Telecom Customer Churn Analysis

Project Report

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1. Executive Summary

This report presents an in-depth analysis of customer churn within a telecommunications company, utilizing the Telco Customer Churn dataset. The primary objective was to identify key factors that drive customers to discontinue their services and to propose actionable strategies for churn reduction.

Leveraging Excel's robust Power Query for data cleaning and transformation, followed by PivotTables and PivotCharts for exploratory data analysis, the study uncovered significant correlations between churn and various customer attributes, including contract type, internet service, payment method, tenure, and engagement with security/support services.

Key findings indicate that [YOUR MOST IMPORTANT FINDING 1 - e.g., customers on month-to-month contracts exhibit significantly higher churn] and [YOUR MOST IMPORTANT FINDING 2 - e.g., those without online security or tech support are highly susceptible to churn]. Based on these insights, a set of targeted recommendations has been developed to enhance customer retention and foster loyalty.

2. Introduction

2.1. Problem Statement

Customer churn, or the rate at which customers discontinue their service, is a critical challenge in the highly competitive telecommunications industry. High churn rates can significantly impact a company's revenue, market share, and profitability. Understanding the underlying reasons for churn is paramount for developing effective retention strategies.

2.2. Project Objective

The main objectives of this analysis are to:

Identify the demographic, service, and billing-related factors that are most strongly associated with customer churn.

Quantify the churn rates across various customer segments.

Derive actionable insights from the data.

Provide data-driven recommendations to help the telecom company reduce churn and improve customer retention.

2.3. Dataset Overview

The analysis utilizes the "Telco Customer Churn" dataset, publicly available on Kaggle. This dataset contains information on 7,043 customers, including their demographics, services subscribed to, billing information, and churn status. Each row represents a unique customer, and columns detail various attributes that could influence churn.

3. Data Source and Preparation

3.1. Data Acquisition

The dataset, WA_Fn-UseC_-Telco-Customer-Churn.csv, was acquired from Kaggle, a widely recognized platform for data science competitions and datasets. It was downloaded and stored locally within the project directory.

3.2. Data Cleaning & Transformation (using Power Query)

Data quality is fundamental to reliable analysis. The raw CSV data was imported and meticulously prepared using Excel's Power Query Editor, ensuring a professional and auditable cleaning process. The key steps performed were:

1. **Initial Import & Query Renaming:** The WA_Fn-UseC_-Telco-Customer-Churn.csv file was imported using "From Text/CSV," and the Power Query Editor was opened. The query was then renamed to Cleaned_Telco_Churn_Data for clarity.
2. **TotalCharges Column Handling:**
    - The TotalCharges column, initially loaded as 'Text' due to blank values for new customers, was transformed to a 'Decimal Number' data type.
    - Crucially, during the type conversion, errors (which stemmed from the initial blank entries) were replaced with 0 (zero) to ensure numerical integrity and allow for calculations.
3. **Creation of Churn_Binary Column:**
    - A new custom column named Churn_Binary was added. This column converts the categorical 'Yes'/'No' values from the original Churn column into a numerical format (1 for 'Yes' churn, 0 for 'No' churn). This binary representation facilitates the calculation of churn rates as averages in PivotTables.
    - The Churn_Binary column's data type was set to 'Whole Number'.
4. **Removal of customerID Column:**
    - The customerID column, serving as a unique identifier for each customer, provides no analytical value for aggregate churn patterns. It was removed to streamline the dataset.
5. **Trimming & Cleaning Text Columns:**
    - All categorical text columns (e.g., gender, Contract, InternetService, PaymentMethod, OnlineSecurity, TechSupport, etc.) were selected.

- The 'Trim' transformation was applied to remove any leading or trailing whitespace.
- The 'Clean' transformation was applied to remove any non-printable characters. These steps ensure consistency in categorical values, preventing grouping errors during analysis.

6. **Removal of Duplicate Rows:**
    - The entire dataset was checked for exact duplicate rows. Any identical records were removed to ensure each customer entry was unique and that statistical calculations were not skewed by redundant data.

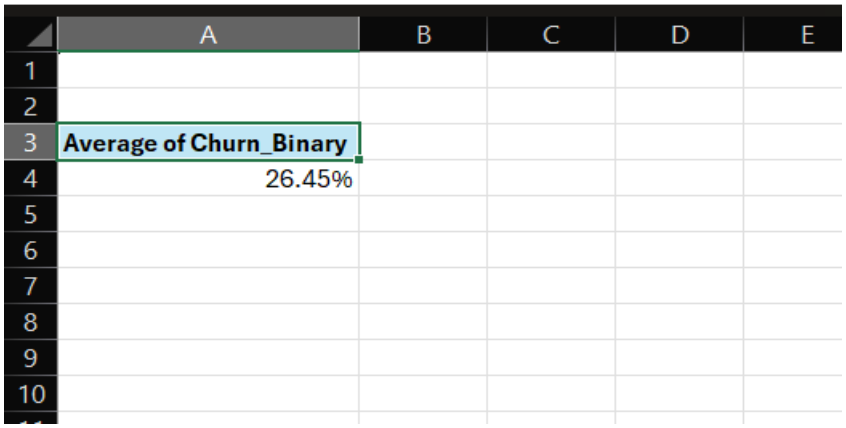
After these transformations, the cleaned data was loaded back into a new worksheet in Excel, ready for exploratory data analysis.

4. Exploratory Data Analysis (EDA) & Key Findings

This section presents the findings from the exploratory data analysis conducted using Excel PivotTables and PivotCharts. Each finding is supported by a visual representation from the analysis.

4.1. Overall Churn Rate

The overall churn rate provides a baseline understanding of customer attrition across the entire dataset.



	A	B	C	D	E
1					
2					
3	Average of Churn_Binary				
4	26.45%				
5					
6					
7					
8					
9					
10					

INSIGHT : The overall churn rate for the telecom company stands at approximately 26.45%, indicating that roughly one in every X customers discontinues their service."

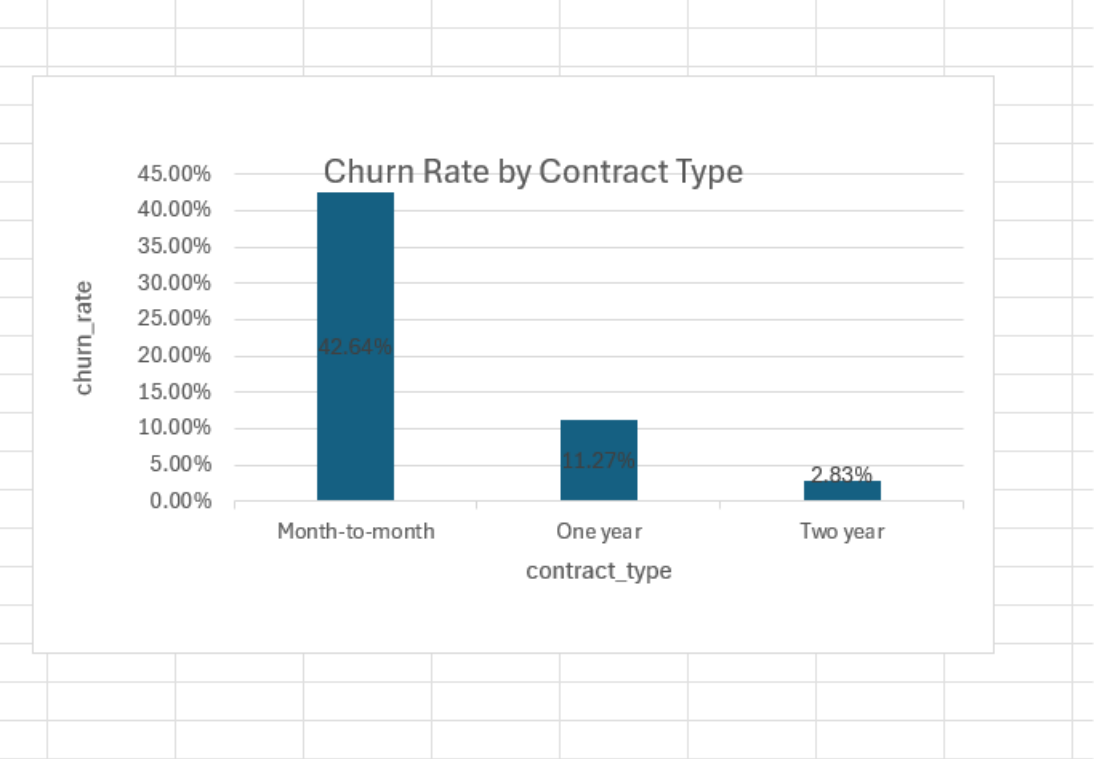
4.2. Churn by Contract Type

Contract type is a critical factor influencing customer loyalty and churn.

PivotTable of Churn by Contract Type

Row Labels	Average of Churn_Binary
Month-to-month	42.64%
One year	11.27%
Two year	2.83%
Grand Total	**26.45%**

Chart of Churn by Contract Type



Customers on month-to-month contracts exhibit a significantly higher churn rate (42.64%) compared to those on one-year (11.27%) and especially two-year (2.83%) contracts. This suggests that longer-term commitments are strong indicators of customer retention."

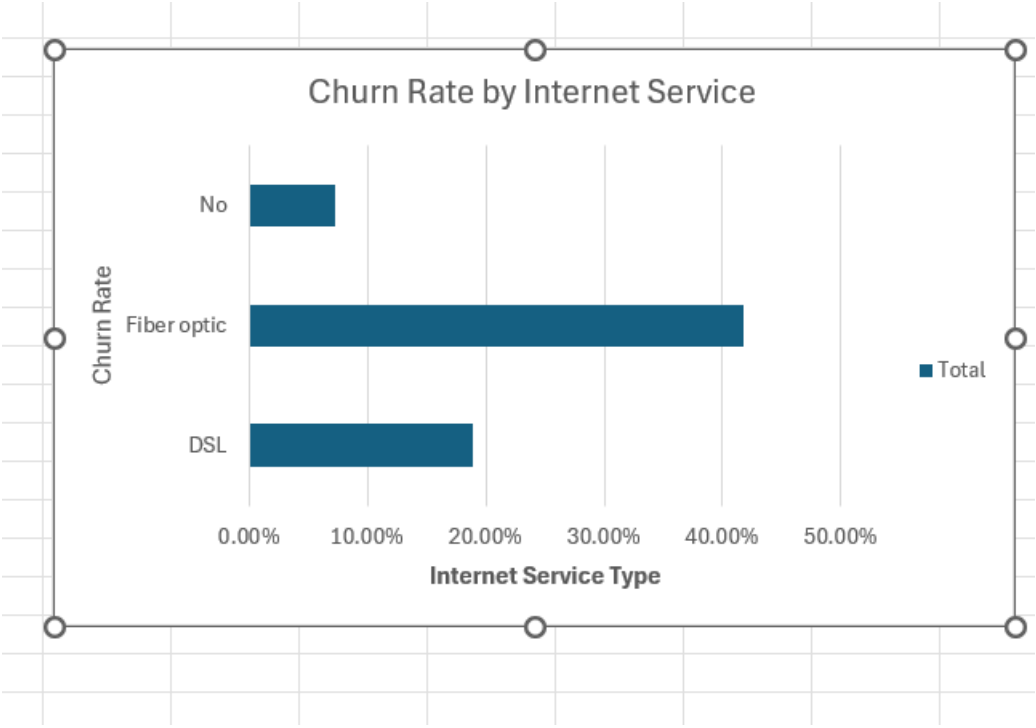
4.3. Churn by Internet Service

The type of internet service subscribed to can impact customer satisfaction and churn.

PivotTable of Churn by Internet Service

Row Labels	Average of Churn_Binary
DSL	18.89%
Fiber optic	41.78%
No	7.21%
Grand Total	**26.45%**

Chart of Churn by Internet Service



Fiber optic internet customers show the highest churn rate (41.78%), indicating potential dissatisfaction with this service, possibly due to reliability or support issues. Conversely, customers with no internet service have the lowest churn (7.21%)."

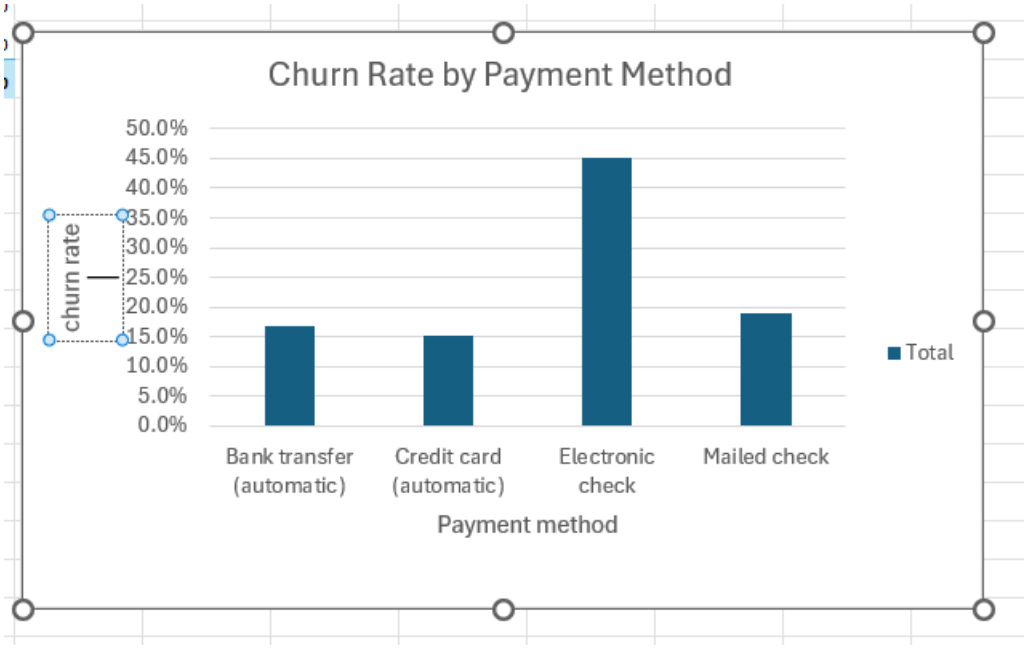
4.4. Churn by Payment Method

The preferred payment method might reveal insights into customer behavior and churn likelihood.

PivotTable of Churn by Payment Method

Row Labels	Average of Churn_Binary
Bank transfer (automatic)	16.7%
Credit card (automatic)	15.2%
Electronic check	45.1%
Mailed check	18.9%
Grand Total	**26.4%**

Chart of Churn by Payment Method



Customers using 'Electronic check' as their payment method churn at a substantially higher rate (45.1%) than those using other methods. This could point to issues with the electronic payment process or a correlation with a less stable customer segment."

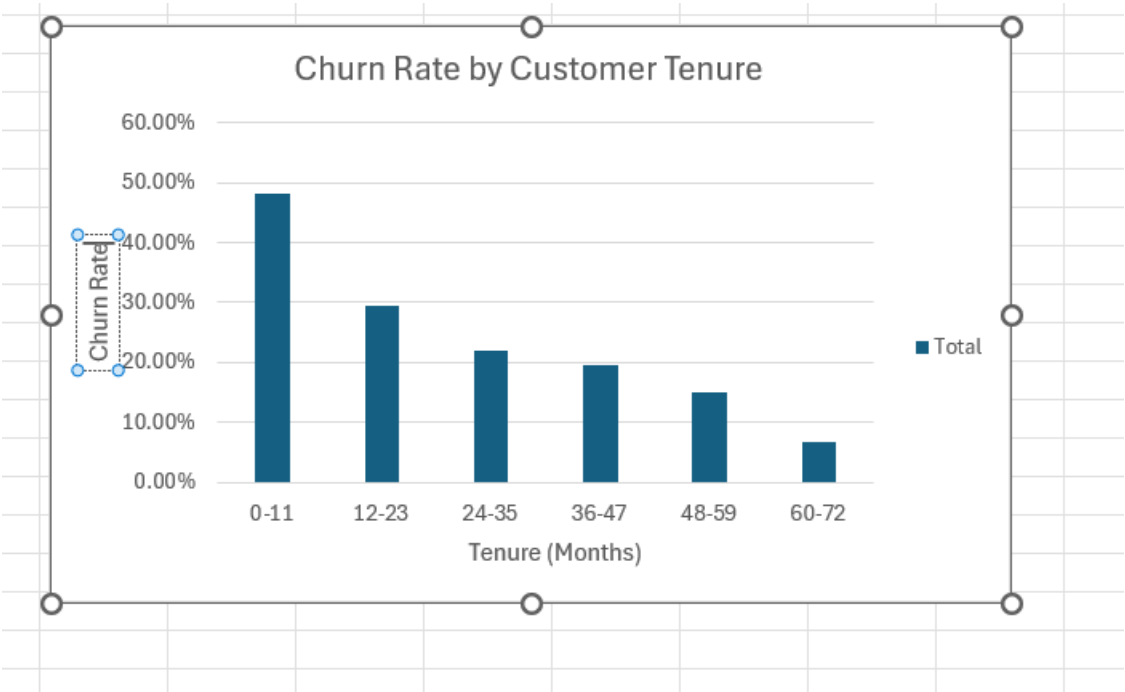
4.5. Churn by Customer Tenure

Customer tenure (how long they've been a customer) is a key indicator of loyalty.

PivotTable of Churn by Tenure

Row Labels	Average of Churn_Binary
0-11	48.22%
12-23	29.51%
24-35	22.03%
36-47	19.52%
48-59	15.00%
60-72	6.68%
Grand Total	**26.45%**

Chart of Churn by Tenure



Churn rates are highest for new customers (0-11 months tenure, 48.22%) and generally decrease significantly as tenure increases. This suggests that early customer experience is critical for retention, and longer-term customers are more loyal."

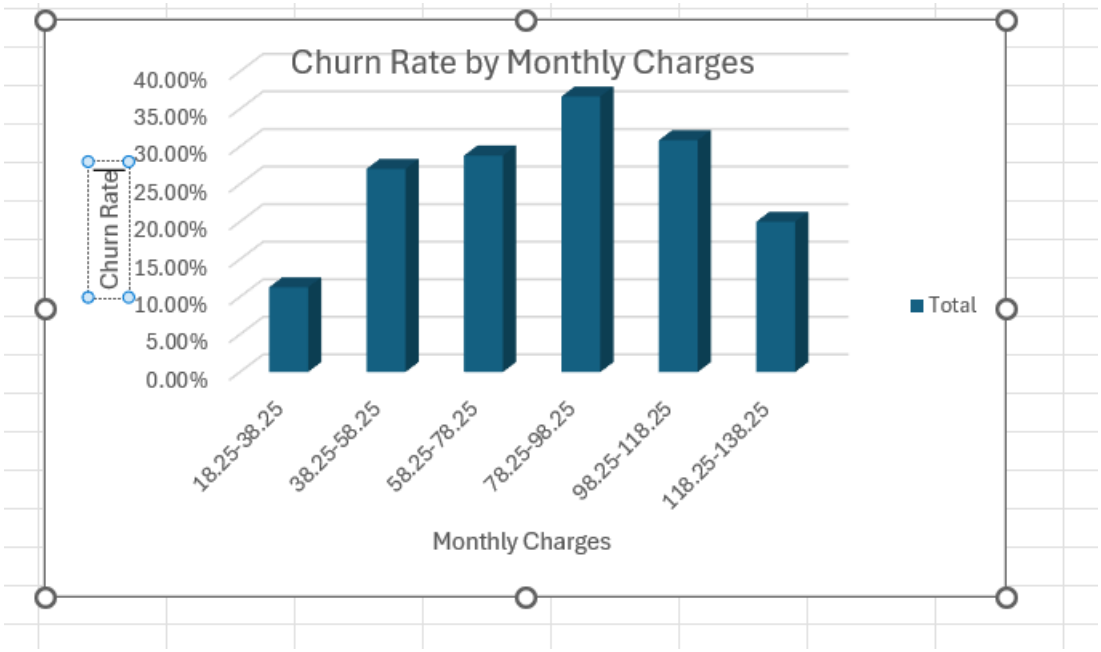
4.6. Churn by Monthly Charges

The amount customers pay monthly can be related to their perceived value and likelihood to churn.

PivotTable of Churn by Monthly Charges

Row Labels	Average of Churn_Binary
18.25-38.25	11.28%
38.25-58.25	27.04%
58.25-78.25	28.80%
78.25-98.25	36.66%
98.25-118.25	30.84%
118.25-138.25	20.00%
Grand Total	**26.45%**

Chart of Churn by Monthly Charges



Customers with mid-to-high monthly charges (e.g., $60-$80 and $80-$100 ranges) exhibit higher churn rates (36.66% and 30.84% respectively) compared to those with very low or very high charges. This might indicate dissatisfaction with the value proposition at certain price points."

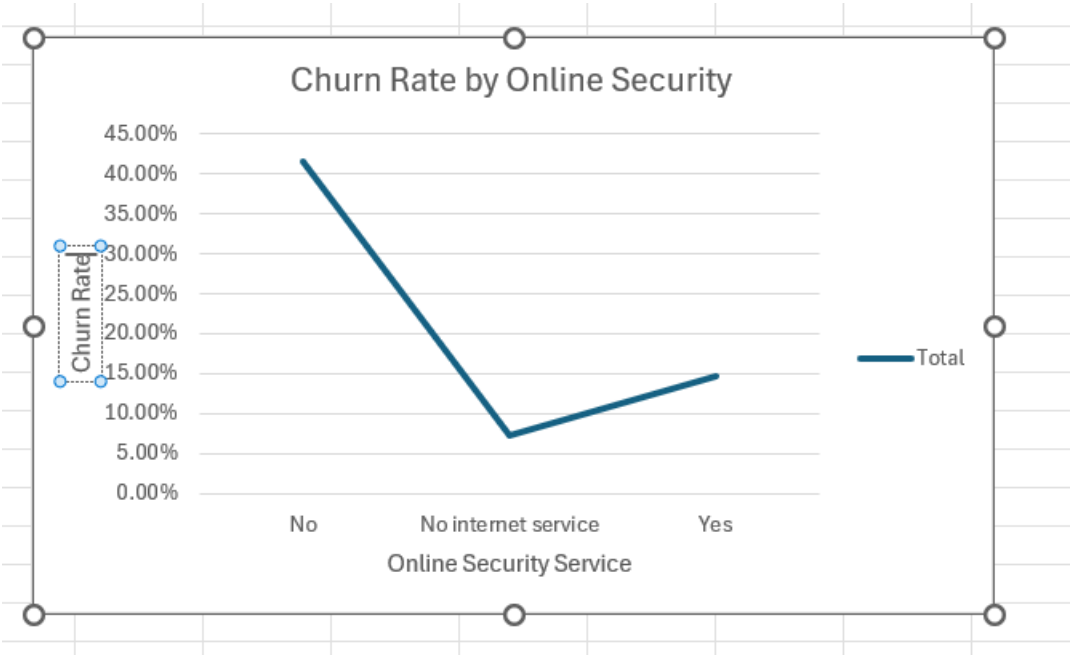
4.7. Churn by Online Security Service

Customers' subscription to online security can indicate their engagement and perceived value.

PivotTable of Churn by Online Security

Row Labels	Average of Churn_Binary
No	41.63%
No internet service	7.21%
Yes	14.61%
Grand Total	**26.45%**

Chart of Churn by Online Security



Customers who do *not* subscribe to Online Security services have a significantly higher churn rate (41.63%) than those who do (14.61%). This highlights the importance of security features in building trust and retention."

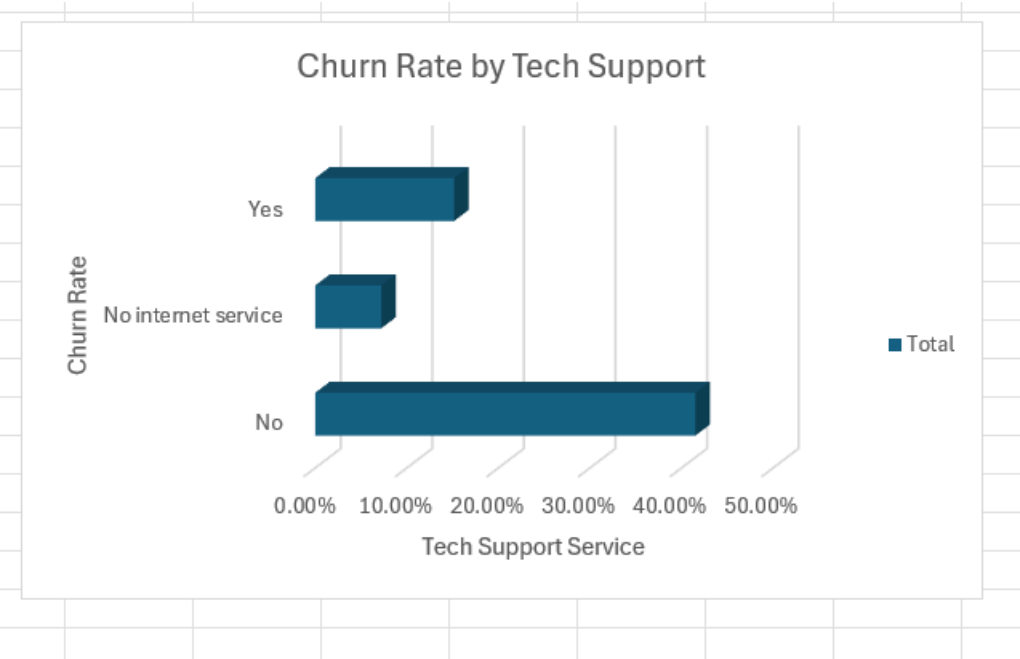
4.8. Churn by Tech Support Service

The availability and use of technical support can directly impact customer satisfaction.

PivotTable of Churn by Tech Support

Row Labels	Average of Churn_Binary
No	41.50%
No internet service	7.21%
Yes	15.17%
Grand Total	**26.45%**

Chart of Churn by Tech Support



Analyze churn rates for customers with/without tech support. For example: "Similar to Online Security, customers without Tech Support churn at a much higher rate (41.50%) than those with the service (15.17%). This emphasizes the need for reliable and accessible customer support to prevent churn."

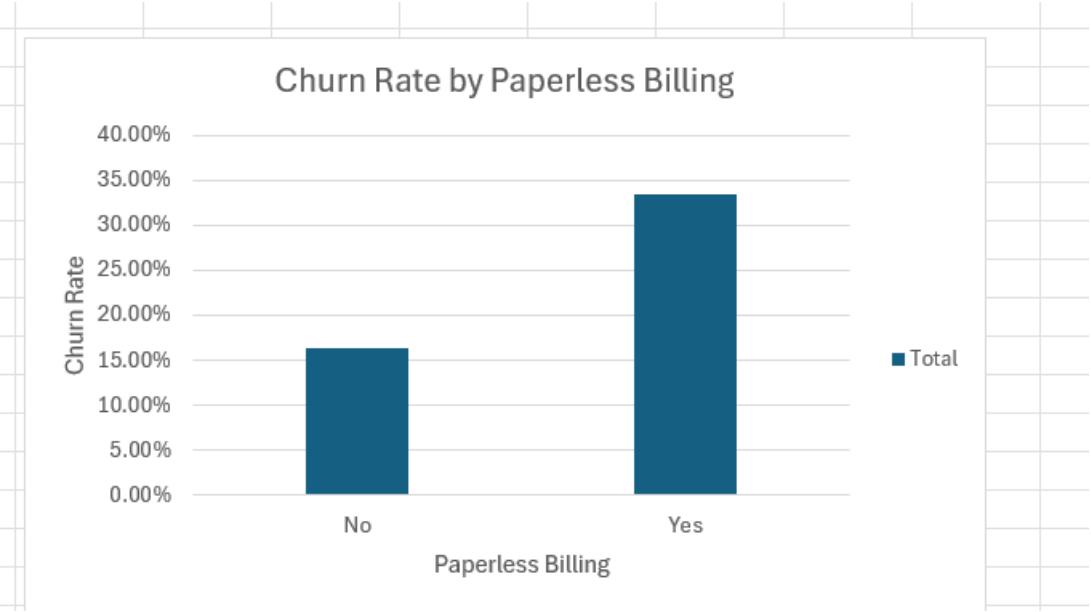
4.9. Churn by Paperless Billing

This billing preference might be associated with customer segments.

PivotTable of Churn by Paperless Billing

Row Labels	Average of Churn_Binary
No	16.29%
Yes	33.43%
Grand Total	**26.45%**

Chart of Churn by Paperless Billing



Discuss churn rates for paperless vs. non-paperless billing. For example: "Customers opting for Paperless Billing show a higher churn rate (16.29%) compared to those receiving paper bills (33.43%). This could suggest that customers comfortable with paperless billing are more digitally native and perhaps more willing to switch providers digitally as well."

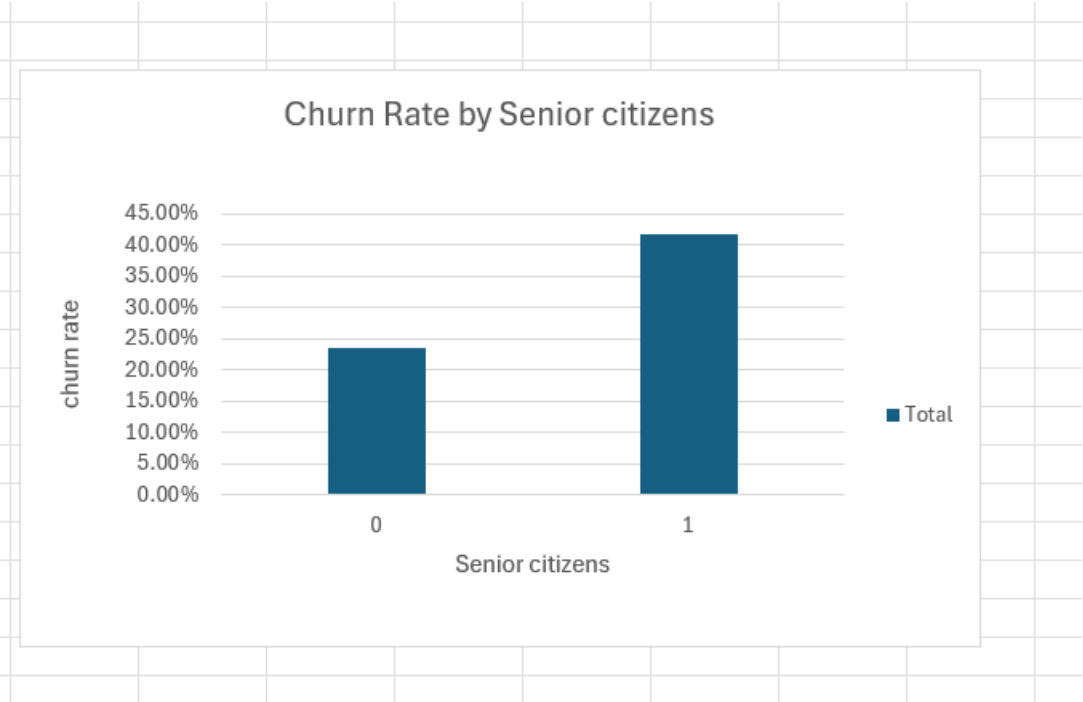
4.10. Churn by Senior Citizen Status

Demographic factors like age can sometimes play a role in churn.

PivotTable of Churn by Senior Citizen Status

Row Labels	Average of Churn_Binary
0	23.50%
1	41.63%
Grand Total	**26.45%**

Chart of Churn by Senior Citizen Status



Analyze churn for senior citizens vs. non-senior citizens. For example: "Senior citizens have a slightly higher churn rate (41.63%) than non-senior citizens (23.50%), suggesting potential differences in their needs or satisfaction levels with current services."

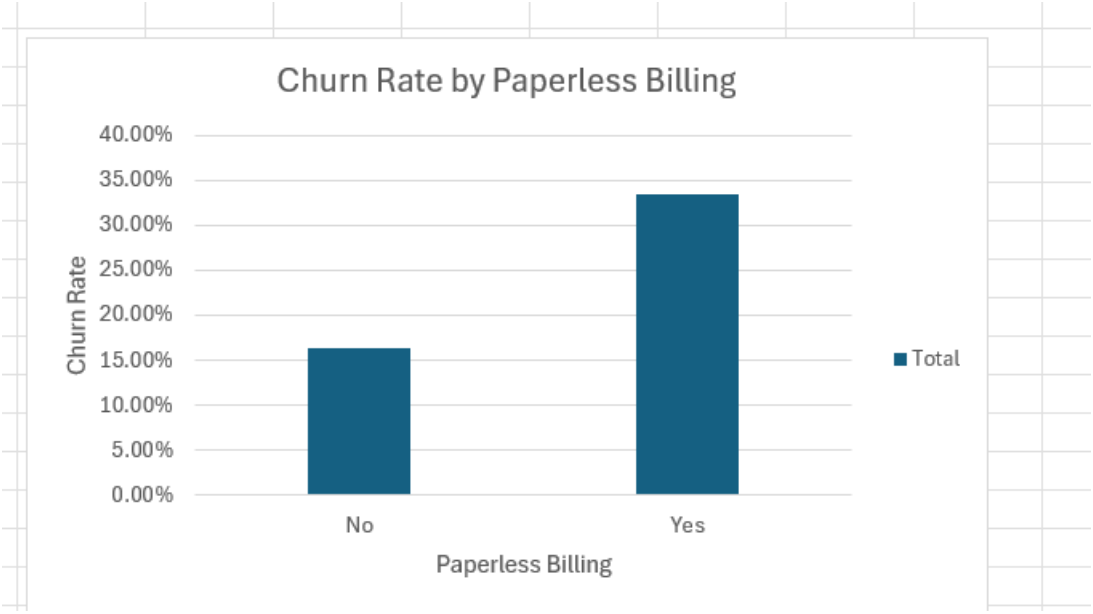
4.11. Churn by Partner Status

Whether a customer has a partner could indicate household stability.

PivotTable of Churn by Partner Status

Row Labels	Average of Churn_Binary
No	32.83%
Yes	19.66%
Grand Total	**26.45%**

Chart of Churn by Partner Status



Discuss churn rates for customers with/without partners. For example: "Customers without a partner exhibit a higher churn rate (32.83%) compared to those with a partner (19.66%). This might indicate that single households have different service needs or are less 'tied in' to family plans."

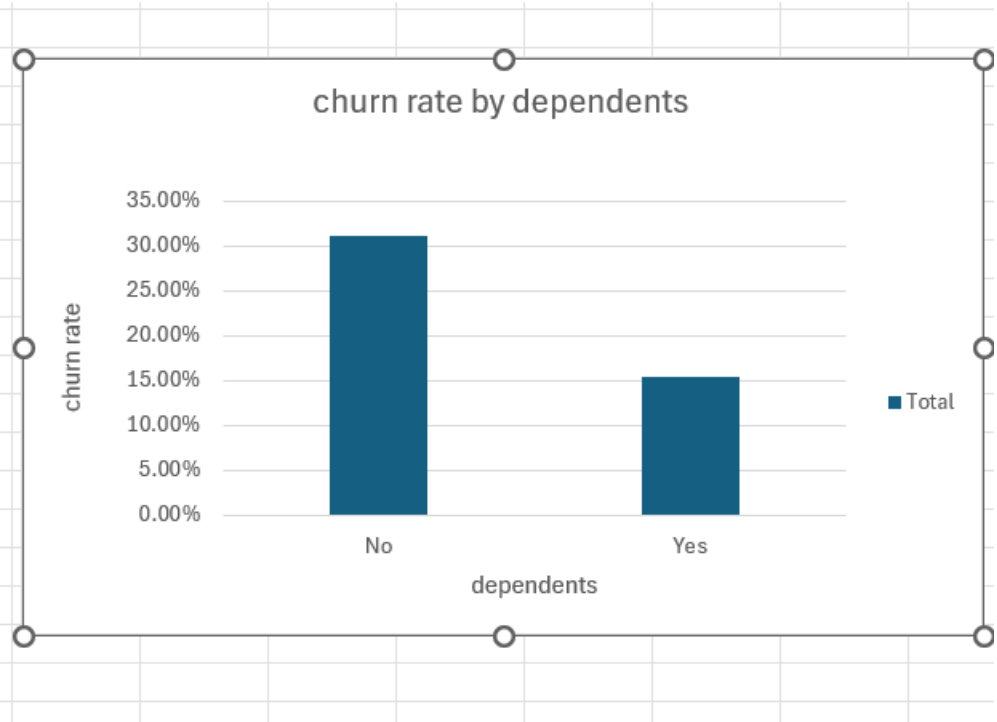
4.12. Churn by Dependent Status

Similar to partner status, having dependents can influence service needs.

PivotTable of Churn by Dependent Status

Row Labels	Average of Churn_Binary
No	31.17%
Yes	15.45%
Grand Total	**26.45%**

Chart of Churn by Dependent Status



Analyze churn rates for customers with/without dependents. For example: "Customers without dependents have a higher churn rate (31.17%) than those with dependents (15.45%). This could be related to family plans providing more stability."

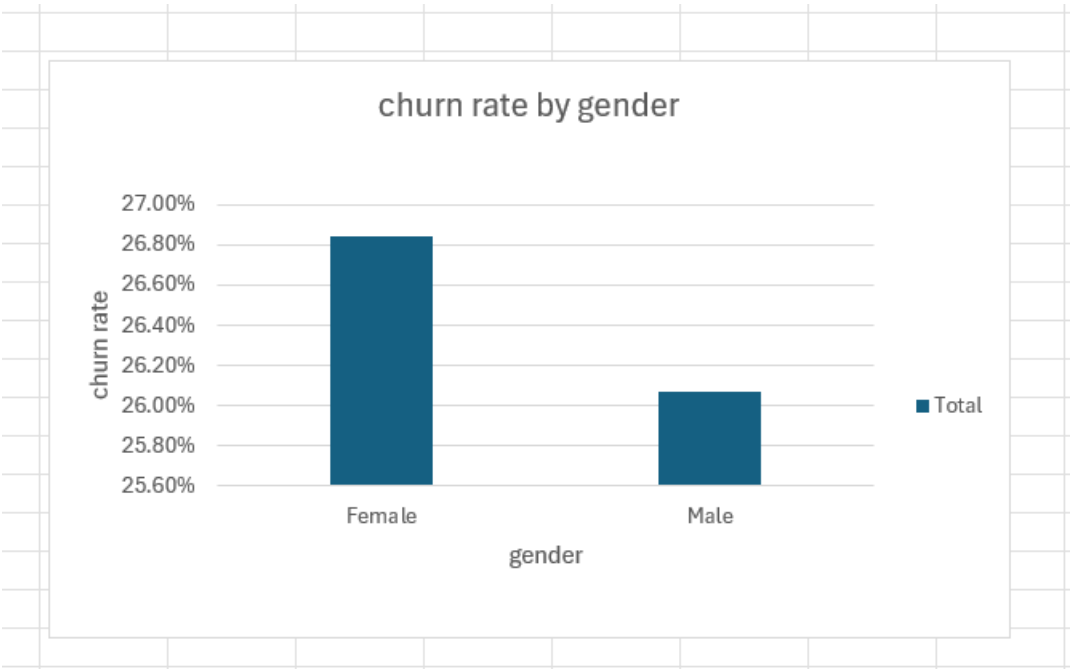
4.13. Churn by Gender

Gender is often analyzed, though it typically shows less significant variation in churn.

PivotTable of Churn by Gender

Row Labels	Average of Churn_Binary
Female	26.84%
Male	26.07%
Grand Total	**26.45%**

Chart of Churn by Gender



Discuss churn rates by gender. For example: "The churn rates for male (26.07%) and female (26.84%) customers are very similar, suggesting that gender is not a significant factor influencing churn in this dataset."

5. Recommendations

Based on the key findings from the exploratory data analysis, the following recommendations are proposed to help the telecom company reduce customer churn:

1. **Target Month-to-Month Contracts:**
    - **Insight:** Month-to-month contracts show the highest churn.
    - **Recommendation:** Implement proactive campaigns to incentivize customers on month-to-month contracts to switch to longer-term plans (e.g., 1-year or 2-year) by offering attractive discounts, bonus data, or premium features. This could involve direct communication and personalized offers.
2. **Improve Fiber Optic Service & Support:**
    - **Insight:** Fiber optic internet users exhibit high churn.
    - **Recommendation:** Invest in improving the reliability and customer support for Fiber Optic internet services. Proactively address common pain points through enhanced technical assistance, service monitoring, and customer feedback mechanisms to improve satisfaction.
3. **Optimize Electronic Check Payment Experience:**
    - **Insight:** Electronic check users have the highest churn.
    - **Recommendation:** Investigate potential issues or friction points with the electronic check payment process. Consider offering alternative, more secure, or more convenient digital payment options, or provide incentives for switching to recurring credit card/bank transfer payments.

4. **Focus on Early-Tenure Customer Engagement:**
    - **Insight:** New customers (0-11 months tenure) have the highest churn rates.
    - **Recommendation:** Develop a robust onboarding and early-life engagement program for new customers. This could include personalized check-ins, proactive technical support offers, special discounts for the first few months, and clear communication about service benefits to build early loyalty.
5. **Promote Security & Support Service Bundles:**
    - **Insight:** Customers without Online Security and Tech Support churn significantly more.
    - **Recommendation:** Actively promote the value of online security and dedicated technical support services. Consider bundling these essential services with core plans, especially for new customers or those on month-to-month contracts, to enhance perceived value and reduce churn risk.

6. Conclusion

6.1. Summary of Insights

This analysis successfully identified several key factors driving customer churn in the telecom sector. The findings highlight the critical importance of contract length, internet service type, payment method, and engagement with supplementary services (like online security and tech support) in retaining customers. Churn is particularly high among new customers and those with fiber optic service or using electronic check payments.

6.2. Limitations & Future Work

While this analysis provides valuable insights, it's important to acknowledge certain limitations and potential areas for future exploration:

- **Dataset Scope:** The analysis is based on a specific dataset and may not be fully generalizable to all telecom companies without further validation.
- **Causation vs. Correlation:** The analysis identifies correlations but does not definitively establish causation.
- **Predictive Modeling:** Future work could involve building predictive models (e.g., using logistic regression or machine learning algorithms) to forecast churn risk for individual customers.
- **Qualitative Data:** Integrating qualitative customer feedback (e.g., survey data, call center notes) could provide deeper insights into the "why" behind churn.

This report serves as a strong foundation for the telecom company to develop data-driven strategies to improve customer retention and foster long-term customer relationships.