**Telecom Customer Churn Analysis Report**

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**Executive Summary**

This report analyzes customer churn in a telecom company with a customer base of 7,043. The primary objective of this analysis is to understand the patterns of customer churn, identify contributing factors, and provide recommendations to reduce churn.

The findings show that customers with month-to-month contracts, shorter tenures, and certain payment methods are more likely to churn. Additionally, a lack of value-added services like online security, tech support, and device protection significantly contributes to churn. Recommendations are provided based on the identified trends to enhance customer retention.

**Introduction**

Customer churn is a critical metric for the telecom industry. It represents the percentage of customers that stop using the company's services over a given period. This report uses data from the company's telecom services to analyze customer churn patterns, identify the factors leading to churn, and suggest actionable insights for reducing it.

**Data Overview**

* **Total Customers**: 7,043
* **Churned Customers**: 1,869 (Churn Rate: [26.54 %])
* **Data Source**: MySQL and Power BI Desktop report on telecom customer churn

**SQL Quires**

USE customer\_churn; #using the Schema

**# 1. Identify the total number of customers and the churn rate**

SELECT COUNT (\*) AS total\_customers

FROM customer\_churn;

#Total number of customers is 4835

SELECT

COUNT(`Customer ID`) AS Churned\_Customers,

(COUNT(`Customer ID`) / (SELECT COUNT(`Customer ID`) FROM customer\_churn)) \* 100 AS Churn\_Rate\_Percentage

FROM customer\_churn

WHERE `Customer Status` = 'Churned';

# NO OF CHURNED CUSTOMER = 1586, CHURN RATE PERCENTAGE = 32.8025%

**# 2.Find the average age of churned customers**

SELECT AVG(Age) AS Average\_Age\_Of\_Churned\_Customers

FROM customer\_churn

WHERE `Customer Status` = 'Churned';

#AVERAGE AGE OF CHURNED CUSTOMER = 50.1658

**# 3.Discover the most common contract types among churned customers**

SELECT contract, COUNT(\*) AS Number\_Of\_Churned\_Customers

FROM customer\_churn

WHERE `Customer Status` = 'Churned'

GROUP BY contract

ORDER BY Number\_Of\_Churned\_Customers DESC

limit 1;

#THE MOST COMMON CONTRACT TYPE AMONG CHURNED CUSTOMERS = Month-to-Month WITH 1403 CHURNED CUSTOMERS

**#4. Analyze the distribution of monthly charges among churned customers**

SELECT

SUM(`monthly charge`) AS total\_monthly\_charges\_churned,

AVG(`monthly charge`) AS avg\_monthly\_charges\_churned

FROM customer\_churn

WHERE `Customer Status` = 'Churned';

# THE DISTRIBUTION OF MONTHLY CHARGES AMONG EACH CHURNED CUSTOMERS = 81.10

**#5. Create a query to identify the contract types that are most prone to churn**

SELECT

contract,

COUNT(\*) AS churned\_customers\_count

FROM customer\_churn

WHERE `Customer Status` = 'Churned'

GROUP BY contract

ORDER BY churned\_customers\_count DESC;

# THE CONTRACT TYPE THAT ARE MOST PRONE TO CHURN IS MONTH-TO-MONTH CONTRACT TYPE

**#6. Identify customers with high total charges who have churned**

SELECT `Customer ID`, `total charges`

FROM customer\_churn

WHERE `Customer Status` = 'Churned'

ORDER BY `total charges` DESC

LIMIT 10;

**#7. Calculate the total charges distribution for churned and non-churned customers**

SELECT

SUM(`total charges`) AS sum\_total\_charges\_churned,

AVG(`total charges`) AS avg\_total\_charges\_churned

FROM customer\_churn

WHERE `Customer Status` = 'Churned';

#TOTAL CHARGES FOR CHURNED = 2726469, CHARGES FOR EACH = 1719.085

SELECT

SUM(`total charges`) AS sum\_total\_charges\_stayed,

AVG(`total charges`) AS avg\_total\_charges\_stayed

FROM customer\_churn

WHERE `Customer Status` != 'Churned';

#TOTAL CHARGES FOR UNCHURNED = 11300430.84, CHARGES FOR EACH = 3478.12

**#8. Calculate the average monthly charges for different contract types among churned** customers

SELECT

`contract`,

AVG(`monthly charge`) AS avg\_monthly\_charges

FROM customer\_churn

WHERE `Customer Status` = 'Churned'

GROUP BY `contract`;

# avg monthly charges for Month-to-Month = 79.44, One Year = 92.84 AND Two Year = 97.51

**#9. Identify customers who have both online security and online backup services and have not churned**

SELECT `Customer ID`, `online security`, `online backup`

FROM customer\_churn

WHERE `online security` = 'Yes'

AND `online backup` = 'Yes'

AND `Customer Status` != 'Churned';

SELECT \*

FROM customer\_churn

WHERE `online security` = 'Yes'

AND `online backup` = 'Yes'

AND `Customer Status` != 'Churned';

**#10. Determine the most common combinations of services among churned customers**

SELECT

CONCAT\_WS(', ',

CASE WHEN `online security` = 'Yes' THEN 'Online Security' ELSE NULL END,

CASE WHEN `online backup` = 'Yes' THEN 'Online Backup' ELSE NULL END,

CASE WHEN `device protection Plan` = 'Yes' THEN 'Device Protection plan' ELSE NULL END,

CASE WHEN `Premium tech support` = 'Yes' THEN 'Premium Tech Support' ELSE NULL END,

CASE WHEN `streaming tv` = 'Yes' THEN 'Streaming TV' ELSE NULL END,

CASE WHEN `streaming movies` = 'Yes' THEN 'Streaming Movies' ELSE NULL END

) AS service\_combination,

COUNT(\*) AS num\_customers

FROM customer\_churn

WHERE `Customer Status` = 'Churned'

GROUP BY service\_combination

ORDER BY num\_customers DESC;

**#11. Identify the average total charges for customers grouped by gender and marital status**

SELECT

`Gender`,

`Married`,

AVG(`total charges`) AS avg\_total\_charges

FROM customer\_churn

GROUP BY `Gender`, `Married`;

**#12. Calculate the average monthly charges for different age groups among churned customers**

SELECT

CASE

WHEN `Age` < 20 THEN 'Under 20'

WHEN `Age` BETWEEN 20 AND 29 THEN '20-29'

WHEN `Age` BETWEEN 30 AND 39 THEN '30-39'

WHEN `Age` BETWEEN 40 AND 49 THEN '40-49'

WHEN `Age` BETWEEN 50 AND 59 THEN '50-59'

WHEN `Age` >= 60 THEN '60 and above'

END AS age\_group,

AVG(`monthly charge`) AS avg\_monthly\_charges

FROM customer\_churn

WHERE `Customer Status` = 'Churned'

GROUP BY age\_group

ORDER BY age\_group;

**#13. Determine the average age and total charges for customers with multiple lines and online backup**

SELECT

AVG(`Age`) AS avg\_age,

SUM(`total charges`) AS total\_charges

FROM customer\_churn

WHERE `Multiple Lines` = 'Yes'

AND `online backup` = 'Yes';

#The average age and total charges for customers with multiple lines and online backup

# Average age = 48.6115 And Total Charges = 6612503.850

**#14. Identify the contract types with the highest churn rate among senior citizens (age 65 and over)**

SELECT

`contract`,

COUNT(CASE WHEN `Customer Status` = 'Churned' THEN 1 END) AS churned\_count,

COUNT(\*) AS total\_count,

(COUNT(CASE WHEN `Customer Status` = 'Churned' THEN 1 END) / COUNT(\*)) \* 100 AS churn\_rate

FROM customer\_churn

WHERE `Age` >= 65

GROUP BY `contract`

ORDER BY churn\_rate DESC;

**#15. Calculate the average monthly charges for customers who have multiple lines and streaming TV**

SELECT

AVG(`monthly charge`) AS avg\_monthly\_charges

FROM customer\_churn

WHERE `Multiple Lines` = 'Yes'

AND `streaming tv` = 'Yes';

#Average Monthly charges of customer who have multiple line and Streaming TV is 95.634

**#16. Identify the customers who have churned and used the most online services**

SELECT

`Customer ID`,

COUNT(CASE WHEN `online security` = 'Yes' THEN 1 END) +

COUNT(CASE WHEN `online backup` = 'Yes' THEN 1 END) +

COUNT(CASE WHEN `streaming tv` = 'Yes' THEN 1 END) +

COUNT(CASE WHEN `streaming movies` = 'Yes' THEN 1 END) +

COUNT(CASE WHEN `device protection plan` = 'Yes' THEN 1 END) +

COUNT(CASE WHEN `premium tech support` = 'Yes' THEN 1 END) AS online\_service\_count

FROM customer\_churn

WHERE `Customer Status` = 'Churned'

GROUP BY `Customer ID`

ORDER BY online\_service\_count DESC;

**#17. Calculate the average age and total charges for customers with different combinations of streaming services**

SELECT

CONCAT\_WS(', ',

CASE WHEN `streaming tv` = 'Yes' THEN 'Streaming TV' ELSE NULL END,

CASE WHEN `streaming movies` = 'Yes' THEN 'Streaming Movies' ELSE NULL END

) AS streaming\_service\_combination,

AVG(`Age`) AS avg\_age,

SUM(`total charges`) AS total\_charges

FROM customer\_churn

GROUP BY streaming\_service\_combination

ORDER BY streaming\_service\_combination;

**#18. Identify the gender distribution among customers who have churned and are on yearly contracts**

SELECT

`Gender`,

COUNT(\*) AS churned\_count

FROM customer\_churn

WHERE `Customer Status` = 'Churned'

AND `contract` != 'month-to-month' #because apart from 'month-to-month' other contract are in yearly

GROUP BY `Gender`;

**#19. Calculate the average monthly charges and total charges for customers who have churned, grouped by contract type and internet service type**

SELECT

`contract`,

`internet service`,

AVG(`monthly charge`) AS avg\_monthly\_charges,

SUM(`total charges`) AS total\_charges

FROM customer\_churn

WHERE `Customer Status` = 'Churned'

GROUP BY `contract`, `internet service`

ORDER BY `contract`, `internet service`;

**#20. Find the customers who have churned and are not using online services, and their average total charges**

SELECT

COUNT(`Customer ID`) AS churned\_customers\_not\_using\_online\_services,

AVG(`total charges`) AS avg\_total\_charges

FROM customer\_churn

WHERE `Customer Status` = 'Churned'

AND `Online security` = 'No'

AND `Online backup` = 'No'

AND `Device Protection Plan` = 'No'

AND `Premium Tech Support` = 'No'

AND `Streaming Tv` = 'No'

AND `Streaming Movies` = 'No';

#customers who have churned and are not using online services is 327 and their average total charges is 439.64

**#21. Calculate the average monthly charges and total charges for customers who have churned, grouped by the number of dependents**

SELECT

`Number of Dependents`,

AVG(`monthly charge`) AS avg\_monthly\_charges,

SUM(`total charges`) AS total\_charges

FROM customer\_churn

WHERE `Customer Status` = 'Churned'

GROUP BY `Number of Dependents`

ORDER BY `Number of Dependents`;

**#22. Identify the customers who have churned, and their contract duration in months (for monthly contracts)**

SELECT

`Customer ID`,

`Tenure in Months`

FROM customer\_churn

WHERE `Customer Status` = 'Churned'

AND `contract` = 'Month-To-Month';

**#23. Determine the average age and total charges for customers who have churned, grouped by internet service and phone service**

SELECT

`internet service`,

`phone service`,

AVG(`Age`) AS avg\_age,

SUM(`total charges`) AS total\_charges

FROM customer\_churn

WHERE `Customer Status` = 'Churned'

GROUP BY `internet service`, `phone service`

ORDER BY `internet service`, `phone service`;

# Average Age is 50 and Total Charges is 2726469

**#24. Create a view to find the customers with the highest monthly charges in each contract type**

CREATE VIEW Highest\_Monthly\_Charges\_Per\_Contract AS

SELECT

`Customer ID`,

`contract`,

`monthly charge`

FROM customer\_churn

WHERE (`contract`, `monthly charge`) IN (

SELECT

`contract`,

MAX(`monthly charge`)

FROM customer\_churn

GROUP BY `contract`

);

#To view the Highest charge in each contract type

SELECT \* FROM Highest\_Monthly\_Charges\_Per\_Contract;

**#25. Create a view to identify customers who have churned and the average monthly charges compared to the overall average**

CREATE VIEW Churned\_Customers\_Average\_Comparison AS

SELECT

`Customer ID`,

`monthly charge`,

AVG(`monthly charge`) OVER () AS overall\_avg\_monthly\_charge,

AVG(`monthly charge`) OVER (PARTITION BY `Customer Status`) AS churned\_avg\_monthly\_charge

FROM customer\_churn

WHERE `Customer Status` = 'Churned';

#To view Churned Customers Average Comparison

SELECT \* FROM Churned\_Customers\_Average\_Comparison;

**#26. Create a view to find the customers who have churned and their cumulative total charges over time**

CREATE VIEW Churned\_Customers\_Cumulative\_Charges AS

SELECT

`Customer ID`,

`total charges`,

SUM(`total charges`) OVER (PARTITION BY `Customer ID`) AS cumulative\_total\_charges

FROM customer\_churn

WHERE `Customer Status` = 'Churned';

#To Churned Customers Cumulative Charges

SELECT \* FROM Churned\_Customers\_Cumulative\_Charges;

**#27. Stored Procedure to Calculate Churn Rate**

DELIMITER $$

CREATE PROCEDURE Calculate\_Churn\_Rate()

BEGIN

DECLARE total\_customers INT;

DECLARE churned\_customers INT;

DECLARE churn\_rate DECIMAL(5, 2); -- Adjust precision as necessary

-- Calculate the total number of customers

SELECT COUNT(\*) INTO total\_customers FROM customer\_churn;

-- Calculate the total number of churned customers

SELECT COUNT(\*) INTO churned\_customers FROM customer\_churn WHERE `Customer Status` = 'Churned';

-- Calculate the churn rate

IF total\_customers > 0 THEN

SET churn\_rate = (churned\_customers / total\_customers) \* 100; -- Churn rate in percentage

ELSE

SET churn\_rate = 0; -- To handle division by zero

END IF;

-- Return the churn rate

SELECT churn\_rate AS Churn\_Rate;

END $$

DELIMITER ;

CALL Calculate\_Churn\_Rate();

#Customer Churn Rate is 32.80

**#28. Stored Procedure to Identify High-Value Customers at Risk of Churning.**

DELIMITER //

CREATE PROCEDURE IdentifyHighValueCustomersAtRisk()

BEGIN

DECLARE high\_value\_threshold DECIMAL(10, 2);

DECLARE total\_customers INT;

DECLARE high\_value\_customers INT;

DECLARE high\_value\_customers\_at\_risk INT;

-- Define the threshold for high-value customers

SET high\_value\_threshold = 1000; -- Adjust this threshold as needed

-- Count total customers

SELECT COUNT(\*) INTO total\_customers FROM customer\_churn;

-- Count high-value customers

SELECT COUNT(\*) INTO high\_value\_customers FROM customer\_churn WHERE `total charges` > high\_value\_threshold;

-- Count high-value customers at risk of churning

SELECT COUNT(\*) INTO high\_value\_customers\_at\_risk FROM customer\_churn WHERE `total charges` > high\_value\_threshold AND `Customer status` = 'Churned';

-- Output the results

SELECT high\_value\_customers AS 'High\_Value\_Customers', high\_value\_customers\_at\_risk AS 'High\_Value\_Customers\_at\_Risk';

END//

DELIMITER ;

CALL IdentifyHighValueCustomersAtRisk();

**Findings**

* The total customer base is **7,043**, with **1,869** churned customers.
* The churn rate appears to be higher among customers with certain services and contract types.
* Gender: There is a fairly balanced distribution of customers by gender, with **3,555 males** and **3,488 females**.
* Age: Customers aged **34** seem to have higher churn rates, as highlighted in the churned customer details.
* **Month-to-month contracts** a significantly higher churn rate, suggesting that these customers require more attention. Most churned customers are on month-to-month contracts.
* Longer contracts such as **One Year** and **Two Year** contracts show relatively lower churn.
* Customers with shorter tenures, particularly those who have used the service for **0-10 months**, tend to churn more.
* The analysis also indicates that customers with tenures above **50 months** churn significantly less.
* Customers using **Fiber optic internet services** show a higher propensity to churn compared to those using other types like **DSL** or **Cable**.
* There is a strong correlation between churn and **online security** and **tech support** services: customers without these services churn more frequently.
* Customers who use **Bank Withdrawal** as a payment method are more likely to churn compared to those using credit cards or other methods.
* Customers without **online backup**, **device protection**, or **technical support** tend to have higher churn rates, indicating the importance of offering these additional services.

**Recommendations:**

* Focus on month-to-month contract customers by offering better retention strategies.
* Address churn drivers by enhancing fiber optic internet services, offering online backups, tech support, and device protection to improve customer satisfaction.
* Consider reviewing the bank withdrawal payment method, as it is associated with higher churn.
* Month to month contract should be given more attention as customers that have subscribed for that tend to churn.
* Customers who have used between 0 to10 months tend to churn.
* Customer using **Fiber optic internet service** tend to churn.
* Customers using **Bank Withdrawal payment method** tend to churn.
* Customers without **online backup** churn more.
* Customers without **Tech support** churn more.
* Customers without **device protection** tend to churn more.

**Conclusion**

The analysis reveals that customer churn is significantly affected by contract type, tenure, internet service, and the availability of value-added services. Addressing these issues through targeted retention strategies, enhancing customer service, and incentivizing long-term contracts can reduce churn and improve customer loyalty.