Sales and Orders Analysis for AWTADE

(A Data-Driven Approach to Sales & Inventory Optimization)

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Tools & Technologies Used:

SQL | Python | Tableau

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1. Project Planning & Management

Project Proposal

Overview of the project

The "Sales and Orders Analysis" project for AWTADE (Arab World Trading and Distribution EST), a food products distribution company, focuses on optimizing sales and inventory operations. AWTADE procures goods from major manufacturers and suppliers, distributing them to wholesale traders across designated regions. This project aims to extract, clean, and analyze sales and inventory data to generate actionable insights that improve decision-making, enhance operational efficiency, and drive business growth. By leveraging data analysis, the project will help identify key performance indicators, reduce inefficiencies in order fulfillment, and enhance sales forecasting, ultimately leading to more informed business strategies.

Objectives

- **Increase Sales Performance:** Analyze sales trends and customer purchasing behavior to optimize revenue growth by at least 10% through data-driven marketing strategies.
- **Enhance Inventory Management:** Monitor stock movements and demand fluctuations to reduce overstocking and minimize shortages by 15%.
- **Improve Order Fulfillment Efficiency:** Track approval rates, supervisor decisions, and delivery performance to achieve a 95% on-time delivery rate.
- **Enable Real-Time Data Insights:** Develop interactive Tableau dashboards that provide real-time analytics, reducing manual reporting efforts by 50%.
- **Strengthen Data-Driven Decision Making:** Provide stakeholders with actionable insights to optimize sales strategies, resource allocation, and inventory planning, improving operational efficiency by 20%.

Scope

- Extract and analyze data from AwtadSonicData using SQL, including sales transactions, inventory logs, and customer purchasing behavior.
- Clean and preprocess data using Python scripts to ensure accuracy and consistency.
- Visualize findings using Tableau dashboards, enabling real-time tracking of key metrics such as order trends, approval rates, and inventory levels.

Project Plan

- Timeline (Gantt Chart)

Phase	Duration
Requirements Finalization through Stakeholder interviews, KPI definition	Week 1
Data Extraction (SQL)	Weeks 2-3
Data Cleaning (Python)	Week 4
Data Analysis (SQL)	Weeks 5
Visualization (Tableau)	Week 6

- Milestones and Deliverables:
  - **Milestone 1 (Week 3):** Completion of SQL queries for sales movement, customer orders.
    - *Deliverable:* Optimized SQL scripts to track stock levels, order processing.
  - **Milestone 2 (Week 4):** Development of Python scripts for data cleaning and extraction.
    - *Deliverable:* Automated data pipelines for transforming and standardizing raw sales and inventory data.
  - **Milestone 3 (Week 6):** Deployment of interactive Tableau dashboards for visualization.
    - *Deliverable:* Dynamic dashboards displaying key metrics such as sales trends, approval rates, and inventory insights.

▪ Task Assignment and Roles

Team Member	Role	Responsibilities
• Mahmoud Ali	Project Lead	Oversees project timeline, manages stakeholder communication, and ensures project milestones are met.
• Mahmoud Ali • Ahmed Abdel Qawy	SQL Development	Optimizes SQL queries for efficient data retrieval, ensures database efficiency, and maintains data integrity.
• May Mohamed ElMofty • Menna t-Allah Sayed	Python Development	Extracts, cleans, and processes data for analysis
• Mikhael Adel • Belal Farouk	Data Visualization	Develops interactive dashboards using Tableau, ensuring effective data representation and user-friendly visuals.

▪ Risk Assessment and Mitigation Plan

Risk	Impact	Mitigation Strategy
Inaccurate, incomplete, or inconsistent data can result in flawed analysis and misleading insights.	High	Implement automated data validation checks and conduct periodic audits.
Unauthorized access to sensitive sales, inventory, or customer data could lead to security incidents.	Critical	Enforce multi-factor authentication (MFA), encrypt sensitive data, and establish access controls.
Downtime in SQL servers, data warehouses, or Tableau	High	Set up automated failover mechanisms and schedule

dashboards could delay analysis and decision-making.		regular backups to ensure high availability.
Delays in data preparation, system integration, or dashboard development could extend the project timeline.	Medium	Implement iterative project management methodologies and monitor progress through dashboards.
End-users may face challenges in interpreting Tableau dashboards, reducing the effectiveness of insights.	Medium	Conduct user training sessions and gather feedback for iterative dashboard improvements.

▪ KPIs (Key Performance Indicators)

Metric	Target
Data accuracy after cleaning	≥ 98%
SQL query response time	≤ 3 seconds for complex queries
Tableau dashboard load time	≤ 5 seconds for all visualizations
Percentage of project milestones achieved on time	≥ 95%
Time taken to complete data extraction and cleaning phases	Tracked and optimized weekly
Customer satisfaction score on data analysis insights	≥ 4.7/5
Number of actionable insights derived from analysis	Tracked and reported monthly

2. Requirements Gathering

▪ Stakeholder Analysis

AWTADE (Arab World Trading and Distribution EST.)

Engaging with key departments including Sales, Warehouse Management, and Human Resources to ensure smooth and efficient operations across departments.

Stakeholder	Role	Needs and Expectations
Executive Leadership	Strategic decision-makers	High-level insights into sales performance and trends
Sales and Marketing Teams	Analyze customer behavior and sales performance	Detailed sales reports and customer behavior analysis
Inventory and Logistics	Manage stock and supply chain efficiency	Real-time inventory tracking and demand forecasting

▪ User Stories and Use Cases

1. How many orders have been received each month?
2. What is the number of approved and disapproved orders?
3. Which supervisors have orders that were not approved?
4. How well do delivery representatives match their targeted vs. actual deliveries?
5. What is the total transaction volume of each customer per month?
6. Which employee has placed the most orders?
7. Which product has the highest sales?
8. Which product generates the highest profit?
9. Which customer has placed the most orders?
10. Which customer has the highest outstanding debt?
11. What is the total sales revenue?
12. What is the total amount spent on purchases?

Functional Requirements

The system is designed using SQL, Python, and Tableau to deliver the following functionalities:

- Extract sales, orders, and inventory data using SQL.
- Use Python to clean and standardize data.
- Provide interactive dashboards using Tableau.
- Allow export of reports in CSV, PDF, and Excel formats.
- Track and log system performance metrics.

Non-functional Requirements

- Collaboration and stakeholder engagement, where a meeting was conducted with the company manager to align project requirements with business needs.
- Implement data backup and recovery protocols.

3. System Analysis and Design

▪ Problem Statement and Objectives

AWTADE (Arab World Trading and Distribution EST) faces operational inefficiencies due to the lack of data-driven insights into sales performance, inventory management, and order fulfillment. Without a structured approach to analyzing sales trends, customer purchasing behavior, and delivery performance, the company struggles with demand forecasting, stock optimization, and resource allocation. This results in delays, increased costs, and missed revenue opportunities.

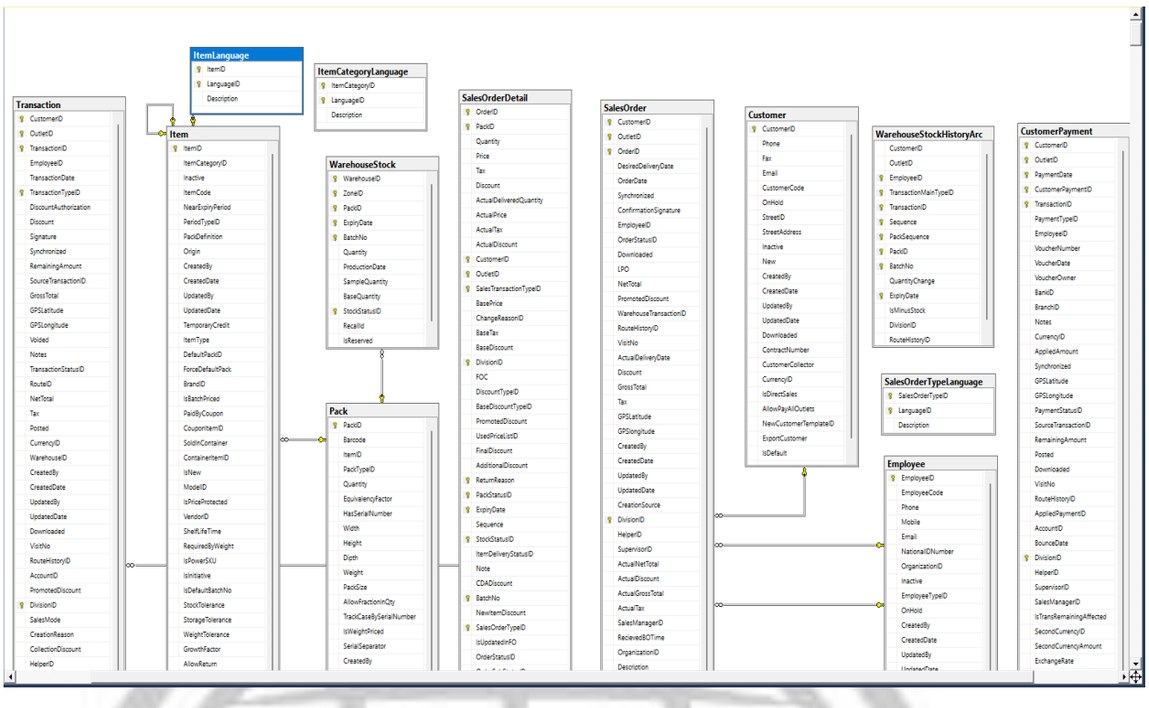
To address these challenges, an advanced analytics system is required to extract, clean, and visualize key business data for more informed decision-making.

Objectives:

- **Enhance Sales Analysis:** Identify patterns in sales performance and customer purchasing behavior to optimize revenue growth and market strategy.
- **Improve Inventory Management:** Track stock movement and demand fluctuations to reduce overstocking and minimize shortages.
- **Optimize Order Fulfillment:** Monitor approval rates, supervisor decisions, and delivery performance to enhance logistics efficiency.
- **Implement Real-Time Data Insights:** Develop interactive Tableau dashboards for real-time visualization of sales, inventory, and operational performance.
- **Strengthen Decision-Making:** Provide stakeholders with actionable insights to improve sales strategies, inventory planning, and overall business operations.

The company faces challenges in tracking order fulfillment, approval trends, and delivery efficiency. This project aims to provide a comprehensive reporting system using SQL, Python, and Tableau.

Database Design and Data Modeling



Data Flow and System Behavior

Logical and Physical Schema

- *Tables*: WarehouseStockHistoryArc, WarehouseStock, Pack, Item, ItemCategoryLanguage, Transaction, CustomerPayment, Customer, SalesOrder, OrderStatusLanguage, SalesOrderDetail, Employee, ItemLanguage.

UI/UX Design and Prototyping

Branding and Theme: The UI design incorporates the AWTADE logo along with its five dominant colors and corresponding HEX codes:

- **Dark Gray/Black:** #1d1d1b
- **Muted Blue:** #5a7686
- **White:** #ffffff
- **Light Gray:** #bcc3c7
- **Deep Blue:** #294456