Financial Data Analysis

Project Overview

This project focused on analyzing financial data to deliver real-time insights into key performance metrics and trends. The goal was to empower stakeholders with the tools needed to monitor and evaluate credit card operations efficiently and effectively.

I worked with two CSV datasets: **Credit Card Transactions** and **Customer Data.** The project involved designing a database, ingesting the CSV files, processing the data for insights, and visualizing results through dynamic Power BI dashboards.

Steps Taken to Achieve Project Goals

1. Data Integration and Storage:

- Designed relational database tables for structured storage of credit card transaction and customer data.
- Loaded the CSV files into the database using a Python script leveraging libraries like **pandas** and **SQLAlchemy** for seamless data insertion.
- Verified the integrity of imported data to ensure consistency and reliability.

2. Data Processing and Transformation:

- Cleaned and processed the data to extract meaningful insights.
- Segmented customers into **age groups** and **income groups** for targeted analysis.
- Calculated key financial metrics such as **revenues, interest earned, transaction amounts,** and **activation/delinquency rates.**
- Applied business logic to identify trends and generate actionable insights.

3. Data Visualization with Power BI:

- Connected the database to Power BI to create real-time, interactive dashboards.

- Used **DAX queries** in Power BI for advanced calculations and dynamic measures.
- Designed two comprehensive dashboards:
    - **Credit Card Dashboard:** Focused on transaction-level metrics and revenue analysis.
    - **Customer Dashboard:** Highlighted customer demographics, behavior, and contribution to key metrics.

Key Insights Delivered

The dashboards provided a clear overview of performance, highlighting the following metrics:

1. **Overall Metrics:**
    - Total Revenue: **$57M**
    - Total Interest Earned: **$8M**
    - Total Transaction Amount: **$46M**
2. **Demographic Insights:**
    - Male customers contributed **$31M** in revenue, while female customers contributed **$26M.**
    - **Blue** and **Silver credit cards** accounted for **93%** of all transactions.
    - **Texas, New York,** and **California** generated **68%** of total revenue.
3. **Customer Engagement and Risk:**
    - Activation Rate: **57%** (Percentage of customers actively using their credit cards).
    - Delinquency Rate: **6.06%** (Percentage of customers with overdue payments).

4. **Credit Card Trends:**
    - Revenue and transaction amounts were heavily skewed toward **Blue** and **Silver cardholders.**
    - High-value transactions were predominantly from the top **three states** (Texas, New York, California).

Business Value

This project delivered a wealth of actionable insights:

- **Enhanced Decision-Making:** The dashboards provided stakeholders with a clear and real-time view of financial and customer metrics, enabling informed decisions.
- **Targeted Marketing and Risk Management:** Segmentation by age, income, and geography helped in identifying high-value customers and mitigating risk in high-delinquency segments.
- **Operational Efficiency:** Insights into activation and delinquency rates supported strategies for improving customer engagement and reducing defaults.
- **Revenue Optimization:** Identification of top-performing credit cards and high-revenue regions allowed for tailored promotional campaigns to drive growth.

Conclusion

This financial data analysis project successfully combined Python-based data engineering and Power BI visualization to offer stakeholders a comprehensive view of credit card operations. The insights derived from the dashboards not only highlighted performance trends but also provided a foundation for strategies to enhance revenue, manage risk, and improve customer satisfaction.

With a focus on real-time monitoring and dynamic reporting, this project demonstrated the value of combining data engineering and analytics to drive business outcomes in the financial sector.