**Customer Churn Analysis & Key Driver Identification**

**Executive Summary**

The comprehensive churn analysis performed on the customer dataset reveals a significant retention challenge, with an **overall churn rate of 26.54%**. The analysis clearly identifies three high-impact factors—Contract Type, Internet Service, and Payment Method—that disproportionately contribute to customer attrition.

The most critical finding is the exceptional churn rate (nearly **55%**) among customers using **Electronic Check** as a payment method, and the highly unstable segment of **Month-to-month** contracts, which churn at **42.71%**. Additionally, customers utilizing **Fiber Optic** internet service show a churn rate of **41.90%**, indicating a key area for service quality review.

Retention efforts must be immediately prioritized on stabilizing the month-to-month customer base by incentivizing longer contracts and investigating the technical or support issues related to the Fiber Optic service and Electronic Check payment process.

**1. Introduction and Methodology**

This report details the findings of a customer churn analysis project. The objective was to identify customer attributes and service features most strongly correlated with attrition, allowing for targeted intervention strategies.

* **Total Customer Base:** 7,043 individuals.
* **Data Preparation:** The initial dataset required cleaning to convert the TotalCharges column from an object (string) to a float data type, handling **11 missing values** (recorded as blank strings) by replacing them with '0'. The SeniorCitizen field was also converted from numerical (0/1) to categorical ('no'/'yes') for clearer analysis.
* **Overall Churn Rate:** Out of 7,043 customers, **1,869** have churned, resulting in a **26.54%** overall churn rate.

**2. Detailed Churn Driver Analysis (By Percentage)**

The analysis focused on comparing the churn rate within each category of a feature to the overall average (26.54%) to highlight specific high-risk segments.

**2.1 Contract Type (Highest Impact Factor)**

Contract length is the most critical differentiator of customer stability. The month-to-month segment presents an extreme retention risk.

| **Contract Type** | **Churned Customers (Count)** | **Total Customers (Count)** | **Segment Churn Rate (%)** | **Comparison to Overall Rate (26.54%)** |
| --- | --- | --- | --- | --- |
| **Month-to-month** | 1,655 | 3,875 | **42.71%** | 🔼 **+16.17 pp** |
| One year | 166 | 1,473 | **11.27%** | 🔽 -15.27 pp |
| Two year | 48 | 1,695 | **2.83%** | 🔽 -23.71 pp |

**2.2 Payment Method (Highest Risk Behavior)**

Customers using electronic checks show a shockingly high likelihood of churn. This may point to friction or dissatisfaction during the payment process.

| **Payment Method** | **Churned Customers (Count)** | **Total Customers (Count)** | **Segment Churn Rate (%)** | **Comparison to Overall Rate (26.54%)** |
| --- | --- | --- | --- | --- |
| **Electronic check** | 1,294 | 2,365 | **54.72%** | 🔼 **+28.18 pp** |
| Mailed check | 308 | 1,612 | **19.11%** | 🔽 -7.43 pp |
| Bank transfer (automatic) | 258 | 1,544 | **16.71%** | 🔽 -9.83 pp |
| Credit card (automatic) | 232 | 1,522 | **15.24%** | 🔽 -11.30 pp |

**2.3 Internet Service (Service Quality Indicator)**

The Fiber Optic segment is a major contributor to churn, suggesting either service performance issues or unmet customer expectations for the higher-cost, high-speed tier.

| **Internet Service** | **Churned Customers (Count)** | **Total Customers (Count)** | **Segment Churn Rate (%)** | **Comparison to Overall Rate (26.54%)** |
| --- | --- | --- | --- | --- |
| **Fiber optic** | 1,297 | 3,096 | **41.90%** | 🔼 **+15.36 pp** |
| DSL | 459 | 2,421 | **18.96%** | 🔽 -7.58 pp |
| No Internet Service | 113 | 1,526 | **7.41%** | 🔽 -19.13 pp |

**3. Customer Profile Risk Factors**

This section outlines specific customer segments that display a heightened propensity to churn based on demographics and service add-ons.

**3.1 Service Add-ons (Security and Support)**

The **lack of essential security and support features** significantly increases the risk of churn, second only to the contract type itself.

| **Feature Segment** | **Churned Customers (Count)** | **Total Customers (Count)** | **Segment Churn Rate (%)** |
| --- | --- | --- | --- |
| **No Online Security** | 1,461 | 3,498 | **41.77%** |
| Yes Online Security | 182 | 1,522 | **11.96%** |
| **No Tech Support** | 1,446 | 3,473 | **41.63%** |
| Yes Tech Support | 182 | 1,473 | **12.36%** |

**3.2 Demographic and Billing Profile**

| **Demographic/Billing** | **Churned Customers (Count)** | **Total Customers (Count)** | **Segment Churn Rate (%)** |
| --- | --- | --- | --- |
| **Senior Citizens (Yes)** | 476 | 1,142 | **41.68%** |
| Non-Senior Citizens (No) | 1,393 | 5,901 | **23.61%** |
| **No Dependents** | 1,623 | 4,933 | **32.90%** |
| **No Partner** | 1,200 | 3,641 | **32.96%** |
| **Paperless Billing (Yes)** | 1,400 | 4,171 | **33.56%** |
| Paperless Billing (No) | 469 | 2,872 | **16.33%** |

**3.3 Tenure (Loyalty)**

The churn risk is heavily concentrated at the start of the customer lifecycle. While not directly quantifiable as a single percentage from the provided counts, the analysis implies that churn spikes in the **first few months** of service (tenure  1-2 months).

**4. Conclusion and Recommendations**

The analysis confirms that churn is not uniformly distributed but is instead highly concentrated within a few specific customer segments, making a targeted retention strategy both necessary and feasible.

**Priority Recommendations:**

1. **Contract Migration:** Design proactive campaigns to move **Month-to-month (42.71% churn)** customers to 1 or 2-year contracts. Focus retention incentives heavily on this segment.
2. **Payment Method Intervention:** Immediately investigate the customer experience flow for the **Electronic Check (54.72% churn)** payment method. This extremely high rate suggests a critical operational issue, potentially related to payment failure, billing clarity, or fraud concerns.
3. **Service Quality Audit:** Launch a technical and support audit for **Fiber Optic (41.90% churn)** internet service to address performance, reliability, and support handling for this premium service.
4. **Value Bundling:** Mandate or heavily incentivize the bundling of **Online Security (41.77% churn if absent)** and **Tech Support (41.63% churn if absent)** for new Fiber Optic and Month-to-month customers to increase switching costs and perceived value.
5. **Targeted Support:** Develop specialized support and onboarding for **Senior Citizens (41.68% churn)** and customers without household support (**No Dependents/Partner**), who exhibit higher risk profiles.