

Executive Summary

This comprehensive analysis investigates key factors driving customer churn in the telecom industry. The dataset was methodically cleaned, transformed, and analyzed, supported by insightful visualizations. Below are the key findings and detailed observations:

1. Customer Churn Rate and Demographic Analysis

- **Churn Rate:** A churn rate of **26.54%** was identified, highlighting a significant portion of customers leaving the service. This is visualized in a pie chart, providing a clear perspective on the magnitude of the issue.
 - **Senior Citizens:** Comparative analysis revealed that senior citizens have a higher churn rate than younger customers.
 - **Gender Breakdown:** Insights from the dataset do not indicate a significant gender-based difference in churn behavior, as the churn percentages were balanced between male and female customers.
 - **Top 5 Observations in Demographics:**
 1. Senior citizens contribute more to churn rates than non-senior citizens.
 2. Customers without dependents tend to churn more.
 3. Customers with shorter tenure (less than 6 months) form a significant portion of churners.
 4. Month-to-month contract users are more prone to churn.
 5. Internet service types like **fiber optic** show higher churn compared to DSL.
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2. Data Preparation and Cleaning

- **Binary Conversions:** Variables such as **Senior Citizen** were converted from binary (0/1) to more interpretable "Yes/No" labels for better readability.
- **Missing Values:** Missing or inconsistent values in the **Total Charges** column were handled by replacing blanks with 0 and converting the column into numeric format.
- **Initial Data Insights (First 5 Rows):**

- The dataset consists of columns like **tenure**, **monthly charges**, and contract types, among others.
- Example rows:

CustomerID	Gender	Senior Citizen	Tenure	Monthly Charges	Total Charges	Churn
7590-VHVEG	Female	No	1	29.85	29.85	No
5575-GNVDE	Male	No	34	56.95	1889.5	No

3. Key Factors Affecting Churn

- **Tenure:** Customers with a shorter tenure (0–6 months) churn at a much higher rate compared to those with tenure over a year.
- **Contract Types:** Month-to-month contracts show a higher churn rate, whereas customers with one-year or two-year contracts are less likely to leave.
- **Payment Methods:** Electronic check users have a higher churn rate compared to those using automatic bank transfers or mailed checks.
- **Service Preferences:**
 - Customers using **fiber optic** internet have a higher churn rate compared to DSL users.
 - Add-on services like **online security** and **tech support** significantly reduce churn likelihood.

Top 5 Insights on Factors:

1. Customers with **monthly charges over \$70** are more likely to churn.
2. Customers opting for **paperless billing** show higher churn.
3. Customers with **no online security** churn at a higher rate.
4. Senior citizens churn more frequently, regardless of tenure.
5. **Fiber optic internet users** represent the majority of churned customers.

4. Visualization Highlights

- **Pie Chart for Churn Rate:** Clearly illustrates the proportion of customers who have churned versus retained.
 - **Bar Charts for Service Types:** Display the impact of services like internet type, online security, and tech support on customer retention.
 - **Comparative Analysis Charts:**
 - A bar chart comparing the churn rate across contract types emphasizes the need for long-term contracts.
 - Visualizations of monthly charges and tenure highlight the critical thresholds influencing churn behavior.
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5. Recommendations for Retention Strategies

Based on the analysis, the following actions are recommended:

1. **Targeted Offers:** Provide discounts or promotions for customers with monthly contracts to encourage longer-term commitments.
2. **Enhanced Services for Seniors:** Develop tailored offerings for senior citizens, such as simplified service plans or additional support.
3. **Improved Online Security:** Promote add-on services like online security and tech support to reduce churn among high-risk groups.
4. **Flexible Payment Plans:** Incentivize customers using electronic checks to switch to automated payment methods.
5. **Focus on High-Charge Customers:** Monitor and engage customers with monthly charges exceeding \$70 to preempt churn.