (based on forecast uplift)

**5.2 Excel Automation Suggestions**

- Add data validation and dynamic dropdowns for month/year selection
- Automate monthly data entry with macros or Power Query integration
- Add visual alerts (conditional formatting) when actual sales deviate >15% from forecast

# 6. Deliverables in Excel:

- Fully structured workbook with:
    - Historical data and forecast calculations
    - Three forecast methods side-by-side
    - Summary dashboard with filters and dynamic charts
- Excel instructions tab with formula explanations for internal training

# 7. Stakeholder Relevance:

**Academic:**

- Suitable for teaching Excel-based time series forecasting and model comparison
- Introduces non-statisticians to predictive analytics using built-in Excel tools

**Corporate:**

- Enables retail managers to adopt simple forecasting for inventory and procurement
- Avoids dependency on complex tools while still offering **data-backed planning**
- Serves as a reusable Excel template for monthly forecasting operations