Grocery Sales & Inventory Analysis

(2024 – 2025)

Project Overview

This project analyses grocery sales and inventory data using Power BI to identify sales trends, monitor stock levels, and highlight reorder-required products. The goal is to enable data-driven decision-making for retail operations.

Project Objectives

1. **Analyse Sales Performance**
   To evaluate overall sales trends, revenue growth, and product-wise performance across the grocery store.
2. **Monitor Inventory Levels**
   To track current stock availability and identify low-stock and out-of-stock products in real time.
3. **Identify Reorder Requirements**
   To highlight products that have reached or fallen below their reorder level to prevent stock-out situations.
4. **Understand Product & Category Demand**
   To analyze customer demand patterns by product and category to support better inventory planning.
5. **Improve Inventory Optimization**
   To reduce overstocking and understocking by aligning inventory levels with actual sales trends.
6. **Track Key Business KPIs**
   To calculate and visualize KPIs such as Total Revenue, Sales Quantity, Average Order Value, and Stock Availability.
7. **Enable Data-Driven Decision Making**
   To provide stakeholders with interactive dashboards for quick and informed business decisions.

8. **Enhance Supplier Planning**
   To assess supplier-wise product performance and support efficient procurement strategies.

Data source

Source Description & Timeline

Domain: Retail Analytics domain

Problem statement:

Grocery retailers struggle to effectively monitor sales performance and inventory levels due to fragmented data and the absence of real-time analytical insights. Poor visibility into product demand and stock status often leads to stock shortages, excess inventory, and lost revenue.

The given dataset contains historical sales, product, inventory, customer, and supplier data, but without analysis it is difficult to:

- Identify top- and low-performing products and categories
- Track inventory health and reorder requirements
- Align stock levels with actual sales demand

The goal of this project is to transform the dataset into interactive Power BI dashboards that provide actionable insights for sales optimization, inventory control, and informed business decision-making.

Attribute Details:

Attributes	Data Type	Description
Product ID	Text	Unique identifier for each record or entry
Product Name	Text	Name of the grocery product
Category	Text	Product category (e.g., Dairy, Fruits, Snacks)
Supplier ID	Text	Unique identifier for each supplier
Supplier Name	Text	Name of the supplier
Stock Quantity	Whole Number	Current available stock quantity
Reorder Level	Whole Number	Minimum stock threshold
Reorder Quantity	Whole Number	Quantity to be reordered when stock is low

Unit Price	Fixed Decimal Number	Selling price of the product
Total Stock value	Whole Number	Total inventory value (Stock Quantity × Unit Price)
Stock Level	Text	Minimum stock threshold
Stock Action	Text	Action required (Reorder / Maintain / No Action)
Reorder Cost	Fixed Decimal Number	Total cost incurred for reordering stock
Received Date	Date	Date when stock was received
Last Order Date	Date	Most recent date when stock was reordered
Expiration Date	Date	Product expiry date
Warehouse Location	Text	Customer state/region
Sales Volume	Whole Number	Total units sold
Revenue	Fixed Decimal Number	Total sales revenue generated
Inventory Turnover Rate	Whole Number	Rate at which inventory is sold and replaced
Status	Text	Overall inventory or sales status
Profit margin	Percentage	Profit earned relative to cost

Tools and Technologies:

- **Microsoft Excel (.xlsx)**
  Used as the primary data source to store grocery sales, product, inventory, customer, and supplier data in structured tables.
- **Excel Functions & Features**
  - Data
  - Removing duplicates and handling missing values
  - Lookup functions (XLOOKUP / VLOOKUP)
  - Basic calculations and validation

Data Analysis & Visualization

- **Power BI Desktop**

- Importing Excel data
- Data modelling using relationships
- Creating interactive dashboards and reports

- **Power Query**
  - Data transformation and cleansing
  - Column splitting, renaming, and data type conversion

Data Preprocessing (Excel/Preprocessing)

Data Collection:

Collected Grocery Sales Data for the year 2024 -2025 from the Google Dataset Search and 2024-2025 data from Grocery Inventory and Sales Dataset, all data stored in same data sheet.

Data Consolidation:

Separate the Excel sheet (2024-2025) into a two Excel Workbook and description rows for consistency.

Data Cleaning in Excel:

Imported CSV files into Excel to perform data cleaning, including filling missing values, aligning columns, standardizing text formats, creating calculated columns using formulas, and applying consistent styling across all sheets.

Data cleaning in Power Query:

Imported the dataset into Power BI Power Query Editor to standardize text formats, split columns, and ensure consistent data types across all fields.

Data Transformation:

Added a calculated flag column to improve data classification and applied consistent formulas and standardized field names to align both datasets.

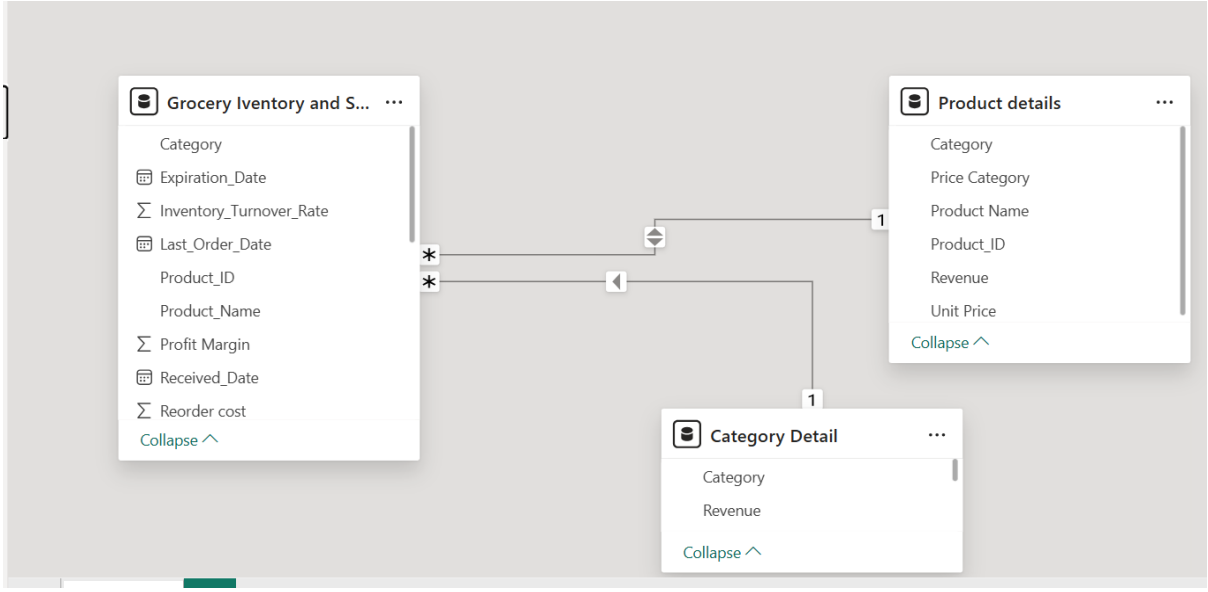
Data Integration:

Appended the cleaned and formatted datasets to create a unified dataset, ready for visualization and analysis in Power BI.

Data Modelling and DAX (Power BI)

Data Modelling:

In data modelling, a Grocery Table was created and linked to the main dataset using the Product field to enable product ID. Grocery Table was created and linked to the main dataset using the Category to enable Category Visualization.



Calculated columns and DAX Measure:

Using DAX (Data Analysis Expression), several calculated columns, measures, and parameters were created to enhance analytical insights.

DAX Components Created:

- **Calculated Columns:**
  - Turnover Segment
  - Stock Level
  - Stock Action
- **Measures:**
  - Inventory Value
  - Low Stock Items
  - Reordered Required
  - Sales by Last Month
  - Total Revenue
  - Product Count

- **Parameters:**
  - Category Parameters
  - Status parameters
  - Turnover Segment
  - Year

Analysis and Visualizations (Power BI)

To address Power BI was used to analyse grocery sales and inventory data and present insights through interactive and user-friendly dashboards.

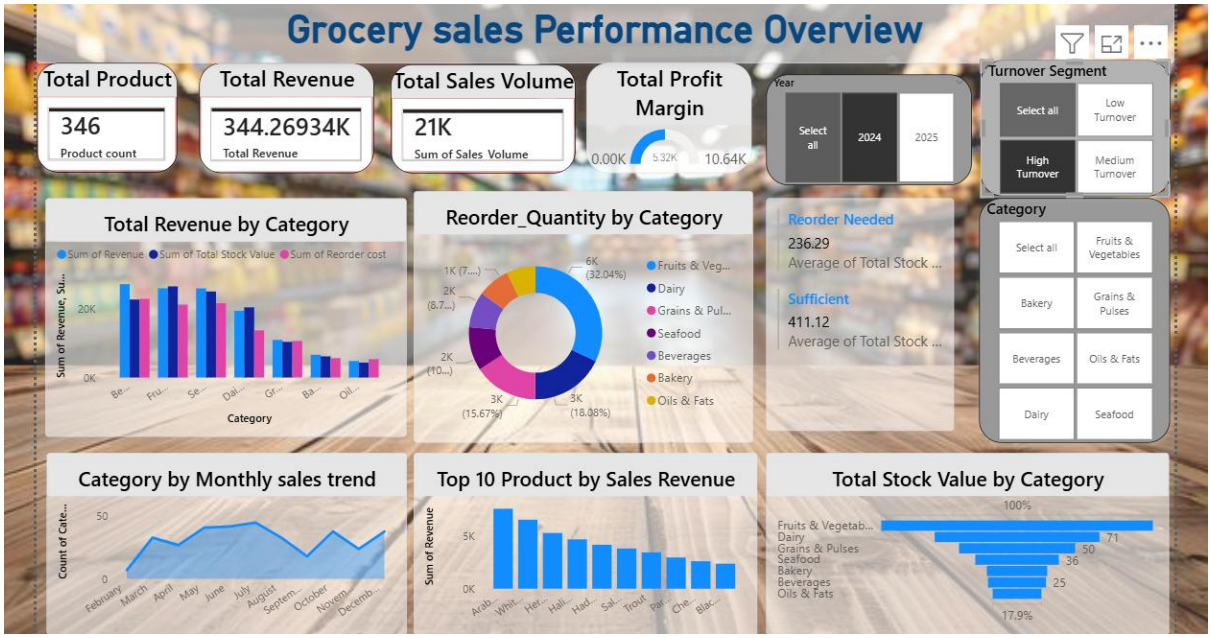
Analysis Performed

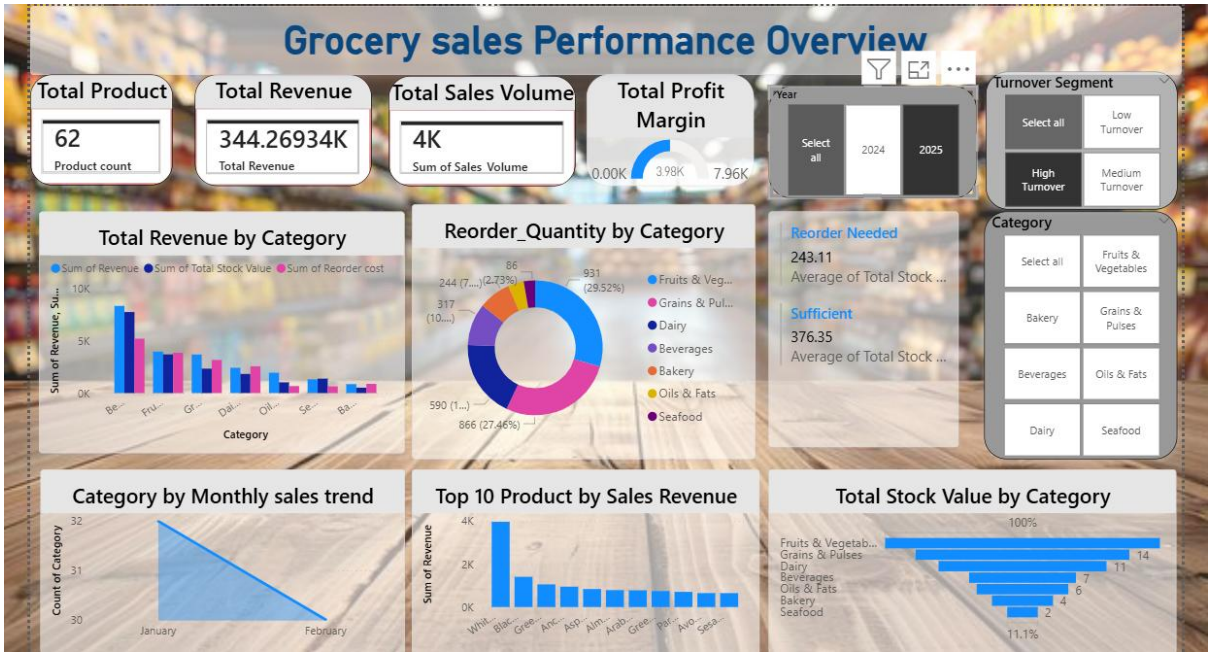
- Sales performance analysis by product, category, and time
- Revenue and quantity trend analysis (daily, monthly, yearly)
- Inventory status analysis to identify low-stock and reorder-required products
- Product and category-wise contribution to total revenue
- Comparison of sales demand versus available stock

Visualizations Created

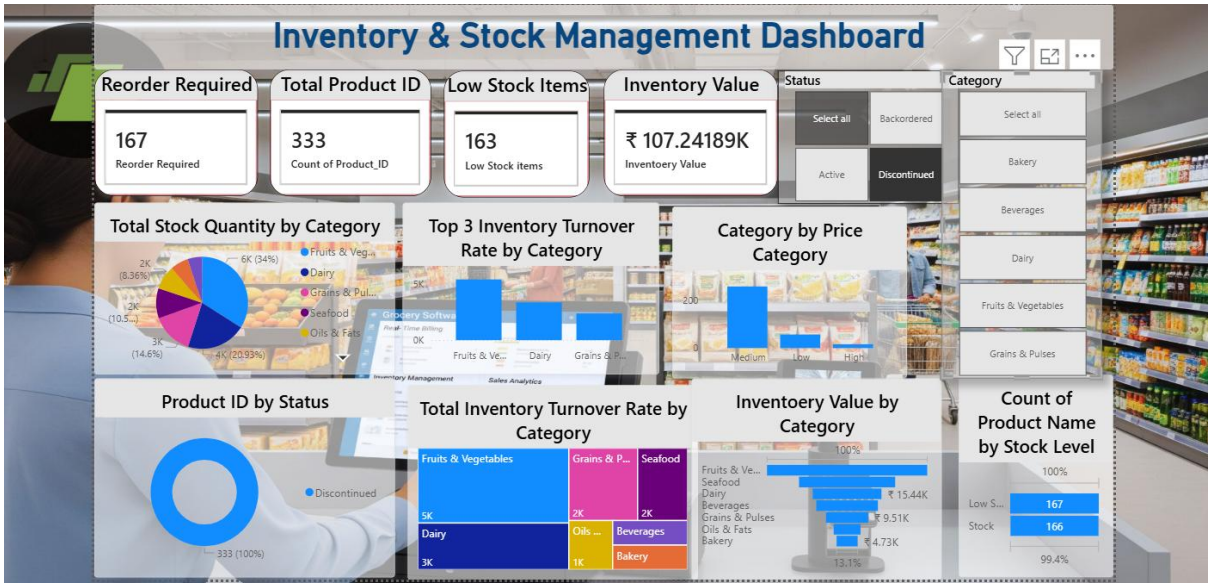
- **KPI Cards** – Total Revenue, Total Quantity Sold, Total Orders
- **Line Charts** – Sales trends over time
- **Bar & Column Charts** – Product-wise and category-wise sales
- **Tables & Matrix** – Detailed product and inventory information
- **Donut / Pie Charts** – Category contribution to total sales
- **Slicers** – Date, Category, Product, Stock Status

Grocery Sales Performance Overview





Inventory & Stock Management Dashboard



Insights

- A small set **of products contributes** to a large share of **total revenue**, indicating clear top-performing items.
- Certain categories consistently outperform others, making them key drivers of overall sales.
- Several high-demand **products frequently** fall into **Low Stock or Reorder Needed status**, highlighting inventory risk areas.
- Some products show low sales volume but **high stock levels**, indicating overstocking and **slow-moving inventory.**
- Sales trends vary by time period, showing seasonal or monthly demand patterns.
- Aligning inventory levels with sales demand can significantly reduce stock-outs and excess inventory.

Conclusion

This project successfully transformed raw Excel-based grocery sales and inventory data into an interactive Power BI reporting solution. By integrating, modelling, and analysing the data, the dashboards provide clear visibility into sales performance, inventory health, and reorder requirements. The insights generated support data-driven decision-making for inventory optimization, demand planning, and sales strategy. This project demonstrates practical skills in data preprocessing, data modelling, DAX, and dashboard design, making it a strong portfolio example for a Data Analyst / Business Intelligence role.