# Executive Summary: Customer Churn Analysis

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Objective:  
The analysis aims to understand customer churn patterns, identify contributing factors, and uncover insights to help reduce churn and improve customer retention strategies.

Data Preparation:  
- Data Cleaning: Missing values in the "TotalCharges" column were replaced with `0`, ensuring no gaps in financial data. Data types were adjusted for consistency, particularly for numerical fields.  
- Feature Engineering: The SeniorCitizen column was transformed into a binary feature (Yes/No) for easier analysis and visualization.

Key Findings:

Overall Churn Rate:  
- 26.54% of customers have churned, while 73.46% remain active. This baseline helps measure the impact of various factors on churn likelihood.

Demographic Insights:  
- Gender and Churn:  
 - Male Customers: 26.9% churn rate.  
 - Female Customers: 26.2% churn rate.  
 - Gender doesn’t appear to be a major churn driver, as the difference is minimal.

- Senior Citizens:  
 - 41.4% of senior citizens churned, compared to 23.6% of non-senior customers.  
 - Seniors are almost 1.75x more likely to churn, indicating the need for targeted strategies for this segment.

Service Usage & Churn:  
- Phone and Multiple Lines:  
 - Single Line: 25.6% churn rate.  
 - Multiple Lines: 28.1% churn rate.  
 - Having multiple lines slightly increases churn, potentially due to higher costs.

- Internet Service:  
 - DSL Users: 19.2% churn rate.  
 - Fiber Optic Users: 42.0% churn rate.  
 - No Internet Service: 7.3% churn rate.  
 - Fiber optic users face the highest churn, possibly due to pricing or service issues.

- Online Security & Backup:  
 - No Online Security: 46.0% churn rate.  
 - With Online Security: 14.6% churn rate.  
 - No Online Backup: 40.5% churn rate.  
 - With Online Backup: 21.5% churn rate.  
 - Lack of security and backup services strongly correlates with higher churn, highlighting key retention opportunities.

Contract Type & Tenure:  
- Month-to-Month Contracts: 43.6% churn rate.  
- One-Year Contracts: 11.1% churn rate.  
- Two-Year Contracts: 2.6% churn rate.  
- Customers with longer contracts churn significantly less, emphasizing the value of promoting long-term plans.

- Customer Tenure:  
 - 0–6 months tenure: 45.5% churn rate.  
 - 6–24 months tenure: 32.3% churn rate.  
 - 24+ months tenure: 18.1% churn rate.  
 - Newer customers are far more likely to churn, suggesting a need for improved onboarding and early engagement.

Visualizations:  
The analysis included well-structured countplots, pie charts, and stacked bar charts with percentage labels, making complex patterns visually intuitive. These visualizations provided clarity on churn distribution across multiple dimensions.

Conclusion & Recommendations:  
The analysis reveals that senior citizens, fiber optic users, and customers lacking support or security services face higher churn rates. Additionally, month-to-month contracts and short-tenure customers are at greater risk of leaving.

🔔 Actionable Recommendations:  
- Targeted Retention Campaigns: Special discounts or personalized offers for seniors and fiber optic users.  
- Service Bundling: Offer discounted packages combining internet with security and backup services.  
- Contract Incentives: Encourage longer-term contracts with loyalty rewards or cost savings.  
- Enhanced Onboarding: Strengthen early engagement with educational resources, proactive support, and regular check-ins for new customers.

This data-driven approach provides a solid foundation for designing interventions that reduce churn and enhance customer lifetime value. 🚀