TELECOM CUSTOMER CHURN

DATA ANALYSIS

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Churn Analysis For Customers

Presentation Objective

The Objective of this project is to find out what causes customers to leave (churn) in a telecom company by analyzing and visualizing the data. Using tools like MySQL, Power BI, the project aims to create clear Insights in SQL queries and dashboards for Churn, Revenue, and Services. These insights will help the company take smart actions to keep customers happy and reduce churn.

Problem Statement

The Challenge: *Why Customers Leave*

- **Customer Churn** (people leaving services) is the biggest threat to a Company's revenue.
- It costs much more money to find a new customer than it does to keep an existing one.
- Every customer who leaves takes their monthly payment with them, directly hurting a company's profit.

- Who is Leaving (Which Customer Groups Churn most)?
- What services/ contracts are related to Churn (is it a service issue or a pricing issue)?
- What action you can take (how would you use these insights to keep more customers)?

Project Requirements Tools

- **Kaggle**: Data Download Using API
- **MySQL Workbench**: SQL Database
- **Power Query Editor**: Power BI
- **Power BI Desktop**: Dashboard Creation

- [Database/Management] Import the data into the proper Database structure. Added missing Customer's Date of Birth(Synthetic).
- [Visualization] Connected the Database to build 3 dashboards (churn, revenue, service)turned data into easy to understand business insights.

Know Your Columns

Unique Identifier:	Customer ID
Demographics:	Gender, Senior Citizen, Partner, Dependents, DOB
Services:	Phone Service, Multiple Lines, Internet, Online Security, Online Backup, Device Protection, Tech Support, Streaming TV, Streaming Movies, Paperless Billing
Financials:	Tenure, Contract, Payment Method, Monthly Charges, Total Charges
Dependent Variable:	Churn

- Customer Details: Help us find which customer groups are most likely to leave/churn.
- Service: Identifies if problems are linked to the quality or type of services used.
- Contract and Money: Identifies how customers pay & which financial factors drive them to leave.

Business Problems

- To calculate the overall churn rate of the entire customer base

Purposes: To measure the overall customer base for the project. This query calculates the percentage of all customers who left the company.

```sql
SELECT
    COUNT(*) AS Total_Customers,
    SUM(CASE WHEN Churn = "Yes" THEN 1 ELSE 0 END) AS Total_Churned,
    100 * SUM(CASE WHEN Churn = "Yes" THEN 1 ELSE 0 END) / COUNT(*) AS ChurnRate_Percent
FROM telecom_churn;
```

Total_Customers	Total_Churned	ChurnRate_Percent
7043	1869	26.5370

Insights: Almost 26.54% customers are leaving the company. This is the main problem, so we must focus on reducing it.

Business Problems

❑ Compare churn rates between gender

Purposes: To find out if customer churn is higher for one gender compare to the other.

Gender	Total_Customers	Total_Churned	ChurnRate_Percent
Female	3488	939	26.9209
Male	3555	930	26.1603

Insights: The problem of high churn affects male and female customers almost equally, so we should focus our efforts on other factors.

```
SELECT
    Gender,
    COUNT(*) AS Total_Customers,
    SUM(CASE WHEN Churn = 'Yes' THEN 1 ELSE 0 END) AS Total_Churned,
    100 * SUM(CASE WHEN Churn = 'Yes' THEN 1 ELSE 0 END) / COUNT(*) AS ChurnRate_Percent
FROM telecom_churn
GROUP BY Gender;
```

Business Problems

- Identify the customers who have paid the highest total charges but still churned

Purposes: To find the customers who had the highest total charges but still decided to leave the company.

```
SELECT
    CustomerID, TotalCharges, Churn
FROM
    telecom_churn
WHERE
    Churn = "Yes"
ORDER BY
    TotalCharges DESC
LIMIT 10;
```

CustomerID	TotalCharges	Churn
2889-FPWRM	8684.80	Yes
0201-OAMXR	8127.60	Yes
3886-CERTZ	8109.80	Yes
1444-VVSGW	7968.85	Yes
5271-YNWVR	7856.00	Yes
8199-ZLLSA	7804.15	Yes
9053-JZFKV	7752.30	Yes
1555-DJEQW	7723.90	Yes
3259-FDWOY	7723.70	Yes
7317-GGVPB	7690.90	Yes

Insights: We are losing customers who pay the most(negative impact on our revenue), so we must focus on retaining the high spending customers.

Business Problems

- Identify which churned customers used fiber optic in Internet Service

Purposes: To check how many churned customers were using Fiber Optic internet service. This helps us see if a specific product is causing customer loss.

CustomerID	InternetService	Churn
0004-TLHLJ	Fiber optic	Yes
0011-IGKFF	Fiber optic	Yes
0013-EXCHZ	Fiber optic	Yes
0023-XUOPT	Fiber optic	Yes
0093-XWZFY	Fiber optic	Yes
0094-OIFMO	Fiber optic	Yes
0107-YHINA	Fiber optic	Yes
0115-TFERT	Fiber optic	Yes
0122-OAHPZ	Fiber optic	Yes
0125-LZQXK	Fiber optic	Yes

```
SELECT
    CustomerID, InternetService, Churn
FROM
    telecom_churn
WHERE
    Churn = "Yes" AND InternetService = "Fiber optic"
LIMIT 10;
```

Insights: We need to investigate the Fiber Optic service. problems could include high price or poor customer support.

Business Problems

- Count of churned customers by payment method

Purposes: To find out which payment method is used most often by customers who churn. This identifies if the payment process itself is a cause of dissatisfaction.

```
SELECT PaymentMethod, COUNT(*) AS Churned_Count
FROM telecom_churn
WHERE Churn = 'Yes'
GROUP BY PaymentMethod
ORDER BY Churned_Count DESC;
```

PaymentMethod	Churned_Count
Electronic check	1071
Mailed check	308
Bank transfer (automatic)	258
Credit card (automatic)	232

Insights: The electronic check payment method is the biggest churn risk and needs to be investigate. We should encourage customers to switch to automatic payment options.

Business Problems

- Top 10 customers by revenue per month (Life time value)

Purposes: To show which customers have given the money on average each month over their time with the company.

CustomerID	Tenure	TotalCharges	Churn	Revenue_Per_Month
1875-QIVME	2	242.80	Yes	121.400000
5734-EJKXG	61	7365.70	No	120.749180
8879-XUAHX	71	8564.75	No	120.630282
2889-FPWRM	72	8684.80	Yes	120.622222
7569-NMZYQ	72	8672.45	No	120.450694
9739-JLPQJ	72	8670.10	No	120.418056
0052-DCKON	66	7942.15	No	120.335606
8984-HPEMB	71	8477.60	No	119.402817
9788-HNGUT	72	8594.40	No	119.366667
4868-AADLV	66	7862.25	No	119.125000

```
SELECT CustomerID, Tenure, TotalCharges, Churn,
       CASE WHEN Tenure > 0 THEN TotalCharges / Tenure
       ELSE TotalCharges END AS Revenue_Per_Month
FROM telecom_churn
ORDER BY Revenue_Per_Month DESC
LIMIT 10;
```

Insights: We must identify our highest-paying customers. A small number of customers often make a large share of revenue, so protect them at first.

Business Problems

- High value and short tenure customers who left early

Purposes: Find customers who paid a lot of money but churned within their first 6 months.

```
SELECT CustomerID, Tenure, TotalCharges, Churn
FROM telecom_churn
WHERE Tenure < 6 AND TotalCharges > 400 AND Churn = 'Yes'
ORDER BY Tenure ASC
LIMIT 10;
```

CustomerID	Tenure	TotalCharges	Churn
1374-DMZUI	4	424.45	Yes
5419-CONWX	4	442.85	Yes
2656-TABEH	4	420.20	Yes
3932-CMDTD	4	443.90	Yes
0306-JAELE	5	453.40	Yes
0876-WDUUZ	5	425.90	Yes
1010-DIAUQ	5	492.55	Yes
1569-TTNYJ	5	412.10	Yes
1624-NALOJ	5	502.60	Yes
9681-OXGVC	5	514.00	Yes

Insights: Identify customers who gave a lot of money in a short time but then left (top retention priority). Maybe this is a sign of poor initial experience or technical problems.

Business Problems

- churn vs retained revenue & customer counts inside each age group

Purposes: See how many customers in each age group leave the company and how much revenue those departures represent.

Age_Group	Churn	Customers_count	Revenue
18-30	Yes	436	665262.65
18-30	No	1376	3323834.35
31-55	Yes	828	1115812.40
31-55	No	2707	6471118.05
56-70	Yes	299	484317.50
56-70	No	672	1906737.55
70+	Yes	306	597534.35
70+	No	419	1491551.85

Insights: Show if an age group has high churn and high lost revenue, it's the top priority for retention. When a group is large and spends a lot, it makes their churn financially painful.

```
SELECT
  CASE
    WHEN TIMESTAMPDIFF(YEAR, SyntheticDOB, CURDATE()) BETWEEN 18 AND 30 THEN '18-30'
    WHEN TIMESTAMPDIFF(YEAR, SyntheticDOB, CURDATE()) BETWEEN 31 AND 55 THEN '31-55'
    WHEN TIMESTAMPDIFF(YEAR, SyntheticDOB, CURDATE()) BETWEEN 56 AND 70 THEN '56-70'
    ELSE '70+'
  END AS Age_Group,
  Churn,
  COUNT(*) AS Customers_count,
  ROUND(SUM(TotalCharges),2) AS Revenue
FROM telecom_churn
GROUP BY Age_Group, Churn
ORDER BY Age_Group, Churn DESC;
```

Business Problems

- Average monthly charges for churned and retained customers

Purposes:. To compare the average monthly charge of customers who left vs customers who stayed.

```
SELECT
    Churn,
    ROUND(AVG(MonthlyCharges), 2) AS Avg_Monthly_Charges
FROM telecom_churn
GROUP BY Churn;
```

Churn	Avg_Monthly_Charges
No	61.27
Yes	74.44

Insights: Identify customers who left were paying significantly more on average than customers who stayed.

Business Problems

- Total churn and churn rate by Tenure category

Purposes: To group customers by how long they have been with the company (Tenure) and find the churn rate for each group. This shows when we are most likely to lose a customer.

Tenure_Category	Total_Customers	Total_Churned	ChurnRate_Percent
0-12 Months	2186	1037	47.43824
12-24 Months	1024	294	28.71094
24-36 Months	832	180	21.63462
36-48 Months	762	145	19.02887
48-60 Months	832	120	14.42308
60+ Months	1407	93	6.60981

```sql
SELECT
    CASE
        WHEN Tenure <= 12 THEN '0-12 Months'
        WHEN Tenure <= 24 THEN '12-24 Months'
        WHEN Tenure <= 36 THEN '24-36 Months'
        WHEN Tenure <= 48 THEN '36-48 Months'
        WHEN Tenure <= 60 THEN '48-60 Months'
        ELSE '60+ Months'
    END AS Tenure_Category,
    COUNT(*) AS Total_Customers,
    SUM(CASE WHEN Churn = 'Yes' THEN 1 ELSE 0 END) AS Total_Churned,
    SUM(CASE WHEN Churn = 'Yes' THEN 1 ELSE 0 END) * 100.0 / COUNT(*) AS ChurnRate_Percent
FROM telecom_churn
GROUP BY Tenure_Category
ORDER BY Total_Churned DESC;
```

Insights: The highest churn is in the short term(0-12 Months). We have a major problem in keeping new customers. So we must design and implement a retention program specially for short term customers.

Business Problems

- Customers who bought many services but still churned

Purposes:. To find customers who purchased a high number of extra services but still decided to churn(failure in service delivery).

```
SELECT CustomerID, Tenure, MonthlyCharges, TotalCharges, Churn,
  (CASE WHEN PhoneService = 'Yes' THEN 1 ELSE 0 END
   + CASE WHEN MultipleLines = 'Yes' THEN 1 ELSE 0 END
   + CASE WHEN OnlineSecurity = 'Yes' THEN 1 ELSE 0 END
   + CASE WHEN OnlineBackup = 'Yes' THEN 1 ELSE 0 END
   + CASE WHEN DeviceProtection = 'Yes' THEN 1 ELSE 0 END
   + CASE WHEN TechSupport = 'Yes' THEN 1 ELSE 0 END
   + CASE WHEN StreamingTV = 'Yes' THEN 1 ELSE 0 END
   + CASE WHEN StreamingMovies = 'Yes' THEN 1 ELSE 0 END) AS Num_of_services
FROM telecom_churn
WHERE Churn = 'Yes'
ORDER BY TotalCharges DESC
LIMIT 10;
```

CustomerID	Tenure	MonthlyCharges	TotalCharges	Churn	Num_of_services
2889-FPWRM	72	117.8	8684.80	Yes	8
0201-OAMXR	70	115.55	8127.60	Yes	8
3886-CERTZ	72	109.25	8109.80	Yes	7
1444-VVSGW	70	115.65	7968.85	Yes	8
5271-YNWVR	68	113.15	7856.00	Yes	8
8199-ZLLSA	67	118.35	7804.15	Yes	8
9053-JZFKV	67	116.2	7752.30	Yes	8
1555-DJEQW	70	114.2	7723.90	Yes	8
3259-FDWOY	71	106	7723.70	Yes	6
7317-GGVPB	71	108.6	7690.90	Yes	7

Insights: Identify customers who are losing interest in the best services because of the higher their expectation for quality and support. We must review the quality and responsiveness of our services.

Business Problems

- Total churn and churn rate by Payment method & paperless billing

Purposes: To identify the risk created by combining the electronic check payment method with paperless billing.

PaymentMethod	PaperlessBilling	Total_Customers	Total_Churned	ChurnRate_Percent
Bank transfer (automatic)	No	653	72	11.0260
Bank transfer (automatic)	Yes	891	186	20.8754
Credit card (automatic)	No	640	64	10.0000
Credit card (automatic)	Yes	882	168	19.0476
Electronic check	No	623	204	32.7448
Electronic check	Yes	1742	867	49.7704
Mailed check	No	956	129	13.4937
Mailed check	Yes	656	179	27.2866

```
SELECT PaymentMethod, PaperlessBilling,
       COUNT(*) AS Total_Customers,
       SUM(CASE WHEN Churn = 'Yes' THEN 1 ELSE 0 END) AS Total_Churned,
       100 * SUM(CASE WHEN Churn = 'Yes' THEN 1 ELSE 0 END) / COUNT(*) AS ChurnRate_Percent
FROM telecom_churn
GROUP BY PaymentMethod, PaperlessBilling
ORDER BY PaymentMethod;
```

Insights: The digital process involving electronic payments and billing is severely broken. We must immediately investigate and fix the system failures or confusing process steps related to Electronic Check payments and digital billing.

Business Problems

- Month-to-month customers with high monthly bills who left

Purposes:. Find high-paying customers on month-to-month plans who still churn (expensive losses)

```
SELECT CustomerID, Contract, Tenure, MonthlyCharges,
TotalCharges, Churn
FROM telecom_churn
WHERE Contract = 'Month-to-month' AND Churn = "Yes"
ORDER BY MonthlyCharges DESC
LIMIT 10;
```

CustomerID	Contract	Tenure	MonthlyCharges	TotalCharges	Churn
2302-ANTDP	Month-to-month	48	117.45	5438.90	Yes
4361-BKAXE	Month-to-month	41	114.5	4527.45	Yes
9158-VCTQB	Month-to-month	41	113.6	4594.95	Yes
7279-BUYWN	Month-to-month	41	113.2	4689.50	Yes
1583-IHQZE	Month-to-month	12	112.95	1384.75	Yes
0115-TFERT	Month-to-month	21	111.2	2317.10	Yes
9079-YEXQJ	Month-to-month	54	111.1	6014.85	Yes
5099-BAILX	Month-to-month	43	110.75	4687.90	Yes
3336-JORSO	Month-to-month	33	110.45	3655.45	Yes
9851-KIELU	Month-to-month	10	110.1	1043.30	Yes

Insights: To show which month-to-month customers were paying a lot but still left. Offer targeted incentives to these customers and focus on larger plans.

Dashboard Churn:

Churn Analysis DASHBOARD

Revenue

Service

Customers Age Group: 18-34 | 35-49 | 50-64 | 65-80 | 80+

Total Customers
7043

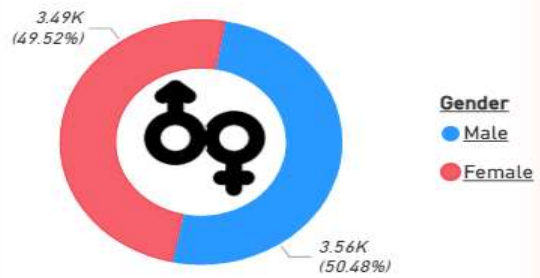
Total Churned
1869

Churn Rate %
26.54%

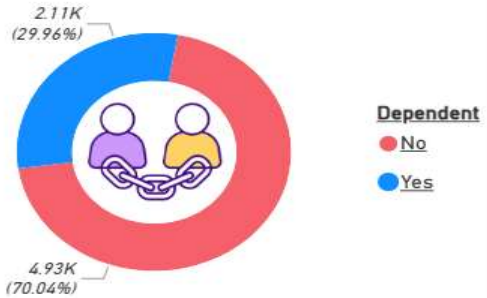
Retention Rate %
73.46%

Predictive CLV
$244

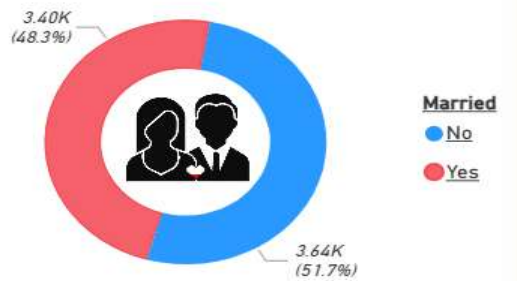
Total Customers By Gender



Total Customers By Dependents



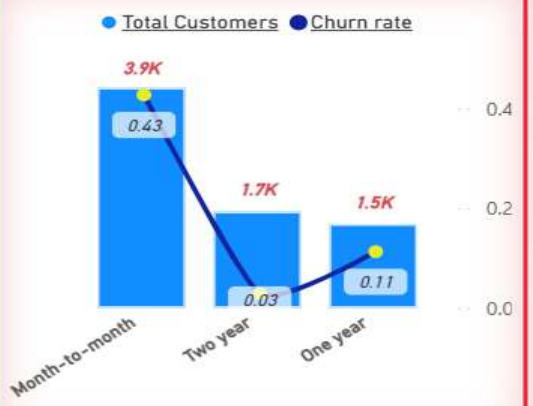
Total Customers By Married



Churned & Retained Customer By Tenure Category

Tenure Category	Churned Customr	Retained Customr
0-12 Months	1037	1149
12-24 Months	294	730
24-36 Months	180	652
36-48 Months	145	617
48-60 Months	120	712
60+ Months	93	1314
Total	1869	5174

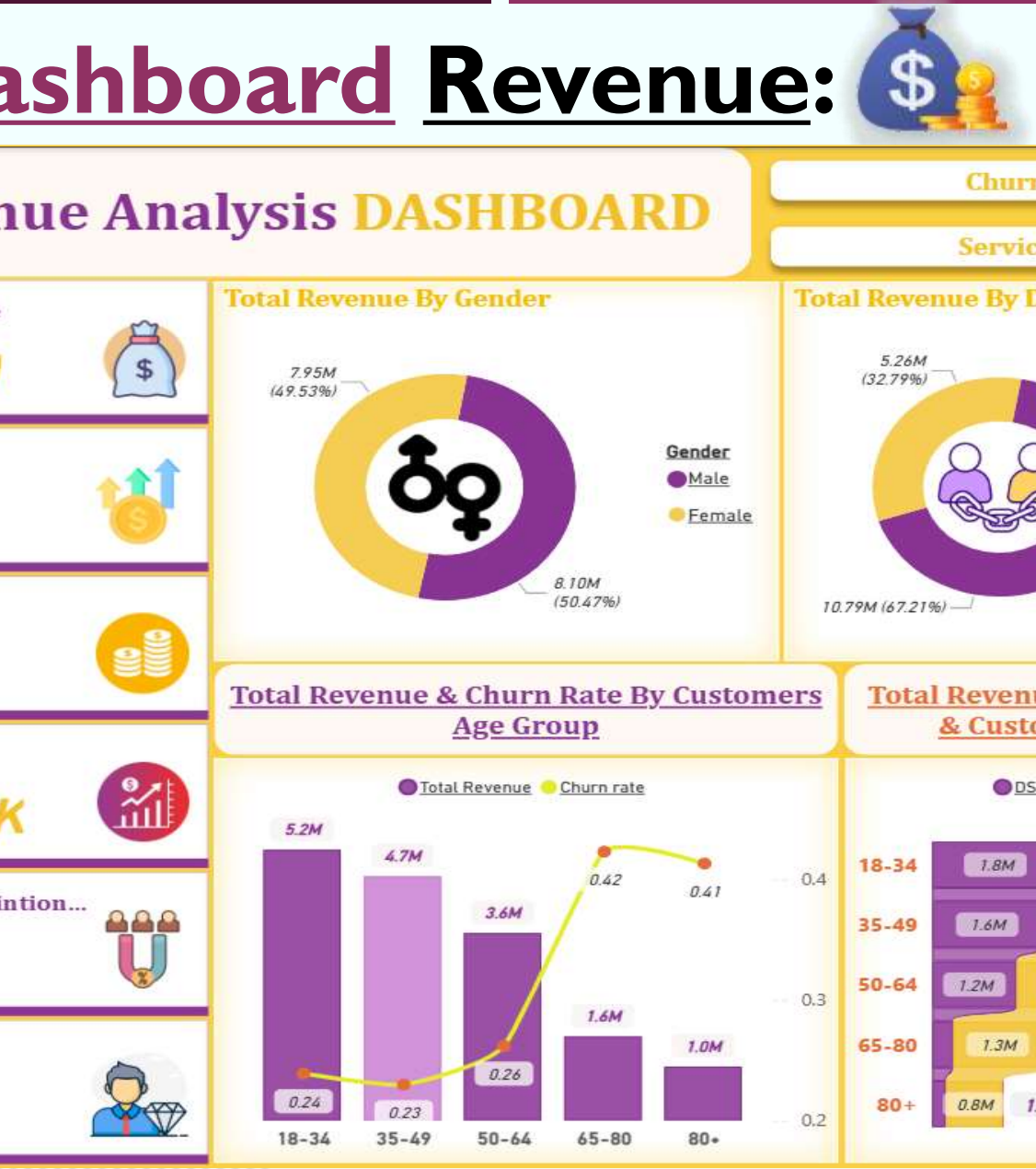
Customers & Churn Rate By Contract



Churned Customers Has Services

Services	No	Yes
DeviceProtection	68.96%	31.04%
MultipleLines	49.97%	50.03%
OnlineBackup	70.22%	29.78%
OnlineSecurity	83.20%	16.80%
StreamingMovies	53.42%	46.58%
StreamingTV	53.64%	46.36%
TechSupport	82.35%	17.65%

Dashboard Revenue:



Dashboard Service:

Service Analysis DASHBOARD

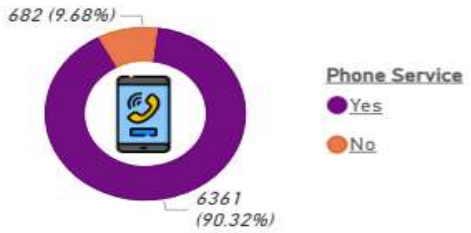
Churn

Revenue

Customers Age Group

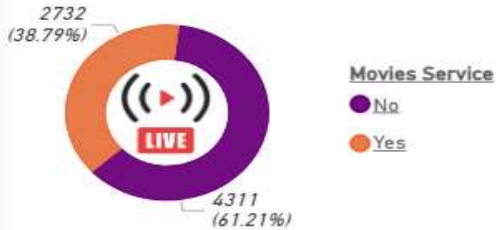
18-34 | 35-49 | 50-64 | 65-80 | 80+

Total Customers by Phone Service



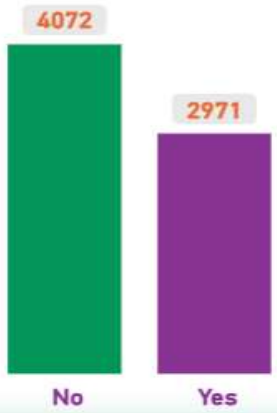
Total Customers by Tech Support

Total Customers by Streaming Movies

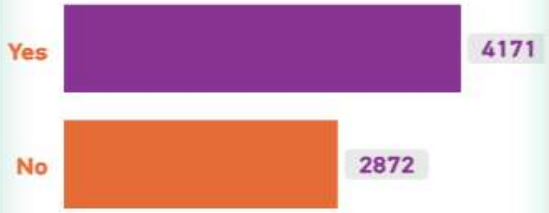


Total Customers by Streaming TV

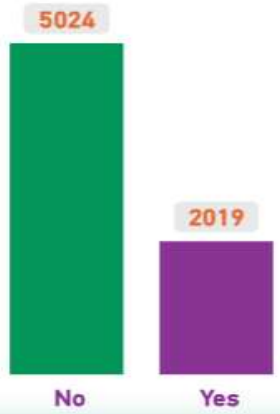
Total Customers by Multiple Lines



Total Customers by Paperless Billing



Total Customers by Online Security



Total Customers by Online Backup

Results & Insights

Service Quality: The customers who pay the most for premium services are the most unhappy & likely to leave.

New Customer Failure: We are failing to keep new customers. The first year of service is the highest risk period.

Customer Protect: Show customers have given the most revenue over their lifetime.

Age Group Focus: Some age groups both leave more & cost more in lost revenue.

Contract Commitment: The risky customer profile pays high prices on an easy month-to-month contract

Challenges Faced

The raw data had null values, which had to be carefully managed. Missing the customer's Date of birth, so create the Synthetic data within MYSQL to perform the valuable age group analysis.

Creating useful variables (age groups, tenure category, service counts) needs careful rules. Define clear, business-driven group rules and verify with samples before aggregating.

It analyses a huge number of factors. The challenge was to translate the technical results(MYSQL)into short, easy-to-understand that can be used to reduce churn.

Conclusion

This project successfully turned raw customer data into a clear strategy for reducing customer loss. This analysis shows that major problem with premium services are making the most valuable clients unhappy. By fixing the core service & process failures, we secure revenue & ensure better long-term customer loyalty. The data insights provide the roadmap needed for successful retention efforts.

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