

Executive Summary

The analysis conducted in this notebook explores factors influencing customer churn in a telecommunications company. The findings, supported by detailed visualizations, uncover key patterns in customer behavior, demographic influence, and service preferences. The summary below provides insights supported by percentages and actionable takeaways.

Data Preparation

- The dataset underwent cleaning and transformation:
 - Missing tenure values were replaced with 0, reflecting new customers.
 - Non-numeric values in "TotalCharges" were corrected.
 - Categorical binary columns like "SeniorCitizen" were encoded as "Yes" or "No" for easier interpretation.

This ensured consistency and accuracy in subsequent analysis.

Key Insights from Analysis

1. **Customer Churn Overview:**
 - **26.54%** of customers have churned, indicating a significant opportunity for retention improvement.
 - The remaining **73.46%** of customers are retained, showcasing a loyal majority.
2. **Demographics and Churn:**
 - **Senior Citizens:**
 - Among senior citizens, **41%** have churned compared to only **23%** for non-senior citizens.
 - This indicates that age and associated factors like service needs play a critical role in churn.
 - **Dependents:**
 - Customers without dependents have a churn rate of **31%**, compared to only **19%** for those with dependents.
 - Dependents may signify higher service stickiness due to shared usage needs.
3. **Tenure and Churn:**
 - Customers with a tenure of less than 2 months have a churn rate exceeding **60%**, indicating high attrition among new customers.
 - Conversely, customers with tenures longer than 5 years have a churn rate below **10%**, highlighting increased loyalty with tenure length.

- This suggests onboarding experience and initial service satisfaction are critical retention factors.
 - 4. **Service Usage and Churn:**
 - Customers subscribing to **OnlineSecurity** and **TechSupport** have churn rates of **15%**, significantly lower than the overall churn rate of **26.54%**.
 - Customers without **OnlineBackup** or **StreamingServices** exhibit churn rates closer to **40%**, indicating the importance of comprehensive service bundles in retention.
 - 5. **Payment Methods and Churn:**
 - **Electronic check** users have the highest churn rate at **41%**, compared to:
 - **18%** for credit card auto-pay users.
 - **16%** for bank transfer auto-pay users.
 - Auto-payment methods correlate strongly with lower churn, suggesting convenience and reliability reduce customer attrition.
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Visualization Highlights

- **Pie Charts:**
 - Showed the proportional breakdown of churned vs. retained customers across multiple categories like tenure, seniority, and payment methods.
 - **Bar Graphs:**
 - Illustrated stark contrasts in churn rates by tenure groups, payment methods, and service subscriptions.
 - **Histograms:**
 - Highlighted the distribution of tenure, showcasing churn patterns concentrated in the early months of service.
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Recommendations

1. **Focus on New Customer Onboarding:**
 - Target customers with tenures of fewer than 6 months, as they are the most at-risk.
 - Implement satisfaction surveys, onboarding rewards, or personalized service improvements.
2. **Enhance Services for Seniors:**
 - Introduce age-specific plans with simplified billing, senior-friendly tech support, and additional security.
3. **Upsell Services to At-Risk Customers:**
 - Promote **OnlineSecurity**, **TechSupport**, and **StreamingServices** to customers not currently subscribed.
 - Bundled services reduce churn by enhancing perceived value.

4. Improve Payment Process:

- Transition electronic check users (41% churn) to auto-payment methods with incentives such as discounts or loyalty points.

5. Strengthen Retention with Loyalty Programs:

- Reward long-term customers (tenure > 2 years) with exclusive offers, enhancing lifetime value.

This analysis leverages demographic patterns, service usage insights, and payment behaviors to propose actionable strategies aimed at reducing churn and improving customer satisfaction. Percentages provide a quantitative foundation for prioritizing efforts, while visualizations effectively highlight key trends.