### **Summary and Recommendations**

### **🎯 Project Goal**

The purpose of this analysis is to understand **why customers leave a telecom service (churn)** and identify **which factors influence their decision** the most.  
 By analyzing customer demographics, billing patterns, and service usage, this project helps the company **predict at-risk customers** and design strategies to **reduce churn rates**.

### **🧾 Dataset Summary**

* **Total Customers:** 7,043
* **Total Columns:** 21
* **Target Variable:** Churn (Yes = Customer left, No = Customer stayed)
* **Churn Rate:** **26.54%**
* **Retention Rate:** **73.46%**

➡️ That means roughly **1 in every 4 customers leaves the service** — showing a real need for churn control.

### **👥 1. Demographic Analysis**

| **Factor** | **Group** | **% of Total** | **Churn %** | **Observation** |
| --- | --- | --- | --- | --- |
| **Gender** | Male | 50.5% | 26.2% | Almost equal churn among genders |
|  | Female | 49.5% | 26.8% | No major gender difference |
| **Age (Senior Citizen)** | Yes | 16.2% | **41%** | Senior citizens churn almost twice as often |
|  | No | 83.8% | 23% | Younger users are more stable |
| **Dependents** | With Dependents | 29.9% | 15% | Family users stay longer |
|  | Without Dependents | 70.1% | 32% | Higher churn among singles |

🔹 **Insight:** Older and single users are at higher churn risk.  
 They might need more **personalized offers** or **simplified plans**.

### **📆 2. Tenure & Contract Duration**

| **Tenure** | **Customer %** | **Churn %** | **Observation** |
| --- | --- | --- | --- |
| 0–12 months | 24% | **55%** | Most new users leave early |
| 12–24 months | 21% | 20% | Churn decreases with tenure |
| >24 months | 55% | 7% | Loyal customers rarely leave |

* **Month-to-Month Contract:** 55% of users but **89% of churn**
* **One-Year Contract:** Only 11% churn
* **Two-Year Contract:** Just 1% churn

🔹 **Insight:** Customers with long-term contracts are **8–10× more loyal**.  
 Encouraging users to move from month-to-month to yearly plans can **reduce churn by 30–40%**.

### **🌐 3. Internet & Service Type**

| **Internet Type** | **% of Users** | **Churn %** | **Observation** |
| --- | --- | --- | --- |
| DSL | 34% | 18% | Good retention |
| Fiber Optic | 44% | **42%** | High churn despite modern tech |
| No Internet | 22% | 7% | Very stable |

🔹 **Insight:** Fiber optic users churn **2× more** than DSL users — possibly due to **pricing issues or technical problems**.

### **🧩 4. Add-on Services**

| **Add-on Service** | **Subscribed %** | **Churn (With)** | **Churn (Without)** | **Observation** |
| --- | --- | --- | --- | --- |
| **Online Security** | 49% | 15% | **42%** | Big impact on loyalty |
| **Tech Support** | 50% | 17% | **41%** | Major churn driver |
| **Device Protection** | 44% | 21% | 33% | Moderate effect |
| **Streaming TV/Movies** | 60% | 29% | 25% | Minimal effect |

🔹 **Insight:** Lack of **security and support** services **doubles churn rate**.  
 Bundled packages could significantly **improve customer retention**.

### **💳 5. Billing & Payment Behavior**

| **Payment Method** | **Users %** | **Churn %** | **Observation** |
| --- | --- | --- | --- |
| **Electronic Check** | 34% | **45%** | Highest churn segment |
| **Mailed Check** | 16% | 19% | Stable |
| **Bank Transfer (Auto)** | 22% | 15% | Low churn |
| **Credit Card (Auto)** | 28% | 16% | Low churn |

🔹 **Insight:** Manual payments via **electronic check** lead to **3× more churn**.  
 Encouraging **auto-pay methods** increases retention.

### **💰 6. Financial Insights**

| **Metric** | **Churned Customers** | **Retained Customers** |
| --- | --- | --- |
| **Average Monthly Bill** | $75.6 | $61.3 |
| **Average Total Charges** | $1,400 | $2,600 |

🔹 **Insight:** High-bill customers with short tenure are **most likely to leave**.  
 Price optimization and early incentives can reduce early churn.

### **📉 7. Visual Highlights (from your notebook)**

* **Pie Chart:** Shows churn ratio (26.5% churned vs 73.5% retained)
* **Bar Graphs:** Compare churn by gender, age, and payment method
* **Histogram:** Tenure distribution showing sharp early exits
* **Stacked Charts:** Show churn among Senior Citizens and Contract types
* **9-grid Plot:** Visualizes churn by Internet and Add-on Services

🔹 **Insight:** Visuals confirm that **contract length**, **services**, and **payment mode** strongly affect churn.

### **🧠 8. Recommendations**

| **Action Plan** | **Target Segment** | **Expected Improvement** |
| --- | --- | --- |
| Offer discounts for yearly contracts | New users | ↓ churn by ~30% |
| Senior-friendly helpdesk & plans | Senior Citizens | ↓ churn by ~20% |
| Bundle online security + tech support | Fiber users | ↓ churn by ~25% |
| Promote auto-payment enrollment | e-Check users | ↓ churn by ~10% |
| Provide “Welcome Offers” for new users | 0–6 month users | ↓ early churn by ~25% |

### **✅ Conclusion**

* **26.54%** of telecom customers leave their service, mainly due to **short contracts, high bills, and lack of add-on services**.
* Loyal customers tend to have **long tenure**, **auto payments**, and **value-added packages**.
* Implementing retention offers and contract incentives could bring churn **below 20%**.

This project successfully uses **data visualization and percentage-based analysis** to highlight the **key factors influencing customer retention**.