SUMMARY AND RECOMMENDATION

Customer Churn Analysis Summary

Dataset Overview:

- **Dataset Size**: 7,043 customer entries with 21 attributes covering customer demographics, services, billing, and churn status.
- **Data Cleaning**:
  - Blank values in the `TotalCharges` column were replaced with zeros, and the column was converted to numeric format.
  - No null values or duplicate rows were present, ensuring clean data.
- **Data Composition**:
  - **Gender**: Male and Female in almost equal proportions.
  - **Senior Citizens**: 16.2% of customers are senior citizens.

Key Insights:

1. **Churn Rate**:
   - **26.54%** of customers (1,869 customers) have churned, while **73.46%** (5,174 customers) have not.
   - This highlights that more than a quarter of the customer base has discontinued services, requiring focused retention strategies.
2. **Churn by Gender**:
   - Male: **26.85%** churned; Female: **26.32%** churned.
   - No significant difference in churn rates based on gender, suggesting gender-neutral factors drive churn.
3. **Churn by Senior Citizen Status**:
   - Senior Citizens: **41.68%** churn rate.
   - Non-Senior Citizens: **23.67%** churn rate.
   - **Insight**: Senior citizens are almost twice as likely to churn compared to non-senior customers.
4. **Churn by Tenure**:
   - Customers with short tenure (<2 months): High churn rate of over **70%**.
   - Customers with tenure >60 months: Low churn rate of **11%**.
   - **Insight**: Customer loyalty increases significantly with longer tenure. Early retention efforts are critical to reduce churn.
5. **Churn by Contract Type**:
   - **Month-to-Month Contracts**: **43.96%** churn rate.
   - **One-Year Contracts**: **11.95%** churn rate.
   - **Two-Year Contracts**: **2.92%** churn rate.

- ○ **Insight**: Month-to-month customers are 15 times more likely to churn compared to those with two-year contracts. Long-term contracts strongly correlate with reduced churn.
6. **Churn by Internet Services**:
   - ○ **DSL** users: **19.21%** churn rate (lowest among all).
   - ○ **Fiber Optic** users: **41.34%** churn rate (highest among all).
   - ○ Customers without internet services have a churn rate of **7.4%**, suggesting their service scope is likely narrower.
7. **Churn by Add-On Services**:
   - ○ Customers without the following services have significantly higher churn rates:
     - ■ **Online Security**: **42.95%** churn rate (vs. 15.24% for those with it).
     - ■ **Tech Support**: **41.87%** churn rate (vs. 16.52% for those with it).
     - ■ **Streaming TV**: **30.17%** churn rate (vs. 21.74% for those with it).
   - ○ **Insight**: Offering or promoting value-added services like online security and tech support can reduce churn significantly.
8. **Churn by Payment Method**:
   - ○ **Electronic Check**: **45.96%** churn rate.
   - ○ **Credit Card**: **16.12%** churn rate.
   - ○ **Bank Transfer**: **16.75%** churn rate.
   - ○ **Mailed Check**: **23.02%** churn rate.
   - ○ **Insight**: Customers using electronic checks are nearly three times more likely to churn than those using other payment methods.

Visual and Statistical Analysis:

1. **Churn Distribution**:
   - ○ Pie Chart: Showed that **26.54%** of customers churned.
   - ○ Bar Chart: Highlighted demographic and service-related churn factors, such as senior citizen status and contract type.
2. **Senior Citizen Churn (Stacked Bar Chart)**:
   - ○ Senior citizens have a **41.68%** churn rate compared to **23.67%** for non-senior customers.
   - ○ The visual revealed a clear disparity, emphasizing the need for targeted retention strategies for this demographic.
3. **Tenure Analysis (Histogram)**:
   - ○ Short-term users (1–2 months): High churn rate of over **70%**.
   - ○ Long-term users (60+ months): Low churn rate of **11%**.
   - ○ The data emphasized the need to improve onboarding and early customer experience.
4. **Service Usage Analysis**:
   - ○ Customers with **multiple lines**, **tech support**, and **online security** had lower churn rates than those without these services.

- For instance, customers without online security churned at **42.95%**, nearly three times more than those with the service.
5. **Payment Method Analysis**:
    - Bar Chart: Electronic check users showed the highest churn rates (**45.96%**), while credit card and bank transfer users had significantly lower churn rates (**16–17%**).

Conclusions and Recommendations:

1. **Contract Strategies**:
    - Encourage long-term contracts to reduce churn. Offering discounts or benefits for one-year and two-year plans could be effective.
2. **Targeted Retention**:
    - Focus on high-risk groups:
        - Senior citizens (**41.68%** churn rate).
        - Month-to-month contract users (**43.96%** churn rate).
        - Electronic check users (**45.96%** churn rate).
3. **Service Improvements**:
    - Promote add-on services such as online security and tech support, which have been shown to significantly reduce churn.
4. **Early Engagement**:
    - Focus retention efforts on new customers during the first few months (high churn rate of **70%** for 1–2 months).
5. **Payment Method Optimization**:
    - Discourage electronic check payments by promoting more stable payment methods, such as credit cards and bank transfers.
6. **Demographic-Based Targeting**:
    - Implement strategies tailored for senior citizens, such as personalized offers or enhanced customer support, to address their higher churn rates.