Credit Card Transaction Analysis

Project Objective

The objective is to analyze credit card financial data and develop transaction and customer analysis dashboards that provide real-time insights into key performance metrics and trends. These dashboards enable stakeholders to monitor and optimize credit card operations, make data-driven decisions, and identify opportunities for growth and enhanced customer engagement.

Project Summary

Analyzed weekly credit card data and developed transaction and customer dashboards. Data was loaded into an SQL database and imported into Power BI Desktop to derive actionable insights. The dataset included features such as transaction amounts, interest earned, card categories, utilization ratios, customer demographics, and income details. The Transaction Analysis Dashboard highlights spending trends, transaction types, revenue by categories, and revenue growth, while the Customer Analysis Dashboard explores customer behavior and transaction patterns. Streamlined data processing and analysis enable efficient monitoring of key performance metrics and trends, while dashboard findings offer practical recommendations to enhance decision-making processes.

Key Features:

1. Data Integration:

- Consolidated credit card transaction and customer data stored in an SQL database.
- Data imported into Power BI Desktop for advanced visualization and analysis.

2. Metrics and Insights:

- **Transaction Analysis**: Total transaction amounts, number of transactions, and mode of transactions.
- **Customer Segmentation**: Spending behaviours across categories (e.g., groceries, travel, bills and entertainment).
- **Revenue Insights**: Revenue from different card types, customer job types and education levels, different age groups, and contributions from different customer groups, such as singles and married couples.
- **Utilization Trends**: Average credit utilization and spending trends over time.

3. Visualizations:

- Interactive dashboards with charts, graphs, and filters for detailed exploration.
- Week-over-week growth in revenue across all card types and expenditure types.
- Utilized tables to summarize detailed insights on revenue, transaction amounts, and interest earned.

Variable Description

- **client_Num** : A unique id assigned to each customer
- **customer_Age** : Age of customer
- **gender** : Customer's Gender
- **dependent_Count** : Number of dependents or individuals reliant on the primary cardholder
- **education_Level** : Highest level of education of the customer
- **marital_Status** : Marital status of customer
- **state_cd** : Code of state where customer resides in
- **zipcode** : Zipcode of state where customer resides in
- **car_Owner** : IF the customer owns a car or not (yes or no)
- **house_Owner** : IF the customer owns a house or not (yes or no)
- **personal_loan** : If the customer has personal loan or not (yes or no)
- **contact** : contact number of client
- **customer_Job** : Customer job type
- **income** : Income of customer
- **cust_Satisfaction_Score** : A metric that represents how satisfied a customer is with their experience using the credit card (between 1 to 5)
- **total_trans_amt :** The total amount spent or processed in transactions
- **total_revolving_bal** : Refers to the total balance that cardholders carry over from month to month without paying it in full
- **Avg_Utilization_Ratio :** The ratio of the average credit card balance to the total credit limit over a specific period and represents the proportion of the credit limit that a customer is using
- **Use_chip :** method used to complete the transaction
    1. **Swipe**: The transaction was completed by swiping the card

2. **Chip**: The transaction was processed using the card's EMV chip
3. **Online**: The transaction occurred in a digital or e-commerce environment

- **card_Category** : It is the type of card that the client used
    1. **Blue :** Entry-level card with basic features
    2. **Gold :** A mid-tier card offering better benefits than Blue
    3. **Silver :** Likely a step above Blue but below Gold
    4. **Platinum :** A premium card with higher credit limits and exclusive rewards
- **Week_Start_Date** : It is the date of the first day of each week of the year
- **Customer_Acq_Cost** : It is the amunt that went towards acquiring the client.
- **Exp_Type** : Refers to the expense type or category of the transaction
- **Interest_Earned** : It is the amount of interest that the company earned through the client’s card

SQL Query Used

1. Database Creation using sql

Query Editor | Query History

```sql
--- Step 1: Database Creation
CREATE DATABASE Credit_Card_Transactions

```

2. Credit Card detail and Customer table creation

Query Editor | Query History

```sql
--- Step 2: Create Credit Card Detail Table
CREATE TABLE Credit_Card_detail (
    Client_Num INT,
    Card_Category VARCHAR(20),
    Annual_Fees INT,
    Activation_30_Days INT,
    Customer_Acq_Cost INT,
    Week_Start_Date DATE,
    Week_Num VARCHAR(20),
    Qtr VARCHAR(10),
    current_year INT,
    Credit_Limit DECIMAL(10,2),
    Total_Revolving_Bal INT,
    Total_Trans_Amt INT,
    Total_Trans_Ct INT,
    Avg_Utilization_Ratio DECIMAL(10,3),
    Use_Chip VARCHAR(10),
    Exp_Type VARCHAR(50),
    Interest_Earned DECIMAL(10,3),
    Delinquent_Acc VARCHAR(5)
);
```

Query Editor | Query History

```sql
--- Step 2: Create Customer Detail Table

CREATE TABLE Customer_detail (
    Client_Num INT,
    Customer_Age INT,
    Gender VARCHAR(5),
    Dependent_Count INT,
    Education_Level VARCHAR(50),
    Marital_Status VARCHAR(20),
    State_cd VARCHAR(50),
    Zipcode VARCHAR(20),
    Car_Owner VARCHAR(5),
    House_Owner VARCHAR(5),
    Personal_Loan VARCHAR(5),
    Contact VARCHAR(50),
    Customer_Job VARCHAR(50),
    Income INT,
    Cust_Satisfaction_Score INT
);

```

3. Copy Data from csv file to sql

Query Editor | Query History

```sql
--- Step 3: Copy csv data into SQL

--- Copy Credit Card details

COPY Credit_Card_detail
FROM 'D:\Projects\Power Bi Projects\Credit Card Transactions Power bi Project\credit_card.csv'
DELIMITER ','
CSV HEADER;


--- Copy Customer details


COPY Customer_detail
FROM 'D:\Projects\Power Bi Projects\Credit Card Transactions Power bi Project\customer.csv'
DELIMITER ','
CSV HEADER;
```

4. Dataset first view

Query Editor | Query History

```
66  --- Dataset view
67  SELECT * FROM credit_card_detail
68  SELECT * FROM Customer_detail
69
```

5. Add data for week – 53

Query Editor | Query History

```
71  --- Add data for week - 53
72  COPY Credit_Card_detail
73  FROM 'D:\Projects\Power Bi Projects\Credit Card Transactions Power bi Project\cc_add.csv'
74  DELIMITER ','
75  CSV HEADER;
76
77  COPY Customer_detail
78  FROM 'D:\Projects\Power Bi Projects\Credit Card Transactions Power bi Project\cust_add.csv'
79  DELIMITER ','
80  CSV HEADER;
81
```

DAX used

1. Creating a new feature Age_group using DAX

```
Age_group = SWITCH(
    TRUE(),
    customer_detail[customer_age] < 30, "20-30",
    customer_detail[customer_age] >= 30 && customer_detail[customer_age]< 40,"30-40",
    customer_detail[customer_age] >= 40 && customer_detail[customer_age]< 50,"40-50",
    customer_detail[customer_age] >= 50 && customer_detail[customer_age]< 60,"50-60",
    customer_detail[customer_age] >=60 ,">60"
    )
```

2. Income_range feature creation

```
Income_range = SWITCH(
    TRUE(),
    customer_detail[income] < 80000 , "<80K",
    customer_detail[income] >= 80000 && customer_detail[income] < 160000, "80K-160K",
    customer_detail[income] >= 160000 && customer_detail[income]< 240000, "160K-240K"
    )
```

3. Creation of dimDate table using DAX

```
dimDate = CALENDARAUTO()

month = FORMAT(dimDate[Date],"mmmm")

month_number = MONTH(dimDate[Date])

week = "Week" & "-" & WEEKNUM(dimDate[Date])

week_number = WEEKNUM(dimDate[Date])

quarter = "Q" & FORMAT(dimDate[Date],"q")

quarter_num = FORMAT(dimDate[Date],"q")

current_year = YEAR(dimDate[Date])
```

4. Calculate revenue using DAX

```
revenue = credit_card_detail[total_trans_amt] + credit_card_detail[interest_earned] + credit_card_detail[annual_fees]
```

5. Calculate previous week revenue

```
previous_week_revenue = INT(CALCULATE(sum(credit_card_detail[revenue]),FILTER(ALL(dimDate),dimDate[week_number] =
MAX(dimDate[week_number])-1)))
```

6. Calculate Previous month revenue

```
previous_month_revenue = INT(CALCULATE(sum(credit_card_detail[revenue]),FILTER(ALL(dimDate),dimDate[month_number] =
MAX(dimDate[month_number])-1)))
```

7. Calculate week over week growth using DAX

```
wow_growth = SWITCH(
        TRUE(),
        ISBLANK([previous_week_revenue]),BLANK(),
        ISBLANK([total_revenue]),BLANK(),
        (([total_revenue]-[previous_week_revenue])/[previous_week_revenue])
        )
```

8. Calculate month over month growth using DAX

```
MoM Growth = SWITCH(
        TRUE(),
        ISBLANK([previous_month_revenue]),BLANK(),
        ISBLANK([total_revenue]),BLANK(),
        (([total_revenue]-[previous_month_revenue])/[previous_month_revenue])
         )
```

Insights

From Credit Card report

- The total revenue generated by company is 56.51M.
- The total transactions done by customer is around 667K and Total transaction amount is 46M.
- Total interest earned is 7.98M.
- A larger portion of revenue generated from Graduate Customers (23M) followed by High School Customers (11M).
- 36M revenue generated from swipe mode of payment.
- Maximum revenue growth of 28.8% was observed in week no. 53.
- Among different job types, Businessman and White Collar are contributing more in revenue.
- Nearly 47M out of 56.52M revenue is generated only from BLUE card type.
- Blue & Silver credit card are contributing to 96% of overall transaction.
- All quarters almost shows same revenue generation.
- Maximum growth in revenue was observed in the months of April (23%), July (29%), and October (18%) when compared to the previous month.
- Around 24M in revenue of the company comes from expenditure types like bill payments (14M) and entertainment expenses (10 M).

From Customer report

- Around 31M revenue were generated from male customers and nearly 26M by female customers.
- People from age group 40 - 50 spent most using credit card followed by people from the age group 50 - 60 and people from age group 20 - 30 spent less.
- Company generates 29M revenue from married couple and 24M revenue from singles.
- Maximum revenue comes from business persons.
- Out of 10.29K customers, around 8K customers have a salary of less than 80K.
- 54.4% of total revenue comes from people who have a salary of less than 80K.
- People with dependent counts of 3 and 2 contribute more, and those with a dependent count of 5 contribute the least to the revenue.
- Only 67 people have a platinum card, out of which 46 people belong to salary range of 160K - 240k.
- 193 people have Gold cards and 649 people have Silver cards, the rest 9.3K people, have blue card.
- TX, NY, and CA contributing to 69% of total revenue.