Project Outline

Business Intelligence Course

Due Date: 1404/10/28

Project Title

Design and Development of a Business Intelligence Dashboard for Pharmaceutical Sales

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1. Project Overview

The objective of this midterm project is to enable students to apply core concepts of **Business Intelligence**, **data modeling**, and **analytical visualization** in a practical and realistic business environment. In this project, students are required to design and implement an **interactive Power BI dashboard** for a pharmaceutical company's sales data covering a period of **three years**.

The company operates with **three distinct brands**, each offering multiple pharmaceutical products. Sales are conducted through a network of distributors and pharmacies across various cities and provinces. The project emphasizes transforming raw transactional data into **meaningful, actionable insights** that can support strategic and managerial decision-making.

Students are expected to demonstrate their understanding of dimensional modeling, KPI definition, comparative analysis, and customer analytics using Power BI.

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2. Data Description and Model

The dataset provided for this project consists of several fact and dimension tables:

- **Fact Tables:**

  - Sales
  - Target
- **Dimension Tables:**

  - Calendar
  - Companies
  - Products
  - Pharmacies
  - Distributors
  - Cities
  - Provinces

The overall sales process follows this structure:

Products are supplied by distributors to pharmacies; sales occur at the pharmacy level, are recorded for each city, and are aggregated at the provincial level. The Calendar table is used to enable time-based analysis and comparisons.

Students are required to create an appropriate data model in Power BI with correct relationships between fact and dimension tables.

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3. Fact Tables Schema

3.1 Sales Table

- **SellDate:** Date on which the sale occurred
- **PharmacyId:** Identifier of the pharmacy
- **DistributorId:** Identifier of the distributor
- **ProductId:** Identifier of the product
- **CityID:** Identifier of the city
- **NumInPack:** Number of items in each product pack
- **SellPacks:** Number of packs sold
- **ResultPack:** Total number of items sold (NumInPack × SellPacks)

3.2 Target Table

- **Date:** Date associated with the target value
- **ProductId:** Identifier of the targeted product
- **CityID:** Identifier of the targeted city
- **TargetResultPack:** Target number of items to be sold

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4. Dashboard Structure and Analytical Requirements

The Power BI dashboard must contain **five main pages**, each designed with a clear analytical objective and appropriate visualizations.

Page 1: Sales Overview

Objective:

Provide a high-level overview of overall sales performance and product contribution.

Filters:

- Product
- Distributor
- Province
- Date

Required Visualizations:

- Total sales figures for each brand
- Sales trends over time (line chart)
- Sales breakdown by product category (bar or column chart)
- Comparison of actual sales versus target performance (gauge or bar chart)

Page 2: Provincial Sales Analysis

Objective:

Analyze geographical sales performance and identify regional patterns.

Required Visualizations:

- Map visualization showing sales distribution across provinces

- Sales trends over time by province
- Top-performing cities within each province (bar chart)

Page 3: Target vs. Sales Comparison

Objective:

Evaluate how actual sales compare with predefined company targets.

Required Visualizations:

- Time-based comparison of actual sales versus targets
- Deviation or variance analysis illustrating under- and over-performance
- Product-level performance against sales targets

Page 4: Customer Analysis

Objective:

Examine customer behavior and retention dynamics.

Required Visualizations:

- Distribution of customer types (new, returning, lost)
- Trends in customer acquisition and retention over time
- Analysis of key factors influencing customer retention (e.g., purchase frequency, product category, distributor)

Page 5: Customer Details

Objective:

Provide detailed insights at the individual customer (pharmacy) level.

Required Visualizations:

- Customer type breakdown
- Sales volume by customer
- Customer purchase history and product preferences

5. Use of AI‑Driven Analysis

In addition to traditional BI visualizations, this project incorporates **AI‑assisted analytical features available within Power BI**, specifically the **Key Influencers visual**.

The Key Influencers tool will be used to analyze and identify the most significant factors affecting:

- High sales performance
- Customer retention
- Achievement of sales targets

This AI‑driven analysis will be primarily applied on the **Customer Analysis** page to evaluate the impact of variables such as product category, distributor, and geographic location on business outcomes. The use of built‑in AI ensures transparency, interpretability, and suitability for students at an introductory to intermediate level, while enriching the analytical depth of the project.

All insights generated through AI tools must be critically evaluated and interpreted by the student.

6. AI Tools and Academic Integrity (Honor Code)

Students are permitted and encouraged to use AI tools to assist in data analysis, visualization design, and insight generation. However, all submitted work must be **original**, and students are fully responsible for understanding and explaining the results presented.

Consultation with peers, teaching assistants, and the instructor is allowed. Any form of copying, duplication, or misrepresentation of work violates the course Honor Code and will be handled according to university regulations.