WideWorldImporters

Data Analysis Project

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1. Project Planning & Management

1.1 Project Overview

This project utilizes the **WideWorldImporters** database to generate actionable insights in the domains of **Sales, HR, Supply Chain, and Marketing**. The primary objective is to enhance **decision-making** through structured data analysis and visualization.

1.2 Objectives

- Provide **data-driven insights** for improved business decisions.
- Develop interactive **dashboards** and **reports** using SQL Server, Power BI, Python, and Excel.
- Ensure **data integrity** and optimize analytical methodologies.

1.3 Project Scope

- Exclusive focus on **data analysis methodologies**.
- Use of **SQL Server** for data extraction.
- **Python and Excel** for data processing.
- **Power BI** for dashboard creation and visualization.

1.4 Project Timeline

Week	Task
1	Database familiarization & task assignments
2	Data extraction & initial cleaning
3	Exploratory Data Analysis (EDA)
4	Dashboard design in Power BI
5	Insights refinement & dashboard usability testing
6	Drafting documentation
7	Final reporting & recommendations
8	Presentation preparation & submission

1.5 Task Assignments & Roles

- **AbdelRahman AbdelMoez Anwar** – Data Visualization (Power BI), Business Insights.
- **Fatma Ali Khaled** – Data Cleaning & Processing (Python, Excel).
- **Youssef Mohamed Farag** – SQL-based Data Extraction.
- **Noha Soliman Mohamed** – Documentation & Presentation Preparation.

1.6 Risk Assessment & Mitigation Plan

Risk	Mitigation Strategy
Data Integrity Issues	Use **robust cleaning techniques** in Python (Pandas) & SQL validations.
Time Constraints	Adhere to timeline & conduct **regular progress reviews**.
Visualization Complexity	Focus dashboards on **Key Performance Indicators (KPIs)** for clarity.

1.7 Key Performance Indicators (KPIs)

- **Sales:** Revenue growth, best-selling products, customer retention rate.
- **HR:** Employee turnover rate, performance analysis.
- **Supply Chain:** Inventory turnover, supplier efficiency.
- **Marketing:** Campaign effectiveness, customer acquisition cost.

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2. Literature Review

2.1 Feedback & Evaluation

- **Strengths:** Effective SQL queries and interactive dashboards.
- **Areas for Improvement:** Enhanced data cleaning techniques, deeper narrative insights.

2.2 Suggested Improvements

- **Advanced Analytics:** Implement predictive modeling.
- **Enhanced Dashboards:** Add interactive filters & drill-down capabilities.
- **Improved Documentation:** Provide in-depth business impact explanations.

2.3 Grading Criteria

- **Documentation:** Clarity, structure, and reporting depth.
- **Implementation:** Effective SQL, Python, and Power BI utilization.
- **Testing:** Accuracy in extraction, cleaning, and visualization.

- **Presentation:** Delivery quality, storytelling, and stakeholder relevance.

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3. Requirements Gathering

3.1 Stakeholder Analysis

- **Sales Managers** – Revenue trends & product distribution.
- **HR Specialists** – Employee turnover & retention strategies.
- **Supply Chain Teams** – Supplier reliability & inventory management.
- **Marketing Executives** – Campaign performance & customer acquisition costs.

3.2 Functional & Non-Functional Requirements

Type	Requirements
Functional	Data Extraction (SQL), Data Cleaning (Python, Excel), Visualization (Power BI), Reporting (Excel).
Non-Functional	Performance (fast report generation), Security (restricted access), Usability (user-friendly UI).

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4. System Analysis & Design

4.1 System Architecture

- **Backend:** SQL Server for data storage & querying.
- **Processing:** Python (Pandas, Matplotlib, Seaborn) for data manipulation.
- **Visualization:** Power BI for interactive dashboards.
- **Reporting:** Excel for detailed insights.

4.2 Data Flow & System Behavior

1. **Data Extraction** – Retrieve raw data using SQL.
2. **Data Cleaning** – Apply preprocessing using Python & Excel.
3. **Data Analysis** – Perform trend analysis & derive insights.
4. **Visualization & Reporting** – Develop dashboards & generate reports.

4.3 UI/UX Design Principles

- **Consistency:** Standardized color schemes & typography.
- **Accessibility:** Intuitive navigation & tooltips.
- **Interactivity:** Drill-down capabilities & filters.

4.4 Deployment Strategy

- **Hosting:** Power BI Service for dashboards, scheduled SQL & Python scripts.
- **Security Measures:** User-based access restrictions.

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5. Data Analysis Track

5.1 Data Cleaning & Preprocessing

- Handle missing values using **imputation techniques**.
- Remove duplicates using **SQL DISTINCT** and **Pandas drop_duplicates()**.
- Standardize data formats (dates, currencies).

5.2 Exploratory Data Analysis (EDA)

- **Sales:** Top products, revenue trends.
- **HR:** Employee retention, salary distributions.
- **Supply Chain:** Supplier efficiency, inventory turnover.
- **Marketing:** Campaign performance & customer insights.

5.3 Data Visualization & Reporting

- Develop **interactive Power BI dashboards**.

- Create **Excel reports** with pivot tables & charts.

5.4 System Deployment & Automation

- Schedule **SQL queries** and **Python scripts** for real-time data updates.
- Secure **dashboard access** for stakeholders.

5.5 Final Deliverables

- **Executive Summary Report** – Key insights & business recommendations.
- **Stakeholder Presentation** – Storytelling through data visualizations.

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6. Conclusion

This project provides a structured approach for **analyzing WideWorldImporters data** using industry-standard tools. The combination of **SQL, Python, Power BI, and Excel** ensures data integrity and enables effective decision-making in **Sales, HR, Supply Chain, and Marketing**. The insights generated will help stakeholders optimize business strategies and drive growth.

GitHub Link: https://github.com/abdelrahmanabdelmoez/DEPI-Graduation-Project/blob/main/WideWorldImporters%20Data%20Analysis%20Project.pdf