Customer Churn Analysis Report

1. Introduction

This report focuses on understanding the reasons and factors contributing to customer churn for a telecom company, using key insights derived from customer demographic, account and service-related data. The objective is to identify key factors influencing churn and developing actionable solutions that can reduce churn and improve customer retention.

2. Data

2.1 Data Description
The data comes from [Customer Churn Prediction](#)

The initial dataset consisted of 7,043 customer records and 21 features, with the target variable "Churn" indicating whether a customer had discontinued their service.

```
print(base_data.shape)
print(base_data.dtypes)

(7043, 21)
customerID          object
gender              object
SeniorCitizen        int64
Partner             object
Dependents          object
tenure               int64
PhoneService        object
MultipleLines       object
InternetService     object
OnlineSecurity      object
OnlineBackup        object
DeviceProtection    object
TechSupport         object
StreamingTV         object
StreamingMovies     object
Contract            object
PaperlessBilling    object
PaymentMethod       object
MonthlyCharges     float64
TotalCharges        object
Churn               object
dtype: object
```

Figure 1: *Dataset Features*

The dataset was divided into three main categories: demographic information, account details, and service insights.

Features:

1. **Demographic Information**:
   - customerID: Unique identifier for each customer.
   - gender: Gender of the customer (Male/Female).
   - SeniorCitizen: Indicates whether the customer is a senior citizen (1: Yes, 0: No).
   - Partner: Indicates whether the customer has a partner (Yes/No).
   - Dependents: Indicates whether the customer has dependents (Yes/No).

2. **Account Information**:
   - tenure: Number of months the customer has stayed with the company.
   - Contract: Type of contract (Month-to-month, One year, Two year).
   - PaperlessBilling: Whether the customer has opted for paperless billing (Yes/No).
   - PaymentMethod: Method of payment (e.g., Electronic check, Mailed check, Bank transfer, Credit card).
   - MonthlyCharges: Monthly subscription charges.
   - TotalCharges: Total amount billed to the customer.
   - Churn: Indicates whether the customer has churned (Yes: left the company, No: still a customer).

3. **Service Details**:
   - PhoneService: Phone service (Yes/No).
   - MultipleLines: Multiple lines (Yes/No).
   - InternetService: Type of internet service (DSL, Fiber optic, No internet service).
   - OnlineSecurity: Online security add-on (Yes/No).
   - OnlineBackup: Online backup add-on (Yes/No).
   - DeviceProtection: Device protection plan (Yes/No).
   - TechSupport: Technical support plan (Yes/No).
   - StreamingTV: TV streaming service (Yes/No).
   - StreamingMovies: Movie streaming service (Yes/No).

4. **New Features**: for further analysis (create New Columns in Power BI)
   ○ CustomerSubscriptionPeriod: Groups customers based on the length of their tenure into subscription periods.
     ■ ***Purpose****: Enables tenure-based segmentation to identify trends and retention strategies for different subscription periods.*
     ■ ***Description:***
       1. ***1 Year:*** Tenure ≤ 12 months
       2. ***2 Year:*** Tenure > 12 and ≤ 24 months
       3. ***3 Year:*** Tenure > 24 and ≤ 36 months
       4. ***4 Year:*** Tenure > 36 and ≤ 48 months
       5. ***5 Year:*** Tenure > 48 and ≤ 60 months
       6. ***6 Year:*** Tenure > 60 and ≤ 72 months
       7. ***>6 Year:*** Tenure > 72 months
   ○ MonthlyChargeCategory: Categorizes customers based on their monthly charges.
     ■ ***Purpose:*** *Highlights cost-sensitive customer segments and helps evaluate pricing strategies.*
   ○ RiskyCustomer: Identifies customers who are at a higher likelihood of churning based on their monthly charges.
     ■ ***Purpose:*** *Pinpoints customers at risk of churning for proactive intervention.*
     ■ ***Description:***
       1. ***Risky****:* Customers who have not churned but are at a high likelihood of doing so due to their _higher_ monthly charges compared to the average of churned customers.
       2. ***Non-Risky***: Customers who have not churned and are less likely to churn due to their _lower_ monthly charges compared to the average of churned customers.
       3. ***Churned***: Customers who have already churned.
   ○ TotalSubscribedService: Counts the total number of services a customer has subscribed to

2.2 Data cleaning

The dataset comprises 7,043 instances, with 11 missing values. Additionally, the **"TotalCharges"** column should be converted from a *string* to a *numeric* format.

Figure 2: *Missing Values in TotalCharge feature*

With only 11 instances out of 7,043, removing the missing values will have a minimal impact on the overall dataset.

3. Report

3.1 Key metrics:

- **Churn Rate**: 26.58% (1,869 churned customers out of 7,032 total customers).
- **Average Monthly Charges for Churned Customers**: $74.44 (higher than retained customers at $64.76).
- **Tenure**: Churn is highest among customers with a tenure of 1 year (47.68%) and lowest at 6 years (6.61%).
- **Risky Customers**: 2,096 customers are classified as risky (high monthly charges > $74.44).

- **Key Service Categories**: Phone Service (90% subscription), Tech Support (29%), and Online Security (29%).

3.2 Dataset Summary

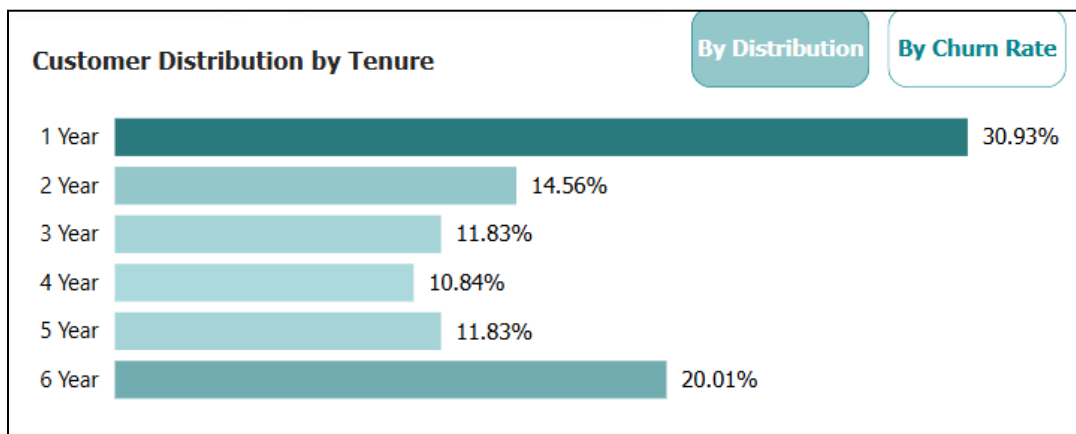1. **Tenure**:
   - **Churn Rate**:
     - Churn is **highest** in customers with a tenure of **1 year (47.68%)**
     - Lowest at 6 years (6.61%).
     - Customers with **shorter tenures** are more **likely to churn** due to a lack of established loyalty.
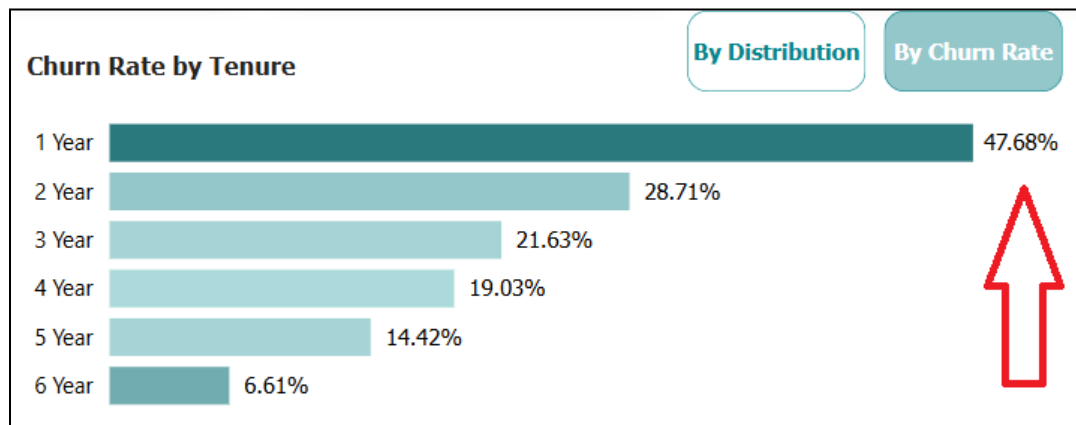
Figure 3: Churn Rate by Tenure

   - **Distribution:**
     - 30.93% of customers have been with the company for just 1 year, making this the largest group.
     - This is followed by customers who have stayed for nearly 6 years, accounting for 20.01%.
     - The remaining 50% of customers are distributed more evenly across 2, 3, 4 and 5 years of tenure.


*Figure 4: Customer Distribution by Tenure*

2. **Contract Type**
   ○ **Monthly Contract:**
     ■ **Monthly contracts** have the **highest churn rate (42.7%)**, followed by yearly contracts (11.3%) and two-yearly contracts (2.8%).
     ■ Similarly, in terms of **distribution**, **more than half of the total customers** opt for **monthly contracts**, further contributing to the high churn rate in this category.
     ■ Churn is significantly higher for monthly contracts due to flexibility, often leading to easier exits.
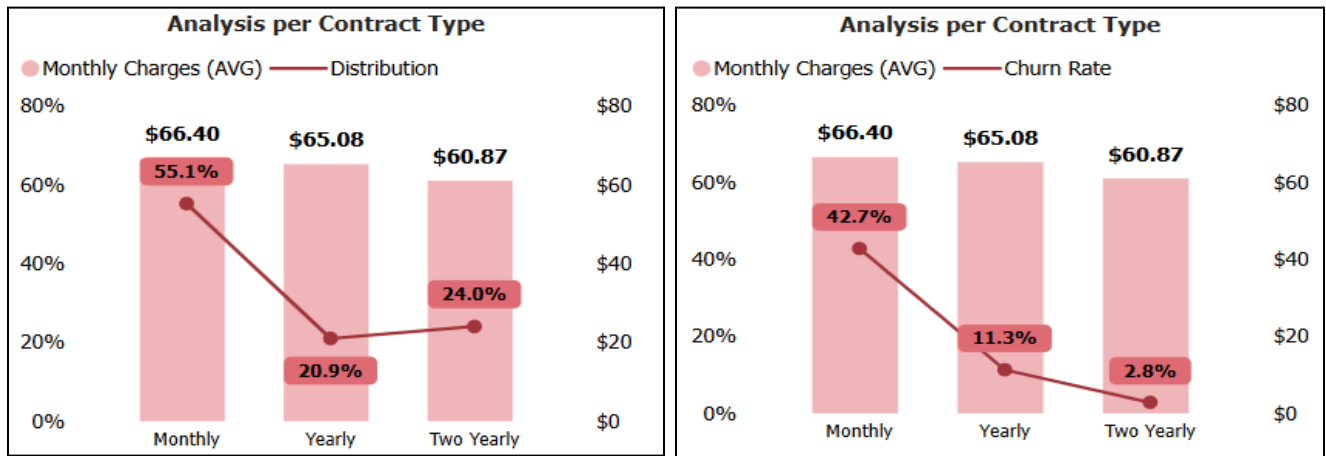
Figure 5: Distribution & Churn Rate by Contract type

   ○ To dig deeper in, as we can see from Figure 6:
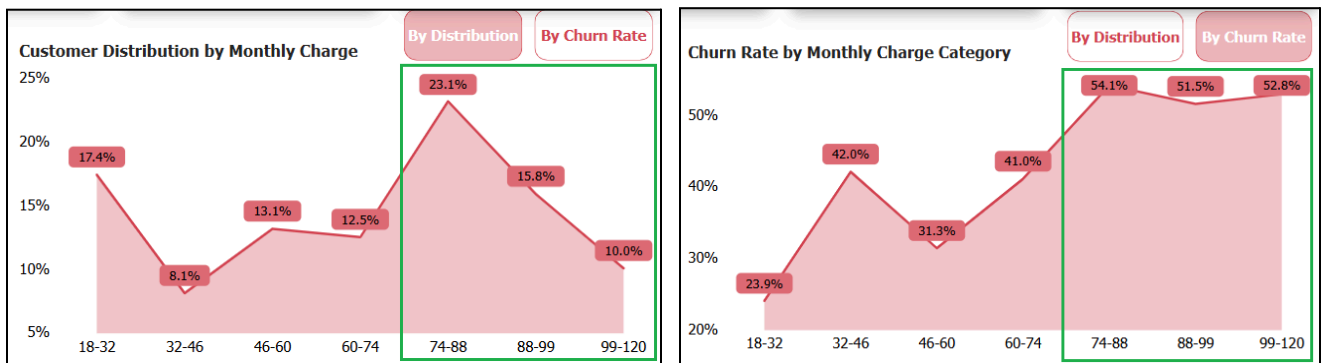
Figure 6: Distribution & Churn Rate of Monthly Contract by Monthly Charge Bin

- **Critical Focus on High-Charge Segments:**
    1. The **$74–120 range** contains the **largest concentration of customers at high risk of churn.**
    2. This trend suggests that as the cost increases beyond $74/month, customers' likelihood to leave also significantly increases.
    3. Insights from **risky customer** data also align, with **higher monthly charges** being a **predictor of churn vulnerability.**
- **Retention of Low-Charge Customers:**
    1. The **$18–32 group** is the most stable, with a **low churn rate** (10.5%). **Retaining this group** requires maintaining affordability and service quality.
  - **Contract and Tenure Relationship:**
    - Customers with **longer contract terms**, such as Two-Yearly contracts, consistently **demonstrate longer tenures** across all segments.
    - Monthly contract customers tend to have **shorter tenures**, with the majority concentrated in the 1-year category, highlighting their **higher likelihood of early churn.**
    - Yearly and Two-Yearly contract customers show a more balanced distribution across tenure periods, suggesting that longer contracts promote retention and stability.

Contract	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year
Monthly	1994	737	486	316	234	108
Two Yearly	58	90	96	178	277	986
Yearly	123	197	250	268	321	313

*Figure 7: Contract Type & Tenure Heatmap*

3. **Demographic:**
   - **Single customers** are noticeably **more likely to churn compared to married customers**, highlighting the need to prioritize retention efforts for this group.
   - With nearly identical churn rates for males (13.2%) and females (13.4%), **gender** appears to **have little to no influence on churn behavior.**
   - **Younger customers** show a **higher tendency to churn**, emphasizing the importance of crafting strategies tailored specifically for this demographic.
   - Customers **with dependents demonstrate greater loyalty**, presenting an opportunity to focus on this group to strengthen long-term retention.
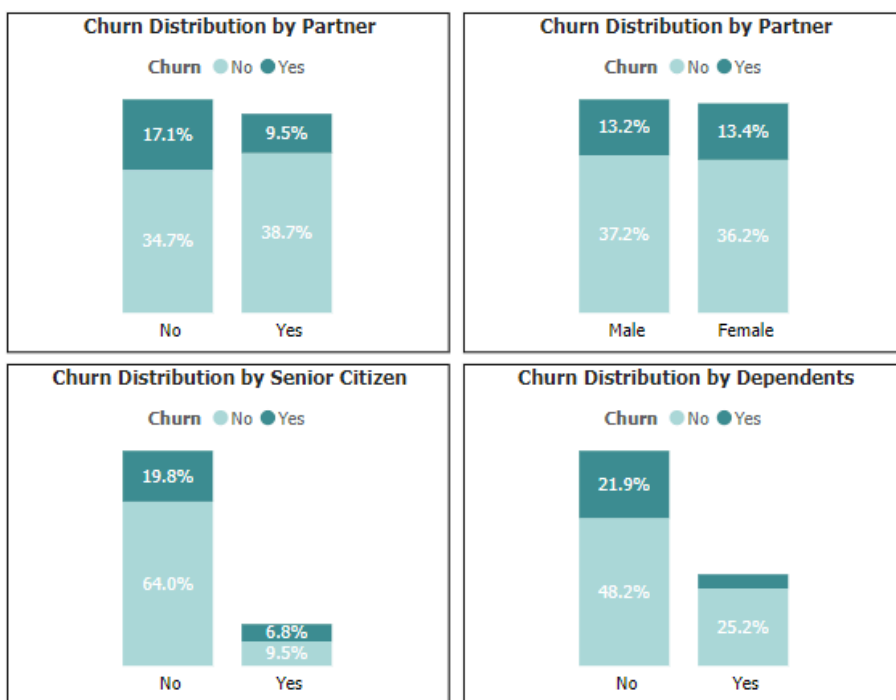
Figure 8: Demographic Churn Distribution

4. Conclusion
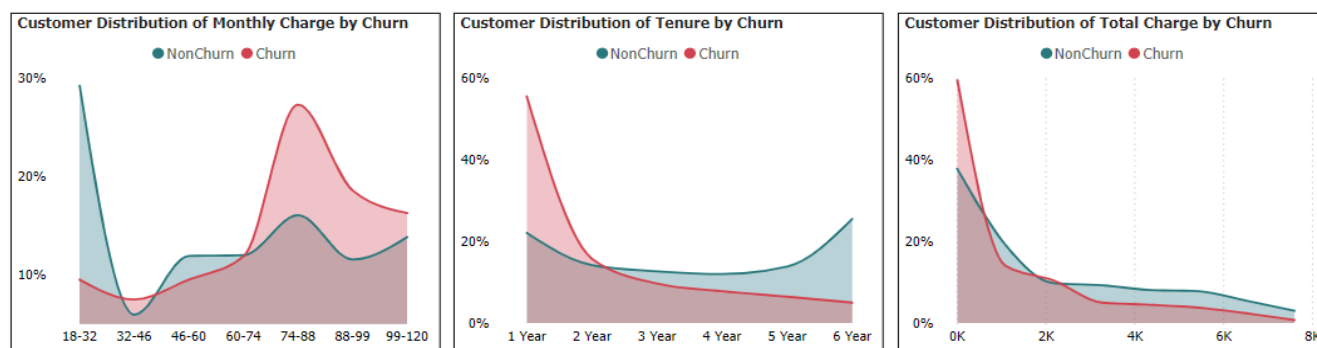
Figure 9: Numerical Features Distribution by Churn Customer

Tenure, monthly charges and total charges play a pivotal role in determining churn probability. Customers with shorter tenure and higher monthly charges are notably more prone to leaving, especially those in the $74–$120 monthly charge category. On the other hand, customers with extended tenure (5–6 years) exhibit stronger loyalty and are less likely to churn.

Moreover, a direct relationship exists between higher total charges and an increased likelihood of churn, highlighting the impact of cost sensitivity among customers. To address

this, Telco could design more competitive pricing structures, such as offering discounts or exclusive benefits for customers committing to longer contracts or bundled service packages.

Implementing tiered pricing that progressively reduces monthly charges for long-term customers may further enhance retention. Strengthening retention strategies by improving service quality and providing tailored incentives for loyal, long-tenured customers can boost satisfaction, fostering long-term loyalty and reducing churn rates effectively.