POWER BI
FINANCIAL ANALYSIS
USING DAX

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INTRODUCTION

You are a Financial Data Analyst tasked with analyzing credit card usage and financial metrics for a banking institution. Using the provided data, you will create reports in Power BI by applying DAX functions. Your goal is to calculate financial metrics like running totals, moving averages, and growth rates, and generate KPIs that assess customer behavior, credit utilization, and delinquency risk. The analysis will provide key insights for improving customer retention and financial performance.

CORE ANALYSIS OBJECTIVES

- Running Total: Credit Card Transactions
- 4-Week Moving Average: Credit Limit per Client
- Growth Rates: MoM% and WoW% on Transactions
- CAC Ratio: Transaction Amount
- Yearly Average: Avg Utilization Ratio
- Interest %: Interest_Earned vs Total_Revolving_Bal
- Top 5 Clients: By Transaction Amount
- High Utilization Clients: Avg_Utilization > 80%
- Churn Indicator: No Transactions in 6 Months
- Delinquency Rate: Clients with Delinquent_Acc > 0
- Credit Risk Score: Based on Utilization, Delinquent_Acc, Revolving_Bal
- Correlation: Income vs Credit Limit
- Satisfaction Score: By Card Category
- Loan vs Credit Limit: Avg Credit Limit for Loan Approval
- High-Risk Flag: Revolving_Bal > 90% of Credit Limit & High Utilizatio

POWER BI

DAX QUERIES USED FOR ANALYSIS

RUNNING TOTAL OF CREDIT_CARD TRANSACTIONS

```
1 Running Total =
2 CALCULATE([total_txn], FILTER(ALL
3 (credit_card),credit_card[Week_Start_Date]
4 <= MAX(credit_card[Week_Start_Date])))
```

Why Calculate Running Total?

Calculating the **running total** of credit card transactions helps **to track the cumulative spending of clients over time**. It offers a clearer view of spending patterns and **allows businesses** to evaluate whether spending is increasing or decreasing. This metric is particularly useful for **forecasting and identifying** trends that can inform marketing strategies or risk assessments.

Week_Start_Date	total_txn	Running Total
01-01-2023	$8,35,767	$8,35,767
08-01-2023	$8,44,739	$16,80,506
15-01-2023	$9,23,367	$26,03,873
22-01-2023	$8,69,235	$34,73,108
29-01-2023	$8,49,078	$43,22,186
05-02-2023	$8,98,867	$52,21,053
12-02-2023	$8,90,756	$61,11,809
19-02-2023	$8,68,091	$69,79,900
26-02-2023	$8,81,861	$78,61,761
05-03-2023	$7,93,080	$86,54,841
12-03-2023	$9,15,725	$95,70,566
19-03-2023	$8,90,081	$1,04,60,647
26-03-2023	$7,89,941	$1,12,50,588
02-04-2023	$8,09,413	$1,20,60,001
09-04-2023	$8,50,979	$1,29,10,980
16-04-2023	$8,67,373	$1,37,78,353
23-04-2023	$7,84,927	$1,45,63,280
30-04-2023	$8,62,036	$1,54,25,316
Total	**$4,55,33,021**	**$4,55,33,021**

4-WEEK MOVING AVERAGE OF CREDIT LIMIT

```
mov_avg_per_client =
VAR Week4 = DATESINPERIOD('calendar'[Date], MAX('calendar'[Date]), -28, DAY)

VAR TotalCreditLimit = CALCULATE(SUM(credit_card[Credit_Limit]), Week4,
    ALLEXCEPT(credit_card, credit_card[Client_Num]))

VAR NumOfWeeks = CALCULATE(DISTINCTCOUNT('calendar'[weeknum]), Week4,
    ALLEXCEPT(credit_card, credit_card[Client_Num]))

RETURN DIVIDE(TotalCreditLimit, NumOfWeeks, 0)
```

weeknum	mov_avg_per_client
1	17,04,635.70
2	16,52,797.70
3	16,10,670.17
4	16,19,888.43
5	16,43,390.75
6	16,70,808.25
7	17,83,271.23
8	18,04,676.63
9	17,31,894.80
10	16,64,642.43
11	15,82,654.10
12	16,33,699.30
13	16,26,274.85
14	16,69,893.15
15	16,63,878.83
16	15,92,137.88
17	15,88,067.53
Total	13,03,109.62

4-Week Moving Average of Credit Limit

A 4-week moving average of credit limits smooths out short-term fluctuations, providing a more stable view of how a client's credit availability is changing over time. This metric helps in analyzing credit behavior and understanding whether credit limits are increasing or decreasing consistently. It also allows the business to respond quickly to shifts in credit utilization trends.

MOM% GROWTH ON TRANSACTIONS

```
1 mom%growth =
2
3 var prev_month = CALCULATE([total_txn],DATEADD('calendar'[Date],-1,MONTH))
4
5 RETURN DIVIDE([total_txn]-prev_month,prev_month,0)
```

Role of Month-over-Month Growth

MoM% Growth measures the monthly change in transaction amounts as a percentage. It helps businesses identify longer-term trends in customer spending patterns. By analyzing MoM growth, organizations can understand whether spending is increasing, decreasing, or remaining stable across months. This insight is essential for strategic planning, seasonal analysis, and making data-driven decisions to optimize financial performance.

Month	total_txn	mom%growth
July	$45,46,958	28.68%
January	$43,22,186	0.00%
December	$42,41,103	24.54%
April	$41,74,728	23.19%
October	$40,50,909	17.32%
February	$35,39,575	-18.11%
June	$35,33,660	3.11%
September	$34,52,874	0.09%
August	$34,49,868	-24.13%
May	$34,26,913	-17.91%
November	$34,05,420	-15.93%
March	$33,88,827	-4.26%
Total	**$4,55,33,021**	**10.27%**

WOW% GROWTH ON TRANSACTIONS

```
wow%growth =

var prev_month = CALCULATE([total_txn],DATEADD('calendar'[Date],-7,DAY))

RETURN DIVIDE([total_txn]-prev_month,prev_month,0)
```

Role of Week-over-Week Growth

WoW% Growth evaluates the weekly change in transaction amounts as a percentage. It focuses on short-term trends and captures quick fluctuations in customer spending behavior. Businesses can use WoW growth analysis to identify weekly patterns, respond swiftly to changes, and adjust marketing campaigns or financial strategies in real time. It is especially useful for identifying the immediate impact of promotions, events, or other influencing factors.

weeknum	total_txn	wow%growth
1	$8,35,767	0.00%
2	$8,44,739	1.07%
3	$9,23,367	9.31%
4	$8,69,235	-5.86%
5	$8,49,078	-2.32%
6	$8,98,867	5.86%
7	$8,90,756	-0.90%
8	$8,68,091	-2.54%
9	$8,81,861	1.59%
10	$7,93,080	-10.07%
11	$9,15,725	15.46%
12	$8,90,081	-2.80%
Total	**$4,55,33,021**	**2.27%**

CUSTOMER ACQUISITION COST (CAC)

```
1 cust_acc_cost =
2
3 DIVIDE(SUM(credit_card[Customer_Acq_Cost]),[total_txn],0)
```

What is Customer Acquisition Cost (CAC)?

Customer Acquisition Cost (CAC) calculates how much it costs to acquire a new customer relative to the revenue generated from their transactions. It is a critical metric for evaluating the effectiveness of marketing campaigns and customer acquisition strategies. By comparing CAC to the revenue generated, companies can determine if their investment in marketing is yielding a good return, ensuring resources are used efficiently.

2.18%

cust_acc_cost

YEARLY AVG UTILIZATION RATIO FOR EACH CLEINT

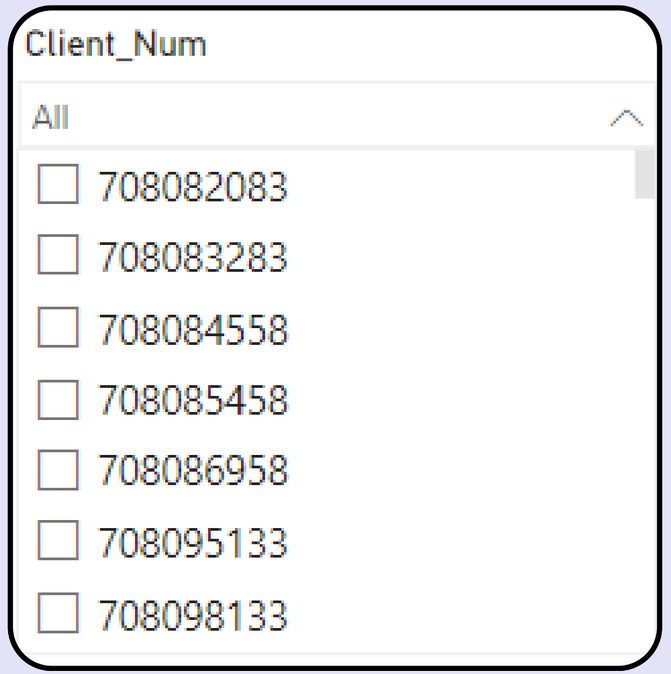
```
1 yearly_avg_utilization_ratio =
2
3 AVERAGE(credit_card[Avg_Utilization_Ratio])
```

0.27

avg_utilization_ratio

Yearly Avg Utilization Ratio

The yearly average utilization ratio reflects how frequently clients use their available credit throughout the year. A high utilization ratio might indicate that clients are more reliant on credit, which could signal financial stress or potential credit risk. On the other hand, a low ratio may suggest that clients are not fully utilizing their credit limits, indicating potential underuse or missed opportunities for growth. Here we have added a slicer to get it for each client.



RATIO – INTEREST EARNED BY TOTAL REVOLVING BALANCE

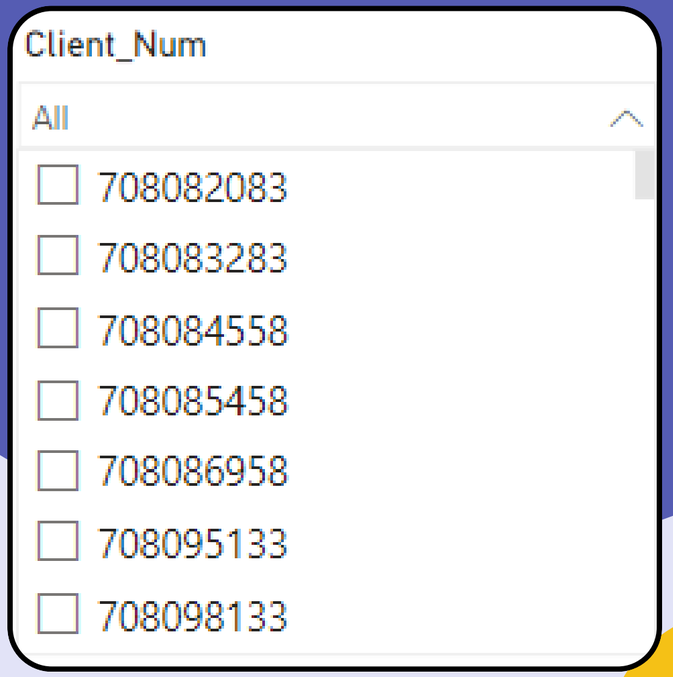
```
1 perct_interest_earned_by_revolving_bal =
2
3 DIVIDE(SUM(credit_card[Interest_Earned]),SUM(credit_card[Total_Revolving_Bal]))
```

66.63%

perct_interest_earned_by_revolving_bal

Interest Earned vs Total Revolving Balance

This ratio compares the interest earned to the total revolving balance of clients. It provides insights into how effectively the bank is generating revenue from customers who carry a balance over time. By tracking this metric, businesses can better understand their interest income and identify opportunities to minimize delinquency risks while maximizing returns from revolving balances. We have added a slicer to get it for each customer.



TOP 5 CLIENTS BY TRANSACTION AMOUNT

```
top5_clients_by_txns =

TOPN(5,SUMMARIZE(credit_card,credit_card[Client_Num],

"total_amount",[total_txn]),[total_amount],DESC)
```

Client_Num	total_amount
718140783	18484
956622169	19597
941614504	18504
920819113	79463
919695363	19739

Why Top 5 Clients by Transaction Amount?

Identifying the top 5 clients based on their transaction amount highlights the most valuable customers. This analysis is crucial for understanding customer behavior, allowing businesses to tailor retention strategies and focus marketing efforts on high-value clients. It also ensures that resources are allocated toward maintaining strong relationships with these clients.

FLAG HIGH UTILIZATION CLIENTS (UTILIZATION > 80%)

```
avg_uti_exceeds_80% =

IF(credit_card[Avg_Utilization_Ratio]*100>80,"Yes","NO")
```

avg_uti_exceeds_80%
NO
NO
Yes
NO
NO
NO
NO
NO
NO
NO
Yes
NO
NO
NO
NO
NO
NO
NO
NO
Yes

Why High Utilization Clients (Utilization > 80%)

Flagging clients with a utilization ratio above 80% helps identify those who may be at a higher risk of default or financial strain. A high utilization ratio often suggests that a client is nearing their credit limit, which could lead to payment issues or overdue accounts. Identifying these clients early allows for proactive intervention to manage risk and offer tailored financial advice.

KPI: CUSTOMER CHURN INDICATOR

```
1 churn =
2
3 var amount = CALCULATE([total_txn],DATESINPERIOD('calendar'[Date],
4                                 max('calendar'[Date]),-6,MONTH))
5
6 RETURN IF(ISBLANK(amount),"Churned","Not Churned")
```

Churn Indicator
Churned
Churned
Churned
Churned
Churned
Churned
Churned
Churned
Churned
Churned
Churned
Churned
Churned
Churned
Churned
Not Churned
Not Churned
Not Churned
Not Churned
Not Churned

Role of KPI: Customer Churn Indicator?

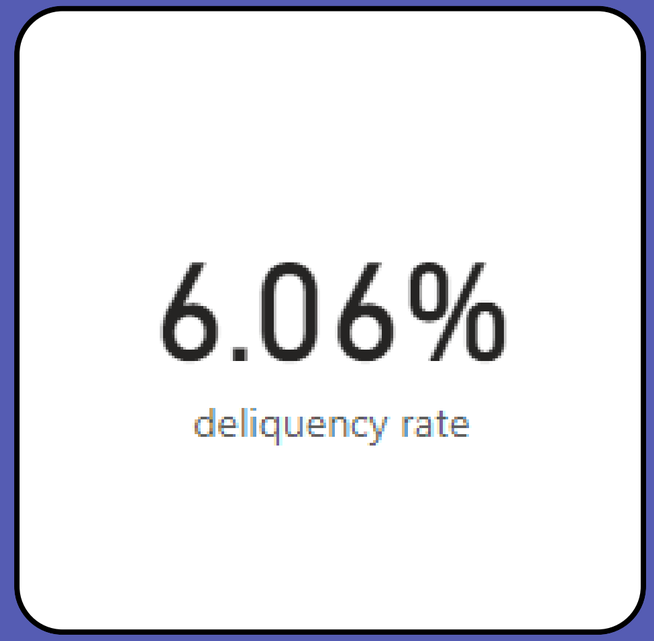
A customer churn indicator helps identify clients who have not made any transactions in the past 6 months. This metric is essential for understanding customer retention and can highlight potential issues in engagement. By flagging these clients, businesses can target retention efforts or re-engagement campaigns to prevent customer loss and improve long-term loyalty.

PERCENTAGE OF CLIENTS WITH DELINQUENT_ACC > 0.

```
deliquency rate = var greater = CALCULATE(COUNTROWS(credit_card),credit_card
[Delinquent_Acc]>0)

var total_rows = COUNTROWS(credit_card)

RETURN DIVIDE(greater,total_rows,0)
```

Why High Utilization Clients (Utilization > 80%)

The delinquency rate measures the percentage of clients with overdue accounts. This metric is a critical indicator of the financial health of a customer base. A high delinquency rate can signal potential credit risks and may require closer monitoring of client accounts. By analyzing delinquency, businesses can refine their credit policies and take steps to reduce financial exposure.



CREDIT RISK SCORE FOR EACH CLIENT

```
noramalised_revo_bal =

DIVIDE(credit_card[Total_Revolving_Bal]-MIN(credit_card[Total_Revolving_Bal]),

MAX(credit_card[Total_Revolving_Bal])-MIN(credit_card[Total_Revolving_Bal]),0)
```

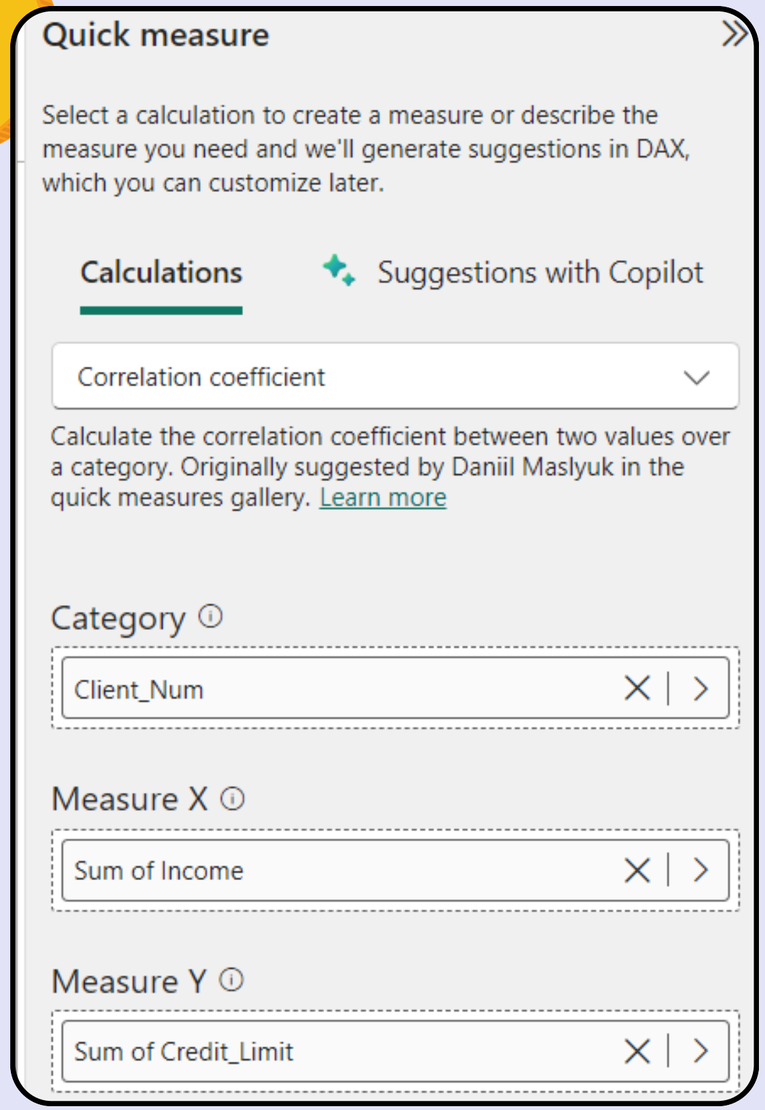
```
credit_risk_score = credit_card[Avg_Utilization_Ratio]*0.50 +

                    credit_card[noramalised_revo_bal]*0.30 +

                    credit_card[Delinquent_Acc]*0.20
```

Why Credit Risk Score for each client?

A credit risk score combines key factors such as utilization ratio, delinquent accounts, and revolving balances to assess the overall creditworthiness of a client. This score provides businesses with a comprehensive view of a client's risk profile, helping to make informed decisions on credit limits, lending, and debt management strategies. Here we first normalized the revolving bal then calculated the score.

noramalised_revo_bal	credit_risk_score
0.659912594358363	0.432473778307509
1	0.668
0.703615415176798	0.318084624553039
0	0
0.297576479936432	0.40877294398093
0.728247914183552	0.245974374255066
0.56336909018673	0.619010727056019
0.744139849026619	0.386741954707986
0.904648390941597	0.696394517282479
1	0.406
0.353595550258244	0.415578665077473
0	0
0.416765991259436	0.147529797377831
0	0
0	0.2
0.410806515693286	0.163741954707986

CORRELATION B/W INCOME & CREDITLIMIT FOR ALL CLIENTS



How we calcualted correlation?

We used a Quick Measure in Power BI to calculate the correlation. In this setup:

- Client Number was placed in the Category field.
- Income was assigned to the Measure X-axis.
- Credit Limit was assigned to the Measure Y-axis.

0.13

Income and Credit_Limit correlation for Client_Num

Why analyzing correlation b/w incomeand CL?

Analyzing the correlation between a client's income and credit limit ensures that credit is allocated appropriately based on the client's ability to repay. A strong correlation indicates that credit limits align with a client's financial capacity, reducing the risk of overextension. This metric helps in developing responsible lending practices and preventing over-indebtedness.

AVG CUSTOMER SATISFACTION SCORE BY CARD CATEGORY

```
avg_satiscation_score =

SUMMARIZE(credit_card,credit_card[Card_Category],

"avg_satisfaction_score",AVERAGE(customers[Cust_Satisfaction_Score]))
```

Card_Category	avg_satisfaction_score
Blue	3.19927536231884
Silver	3.22187981510015
Gold	3.04663212435233
Platinum	2.71641791044776

Why Satisfaction Score by Card Category?

Calculating the average customer satisfaction score by card category provides insights into how clients feel about their credit cards and the services provided. This metric is valuable for understanding customer preferences and can guide product development and marketing strategies aimed at improving customer experience and satisfaction.

AVERAGE CREDIT LIMIT FOR CLIENTS WITH LOANS

```
customers_with_loan =

CALCULATE(AVERAGE(credit_card[Credit_Limit]),

customers[Personal_loan]="yes")
```

Role of Average Credit Limit With Loan

The Average Credit Limit for clients with loans reflects the credit extended to customers with existing personal loans. It helps assess financial risk exposure and repayment capacity. A higher limit suggests confidence in the borrower's financial behavior, guiding credit policy adjustments and sustainable lending practices.

AVERAGE CREDIT LIMIT FOR CLIENTS WITHOUT LOANS

```
customers_without_loan =

CALCULATE(AVERAGE(credit_card[Credit_Limit]),

customers[Personal_loan]="no")
```

Role of Average Credit Limit Without Loan

The Average Credit Limit for clients without loans represents the typical credit amount available to customers without personal loans. It helps financial institutions understand creditworthiness and risk appetite. A higher limit often indicates strong financial stability, aiding in targeting loan offers and customizing financial products.

FLAG HIGH RISK CLIENTS

```
high_risk_cust =

IF(credit_card[noramalised_revo_bal]>0.9 &&

credit_card[Avg_Utilization_Ratio]>0.8,"Flagged","Not Flagged")
```

high_risk_cust
Not Flagged
Not Flagged
Not Flagged
Flagged
Not Flagged
Not Flagged
Flagged
Not Flagged
Not Flagged
Not Flagged
Not Flagged
Not Flagged
Not Flagged

Why flagging high risk clients?

Flagging clients with a high revolving balance and utilization ratio helps identify those at significant financial risk. These clients are more likely to default or experience financial distress. Early identification allows businesses to take action, such as adjusting credit limits or offering financial counseling, to reduce the risk of defaults and ensure responsible lending.

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