**Dashboard for Monitoring Internet Use and Customer Retention**

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**A. INTERACTIVE DATA DASHBOARD**

The tableau dashboard was created using Tableau Public can be accessed at this link: <https://public.tableau.com/views/ChurnAnalysis_16882133465550/Dashboard?:language=en-US&:display_count=n&:origin=viz_share_link>

**A1. DATA SETS**

The two dataset sources for the dashboard are attached. The first data source, “churn\_clean.csv” is the churn dataset provided internally. The second data source, “broadband\_data\_clean.csv” includes county level broadband internet availability and usage data released by Microsoft and the FCC (Thomas, 2022).

Python was used to pre-process both datasets before uploading them to Tableau. The python script is attached (D210.py). The external broadband dataset (Thomas, 2022) was cleaned by removing metadata rows at the top of the table and checking for nulls and duplicates (none found). The values in the “County Name” field of the broadband dataset were also adjusted to match the “County” field in the customer churn dataset so that “county” serve as a key for joining the datasets in Tableau. For example, in the broadband dataset, the county names included the word “county”, “municipality”, or “borough” after the name, which is inconsistent with the customer churn dataset “county” format. Therefore, those ending strings were removed from the broadband dataset “country name” column. Finally, a ”Region” feature was also added to the customer churn dataset by mapping states to the four major regions in the U.S. This addition will allow us to use “region” as a filter on our tableau dashboard.

**A2. INSTALLATION INSTRUCTIONS**

The dashboard is currently available on dashboard public. Follow the instructions below to access the dashboard.

1. Click the link below to open it or copy and paste the link into your favorite browser.   
   <https://public.tableau.com/views/ChurnAnalysis_16882133465550/Dashboard?:language=en-US&:display_count=n&:origin=viz_share_link>
2. In the bottom right corner of the dashboard, click the full screen icon (see picture below) to use the dashboard in full screen mode.

A screenshot of a computer

Description automatically generated

**A3. NAVIGATION INSTRUCTIONS**

There are two drop-down filters available next to the title at the top of the dashboard, “Region” and “Area Type”. These filters can be used individually or simultaneously to filter all of the data on the dashboard to the selected region and area. To reset the filters, you can click the filter symbol above the dropdown menu or change your selection to “all”.

Important information can be found in the orange section along the right side of the dashboard. Key performance indicators (KPIs) are provided in dark blue text, and include the overall customer churn percentage, the total number of customers, average broadband usage, and average broadband availability for the selected area. Broadband usage and availability data is determined at the county level as the percent of people in the county using broadband and the percent of people in the county with access to broadband. These county percentages are then averaged for the selected area based on the region and area type filters at the top of the dashboard. Help contact information is available in the bottom right corner of the dashboard.

The white section of the dashboard contains multiple data visualizations. First is a horizontal bar chart showing the number of customers with each contract type (monthly, one year, and two year), and includes the percent of churn customers in each group. This visualization also includes a line showing average bandwidth usage per year for each contract type. Below the bar chart, there is an interactive map showing broadband availability, customer churn, and the number of customers at the county level. In addition, there is a line graph showing the relationship between customer tenure and bandwidth use. The counties on the map are filled with shades of blue corresponding to broadband availability, with darker colors indicating a higher percentage of the population having broadband access. The line graph includes a blue line representing average broadband availability for the customers included in the graph. This average is calculated based on tenure bins of 2 years. The circles on the map and line graph vary in size corresponding to the number of customers in each county and color (shades of orange) corresponding to the percent of customer churn. Legends for the map and line graph can be found directly below both charts. Hovering your mouse pointer over any of the graphs will provide a summary of the data for the point or area.

**B. PANOPTO STORYTELLING WITH DATA**

The Panopto multimedia presentation can be accessed here: <https://wgu.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=b8db8789-bf99-4056-a035-b04a017097b7>

**C1. DASHBOARD ALIGNMENT**

A primary need indicated by the data dictionary is retaining profitable customers and reducing customer churn. To meet this need, it is important to identify customer characteristics that are associated with churn and longer tenure. During data exploration, a strong relationship between customer tenure and bandwidth use was discovered. In addition, longer contract lengths are associated with less churn. This led to the question, “How does internet use and availability impact customer retention?” Incorporating information about broadband internet availability into the dashboard will allow us to 1) identify patterns between internet availability and customer churn and 2) identify areas where there is internet available for expanding our current customer base. Finally, the dashboard also includes the distribution of customer contract types so that we can monitor customer churn for different contracts. The dashboard can be filtered for certain regions, allowing the organization to identify areas that require urgent attention and focus their efforts in those areas.

**C2. ADDITIONAL DATA INSIGHTS**

The additional dataset provides data of broadband internet availability and use at the county level. This data, in conjunction with our current customer distribution, can provide answers to highly valuable questions including:

1. Which counties have high internet availability and low customer counts, making them ideal areas for expansion?
2. Is customer retention associated with broadband availability?
3. Does broadband availability influence customer bandwidth use?

Answering these questions with the additional dataset will provide valuable insight into the drivers of customer churn as well and identify regions for potential expansion.

**C3. DECISION MAKING SUPPORT**

The first data visualization that can assist in decision making is the bar graph representing bandwidth use and churn rates for the three contract types. The bar graph shows that most customers choose monthly contracts, however monthly contracts also have the greatest proportion of customer churn. The proportion of customer churn tends to decrease with contract length. The visualization also includes a line representing average bandwidth use for each contract type. This visualization can help identify if promoting longer contracts may be beneficial in a region with high churn rates and can identify if there is a link between contract length and bandwidth use in a particular region.

The second data visualization that can assist in decision making is the interactive map. The map includes broadband availability, customer counts, and customer churn rates at the county level. This visualization can help decision makers in several ways. First, it can identify counties with high broadband availability but few customers so that the company can target those for increased service. In addition, it can help identify counties with high customer churn rates and allow decision makers to determine if the churn rate is associated with broadband availability in the region.

**C4. INTERACTIVE CONTROLS**

The two interactive controls on the dashboard are drop down menus at the top of the dashboard. These menus allow the data to be filtered by region (midwest, northeast, south, west) and area type (rural, urban, suburban). The changes made to these filters will adjust all visualizations on the dashboard as well as the KPIs on the right side.

**C5. COLORBLINDNESS**

The tableau colorblind pallet was used for all data visualizations in the dashboard to make visualizations in the dashboard accessible for individuals with colorblindness. In addition, tool tips and data labels were added to visualizations to assist with interpretation and clarify visualization patterns.

**C6. DATA REPRESENTATIONS**

The main points of the story are that both bandwidth usage and contract length are related to customer retention. However, customer bandwidth use is not related to broadband availability. The bar graph at the top of the data visualization clearly shows the relationship between customer churn rates and contract type and includes a line to assess bandwidth usage by customers with different contract types. This plot shows that monthly customers have higher churn rates than customers with longer contracts, and that bandwidth use is not related to customer contract length. This data representation was included to clearly show the customer distribution for different contract lengths as well as the proportion of customer churn for each type of contract. The scatter plot below the bar graph also supports this story. The scatter plot shows that increased bandwidth usage per year is associated with longer customer tenure, regardless of broadband availability. Including this scatterplot emphasizes the strength of the correlation between customer tenure and bandwidth use.

**C7. AUDIENCE ANALYSIS**

The audience includes company executives with the goal of increasing customer retention. The message of the presentation targets this goal and summarizes data findings in simplified, non-technical language so that it is easy for executives to understand. In addition, the presentation clearly summarizes key findings to focus the executives on the main points of the data. Furthermore, by allowing the data to be filtered by region, regional executives can tailor their analysis and strategies to a specific region of interest.

**C8. UNIVERSAL ACCESS**

The dashboard was created in Tableau Public and can be viewed in browser. This allows for universal access regardless of PC operating system or personal browser preferences. The dimensions of the dashboard are also in alignment with a variety of screen sizes so that it is accessible on numerous devices. Finally, my contact information was included directly on the dashboard so that help could be provided efficiently if needed.

**C9. EFFECTIVE STORYTELLING**

One storytelling element used was describing the datasets and how they can be used together to meet business goals. Introducing the new dataset and describing how it can help understand data patterns or target business actions helps engage the audience because it provides thought direction for the remainder of the presentation.

The second storytelling element used was outlining actionable insights generated from the data. Brainstorming these actionable insights at the end of the presentation allows executives to see the impact and value of the datasets and data visualizations, further increasing engagement.

**D. SOURCES**

Thomas, A. 2022. Broadband usage in US. Dataworld. https://data.world/amberthomas/broadband-usage-in-us