**Summary and Recommendations**

## **1. Key Data Visualizations & Insights**

### **Churn Distribution**

* **Graph Used:** sns.countplot(x='Churn', data=df)
* **Insight:**
  + A **countplot** is used to analyze the **number of customers who churned vs. those who stayed**.
  + It provides an overview of how many customers **left the service**.
  + A **pie chart** further breaks down the **churn percentage**, making it easier to see the proportion of customers who churned.

### **Gender-wise Churn**

* **Graph Used:** sns.countplot(data=df, x='gender', hue='Churn')
* **Insight:**
  + This visualization compares **male and female customers** in terms of churn.
  + If one gender has a significantly higher churn rate, targeted marketing strategies can be used to retain those customers.

### **Senior Citizen Churn**

* **Graph Used:** sns.countplot(data=df, x='SeniorCitizen', hue='Churn')
* **Insight:**
  + This analysis examines if **older customers (Senior Citizens)** are **more likely to churn**.
  + If senior citizens show a **higher churn rate**, the company can introduce **better support and tailored packages** to retain them.

### **Tenure vs. Churn**

* **Graph Used:** sns.histplot(x='tenure', data=df, bins=72, hue='Churn')
* **Insight:**
  + This histogram shows **how customer churn is distributed across different tenure periods**.
  + **Key observation:** Customers with **short tenure (new customers)** tend to churn more.
  + Suggests that **early-stage customer engagement** is crucial for retention.

**Contract Type & Churn**

* **Graph Used:** sns.countplot(data=df, x='Contract', hue='Churn')
* **Insight:**
  + Different **contract types (Month-to-month, One-year, Two-year)** are analyzed for churn trends.
  + **Month-to-month customers have the highest churn rate**.
  + Customers on **long-term contracts (1-year, 2-year) are less likely to leave**.
  + This suggests that **offering incentives for longer contracts** can reduce churn.

### **Payment Method & Churn**

* **Graph Used:** sns.countplot(data=df, x='PaymentMethod', hue='Churn')
* **Insight:**
  + This visualization examines **which payment methods** are most associated with churn.
  + **Customers paying via Electronic Check have a significantly higher churn rate**.
  + This indicates that **payment method preferences influence churn behavior**.
  + Possible reason: Customers using **Electronic Check** might be facing **inconvenience or hidden charges**.

## **2. Key Data Cleaning Steps**

Before analysis, the dataset was **preprocessed** to ensure accuracy:

* **Missing Values:** Checked using df.isnull().sum(), ensuring no missing data affects the analysis.
* **Duplicate Entries:** Identified and removed using df.duplicated().sum().
* **Data Transformation:** Converted SeniorCitizen column from **0/1 to "No/Yes"** for better readability.

## 

## 

## 

## 

## **3. Key Conclusions & Business Implications**

### **Top Factors Influencing Churn**

1. **Customers with short tenure** are more likely to churn → **Early engagement strategies** are needed.
2. **Senior Citizens have higher churn** → Personalized support & discounts may help retain them.
3. **Month-to-month contract customers churn the most** → Offering **long-term contract discounts** can improve retention.
4. **Electronic check users have higher churn** → Possibly due to hidden charges or inconvenience → The company should **offer better payment options**.

### **Recommended Actions for Reducing Churn**

**Encourage Long-Term Contracts**

* Offer **discounts or rewards** for customers opting for **1-year or 2-year plans**.

**Improve Payment Flexibility**

* Offer discounts or perks to customers using **automatic payments via credit card or bank transfers**.

**Personalized Customer Support for Senior Citizens**

* **Dedicated helpline** for senior customers.
* **User-friendly onboarding** for non-tech-savvy users.

**Focus on New Customers**

* **Retention strategies in the first 6 months** are critical.