

Churn-Analysis-PowerBI-Project

Project Overview

This project offers an in-depth analysis of customer churn data of tele communication company. Churn in this context signifies the number of customers who have left the company, commonly referred to as attrition. The dataset used for this analysis is a sample, utilized for the purpose of practicing report creation and understanding the various aspects of data analysis using PowerBI.

Objective

- Understand and analyze the factors contributing to customer churn.
- Develop actionable insights from the data to help reduce churn.

Tools Used

- **My SQL**
- **Power BI**

SQL Suitable Questions:

1. Identify the total number of customers and the churn rate
2. Find the average age of churned customers
3. Discover the most common contract types among churned customers
4. Create a query to identify the contract types that are most prone to churn
5. Identify customers with high total charges who have churned
6. Calculate the total charges distribution for churned and non-churned customers
7. Calculate the average monthly charges for different contract types among churned customers
8. Identify customers who have both online security and online backup services and have not churned
9. Identify the average total charges for customers grouped by gender and marital status
10. Calculate the average monthly charges for different age groups among churned customers
11. Determine the average age and total charges for customers with multiple lines and online backup

12. Identify the contract types with the highest churn rate among senior citizens (age 65 and over)
13. Calculate the average age and total charges for customers with different combinations of streaming services
14. Identify the gender distribution among customers who have churned and are on yearly contracts
15. Calculate the average monthly charges and total charges for customers who have churned, grouped by contract type and internet service type
16. Find the customers who have churned and are not using online services, and their average total charges
17. Calculate the average monthly charges and total charges for customers who have churned, grouped by the number of dependents
18. Identify the customers who have churned, and their contract duration in months (for monthly contracts)
19. Determine the average age and total charges for customers who have churned, grouped by internet service and phone service
20. Stored Procedure to Calculate Churn Rate
21. Stored Procedure to Identify High-Value Customers at Risk of Churning

Sql:

1--the total number of customers and the churn rate--

```
SELECT
    COUNT(*) AS Total_Customers,
    SUM(CASE WHEN Churn_Status = 'Yes' THEN 1 ELSE 0 END) AS Churned_Customers,
    SUM(CASE WHEN churn_status = 'Yes' THEN 1 ELSE 0 END) / COUNT(*) * 100 AS
Churn_Rate_Percentage
FROM
    dbo.customer_churn_dataset$;
```

Results Messages			
	Total_Customers	Churned_Customers	Churn_Rate_Percentage
1	500	105	0

--2.the average age of churned customers

```
SELECT
```

```

AVG(Age) AS Average_Age
FROM
  dbo.customer_churn_dataset$
WHERE
  Churn_Status = 'Yes';

```

Results		Messages
	Average_Age	
1	50.8952380952381	

--3.the most common contract types among churned customers

```

SELECT TOP 1
  Contract_Type,
  COUNT(*) AS Frequency
FROM
  dbo.customer_churn_dataset$
WHERE
  Churn_Status = 'Yes'
GROUP BY
  Contract_Type
ORDER BY
  Frequency DESC;

```

Results			Messages
	Contract_Type	Frequency	
1	Monthly	56	

--4.a query to identify the contract types that are most prone to churn

```

SELECT
  Contract_Type,
  COUNT(*) AS Churned_Customers_Count
FROM
  dbo.customer_churn_dataset$
WHERE
  Churn_Status = 'Yes'
GROUP BY
  Contract_Type
ORDER BY
  Churned_Customers_Count DESC;

```

Results Messages		
	Contract_Type	Churned_Customers_Count
1	Monthly	56
2	Yearly	49

```
--5. customers with high total charges who have churned
SELECT
    Customer_ID,
    Total_Charges
FROM
    dbo.customer_churn_dataset$
WHERE
    Churn_Status = 'Yes' AND Total_Charges > (SELECT AVG(Total_Charges) FROM
customer_churn_dataset$ WHERE Churn_Status = 'Yes');
```

Customer_ID Total_Charges

38584 628.47

38978 714.63

71747 743.63

80727 880.69

111234 773.84

111831 683.66

116390 589.43

140694 628.91

159437 588.06

176478 945.93

183738 950.02

242863 869.82

288065 657.68

310143 941.81

322789 642.52

333325 689.1

352916 999.57

369805 619.9

370020 563.1

387321 865.34

390805 980.52

393378 646.71

422424 923.41

446639 680.71

447464 912.96

464172 574.21

466678 934.44

473184 801.81

476672 637.28

522957 579.54

545705 812.42

609218 618.93

634478 551.05

650067 739.92

650227 756.13

677356 767.62

683175 687.31

684734 945.9

705147 958.51

709361 829.77

725159 891.98

739788 865.17

780901 940.13

801356 678.95

804356 598.04

816833 897.07

843682 652.73

870518 974.53

873919 643.44

876563 597.8

881750 542.8

884342 595.28

891382 828.21

913587 865.16

966017 587.13

972885 837.63

977377 967.92

--6. Total Charges Distribution for Churned and Non-Churned Customers

```
SELECT churn_status, SUM(total_charges) AS TotalChargesSum
FROM customer_churn_dataset$
GROUP BY churn_status;
```

Results Messages

	churn_status	TotalChargesSum
1	No	204809.94
2	Yes	56781.65

--7. Average Monthly Charges for Different Contract Types Among Churned Customers

```
SELECT contract_type, AVG(monthly_charges) AS AverageMonthlyCharges
FROM customer_churn_dataset$
WHERE churn_status = 'Yes'
GROUP BY contract_type;
```

Results Messages

	contract_type	AverageMonthlyCharges
1	Monthly	52.2476785714286
2	Yearly	52.7708163265306

--8. Customers with Both Online Security and Online Backup Services and Have Not Churned

```
SELECT customer_id
FROM customer_churn_dataset$
WHERE online_security = 'Yes' AND online_backup = 'Yes' AND churn_status = 'No';
```

--9. Average Total Charges Grouped by Gender and Marital Status

```
SELECT Gender, marital_status, AVG(total_charges) AS AverageTotalCharges
FROM customer_churn_dataset$
GROUP BY Gender, marital_status;
```

	Gender	marital_status	AverageTotalCharges
1	Female	Married	544.483185185185
2	Male	Married	498.964237288136
3	Female	Single	533.253358778626
4	Male	Single	511.658534482759

--10. Average Monthly Charges for Different Age Groups Among Churned Customers

```
SELECT
CASE
    WHEN Age BETWEEN 20 AND 29 THEN '20s'
    WHEN Age BETWEEN 30 AND 39 THEN '30s'
    WHEN Age BETWEEN 40 AND 49 THEN '40s'
    ELSE '50+' END AS AgeGroup,
    AVG(monthly_charges) AS AverageMonthlyCharges
FROM customer_churn_dataset$
WHERE churn_status = 'Yes'
GROUP BY age;
```

-- --11. Average Age and Total Charges for Customers with Multiple Lines and Online Backup

```
SELECT AVG(Age) AS AverageAge, AVG(total_charges) AS AverageTotalCharges
FROM customer_churn_dataset$
WHERE multiple_lines = 'Yes' AND online_backup = 'Yes';
```

	AverageAge	AverageTotalCharges
1	49.5725806451613	546.667177419355

--12. Contract Types with the Highest Churn Rate Among Senior Citizens (Age 65 and Over)

```

SELECT TOP 1 contract_type,
    (COUNT(*) * 100.0 / (SELECT COUNT(*) FROM customer_churn_dataset$ WHERE Age >=
65)) AS ChurnRate
FROM customer_churn_dataset$
WHERE churn_status = 'Yes' AND Age >= 65
GROUP BY contract_type
ORDER BY ChurnRate DESC;

```

Results Messages		
	contract_type	ChurnRate
1	Monthly	14.159292035398

```

--13. Average Age and Total Charges for Customers with Different Combinations of
Streaming Services
SELECT streaming_tv, streaming_movies, AVG(Age) AS AverageAge, AVG(total_charges) AS
AverageTotalCharges
FROM customer_churn_dataset$
GROUP BY streaming_tv, streaming_movies;

```

Results Messages				
	streaming_tv	streaming_movies	AverageAge	AverageTotalCharges
1	No	No	46.3237410071942	485.197338129496
2	Yes	No	49.3414634146341	509.962113821138
3	No	Yes	49.9016393442623	561.915983606557
4	Yes	Yes	48.4913793103448	541.983362068966

```

--14. Gender Distribution Among Customers Who Have Churned and Are on Yearly Contracts
SELECT Gender, COUNT(*) AS Count
FROM customer_churn_dataset$
WHERE churn_status = 'Yes' AND contract_type = 'Yearly'
GROUP BY Gender;

```

Results Messages		
	Gender	Count
1	Female	30
2	Male	19

```

--15. Average Monthly and Total Charges for Churned Customers, Grouped by Contract Type
and Internet Service Type
SELECT contract_type, internet_service, AVG(monthly_charges) AS AverageMonthlyCharges,
AVG(total_charges) AS AverageTotalCharges

```



```
FROM customer_churn_dataset$
WHERE churn_status = 'Yes'
GROUP BY contract_type, internet_service;
```

	contract_type	internet_service	AverageMonthlyCharges	AverageTotalCharges
1	Monthly	DSL	55.1727272727273	443.244090909091
2	Yearly	DSL	57.41625	556.090833333333
3	Monthly	Fiber Optic	50.355	561.567941176471
4	Yearly	Fiber Optic	48.3112	583.6316

--16. Customers Who Have Churned, Not Using Online Services, and Their Average Total Charges

```
SELECT customer_id, AVG(total_charges) AS AverageTotalCharges
FROM customer_churn_dataset$
WHERE churn_status = 'Yes' AND online_security = 'No' AND online_backup = 'No'
GROUP BY customer_id;
```

--17. Average Monthly Charges and Total Charges for Churned Customers, Grouped by the Number of Dependents

```
SELECT dependents, AVG(monthly_charges) AS AverageMonthlyCharges, AVG(total_charges) AS
AverageTotalCharges
FROM customer_churn_dataset$
WHERE churn_status = 'Yes'
GROUP BY Dependents;
```

	dependents	AverageMonthlyCharges	AverageTotalCharges
1	0	50.3856666666667	610.019333333333
2	1	56.8769230769231	600.148076923077
3	2	44.7107407407407	488.09037037037
4	3	59.7309090909091	440.853636363636

--18. Identify the Customers Who Have Churned, and Their Contract Duration in Months (for Monthly Contracts)

```
SELECT customer_id, contract_type
FROM customer_churn_dataset$
WHERE churn_status = 'Yes' AND contract_type = 'Monthly';
```

--19. 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 AverageAge, AVG(total_charges) AS
AverageTotalCharges
FROM customer_churn_dataset$
WHERE churn_status = 'Yes'
GROUP BY internet_service, phone_service;

```

	internet_service	phone_service	AverageAge	AverageTotalCharges
1	DSL	No	46.6153846153846	498.656923076923
2	Fiber Optic	No	51.4705882352941	601.976470588235
3	DSL	Yes	53.4	506.6235
4	Fiber Optic	Yes	52.56	528.676

Power BI Suitable Questions:

1. Analyze the distribution of monthly charges among churned customers
2. Determine the most common combinations of services among churned customers
3. Calculate the average monthly charges for customers who have multiple lines and streaming TV
4. Identify the customers who have churned and used the most online services
5. Create a view to find the customers with the highest monthly charges in each contract type
6. Create a view to identify customers who have churned and the average monthly charges compared to the overall average

Workflow

1. Data Connection

Establish a stable connection to the source of the Customer churn dataset

2. Data Preparation

Data cleaning and preparation are crucial for accurate analysis. The following steps outline the data preparation process:

Given data is clean and free of outliers.

3. Data Modeling and Analysis

Construct reference tables and develop conditional columns:

- Create a reference table from the customer_churn_dataset table, rename it to Churn Analysis table.

- Introduce an 'Age Bin' conditional column in the reference table Churn Analysis.

4. Creating Measures

Develop measures to further aid the analysis:

- Measure to calculate the number of customers.
- Measure to calculate the number of churned customers.
- Measure to calculate the churn rate.
- Measure to calculate Average age of Churned Customers.
- Measure to calculate High Total charges among Churners.
- Measure to calculate Average Monthly charges of Churners.
- Measure to calculate Monthly charges of churners.
- Measure to identify customers who have both online security and online backup services
- Measure to identify the average monthly charges for different age groups among churned customers
- Measure to determine the average age and total charges for customers with multiple lines and online backup
- Measure to identify the contract types with the highest churn rate among senior citizens
- Measure to calculate the average monthly charges for customers who have multiple lines and streaming TV
- Measure to identify the customers who have churned and used the most online services
- Measure to calculate the average age and total charges for customers with different combinations of streaming services
- Identify the gender distribution among customers who have churned and are on yearly contracts
- Measure to calculate the average monthly charges and total charges for customers who have churned, grouped by contract type and internet service type
- Measure to find the customers who have churned and are not using online services, and their average total charges
- Measure to calculate the average monthly charges and total charges for customers who have churned, grouped by the number of dependents
- Measure to determine the average age and total charges for customers who have churned, grouped by internet service and phone service
- Measure to create a view to find the customers with the highest monthly charges in each contract type
- Create a view to identify customers who have churned and the average monthly charges compared to the overall average

5. Data Visualization

Visual representation of data offers intuitive insights. The following visuals will be incorporated in the report:

Various appropriate charts were using to Visualize and cards were used to highlight the insights.

Following Slicers were used for accuracy of outcomes.

- Churn Status
- Contract Types
- No. of Dependents
- Gender
- Marital Status

With all the above create various Dashboard on Customer Churn Analysis as shown below.



TELECOM CUSTOMER CHURN ANALYSIS DASHBOARD

churn_status

Select all No Yes

contract_type

Select all Monthly >

gender

Select all Female Male

dependents

All

marital_status

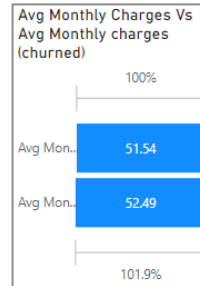
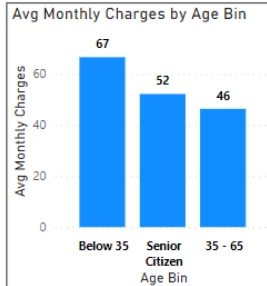
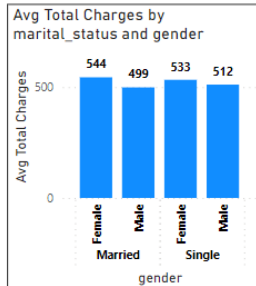
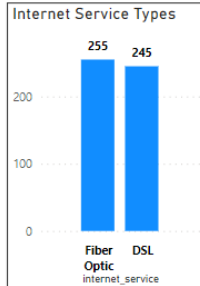
Married Single

Avg Total Charges of Churned Customers

523.18

Avg Total Charges of Customers

523.18



Avg Monthly charges of churned customers

52.49

Avg Total Charges grouped by marital status & Gender.

523.18

TELECOM CUSTOMER CHURN ANALYSIS DASHBOARD

Avg Age of customer with TV & Movie Streaming

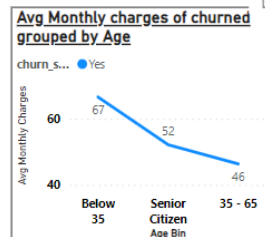
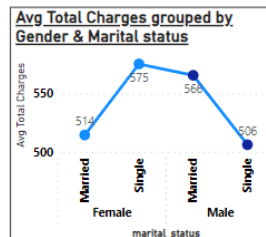
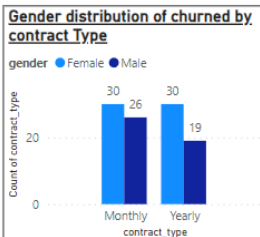
49.50

Avg Monthly charges of customer using Streaming Services

460.90

churn_status

Select all No Yes

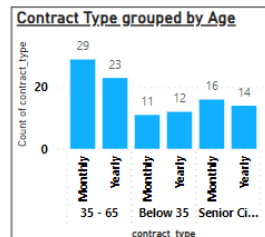
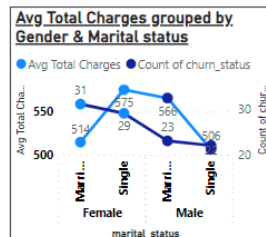
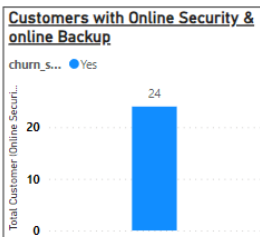


Avg Monthly charges (Multiple Lines & Streaming TV)

48.69

Avg Age (Multiple Lines & Online Backup)

50.22



Avg Total Charges (Multiple Lines & Online Backup)

593.34

Count of churned customers using all online services

(Blank)

TELECOM CUSTOMER CHURN ANALYSIS DASHBOARD

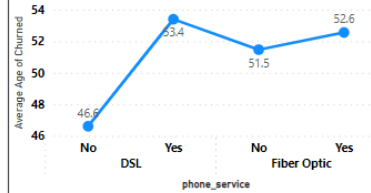
churn_status

Select all
No
Yes

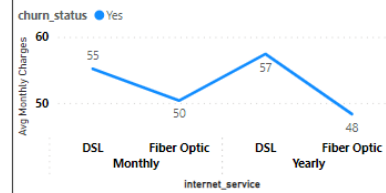
Avg Total Charges of customer not using Online Services

Avg Total Charges: 485.06

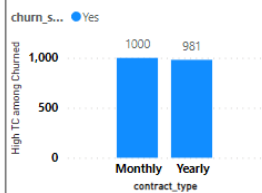
Avg Age of Customer grouped by Internet Service & Phone Service



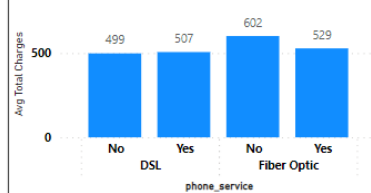
Avg Monthly charges grouped by Contract Type & Internet service



Highest Total Charges by Contract Type



Avg Total Charges grouped by Internet Service & Phone Service



Avg Monthly & Total Charges grouped by Dependents

