Telecom Customer Churn Analysis Dashboard

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Tool Used:	**Microsoft Power BI**
Dataset:	**churn-bigml-20.csv**
Project Link:	**https://github.com/nisansalasandu/Customer-Churn-Analysis-Dashboard**

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1. Introduction

1.1 Project Overview

This project focuses on creating an interactive Power BI dashboard to analyze **customer churn** in a telecom company. The goal is to visualize trends, detect churn patterns, and identify key factors that lead to customer loss.

This project analyzes customer churn in a telecom company using Power BI.
The goal is to identify key patterns, behaviors, and factors that lead customers to leave the company. By visualizing churn data, the dashboard helps management improve customer retention, service quality, and revenue performance.

1.2 Business Problem

Telecom companies face high competition and customer switching. Understanding *why* customers leave and *who* is at risk can significantly improve retention and profitability.

1.3 Objectives

- To identify churn drivers such as service issues, charges, and usage behavior.
- To calculate churn rates and visualize them across states, tenure, and service categories.
- To provide actionable insights for customer retention strategies.

2. Dataset Overview

2.1 Data Source

The dataset used is **churn-bigml-20.csv**, which contains detailed customer-level data on usage, plans, charges, and churn status.

2.2 Key Attributes and Fields

Category	Attributes
Customer Info	State, Account Length, Area Code
Plans	International Plan, Voice Mail Plan
Usage	Day Minutes, Evening Minutes, Night Minutes, International Minutes, Day Calls, Evening Calls, Night Calls, International Calls
Charges	Day Charge, Evening Charge, Night Charge, International Charge
Support	Customer Service Calls
Target	Churn (Yes/No)

3. Tools and Technologies Used

- **Microsoft Power BI Desktop** – for data visualization and dashboard creation
- **Power Query Editor** – for cleaning and transforming data
- **DAX (Data Analysis Expressions)** – for custom measures and KPIs

4. Data Preparation and Cleaning

4.1 Importing Data into Power BI

- Used **Get Data → Text/CSV** to import churn-bigml-20.csv.
- Verified column names and data preview before loading.

4.2 Data Cleaning and Transformation

Performed using Power Query Editor:

- Renamed columns for clarity (e.g., Int'l plan → International Plan).
- Checked and replaced missing values. (no missing values or duplicated rows in this dataset)
- Adjusted data types (text, number, decimal).

4.3 Added Calculated New Columns

New Column	Purpose	Formula / Method
Tenure Group	Groups customers by account length	Conditional Column: If Account Length <50 → Low, <100 → Medium, else High
Total Calls	Total number of calls per customer	[Day Calls] + [Evening Calls] + [Night Calls] + [International Calls]
Total Minutes	Total call duration per Customer	[Day Minutes] + [Evening Minutes] + [Night Minutes] + [International Minutes]
Total Charges	Total billed amount per customer	[Day Charge] + [Evening Charge] + [Night Charge] + [International Charge]
High Service Caller	Flags frequent callers (>3 calls)	If Service Calls > 3 → "Yes", else "No"

- ❖ Clean and enriched dataset → Ready for visualization.

5. Data Modeling and DAX Measures

5.1 Relationship Setup

Since this dataset was from a single CSV, no relational modeling was required. All measures were created within the same table.

5.2 Key DAX Measures and Formulas

KPI	Description	DAX Measure	Visual
Total Customers	Total count of customers	COUNTROWS('churn-bigml-20')	Card
Churned Customers	Customers who left	CALCULATE(COUNTROWS('churn-bigml-20'), 'churn-bigml-20'[Churn]="Yes")	Card
Churn Rate (%)	% of customers who left	DIVIDE([Churned Customers],[Total Customers], 0)*100	Card
Total Revenue	Total charge from all call types of all customers	SUM('churn-bigml-20'[Day Charge])+SUM('churn-bigml-20'[Evening Charge])+SUM('churn-bigml-20'[Night Charge])+SUM('churn-bigml-20'[International Charge])	Card
Average Service Calls	Mean of service calls	AVERAGE('churn-bigml-20'[Service Calls])	Card
Churn due to High Calls	Churn with >3 service calls	CALCULATE([Churned Customers],'churn-bigml-20'[Service Calls]>3)	Card

6. Dashboard Design and Visualizations

The dashboard was divided into **two pages** for clear storytelling:

6.1 **Page 1:** Churn Overview Dashboard

Visuals:

1. **KPI cards** - Total Customers, Churn Rate, Revenue, etc.
2. **Donut Chart** – Churn (Yes) by International Plan
   Shows churn ratio between users with/without an international plan.
3. **Clustered Bar Chart** – Churn by State
   Identifies states with high churn counts.
4. **Column Chart** – Churn by Customer Service Calls
   Reveals if more service calls lead to churn.
5. **Line Chart** – Account Length vs Churn (No)
   Highlights retention trends with longer tenure.
6. **Pie Chart** – Total Charge by Tenure Group (Non-Churn)
   Displays revenue distribution by customer loyalty.
7. **Map** – Churn by State
   Visualizes churn concentration geographically.

Slicers:

- State
- Churn (Yes/No)

6.2 Page 2: Call Usage and Revenue Patterns

Donut Charts:

Visual	Value	Insight
Sum of Calls	Total calls by type (Day, Evening, Night, International)	Call usage pattern

Sum of Minutes	Total minutes by call type	Which time period customers use more
Sum of Charges	Total charge by call type	Revenue share per call type

Scatter Plots:

Visual	X-Axis	Y-Axis	Legend	Insight
Day Minutes vs Day Calls	Day Minutes	Day Calls	Churn	Shows relation between usage and churn
Evening Minutes vs Evening Calls	Evening Minutes	Evening Calls	Churn	Customer engagement at night
Night Minutes vs Night Calls	Night Minutes	Night Calls	Churn	Night usage behavior
International Minutes vs International Calls	International Minutes	International Calls	Churn	Correlation between high international use and churn

Bar Chart:

- **Sum of Total Charge by Tenure Group and Churn**
  → Reveals how loyal vs. new customers contribute to revenue.

Filters and Slicers

Interactive filters were added for:

- **Churn (Yes/No)**
- **Tenure Group**

7. KPI Cards and Metrics

KPI	Value	Insight
Total Customers	667	Active customers in dataset
Churned Customers	95	Customers who left
Churn Rate	14.24%	Percentage of churned users
Total Revenue	$40K	Combined total charges
Avg Service Calls	1.56	Average customer support interactions
Churn Due to High Calls	27	Customers churned due to service issues

8. Insights and Analysis

- Customers with International Plans show lower churn rates.
- States such as WA, KS, NJ have higher churned counts.
- Customers with more than 3 service calls are 27 out of 95.
- High Tenure customers contribute most to total revenue.
- Usage behavior (minutes and calls) varies significantly between churned and retained users.

9. Dashboard Design & Formatting Choices

- **Theme:** Dark background with contrasting bright visuals for clarity.
- **Color coding:**
    - Red for churn-related KPIs

- **Layout:** Two-page structure (Overview and Usage Insights).
- **Visual alignment:** All visuals neatly distributed and labeled.

10. Interactivity and User Experience

- Users can filter by *State* or *Churn status*.
- Visuals dynamically adjust with slicer selections.
- KPIs instantly update for real-time insights.
- Tooltip enhancements for detailed view of each data point.

11. Findings and Recommendations

- Focus on **customer support quality** — service call dissatisfaction is a major churn driver.
- Offer **loyalty benefits** for medium-tenure customers to reduce churn.
- Improve **International Plan offerings** to retain global customers.
- Monitor states with higher churn to tailor region-specific strategies.

12. Conclusion

The Telecom Customer Retention and Usage Insights Dashboard provided a comprehensive view of customer behavior, service usage, and churn dynamics across multiple dimensions. Through data visualization in Power BI, it became clear that several factors contribute to customer churn. By transforming raw data into meaningful insights, this dashboard supports strategic decision-making for customer retention and revenue improvement.

The analysis does not show that customers with high service call counts are more likely to churn. The dashboard's interactive design allows managers to easily filter, compare, and analyze customer segments, enabling deeper exploration of churn causes and usage patterns. This flexibility ensures that decision-makers can monitor key performance indicators in real time and identify emerging risks early.

In conclusion, the Power BI dashboard successfully converts complex customer data into clear, actionable insights. It empowers business leaders to make informed, data-driven decisions, improve service quality, and implement effective retention strategies. With regular updates and continuous data monitoring, this solution can help the company enhance customer satisfaction, reduce churn rates, and sustain long-term profitability in a competitive telecom market.

End of the Report.
