📊 *Customer Churn Analysis Dashboard*

(Power BI)

💥 Project Overview

This project presents an end-to-end **Customer Churn Analysis Dashboard** built using **SQL + Power BI** to analyze customer retention, revenue impact, and behavioral risk indicators.

The objective was to design a scalable data model, implement advanced DAX measures, and deliver executive-ready insights to support churn reduction strategy and revenue protection.

🎯 Business Objectives

- ★ Measure overall **Churn Rate (%)**
- ★ Identify **Revenue Impact from Churned Customers**
- ★ Detect **High-Value Customers at Risk**
- ★ Analyze **Churn Drivers** (Plan Type, Region, Tenure, Support Behavior)
- ★ Build an interactive dashboard with tooltips and drill analysis

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📂 Dataset Description

The dataset consists of the following tables:

Table	Description
tab_customers	Customer demographic details

`tab_subscriptions`	Plan type, start/end dates, churn flag
`tab_transactions`	Revenue transactions per customer
`tab_support_tickets`	Customer service interaction history

🧱 Data Model Design

The model follows a **clean star-schema-like structure**:

```
                 tab_customers
                      |
   _____
  |                    |                            |
tab_subscriptions   tab_transactions      tab_support_tickets
```

- ❖ `tab_customers` acts as the central dimension
- ❖ All fact tables are connected via `customer_id`
- ❖ Single-direction relationships (no ambiguity)
- ❖ No bidirectional filters

This prevents double counting and ensures clean filter propagation.

🧮 Key DAX Measures Implemented

Core KPIs

- ★ `Total Customers`
- ★ `Churned Customers`
- ★ `Churn Rate %`
- ★ `Total Revenue`
- ★ `Revenue from Churned Customers`
- ★ `Revenue from Active Customers`
- ★ `Avg Tickets per Customer`
- ★ `Avg Customer Tenure (Days)`

Advanced DAX Technique Used

Since churn status and revenue existed in separate fact tables, `TREATAS()` was used with `CALCULATETABLE()` to correctly propagate churn filters across the customer dimension for accurate revenue attribution.

Example:

```
Revenue from Churned Customers =
CALCULATE(
    [Total Revenue],
    TREATAS(
        CALCULATETABLE(
            VALUES(tab_subscriptions[customer_id]),
            tab_subscriptions[churn_flag] = 1
        ),
        tab_customers[customer_id]
    )
)
```

This ensured:

- ❖ No incorrect 50–50 revenue splits
- ❖ Accurate churn-based revenue segmentation
- ❖ No need for ambiguous model relationships

📈 Dashboard Pages

1️⃣ Executive Overview

- ❖ Total Customers
- ❖ Churn Rate %
- ❖ Revenue Impact
- ❖ Active vs Churned Comparison
- ❖ Executive Insight Summary

2️⃣ Churn Drivers Analysis

- ❖ Churn by Plan Type
- ❖ Churn by Region

- ❖ Tenure Distribution
- ❖ Support Behavior Impact
- ❖ Behavioral Risk Indicators

3️⃣ Revenue Impact & High-Value Risk

- ❖ Revenue Loss from Churn
- ❖ High-Value Customer Risk Segments
- ❖ Revenue Concentration Analysis
- ❖ Risk-Based Insights

🎨 Advanced UX Features

- ★ Report Page Tooltips (contextual churn insights)
- ★ Navigation buttons (multi-page flow)
- ★ Clean executive layout
- ★ Insight text summaries per page
- ★ KPI integrity validation & stress testing

🔍 Key Business Insights

- ★ Churn rate aligns with behavioral risk signals.
- ★ Churned customers contribute disproportionately to revenue.
- ★ High-tier plan holders show elevated churn probability.
- ★ Higher support ticket volume correlates with churn risk.
- ★ Certain regions demonstrate concentrated churn clusters.
- ★ High-value customers require a targeted retention strategy.

💼 Business Recommendations

- ★ Implement early-warning triggers for customers with increasing support frequency.
- ★ Prioritize retention campaigns for high-tier plan subscribers.
- ★ Introduce loyalty benefits for high-revenue customers approaching renewal.
- ★ Monitor churn-prone regions with proactive outreach.
- ★ Develop churn prediction scoring using behavioral signals.
- ★ Align customer success teams with high-risk segments.

🧪 KPI Integrity Validation

Before final export, the dashboard underwent:

- ★ Filter context stress testing
- ★ Churn filter propagation validation
- ★ SQL baseline reconciliation
- ★ Revenue aggregation verification
- ★ Cross-page consistency checks

All KPIs were validated and confirmed accurately.

🛠️ Tools Used

- ★ SQL (Data Analysis & Validation)
- ★ Power BI Desktop
- ★ DAX (Advanced Filter Context Handling)
- ★ Data Modeling (Star Schema Principles)

🗃️ Project Files

```
Customer-Churn-PowerBI/
|
├── data/
├── dashboard/
|    └── Customer_Churn_Analysis.pbix
|
├── report/
|    └── Customer_Churn_Analysis_Dashboard.pdf
|
├── template/
|    └── Customer_Churn_Analysis.pbit
|
└── README.md
```

🚀 Portfolio Value

This project demonstrates:

- ★ End-to-end BI development
- ★ Strong data modeling fundamentals
- ★ Advanced DAX proficiency
- ★ Business-driven analytical thinking
- ★ Executive-ready dashboard design
- ★ Real-world decision support capability

👦🏻 Author

Anirudha Das
Aspiring Data Analyst / Business Intelligence Professional
📍 Bolpur, WB, India