

# Enterprise Sales Analytics & Reporting Solution

## 1. Introduction

In today's competitive business environment, organizations generate large volumes of transactional data. However, raw data alone cannot provide value unless processed, analyzed, and visualized properly. The purpose of this project is to design an **Enterprise Sales Analytics & Reporting Solution** that enables decision-makers to track sales, profits, customer behavior, and market performance using data-driven insights. This project integrates **Python, MySQL, and Power BI** to build an end-to-end solution.

## 2. Tools & Technologies Used

- **Python** → Used for Extract, Transform, and Load (ETL) process to clean and load raw data into MySQL. - **MySQL** → Relational database to store and query structured sales data. - **Pandas & SQLAlchemy** → For data cleaning and database connection. - **Power BI** → For data visualization and dashboard reporting. - **Dotenv** → To securely store database credentials in environment files.

## 3. Data Preparation & Cleaning

The raw dataset used is **Global Superstore Dataset**, which contains order-level details such as sales, profit, customers, products, and shipping details. Before loading into MySQL, the following steps were performed using Python: - Removed duplicate records using `drop_duplicates()` - Removed missing values using `dropna()` - Corrected data encoding issues (`latin1` encoding) - Loaded clean dataset into MySQL using `to_sql()` function This ensured the dataset was clean, consistent, and ready for analysis.

## 4. Database Design & Loading Process

- Database Name: **analytics** - Table Name: **superstore** - Data loaded from CSV into MySQL using Python & SQLAlchemy. - Each column (Order ID, Customer ID, Sales, Profit, Category, etc.) was properly structured for queries. This allows Power BI to connect directly to the MySQL database for live reporting.

## 5. Dashboard Design

**Page 1: Executive Overview** - KPI Cards: Total Sales, Total Profit, Profit Margin - Sales by Region (Map) - Sales Trend over Time (Line Chart) - Profit by Segment (Bar Chart) - Category Sales Breakdown (Tree Map) This page provides a quick business summary for management.

**Page 2: Market & Category Analysis** - KPIs: Total Sales, Total Profit, Profit Margin - Best Market by Sales (Bar Chart) - Top Category by Profit (Tree Map) - Lowest Margin Sub-Category (Bar Chart) - Sales & Profit Trend by Category (Line Chart) Helps compare performance across markets, categories, and sub-categories.

**Page 3: Customer Analysis** - KPIs: Total Customers, Top Customer Sales, Average Order Value - Sales by Customer Segment (Bar Chart) - Top 10 Customers by Sales (Table/Bar Chart) - Sales vs Profit (Scatter Plot – Customer View) Provides insights into customer behavior and profitability.

**Page 4: Product & Shipping Analysis** - KPIs: Total Orders, Top Product by Sales, Average Shipping Days - Sales by Product Category (Bar Chart) - Top 10 Products by Profit (Table/Bar Chart) - Shipping Mode Impact on Profit (Column Chart) Focuses on product-level and shipping

efficiency insights.

## 6. Key Insights & Results

- Technology category generated the highest sales, while Furniture lagged behind in profitability.
- Consumer Segment contributed the maximum revenue, while Corporate had higher profit margins.
- The US and APAC regions performed strongly, while Africa showed lower margins.
- Certain customers and products caused losses, highlighting the need for better discount policies.
- Standard Class shipping dominated, but Express Shipping showed better profit efficiency.

## 7. Conclusion & Future Scope

The project successfully built a **complete analytics pipeline**: from raw data cleaning (Python), to structured storage (MySQL), and final visualization (Power BI dashboards). This solution enables stakeholders to make data-driven decisions, track KPIs, and identify areas for improvement.

**Future Enhancements:**

- Automating ETL pipeline using Airflow or Prefect
- Adding predictive analytics (e.g., forecasting sales)
- Enabling role-based dashboards for sales managers, executives, and supply chain teams