



Telecom Customer Churn Report

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Python For Business Analytics

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Project Objectives:

The overall objective of this project is to analyze data correlating to customer churn related to telecom firms in California. In the process, specific patterns and correlations will be used to help find the opportunities that the Telecom company must take advantage of, in order to retain more customers and attract the newer customers that engage within the firms' service. Some of the churn reasons/categories we expect to find are:

- Industry competition drives customers away and results in churn. The competition can include better service offers, better devices, and higher download speeds.
- Attitude of a support person (Customer Service Rep). Bad experience with customer support will result in greater churn.
- Lack of security. Customers who opt into security plans may have a more pleasing experience with the product as opposed to those who do not, consequently leading them to churn.

Our Process:

Define the problem and reframe the question: First, we approached the question “I am CEO of a telecom firm, what is causing the churn in our customer base?” and understood that the question provided was not quantifiable and didn't have a clearly defined goal. Understanding the importance of needing to have a quantifiable question, our group approached different quantifiable factors such as the loss of subscribed customers and the ratio of lost to gained. We also approached the subject of the goals of a firm to better understand the objective of the questions and aggrieved that success was the goal of any business/firm is customer retention. To reach this goal we must understand how to retain existing customers and attract new ones. It's important to address the factors that lead to customer churn. Through this analysis of the question we came up with the question “What opportunities does a telecom firm have to retain more customers and attract new customers ?”.

Data Gathering: We collected customer data from our SQL server provided by Professor John Droescher. The dataset included important customer information such as City, contract_type, Customer_Status, and different services customers opted into.

Data Cleaning, and Preprocessing: For the data cleaning process, we dropped columns that may not be necessary. We removed the Customer_ID, Latitude, and Longitude columns. Customer_ID column is a duplicate of the Python default indexing column. The Latitude and Longitude columns were removed as they aren't necessary since we already have information regarding the customer's city.

Data Analysis: We used Pandas, a Python library designed for data analysis work, to analyze our data. We reformatted the data into tables for each query to observe possible relationships between columns and customer status. The GroupBy function was often used to join together data and aggregate it.

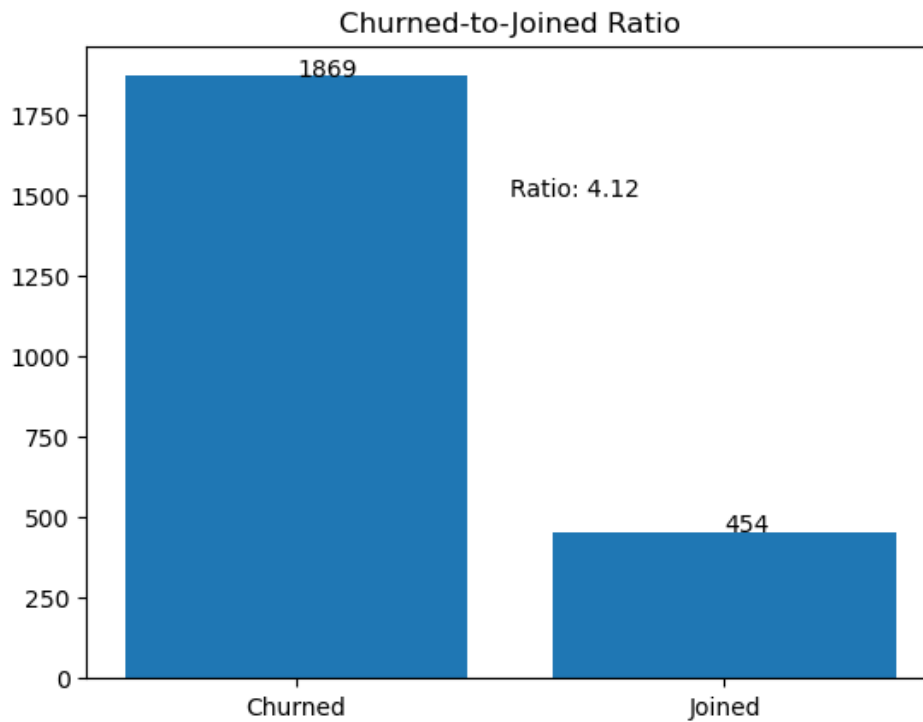
Data Visualization: We used Matplotlib, a Python library designed for building visual elements, to create bar graphs and pie charts to visually display relationships and make the data easier to read.

Dashboard: We created a dashboard using Tableau that allows us to quickly examine our major findings.

Report: Our report documented our methodology, findings, and recommendations. We included a description of the problem, research question, data gathering, cleaning, preprocessing, analysis, visualization, interpretation, and recommendations.

PowerPoint Presentation: Our PowerPoint presentation summarized our project, findings, and recommendations.

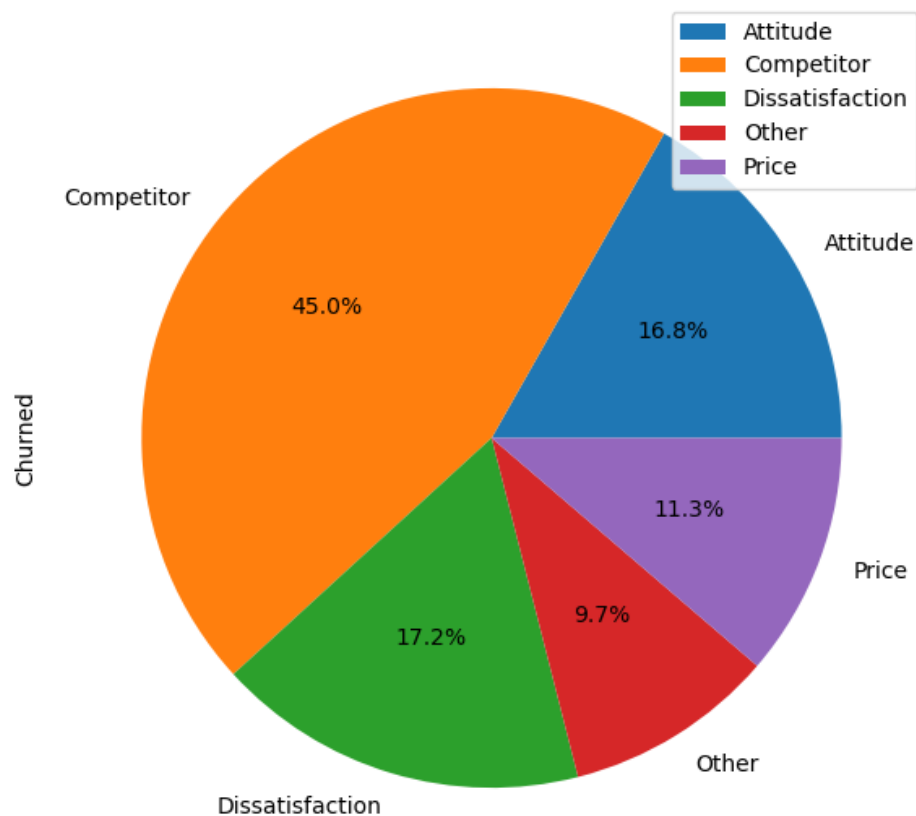
Analysis Report



A troubling 1869 customers churned, while the telecom company only managed to bring in a new 454 customers, representing a Churned to Joined ratio of 4.12x.

Task: We need to identify the biggest categories of churn. Understanding customer pain points is crucial to prevent further churns.

Approach: Wrote a query that groups the Churn_Category and Customer_Status columns and calling the .Size() function afterward. The results display a table of churn category in descending order.

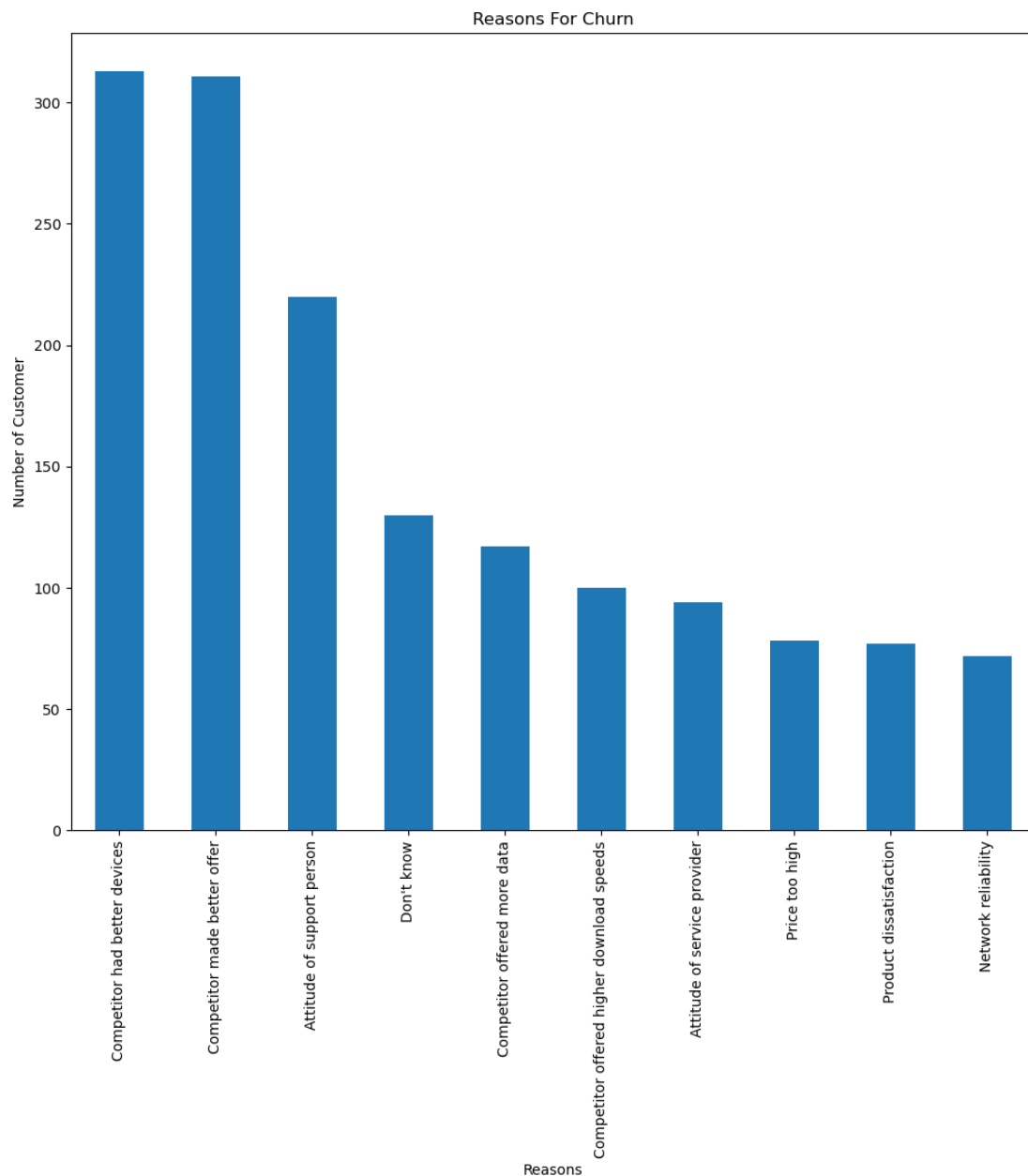


Analysis: 45% of the customers that left are due to competition, indicating that the company is facing tough competition in the market. 16.8% of the customers left due to the attitude of customer support/service. Dissatisfaction accounts for 17.2% of the customers who left the telecom firm. Price is the fourth reason, accounting for 11.3% of the customers who left. Finally, the "other" category accounts for 9.7% of the customers who left the company.

Task: Previously we made a pie chart displaying the percentages of the different categories of why customer churn is happening. Competition, attitude, and dissatisfaction made up about 3 quarters of

the pie chart. We will look to confirm this by understanding how many customers churned and for the specific reason that is linked to it.

Approach: Wrote a query that groups the Churn_Category and Churn_Reason columns and calling the .Size() function afterward. The results display a table of churn category and the reasons associated with it in descending order.



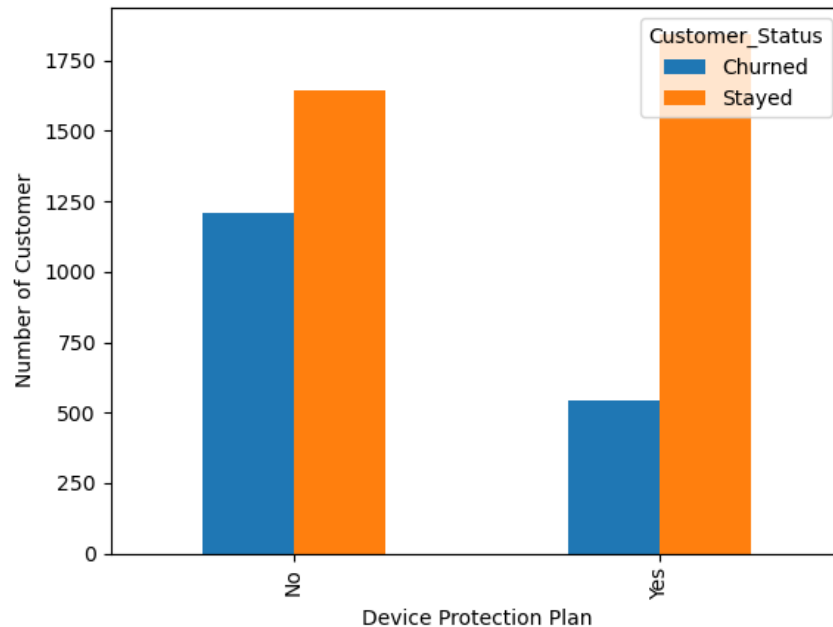
Analysis: The greatest reason for customer churn resulted in the competition category with 313 customers leaving because competitor has better device and 311 customers leaving because the competitor made a better offer. 117 customers churned due to better data offerings from other companies, while 100 customers found better high-speed downloads from other competitors. The attitude towards the support person and service provider totaled up to 314 leaving the telecom firms.

Verifying The Reasons With Data:

Let's take a closer look at some of the biggest reasons for customer churn and see if we can make sense of it with information from the dataset.

Task: When knowing that competition is one of the biggest reasons for churn it is necessary that we continue to explore the possible reasons why. Below, we used device protection plan as a measure of good device, as having good protection will lead to a better overall user experience and ultimately, having positive views toward the device.

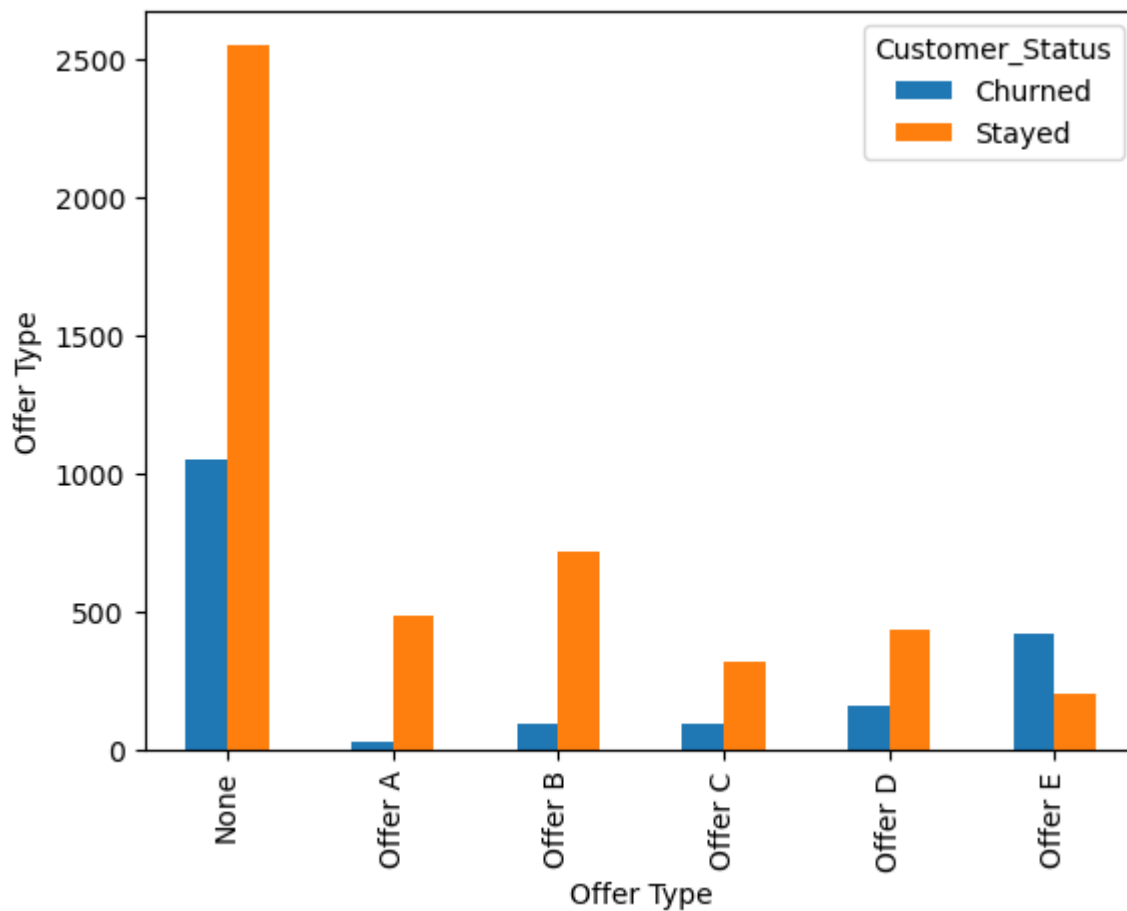
Approach: We wrote a query to show how many customers churned based on having or not having a protection plan. First, we needed to replace the numbered values in the 'device_protection_plan' to strings of yes and no. Then by grouping Device_Protection_Plan and Customer_Status it counts the number of each of the occurrences for the two groups. We used size () to create a device protection plan dataframe and used dropna () to ensure that any rows that had empty values were removed. Lastly, we used device_churn.plot to generate a bar graph.

**Analysis:**

545 customers with device protection plan churned, whereas individuals without a Device protection plan have a churn of 1,211 which is a 666 customer difference.

Task: Second biggest reason for churn was that competitors made better offers. Let's have a look at the different offers made to customers by the telecom company and the rate of churn.

Approach: Wrote a query to group 'offer' and 'Customer_Status' together, which would allow the dataframe to be organized by specific column/ row through size(). This data was used to create a bar graph that represents the customer status for different types of offers.

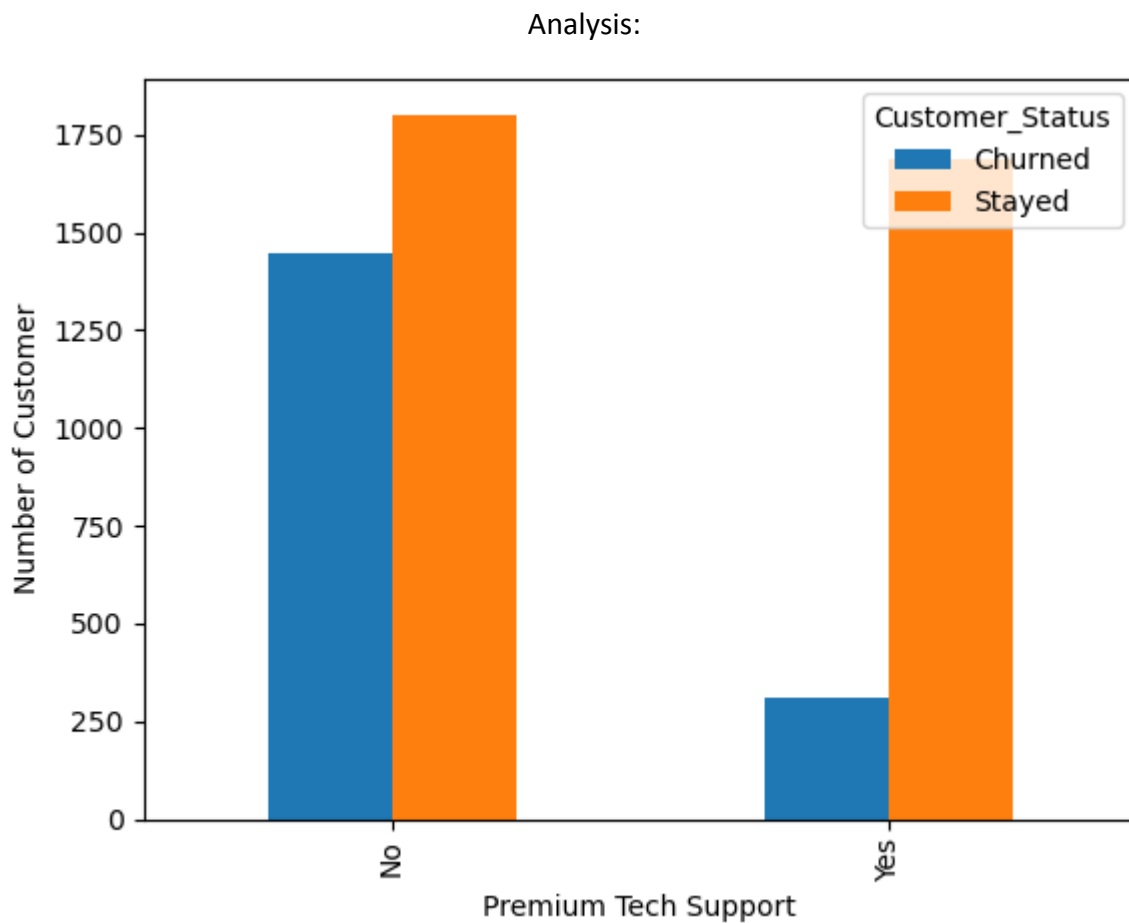


Analysis: Offer A resulted in 35 churned customers and 485 customers retained. Offer B resulted in 101 customers churned and 723 retained. Offer C had 95 customers churned and 320 customers retained while offer D resulted in 161 churned and 441 retained. Offer E had 426 churned customers while only 204 customers stayed. 1051 customers who received no offers churned, accounting for the majority of the churn.

Task: Third biggest reason for churn was Attitude of support person. Let's examine the churn rate of customers who has premium customer support. It is important to look at the effect of premium tech

support on customer retention rates. We will look to see if customers who opt into premium tech support experience greater retention.

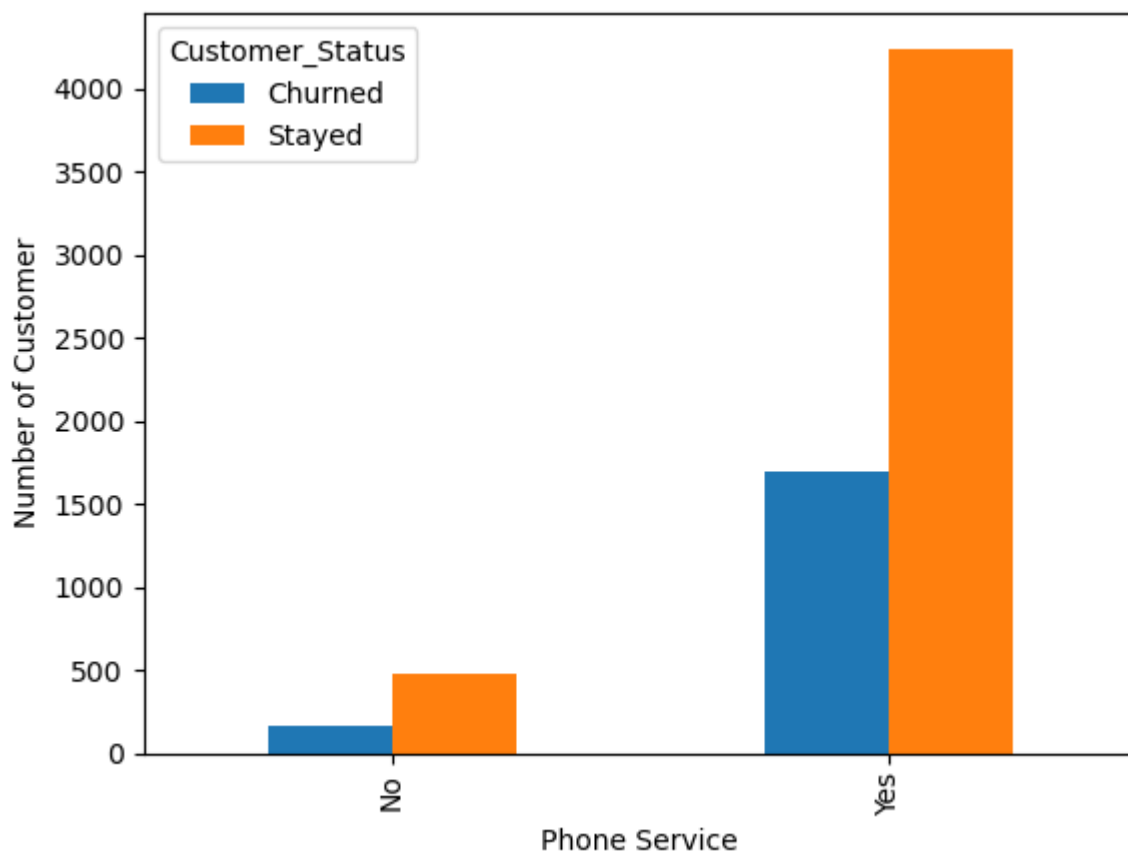
Approach: The first query grouped the Premium_Tech_Support and Customer_Status. The results displayed the churned and stayed status for customers who have premium tech support and those who don't.



Analysis: 1,446 Customers who do not have premium tech support churned, while 1,802 stayed with the firm. Customers with premium tech support only experienced 310 churns, while, 1,687 customers stayed.

Task: Attitude of service provider was the 7th biggest reason for churn. Let's examine if customers who only have access to regular phone service experiences a large churn.

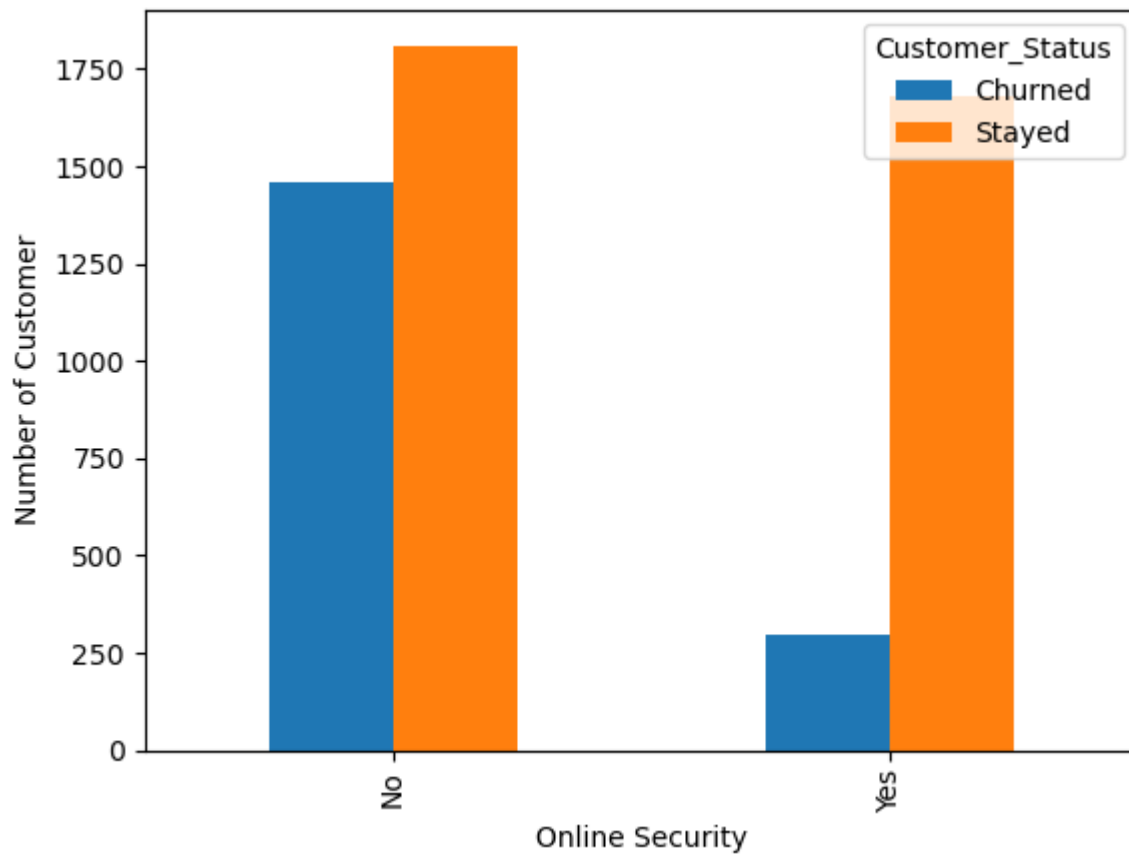
Approach: By grouping Phone_Service with Customer_Status and creating a separate data frame we are able to identify a numbered value of customers that churned or stayed after retrieving a phone service. Then using service_churn.plot to create a bar graph with phone service being the x-label.



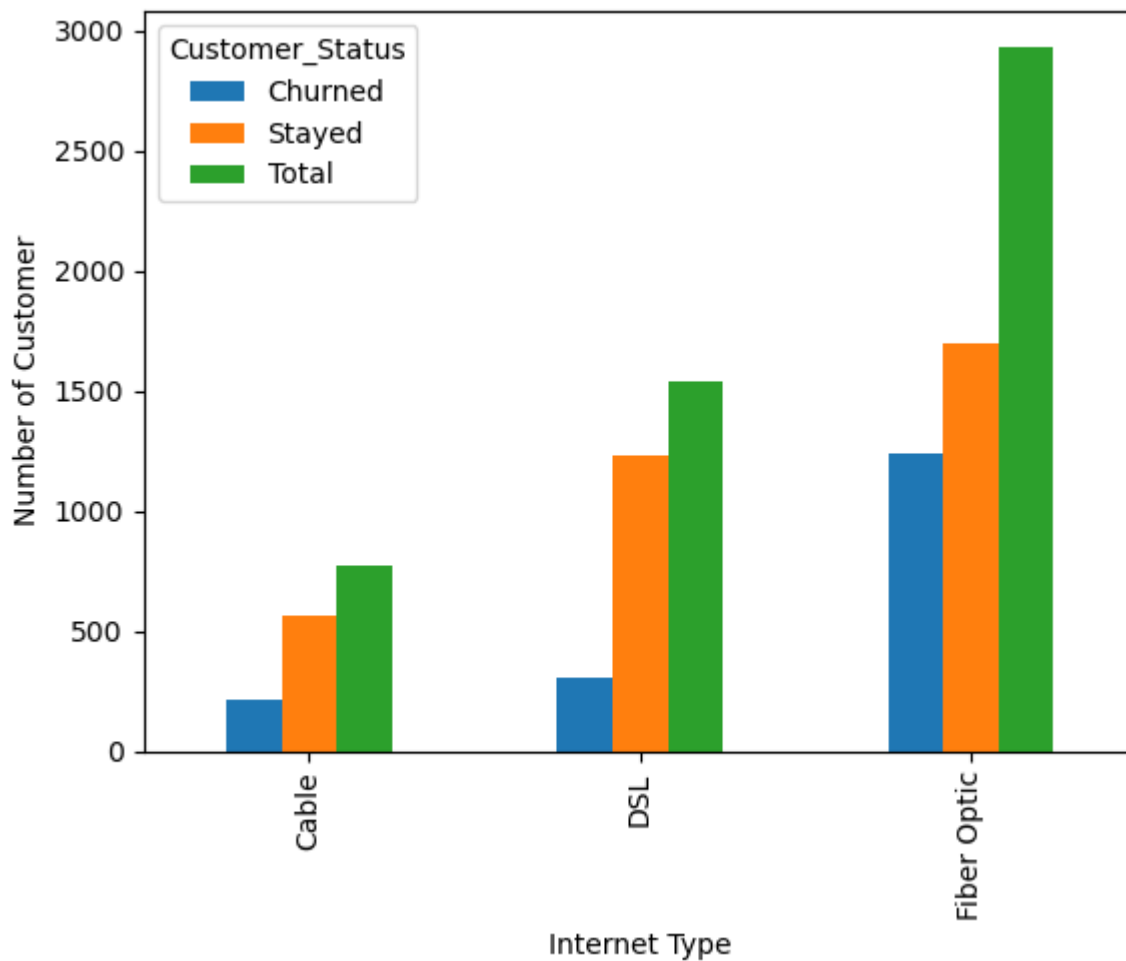
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Analysis: Customers who only have the regular phone service offered by the telecom company have a huge churn population. This may imply that the existing phone service may be a painpoint to customers.

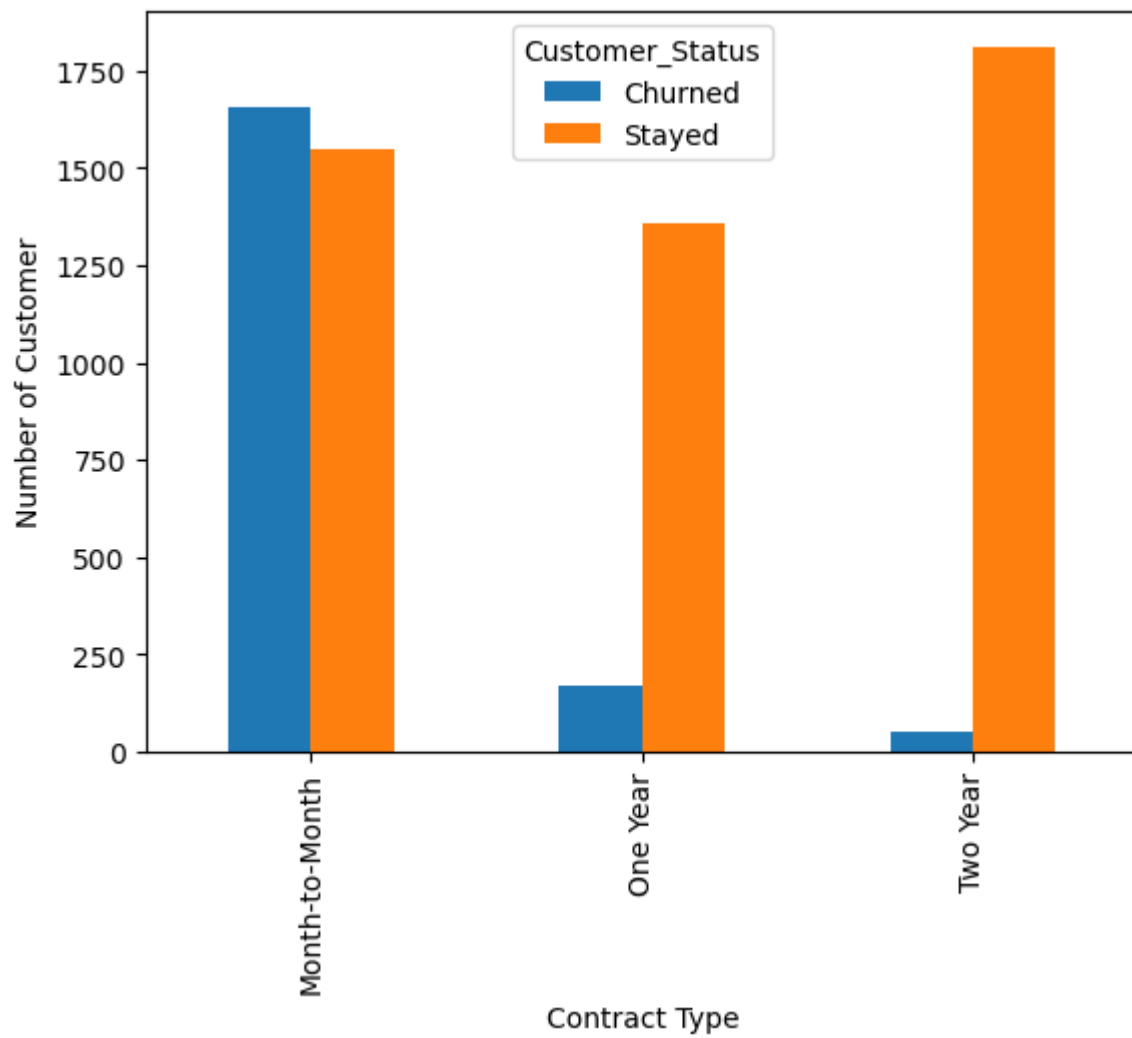
Additional factors that experience high churn:



Analysis: 1,678 customers with online security stayed with the telecom company while the churn rate remained relatively low at 295. 1,811 customers without online security stayed with the firm, however, an alarming 1,461 individuals churned.



Analysis: Most customers use Fiber Optic, with a total of 2,934 individuals. Fiber Optic also experiences a noticeable rate of churn, with almost half the customers leaving at 1236. DSL has the best stay-to-churn ratio as 1,230 individuals stayed to 307 individuals churning, a ratio of .25.

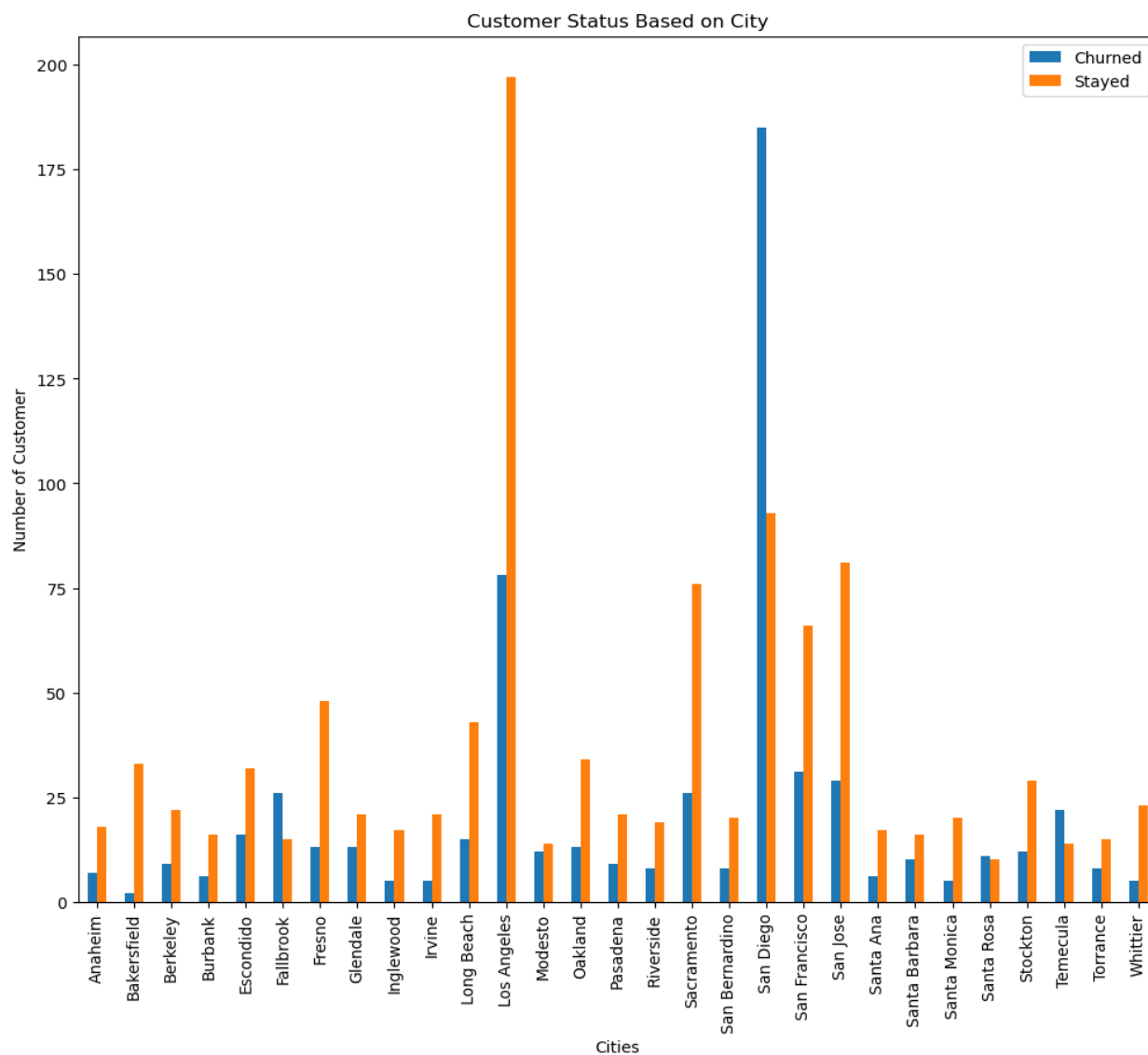


Analysis: Customers who opt into the Month-to-Month contract type experienced a whopping 1655 customers churn, while retaining only 1547 customers. The Two Year contract type is extremely efficient at retaining customers, having only 48 customers leave the firm while 1813 stay.

Deep Dive Into San Diego:

Task: Find the city with the largest customer churn population.

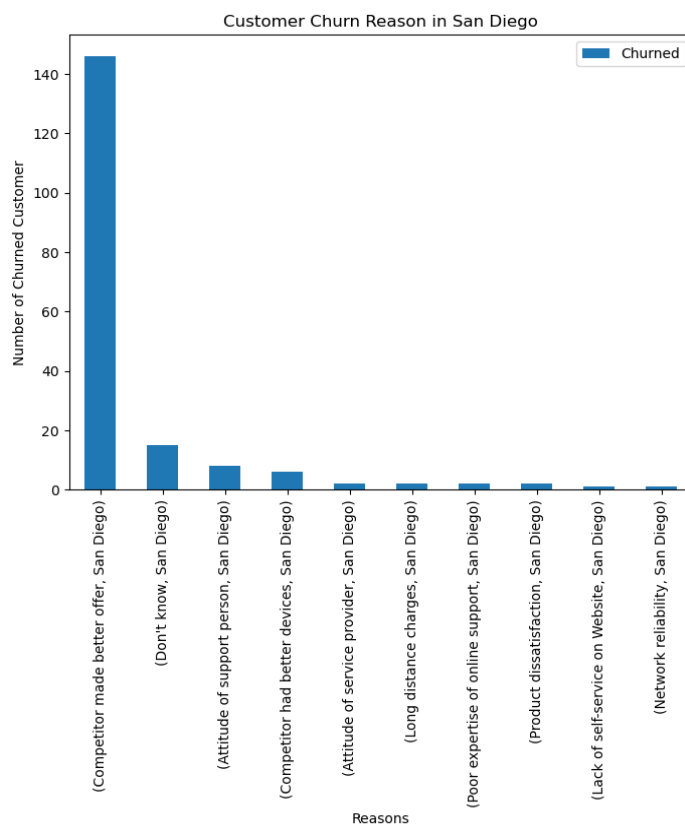
Approach: Wrote a query to filter out cities with less than 20 customers so we can get a clean set of lists to visualize. The query was then joined with a second query that groups the City and Customer_Status columns. The result was a table of customer status displayed in descending order.



Analysis: San Diego had an alarming amount of customer churns with 185, followed by Los Angeles. However, San Diego had double the customers leave as customers who stayed.

Task: San Diego alone accounted for almost 10% of the total customer churn population. We need to find the biggest reason why customers are abandoning the service in San Diego.

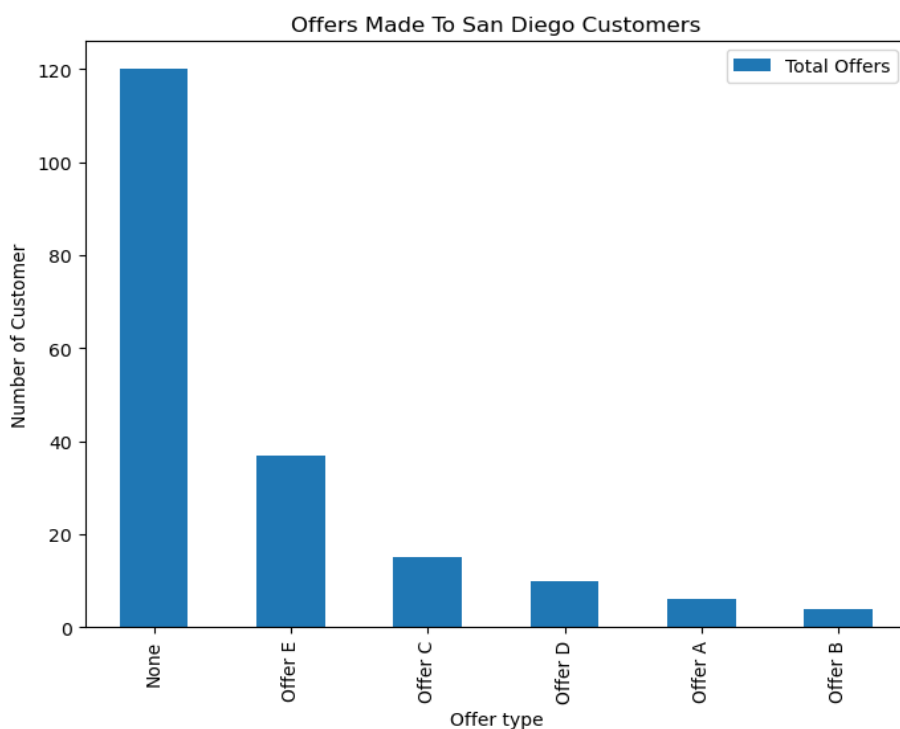
Approach: Wrote a query to search for San Diego within the City column followed by grouping it by Churn_Reason, and City. The results displayed the reasons for customer churn in San Diego in descending order.



Analysis: A staggering 78% of customers churned in San Diego because competitors made better offers. This is an important piece of data as we will look into what kind of offers were made to these customers in San Diego by the telecom company.

Task: 78% of customers churned in San Diego because competitors made better offers. We will look to confirm our theory that these customers received either no offer from the telecom company or received an unpleasant offer.

Approach: Wrote a query to search for San Diego within the City column followed by grouping it by the Offer column. The results displayed the various offers San Diego customers were offered by the telecom company.



Analysis: 82% of San Diego customers received either no offers or the worst offer available. This absence of good offers for San Diego customers makes sense why the majority of San Diego churned the telecom company upon receiving better offers from competitors.

Conclusion

The data analysis shows that the telecom company is facing tough competition in the market and needs to improve its device and offerings, as well as customer support/service, to retain customers. The lack of device protection plan, online security, and satisfactory phone service also contribute to customer churn. The company should consider offering better deals and promotions to its customers, especially in San Diego, where the majority of customers churned due to better offers from competitors. The analysis also highlights the importance of contract type, with the two-year contract type being the most efficient at retaining customers. To reduce customer churn, the telecom company needs to address these pain points and prioritize customer retention strategies.