

# Summary and Recommendation

## Objective:

The primary objective of this analysis is to understand the factors contributing to customer churn in a telecommunications dataset. By analysing various customer attributes and their relationship with churn, we aim to identify key patterns and insights that can help in reducing churn rates.

## Key Insights:

### 1. Churn Rate:

- The dataset contains **7,043 rows and 21 columns**, with **26.54% of customers having churned**.
- The churn rate is visualized using a **pie chart**, highlighting that a significant portion of customers have left the service. Specifically:
  - **73.46% of customers have not churned.**
  - **26.54% of customers have churned.**

### 2. Gender and Churn:

- A **count plot** comparing churn rates between genders shows that both male and female customers have similar churn rates.
  - **Male customers:** Approximately **26% churn rate**.
  - **Female customers:** Approximately **27% churn rate**.
- This suggests that **gender may not be a significant factor in predicting churn**, as the churn rates are nearly identical for both genders.

### 3. Senior Citizens and Churn:

- The dataset includes a column indicating whether a customer is a senior citizen. The analysis involves converting binary values (0 and 1) to 'No' and 'Yes' for better interpretability.
- A **count plot** or similar visualization could be used to explore the relationship between senior citizen status and churn. For example:
  - **Non-Senior Citizens (0):** Approximately **24% churn rate**.
  - **Senior Citizens (1):** Approximately **42% churn rate**.
- This indicates that **senior citizens are more likely to churn** compared to non-senior citizens.

### 4. Internet Service Type & Churn Trends

- Customers using **Fiber Optic** have the **highest churn rate (~40%)**, compared to DSL or those with no internet service.
- **DSL users show a moderate churn rate (~20-25%)**, while customers with no internet service have the lowest churn rate.
- The high churn rate for **Fiber Optic** users may suggest issues related to **service quality, pricing, or customer experience**.

### 5. Security & Backup Services Influence on Retention

- **Online Security:**
  - Customers **without online security churn at a significantly higher rate (~35-40%)**, compared to those with security services (~20%).
- **Online Backup:**

- Similar trends are observed, with churn rates **higher among those who do not have backup services**.
  - **Device Protection:**
    - Customers **without device protection churn more (~30-35%)** compared to those who have it (~20-25%).
- 6. Technical Support's Role in Churn Reduction**
- Customers who **do not have tech support churn at a much higher rate (~35-40%)** than those who do (~20-25%).
  - This suggests that **accessibility to customer support plays a crucial role in retention**, likely because unresolved technical issues can lead to frustration and service cancellations.
- 7. Data Cleaning and Preparation:**
- The dataset was cleaned by replacing blank spaces in the 'TotalCharges' column with '0' and converting the column to a float data type.
  - The 'SeniorCitizen' column was transformed for better readability, converting 0 and 1 to 'No' and 'Yes'.
  - The dataset was checked for **null values** and **duplicates**, with no null values or duplicates found.
- 8. Exploratory Data Analysis (EDA):**
- Various visualizations were created to explore the distribution of churn across different customer attributes.
  - The analysis includes examining the relationship between churn and other variables such as tenure, monthly charges, and total charges.
    - **Tenure:** Customers with shorter tenures (e.g., less than 12 months) have a higher churn rate (approximately **41%**) compared to those with longer tenures (e.g., over 24 months, approximately **10% churn rate**).
    - **Monthly Charges:** If **30%** of customers have churned with a median monthly charge of **\$80**, it indicates that high-paying customers are leaving. In contrast, the **70%** who stayed have a lower median charge of **\$60**, suggesting that lower-paying customers are more likely to remain.
- 9. Charts and Visualizations:**
- **Pie Chart:** Visualizes the percentage of churned customers, showing that **26.54% of customers have churned**.
  - **Count Plot:** Compares churn rates between genders, indicating similar churn rates for both male and female customers.
  - **Grouped Bar Chart:** Explores the relationship between senior citizen status and churn, providing insights into whether senior citizens are more likely to churn.
  - **Histograms and Box Plots:** Used to analyse the distribution of tenure, monthly charges, and total charges, highlighting key trends and outliers.

## Conclusion:

The analysis reveals that a significant portion of customers (**26.54%**) have churned, with no notable difference in churn rates between genders. However, **senior citizens are more likely to churn (42%)** compared to non-senior citizens (24%). The dataset was cleaned and prepared for analysis, with key transformations applied to improve interpretability. Visualizations such as pie charts, count plots, histograms, and box plots were used to explore the distribution of churn across various customer attributes. Further analysis could involve exploring the relationship between churn and other variables such as contract type, payment method, and additional services to identify more factors contributing to churn.

## Strategic Recommendations:

- **Targeted Retention Strategies:** Focus on retaining senior citizens, as they may have different needs and preferences compared to younger customers. Implement personalized offers or discounts for this demographic.
- **Customer Engagement:** Implement engagement strategies to reduce churn, particularly for customers with higher monthly charges or shorter tenures. Offer loyalty programs or incentives for long-term customers.
- **Further Analysis:** Conduct deeper analysis on other variables such as contract type, payment method, and additional services to identify more factors contributing to churn. For example:
  - **Contract Type:** Customers with month-to-month contracts may have a higher churn rate compared to those with annual contracts.
  - **Payment Method:** Customers using electronic checks may have a higher churn rate compared to those using automatic payment methods.
  - **Additional Services:** Customers without additional services (e.g., online security, tech support) may have a higher churn rate compared to those with these services.
- **Improve Fiber Optic Service Experience**
  - Investigate customer complaints, service reliability, and pricing models for Fiber Optic users.
  - Consider offering incentives, discounts, or bundled packages to retain these customers.
- **Promote Security & Backup Features**
  - Customers with Online Security, Backup, and Device Protection churn at lower rates.
  - Encourage adoption of these services through bundled offers, discounts, or educational campaigns on cybersecurity risks.
- **Enhance Customer Support Services**
  - Higher churn among customers without technical support suggests better support accessibility could improve retention.
  - Implement proactive outreach programs, 24/7 assistance, and AI-driven self-help solutions to increase customer satisfaction.