## Case 5: Product Demand Forecasting

Introduction and Background

In the fast-moving consumer goods (FMCG) industry, precise demand forecasting is crucial for maintaining an optimal supply chain, minimizing wastage, and ensuring product availability. **FreshMart FMCG**, a leading company in the industry, has long relied on manual forecasting methods using Microsoft Excel. While these traditional methods incorporate recent demand data and promotional schemes, they often fall short in capturing intricate demand patterns and market dynamics.

A major FMCG company’s operations generate 3 months of rolling forecasts at location, C&F agent (stockist) level and SKU.

At the center of FreshMart's operations are **Mr. Rohan Malhotra**, the dynamic Chief Operations Officer (COO), and **Ms. Aditi Sharma**, the Head of Supply Chain Management. During one of their quarterly strategy meetings, Rohan voiced his concerns:

*"Our current forecasting method is heavily dependent on manual inputs. While our teams use business logic and recent trends to generate forecasts, we lack a scientific approach to leverage historical data patterns effectively."*

Aditi agreed, adding:

*"The inaccuracies in our forecasts are leading to stockouts for some products and excess inventory for others. We need a systematic, data-driven approach to enhance forecast accuracy."*

Determined to resolve these inefficiencies, FreshMart embarked on a transformative journey to implement an **advanced forecasting model**, leveraging historical data and machine learning techniques.

The Challenge: Manual Forecasting and Its Limitations

FreshMart’s forecasting was traditionally performed using recent demand data, business intuition, and promotional schemes. However, this approach suffered from several challenges:

1. **Inaccuracy in Predictions** – The manual forecasts often deviated significantly from actual sales due to human bias and lack of statistical rigor.
2. **Lack of Scalability** – As FreshMart expanded into new locations and product categories, manual forecasting became increasingly unmanageable.
3. **Ignoring Seasonal Trends** – Demand fluctuations due to seasonality, festivals, and promotional schemes were not effectively captured.
4. **Inventory Mismanagement** – Inaccurate forecasts led to either **overstocking**, causing increased holding costs, or **stockouts**, resulting in lost sales opportunities.

With these concerns in mind, Dr. Verma and his team designed a **structured project implementation methodology** to build an advanced demand forecasting model.

The Goal of the case study is to come up with project implementation methodology with forecasting models which gives best demand forecast using the historical training and validating on the hold-out set.

**Assumptions may be made as necessary to solve the problem and should be stated clearly.**

The dataset included:

* **Date:** Sales Month (Numeric)
* **Location:** Branch location
* **C&FAgent:** Clearing and Forwarding Agent, who is responsible for handling customs clearance and forwarding logistics of products.
* **Division:** Category of the product
* **SKU:** Product name
* **Sales:** Units sold per month
* **OpeningStock:** Available stock at the beginning of the month
* **Forecast:** Previously predicted sales volume
* **SellingPrice:** Per-unit product price (INR)

Additionally, **scheme data**—which influenced sales through discounts, promotional offers, and marketing campaigns—was collected from Excel spreadsheets.

The case should cover the following area with project code/ workflow, PDF document and short PPT for final presentation.

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| Sr. No | Method |
| 1 | Identification of Business Problem |
| 2 | Data Preparation and Availability |
| 3 | Proposed Approach |
| 4 | Data Analysis |
| 5 | Conclusion and Findings |