**Northwind Sales Dashboard Documentation**

**Project Overview**

This project provides a comprehensive sales analysis dashboard for the **Northwind** database using **Power BI**. The dashboard covers essential business metrics, including revenue, customer insights, product performance, employee contributions, and shipping performance. This documentation provides a detailed breakdown of each report page, metrics, and data preparation steps.

**Table of Contents**

1. Database Setup
2. Data Preparation
3. Dashboard Pages Overview
4. Metrics and Visualizations
5. File Descriptions
6. Usage Instructions

**1. Database Setup**

To replicate the data used in the Power BI dashboard, you'll need to restore the Northwind database and run the provided SQL script.

**Steps to Restore the Database**

1. **Download Northwind.bak**:
   * The backup file Northwind.bak is located in the database folder in this repository.
2. **Restore the Database in SQL Server**:
   * Open SQL Server Management Studio (SSMS).
   * Right-click on **Databases** > **Restore Database…**.
   * Choose **Device** and select Northwind.bak.
   * Follow the prompts to restore the database.
3. **Run the SQL Script**:
   * Open the file NorthwindDataQueries.sql in SSMS.
   * Execute the script to create views or tables that will be used in the Power BI dashboard.

**2. Data Preparation**

The SQL script (NorthwindDataQueries.sql) contains all the necessary data transformation queries. These queries are designed to aggregate data, join tables, and prepare views for Power BI.

**Key Queries in NorthwindDataQueries.sql:**

1. **Employee Data with Average Salary**:
   * Fetches employee details, including their names, department, address, and compares each salary with the overall average.
2. **Dependents per Employee**:
   * Counts the number of dependents each employee has.
3. **Supervisor Summary**:
   * Lists supervisors, including their details, and calculates the number of employees under each.

These queries ensure data consistency and prepare it for effective visualization in Power BI.

**3. Dashboard Pages Overview**

The dashboard consists of the following report pages, each with distinct metrics and visuals.

**1. Overview Report**

* **Purpose**: High-level summary of key business metrics.
* **Key Metrics**:
  + **Order Count**: Total orders placed.
  + **Customer Count**: Unique customers served.
  + **Net Sales**: Total revenue.
  + **Average Days to Ship**: Average time taken to ship orders.
* **Visuals**: Bar chart (Net Sales by CustomerID), Monthly trend (Net Sales by Month), Map (Sales distribution by Country and City).

**2. Revenue Report**

* **Purpose**: Detailed analysis of revenue and profitability.
* **Key Metrics**:
  + **Net Sales**: Total sales revenue.
  + **Net Profit**: Profit after expenses.
  + **Total Discounts**: Sum of discounts provided.
* **Visuals**: Top 5 countries by sales, sales/profit/discounts over time, discounts by country.

**3. Customers Report**

* **Purpose**: Analyzes customer demographics and purchasing behavior.
* **Key Metrics**:
  + **Avg. Net Sales per Customer**: Revenue per customer.
  + **New vs. Repeat Customers**: Insights into customer loyalty.
* **Visuals**: Customer count by country and year, count of new vs. repeat customers.

**4. Products Report**

* **Purpose**: Overview of product performance and profitability.
* **Key Metrics**:
  + **Net Sales by Product**: Revenue per product.
  + **Profitability by Category**: Profitability of each product category.
* **Visuals**: Top 5 products by revenue, category comparison.

**5. Product Performance Report**

* **Purpose**: Year-over-year product sales and net profit analysis.
* **Visuals**: Matrix for YOY performance, profitability analysis.

**6. Employee Report**

* **Purpose**: Employee performance overview based on sales.
* **Key Metrics**:
  + **Net Sales per Employee**: Total sales by each employee.
  + **Order Count per Employee**: Number of orders handled by each employee.
* **Visuals**: Sales by employee, order delays by employee.

**7. Shippers Report**

* **Purpose**: Analyzes shipping costs and performance.
* **Key Metrics**:
  + **Shipping Cost per Order**: Cost incurred for each order.
  + **On-Time Delivery Rate**: Percentage of orders delivered on time.
* **Visuals**: Shipping costs by country, shipping company performance.

**4. Metrics and Visualizations**

This section details each metric and visualization used in the dashboard.

**Metrics**

1. **Order Count**: Total orders processed (Overview).
2. **Customer Count**: Total unique customers (Overview).
3. **Net Sales**: Revenue generated from sales (Revenue, Products, Overview).
4. **Net Profit**: Total profit calculated from net sales (Revenue, Products).
5. **Total Discounts**: Discounts given across orders (Revenue).
6. **Average Days to Ship**: Average shipping duration per order (Shippers).
7. **New vs. Repeat Customers**: Identifies customer retention and loyalty (Customers).

**Visualizations**

1. **Bar Charts**:
   * Display metrics like Net Sales by CustomerID, top products by revenue, etc.
2. **Maps**:
   * Geographic distribution of sales by country and city.
3. **Matrix Charts**:
   * Year-over-year comparison for products and categories.
4. **Line and Area Charts**:
   * Monthly trends for revenue, profit, and discounts.
5. **Pie and Donut Charts**:
   * Percentage breakdowns, e.g., new vs. repeat customers.

**5. File Descriptions**

| **File Name** | **Description** |
| --- | --- |
| **NorthwindSalesDashboard.pbix** | Power BI file containing all dashboard pages and visuals. |
| **database/Northwind.bak** | SQL Server backup of the Northwind database used for analysis. |
| **NorthwindDataQueries.sql** | SQL script with data preparation queries. |
| **Documentation.md** | This documentation file detailing project structure, pages, and metrics. |
| **images/** | Folder containing screenshots of each dashboard page. |

**6. Usage Instructions**

**Prerequisites**

* **SQL Server**: Required to restore and host the Northwind database.
* **Power BI Desktop**: Necessary to open and interact with the .pbix file.

**Steps to Use the Dashboard**

1. **Restore the Database**:
   * Use Northwind.bak to restore the Northwind database in SQL Server.
2. **Run the SQL Script**:
   * Execute NorthwindDataQueries.sql to create views or tables needed for Power BI.
3. **Open the Power BI File**:
   * Open NorthwindSalesDashboard.pbix in Power BI Desktop.
   * Update the SQL Server connection if needed (Transform Data > Data Source Settings).
   * Refresh data to view the latest metrics.
4. **Navigate Dashboard Pages**:
   * Explore each page for insights into revenue, customer demographics, product performance, employee sales, and shipping metrics.

**Additional Notes**

* **Database Source**: This database was provided as part of a course, and may vary slightly from the public Northwind dataset. If you’re using a different version, ensure compatibility with the SQL script.
* **Power BI Features**: Certain visuals may require customizations if the SQL database structure differs. Adjust the data connections accordingly.

**End of Documentation**

This documentation should cover everything users need to set up and understand the Northwind Sales Dashboard.