

# Mobily Analysis

Insights That Drive Better Decisions



# Mobily Analysis

## Introduction & Over View

### Intoduction

This project focuses on analyzing customer churn in the telecommunications industry using a real-world customer dataset. The aim is to understand the key factors that influence customer retention and identify patterns that lead to customer churn. By leveraging analytical tools such as Power BI, Tableau, SQL, and Python, this project provides clear insights that support data-driven decision-making for telecom operators.

### Over view

The primary objectives of this analysis are to:

- Analyze customer behavior, service usage, and account information to detect churn patterns.
- Examine relationships between demographics, subscription types, and churn rates.
- Build interactive visual dashboards that highlight the most influential features behind customer churn.
- Provide insights and recommendations that help telecom companies enhance customer satisfaction and retention.

# Mobily Dataset

## 1. Customer Demographics

- Gender
- senior citizen status
- partner
- dependents

## 2. Account Information

- Tenure
- contract type
- billing method
- paperless billing

## 3. Phone Services

- Whether the customer has phone service or multiple lines

# Mobily Dataset

## 4. Internet Services

- DSL
- fiber optic or no internet
- plus add-on internet features

## 5. Additional Services

- Online security
- backup
- device protection
- tech support
- streaming TV
- streaming movies

## 6. Financial & Churn Data

- Monthly charges
- total charges
- whether the customer churned or stayed



## What This Project Delivers ?

- Cleaned and prepared dataset using SQL/Python
- Exploratory Data Analysis (EDA)
- Visual insights through Power BI & Tableau dashboards
- Churn prediction insights and key influential factors
- Final business recommendations to reduce churn and improve customer loyalty

# Columns Description

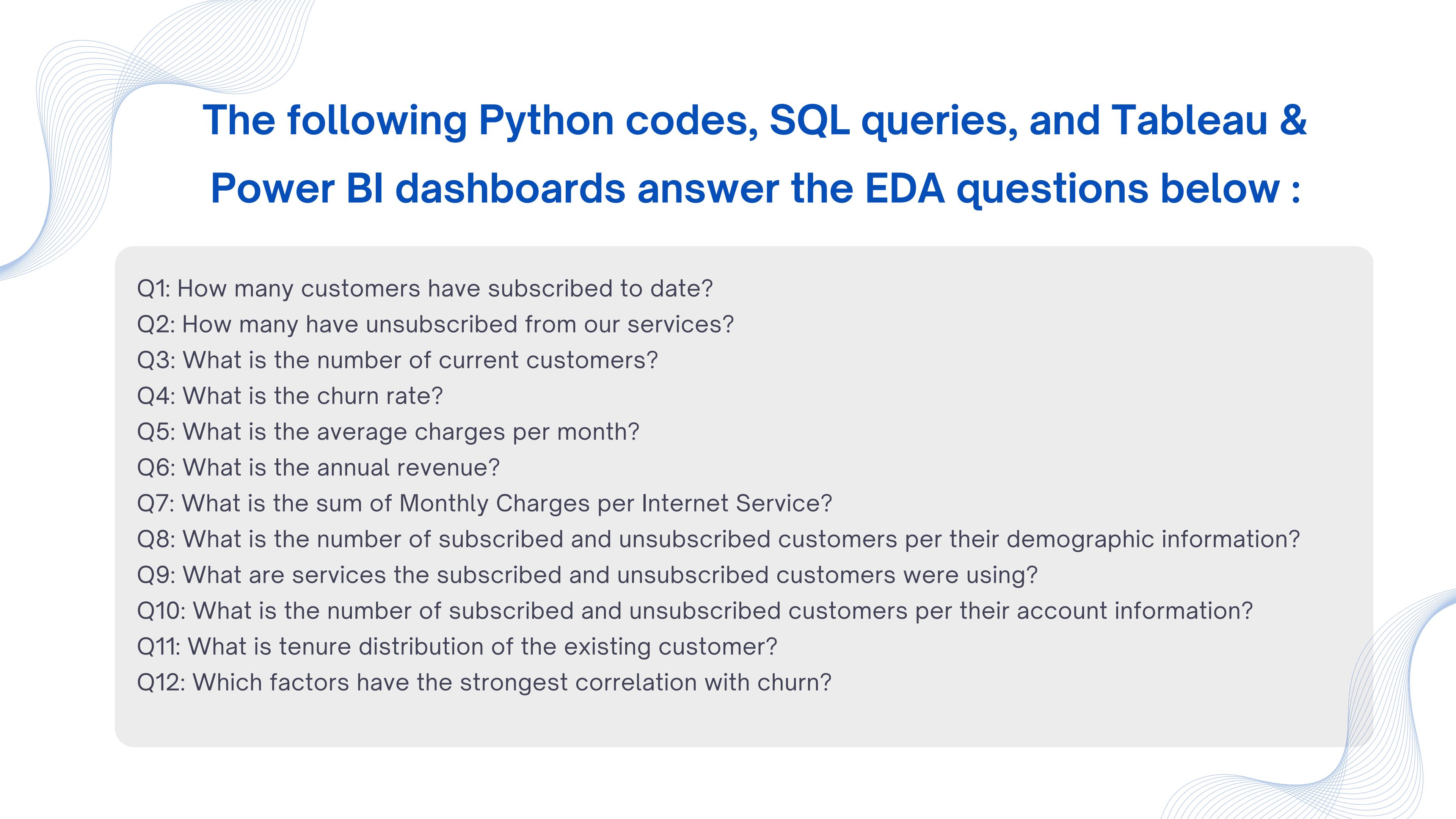
1. **customerID**: A unique identifier for each customer.
2. **gender**: The gender of the customer (Male or Female).
3. **SeniorCitizen**: Indicates whether the customer is a senior citizen (1 = Yes, 0 = No).
4. **Partner**: Indicates whether the customer has a partner (Yes or No).
5. **Dependents**: Indicates whether the customer has dependents (Yes or No).
6. **tenure**: The number of months the customer has stayed with the company.
7. **PhoneService**: Indicates whether the customer has a phone service (Yes or No).
8. **MultipleLines**: Indicates whether the customer has multiple phone lines (Yes, No, or No phone service).
9. **InternetService**: The type of internet service the customer has (DSL, Fiber optic, or No internet service).

# Columns Description

10. **OnlineSecurity**: Indicates whether the customer has online security service (Yes, No, or No internet service).
11. **OnlineBackup**: Indicates whether the customer has an online backup service (Yes, No, or No internet service).
12. **DeviceProtection**: Indicates whether the customer has a device protection service (Yes, No, or No internet service).
13. **TechSupport**: Indicates whether the customer has tech support service (Yes, No, or No internet service).
14. **StreamingTV**: Indicates whether the customer has a streaming TV service (Yes, No, or No internet service).

# Columns Description

15. **StreamingMovies**: Indicates whether the customer has streaming movies service (Yes, No, or No internet service).
16. **Contract**: The type of contract the customer has (Month-to-month, One year, Two years).
17. **PaperlessBilling**: Indicates whether the customer uses paperless billing (Yes or No).
18. **PaymentMethod**: The payment method used by the customer (Bank transfer, Credit card, electronic check, Mailed check).
19. **MonthlyCharges**: The monthly charges paid by the customer.
20. **TotalCharges**: The total charges paid by the customer to date.
21. **Churn**: Indicates whether the customer has churned (left the company) (Yes or No)



# **The following Python codes, SQL queries, and Tableau & Power BI dashboards answer the EDA questions below :**

Q1: How many customers have subscribed to date?

Q2: How many have unsubscribed from our services?

Q3: What is the number of current customers?

Q4: What is the churn rate?

Q5: What is the average charges per month?

Q6: What is the annual revenue?

Q7: What is the sum of Monthly Charges per Internet Service?

Q8: What is the number of subscribed and unsubscribed customers per their demographic information?

Q9: What are services the subscribed and unsubscribed customers were using?

Q10: What is the number of subscribed and unsubscribed customers per their account information?

Q11: What is tenure distribution of the existing customer?

Q12: Which factors have the strongest correlation with churn?

The background features abstract, flowing blue line art on a white surface, with a large, rounded rectangular box containing the text.

**Let's begin with the  
Python code  
and the steps taken to prepare  
the Mobily dataset**

## Load Dataset

```
import pandas as pd
import numpy as np

#upload data
df = pd.read_csv(r"D:\Downloads\Telco\WA_Fn-UseC_-Telco-Customer-Churn.csv")
```

Loaded the Telco dataset and displayed basic info to understand column types and structure

```
▷ v df.info()
[2]

... <class 'pandas.core.frame.DataFrame'>
RangeIndex: 7043 entries, 0 to 7042
Data columns (total 21 columns):
 #   Column           Non-Null Count  Dtype  
---  --  
 0   customerID      7043 non-null   object  
 1   gender          7043 non-null   object  
 2   SeniorCitizen   7043 non-null   int64  
 3   Partner         7043 non-null   object  
 4   Dependents      7043 non-null   object  
 5   tenure          7043 non-null   int64  
 6   PhoneService    7043 non-null   object  
 7   MultipleLines   7043 non-null   object  
 8   InternetService 7043 non-null   object  
 9   OnlineSecurity   7043 non-null   object  
 10  OnlineBackup    7043 non-null   object  
 11  DeviceProtection 7043 non-null   object  
 12  TechSupport     7043 non-null   object  
 13  StreamingTV     7043 non-null   object
```

## Data Overview

Loaded the Telco dataset and displayed basic info to understand column types and structure

## Null Values Check

Verified missing values. No Nulls shown, but TotalCharges contains hidden blanks

```
#Detect null values
print(df.isnull().sum())
```

customerID	0
gender	0
SeniorCitizen	0
Partner	0
Dependents	0
tenure	0
PhoneService	0
MultipleLines	0
InternetService	0
OnlineSecurity	0
OnlineBackup	0
DeviceProtection	0
TechSupport	0
StreamingTV	0
StreamingMovies	0
Contract	0
PaperlessBilling	0
PaymentMethod	0

## Clean & Convert Columns

Replaced blank TotalCharges with NaN, filled them with 0.0, and converted numeric columns to proper data types

```
استبدال الفراغات بقيمة مفقودة #
استخدمنا float np.nan لي ؟ عشانها
df['TotalCharges'] = df['TotalCharges'].replace(' ', np.nan)

تبيني القيم الفارقة#
df['TotalCharges'] = df['TotalCharges'].fillna(0.0)
print("\n--- 0.0 بـ TotalCharges في 11 قيمة معالجة .2 ---")

# intger مدة الخدمة يمثل عدد الشهور وهو رقم صحيح
df['tenure'] = df['tenure'].astype(int)

# الرسوم الشهرية رقم مالي يحتوي على كسور عشرية
# تستخدم float للحفاظ على الدقة العشرية#
df['MonthlyCharges'] = df['MonthlyCharges'].astype(float)

# إجمالي الرسوم رقم مالي يحتوي على كسور عشرية#
# تستخدم float للحفاظ على الدقة العشرية#
df['TotalCharges'] = df['TotalCharges'].astype(float)
print(df.dtypes['TotalCharges'])
```

--- 0.0 بـ TotalCharges في 11 قيمة معالجة .2 ---  
float64

```
#عمل عمود جديد
#تعريف الدالة التي تقسم إلى فئات
def categorize_tenure(tenure):
    if 1 <= tenure <= 10:
        return 'Short'
    elif 11 <= tenure <= 50:
        return 'Long'
    elif tenure > 50:
        return 'Very Long'
    else:
        return 'Zero Tenure'
```

## Create Tenure Category

Created a new column (tenure\_category) by grouping customers based on their tenure

```
#تطبيق الدالة لإنشاء العمود
df['tenure_category'] = df['tenure'].apply(categorize_tenure)

#تبديل القيم في عمود SeniorCitizen
df['SeniorCitizen'] = df['SeniorCitizen'].replace({
    0: 'Younger',
    1: 'Older'
})
```

## Transform SeniorCitizen

Mapped SeniorCitizen values from 0/1 to clearer labels: "Younger" and "Older"

df

[10]

	customerID	gender	SeniorCitizen	Partner	Dependents	tenure	PhoneService	MultipleLines
0	7590-VHVEG	Female	Younger	Yes	No	1	No	No phone service
1	5575-GNVDE	Male	Younger	No	No	34	Yes	No
2	3668-QPYBK	Male	Younger	No	No	2	Yes	No
3	7795-CFOCW	Male	Younger	No	No	45	No	No phone service
4	9237-HQITU	Female	Younger	No	No	2	Yes	No
...	...	...	...	...	...	...	...	...

## Final Dataset

Cleaned dataset showing tenure\_category and updated SeniorCitizen label

```
# CSV الملف بعد التعديلات
output_file_name = 'cleaned_telco_data_After_Update.csv'
df.to_csv(output_file_name, index=False)
```

## Save Cleaned Dataset

Exported the cleaned dataset into a new CSV file for further analysis.

The background features abstract, flowing blue line art on a white surface, with a large, rounded rectangular box centered in the middle.

**From Data Processing in Python**  
→ **To Data Exploration with**  
**SQL**

## Create database Telco\_Analysis

### Create Database

Created a new database named  
Telco\_Analysis

```
5      -----Number of Churned Customers-----
6  ▼ SELECT COUNT(CustomerID) AS Churned_Count
7  FROM TELCO
8  WHERE Churn = 'Yes'
9
10     -----Number of Non-Churned Customers-----
11 ▼ SELECT COUNT(CustomerID) AS Non_Churned_Count
12 FROM TELCO
13 WHERE Churn = 'No'

199 %  No issues found
Results Messages


|   | Churned_Count |
|---|---------------|
| 1 | 1869          |



|   | Non_Churned_Count |
|---|-------------------|
| 1 | 5174              |

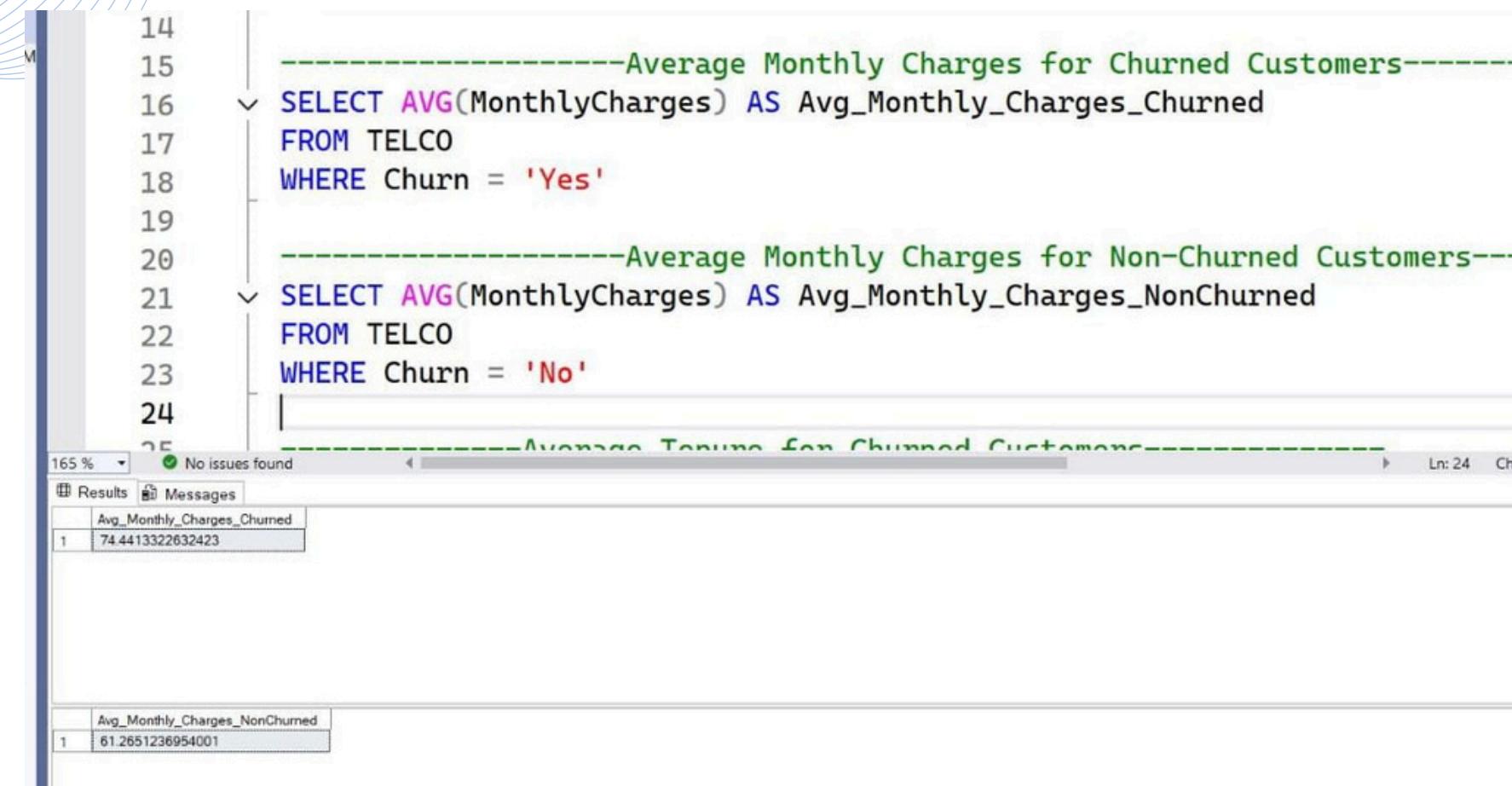

```

### Churned Customers Count

Total number of customers who churned

### Total number of customers who churned

Total number of customers who stayed



```
14
15  -----Average Monthly Charges for Churned Customers-----
16  SELECT AVG(MonthlyCharges) AS Avg_Monthly_Charges_Churned
17  FROM TELCO
18  WHERE Churn = 'Yes'
19
20  -----Average Monthly Charges for Non-Churned Customers---
21  SELECT AVG(MonthlyCharges) AS Avg_Monthly_Charges_NonChurned
22  FROM TELCO
23  WHERE Churn = 'No'
24
25  -----Average Tenure for Churned Customers-----
```

Results

	Avg_Monthly_Charges_Churned
1	74.4413322632423

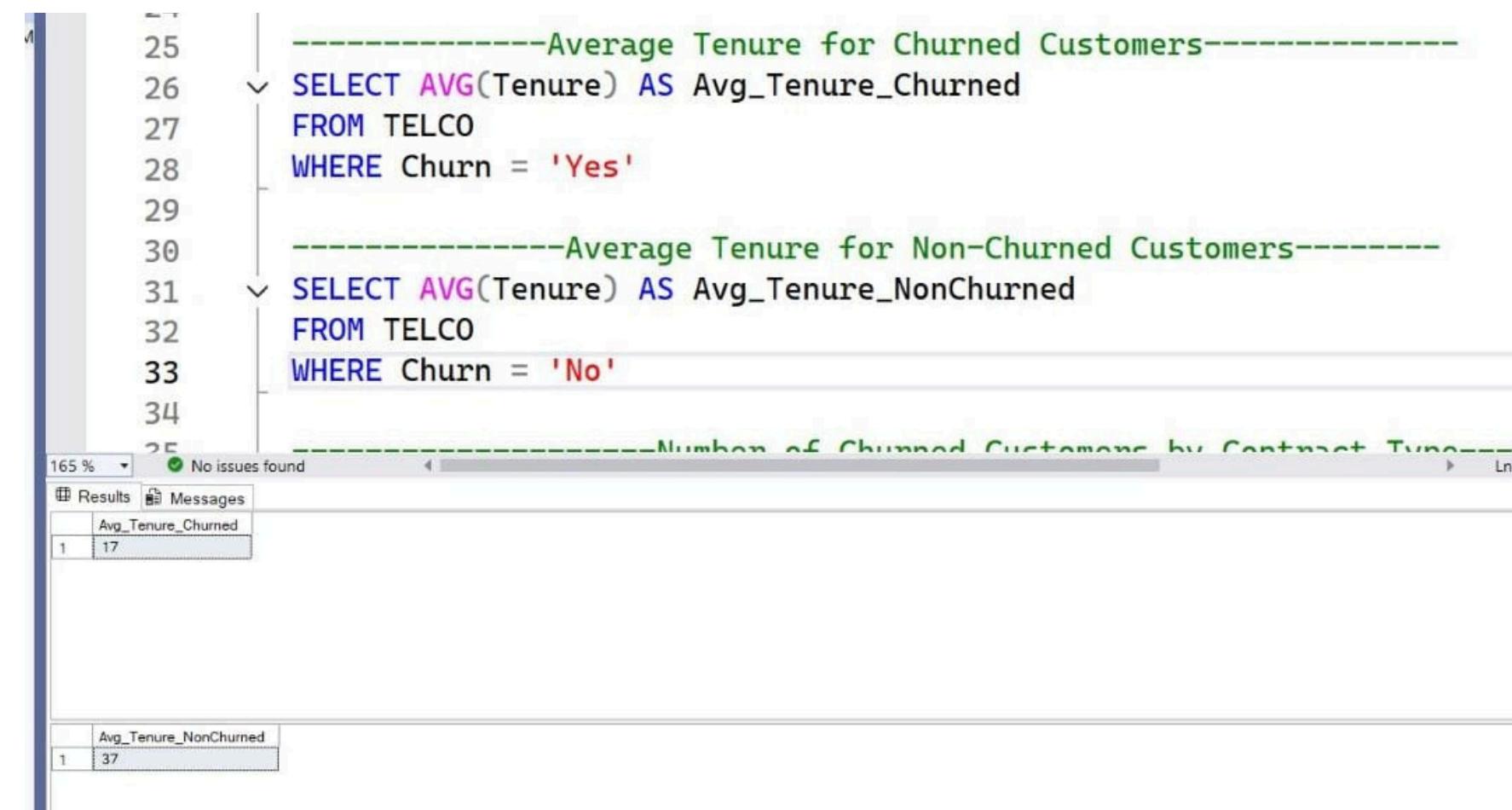
	Avg_Monthly_Charges_NonChurned
1	61.2651236954001

## Avg Monthly Charges (Churned)

Average monthly payment of churned customers

## Avg Monthly Charges (Non-Churned)

Average monthly payment of non-churned customers



```
25  -----Average Tenure for Churned Customers-----
26  SELECT AVG(Tenure) AS Avg_Tenure_Churned
27  FROM TELCO
28  WHERE Churn = 'Yes'
29
30  -----Average Tenure for Non-Churned Customers-----
31  SELECT AVG(Tenure) AS Avg_Tenure_NonChurned
32  FROM TELCO
33  WHERE Churn = 'No'
34
35  -----Number of Churned Customers by Contract Type-----
```

Results

	Avg_Tenure_Churned
1	17

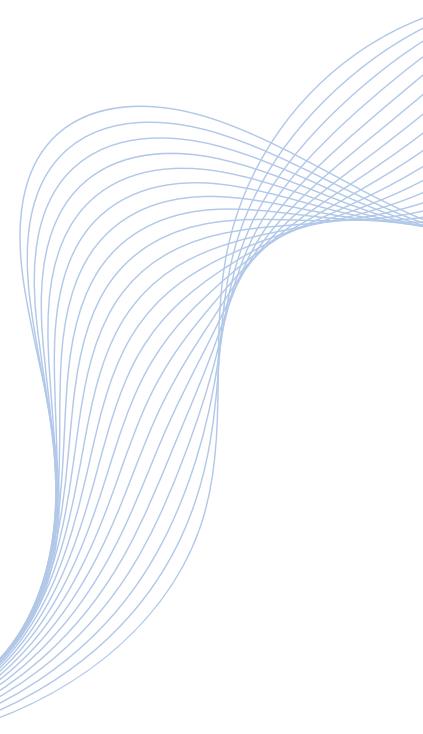
	Avg_Tenure_NonChurned
1	37

## Avg Tenure (Churned)

Average time churned customers stayed

## Avg Tenure (Non-Churned)

Average time non-churned customers stayed



```
SQLQuery1ELC...tation (66) 35 -----Number of Churned Customers by Contract Type----- 36 SELECT Contract, COUNT(CustomerID) AS Churned_Count_By_Contract 37 FROM TELCO 38 WHERE Churn = 'Yes' 39 GROUP BY Contract 40 41 -----Number of Churned Customers by Payment Method----- 42 SELECT PaymentMethod, COUNT(CustomerID) AS Churned_Count_By_PaymentMethod 43 FROM TELCO 44 WHERE Churn = 'Yes' 45 GROUP BY PaymentMethod 116 No issues found 165 % ▾ Results Messages
```

Contract	Churned_Count_By_Contract
1 Month-to-month	1655
2 One year	166
3 Two year	48

PaymentMethod	Churned_Count_By_PaymentMethod
1 Electronic check	1071
2 Credit card (automatic)	232
3 Bank transfer (automatic)	258
4 Mailed check	308

## Churn by Contract Type

Shows churn distribution across contract types

```
49 -----Churned Customers with Online Security----- 50 SELECT OnlineSecurity, COUNT(CustomerID) AS Churned_Count_By_OnlineSecurity 51 FROM TELCO 52 WHERE Churn = 'Yes' 53 GROUP BY OnlineSecurity 54 55 -----Churned Customers with Tech Support----- 56 SELECT TechSupport, COUNT(CustomerID) AS Churned_Count_By_TechSupport 57 FROM TELCO 58 WHERE Churn = 'Yes' 59 GROUP BY TechSupport 165 % ▾ No issues found 165 % ▾ Results Messages
```

OnlineSecurity	Churned_Count_By_OnlineSecurity
1 No internet service	113
2 Yes	295
3 No	1461

TechSupport	Churned_Count_By_TechSupport
1 No internet service	113
2 Yes	310
3 No	1446

## Churn vs. Online Security

Counts churned customers by online security status

## Churn vs. Tech Support

Counts churned customers by tech support availability

```

61  -----Number of Churned Senior Citizens-----
62  ✓ SELECT COUNT(CustomerID) AS Churned_Senior_Citizens
63  FROM TELCO
64  WHERE Churn = 'Yes' AND SeniorCitizen = 'Older'
65
66  -----Number of Churned Non-Senior Citizens-----
67  ✓ SELECT COUNT(CustomerID) AS Churned_Non_Senior_Citizens
68  FROM TELCO
69  WHERE Churn = 'Yes' AND SeniorCitizen = 'Younger'
70
71  -----Number of Churned Customers with Multiple Lines-----
72  ✓ SELECT MultipleLines, COUNT(CustomerID) AS Churned_Count_By_MultipleLines
73  FROM TELCO
74  WHERE Churn = 'Yes'
75  GROUP BY MultipleLines
76
77  -----Number of Churned Customers by Partner Status -----
78  ✓ SELECT Partner, COUNT(CustomerID) AS Churned_Count_By_Partner
79  FROM TELCO
80  WHERE Churn = 'Yes'
81  GROUP BY Partner

```

## Churned Senior Citizens

Number of churned senior customers

```

71  -----Number of Churned Customers with Multiple Lines -----
72  ✓ SELECT MultipleLines, COUNT(CustomerID) AS Churned_Count_By_MultipleLines
73  FROM TELCO
74  WHERE Churn = 'Yes'
75  GROUP BY MultipleLines
76
77  -----Number of Churned Customers by Partner Status -----
78  ✓ SELECT Partner, COUNT(CustomerID) AS Churned_Count_By_Partner
79  FROM TELCO
80  WHERE Churn = 'Yes'
81  GROUP BY Partner

```

## Churned Non-Seniors

Number of churned younger customers

## Churn vs. Multiple Lines

Churned customers grouped by multiple-lines usage

## Churn vs. Partner Status

Churn distribution based on partner status

```

82
83 -----Number of Churned Customers by Dependents Status-----
84
85   SELECT Dependents, COUNT(CustomerID) AS Churned_Count_By_Dependents
86   FROM TELCO
87   WHERE Churn = 'Yes'
88   GROUP BY Dependents
89
90 -----Total Value of Revenue Lost Due to Churn-----
91
92   SELECT SUM(MonthlyCharges) AS Total_Monthly_Revenue_Lost
93   FROM TELCO
94   WHERE Churn = 'Yes'

```

165 % No issues found

Results Messages

Dependents	Churned_Count_By_Dependents
Yes	326
No	1543

Total_Monthly_Revenue_Lost
139130.85

## Churn vs. Dependents

Churn distribution by dependents status

## Total Revenue Lost

Sum of monthly charges lost due to churn

```

94
95 -----Number of Churned High-Value Customers-----
96
97   SELECT COUNT(CustomerID) AS Churned_High_Value_Customers
98   FROM TELCO
99   WHERE Churn = 'Yes' AND MonthlyCharges > (SELECT AVG(MonthlyCharges) FROM TELCO)
100
101 -----Churn Breakdown by Internet Service Type-----
102
103   SELECT InternetService, COUNT(CustomerID) AS Total_Churned_Customers
104   FROM TELCO
105   WHERE Churn = 'Yes'
106   GROUP BY InternetService
107   ORDER BY Total_Churned_Customers DESC

```

150 % No issues found

Results Messages

Churned_High_Value_Customers
1355

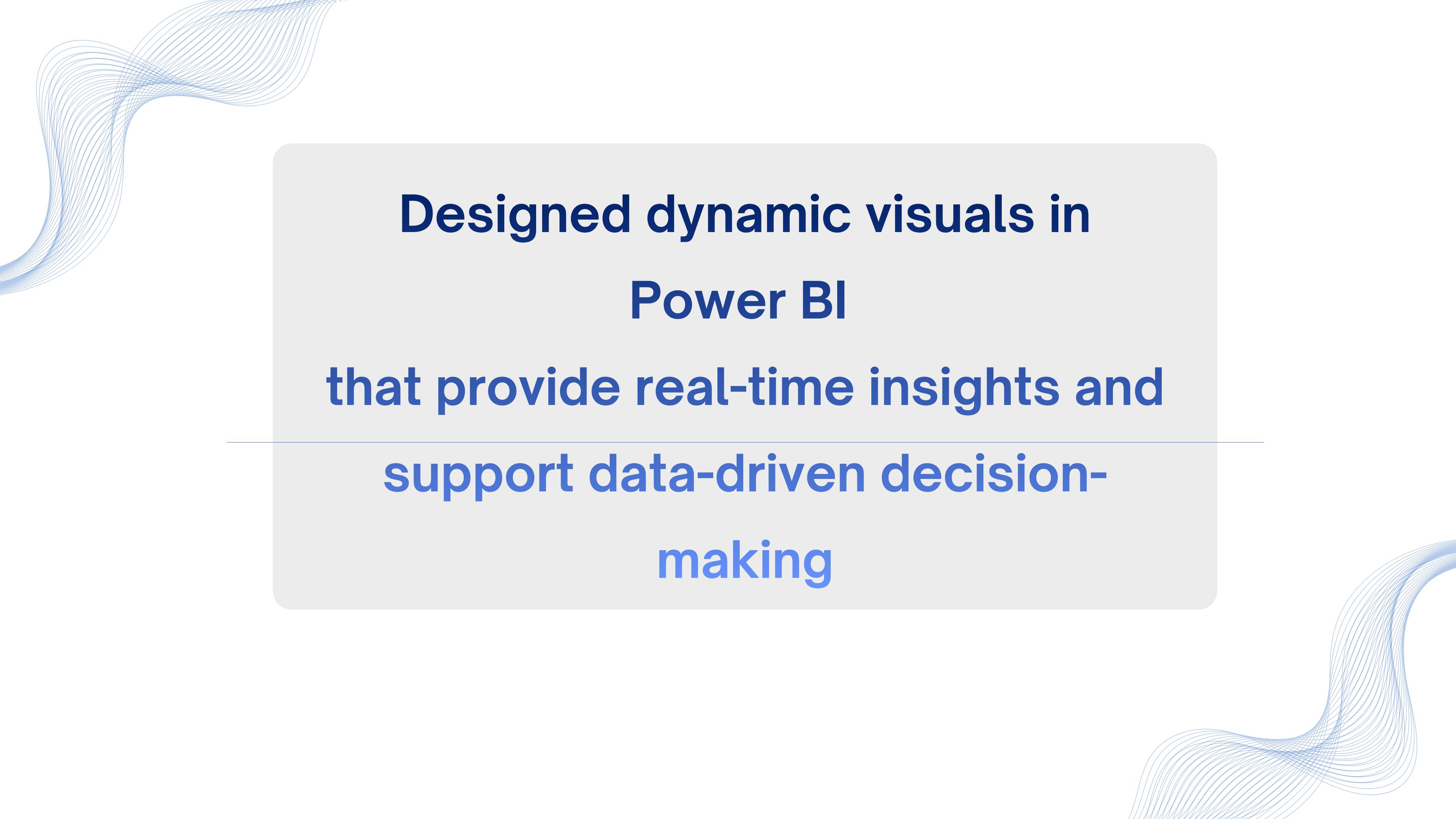
InternetService	Total_Churned_Customers
Fiber optic	1297
DSL	459
No	113

## High-Value Churned Customers

Customers paying above average who churned

## Churn by Internet Service

Churn distribution across internet service types

The background features abstract, flowing blue line art on the left and right sides, resembling stylized waves or energy flows.

**Designed dynamic visuals in  
Power BI  
that provide real-time insights and  
support data-driven decision-  
making**

Total customers

**7,043**

Current Customers

**5,174**

Annual revenue

**\$5.47M**

Annual revenue of current customers

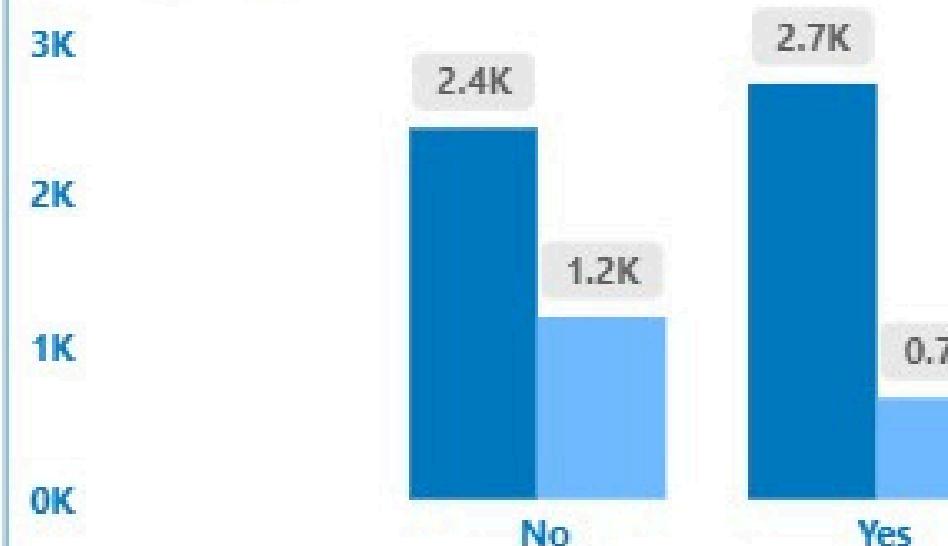
**\$3.8M**

Average monthly charges

**\$64.8**

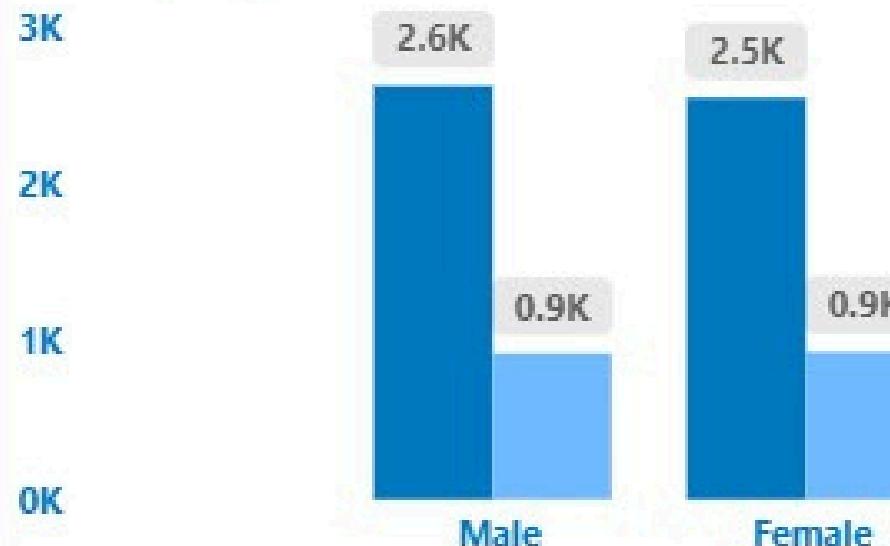
### No. of Customers who have partner by churn rate

Churn ● No ● Yes



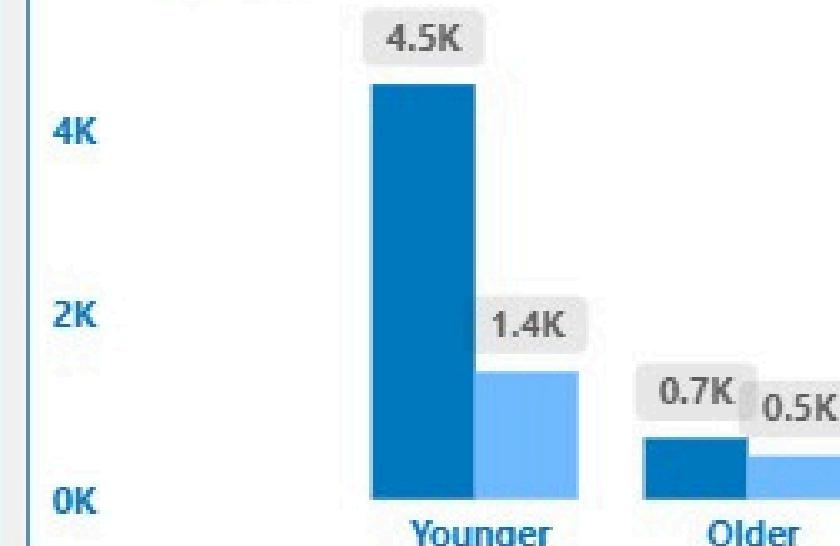
### No. of Customers by gender and churn rate

Churn ● No ● Yes

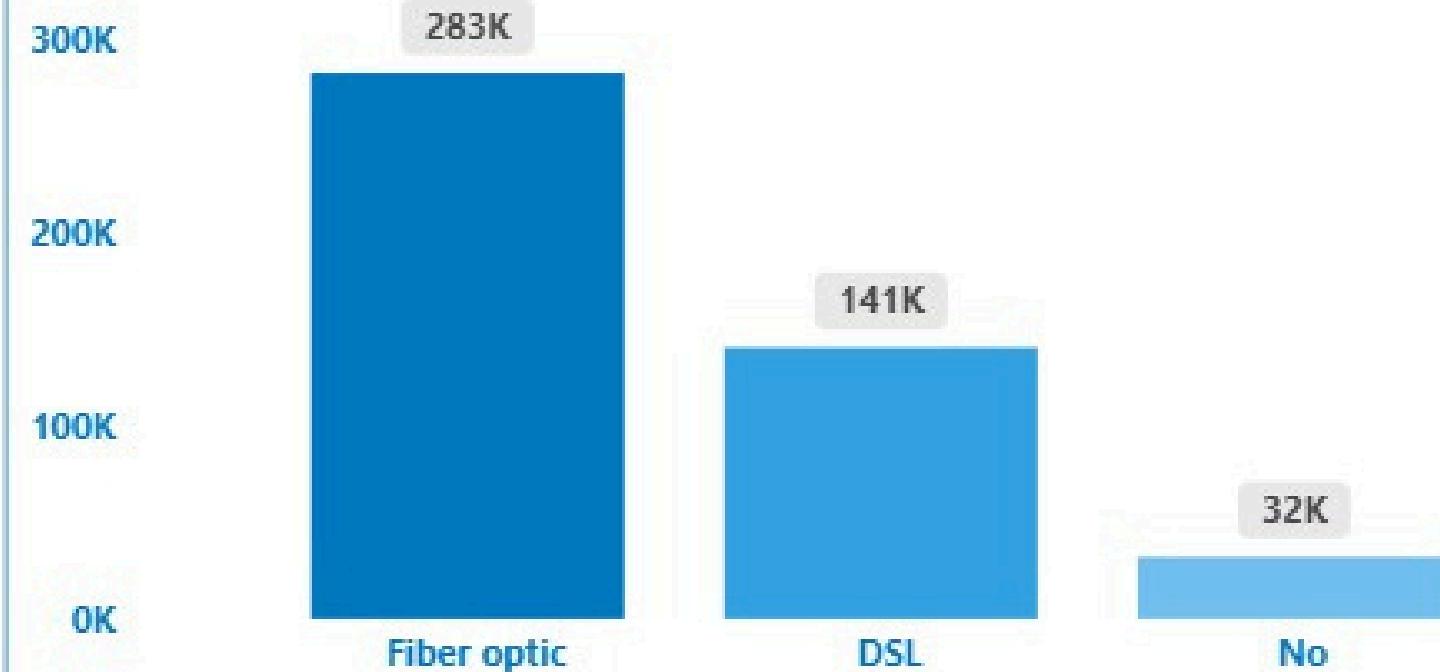


### No. of Customers by senior citizen and churn rate

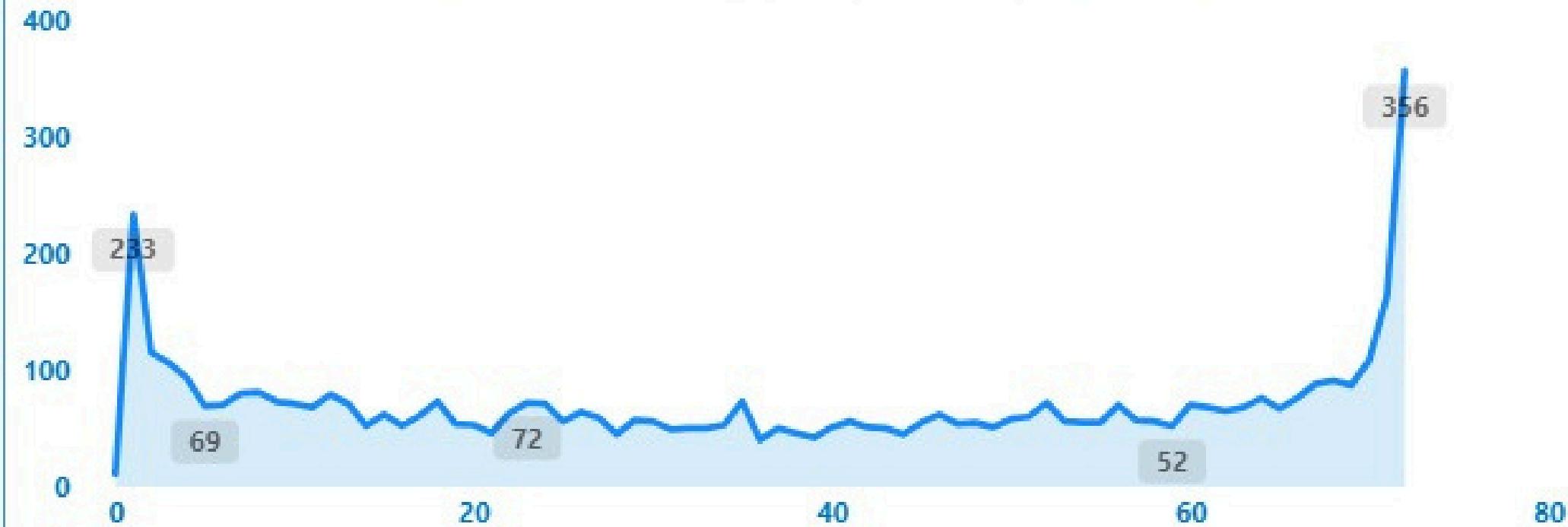
Churn ● No ● Yes



### Total Monthly Charges by InternetService



### Current Customers by tenure



Total customers

7,043

Current Customers

5,174

Annual revenue

\$5.47M

Annual revenue of current customers

\$3.8M

Average monthly charges

\$64.8

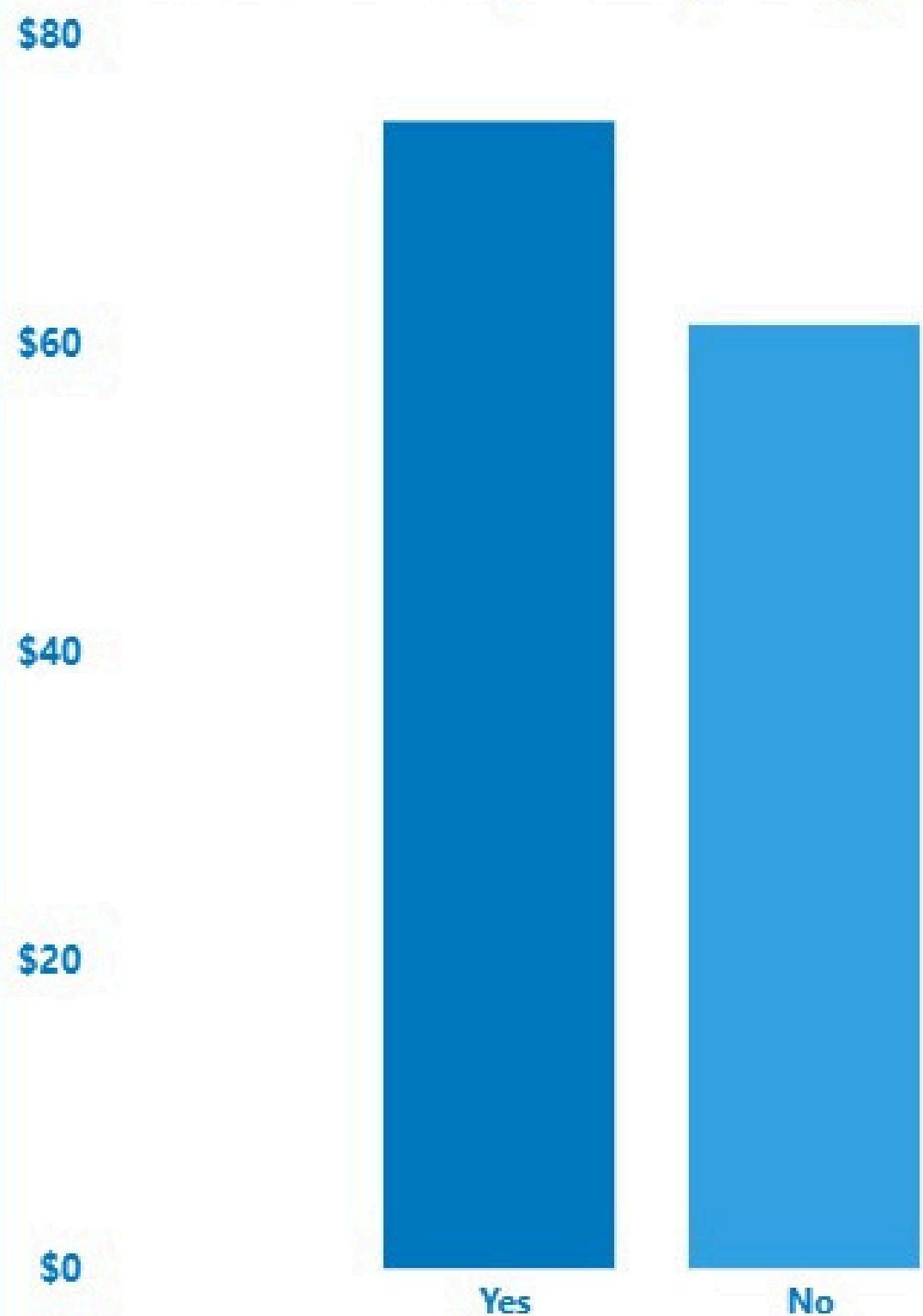
Churn

Select all

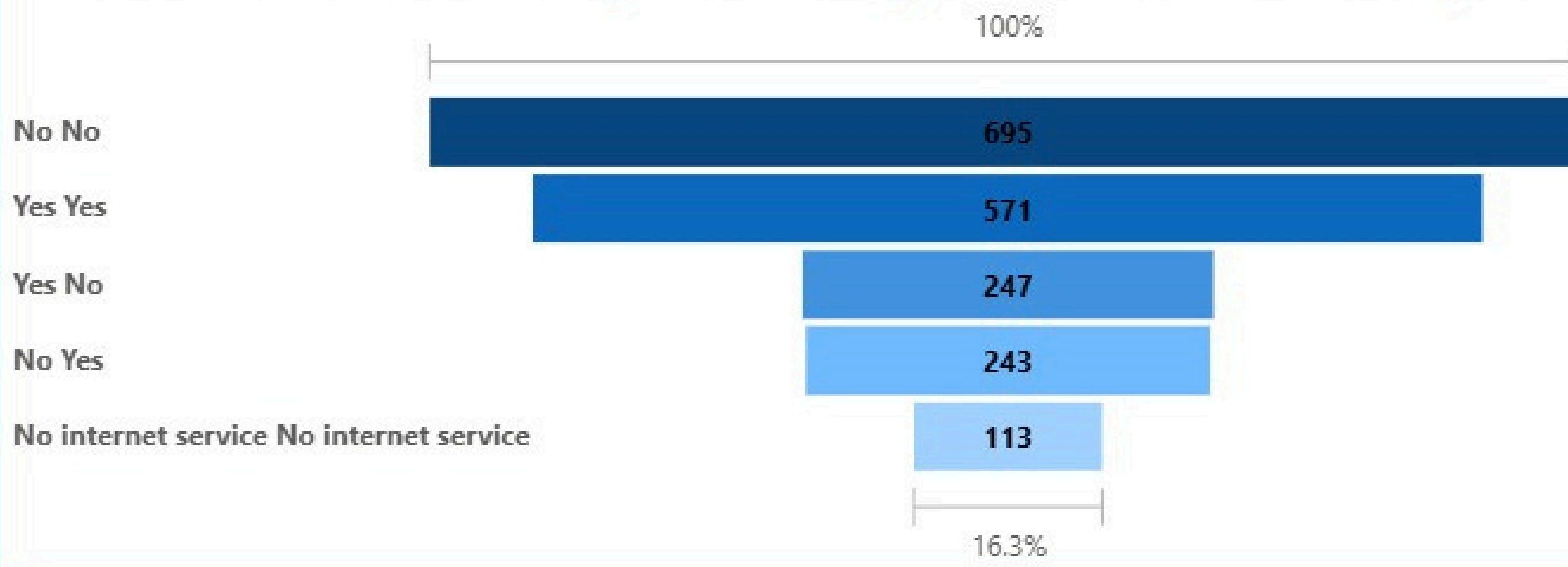
No

Yes

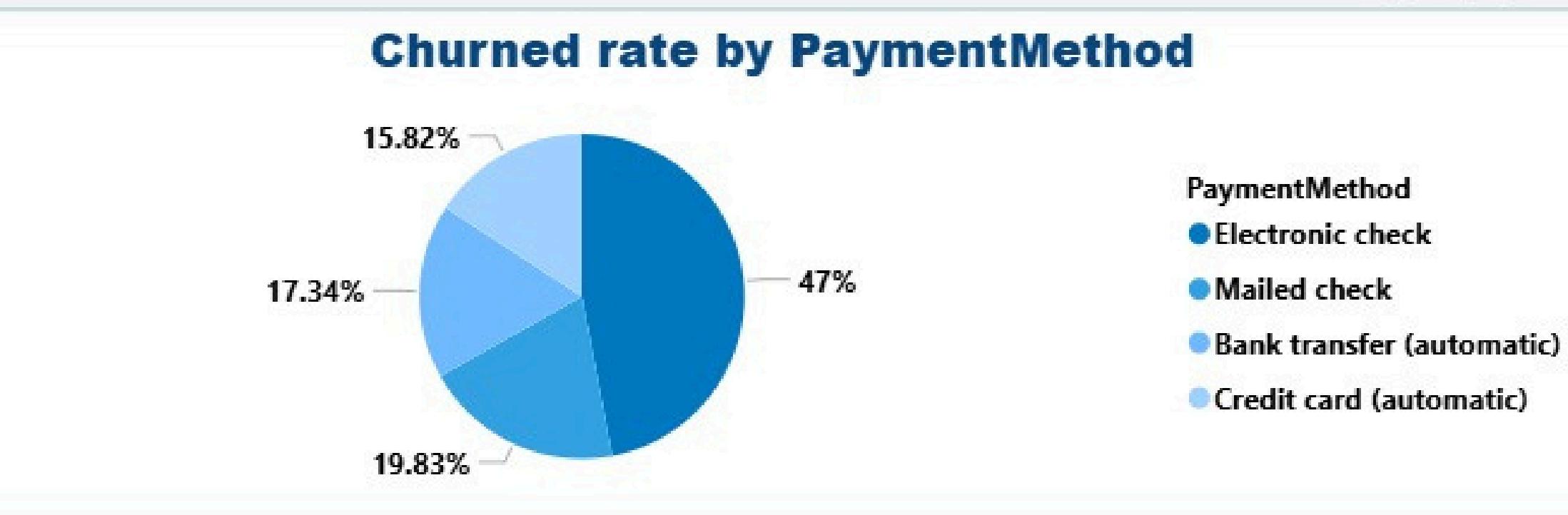
### AVG monthly charges by Churn



### Churned Customers by StreamingMovies and StreamingTV



### Churned rate by PaymentMethod



Total Customers

**7K**

Churned Customers

**1.869K**

Churned Rate

**26.54%**

Lost Monthly Revenue

**\$139K**

**Key Influencers**

**Visual per Churn**

**Key influencers** **Top segments**

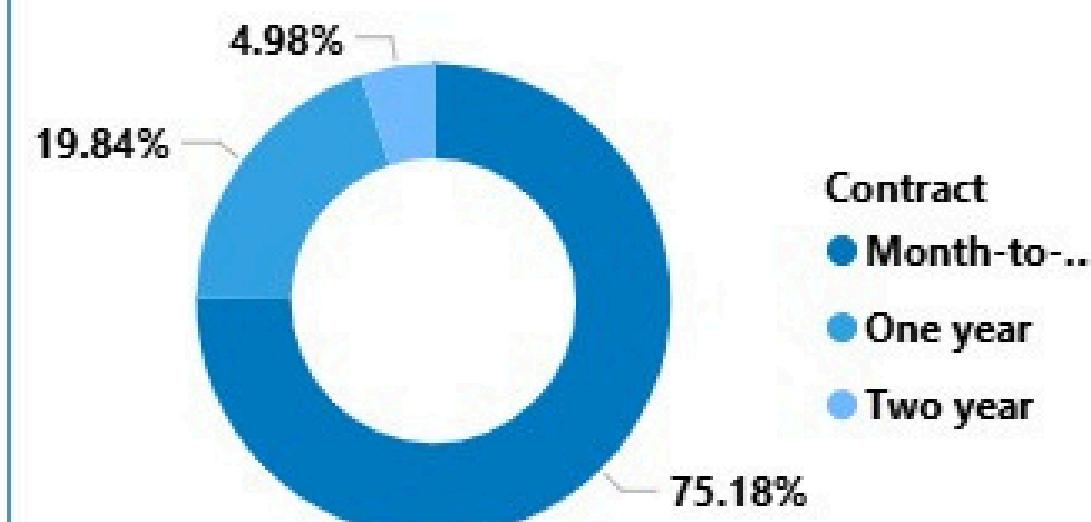
What influences Churn to be  
When.....the likelihood of Churn being Yes increases by

Contract is Month-to-month  
TechSupport is No  
InternetService is Fiber optic  
PaymentMethod is Electronic check  
tenure goes down 24.56

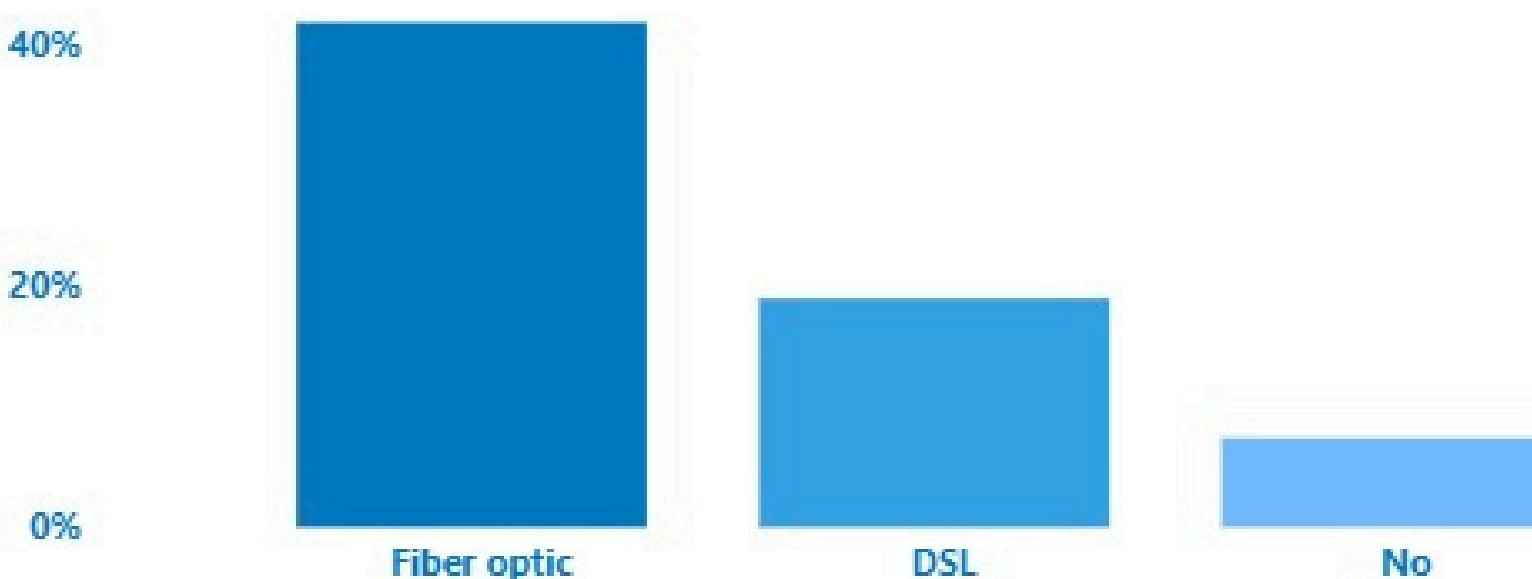
6.32x  
3.51x  
2.89x  
2.65x  
2.02x

Sort by: **Impact** Count

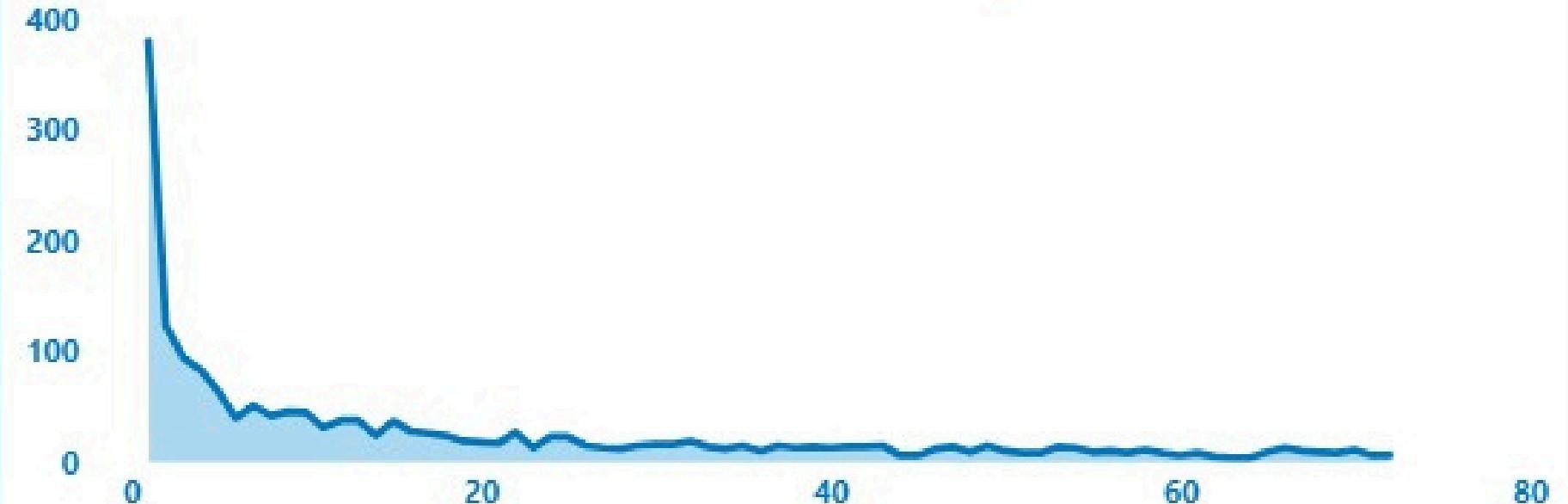
### Churned rate by Contract



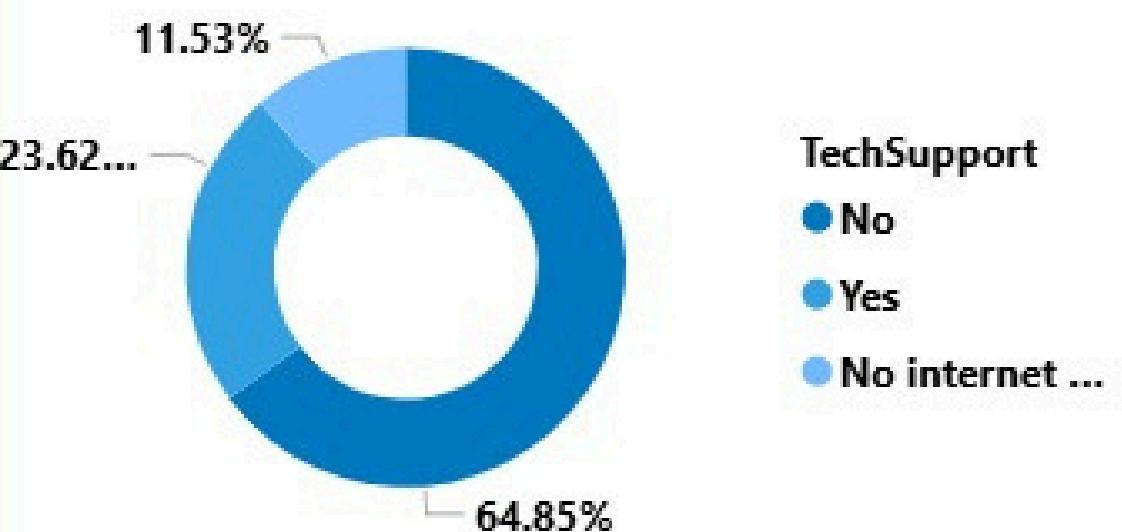
### Churned rate by InternetService



### Churned Customers by tenure



### Churned rate by TechSupport



Total Customers

**7K**

Churned Customers

**1.869K**

Churned Rate

**26.54%**

Lost Monthly Revenue

**\$139K**

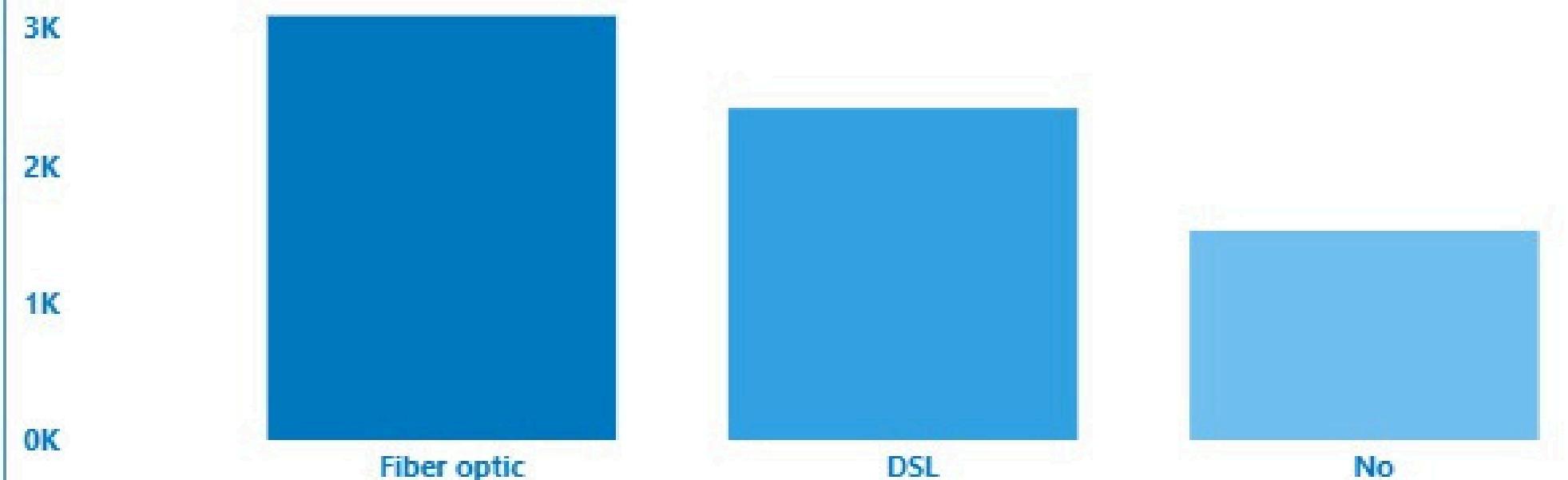
Churn

Select all

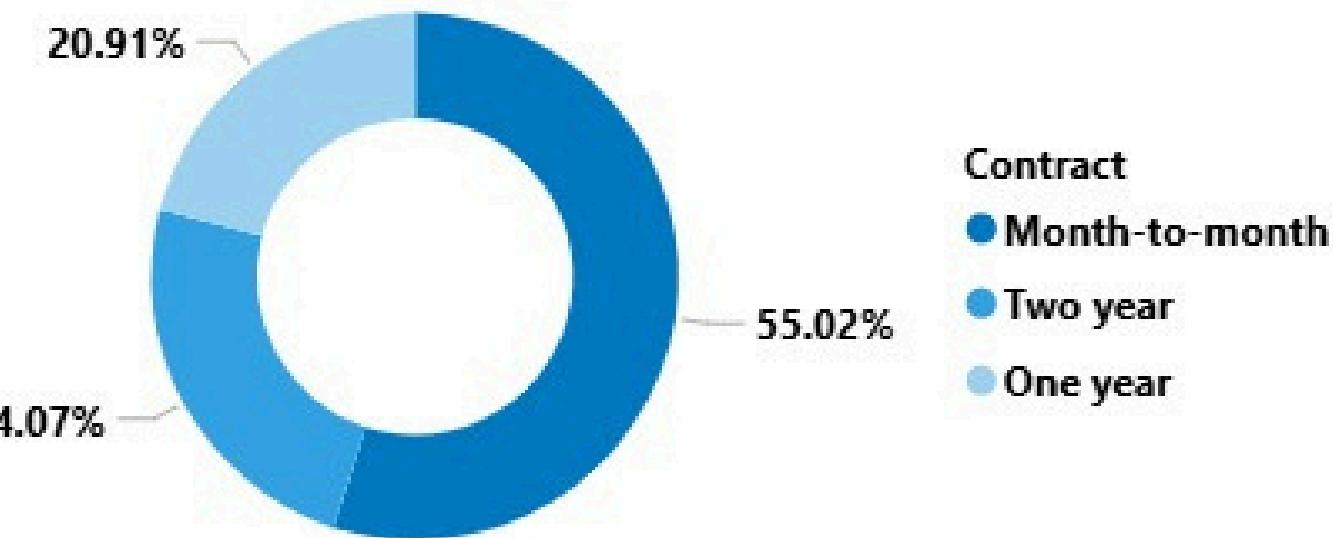
No

Yes

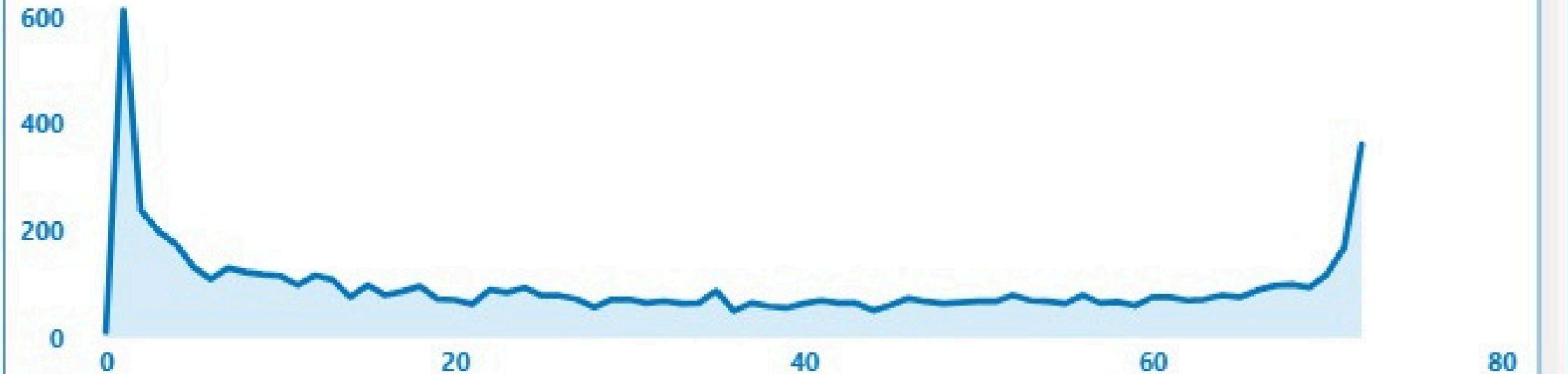
### Total Customers by InternetService



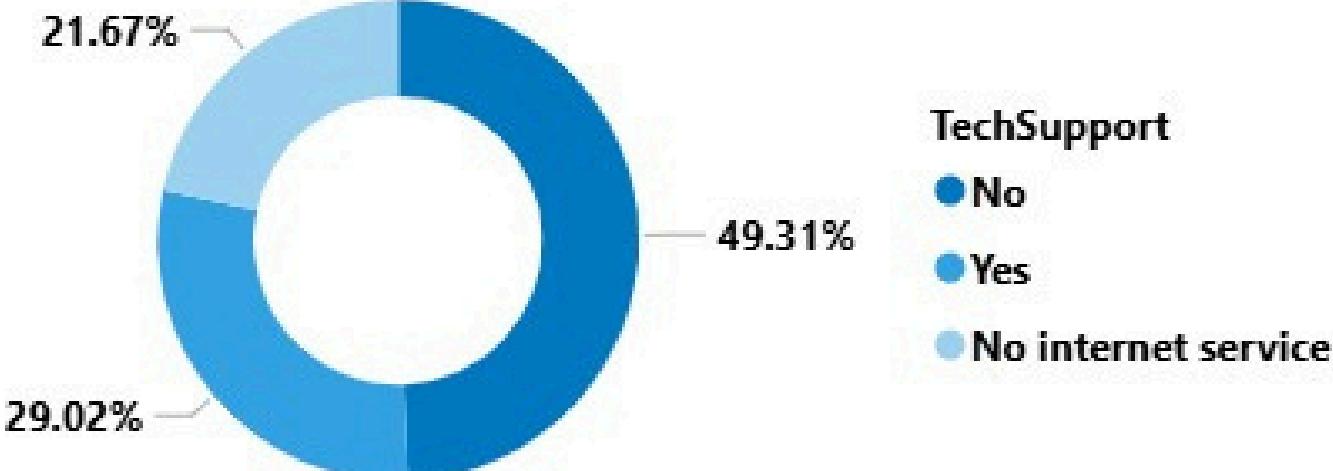
### Total Customers by Contract



### Total Customers by tenure



### Total Customers by TechSupport



# Key Insights :

## **Insight 1: New Customers Are More Likely to Churn**

Customers with a short tenure show a significantly higher churn rate compared to long-term customers.

This indicates that the first few months of the customer lifecycle represent the most critical stage for retention.

## **Insight 2: Higher Monthly Charges Increase Churn Risk**

Customers who churn tend to have higher average monthly charges than retained customers.

## **Insight 3: Fiber Optic Customers Exhibit Higher Churn Rates**

Customers subscribed to Fiber Optic internet services show a higher churn rate compared to DSL customers.

This may be related to higher costs, service quality expectations, or performance-related issues.

# Key Insights :

## **Insight 4: Payment Method Influences Customer Retention**

Customers who use Electronic Check as a payment method have noticeably higher churn rates compared to those using automatic payments (credit card or bank transfer).

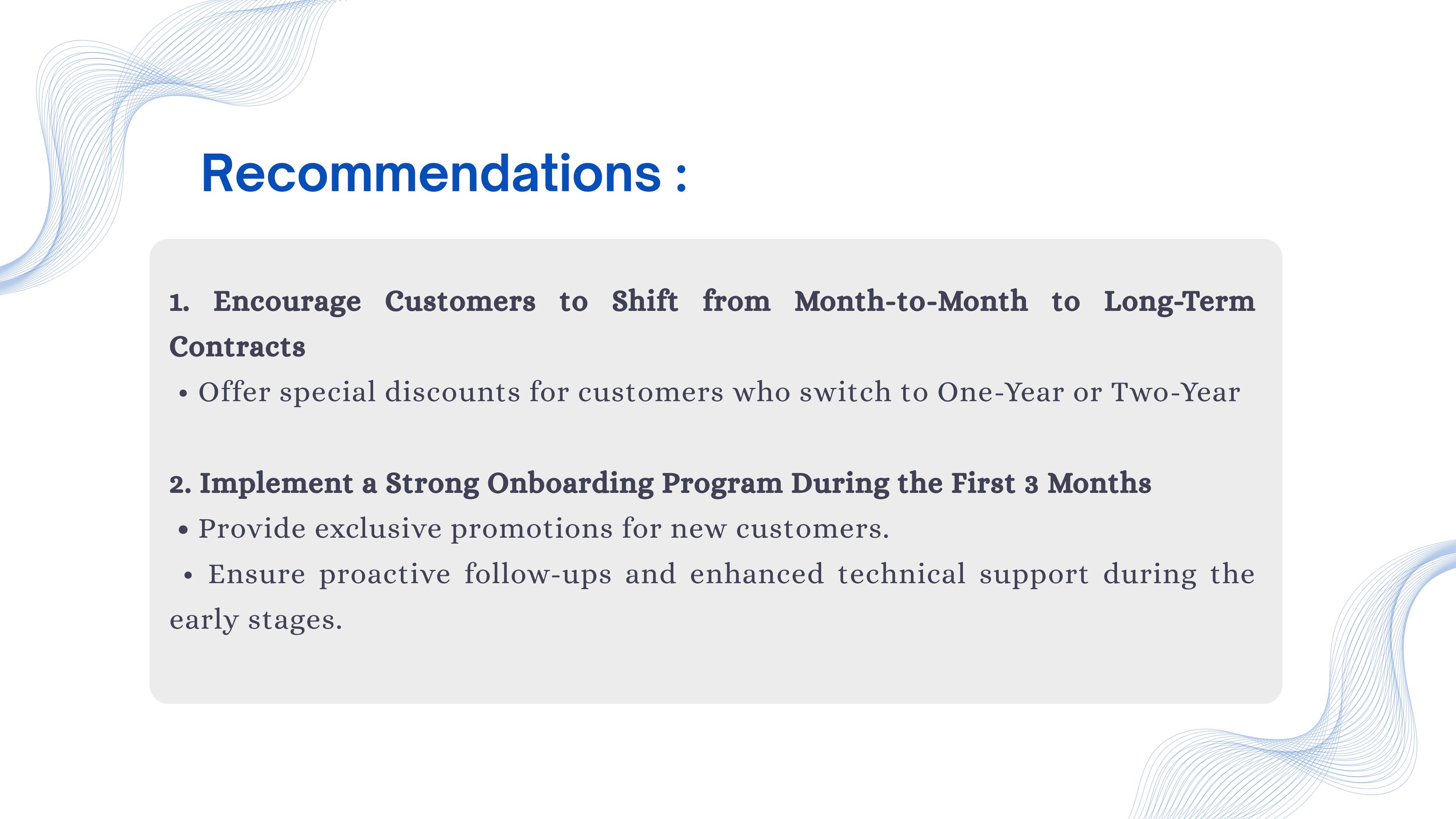
## **Insight 5: Streaming Services Do Not Significantly Impact Customer Loyalty**

The chart showing churned customers by Streaming Movies and Streaming TV services reveals that the number of churned customers who subscribed to these services is very close to the number of churned customers who did not subscribe.

## **Insight 6: Demographics Have Limited Influence on Subscription Status**

The chart analyzing subscribed and unsubscribed customers by demographics (gender, senior citizenship, and partnership status) shows no strong or consistent differences between customer groups.

- Gender does not significantly affect subscription or churn behavior.
- Senior citizens and non-senior customers behave similarly in terms of retention.
- Having a partner does not appear to strongly influence customer loyalty.



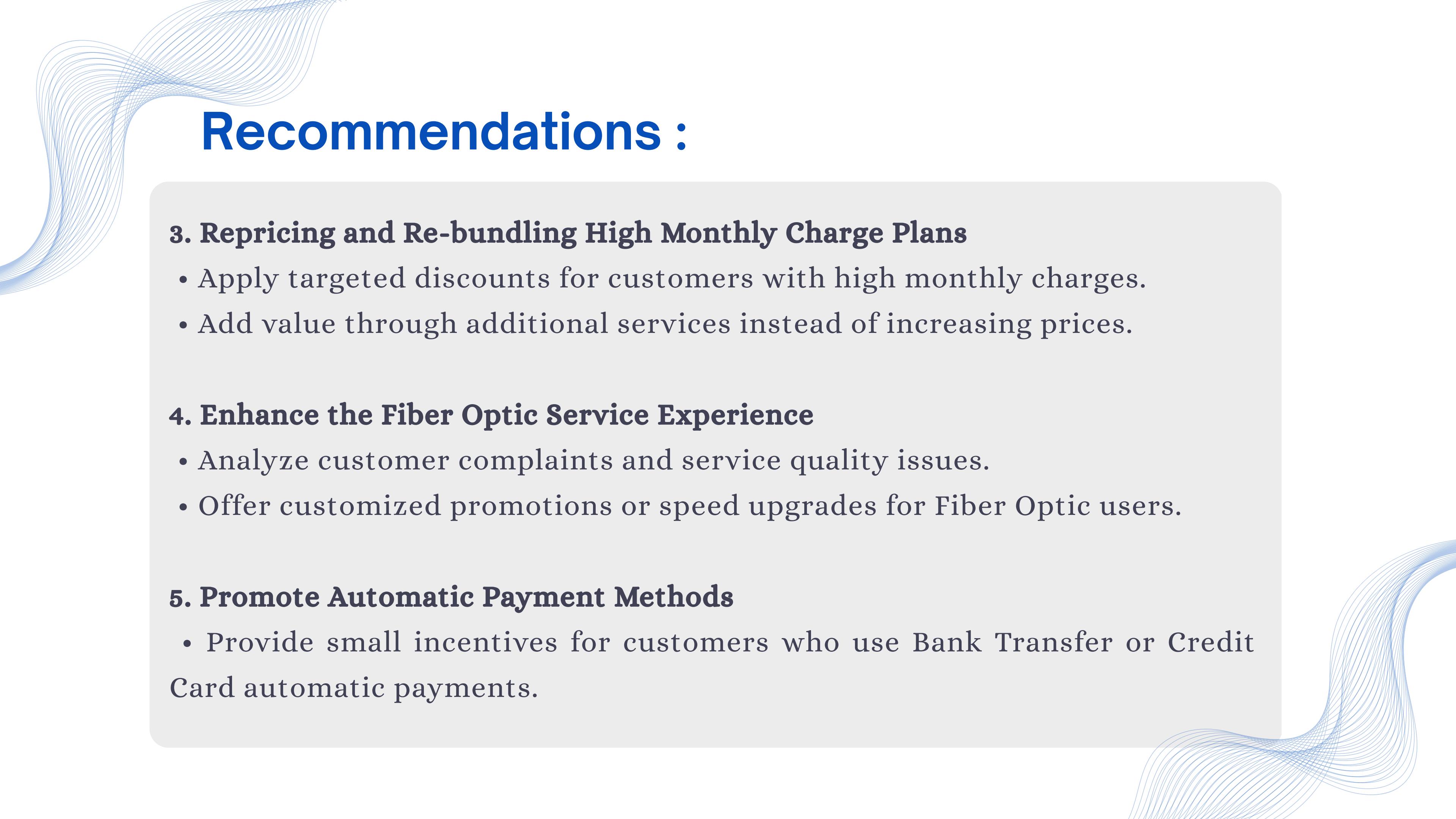
# Recommendations :

## **1. Encourage Customers to Shift from Month-to-Month to Long-Term Contracts**

- Offer special discounts for customers who switch to One-Year or Two-Year

## **2. Implement a Strong Onboarding Program During the First 3 Months**

- Provide exclusive promotions for new customers.
- Ensure proactive follow-ups and enhanced technical support during the early stages.



# Recommendations :

## **3. Repricing and Re-bundling High Monthly Charge Plans**

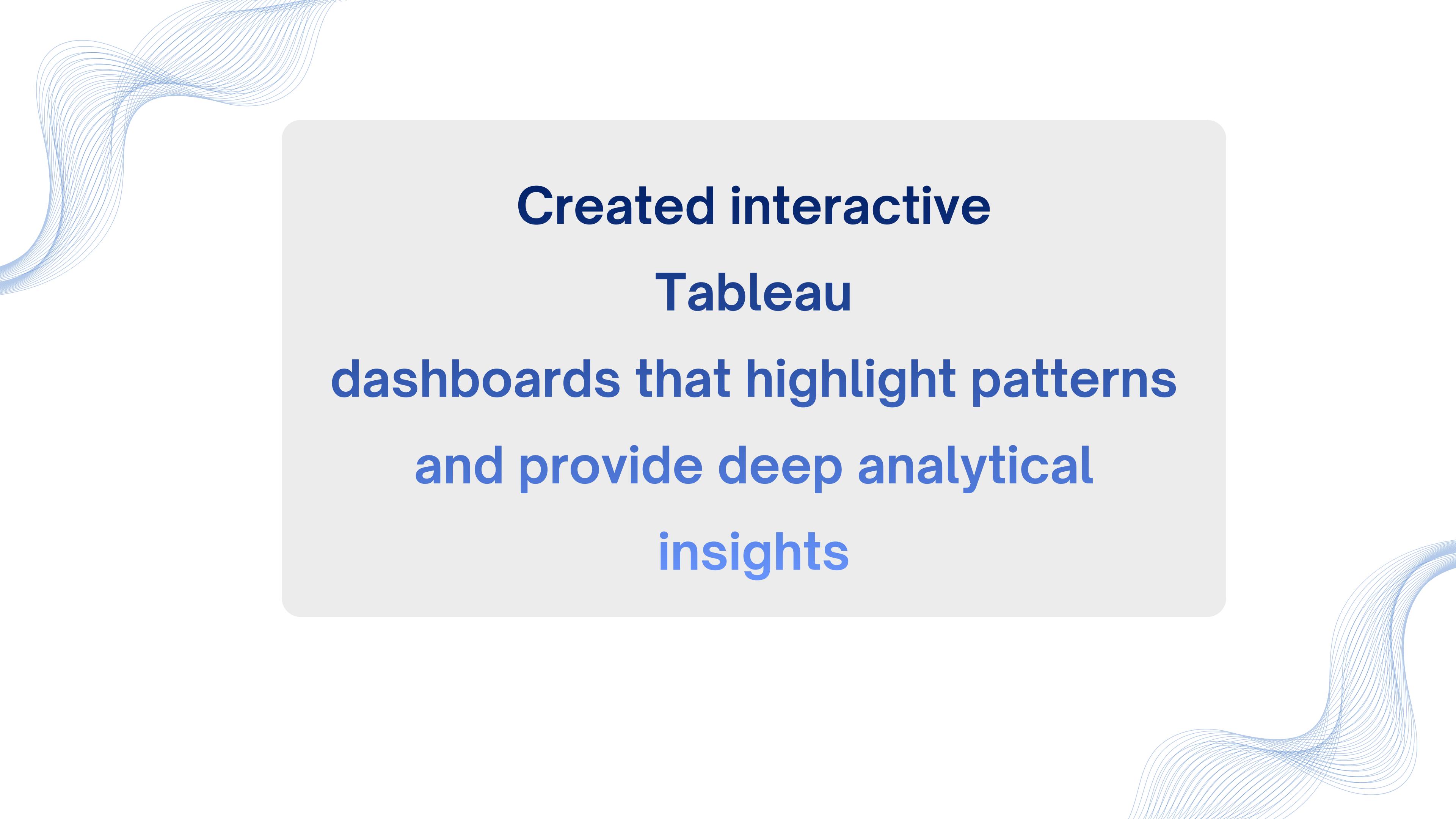
- Apply targeted discounts for customers with high monthly charges.
- Add value through additional services instead of increasing prices.

## **4. Enhance the Fiber Optic Service Experience**

- Analyze customer complaints and service quality issues.
- Offer customized promotions or speed upgrades for Fiber Optic users.

## **5. Promote Automatic Payment Methods**

- Provide small incentives for customers who use Bank Transfer or Credit Card automatic payments.

The background features abstract, flowing blue line art on a white background, with a large, rounded rectangular frame containing the text.

**Created interactive  
Tableau  
dashboards that highlight patterns  
and provide deep analytical  
insights**

**Total Charges**  
16,056,169

**Avg. Monthly Charges**  
64.76

**Avg. Services Per User**  
2.038

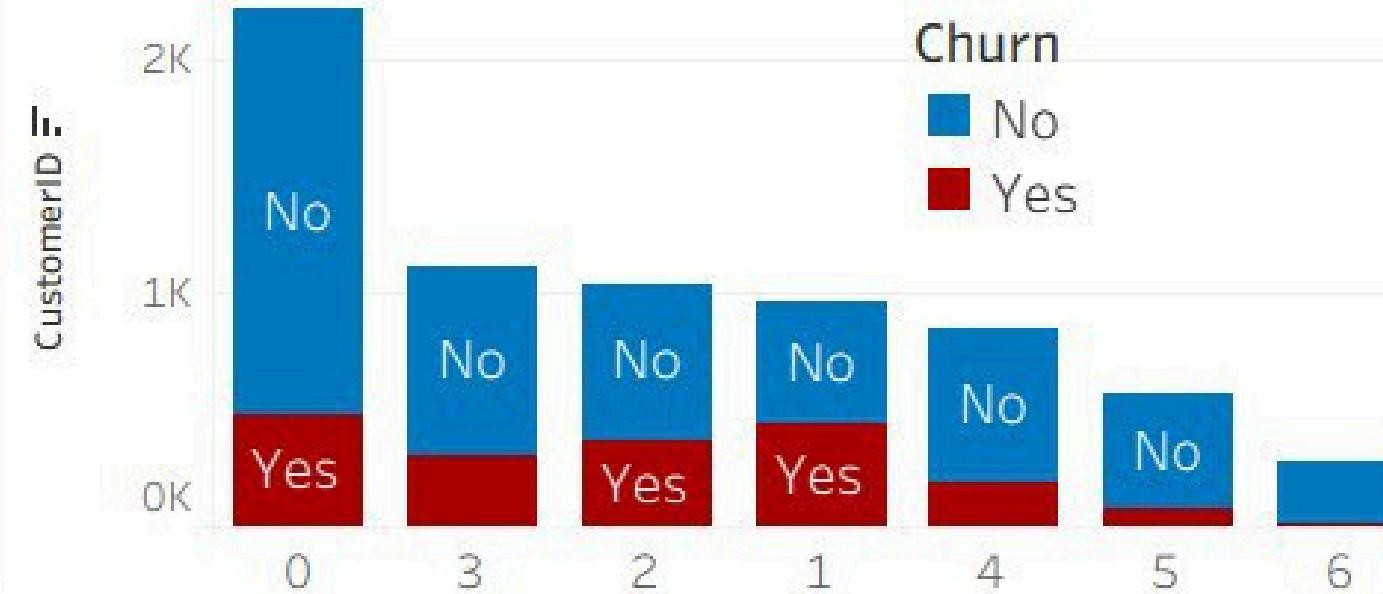
**Zero Add-ons**  
31.51%

**Churn**  
 (All)  
 No  
 Yes

### Total Charges by Payment Method

4,944,903 Electronic check	4,671,593 Credit card (automatic)
4,748,280 Bank transfer (automatic)	1,691,392

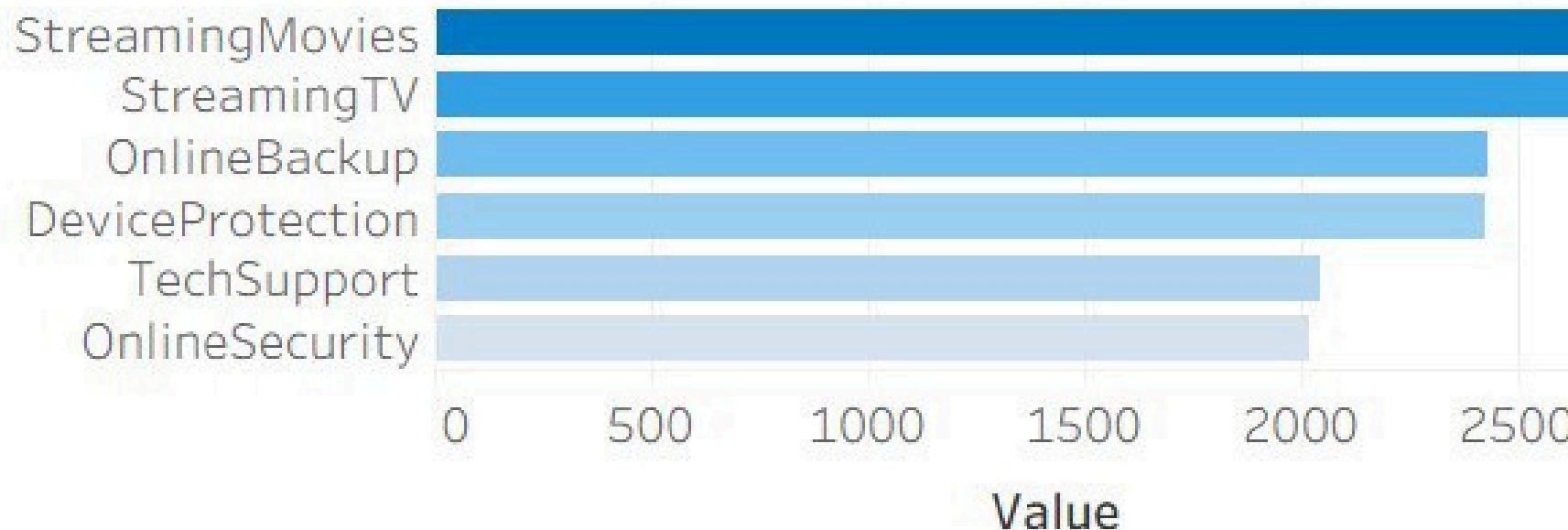
### Churn Risk by Add-ons Count



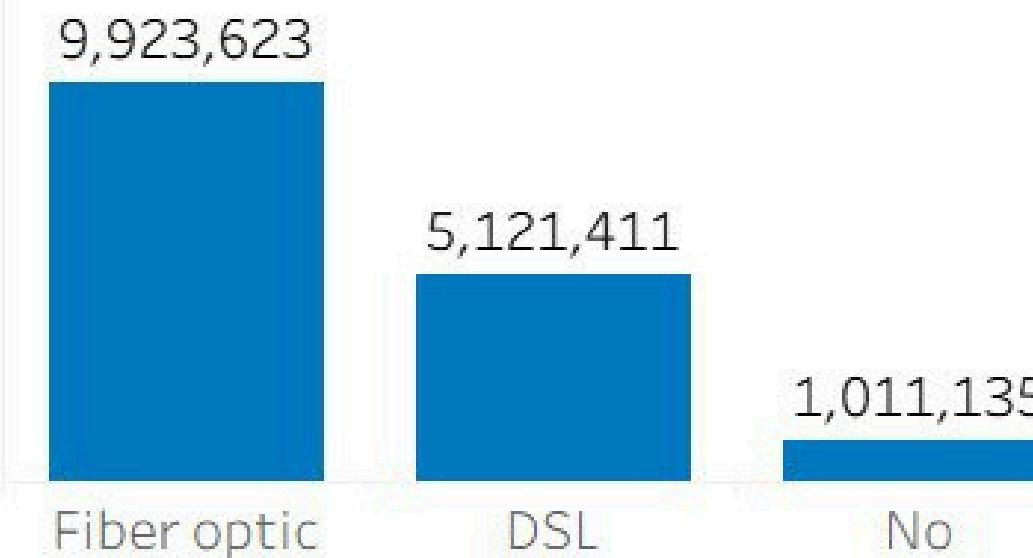
**Dependents**  
 (All)  
 No  
 Yes

**Contract**  
(All)

### Services Popularity



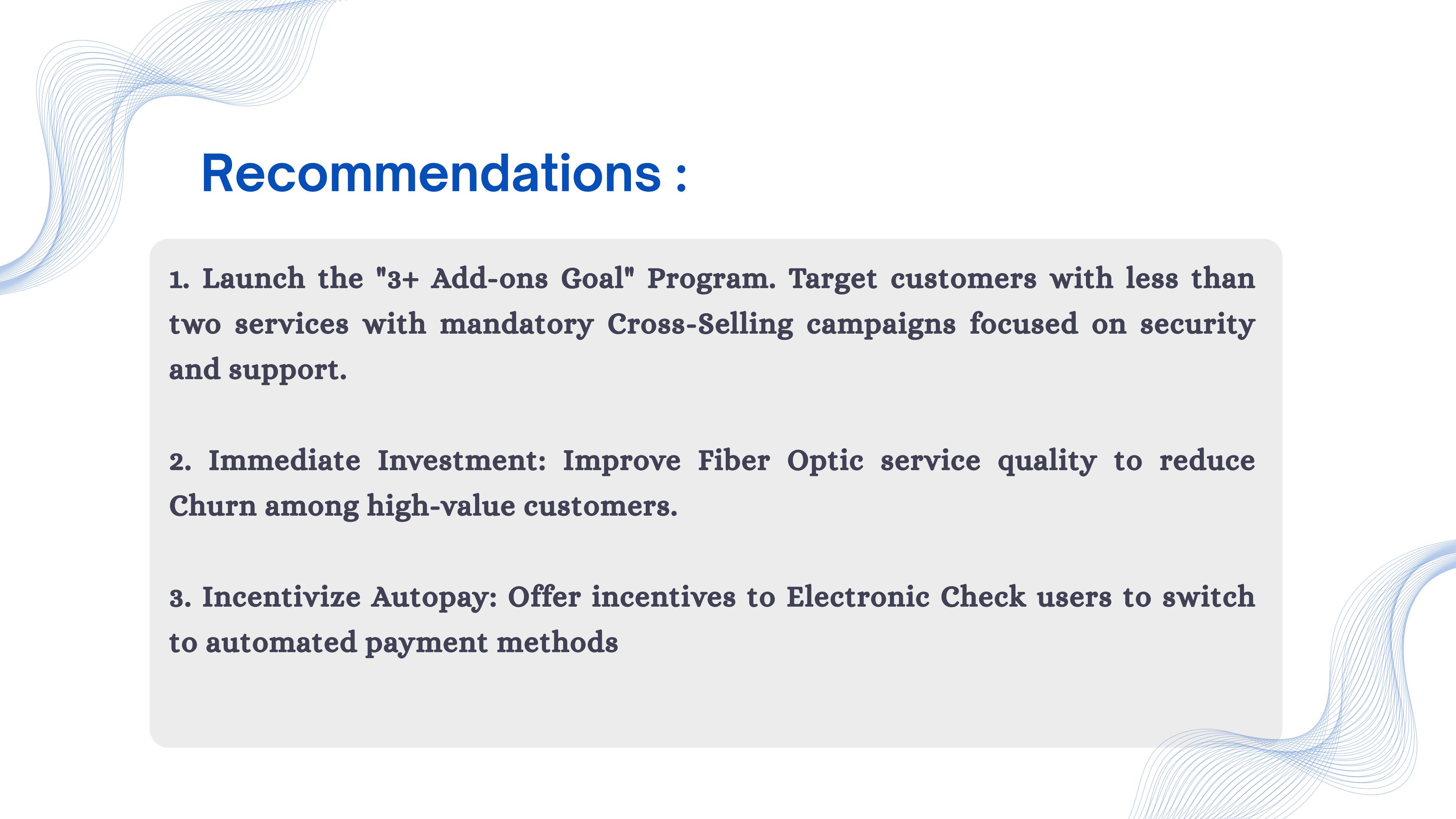
### Total Revenue by Internet Service





## Key Insights :

- 1. Fiber is the Primary Revenue Driver but the Highest Churn Risk.**
- 2. Loyalty is Proportional to Add-ons Count. Customers with 0-1 Add-ons are the most Churn-prone segment.**
- 3. Major Opportunity in Protection Services. Adoption rates for high-retention services (Online Security / Tech Support) are significantly low.**
- 4. High Churn Risk is Associated with Electronic Check Payment.**



## Recommendations :

1. Launch the "3+ Add-ons Goal" Program. Target customers with less than two services with mandatory Cross-Selling campaigns focused on security and support.
2. Immediate Investment: Improve Fiber Optic service quality to reduce Churn among high-value customers.
3. Incentivize Autopay: Offer incentives to Electronic Check users to switch to automated payment methods

# Project Completed By Our Team

**Rewan Elsayed Eltobgy**

**Yasmin Hasan Kamal**

**Abdelrhman Essam AboMalwa**

**Tasneem Hesham Tanawy**

**Nada Elsayed AbuAhmed**

**Rewan Ali Shehab**

The background features abstract, flowing blue line art. On the left, a series of thin, wavy lines create a sense of motion and depth. On the right, a larger, more complex cluster of lines forms a stylized, organic shape, resembling a leaf or a wave. The lines are a light blue color and are set against a plain white background.

# Thank You