Telco Customer Churn Prediction and Retention Analysis

Executive Summary

The analysis was conducted on **7,043 customer records** with 21 variables, covering demographics, service subscriptions, billing methods, contracts, and churn status. The study aimed to uncover drivers of churn and provide strategic recommendations for customer retention.

📂 Dataset Summary

Total Records: 7,043 customer entries with 21 variables.

Customer Demographics: Gender, SeniorCitizen, Partner, Dependents.

Account Information: CustomerID, Tenure, Contract, PaperlessBilling, PaymentMethod.

Services Subscribed: PhoneService, MultipleLines, InternetService, OnlineSecurity, OnlineBackup, DeviceProtection, TechSupport, StreamingTV, StreamingMovies.

Charges & Billing: MonthlyCharges, TotalCharges.

Target Variable: Churn (Yes/No).

📊 Key Statistics

- **Churn Rate**: 26.5% customers discontinued service (1,869 out of 7,043).
- **Customer Retention**: 73.5% stayed (5,174 customers).
- **Average Tenure**: ~32 months.
- **Contract Types**:
  - Month-to-Month → 55% of customers.
  - 1-Year Contract → 21%.
  - 2-Year Contract → 24%.

- **Billing Preferences**: ~59% use Paperless Billing.
- **Average Monthly Charges**: ~$65.
- **Average Total Charges**: ~$2,280.
- **Senior Citizens**: ~16% of the customer base.

Research Questions

📊 Count of Customers by Churn

- The dataset has **7,043 customers** in total.
- Out of these, **5,174 customers (73.5%) did not churn**, while **1,869 customers (26.5%) churned**.
- This means **roughly 1 in 4 customers leave the service**.
- The plot shows a **clear imbalance**, with significantly more customers staying than leaving.
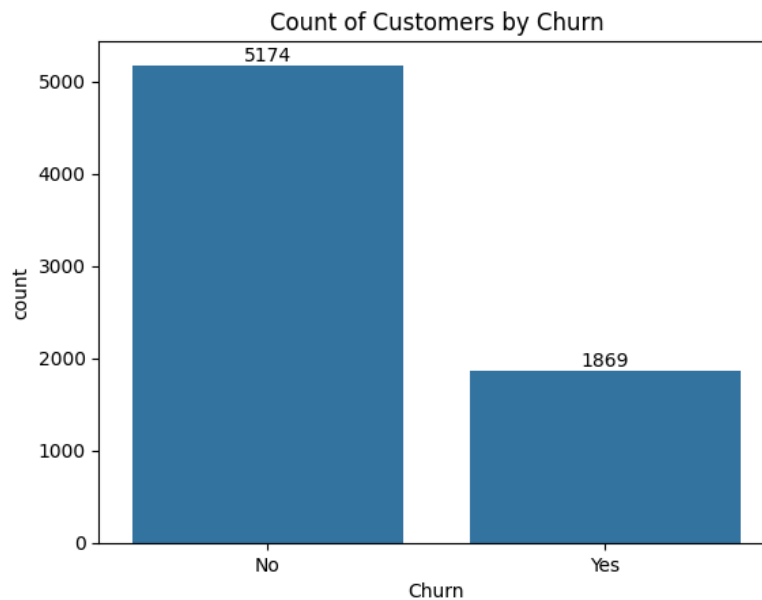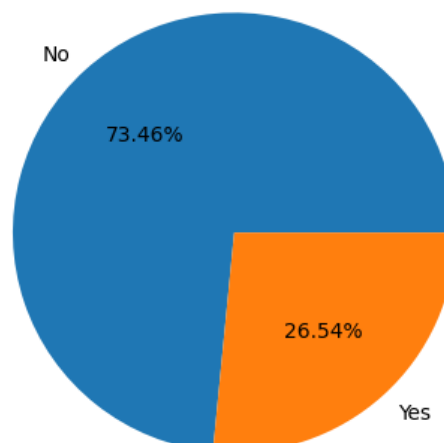

📊 Percentage of Churn Customers

The pie chart illustrates the distribution of customers who have **churned vs. stayed**:

- **Churned Customers**: ~**26.5%** of the total base (≈1,869 out of 7,043).
- **Retained Customers**: ~**73.5%** of the total base (≈5,174 out of 7,043).

This means that **1 in every 4 customers leaves the company**, which highlights a **serious retention challenge**. A churn rate above **25%** is considered high in the telecom industry, signaling the need for **targeted strategies** to retain at-risk customers.
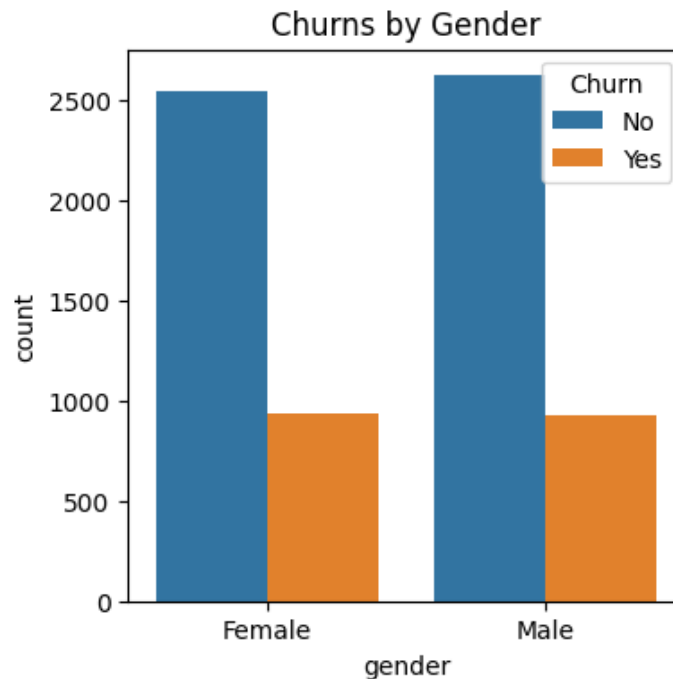
📊 Churn by Gender

The **countplot of churn by gender** shows:

- The churn rate is **almost identical** between **male** and **female** customers.
- Around **27% of both genders** discontinue services, indicating **gender is not a significant factor** in predicting churn.
- This suggests that **service experience, billing, and contract type** are stronger drivers of churn than gender differences.

📊 Count of Customers by SeniorCitizen

- The majority of customers are **non-senior citizens (coded as 0)**.
- **Senior citizens (coded as 1)** make up a **smaller portion** of the customer base.
- Even though they represent a **minority in count**, senior citizens show a **much higher churn rate (~42%)** compared to non-seniors (~24%).

While most customers are younger, senior citizens are a **high-risk group** for churn and need focused retention strategies (e.g., personalized offers, better support, senior-friendly plans).
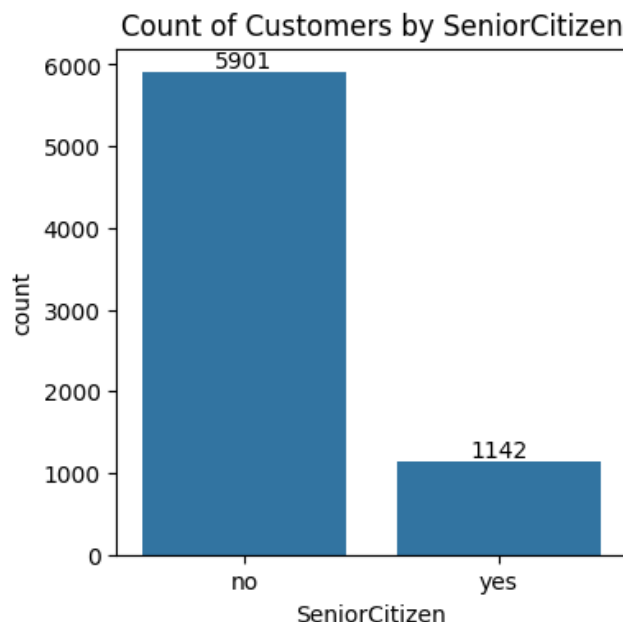
📊 Churn % by SeniorCitizen

- Among **non-senior citizens (0)**, about **24% churned**, while **76% stayed**.
- Among **senior citizens (1)**, churn is much higher at around **42%**, with only **58% staying**.

Senior citizens are **nearly twice as likely** to churn compared to younger customers.
This indicates that age is a significant driver of churn, and telecom providers should consider **senior-friendly plans, better support services, and targeted retention campaigns** to improve loyalty among this group.
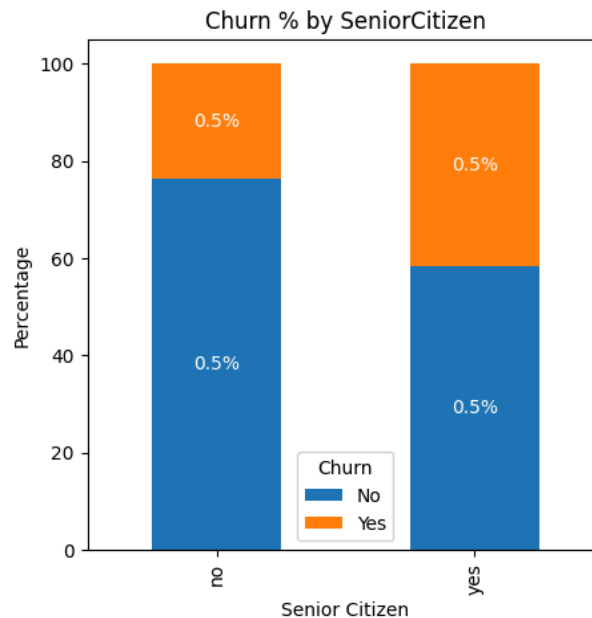
📊 Finding: Distribution of Tenure by Churn

- **Customers with very short tenure (1–2 months)** show the **highest churn rates (>50%)**.
- As tenure increases, churn decreases significantly. Customers who stay longer than **24 months** are **much more likely to remain loyal**.
- The distribution reveals two distinct groups:
  - **High-risk new customers** (short-tenure, high churn).
  - **Stable long-term customers** (long-tenure, low churn).

The **first few months** are critical — poor onboarding or service experience early drives churn. Strengthening customer onboarding and engagement can significantly reduce early churn and improve long-term retention.
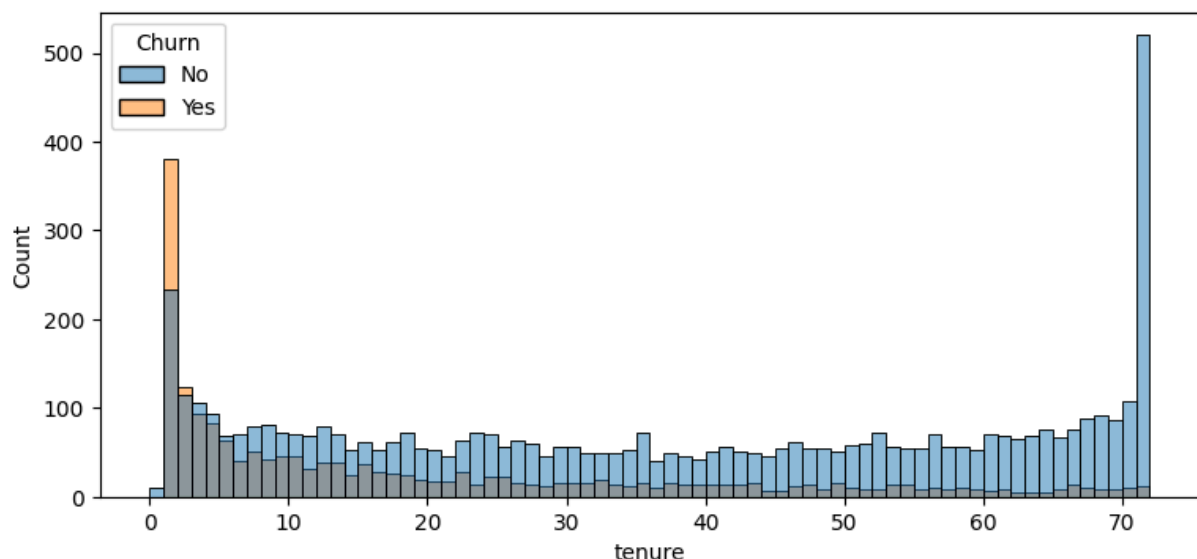
📊 Customer Churn by Contract Type

- **Month-to-Month contracts** dominate the customer base but also account for the **highest churn rate (~43%)**.
- **One-year contracts** show a much lower churn rate (~11%).
- **Two-year contracts** have the **lowest churn (~3%)**, with the majority of customers staying.

Customers on **short-term contracts are far more likely to churn**, while long-term commitments significantly improve retention. Incentivizing customers to shift from month-to-month to annual or bi-annual contracts could drastically reduce churn.
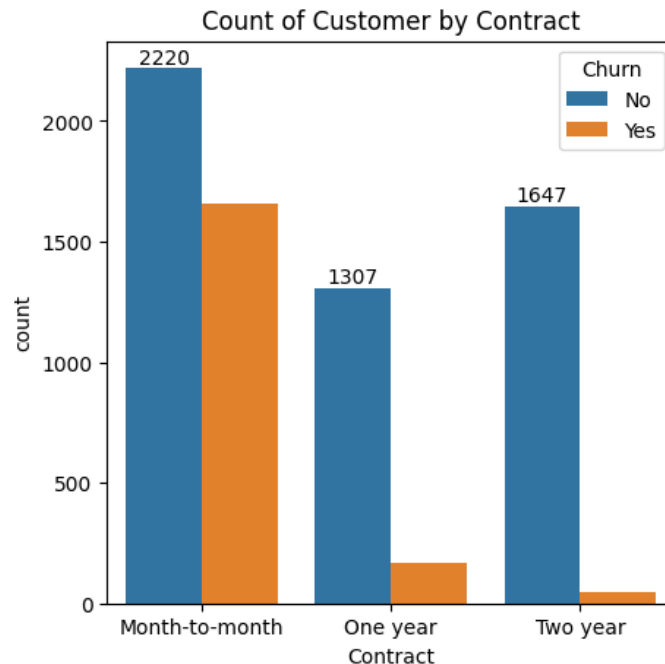
📊 Churn Across Categorical Variables

1. **Demographics**

   - **Senior Citizens** show a **much higher churn rate (~42%)** compared to younger customers (~24%).

   - **Partner & Dependents:** Customers without partners (~32%) or dependents (~31%) churn far more than those with family ties (20% and 16% respectively).

   - **Gender:** Churn is almost identical for males and females (~27%), showing gender isn't a key churn driver.

2. **Telecom Services**

   - **Internet Service:** Fiber optic customers churn at ~42%, nearly double DSL (~19%).

   - **Phone Service:** No major difference between single-line and multiple-line users.

   - **Add-on Services:** Lack of **Tech Support (41%), Online Security (40%), Device Protection (37%)** strongly correlates with churn. Customers with these services churn at less than half those rates (~15–20%).

3. **Entertainment Services**

   - Streaming TV and Movies alone don't strongly impact churn, but when **bundled with other add-ons**, churn rates drop significantly.

4. **Contracts & Billing**

   - **Month-to-Month contracts:** Highest churn (~43%).

- ○ **One-Year contracts:** ~11% churn.

- ○ **Two-Year contracts:** ~3% churn (lowest).

- ○ **Paperless Billing:** Higher churn (~33%) vs. mailed bills (~23%).

5. **Payment Method**

- ○ Customers paying via **electronic check** churn at the highest rate (~45%).

- ○ Auto-pay methods like **credit card (15%)** and **bank transfer (16%)** show the strongest retention.

👉 **Overall Insight:**
 Churn is heavily influenced by **contract length, payment methods, and lack of value-added services (Tech Support, Security, Protection)**. Demographics like age and family status also matter, but service and billing choices are the strongest levers for retention.
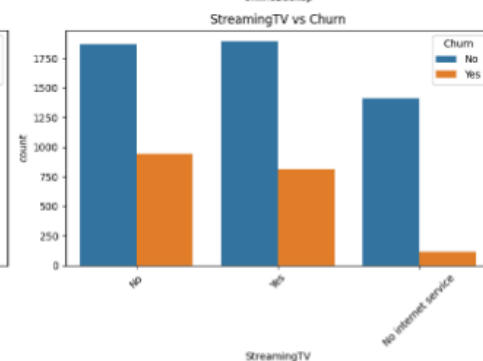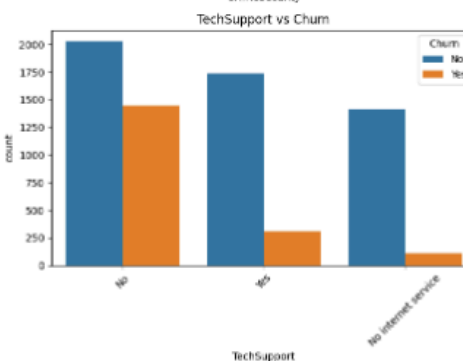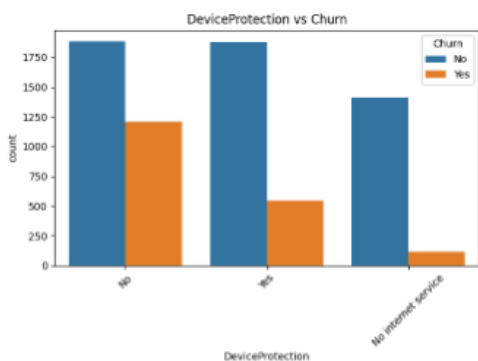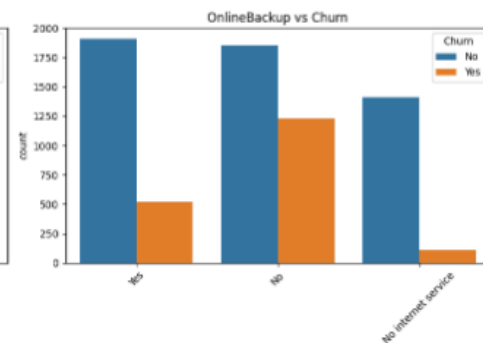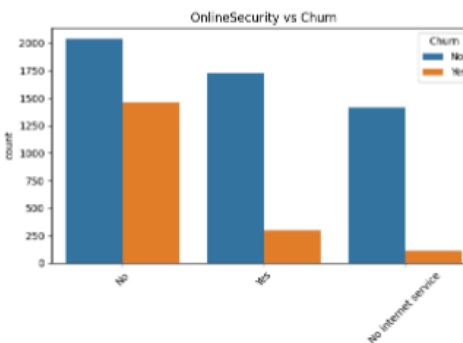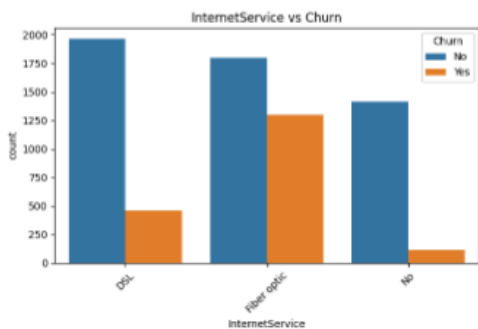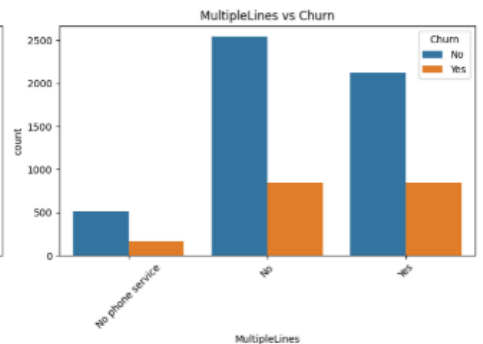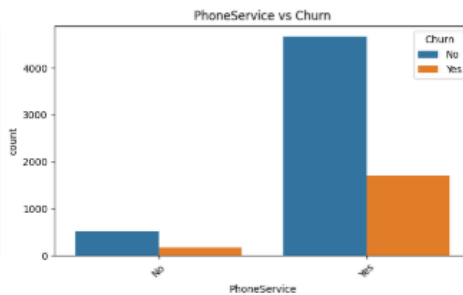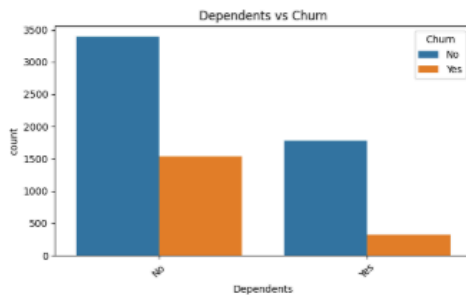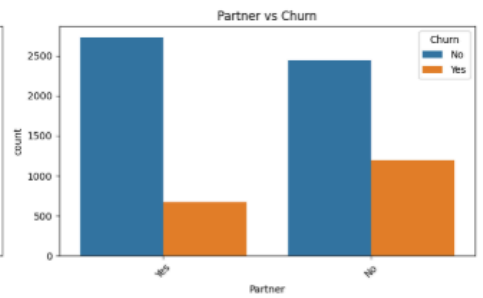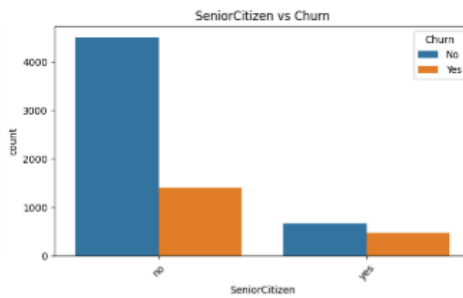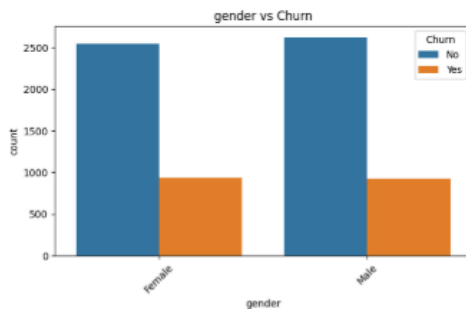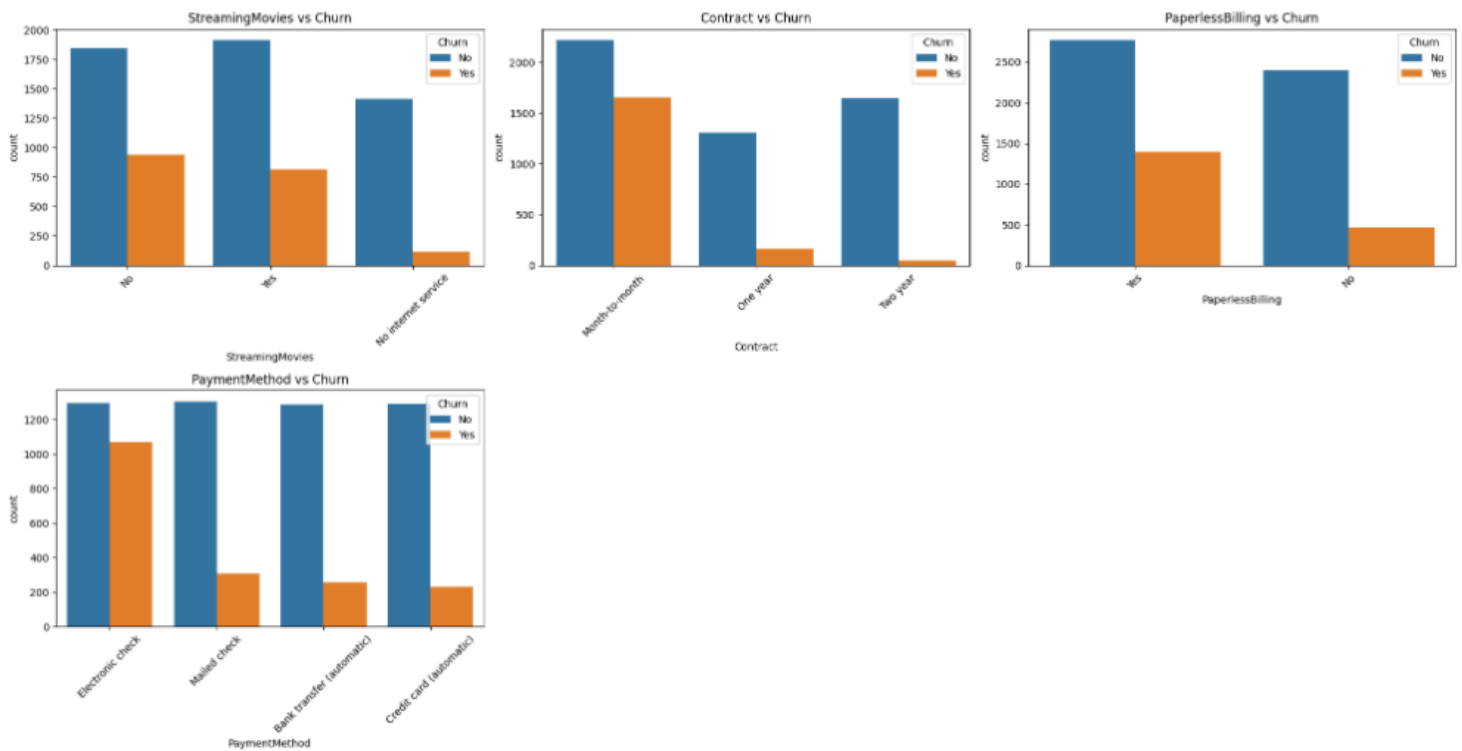
📊 Churn by Payment Method

1. **Electronic Check** customers are the **most vulnerable group**, with a churn rate of about **45%** – nearly **1 in 2 customers** paying this way end up leaving.

2. **Mailed Check** shows a significantly lower churn rate (~19%), suggesting that traditional payers are relatively more loyal.

3. **Auto-Pay Options** (Credit Card & Bank Transfer) are the **safest payment modes** for retention:

   ○ **Credit Card Auto-Pay:** Only ~15% churn.

   ○ **Bank Transfer Auto-Pay:** Similar at ~16% churn.

4. This highlights a strong behavioral trend – **customers who automate their payments tend to stay longer**, while those paying electronically each month are at the highest risk of leaving.
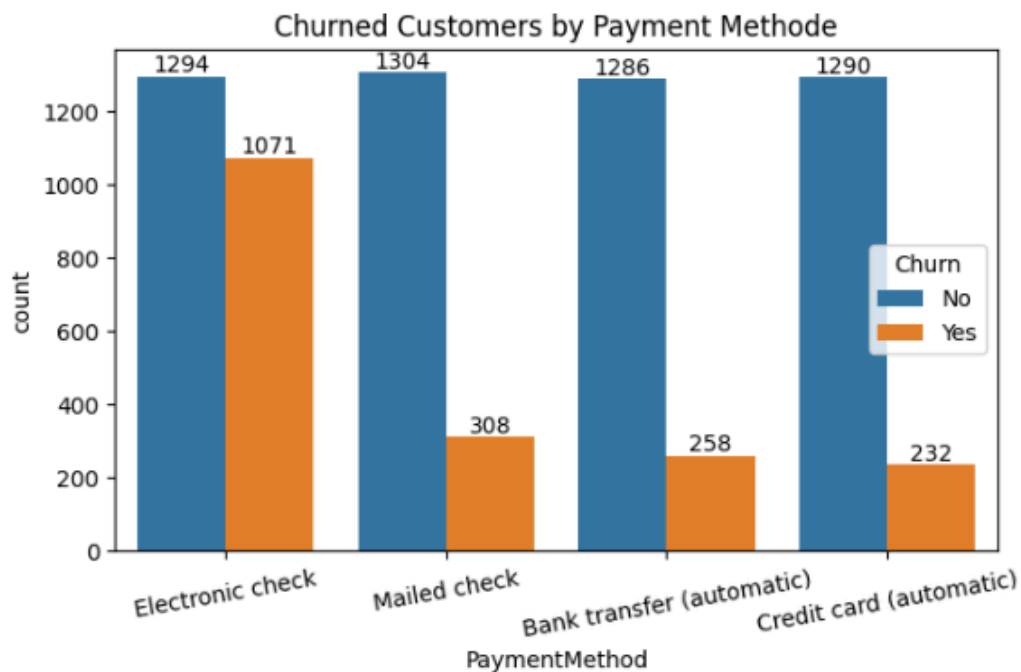
Strategic Recommendations

1. **Promote Long-Term Contracts**

   - Customers on **month-to-month contracts churn at 43%**, compared to only **3% on two-year contracts**.

   - Incentivize upgrades through **discounts, loyalty rewards, and bundled packages** to lock in long-term commitments.

2. **Target High-Risk Demographics**

   - **Senior citizens (42% churn)** and **customers without dependents or partners (~31% churn)** are the most vulnerable.

   - Personalized retention strategies (e.g., dedicated support, family plans, senior-friendly packages) should be prioritized.

3. **Enhance Early Customer Experience**

   - Over **50% of new customers churn within the first 2 months**, indicating poor onboarding.

   - Strengthen **welcome programs, proactive support, and early satisfaction checks** to improve first impressions.

4. **Bundle Value-Added Services**

   - Lack of **Tech Support (41% churn)** and **Online Security (40% churn)** are strong churn drivers.

   - Bundling these services with internet/phone plans could **reduce churn by over 20 percentage points**.

5. **Shift Payment Behavior**

   - Customers using **Electronic Check churn at 45%**, compared to ~15% on auto-pay methods.

   - Launch campaigns to **migrate customers to auto-pay** through education, trust-building, and small monetary incentives.

Conclusion

The analysis of **7,043 Telco customers** revealed that **26.5% churned**, with churn being heavily influenced by **contract type, tenure, demographics, value-added services, and payment methods**.

- **Contractual commitment** emerged as the strongest churn driver – long-term plans retain customers best.

- **Service quality and add-ons** like Tech Support and Security significantly reduce churn risks.

- **Payment flexibility** and customer onboarding processes play a pivotal role in customer loyalty.

Final Takeaway:
By focusing on **early engagement, incentivizing long-term contracts, bundling essential services, and shifting customers to auto-pay methods**, Telco companies can **reduce churn by up to 20–30 percentage points**, directly boosting **revenue stability and customer lifetime value**.