Customer Churn Analysis

Problem Statement:

Effective customer retention is critical for maintaining revenue and long-term growth in the telecommunications industry. Companies need to understand customer behavior and service usage patterns to prevent revenue loss caused by customer churn. The goal of this analysis is to:

- Identify customer segments with a high risk of churn
- Analyze the impact of contract types, tenure, and payment methods on churn
- Evaluate how service usage and pricing influence customer retention
- Assess churn patterns across different internet services
- Provide actionable insights to help reduce churn and improve customer loyalty

Dataset Overview:

The dataset contains customer demographic details, service usage, contract information, payment methods, tenure, monthly charges, total charges, and churn status.

Data Cleaning and Preparation:

In this task, data cleaning is performed using **Excel**. Missing values in the TotalCharges column were identified and corrected. Data types were verified, and unnecessary inconsistencies were removed to ensure the dataset was ready for analysis.

Exploratory Data Analysis (EDA):

Exploratory Data Analysis (EDA) is conducted using **Python** to understand customer behavior. Churn rates were analyzed across contract types, internet services, tenure, and payment methods. This helped identify high-risk customer segments.

Statistic Overview:

	SeniorCitizen	tenure	MonthlyCharges	TotalCharges
count	7043.000000	7043.000000	7043.000000	7043.000000
mean	0.162147	32.371149	64.761692	2279.734304
std	0.368612	24.559481	30.090047	2266.794470
min	0.000000	0.000000	18.250000	0.000000
25%	0.000000	9.000000	35.500000	398.550000
50%	0.000000	29.000000	70.350000	1394.550000
75%	0.000000	55.000000	89.850000	3786.600000
max	1.000000	72.000000	118.750000	8684.800000

Churn Distribution:

The churn distribution shows that the majority of customers have not churned, while a significant minority has left the service, highlighting a clear opportunity for targeted retention strategies.
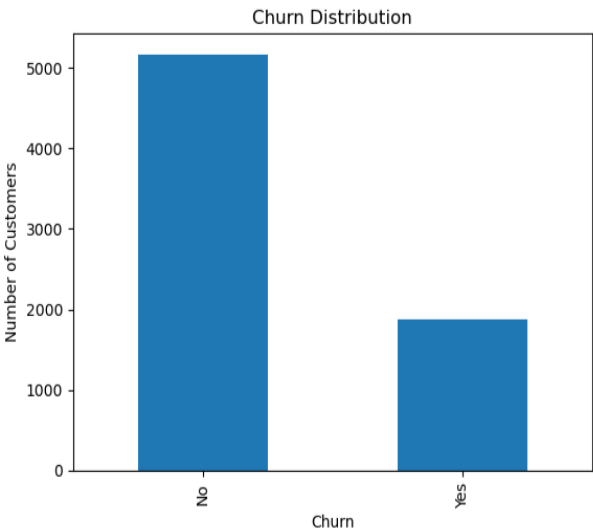
Tenure Analysis:

The tenure analysis shows that customers who did not churn have a higher median tenure of **38 months**, while churned customers have a much lower median tenure of **10 months**, indicating early-stage customers are more likely to leave.

Churn	count	mean	std	min	25%	50%	75%	max
No	5174.0	37.569965	24.113777	0.0	15.0	38.0	61.0	72.0
Yes	1869.0	17.979133	19.531123	1.0	2.0	10.0	29.0	72.0

Churn Analysis by Contract Type:

Churn is highest for month-to-month contracts (**42.71%**) and decreases significantly for one-year (**11.27%**) and two-year contracts (**2.83%**).

Churn	No	Yes
Contract		
Month-to-month	57.29	42.71
One year	88.73	11.27
Two year	97.17	2.83

Churn Behavior by Payment Method:

Customers using **Electronic Check** show a significantly higher churn rate compared to those using **automatic payment methods**, which demonstrate much stronger customer retention.

| Churn	No	Yes
PaymentMethod		
Bank transfer (automatic)	83.290155	16.709845
Credit card (automatic)	84.756899	15.243101
Electronic check	54.714588	45.285412
Mailed check	80.893300	19.106700

Customer Segmentation:

Customer segmentation was performed using the **K-Means** clustering algorithm after standardizing numerical features, with the optimal number of clusters determined using the **Elbow Method.**

Customer segmentation using **K-Means clustering (k=3)** identified three distinct customer groups(segments) based on **tenure, monthly charges, and total charges**, each showing different usage patterns and churn behavior.

- **Segment 0** represents **long-tenure, high-value customers**
- **Segment 1** consists of **mid-tenure, low-spending customers**
- **Segment 2** includes **short-tenure customers with relatively high monthly charges**

Segment	tenure	MonthlyCharges	TotalCharges
0	57.978928	87.220362	5088.251764
1	26.275305	30.394721	737.127880
2	16.043224	76.343400	1269.088006

POWER BI Dashboard:
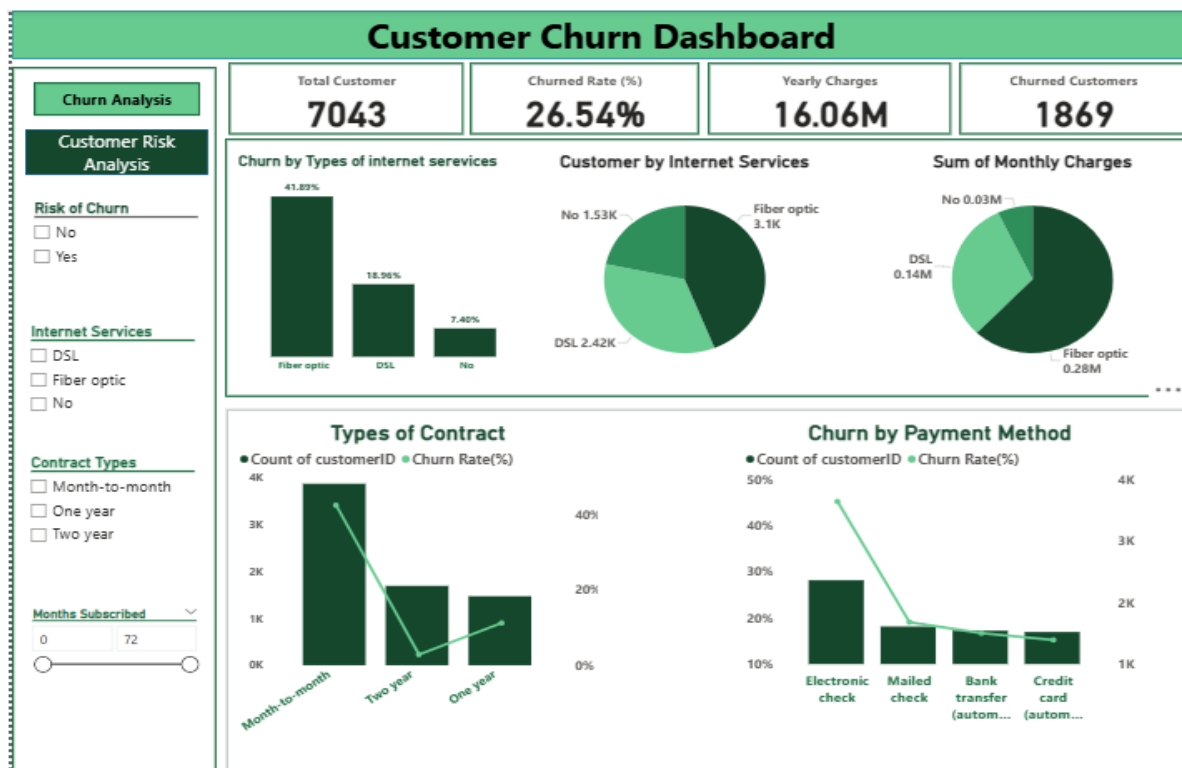
Recommendation:

- Offer targeted discounts or flexible pricing plans to **high-churn customer segments**, particularly those with short tenure and higher monthly charges.
- Encourage customers to switch to **long-term contracts** through loyalty benefits or incentives to improve retention.
- Promote **automatic payment methods** for at-risk customers, as auto-payment users show significantly lower churn rates.