Analysis of Customer Churn in Telco Company

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1. Executive Summary

Objective:

The primary objective of this analysis is to understand the **factors** driving **customer churn** at a Telco company and to develop **strategies** to reduce churn rates. By identifying **key predictors** of churn and analyzing **customer behavior**, I aim to provide **actionable insights** that can help the company **retain** its customer base and improve overall satisfaction.

Key Findings:

The highest churn rates are observed among customers with **month-to-month contracts**.
Customers who use **fiber optic** internet service have a higher likelihood of churning compared to those using DSL.
Monthly charges and **tenure** are significant predictors of churn, with higher charges and shorter tenure being associated with higher churn rates.
Senior citizens and customers without **dependents** also show higher churn rates.

Recommendations:

Introduce **loyalty programs** or **incentives** for customers with month-to-month contracts to encourage longer commitments.
Improve **service quality** for fiber optic customers to reduce dissatisfaction and churn.
Offer **personalized discounts** or **lolr-tier** service packages to high-risk customers.
Develop **targeted retention campaigns** for senior citizens and customers without dependents.

2. Introduction

Background:

Customer churn is a critical issue for telecom companies, affecting revenue and growth. Understanding why customers leave and identifying at-risk customers can help in devising strategies to improve retention. This report presents an analysis of customer churn using a dataset from a Telco company, aiming to uncover insights into churn behavior and suggest actionable strategies for customer retention.

Objective:

The objective of this project is to analyze customer data to identify patterns and factors associated with churn. By leveraging exploratory data analysis I aim to:

- Understand the demographic and service-related characteristics of churned customers.
- Identify key predictors of churn.
- Develop recommendations for reducing churn and enhancing customer retention.

3. Data Overview

Data Description:

The dataset contains information on 7,043 Telco customers, with 21 columns capturing various attributes. The key columns in the dataset are:

customerID: Unique identifier for each customer.
gender: Gender of the customer (Male, Female).
SeniorCitizen: Indicates if the customer is a senior citizen (1) or not (0).
Partner: Whether the customer has a partner (Yes, No).
Dependents: Whether the customer has dependents (Yes, No).
tenure: Number of months the customer has stayed with the company.
PhoneService: Whether the customer has phone service (Yes, No).
MultipleLines: Whether the customer has multiple lines (No, Yes, No phone service).
InternetService: Type of internet service (DSL, Fiber optic, No).
OnlineSecurity: Whether the customer has online security (Yes, No, No internet service).
DeviceProtection: Whether the customer has device protection (Yes, No, No internet service).
TechSupport: Whether the customer has tech support (Yes, No, No internet service).
StreamingTV: Whether the customer has streaming TV (Yes, No, No internet service).
StreamingMovies: Whether the customer has streaming movies (Yes, No, No internet service).
Contract: Type of contract (Month-to-month, One year, Two year).
PaperlessBilling: Whether the customer has paperless billing (Yes, No).
PaymentMethod: Payment method (Electronic check, Mailed check, Bank transfer (automatic), Credit card (automatic)).
MonthlyCharges: The amount charged to the customer monthly.
TotalCharges: The total amount charged to the customer.
Churn: Whether the customer churned (Yes, No).

Data Source: *Telco Customer Churn*
The dataset, provided by IBM, was created for a fictional telecommunication company's customer database and includes information on customer demographics, service subscriptions, payment details, and churn status. Preprocessing steps included handling missing values, encoding categorical variables, and ensuring data quality.

4. Exploratory Data Analysis (EDA)

Preliminary Analysis with Python (Pandas, Jupyter Notebook):

Chi-Square Test (categorical values):

AlloId us to rank the categorical values according to their correlation with churn, using their P-value after confronting them with a Chi-Square test. I obtained the following ranking:
Contract, OnlineSecurity, TechSupport, InternetService, Payment Method, Online Backup, DeviceProtection, StreamingMovies, StreamingTV, PaperlessBilling, Dependants, SeniorCitizen, Partner, MultipleLines. All of the above elements Ire judged statistically significant by the Chi-Square test.
Then, I have two methods that Ire not: PhoneService and Gender.

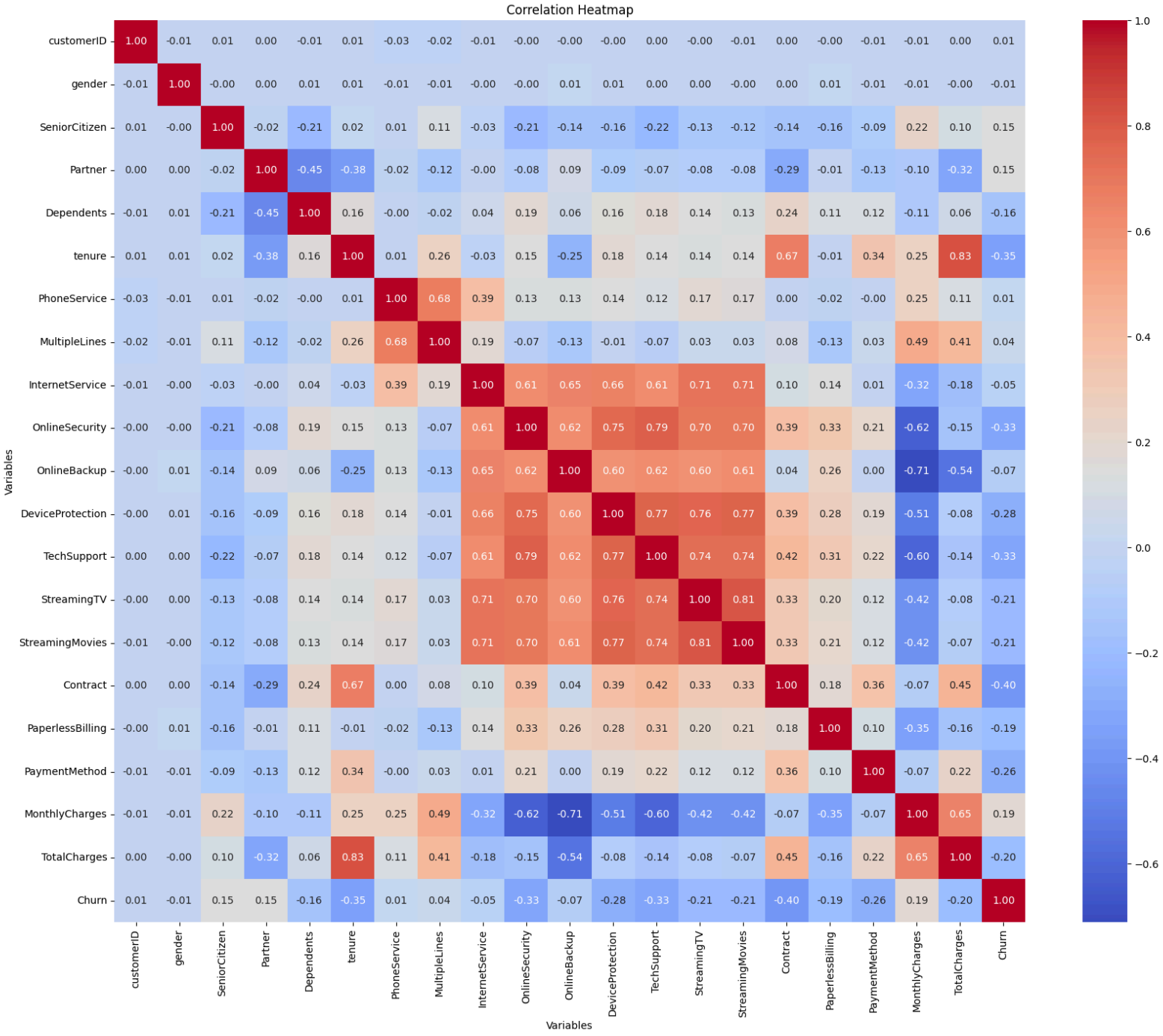
T-test (numerical values):

First, I did a bit of data cleaning for this one, replacing null values by zero for TotalCharges for 11 rows. It was due to the customers having just joined. Then, I did the T-test on Tenure and MonthlyCharges. Tenure was intensely linked with churn, with a P-value just behind Contract (the most linked element with churn in the categorical variables). MonthlyCharges Ire also linked with churn, ranking betIen StreamingTV and PaperlessBilling.

The Jupyter Notebook's file is also available to consult in the same GitHub folder.

Heatmap:

In order to get a general view on how the variables are linked together, I generated a Heatmap:



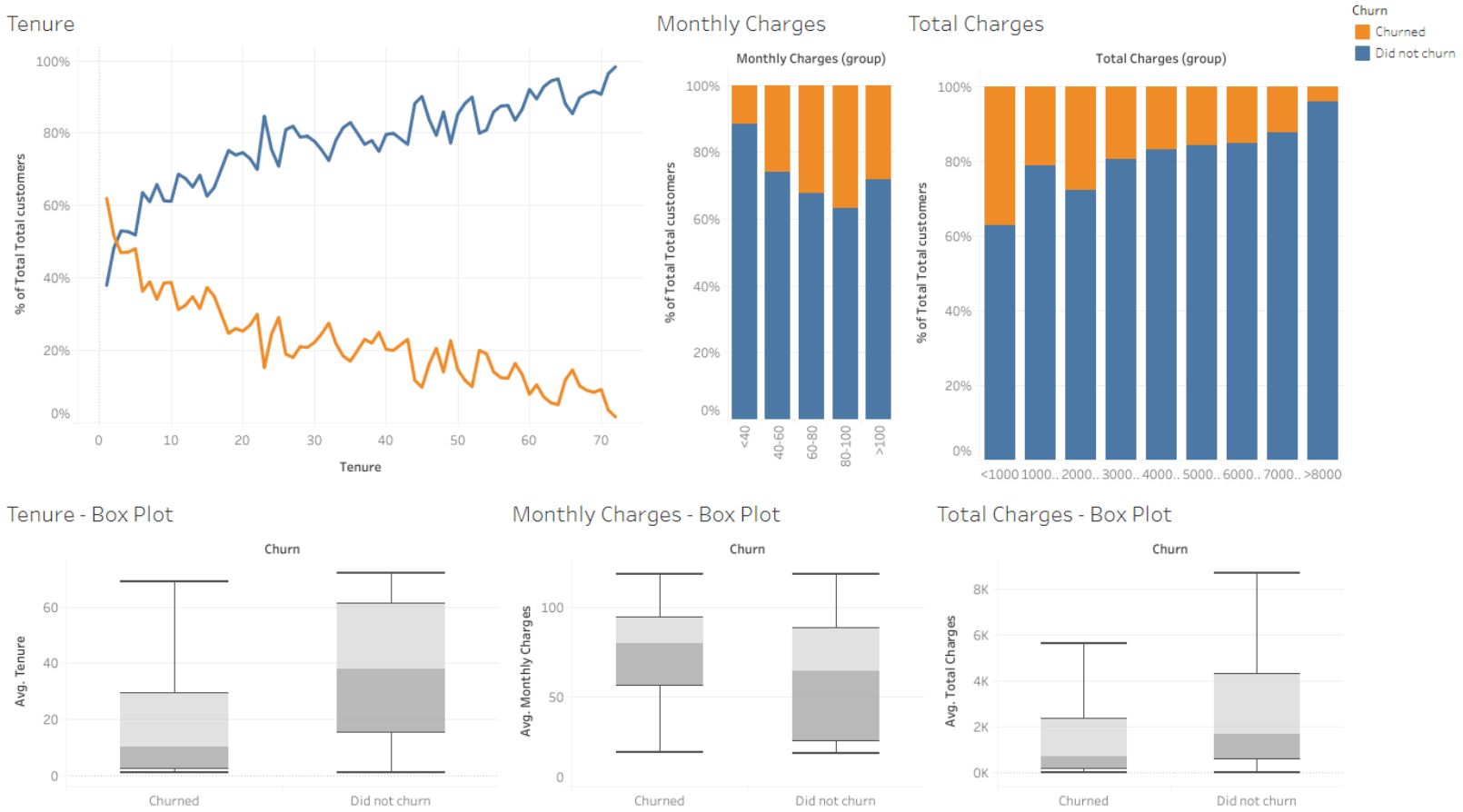
In-Depth Data Visualization on Tableau:

Here is the link to the Tableau file:
https://public.tableau.com/app/profile/jauffray.bruneton/viz/ChurnProject_17165914665310/ChurnStory?publish=yes
I made three Dashboards on Tableau: Categorical Values, Numerical Values, and Further Analysis.

Categorical Values:

I ordered these categorical values by the order of correlation that was found via the Chi-Square test made in the Jupyter Notebook. I also made a pie chart for the overall churn rate and found it was 26%.

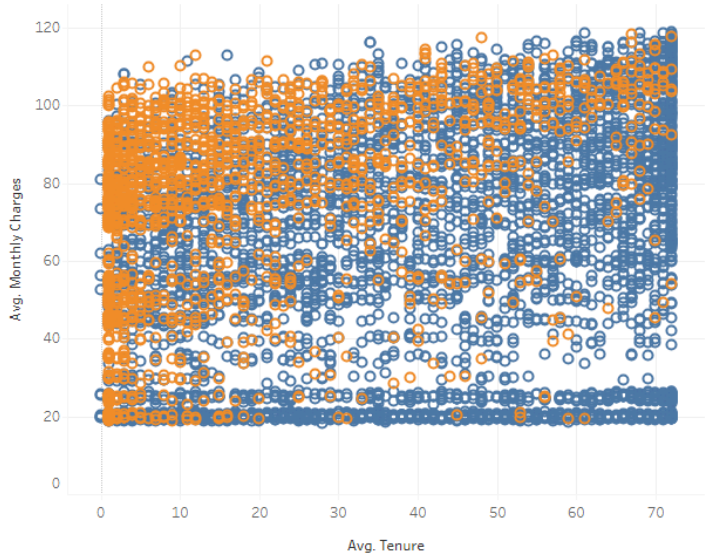
Numerical Values:



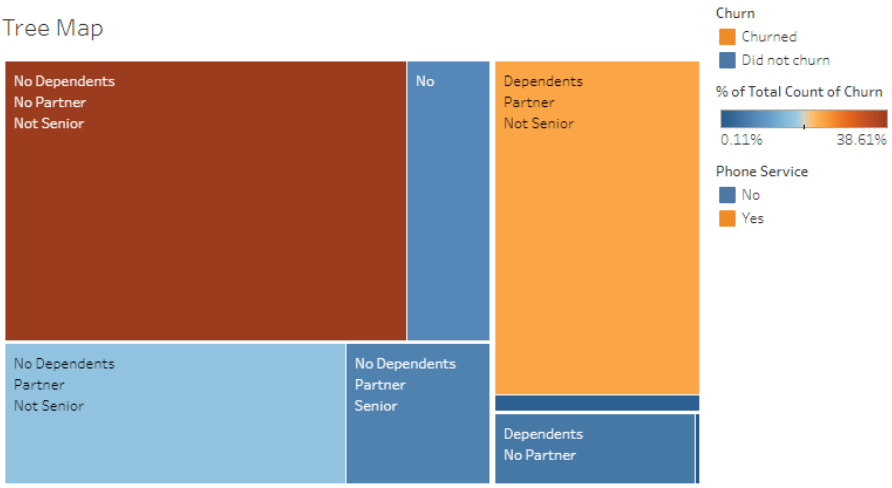
This dashboard is focused on the three numerical values we have in this dataset: Tenure, MonthlyCharges and TotalCharges. I used two different visuals for each of these, in order to get the most insights from them.

Further Analysis:

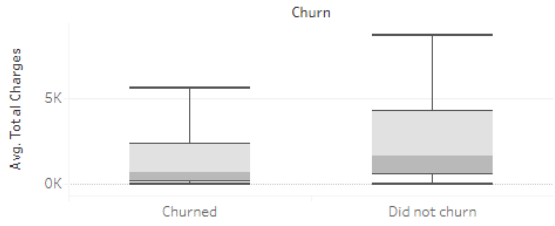
Scatter Plot - Tenure & Monthly Charges



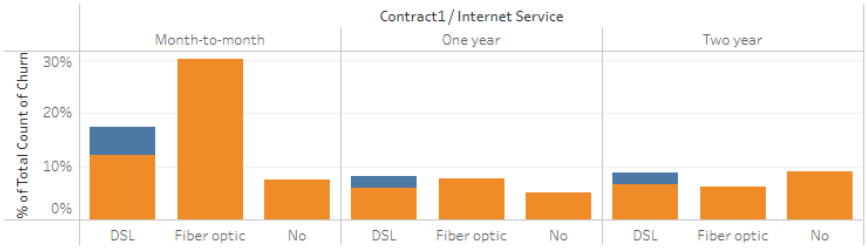
Tree Map



Customer Lifetime Value



Churn Distribution



Here, I focused on different visuals to get the most insights from the data, in order to analyze the Customer Lifetime Value, the Churn Distribution, the correlation between tenure, monthly charges and churn, and a tree map to visualize the demographics of the most-churning customers.

5. Key Findings and Insights

Churn Rate Trends:

Demographics:

Gender: The analysis shows that churn rates are fairly evenly distributed between male and female customers, indicating that gender is not a significant predictor of churn.

Senior Citizen Status: Senior citizens have a higher churn rate compared to non-senior citizens. This suggests that age-specific services or support might be needed to retain older customers.

Dependents: Customers without dependents are more likely to churn compared to those with dependents, possibly indicating that customers with dependents find more value in the services provided or have different service needs.

Service Usage:

Internet Service Type: Customers using fiber optic internet service have significantly higher churn rates compared to those using DSL. This might be due to service quality issues, higher costs, or other factors related to fiber optic services.

Phone Service and Multiple Lines: Customers without phone service or with multiple lines have varied churn rates, indicating that bundling phone services with other services might affect customer retention.

Additional Services: Online Security, Device Protection, Tech Support, Streaming TV, Streaming Movies: Customers who do not subscribe to these additional services tend to have higher churn rates. This suggests that customers who find value in these additional services are less likely to churn.

Contract Type & Payment Method:

Contract Type: The churn rate is highest among customers with month-to-month contracts, significantly lower for those with one-year and two-year contracts. This indicates that longer contracts might help in retaining customers.

Payment Method: Customers using electronic checks have the highest churn rate, while those using bank transfer or credit card automatic payments have lower churn rates. This could be due to the convenience and reliability of automatic payment methods.

Financials:

Monthly Charges: Higher monthly charges are associated with higher churn rates. This suggests that cost is a significant factor in customer churn. The company might not be competitive on the pricing-side and should potentially consider reducing their pricing.

Total Charges: Customers with lower total charges tend to have higher churn rates, indicating that newer customers or those with less usage history are more likely to leave. The company should be especially focusing on new customers to be able to retain them for at least a year, since we saw on the Tableau analysis that half of the customers who churn do it in the first 10 months of joining this company.

Correlation Analysis:

Correlation Heatmap: The correlation heatmap indicates strong correlations between several features and churn. For example, tenure has a strong negative correlation with churn, meaning longer-tenured customers are less likely to churn.
MonthlyCharges shows a positive correlation with churn, indicating that higher monthly charges might drive customers away.

The correlations between the categorical variables and churn were assessed using chi-square tests, which revealed significant associations for variables like Contract, InternetService, and PaymentMethod.

Detailed Insights:

Tenure: Customers with longer tenure are significantly less likely to churn. The company should focus on strategies that increase customer tenure, such as loyalty rewards or tenure-based discounts.

Monthly Charges: High monthly charges are a strong predictor of churn. Offering more affordable plans or flexible pricing options might help in retaining high-risk customers.

Contract Type: Month-to-month contracts have the highest churn rates, suggesting that encouraging customers to switch to longer-term contracts could reduce churn. This can be achieved through attractive offers or discounts for committing to longer contracts.

Internet Service Type: Customers with fiber optic internet service have higher churn rates compared to those with DSL. Improving the quality of fiber optic services or addressing any specific issues related to this service type could help in reducing churn. Customers without internet service have the lowest churn rate so the internet service in its entirety might need some rework.

Additional Services: Subscribing to additional services such as Online Security, Device Protection, Online Backup, Streaming Movies, Streaming TV and Tech Support is associated with lower churn rates. Promoting these services and highlighting their value can enhance customer retention. It could also be an option to make them included by default, but how to adapt pricing to that decision would require further analysis and discussions.

Payment Methods: Automatic payment methods (bank transfer, credit card) are associated with lower churn rates compared to manual methods like electronic checks. Encouraging customers to switch to automatic payments can improve retention. A more aggressive option would be to remove the electronic check option altogether to force customers to choose a “safer” option, but that might dissuade some customers to join the company altogether.

6. Recommendations

Based on our analysis of the Telco customer churn data, I propose the following recommendations to reduce churn and improve customer retention:

Improve Contract Terms and Offer Incentives:

Loyalty Programs: Implement loyalty programs to reward long-term customers and encourage month-to-month customers to switch to longer-term contracts by offering incentives such as discounts, free additional services, or loyalty points.

Discounts for Long-Term Contracts: Offer discounts or other perks for customers who commit to one-year or two-year contracts, reducing the financial burden and increasing the perceived value of staying with the company.

Enhance Service Quality for High-Churn Segments:

Fiber Optic Service Improvements: Since customers with fiber optic internet service have a higher churn rate, investigate potential service issues and enhance the quality and reliability of fiber optic services.

Customer Support Enhancements: Strengthen support services for customers using fiber optic internet and other high-churn segments by providing dedicated support teams and faster resolution times.

Personalized Retention Strategies:

Targeted Marketing Campaigns: Use predictive modeling to identify high-risk customers and create personalized marketing campaigns aimed at addressing their specific needs and concerns.

Proactive Customer Engagement: Engage with at-risk customers proactively through regular check-ins, satisfaction surveys, and personalized offers tailored to their usage patterns and preferences.

Financial Incentives and Flexible Payment Options:

Discounted Monthly Charges: Offer financial incentives such as discounted monthly charges or limited-time offers for customers identified as high risk to make services more affordable and attractive.

Flexible Payment Plans: Provide flexible payment options to accommodate different financial situations, reducing the likelihood of churn due to payment issues.

Enhance Additional Services:

Bundling Services: Encourage customers to subscribe to additional services (e.g., OnlineSecurity, DeviceProtection, TechSupport) through bundling offers, making the overall package more valuable and reducing the likelihood of switching providers.

Service Customization: Allow customers to customize their service packages to better match their needs and preferences, increasing satisfaction and loyalty.

Senior Citizen and Dependent Programs:

Senior Citizen Discounts: Offer special discounts and tailored packages for senior citizens, addressing their specific needs and financial constraints.

Student Plans: Introduce student plans that provide benefits for students. No student plan might explain why customers without dependents and partners churn more. This is based on the hypothesis that students are more likely to not have dependents and partners, because they are generally young.

7. Conclusion

Summary:

This analysis of the Telco customer churn data has provided valuable insights into the factors influencing customer churn and identified key predictors such as contract type, internet service type, monthly charges, and tenure. By understanding these factors, I have developed targeted recommendations to help reduce churn rates and enhance customer retention.

Final Thoughts:

Customer churn is a significant challenge for telecom companies, but through data-driven analysis and strategic actions, it is possible to mitigate its impact. Implementing the recommended strategies, such as improving contract terms, enhancing service quality, offering personalized retention initiatives, and providing financial incentives, can lead to a substantial reduction in churn and an increase in customer loyalty.

By continuously monitoring customer behavior, gathering feedback, and refining retention strategies, the Telco company can ensure long-term customer satisfaction and sustained business growth. Future efforts should focus on deepening the understanding of customer needs and adapting to the evolving market landscape to stay ahead of the competition and retain a loyal customer base.