

# CUSTOMER CHURN ANALYSIS FOR SPEEDYCALL

A DATA-DRIVEN APPROACH TO IMPROVE CUSTOMER RETENTION



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## ABSTRACT

This study investigates factors influencing customer churn in a telecommunications company called SpeedyCall by analyzing key attributes such as tenure, gender, seniority, payment method, contract type, and partner status. Customer churn is defined as the rate at which customers stop using a company's services. This poses a significant challenge for organizations aiming to maintain profitability and customer satisfaction. By utilizing data-driven techniques and visualizations, this research explores associations between churn behavior and the aforementioned attributes to improve retention strategies.

The analysis reveals a strong association between **tenure** and churn, with customers exhibiting shorter tenures being more likely to churn. Longer-tenured customers show improved retention, although a minority of long-tenured customers also leave. Interestingly, **gender** has no significant impact on churn behavior. This indicates that customer retention strategies should not vary based on gender. **Seniority** emerges as a notable factor, with senior citizens exhibiting higher churn rates compared to non-senior citizens.

The study also identifies a significant relationship between churn and **payment methods**, with customers using electronic checks displaying the highest churn rates. Automated payment methods, such as bank transfers and credit cards, correlate with lower churn rates. Additionally, **contract type** plays a crucial role, with both senior and non-senior citizens showing a strong preference for month-to-month contracts.

Lastly, customers with a **partner** tend to have higher total charges and a broader variability in spending compared to those without a partner. This suggests that partner status may influence spending behavior. The findings provide a comprehensive understanding of customer churn dynamics and underscore the importance of tailoring retention strategies to address factors such as payment methods, tenure, seniority, and contract preferences. By implementing targeted initiatives based on these insights, businesses can enhance customer satisfaction, reduce churn rates, and improve long-term profitability.

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## **1.0 INTRODUCTION**

### **1.1 Background of the Study**

Customer churn is a significant challenge for businesses like SpeedyCall, a telecommunications provider. Churn refers to the rate at which customers stop using a company's services. It directly impacts revenue and growth. In the competitive telecom industry, customer acquisition is costly and retaining existing customers is crucial for profitability. Identifying why customers churn can help companies address their pain points and improve service quality.

### **1.2 Objectives**

The primary objectives of this study are:

- 1) Is there an association between tenure and customer churn?
- 2) Is gender is associated with customer churn?
- 3) Is seniority associated with customer churn?
- 4) Is there an association between payment methods and customer churn?
- 5) What is the most preferable contract type for Senior citizen and non-senior citizen?
- 6) Is having a partner or not is associated with total charges?

### **1.3 Significance of the Study**

Understanding customer churn allows SpeedyCall to adopt proactive measures to retain customers and reduce revenue losses and improve customer satisfaction. By focusing on data-driven insights, the company can design loyalty programs, personalized offers, or improved customer support. This not only ensures business sustainability but also strengthens SpeedyCall's position in the market.

## 2.0 DATA

The dataset under analysis consists of **7043 observations**, with no missing values, ensuring a robust and complete dataset for our study. It includes a total of **21 variables**, each contributing valuable insights into the customer churn behavior. For the purpose of this analysis, **7 key variables** were selected due to their relevance in understanding factors associated with customer churn. These variables represent crucial aspects of customer characteristics, service preferences and behaviors. They are pivotal for predicting retention and identifying trends that influence customer decisions.

Below is a brief description of each of the 7 chosen variables:

Variable Name	Description
gender	Whether the customer is a male or a female
SeniorCitizen	Whether the customer is a senior citizen or not (1, 0)
Partner	Whether the customer has a partner or not (Yes, No)
tenure	Number of months the customer has stayed with the company
Contract	The contract term of the customer (Month-to-month, One year, Two year)
PaymentMethod	The customer's payment method (Electronic check, Mailed check, Bank transfer (automatic), Credit card (automatic))
TotalCharges	The total amount charged to the customer

### 3.0 DATA ANALYSIS

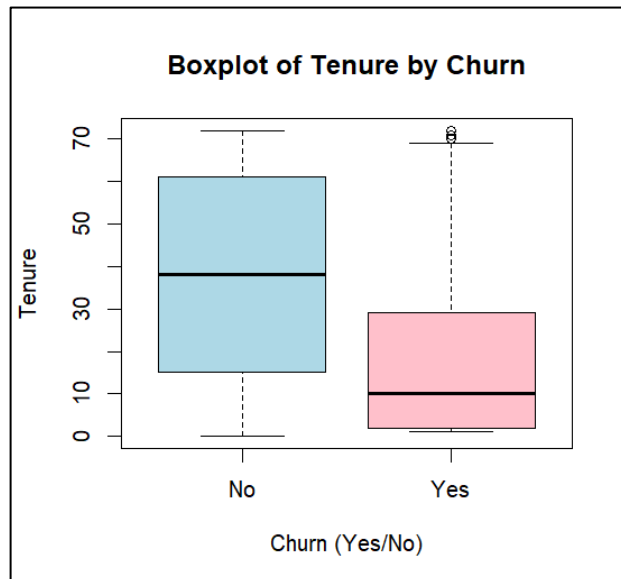
In this section we are mainly focusing on descriptive analysis to get the conclusions. The data analysis is done using R software.

```
> table(Churn)
Churn
No   Yes
5174 1869
```

```
> table(Churn)/7043
Churn
No      Yes
0.7346301 0.2653699
```

Among 7043 customers, there are 1869 churners and 5174 non-churners. The **churn rate is approximately 26.54%** and the **non-churn rate is approximately 73.46%**. This means that approximately one out of every four customers is leaving the service.

#### Objective 1 - Check whether there is an association between tenure and customer churn



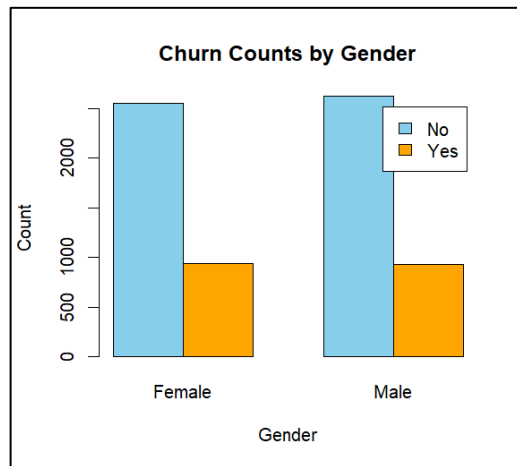
- **Tenure for Non-Churners:** Customers who did not churn generally have higher tenure values. There is a high median tenure. The interquartile range (IQR) is larger.
- **Tenure for Churners:** Customers who churned have a lower median tenure. This suggests that customers with shorter tenures are more likely to churn. The IQR is smaller and there are a few outliers with high tenure. This suggests that some long-tenure customers still churn.

The plot indicates a strong association between tenure and churn status. Longer tenure correlates with lower churn likelihood. This suggests that **customer retention improves as tenure increases**. A few long-tenured customers also leaving. This warrants further investigation into factors influencing their decision to churn.

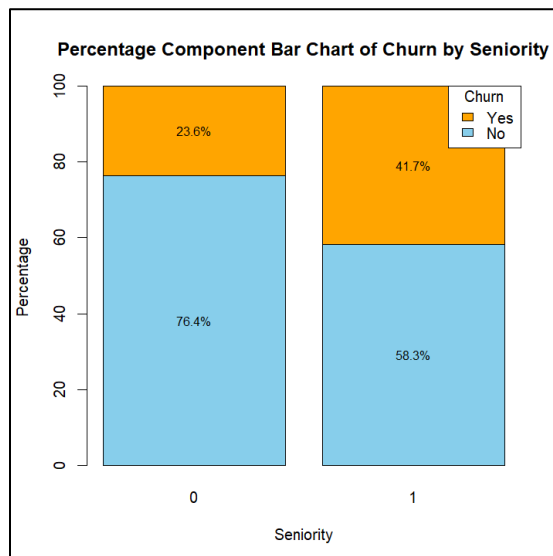
#### Objective 2 – Check whether gender is associated with churn

We can draw a bar plot to check the association between gender and churn.

The chart shows that churn rates for males and females are similar, with no significant difference between the genders. This indicates that gender is not a determining factor for customer churn.



### Objective 3 – Check whether seniority is associated with churn



**41.7%** of senior citizens churned and **58.3%** didn't churn. **23.6%** of non-senior citizens churned, and **76.4%** didn't churn.

Seniority plays a role in churn behavior.

**Customers with lower seniority (0) have a low churn rate. Customers with higher seniority (1) have a higher churn rate.**

This could be due to differences in customer experience, satisfaction, or other factors related to seniority.

### Objective 4 – Check whether there is an association between churn and payment methods

```
> table(Churn,PaymentMethod)
```

	Bank transfer (automatic)	Credit card (automatic)	Electronic check	Mailed check
Churn No	1286	1290	1294	1304
Churn Yes	258	232	1071	308

The below table shows the expected cell frequencies.

	Bank Transfer	Credit Card	Electronic Check	Mailed Check
Churn(No)	1134	1118	1737	1184

Churn(Yes)	410	404	628	428
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Since no more than one-fifth (20%) of the expected frequencies are less than 5 and no expected frequency is less than 1, we can use Pearson's Chi Square Test.

H0 : There is no association between the churn and payment methods.

H1 : There is an association between the churn and payment methods.

```
> chisq.test(table(Churn,PaymentMethod))

Pearson's Chi-squared test

data:  table(Churn, PaymentMethod)
X-squared = 648.14, df = 3, p-value < 2.2e-16
```

Since p value is less than 5%, we reject H0. At 5% level of significance, we can conclude that **there is an association between churn and payment methods.**

The payment method is an influential factor in customer churn. Specifically, the electronic check method is associated with the highest churn rates. This suggests that customers using this method may experience dissatisfaction or face challenges in maintaining their subscriptions. Transitioning customers to more stable payment methods, such as automated bank transfers or credit cards, might help reduce churn rates.

### Objective 5 - Identify the most preferable contract type for senior citizen and non-senior citizen

The below table shows the percentage distribution of contract types (Month-to-month, One year, and Two year) for both non-senior citizens (SeniorCitizen = 0) and senior citizens (SeniorCitizen = 1).

```
> prop.table(table(Contract ,SeniorCitizen),margin=2)*100

      SeniorCitizen
Contract      0      1
Month-to-month 51.99119 70.66550
One year      21.74208 16.63748
Two year      26.26673 12.69702
```

Based on the table, the **most preferable contract type** for senior citizens and non-senior citizens is clearly the **Month-to-Month contract.**

#### Senior Citizens (70.67%):

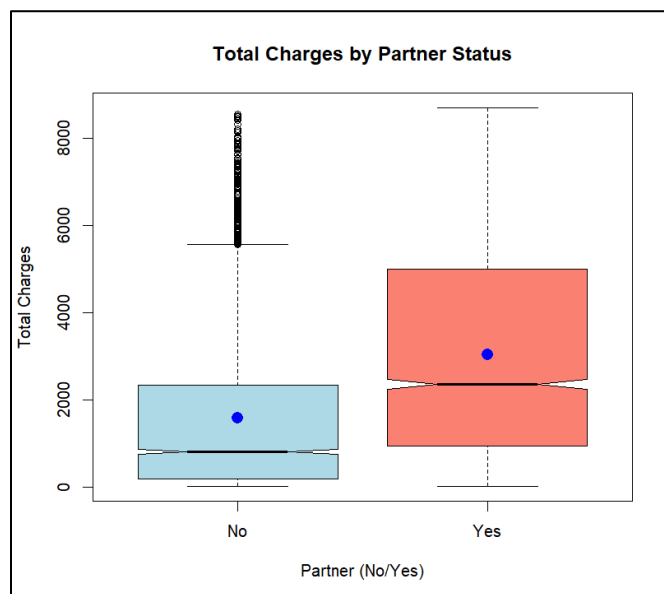
- A majority (70.67%) of senior citizens prefer the **Month-to-Month** contract.
- This indicates that senior citizens prioritize flexibility, as Month-to-Month contracts do not require long-term commitment and allow them to cancel services easily.
- The lower percentages for **One-Year (16.64%)** and **Two-Year (12.70%)** contracts suggest that senior citizens are less inclined toward longer-term contracts, possibly due to uncertainty about future needs or financial constraints.

#### Non-Senior Citizens (51.99%):



- Among non-senior citizens, the **Month-to-Month contract** is also the most popular choice (51.99%). But the preference is less dominant compared to senior citizens.
- A considerable proportion of non-senior citizens also prefer longer-term contracts:
  - **One-Year Contracts (21.74%)**
  - **Two-Year Contracts (26.27%)**

## Objective 6 – Check whether there is an association between having a partner or not and total charges



### Partner Status "No":

- The median is lower compared to the "Yes" group.
- The IQR is narrower. This indicates less variability in Total Charges among customers without a partner.
- There are numerous outliers. This shows that some customers without a partner have much higher Total Charges compared to the majority.

### Partner Status "Yes":

- The median Total Charges is higher

than for customers without a partner.

- The IQR is wider. This shows more variability in Total Charges among customers with a partner.

### Mean Comparison (Blue Dots):

- The blue dot represents the mean Total Charges for each group. In both groups, the mean is higher than the median. This indicates a positive skewness (a few customers have significantly higher Total Charges).

**Customers with a partner ("Yes") tend to have higher Total Charges than those without a partner ("No").**

## 4.0 GENERAL DISCUSSION AND CONCLUSION

- ❖ **Tenure and Churn:** Longer tenures strongly correlate with lower churn rates, highlighting the importance of customer retention efforts over time.
- ❖ **Gender and Churn:** Gender does not significantly impact churn behavior, indicating churn is independent of gender.
- ❖ **Seniority and Churn:** Senior citizens are more likely to churn compared to non-senior citizens, suggesting seniority influences churn behavior.
- ❖ **Churn and Payment Methods:** A significant association exists between payment methods and churn, with electronic check users showing the highest churn rates.
- ❖ **Contract Type Preference by Seniority:** Month-to-Month contracts are the most preferred by both senior and non-senior citizens, reflecting a need for flexibility, especially among senior citizens.
- ❖ **Partner Status and Total Charges:** Customers with a partner tend to have higher total charges, indicating potential differences in service usage patterns.