



WELCOME

Credit Card Sales Analysis

Project Overview

1. The analysis examines customer behavior across credit card categories, focusing on utilization ratios and transaction volumes.
2. It identifies customers with high utilization ratios and ranks the top customers by total transaction amounts each quarter.
3. The analysis tracks the contribution of annual fees by card categories and monitors transaction trends over time.

CREDIT_CARD Table:

- **CLIENT_NUM:** Unique identifier for each customer.
- **Card_Category:** Type of credit card.
- **Annual_Fees:** Yearly fee charged for the card.
- **Activation_30_Days:** Whether the card was activated within 30 days of issuance.
- **Customer_Acq_Cost:** Cost incurred for acquiring the customer.
- **Week_Start_Date:** Start date of the week for the data entry.
- **Week_Num:** Week number in the year.
- **Qtr:** The fiscal quarter in which the data was recorded.
- **current_year:** The current year for the record.
- **Credit_Limit:** Maximum amount of credit available on the card.
- **Total_Revolving_Bal:** Total balance carried forward month-to-month.
- **Total_Trans_Amt:** Total amount spent using the card in each period.
- **Total_Trans_Vol:** Total number of transactions made.
- **Avg_Utilization_Ratio:** Average percentage of credit limit used.
- **Use Chip:** Card usage type (online . Swipe , chip)
- **Exp Type:** Type of expenditure for transaction.
- **Interest_Earned:** Total interest earned by the credit card issuer.
- **Delinquent_Acc:** Number of delinquent (due or pending payment) accounts associated with the client.

CREDIT CARD
SALES ANALYSIS



CUSTOMER Table:

- **CLIENT_NUM:** Unique identifier for each customer.
- **CUSTOMER:** Name or identifier of the customer.
- **GENDER:** Gender of the customer.
- **DEPENDENT:** Number of dependents the customer has.
- **EDUCATION:** Education level of the customer .
- **MARITAL_STATUS:** Marital status of the customer .
- **STATE_CD:** The state code where the customer resides.
- **ZIPCODE:** Postal code of the customer's address.
- **CAR_OWNER:** Whether the customer owns a car.
- **HOUSE_OWNER:** Whether the customer owns a house.
- **PERSONAL_LOAN:** Whether the customer has a personal loan .
- **CONTACT:** Contact details of the customer.
- **CUSTOMER_JOB:** Customer's job or occupation.
- **INCOME:** Annual income of the customer.
- **CUSTOMER_SATISFACTION_SCORE:** Score representing the customer's satisfaction level.

CREDIT CARD
SALES ANALYSIS

- Renaming Column Names in SQL

SQL Query

```
ALTER TABLE CREDIT_CARD  
CHANGE COLUMN `i` Client_Num CLIENT_NUM INT ;  
  
ALTER TABLE CC_ADD  
CHANGE COLUMN `i` Client_Num CLIENT_NUM INT ;  
  
ALTER TABLE CUST_ADD  
CHANGE COLUMN `i` Client_Num CLIENT_NUM INT ;
```


- **Q1:** Write a SQL query to retrieve the total number of customers, grouped by their GENDER and MARITAL STATUS.

SQL Query

```
SELECT GENDER , MARITAL_STATUS , COUNT(CLIENT_NUM) AS TOTAL_CLIENTS  
FROM CUSTOMER  
GROUP BY GENDER , MARITAL_STATUS  
ORDER BY TOTAL_CLIENTS DESC;
```

Output

Result Grid			
Filter Rows:			
	GENDER	MARITAL_STATUS	TOTAL_CLIENTS
▶	F	Married	2953
	F	Single	2516
	M	Married	2175
	M	Single	1720
	F	Unknown	411
	M	Unknown	333

Question 2 : Calculate the total Annual Fees and average Credit Limit for each Card Category

SQL Query

```
SELECT CARD_CATEGORY , SUM(ANNUAL_FEES) AS TOTAL_FEE ,  
ROUND(AVG(CREDIT_LIMIT),2) AS AVERAGE_CREDIT_LIMIT  
FROM CREDIT_CARD  
GROUP BY CARD_CATEGORY;
```

Output

	CARD_CATEGORY	TOTAL_FEE	AVERAGE_CREDIT_LIMIT
►	Blue	2685635	7285.66
	Platinum	20665	16455.13
	Silver	187505	23391.64
	Gold	56210	21857.84

Question 3 : Find customers with an Avg Utilization Ratio greater than 0.5 and list their CLIENT NUM and Credit Limit.

SQL Query

```
SELECT CLIENT_NUM , CREDIT_LIMIT , AVG_UTILIZATION_RATIO
FROM CREDIT_CARD
WHERE AVG_UTILIZATION_RATIO > 0.5
ORDER BY AVG_UTILIZATION_RATIO DESC ;
```

Output

Result Grid				Filter Rows:	Export:
	CLIENT_NUM	CREDIT_LIMIT	AVG_UTILIZATION_RATIO		
▶	709444983	2435	0.999		
	715847058	1863	0.995		
	778885158	2472	0.994		
	816476658	1812	0.992		
	789777408	1442	0.99		
	710382108	2452	0.988		
	720997383	1857	0.987		
	712292133	2330	0.985		
	778327908	2419	0.984		
	803205258	2420	0.983		
	789121233	2329	0.983		
	717592758	1606	0.983		
	709153008	2523	0.983		
	712190358	1843	0.978		
	741517458	2575	0.977		
	788370258	2578	0.976		

4 Question: Find the top 5 customers with the highest Total Trans Amount in each quarter

SQL Query

```
SELECT * FROM
(SELECT CARD_CATEGORY , CLIENT_NUM , QTR , SUM(TOTAL_TRANS_AMT)AS TOTAL_TRANSACTION,
ROW_NUMBER() OVER (PARTITION BY QTR ORDER BY SUM(TOTAL_TRANS_AMT) DESC ) AS RN
FROM CREDIT_CARD
GROUP BY CLIENT_NUM , CARD_CATEGORY , QTR) RANKING
WHERE RN <= 5;
```

Output

Result Grid					Filter Rows:	Export:	Wrap Cell
CARD_CATEGORY	CLIENT_NUM	QTR	TOTAL_TRANSACTION	RN			
Platinum	712503408	Q1	17498	1			
Platinum	708942408	Q1	16937	2			
Platinum	710232483	Q1	16908	3			
Platinum	709094358	Q1	16737	4			
Platinum	711398433	Q1	16736	5			
Platinum	717642633	Q2	17995	1			
Platinum	716004258	Q2	17634	2			
Gold	713758758	Q2	17628	3			
Platinum	713965683	Q2	17258	4			
Platinum	717783483	Q2	17038	5			
Platinum	718140783	Q3	18484	1			
Platinum	721220583	Q3	17390	2			
Gold	756658083	Q3	17350	3			

QUESTION 5: Identify customers whose CUSTOMER_SATISFACTION_SCORE is below 3 and whose income is below the average income of all customers

SQL Query

```
select CLIENT_NUM from customer
WHERE CUSTOMER_SATISFACTION_SCORE < 3 AND INCOME < (SELECT AVG(INCOME) FROM CUSTOMER) ;
```

Output

CLIENT_NUM
708083283
708084558
708085458
708098133
708099183
708104658
708112008
708117933
708119658
708129933
708134283
708145908
708147108

QUESTION 6 :Calculate the rolling average of Avg Utilization Ratio over the past 3 weeks for each customer

SQL Query

```
SELECT
  CLIENT_NUM,
  Week_Start_Date,
  AVG(Avg_Utilization_Ratio)
    OVER (PARTITION BY CLIENT_NUM ORDER BY Week_Start_Date ROWS BETWEEN 2 PRECEDING AND CURRENT ROW) AS Rolling_Avg_Utilization
FROM CREDIT_CARD;
```

Output

Result Grid			Filter Rows:	Export:
CLIENT_NUM	Week_Start_Date	Rolling_Avg_Utilization		
708082083	01-01-2023	0.469		
708083283	01-01-2023	0.736		
708084558	01-01-2023	0.214		
708085458	01-01-2023	0		
708086958	01-01-2023	0.239		
708095133	01-01-2023	0.055		
708098133	01-01-2023	0.5		
708099183	01-01-2023	0.327		
708100533	01-01-2023	0.85		
708103608	01-01-2023	0.212		
708104658	01-01-2023	0.619		

Question 7 : "Identify customers who have low credit card utilization (below 30%), have at least one delinquent account, and have activated their credit card in the last 30 days and find average credit limit for this customers

SQL Query

```
WITH Activated_Customers AS (  
    SELECT  
        CLIENT_NUM,  
        Avg_Utilization_Ratio,  
        Credit_Limit  
    FROM CREDIT_CARD  
    WHERE Activation_30_Days = 'Yes'  
        AND Avg_Utilization_Ratio < 0.3  
        AND Delinquent_Acc > 0  
)  
SELECT  
    round(AVG(Credit_Limit) ,2 )AS Avg_Credit_Limit  
FROM Activated_Customers;
```

Output

Result Grid	Filter Rows:
Avg_Credit_Limit	
11527.03	

Question 8 : Identify customers with significant transaction amounts who also have delinquent accounts.

SQL Query

```
WITH Ranked_Customers AS (  
    SELECT  
        CLIENT_NUM,  
        Total_Trans_Amt,  
        PERCENT_RANK() OVER (ORDER BY Total_Trans_Amt DESC) AS Percent_Rank_  
    FROM CREDIT_CARD  
)  
SELECT  
    CLIENT_NUM,  
    Total_Trans_Amt  
FROM Ranked_Customers  
WHERE Percent_Rank_ >= 0.9 AND CLIENT_NUM IN (  
    SELECT CLIENT_NUM FROM CREDIT_CARD WHERE Delinquent_Acc > 0  
);
```

Output

Result Grid		Filter Rows:
CLIENT_NUM	Total_Trans_Amt	
708162558	1355	
708288108	647	
708295533	1215	
708296883	1178	
708300483	704	
708434733	1249	
708892833	725	
708895158	1371	
709701558	1460	
709707033	1424	
710573808	1334	
710574558	1403	
711204483	781	
711318033	1304	
711711483	1433	
711927108	1196	

Question 9 : calculate the total interest earned by customers whose acquisition cost is above the median value

SQL Query

```
WITH RANKING AS (  
  SELECT  
    CLIENT_NUM,  
    CUSTOMER_ACQ_COST,  
    DENSE_RANK() OVER (ORDER BY CUSTOMER_ACQ_COST DESC, CLIENT_NUM DESC) AS DESC_,  
    DENSE_RANK() OVER (ORDER BY CUSTOMER_ACQ_COST ASC, CLIENT_NUM ASC) AS ASC_  
  FROM CREDIT_CARD  
)  
  
MedianCost AS (  
  SELECT  
    CAST(AVG(CUSTOMER_ACQ_COST) AS SIGNED) AS MEDIAN  
  FROM RANKING  
  WHERE DESC_ = ASC_ OR ASC_ + 1 = DESC_ OR ASC_ - 1 = ASC_  
)  
  
SELECT  
  CLIENT_NUM,  
  SUM(Interest_Earned) AS TOTAL_INTEREST  
FROM CREDIT_CARD  
WHERE CUSTOMER_ACQ_COST > (SELECT MEDIAN FROM MedianCost)  
GROUP BY CLIENT_NUM
```

Output

CLIENT_NUM	TOTAL_INTEREST
708083283	69.44
708084558	202.58
708085458	236.4
708086958	1004.87
708104658	732
708113208	525
708128733	1303.64
708134283	311.43
708139833	441.37
708147108	277.08
708152358	721.71
708153558	634.88
708158133	350.08
708160008	1927.12
708161133	466.92
708163758	2355.3

Question 10 : Identify the percentage of delinquent accounts in each quarter

SQL Query

```
WITH Delinquent_Accounts AS (  
    SELECT  
        Qtr,  
        COUNT(Delinquent_Acc) AS Total_Delinquent_Acc  
    FROM CREDIT_CARD  
    WHERE Delinquent_Acc > 0  
    GROUP BY Qtr  
,  
    Total_Accounts AS (  
        SELECT  
            Qtr,  
            COUNT(*) AS Total_Acc  
        FROM CREDIT_CARD  
        GROUP BY Qtr  
    )  
SELECT  
    D.Qtr,  
    D.Total_Delinquent_Acc,  
    ROUND((D.Total_Delinquent_Acc * 100.0 / T.Total_Acc), 2) AS Delinquent_Percentage  
FROM Delinquent_Accounts D  
JOIN Total_Accounts T ON D.Qtr = T.Qtr;
```

Output

Result Grid				Filter Rows:	Export:
	Qtr	Total_Delinquent_Acc	Delinquent_Percentage		
▶	Q1	181	7.14		
	Q2	136	5.36		
	Q3	157	6.19		
	Q4	140	5.59		

Question 11 : For each Card Category, calculate the delinquency rate (number of delinquent accounts divided by total accounts).

SQL Query

```
SELECT CARD_CATEGORY ,  
COUNT(DELINQUENT_ACC) * 100 / (SELECT COUNT(*) FROM CREDIT_CARD) AS DELIQUENT_PEERcentage  
FROM CREDIT_CARD  
WHERE DELINQUENT_ACC > 0  
GROUP BY CARD_CATEGORY ;
```

Output

Result Grid			Filter Rows:	
	CARD_CATEGORY	DELIQUENT_PEERcentage		
▶	Blue	5.5303		
	Silver	0.3858		
	Gold	0.1187		
	Platinum	0.0396		

Question 12 : Identify customers who have a high credit limit but low transaction volume, and calculate the total interest earned for this segment.

SQL Query

```
WITH High_Limit_Low_Volume AS (
    SELECT
        CLIENT_NUM,
        CREDIT_LIMIT,
        SUM(Total_Trans_Vol) AS Total_Trans_Vol,
        SUM(Interest_Earned) AS Total_Interest_Earned
    FROM CREDIT_CARD
    GROUP BY CLIENT_NUM, CREDIT_LIMIT
),
Overall_Avg_Volume AS (
    SELECT
        AVG(Total_Trans_Vol) AS Overall_Avg_Trans_Vol,
        AVG(CREDIT_LIMIT) AS AVG_LIMIT
    FROM CREDIT_CARD
)
SELECT
    H.CLIENT_NUM,
    H.CREDIT_LIMIT,
    H.Total_Trans_Vol,
    H.Total_Interest_Earned,
    CASE
        WHEN H.Total_Trans_Vol < O.Overall_Avg_Trans_Vol AND H.CREDIT_LIMIT > O.AVG_LIMIT
        THEN 'Target for Increased Spending'
        ELSE 'No Action Needed'
    END AS Marketing_Strategy
    FROM High_Limit_Low_Volume H
    CROSS JOIN Overall_Avg_Volume O
    WHERE H.Total_Trans_Vol < O.Overall_Avg_Trans_Vol AND H.CREDIT_LIMIT > O.AVG_LIMIT ;
```

Output

CLIENT_NUM	CREDIT_LIMIT	Total_Trans_Vol	Total_Interest_Earned	Marketing_Strategy
708095133	33304	29	275.12	Target for Increased Spending
708112008	23510	35	465.08	Target for Increased Spending
708119658	12836	53	554.18	Target for Increased Spending
708121908	22917	45	265.85	Target for Increased Spending
708152358	18512	57	721.71	Target for Increased Spending
708155733	14734	23	296.47	Target for Increased Spending
708177333	11261	26	243.18	Target for Increased Spending
708193008	14480	43	387.84	Target for Increased Spending
708195633	34516	54	488	Target for Increased Spending
708197358	30543	63	622.72	Target for Increased Spending
708217758	14035	30	385.44	Target for Increased Spending
708223383	11410	38	793.44	Target for Increased Spending
708243483	14938	51	427.12	Target for Increased Spending
708292833	27389	60	247.86	Target for Increased Spending
708296883	11749	27	259.16	Target for Increased Spending
708316008	10031	29	394.24	Target for Increased Spending

INSIGHTS

1 .Gender and Marital Status Distribution:

- A) Female clients outnumber male clients in both married (2953 females vs. 2175 males) and single (2516 females vs. 1720 males) categories.
- B) "Unknown" marital status is a relatively small category, with 411 females and 333 males, indicating a manageable group for further analysis or clarification.

2. Card Categories and Financial Metrics:

- A) **Blue cards** generate the highest total fee of **\$2,685,635** with an average credit limit of **\$7,285.66**, indicating strong utilization despite a moderate credit limit.
- B) **Platinum cards** have the lowest total fee of **\$20,665** but a significantly higher average credit limit of **\$16,455.13**, suggesting a more exclusive cardholder base with potentially lower transaction volumes.
- C) **Silver** and **Gold** cards fall in between with Silver having a higher average credit limit (\$23,391.64) than Gold (\$21,857.84), but lower fees compared to Blue.

3.Credit Utilization and Risk:

Clients with **high utilization ratios (above 0.9)** are at risk of overleveraging their credit, which can lead to financial strain or defaults. Monitoring these clients can help in mitigating potential credit risks.

4. Top Cardholders by Transaction Volume:

Platinum cardholders consistently dominate the top 5 spots for highest transaction amounts across all quarters, with the highest transactions peaking at **\$18,484** in Q3.

5. Customer Satisfaction and Income:

The analysis shows a significant portion of customers with **low satisfaction scores (below 3)** and **income below the average**, suggesting a potential area for improvement in customer experience and targeted marketing campaigns to improve engagement.

6. Credit Utilization Trends:

The rolling average of **credit utilization** reveals diverse client behaviors, from consistent low utilization to periodic spikes. This indicates that some clients may be prone to increased spending during specific periods, offering opportunities for targeted interventions.

7. Activated Customers with Low Utilization:

Customers with **low utilization (<0.3)** and **delinquent accounts** have an average credit limit of **\$11,527.03**, suggesting that despite under-utilization, these clients are at risk of delinquency and need closer monitoring.

8. High-Spending Delinquent Clients:

Clients who fall in the **top 10% of transaction volumes** but also have delinquent accounts require special attention. These clients may present a higher risk due to the combination of high spending and delinquency, warranting deeper analysis of their credit behavior.

Interest Earned by Clients:

Clients with higher **acquisition costs** tend to generate **moderate interest** (\$100 to \$1000), with some high-value clients earning significantly higher interest, like **\$3163.82**. This indicates a small number of customers contributing disproportionately to the overall interest earned.

Delinquency Trends by Quarter:

Q1 saw the highest delinquency rate at **7.14%**, while **Q2** had the lowest at **5.36%**. **Q3** and **Q4** showed slightly higher rates at **6.19%** and **5.59%**, respectively, suggesting fluctuations in credit risk over the year.

Delinquency Rates by Card Category:

Blue cardholders had the highest delinquency percentage at **5.53%**, while **Silver**, **Gold**, and **Platinum** card categories had much lower rates, indicating that high-fee cardholders might be more prone to delinquency.

Target for Increased Spending:

The marketing strategy identified **high-limit, low-volume clients** for targeted engagement. These clients, despite having high credit limits, are underutilizing their available credit, presenting an opportunity for interventions that encourage increased spending.

CONCLUSION

Client Demographics: Female clients outnumber male clients, with many earning below average and dissatisfied, presenting an opportunity for targeted improvement in customer experience.

Card Category Analysis: The **Blue card** category generates the highest fees, while the **Platinum card** offers higher credit limits but generates lower fees.

Credit Utilization Risk: Clients with high credit utilization are at a greater risk of financial strain, suggesting the need for closer monitoring of such accounts.

Transaction Volume: **Platinum cardholders** consistently lead in high transaction volumes, but delinquency rates are higher among **Blue card** holders.

Targeted Marketing: High-limit, low-transaction clients present an opportunity to boost spending by targeting them with personalized marketing strategies.

Focus Areas: Concentrating on credit risk management, improving customer satisfaction, and implementing targeted marketing strategies will help optimize financial performance.