



# Customer Churn Analysis Dashboard

(Power BI)

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## ★ 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.

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## 🎯 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
customers	Customer demographic details

<code>subscriptions</code>	Plan type, start/end dates, churn flag
<code>transactions</code>	Revenue transactions per customer
<code>support_tickets</code>	Customer service interaction history

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## Data Model Design

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



- ❖ `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.

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## 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
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## Dashboard Pages

### 1 Executive Overview

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

### 2 Churn Drivers Analysis

- ❖ Churn by Plan Type
- ❖ Churn by Region

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

### **Revenue Impact & High-Value Risk**

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

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## 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.

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## Tools Used

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

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

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## 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
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