PROJECT PROPOSAL: DATACO SUPPLY CHAIN ANALYTICS USING SQL SERVER DATA WAREHOUSING AND POWER BI

Project Description

This project focuses on optimizing DataCo Global's supply chain operations by building a complete SQL Server data warehouse (Bronze, Silver, Gold layers) and developing Power BI dashboards for interactive supply chain insights. The dataset (2015-2018 orders) includes order details, shipping dates, costs, delivery performance, customer attributes, and product department information.

The goal is to provide a reliable, structured warehouse and powerful BI reporting that improves delivery performance, reduces costs, strengthens regional insights, and supports strategic decisions.

All insights and KPIs are fully extractable from the provided datasets.

Group Members and Roles

- **Saleem Khaled:**
  - **Responsibilities:** Data ingestion, Bronze layer development, initialization steps, staging, data quality checks, SQL Server optimization.
- **Abdelrahman Mohamed:**
  - **Responsibilities:** Silver layer development, including data cleaning, standardization, deduplication, and applying business rules.
- **Mohamed Mostafa:**
  - **Responsibilities:** Gold layer building, data modeling (star schema), fact and dimension tables, translating business requirements into KPIs, DAX measures, Power BI modeling, and creating analytical narratives.
- **Mohamed Sameer:**
  - **Responsibilities:** Power BI data model design, visual layouts, dashboard interactions, report performance optimization, and creating stakeholder-ready dashboards.

Team Leader

Saleem Khaled

Objectives (mapped clearly to each team member)

The following objectives match the roles and responsibilities to maintain consistency across the document:

- **Build a complete SQL Server data warehouse (Bronze, Silver, Gold layers).**
  - **Saleem:** Bronze layer ingestion, raw structured staging, initialization, quality handling.
  - **Abdelrahman:** Silver layer transformations and business logic application.
  - **Mohamed Mostafa:** Gold layer development, star schema modeling, and creation of final analytical tables for BI.

- **Improve delivery performance by analyzing shipping delays, regions, and shipping modes.**
    - **Mohamed Mostafa:** Convert delivery KPIs into actionable DAX metrics.
    - **Mohamed Sameer:** Visualize delivery performance via Power BI dashboards.
- **Optimize shipping and operational costs using order item shipping cost and delivery patterns.**
    - **Mohamed Mostafa:** Build cost-related fact tables in the Gold layer and develop cost-efficiency KPIs in Power BI.
    - **Mohamed Sameer:** Create cost comparison dashboards.
- **Enhance regional, product, and customer insights using structured supply chain data.**
    - **Saleem:** Ensure raw geographic, product, and customer data is loaded cleanly in Bronze.
    - **Abdelrahman:** Build regional and product dimensions in the Silver layer.
    - **Mohamed Mostafa:** Finalize dimensions and build aggregated fact tables in the Gold layer.
    - **Mohamed Sameer + Mohamed Mostafa:** Power BI analytics and drill-down visuals.
- **Enable dynamic, executive-level reporting via interactive Power BI dashboards.**
    - **Mohamed Sameer:** Dashboard development.
    - **Mohamed Mostafa:** KPI logic, performance analysis, and providing clean star schema tables (Gold layer) to power the BI model.
    - **Abdelrahman:** Provide clean, structured tables from the Silver layer.
    - **Saleem:** Maintain reliable data ingestion that keeps dashboards accurate.

Tools and Technologies

- SQL Server (for Bronze, Silver, Gold layers)
- Power BI (data modeling, DAX, dashboards)
- SQL (analysis, transformations)
- Excel / python (optional for light data checks if needed)

Milestones and Deadlines

- **Week 1–2: Data Ingestion and Bronze Layer**
    - **Saleem:** SQL Server setup, Bronze layer ingestion, raw data structure, basic cleaning rules.
    - **Abdelrahman:** Initial SQL validations to prepare for Silver layer.
- **Week 3–4: Silver and Gold Layers + Data Warehouse Modeling**
    - **Abdelrahman:** Silver layer transformations (cleaning, standardization, deduplication, business rules).
    - **Mohamed Mostafa:** Gold layer star schema development (fact and dimension tables for orders, shipping, cost, delivery, products, customers).
    - **Saleem:** Performance tuning, incremental load adjustments.
- **Week 5–6: Power BI Data Modeling and KPI Development**
    - **Mohamed Mostafa:** DAX KPIs (On-Time Delivery, Avg Shipping Cost, Order Cycle Time) and Power BI data model setup.
    - **Mohamed Sameer:** Power BI model relationships, field parameters, drill-through logic.

- **Week 7–8: Dashboard Development, Testing, and Presentation**
    - **Mohamed Sameer:** Final dashboard build (Delivery, Cost, Regional, Customer).
    - **Mohamed Mostafa:** Insights, business narrative, and final data validation from the Gold layer.
    - **Abdelrahman + Saleem:** Final data validation from Silver and Bronze layers.

Supply Chain KPIs

All KPIs confirmed to be extractable from the dataset.

- **Delivery and Performance KPIs**
    - On-Time Delivery Rate
    - Late Delivery Rate
    - Order Fulfillment Cycle Time
    - Delivery Risk by Product/Region
    - Shipping Mode Efficiency
- **Cost KPIs**
    - Average Shipping Cost per Order
    - Total Shipping Cost by Region
    - Profit per Order
    - Cost vs. Delivery Time Correlation
- **Operational/Regional KPIs**
    - Late Deliveries by Country/Region
    - Sales and Profit by Department
    - Order Status Breakdown (Complete, Pending, Canceled, Fraud)
- **Customer KPIs**
    - On-Time Delivery by Customer Segment
    - High-Value Customer Impact from Delays
    - Customer Geographic Distribution Impact on delays and shipping cost