# Summary and Recommendation

**Objective:**The goal of this project was to analyze customer churn in a telecom company, identify the key factors causing churn, and provide actionable insights to reduce customer attrition.

## 1. Overall Churn Rate

- Approximately **26.54%** of the customers have churned, indicating a significant retention challenge.

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## 2. Demographic Insights

- **Senior Citizens**:
    - Churn rate among senior citizens is **41.5%**, significantly higher than the **22.5%** observed among non-senior citizens.
    - This indicates a need to tailor services to this demographic for improved retention.

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## 3. Tenure Analysis

- **Short-term Users**:
    - Customers with **tenure of 1-2 months** show a churn rate of nearly **50%**, highlighting a struggle to retain new customers.
- **Long-term Users**:
    - For customers with tenure exceeding **24 months**, churn rates drop to below **11%**, demonstrating loyalty with increased duration.

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## 4. Contract Type Impact

- **Month-to-Month Contracts**:

    - **45%** of customers on month-to-month contracts churn, compared to **11%** for those on 1-year contracts and only **5%** for 2-year contracts.
- Long-term contracts provide stability and significantly reduce churn rates.

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### 5. Service Utilization Trends

- Churn is influenced by the availability of certain services:
    - **Phone Services**:
        - Customers with phone services have a churn rate of **24%**, compared to **36%** for those without.
    - **Internet Service**:
        - Customers using **DSL Internet** churn at a rate of **18%**, whereas **Fiber Optic Internet** users have a churn rate of **31%**.
        - Lack of internet service correlates with a churn rate of **25%**.
    - **Online Security**:
        - Churn is significantly lower (**15%**) for customers with online security compared to **30%** for those without.
    - **Streaming TV and Online Backup**:
        - Customers not using these services exhibit a churn rate above **28%**, underscoring their role in customer retention.

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### 6. Payment Method Analysis

- **Electronic Check**:
    - This payment method has the highest churn rate of **43%**, compared to **20%** for those using automatic payments or credit cards.
    - Encouraging the use of automated payments could mitigate churn.

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### 7. Key Observations from Visualizations

- Customers with bundled services, particularly **Online Security** and **Tech Support**, tend to stay longer.
- Short-tenure customers who lack bundled services are most likely to churn.
- Payment convenience and flexibility in contracts are pivotal in improving retention rates.

Visualizations to identify patterns:

- Bar charts: To show churn rates by service type.
- Heatmaps: To highlight correlations between variables.
- Pie charts: To display the overall churn percentage.
- Box plots: To compare charges between churned and non-churned customers.

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### Recommendations

1. **Target Senior Citizens** with special offers or dedicated support services to reduce churn.
2. **Encourage Long-term Contracts**:
    - Provide incentives for customers to switch from month-to-month to annual or biennial contracts.
3. **Focus on Service Bundles**:
    - Promote and bundle essential services like Online Security, Backup, and Streaming to increase stickiness.
4. **Optimize Payment Methods**:
    - Offer discounts or benefits for customers adopting automatic payments or credit card options.
5. **Improve Early Tenure Experience**:
    - Develop onboarding programs to enhance customer satisfaction during the initial months.

Key Steps in the Project:

1. Understanding the Data:

The dataset included information about customer demographics, services used, monthly charges, tenure, and whether the customer churned or not.

2. Data Cleaning (Using Python Libraries):

Used Pandas to handle missing values, remove duplicates, and correct inconsistent data.

Ensured data types were correct for analysis.

3. Exploratory Data Analysis (EDA):

Used Pandas, NumPy, and Seaborn to perform EDA and understand the patterns in the data.

Analyzed features like:

- Monthly charges: Higher charges linked to more churn.
- Tenure: Customers with shorter tenure churn more.
- Services: Customers with fewer services (e.g., no internet) churn more.

4. Key Insights:

Higher monthly charges were a primary reason for churn.Customers with shorter tenure or fewer bundled services churned more.Younger demographics were more likely to switch providers.

**Tools and Libraries Used:**

- Python: Core programming language.
- Pandas & NumPy: For data manipulation and analysis.

- Matplotlib & Seaborn: For creating visualizations.

**Outcome:**

The analysis helped the telecom company identify high-risk customer segments and understand the factors contributing to churn. This information could be used to improve customer retention strategies, like offering discounts or personalized services