Financial Data Analysis

Power BI | DAX

AGENDA

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Introduction

This analysis project establishes a dynamic financial framework to systematically evaluate the credit card portfolio within the banking institution. By leveraging Power BI and robust DAX calculations, we will transform raw transaction and utilization data into actionable intelligence. The core focus is to generate clarity around customer engagement, quantify potential delinquency risk, and provide a clear roadmap for strengthening portfolio performance and enhancing customer retention efforts.

OBJECTIVE

Risk Prediction: Quickly identify and predict which customers are likely to stop making payments (delinquency or default).

Customer Activation: Automatically flag customers who have become inactive or dormant so we can start campaigns to re-engage them.

Portfolio Health: Track core financial metrics, such as credit utilization and total amount spent, to see the current state of the card portfolio.

Reporting Dashboard: Build a simple, executive-facing dashboard that summarizes all top-line performance indicators (KPIs) for fast decision-making.

Customer Grouping: Create flexible, automated groups (segments) for customers based on their recent activity and measured risk levels.

Problem Statement

The rapid growth of credit card usage has increased the need for banks to closely monitor customer behavior, spending patterns, and default risks. However, fragmented data and limited visibility into key financial indicators make it challenging to identify early warning signs of delinquency, understand utilization trends, and assess customer satisfaction levels.

Without a data-driven approach, banks face difficulties in:

Detecting high-risk customers before delinquency occurs

Understanding credit utilization behavior to optimize credit limits

Identifying low-engagement customers who may churn

Prioritizing customer segments for targeted financial products

This project aims to address these gaps by integrating multiple datasets and generating analytical insights that support effective risk control, improved customer retention, and strategic financial decision-making.

Data Overview

This analysis is built using four integrated datasets that capture customer demographics, geographic details, credit card usage patterns, and account-level financial behavior. Together, these datasets provide a 360-degree view of customer profiles, spending habits, credit utilization, and risk indicators.

1. Customer Dataset:

- Contains client-level demographic details such as age, gender, income, and satisfaction score.
- Provides the foundation for understanding customer segments and behavioral patterns.

2. Customer Address Dataset:

- Includes location attributes (state, city, zipcode).
- Helps identify regional trends, high-risk areas, and market penetration.

3. Credit Card Dataset

- Covers financial metrics including transaction amount, revolving balance, credit limit, utilization ratio, delinquent accounts, and interest earned.
- Enables detailed assessment of financial health, spending habits, and risk exposure.

4. Credit Card Address Dataset

- Maps credit card accounts to geographical regions.
- Useful for branch-level performance and regional credit risk analysis.

Summary

By combining demographic, financial, transactional, and geographic data, this project enables a comprehensive analysis of customer behavior, credit performance, and potential risk. These datasets work together to support data-driven decisions in customer retention, credit optimization, and delinquency mitigation.

“Analysis & Insights”

1. Running Total of Credit Card Transactions.

"Shows how customer spending grows over time and highlights long-term transaction trends."

```
Running Total Transactions =
CALCULATE(
    SUM(credit_card[Total_Trans_Amt]),
    FILTER(
        ALL(credit_card[Week_Num]),
        credit_card[Week_Num] <= MAX(credit_card[Week_Num])
    )
)
```

2. Calculate the 4-week moving average of the Credit Limit for each client.

```
CreditLimit 4Week MA =
AVERAGEX(
    FILTER(
        credit_card,
        credit_card[Week_Num] >= MAX(credit_card[Week_Num]) - 3
            && credit_card[Week_Num] <= MAX(credit_card[Week_Num])
    ),
    credit_card[Credit_Limit]
)
```

3. Calculate the MoM% and WoW% Growth on Transaction Amount.

```
WoW Growth % =
DIVIDE(
    SUM(credit_card[Total_Trans_Amt]) -
    CALCULATE(
        SUM(credit_card[Total_Trans_Amt]),
        Calendar[WeekNum] = MAX(Calendar[WeekNum]) - 1
    ),
    CALCULATE(
        SUM(credit_card[Total_Trans_Amt]),
        Calendar[WeekNum] = MAX(Calendar[WeekNum]) - 1
    )
)
```

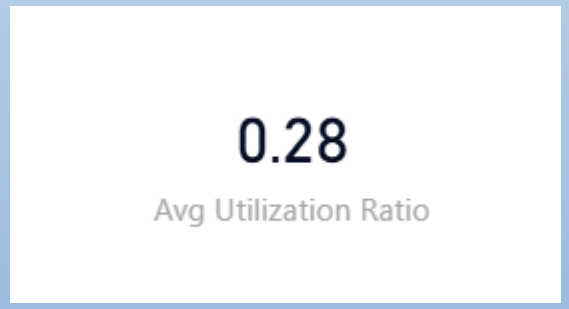
```
MoM Growth % =
DIVIDE(
    SUM(credit_card[Total_Trans_Amt]) -
    CALCULATE(
        SUM(credit_card[Total_Trans_Amt]),
        Calendar[MonthNumber] = MAX(Calendar[MonthNumber]) - 1
    ),
    CALCULATE(
        SUM(credit_card[Total_Trans_Amt]),
        Calendar[MonthNumber] = MAX(Calendar[MonthNumber]) - 1
    )
)
```

4. Calculate Customer Acquisition Cost (CAC) / Transaction Amount.

```
1  CAC Ratio =
2  DIVIDE(
3      SUM(credit_card[Customer_Acq_Cost]),
4      SUM(credit_card[Total_Trans_Amt])
5  )
6
```

5. Calculate the Yearly Average of Avg_Utilization_Ratio.

```
1  Avg Utilization Ratio = AVERAGE(credit_card[Avg_Utilization_Ratio])
2
```



6. Calculate the percentage of Interest Earned compared to Total Revolving Balance for each client.

```
1  Interest% =
2  DIVIDE(
3      SUM(credit_card[Interest_Earned]),
4      SUM(credit_card[Total_Revolving_Bal])
5  )
6
```

7. Calculate the Top 5 Clients by Total Transaction Amount.

```
top_5_clients_by_transection_amount =
TOPN(
    5,
    SUMMARIZE(
        credit_card,
        credit_card[Client_Num],
        "total_amount", SUM(credit_card[Total_Trans_Amt])
    ),
    [total_amount],
    DESC
)
```

8. Identify clients whose Avg_Utilization_Ratio exceeds 80%

```
1  High Utilization_User =
2  IF(MAX(credit_card[Avg_Utilization_Ratio]) > 0.8, 1, 0)
3
```

9. **Customer Churn Indicator: Create a KPI that flags clients who have not made any transactions (Total_Trans_Amt = 0) in the last 6 months.**

```
Notrans_in_last_6_months =
VAR months_6 =
    CALCULATE(
        SUM(credit_card[Total_Trans_Amt]),
        DATESINPERIOD(
            'Calendar'[Date],
            MAX('Calendar'[Date]),
            -6,
            MONTH
        )
)
RETURN
    IF(ISBLANK(months_6), TRUE(), FALSE())
```

10. Delinquency Rate: Calculate the percentage of clients with Delinquent_Acc > 0.

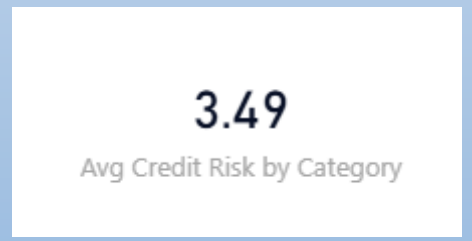
```
1  Delinquency Rate =
2  DIVIDE(
3      CALCULATE(COUNTROWS(credit_card), credit_card[Delinquent_Acc] > 0),
4      COUNTROWS(credit_card)
5  )
6
```

11. **Credit Risk Score: Create a score for each client based on their Avg_Utilization_Ratio, Delinquent_Acc, and Total_Revolving_Bal.**

```
1  Credit Risk Score =
2  credit_card[Avg_Utilization_Ratio] * 50
3      + credit_card[Delinquent_Acc] * 30
4      + credit_card[Total_Revolving_Bal] * 0.1
5
```

12. Average Customer Satisfaction Score by Credit Card Category: Calculate the average Cust_Satisfaction_Score by Card_Category.

```
1  Avg Credit Risk by Category =
2  AVERAGE(Custome_add[Cust_Satisfaction_Score])
3
```



13. Loan Approval vs Credit Limit: Analyze how Credit_Limit affects Personal_loan approval by calculating the average credit limit for clients with and without loans.

```
Avg CreditLimit With Loan =
(CALCULATE(
    AVERAGE( credit_card[Credit_Limit] ),
    FILTER( ALL( Customer ), Customer[Personal_loan] = "Yes" )
)
)
```

```
Avg CreditLimit No Loan =
CALCULATE(
    AVERAGE( credit_card[Credit_Limit] ),
    Customer[Personal_loan] = "No"
)
```

14. High Risk Clients Flag: Create a flag for clients whose Total_Revolving_Bal exceeds 90% of their Credit_Limit and who have a high Avg_Utilization_Ratio.

```
High Risk Flag =
IF (
    credit_card[Total_Revolving_Bal] > credit_card[Credit_Limit] * 0.9
        && credit_card[Avg_Utilization_Ratio] > 0.7,
    1,
    0
)
```

Insights & Findings

Customer Spending Insights

- A small group of customers contributes a major share of total transaction value.
- These high-value customers are ideal for premium offers and retention programs.

Credit Usage Behavior

- Many customers utilize only a small portion of their available credit limit.
- Spending remains stable and controlled, indicating low financial stress.

Insights & Findings

Delinquency Trend

- Delinquent accounts are very few.
- Customers with high utilization show slightly higher chances of delinquency.

Income vs Credit Limit

- Weak correlation between income and credit limit.
- Credit decisions may depend more on credit history and behavior than income alone.

Insights & Findings

High Utilization Segment

- A small segment uses more than 70–80% of their credit limit.
- These users provide good revenue but need monitoring for risk.

Customer Activity

- Frequent transactors maintain higher total transaction amounts.
- These customers are more engaged and loyal to card usage.

Insights & Findings

Age Group Pattern

- Customers aged **30–45** show the highest spending and usage frequency.
- This is the most financially active customer segment.

Monthly Seasonality

- Certain months show spikes in total transactions—possibly due to festivals or salary cycles.
- Bank can design targeted seasonal campaigns.

Insights & Findings

Top Clients

Top 5 customers contribute a significant portion of total spend.

These customers are ideal for credit limit enhancement and reward programs.

Overall Portfolio Health

- Low delinquency, stable usage, and active customers indicate a **healthy credit card portfolio**.

CONCLUSION

- The credit card portfolio is stable, profitable, and low-risk.
- Top customers contribute major revenue → high potential for premium services.
- Spending patterns show opportunities for targeted campaigns.
- Delinquency is low, but high-utilization customers require monitoring.
- Data-driven insights can improve:

- Risk control
- Marketing strategies
- Customer retention
- Revenue growth

Thank you!

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