



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, we will analyze existing telecom customer data to identify churn correlations and find opportunities that exist for us to enhance customer retention rates. 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.
- The 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.

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.

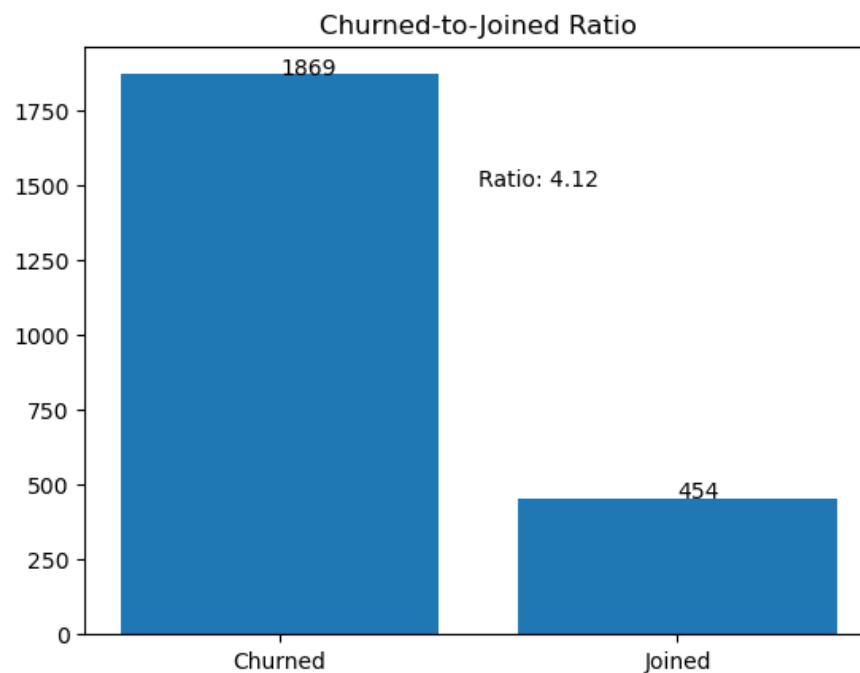
Data Analysis: We used Pandas, a Python library designed for data analysis work, to analyze our data. We reformatted the data into tables for each query to observe possible relationships between columns and customer status. The GroupBy function was often used to join together data and aggregate it.

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.

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.

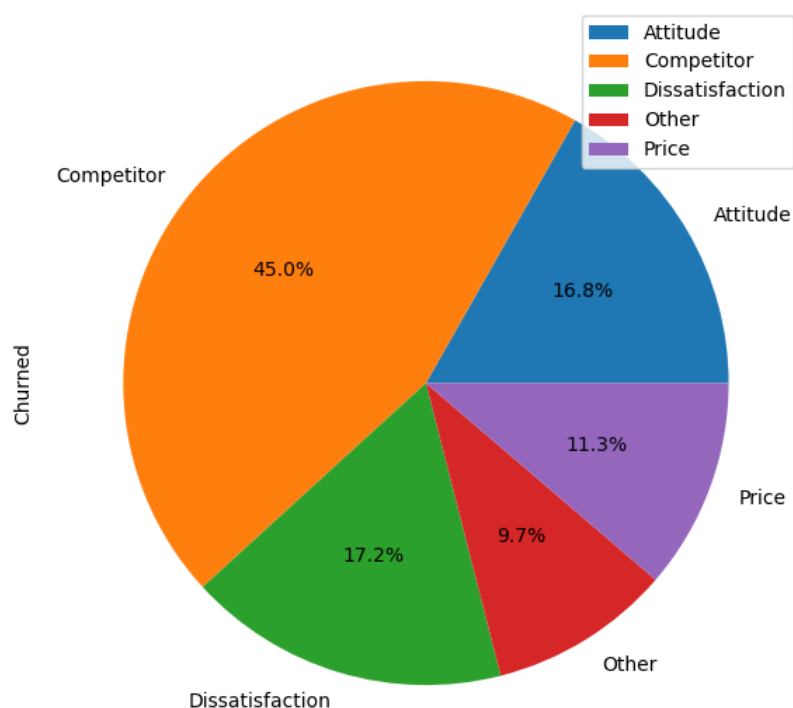
Analysis Report



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.

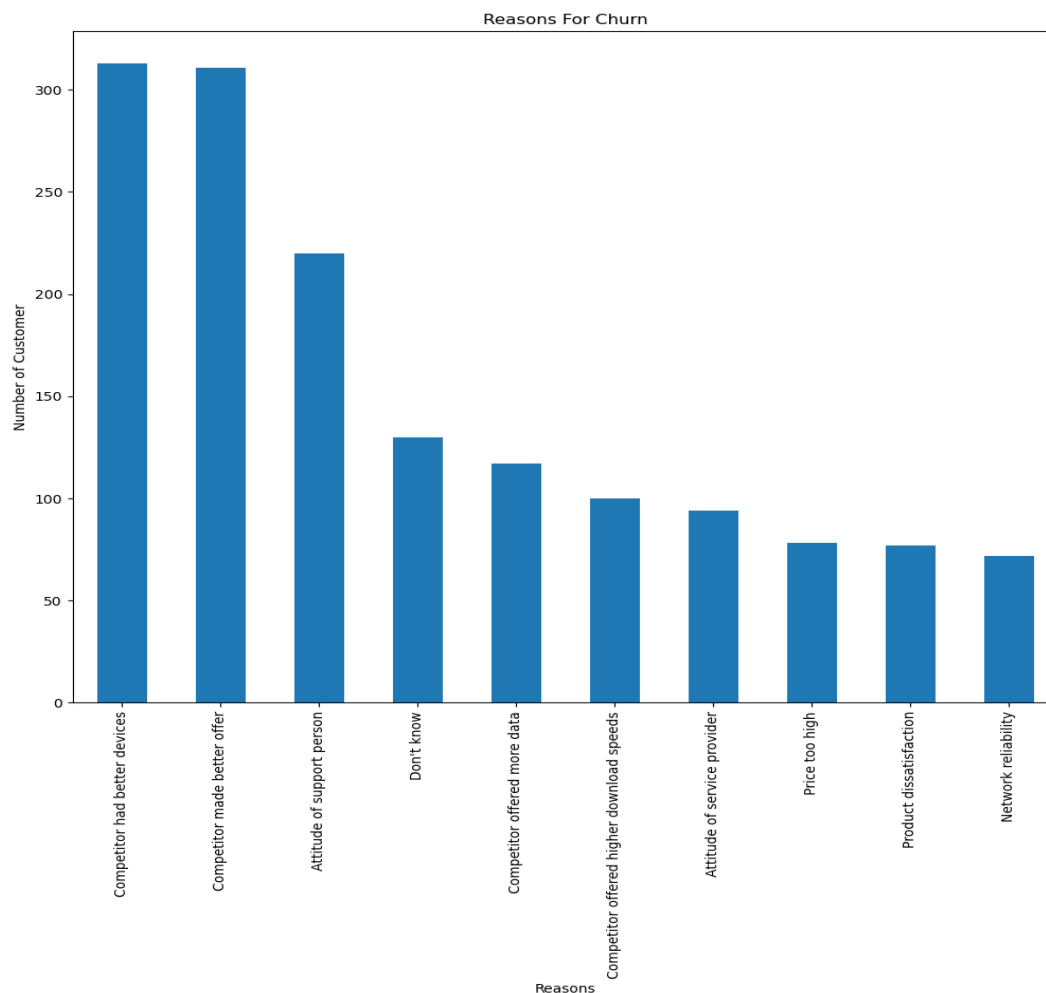
Approach: Wrote a query that groups the Churn_Category and Customer_Status columns and calling the .Size() function afterward. The results display a table of churn categories in descending order.



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 categories and the reasons associated with them in descending order.



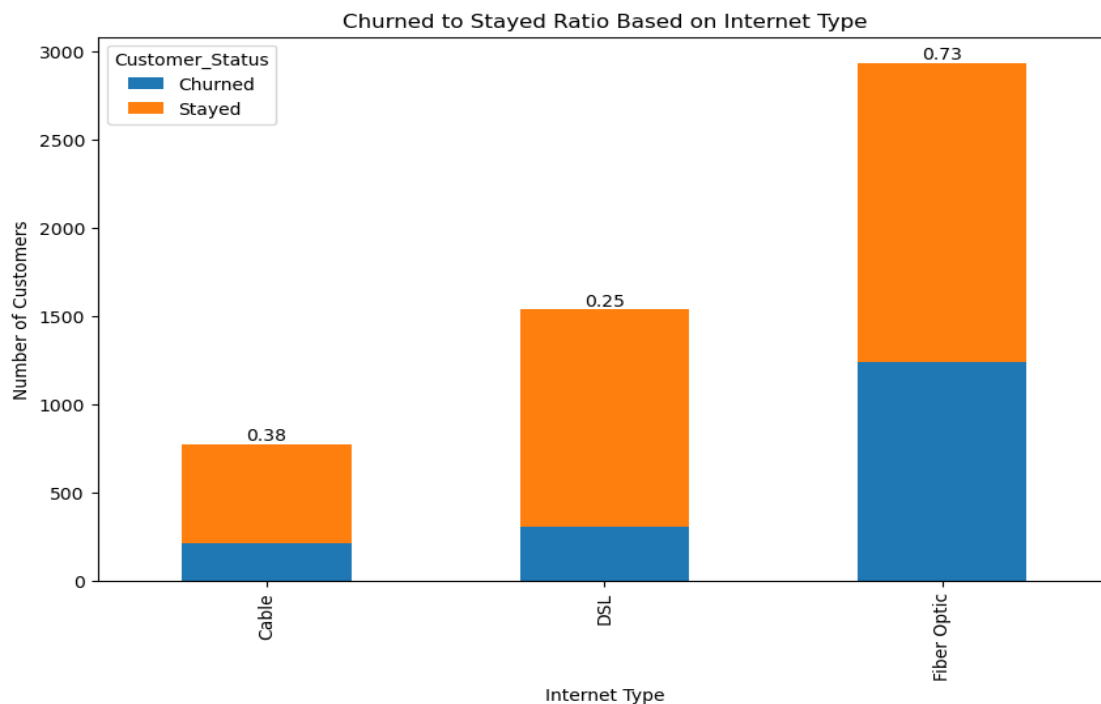
Analysis: The greatest reason for customer churn resulted in the competition category with 313 customers leaving because the competitor has better devices and 311 customers leaving because the competitor made a better offer. 117 customers churned due to better data offerings from other companies, while 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: Better competitor device was the biggest reason for churn. Below we will examine the internet type offered by the company and identify churn correlation.

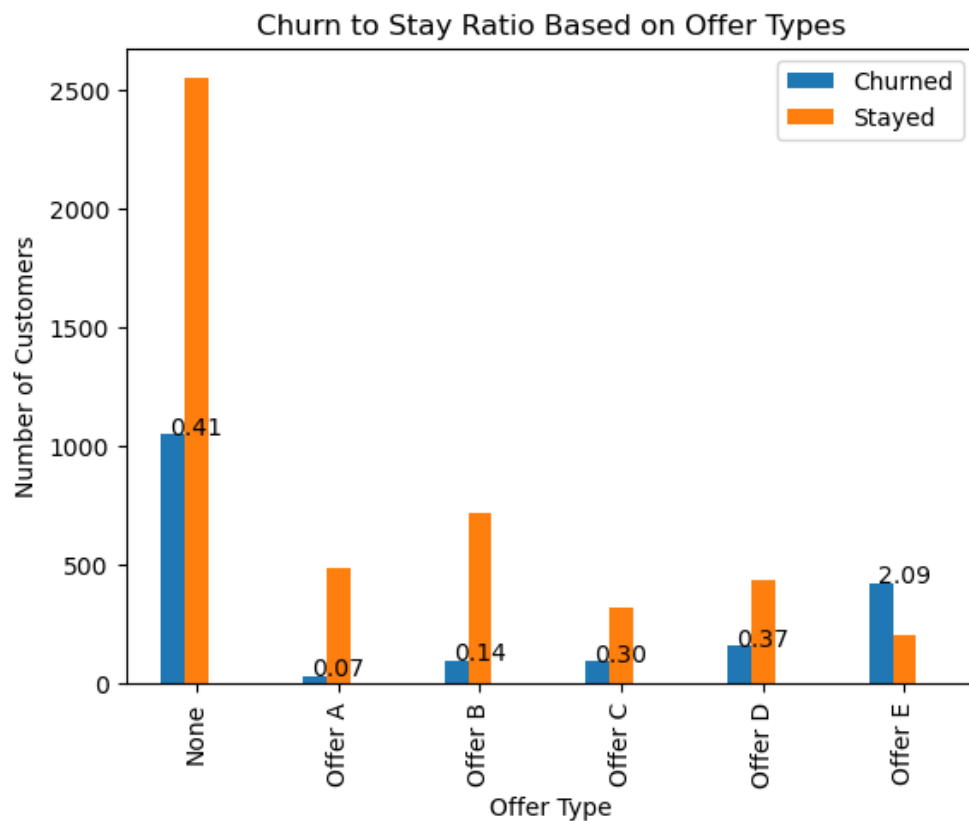
Approach: We wrote a query to show how many customers churned based on the internet type. First, we grouped the Churned and Stayed 'customer_Status' column and the 'Internet_Type' column. We also divided the Churned number and Stayed number on an additional column to get the churned-to-stayed ratio. Lastly, we used Matplotlib to generate a bar graph.



Analysis: Most customers use Fiber Optic, with a total of 2,934 individuals. Fiber Optic also experiences a noticeable rate of churn, with well over half the customers leaving at 1236, representing a churned-to-stayed ratio of 0.73. DSL has the best stay-to-churn ratio as 1,230 individuals stayed to 307 individuals churning, a ratio of .25.

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.

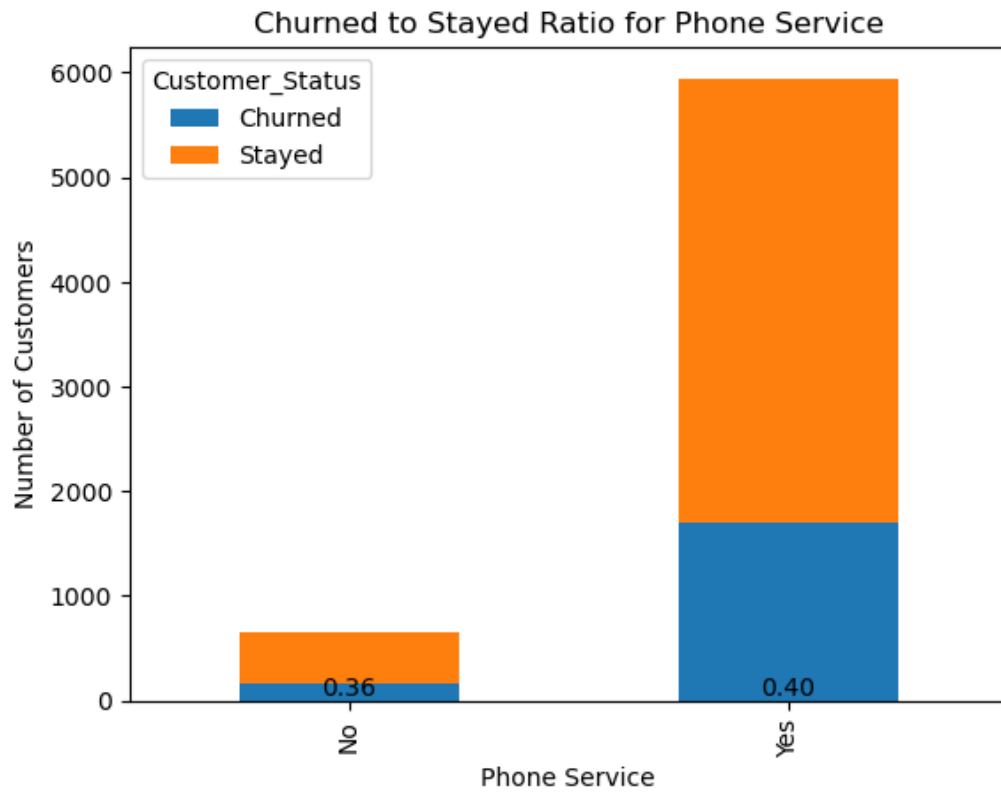
Approach: Wrote a query to group 'offer' and 'Customer_Status' together, which would allow the data frame to be organized by specific column/ row through size(). We also divided the Churned number and Stayed number on an additional column to get the churned-to-stayed ratio. This data was used to create a bar graph that represents the customer status for different types of offers.



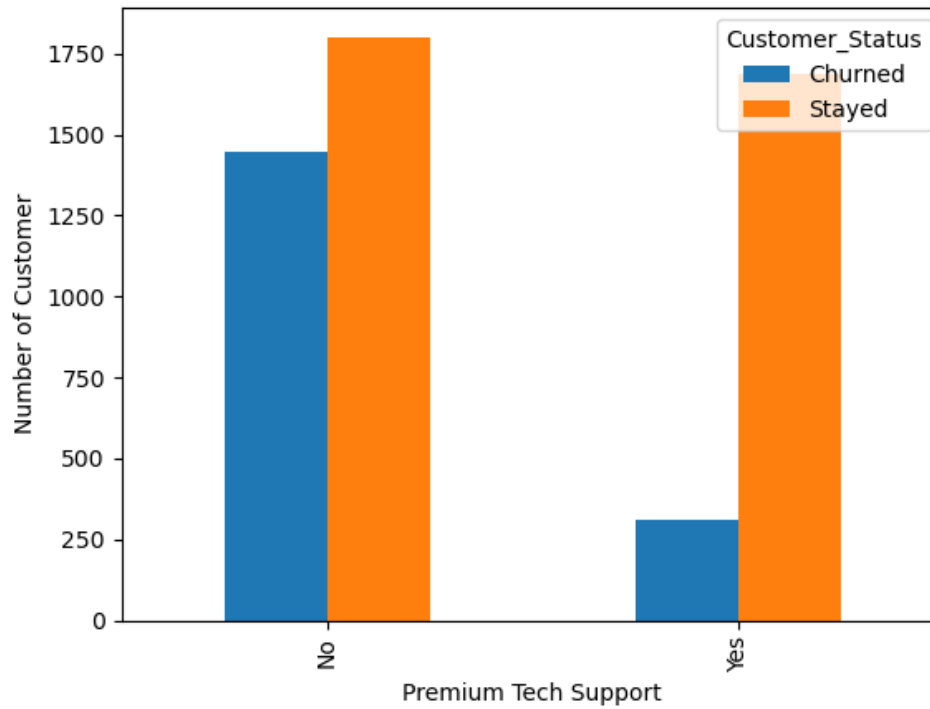
Analysis: Customers who received no Offer type is the most popular, however, the churn-to-stay ratio is 0.41 which indicates that almost half the customers are leaving. Offer E is statistically a terrible offer in retaining customers with the churn-to-stay ratio being at 2.09. The offer with the lowest churn-to-stay ratio is Offer A which only has a churn-to-stay ratio of 0.07, a very good retention rate.

Task: The attitude of service providers was the 3rd 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.



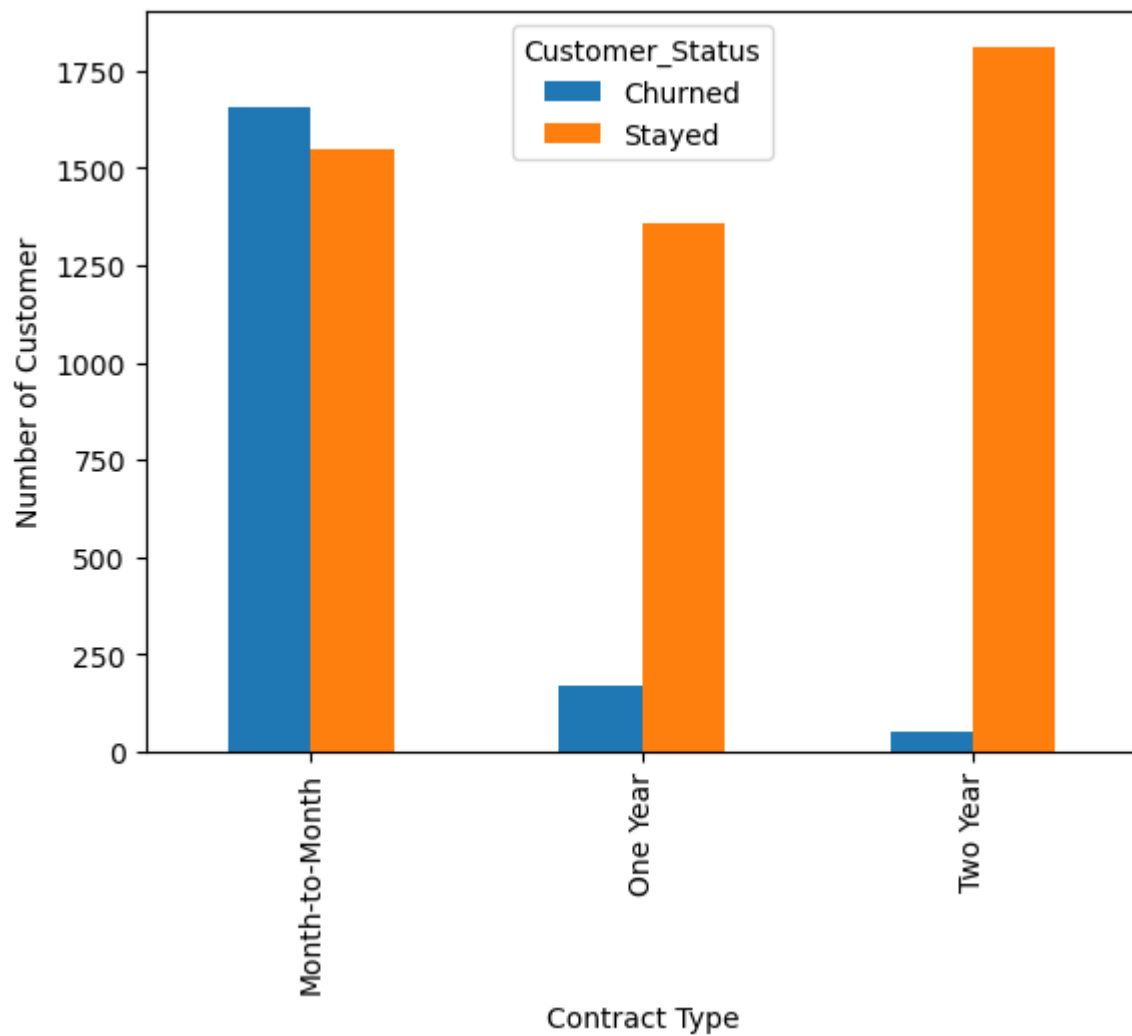
Analysis: Customers who stay with the default phone service experience a higher churned-to-stayed ratio. 0.40, then customers who do not, 0.36. This may indicate issues with the current default phone service.

Additional factors that experience high churn:

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 1687 customers stayed.



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.

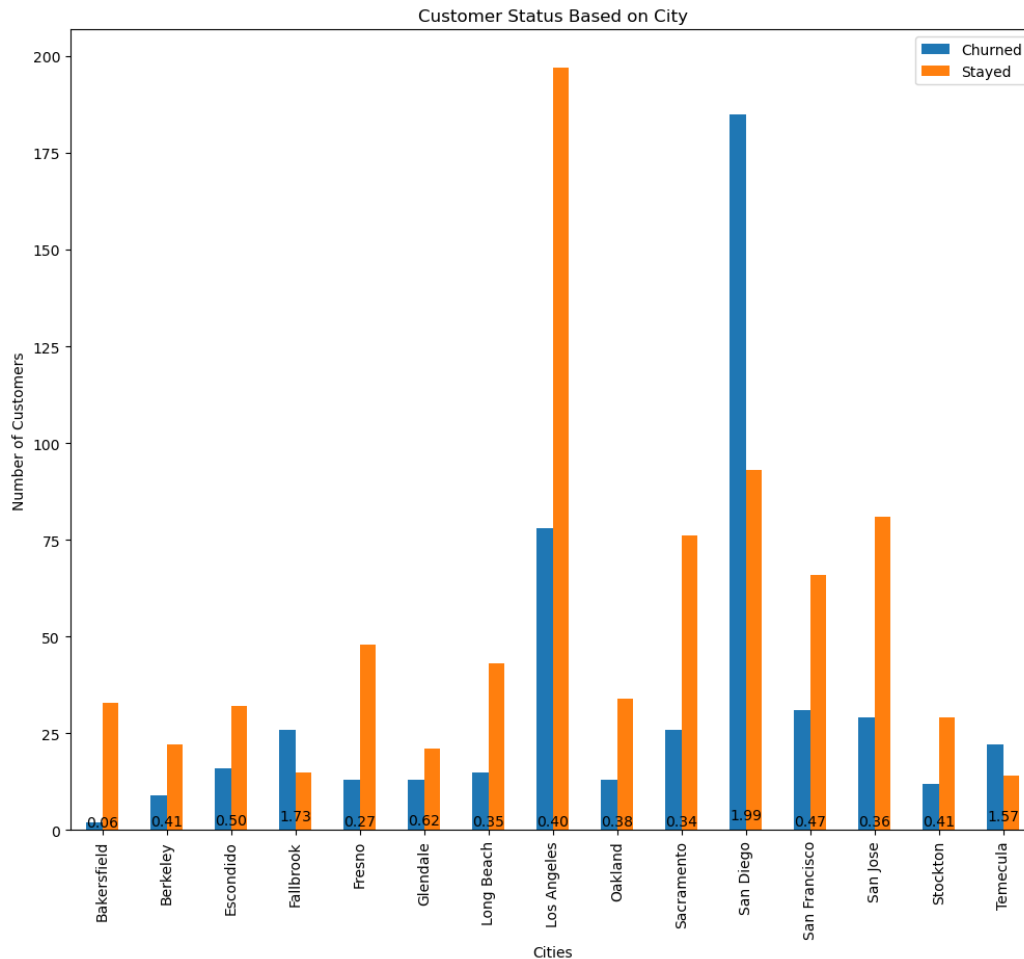


Analysis: Customers who opt into the Month-to-Month contract type experienced a whopping 1655 customers churn, while retaining only 1547 customers. The Two Year contract type is extremely efficient at retaining customers, having only 48 customers leave the firm while 1813 stay.

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 30 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.

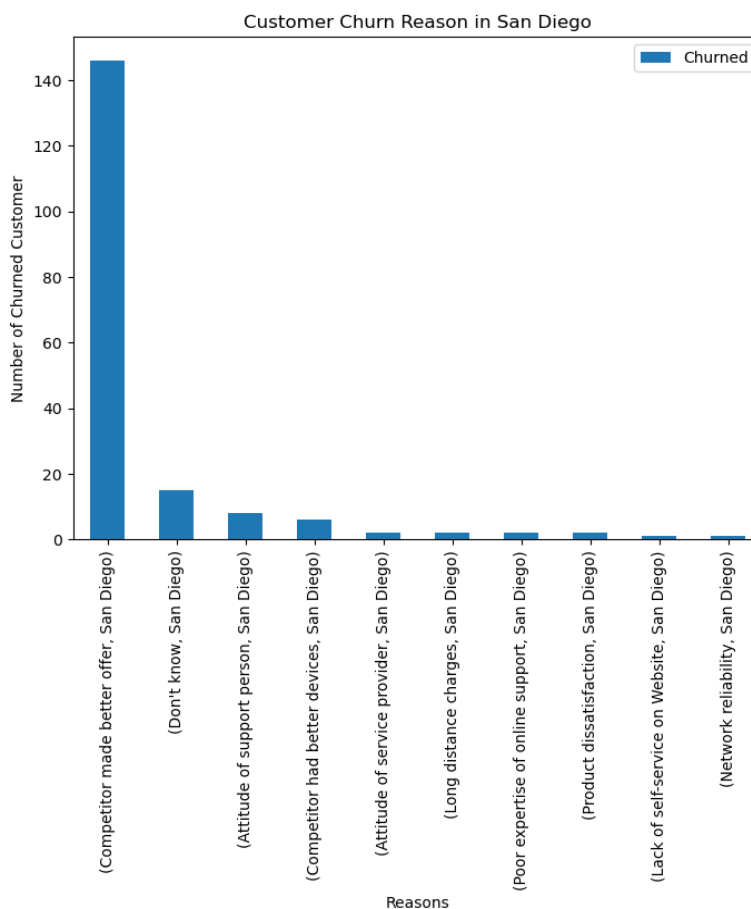


Analysis: In this chart, we can see the number of customers based on the city they live in and the churn-to-stay ratio based on each city. We can see that both Los Angeles and San Diego have the greatest population with Los Angeles having 268 individuals and Sandiego having 278 however the churn-to-stay rate is high with Los Angeles's churn-to-stay rate of 0.40 and San Diego's churn-to-stay

rate of 1.99. This is an issue especially for San Diego since a churn rate over 1 indicates that the firm is losing more customers than the customers staying which tells that the firm is slowly losing profits in that location.

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.

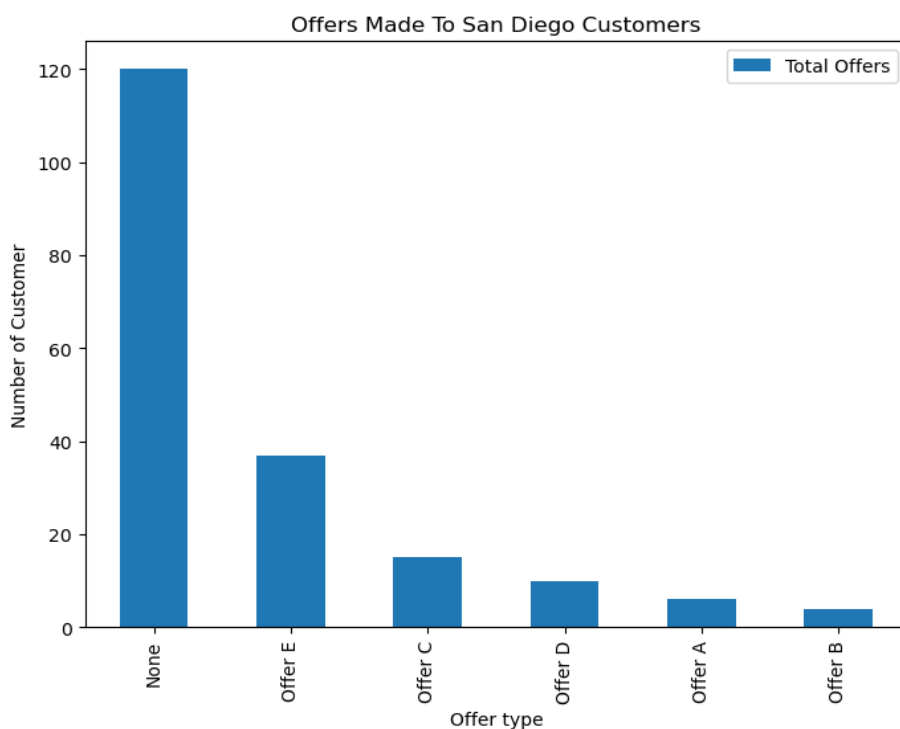
Approach: Wrote a query to search for San Diego within the City column followed by grouping it by Churn_Reason, and City. The results displayed the reasons for customer churn in San Diego in descending order.



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 out 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 Fiber Optic internet type is very inefficient in retaining customers, and DSL may be a better alternative as it has a much better retention rate. Online security and satisfactory phone service also contribute to customer churn. The company should consider promoting offering A to its customers, as it has the best customer retention rate, especially in San Diego where the majority of customers churned due to better offers from competitors. The existing phone service is also correlated to higher churn than customers who do not use it, the company needs to address its regular customer support system. 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. San Diego in particular accounted for a large chunk of the churn population and the company should target this specific region.