📊 Telecom Customer Churn Analysis

Description	This project explores customer churn at **Maven Communications**, a California-based telecom company. Using a real-world dataset, I analyzed service usage patterns, churn behaviour, and customer segmentation to uncover **key insights for improving retention**.
Skills	Analysis · Data Storytelling · Google Sheets · Visualization
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Executive Summary

This project explores customer churn at **Maven Communications**, a California-based telecom company. Using a real-world dataset, I analyzed service usage patterns, churn behaviour, and customer segmentation to uncover **key insights for improving retention**. The analysis reveals that:

- **26.5% of customers churn**, with churn rates highest among those on **Month-to-Month contracts**.
- Customers **without Online Security** are nearly **3x more likely** to churn.
- The **first month** is a critical point for churn; many customers leave shortly after joining.

🎯Objective

You are hired at Maven Communications, a California-based Telecommunications company, as a data analyst. Your goal is to gain insight on the proportion of customers who cancel their services with the company. Cancellation is also sometimes known as churn. By studying cancellation risks, the company can improve retention. Understand what drives customer churn, uncover risk patterns, and offer data-backed recommendations to help Maven Communications **retain more customers**.

Dataset

Source: Telecom Customer Churn

https://www.mavenanalytics.io/data-playground?page=5&pageSize=10

Rows: 7,043 customers

Type: Cross-sectional

Churn data for a fictional Telecommunications company that provides phone and internet services to 7,043 customers in California, and includes details about customer demographics, location, services, and current status

Every row (observation) in the dataset represents one customer and the columns (features) are:

Column	Description
Customer ID	A unique ID that identifies each customer
Gender	The customer's gender: Male, Female
Age	The customer's current age, in years, at the time the fiscal quarter ended
Married	Indicates if the customer is married: Yes, N
Number of Dependents	Number of dependents living with the customer (e.g., children, parents)
City	Name of the city where the customer resides, based on their registered address
Number of Referrals	Number of times the customer referred someone to the company
Tenure in Months	Total number of months the customer has been with the company by quarter end
Offer	Last marketing offer accepted: None, Offer A–E
Phone Service	Indicates home phone subscription: Yes, No
Avg Monthly Long Distance Charges	Customer's average long distance charges to date
Multiple Lines	Indicates multiple phone line subscription: Yes, No (No if no phone service)
Internet Service	Indicates Internet subscription: Yes, No
Internet Type	Type of internet: DSL, Fiber Optic, Cable, None
Avg Monthly GB Download	Average GB download per month (0 if no internet service)
Online Security	Subscribed to online security service: Yes, No (No if no internet service)
Online Backup	Subscribed to online backup service: Yes, No (No if no internet service)
Device Protection Plan	Subscribed to device protection: Yes, No (No if no internet service)

Premium Tech Support	Subscribed to tech support plan: Yes, No (No if no internet service)
Streaming TV	Uses internet to stream TV: Yes, No (No if no internet service)
Streaming Movies	Uses internet to stream movies: Yes, No (No if no internet service)
Streaming Music	Uses internet to stream music: Yes, No (No if no internet service)
Unlimited Data	Has unlimited data plan: Yes, No (No if no internet service)
Contract	Current contract type: Month-to-Month, One Year, Two Year
Paperless Billing	Chosen paperless billing: Yes, No
Payment Method	Payment method: Bank Withdrawal, Credit Card, Mailed Check
Monthly Charge	Current total monthly charge for services
Total Charges	Total charges to date
Total Refunds	Total refunds to date
Total Extra Data Charges	Total charges for extra data beyond the plan
Total Long Distance Charges	Total long distance charges beyond the plan
Total Revenue	Company's total revenue from the customer (Charges - Refunds + Extras)
Customer Status	Status at the end of the quarter: Churned, Stayed, Joined
Churn Category	Broad reason for churning: Attitude, Competitor, etc.
Churn Reason	Specific reason for leaving (tied to Churn Category)

Columns Generated to Support Analysis

Column	Formula
Churned	`=IF(Status="Churned", DIVIDE(Revenue,tenure),"")`
Stayed	`=IF(Status="stayed", DIVIDE(Revenue,tenure),"")`
Most Common Churn Reason	`=IF(Churn_reason="Competitor had better devices", Revenue/tenure, "")`
Second Common Churn	`=IF(Churn_reason="Competitor made better offer", Revenue/tenure, "")`

Reason	
Third Common Churn Reason	`=IF(Churn_reason="Attitude of support person", Revenue/tenure, "")`

▼ Data questions

1. **How many rows are there in the dataset?**
    - 7044
2. **Reflect on the types of each feature. How many of them are numerical**
    - 12 numerical features
    - Numerical features are columns where the values are quantities you can perform math on; like addition, averages, or comparisons.
3. **How many features are categorical?**
    - 24 categorical features
    - Categorical features are columns where Values belong to a fixed set of categories or options. They are labels, not quantities, we can't do math on them.
4. **Is this dataset time series or cross sectional data?**
    - Cross-sectional data
    - This is cross-sectional data since it captures a snapshot of each customer at a point in time, not over time.

▼ Metrics

1. **What is the percentage of all customers who churned?**
    - 26.54%
    - `=COUNTIF(Status,"Churned")/COUNTA(Customer_ID)`
2. **Which contract duration has the highest total number of churns?**
    - Month-to-Month

Contract	Number of churns	Formula
One Year	166	`=COUNTIFS(Status,"=Churned", contract,B20`

Contract	Number of churns	Formula
Two Year	48	`=COUNTIFS(Status,"=Churned", contract,B21`
Month-to-Month	1655	`=COUNTIFS(Status,"=Churned", contract,B22`
Total	1869	`=SUM(C20:C22)`

3. **Which offer type (including "None") has the highest total number of churns?**
    - None

Offer	Number of Churns	Formula
None	1051	`=COUNTIFS(Status,"=Churned",Offer,B26)`
Offer A	35	`=COUNTIFS(Status,"=Churned",Offer,B27)`
Offer B	101	`=COUNTIFS(Status,"=Churned",Offer,B28)`
Offer C	95	`=COUNTIFS(Status,"=Churned",Offer,B29)`
Offer D	161	`=COUNTIFS(Status,"=Churned",Offer,B30)`
Offer E	426	`=COUNTIFS(Status,"=Churned",Offer,B31)`

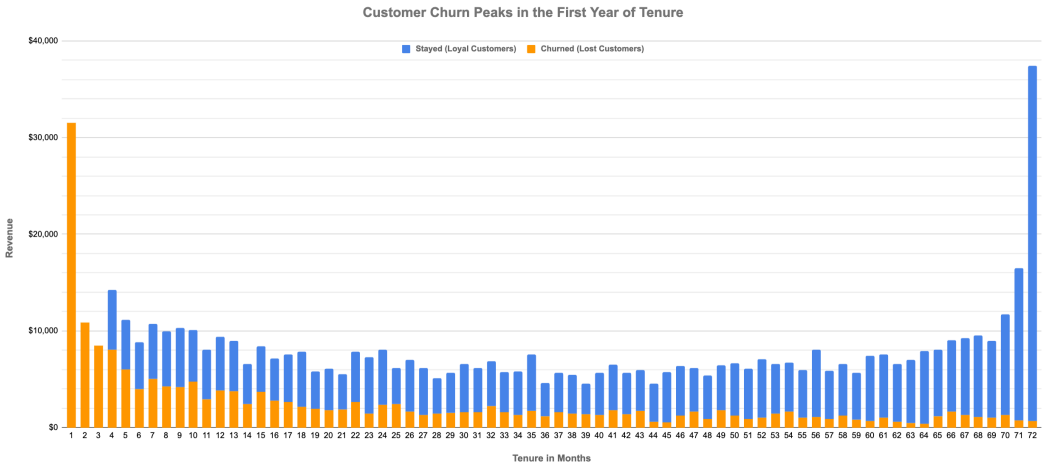
4. **Which offer type (including "None") has the highest total proportion of churns?**
    - Offer E

Offer	Proportion of churns	Formula (Number of Churns by Total number of customer)
None	27.1%	`=DIVIDE(Number of Churn (None), COUNTUNIQUEIFS(Customer_ID,Offer,B34))`
Offer A	6.7%	`=DIVIDE(Number of Churn (Offer A), COUNTUNIQUEIFS(Customer_ID,Offer,B35))`
Offer B	12.3%	`=DIVIDE(Number of Churn (Offer B), COUNTUNIQUEIFS(Customer_ID,Offer,B36))`
Offer C	22.9%	`=DIVIDE(Number of Churn (Offer C), COUNTUNIQUEIFS(Customer_ID,Offer,B37))`
Offer D	26.7%	`=DIVIDE(Number of Churn (Offer D), COUNTUNIQUEIFS(Customer_ID,Offer,B38))`
Offer E	52.9%	`=DIVIDE(Number of Churn (Offer E), COUNTUNIQUEIFS(Customer_ID,Offer,B39))`

5. **What is the churn proportion for customers with Online Security?**
    - 14.6% - `=DIVIDE(COUNTIFS(Status,"=Churned",online_security,B42), COUNTUNIQUEIFS(Customer_ID,online_security,B42))`
6. **What is the churn proportion for customers without Online Security?**
    - 41.8% - `=DIVIDE(COUNTIFS(Status,"=Churned",online_security,B43), COUNTUNIQUEIFS(Customer_ID,online_security,B43))`

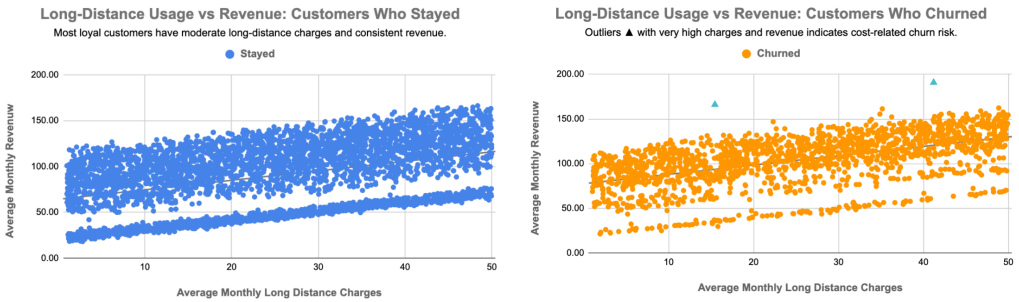
▼ Visualization

1. **Does the number of churns generally increase or decrease as tenure increases?**
    - Decreases



    - **High churn occurs early:** The first few months, especially the **first month**, show a **massive spike in revenue from churned customers**, indicating many customers leave right after joining.
    - **Retention pays off:** Customers with longer tenure (particularly 72 months) contribute **significantly higher revenue**, and these are almost entirely customers who stayed.
    - **Stable loyalty effect:** After the initial drop in churn, the number of churned customers tapers off and remains low, while retained customers consistently contribute.
2. **Does the average monthly revenue generally increase or decrease with the average monthly long distance charges?**

- **Yes**, in both groups, **average monthly revenue generally increases** with **average monthly long distance charges**



🔵 **Customers Who Stayed**

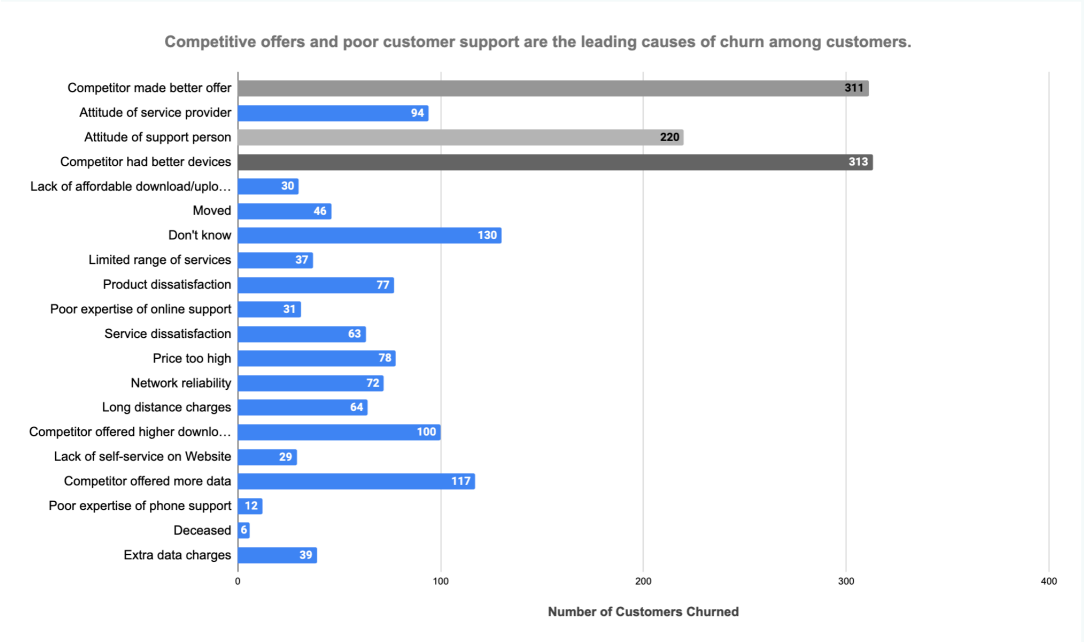
- **Positive correlation**: As long-distance charges increase, so does revenue.
- Indicates that **higher usage aligns with loyalty** and **consistent revenue generation**.

🟠 **Customers Who Churned**

- A **weaker upward trend** is observed, but the data is **more scattered**.
- **Higher variability** suggests **inconsistent behavior** and potential **billing dissatisfaction**.
- Presence of **high-charge outliers** points to **cost-related churn risk**, especially among heavy users.

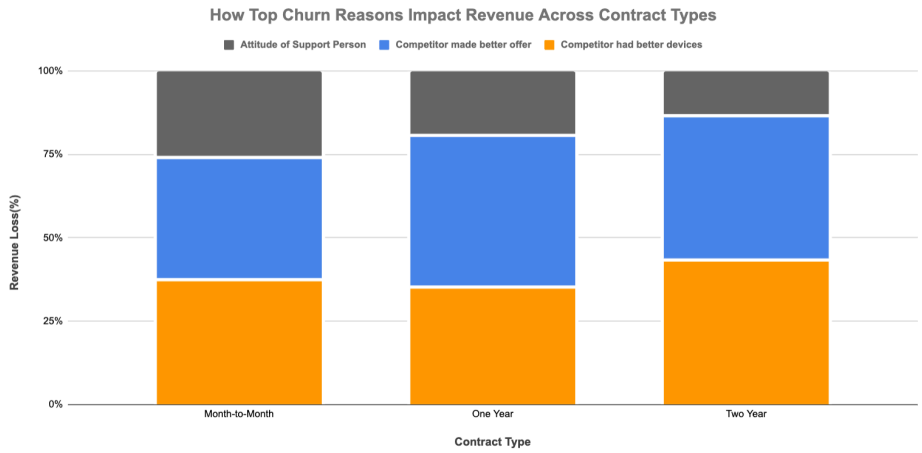
▼ Churn Reason

1. **Which are the 3 most frequent churn reasons?**
   - Competitor had better devices
   - Competitor made better offer
   - Attitude of support person



2. **For what duration of contract is the attitude of support person the most important in terms of the percentage of lost revenue due to churn?**

    - Month-to-Month



- **Two-Year Contracts** have a **higher share** of revenue loss due to **"Competitor made better offer"**.
- **Month-to-Month Contracts** show a more **balanced distribution** across all three churn reasons.

- The **"Attitude of Support Person"** becomes **less impactful** for longer-term contracts.

▼ Recommendations

- 🎯 **Focus on early-stage retention** - Improve onboarding and first-month experience.
- 🛡️ **Promote Online Security** - Bundle it or offer it as a free trial to reduce churn.
- 🧾 **Encourage longer-term contracts** - Use targeted incentives to convert Month-to-Month users.
- 📞 **Improve support quality** - Train frontline staff, monitor support satisfaction.

▼ Tools Used

- **Google Sheets** – Data wrangling, formula-based analysis, and chart creation.
