

End-of-Course Capstone Project: Solving a Key Problem for Northwind Traders

Background

Northwind Traders is a growing supplier of gourmet food and beverage products. Recently, we've noticed uneven sales performance across product categories, customer groups, and regions. Additionally, our operational efficiency is being questioned due to delayed order deliveries and potential underperformance in product offerings. As part of the data analytics team, you are tasked with solving a **specific problem** to help Northwind Traders make data-driven decisions.

The Problem Statement

"Northwind Traders is experiencing a decline in profitability in recent quarters. Management believes that inefficiencies in product sales performance, customer management, and regional marketing strategies are key contributors. Your task is to analyze sales trends, customer behaviors, and operational bottlenecks using the company's historical data and provide actionable recommendations to boost profitability."

You will work on the following objectives:

1. **Identify Underperforming Products and Categories:**
 - Pinpoint products or categories contributing the least to overall revenue.
 - Analyze trends in product sales over time to determine if certain products are losing popularity.
2. **Assess Customer Value and Retention:**
 - Identify the top 20% of customers driving the most revenue using the **Pareto Principle**.
 - Analyze purchasing patterns to identify inactive customers and propose strategies to re-engage them.
3. **Regional Performance Analysis:**
 - Compare sales performance across regions to identify markets with the highest and lowest revenue generation.
 - Highlight regions with declining growth and suggest targeted marketing strategies.
4. **Operational Efficiency in Fulfillment:**
 - Investigate order delivery times and identify any bottlenecks causing delays.
 - Assess how discounts and promotions impact order fulfillment rates and profit margins.
5. **Impact of freight cost on Profitability:**
 - Determine if freight cost really impacts sales and profitability
 - Recommend an optimal freight strategy to maximize sales volume.

Project Deliverables

As a data analytics consultant, you will deliver the following:

1. **SQL Queries:**

- Write SQL scripts to extract relevant data for each of the objectives. This includes:
 - Sales data by product, category, region, and time.
 - Customer purchase patterns and order history.
 - Operational data on order fulfillment and delivery times.
- Save your queries in a .sql file with appropriate comments.

2. **Python Analysis:**

- Clean and preprocess the extracted data for deeper analysis.
- Perform customer segmentation and operational analysis.
- Use Python to generate key insights, including visualizations (e.g., sales trends, product performance graphs).
- Share your code as a github Gist link.

3. **Power BI Dashboard:**

- Create an interactive dashboard that highlights:
 - Sales trends over time (monthly/quarterly/annual).
 - Regional sales performance with a heatmap or bar chart.
 - Top-performing products and customers.
 - KPIs for delivery times and freight impacts.
- Save your work in a .pbix file.

4. **Executive Summary:**

- Write a one-page summary of your findings and recommendations for Northwind management. The summary should include actionable steps for improving profitability.
- Prepare a 3-5 page slide discussing your findings. Your slide should be informative, graphical and not wordy.

Submission Guidelines

- **Deadline:** The project is due on **December 8, 2024, at 11:59 PM**.
- **Submission Location:** Upload the project files to the **Capstone Projects** tab on the portal.
- **File Format:** Compress your deliverables into a ZIP file named Capstone_FirstName_LastName.zip. The ZIP file should contain:

1. A .sql file with your SQL scripts.
2. A .pbix Power BI file.
3. A Gist link for your Python code.
4. A powerpoint or canva slide

Key Tables to Use in the Northwind Database

- **Orders:** For tracking sales transactions.
- **Order Details:** For product-level details within orders.
- **Products:** For product names, categories, and prices.
- **Customers:** For customer information and segmentation.
- **Shippers:** For operational insights related to delivery.
- **Region/Territories:** For regional performance insights.

Evaluation Criteria

Your work will be assessed on:

1. **Relevance and Accuracy of Insights:**
 - How well do your findings address the problem statement?
 - Are your recommendations actionable and justified by data?
2. **SQL and Python Quality:**
 - Are the SQL queries efficient and accurate?
 - Is the Python code clean, well-documented, and effectively visualized?
3. **Dashboard Design:**
 - Is the Power BI dashboard visually compelling and easy to interpret?
 - Do the visualizations align with the problem's objectives?
4. **Professionalism:**
 - Is the final submission well-organized, informative and polished?

Final Note

This capstone project constitutes **50% of your total course assessment**. The exam you have already completed accounts for the remaining **50%**.

If you fail to complete this project, your final course assessment score will be calculated as **50% of your exam score**, effectively halving your potential final grade. This emphasizes the

importance of completing and submitting this project on time to demonstrate your skills and secure a strong final grade.

Take this as an opportunity to showcase your abilities and commitment to applying the knowledge you've gained throughout the course. Good luck!