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WGU MSDA
D210 PA
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A. Tableau Story

On the data visualization site Tableau Public, a story containing an interactive dashboard titled “An Analysis of Customer Churn and Tenure for WGU and Competitor Telecommunications Companies” has been provided. This dashboard uses methods of representation and reporting to compare key metrics of customer factors between the “churn” dataset provided by Western Governors University and the “Telco Customer Churn” dataset obtained from Kaggle at the following URL: <https://www.kaggle.com/datasets/blastchar/telco-customer-churn>. These datasets will be referred to as “WGU” and “Competitor.”

In this dashboard, data has been integrated from the WGU and Competitor datasets to create:

- Four data representations, titled:
 - Churn Rate by Contract
 - Churn Rate by Internet Service
 - Tenure by Contract
 - Tenure by Internet Service
- Two types of interactive controls which can be used to change the data presentation:
 - Filters for different values of Gender and Phone Service.
 - Filters on each data representation. When a bar is selected in one graph, the overall data is filtered to show only data relating to the selected bar.
- Two key performance indicators which compare important metrics from both data sets:
 - Churn rate, expressed as a percentage, of the WGU and the Competitor sets.
 - Average customer tenure, expressed in months, of the WGU and Competitor sets.

A1. Data Set Files

The WGU data set has been provided as a CSV file and attached with the following name: churn_clean.csv.

The Competitor data set has been provided as a CSV file and attached with the following name: comp_churn.csv.

A2. Dashboard Access

To access the Tableau story and dashboard, use an internet browser to visit the following link: <https://public.tableau.com/app/profile/tucker.atwood/viz/AtwoodD210PA/AtwoodD210PA>

A3. Dashboard Navigation

The Tableau story is split into three separate sections, which can be selected individually at the top by clicking either of the captions: Introduction; Metrics and Visualizations; and Results and Insights. The Introduction section and the Results and Insights section are text-based pages that describe the analysis and do not require additional navigation.

The following guidance assists navigation for the Metrics and Visualization section:

- The key performance indicators (KPIs) at the top of the page initially represent the overall churn rate and average tenure for each of the WGU and Competitor data sets. Churn rate is expressed as a percentage and Tenure is expressed in months.
- The data representations below the KPIs represent a breakdown of churn rate and average tenure by contract type and internet service type. A further explanation of each:
 - **Churn Rate by Contract:** the WGU and Competitor churn rates are broken down into three contract types: Month-to-month, One year, and Two year.
 - As labeled, the light blue bars represent WGU churn rates for each contract, and the orange bars represent Competitor churn rates for each contract. The values are labeled at each individual bar.
 - For example, the leftmost pair of bars fall under the “Month-to-month” Contract category, with the left bar representing the churn rate for WGU customers with Month-to-month contracts (37.28%) and the right bar representing the churn rate for Competitor customers with Month-to-month contracts (42.71%).
 - **Churn Rate by Internet Service:** the WGU and Competitor churn rates are broken down into three internet service types: DSL, Fiber optic, and None.
 - As labeled, the light blue bars represent WGU churn rates for each internet service, and the orange bars represent Competitor churn rates for each internet service. The values are labeled at each individual bar.
 - For example, the rightmost pair of bars fall under the “None” Internet Service category, with the left bar representing the churn rate for WGU customers with no internet service (23.30%) and the right bar representing the churn rate for Competitor customers with no internet service (7.40%).
 - **Tenure by Contract:** the WGU and Competitor tenure rates are broken down into three contract types: Month-to-month, One year, and Two year.
 - As labeled, the light blue bars represent WGU average tenure for each contract, and the orange bars represent Competitor average tenure for each contract. The values are labeled at each individual bar.
 - For example, the middle pair of bars fall under the “One year” Contract category, with the left bar representing the average tenure for WGU customers with One year contracts (34.21 months) and the right bar representing the average tenure for Competitor customers with the same contract type (42.04 months).

- **Tenure by Internet Service:** the WGU and Competitor tenure rates are broken down into three internet service types: DSL, Fiber optic, and None.
 - As labeled, the light blue bars represent WGU average tenure for each internet service, and the orange bars represent Competitor average tenure for each internet service. The values are labeled at each individual bar.
 - For example, the middle pair of bars fall under the “Fiber optic” Internet Service category, with the left bar representing the average tenure for WGU customers with Fiber optic internet (34.412 months) and the right bar representing the average tenure for Competitor customers with Fiber optic internet (32.918 months).
- For each of these data representations, **interactive filters** have been applied which allow users to **highlight a specific contract or internet service**.
 - When a **bar is selected**, all other representations and KPIs are modified to show only the selected group.
 - For example, within the “Churn Rate by Contract” graph, selecting either of the bars underneath the “**Two year**” contract type will filter all representations and KPIs to display **only data for customers with Two year contracts**.
 - This can be used to break down data further than the initial representations can offer. Following the above directions can allow a user to, for example, see that Competitor customers with Two year contracts and no internet service have a very low 0.78% churn rate.
- Additional filters have been provided to the right of the data representations:
 - The **Gender** filter allows users to select a specific customer gender: Male, Female, or Nonbinary. Selecting only one or a subset of all options will filter the data for all representations and KPIs. Users may also select All to show all customers.
 - Note: there are zero customers in the Competitor data set listed with a Nonbinary gender. Therefore, no data exists for Nonbinary Competitor customers.
 - The **Phone service** filter allows users to filter customers based on whether they have a phone service with the company. Selecting “Yes” or “No” will filter the data for all representations and KPIs. Users may also select All to show all customers.
 - Note: in the Competitor data, all customers who do not have a phone service have DSL as an internet service provider. Therefore, filtering all representations by “No” in the phone service filter will show zero customer data under the internet service provider types “Fiber optic” and “None.”

B. Video Presentation

Please refer to the link attached with a Panopto video recording. The video is a presentation of this analysis to an audience of data analytics peers, including a description of both data sets, an analysis of the visualizations and metrics, examples of interactive filter usage, and key results, insights, and recommendations gathered from the analysis.

C1. Alignment with Company Needs

The telecommunications company described in the WGU data dictionary, which will be referred to as “**WGU**,” has identified the clear goal of conducting analysis and enacting service strategies that will retain as many of its customers as possible. Prior research has revealed that acquiring a new customer costs ten times more than retaining an existing customer, so reducing customer churn rate is imperative to making WGU as efficient as possible.

This dashboard uses WGU data to compare its churn rates to its competitor’s churn rates, with an emphasis on analyzing various factors such as contract type, internet service, phone service, and gender. These factors can be used to break down customers into select groups, where significant differences in churn rates between WGU and the competitor have been found. Understanding these gaps in the telecom market will help inform future research on the factors and characteristics that make customers more or less likely to leave a service. Therefore, this dashboard can be used to help WGU reduce its customer churn rate, and with more customers staying on board in the future, WGU will enjoy an increase in profit and company success.

C2. Additional Data Set Benefits

The additional data set used to conduct this analysis, which will be referred to as “**Competitor**,” represents a rival telecommunication company’s customer churn data, and includes several variables that can be compared directly to the WGU data. Examples of variables that exist in both data sets and are used in the dashboard include Churn, Tenure, Contract, Internet Service, Phone (Service), and Gender. Since these variables present the same information about two separate telecom companies, they can be used to measure each company’s churn rates and overall success in relation to each other. In areas where the Competitor shows more success at retaining customers than WGU, insights can be gained by further analyzing the reasons for these gaps and can help inform actions to make WGU more successful at customer retention than the Competitor.

C3. Usage of Data Representations for Decision-Making

The following data representations can be found on the Tableau story under the caption “Metrics and Visualizations,” and can be used to support decision-making processes in the following ways:

- **Churn Rate by Contract:** this side-by-side bar graph represents the churn rates for WGU and the Competitor broken down by Contract type: Month-to-month, One year, and Two year. This representation can be used to break down customer retention rates for each company and discover areas of strength, where WGU performs better than the Competitor, or areas of improvement, where WGU performs worse than the Competitor. For example:
 - Although both companies reflect higher overall churn rates for Month-to-month contracts, WGU has a lower churn rate (37.28%) than the Competitor (42.71%) for these contracts. This area of strength can be studied further to determine the causes for relative success in this group, and any insights gained could potentially be applied to other contract types.

- For both One year and Two year contracts, WGU has a higher churn rate (14.61% and 12.65%, respectively) than the Competitor (11.27% and 2.83%, respectively). This difference is especially noticeable for Two year contracts. This area of improvement can be studied further to determine whether the Competitor applies specific methods of customer retention for customers with longer-term contracts, and any insights gained could potentially be applied to WGU's One year and Two year contracts in an attempt to bring churn rates for these groups closer to the Competitor's.
- **Churn Rate by Internet Service:** this side-by-side bar graph represents the churn rates for WGU and the Competitor broken down by Internet Service type: DSL, Fiber optic, and None. This representation can be used to break down customer retention rates for each company and discover areas of strength, where WGU performs better than the Competitor, or areas of improvement, where WGU performs worse than the Competitor. For example:
 - WGU has a lower customer churn rate (23.59%) for customers with Fiber optic internet than the Competitor (41.89%). However, WGU's churn rate is similar to its overall rate, while the Competitor's churn rate is noticeably higher. Further research may be beneficial to determine why the Competitor's customers with Fiber optic internet are this much more likely to leave their service. If WGU offers a better service to this group of customers, it may be profitable to target this group for future customer onboarding.
 - For customers with DSL internet and no internet service, WGU has a higher customer churn rate (32.17% and 23.30%, respectively) than the Competitor (18.96% and 7.40%, respectively). This difference is especially noticeable for customers with no internet service. This area of improvement can be studied further to determine whether the Competitor applies specific methods of customer retention for customers with no internet service, and any insights gained could potentially be applied to WGU's customers with no internet service in an attempt to bring churn rates for this group closer to the Competitor's.
- These representations can also be used to support decision-making processes by being used as filters or with other filters across other representations and metrics on the dashboard. After breaking down churn rates by contract type and internet service providers, these other filters may be applied to further break down the data and gather additional insights into groups of customers at higher or lower risk of churning.

C4. Interactive Controls

The following interactive controls have been utilized on the dashboard to provide users with the option to change the presentation of the data, which can be used to further break down and understand differences between WGU customers and Competitor customers:

- Interactive filters that allow users to **highlight a specific contract or internet service** have been applied to the following data representations: "Churn Rate by Contract," "Churn Rate by Internet Service," "Tenure by Contract," and "Tenure by Internet Service." When a bar is selected, all other representations and KPIs are modified to show only the selected group.

- For example, within the “Churn Rate by Internet Service” graph, selecting either of the bars underneath the “DSL” internet service will filter all representations and KPIs to display only data for customers with DSL as an internet service provider.
- This can be used to break down data further than the initial representations can offer. Following the above directions can allow a user to, for example, see that Competitor customers with DSL internet service and Two year contracts have a very low 1.91% churn rate.
- Interactive filters on the **right side of the dashboard** are provided to further break down the data representations and KPIs:
 - The Gender filter allows users to select a specific customer gender: Male, Female, or Nonbinary. Selecting only one or a subset of all options will filter the data for all representations and KPIs. Users may also select All to show all customers.
 - This can be used to filter customers further than the original data representations and metrics are capable of. For example, selecting only “Male” customers will show that WGU’s overall churn rate for Male customers (27.804%) is higher than the Competitor’s (26.160%) while selecting only “Female” customers will show that WGU’s overall churn rate for Female customers (25.313%) is lower than the Competitor’s (26.921%).
 - Note: there are zero customers in the Competitor data set listed with a Nonbinary gender. Therefore, no data exists for Nonbinary Competitor customers.
 - The Phone service filter allows users to filter customers based on whether they have a phone service with the company. Selecting “Yes” or “No” will filter the data for all representations and KPIs. Users may also select All to show all customers.
 - This can be used to filter customers further than the original data representations and metrics are capable of. For example, selecting only “No” will show that WGU’s overall churn rate for customers without a phone service (30.118%) is higher than the Competitor’s (24.927%) while selecting only “Yes” will show that WGU’s overall churn rate for customers with a phone service (26.1277%) is lower than the Competitor’s (26.7096%).
 - Note: in the Competitor data, all customers who do not have a phone service have DSL as an internet service provider. Therefore, filtering all representations by “No” in the phone service filter will show zero customer data under the internet service provider types “Fiber optic” and “None.”

C5. Colorblindness Accessibility

The dashboard used to represent this analysis has been built with specific colors designed to be accessible for individuals who experience colorblindness.

- The colors of the bars for the “Churn Rate by Contract” and “Churn Rate by Internet Service” are light blue and orange; the colors of the bars for the “Tenure by Contract” and “Tenure by Internet Service” are dark blue and maroon. Both of these combinations can be more easily deciphered than other combinations by those with colorblindness.

- These colors were specifically chosen from the “**Color Blind**” palette in Tableau, which was designed by Maureen Stone to create pairs of colors easily distinguished by individuals with color vision deficiency (CVD). People with CVD are generally able to recognize the color blue similarly to people without CVD. Though the orange and maroon bars may appear slightly different to those with CVD, their pairing with shades of blue makes the combinations easy to tell apart.
- Information about Tableau’s colorblind-friendly palette was found at this source: <https://www.tableau.com/blog/examining-data-viz-rules-dont-use-red-green-together>.

C6. Usage of Data Representations for Storytelling

The following data representations can be found on the Tableau story under the caption “Metrics and Visualizations,” and can be used to support the story in the following ways:

- **Tenure by Contract:** this side-by-side bar graph represents the average tenure for WGU and the Competitor broken down by Contract type: Month-to-month, One year, and Two year. This representation can be used to demonstrate the average amount of time a customer stays with each service with customers split into groups based on contract type. This representation supports the primary intention of the analysis, understanding and comparing customer churn rate, by providing information about customers staying with the service that is deeper than simply noting whether they left the service or not. For example:
 - The “Churn Rate by Contract” representation implies that WGU performs better (has a lower churn rate) than the Competitor for customers with Month-to-month contracts. This corresponding representation for Tenure confirms that implication, as WGU has a significantly higher average tenure for customers with Month-to-month contracts (34.25 months) than the Competitor (17.97 months). With both lower churn rates and higher average tenure in this group of customers, the Tenure representation has strengthened the story that WGU is more successful than the Competitor in this group of customers.
 - The “Churn Rate by Contract” representation implies that WGU performs worse (has a higher churn rate) than the Competitor for customers with One year and Two year contracts. This corresponding representation for Tenure confirms that implication, as WGU has a lower average tenure for customers with One year contracts (34.00 months) than the Competitor (42.30 months) and a significantly lower average tenure for customers with Two year contracts (35.71 months) than the Competitor (56.90 months). With both higher churn rates and lower average tenure in these groups of customers, the Tenure representation has strengthened the story that the Competitor is more successful than WGU in this group of customers.
- **Tenure by Internet Service:** this side-by-side bar graph represents the average tenure for WGU and the Competitor broken down by Internet Service: DSL, Fiber optic, and None. This representation can be used to demonstrate the average amount of time a customer stays with each service with customers split into groups based on internet service. This representation supports the primary intention of the analysis, understanding and comparing

customer churn rate, by providing information about customers staying with the service that is deeper than simply noting whether they left the service or not. For example:

- The “Churn Rate by Internet Service” representation implies that WGU performs better (has a lower churn rate) than the Competitor for customers with Fiber optic internet, and worse (higher churn rate) for customers with DSL or no internet service. This corresponding representation for Tenure does not confirm that implication; for each customer group by internet service, WGU customers have a higher average tenure than the Competitor.
- This sheds new light upon the previous limited information and may reflect a new implication that WGU is not inferior to the Competitor by any of the internet service types. Further research may be needed to determine whether there is a significant difference in customer retention between the companies by internet service type. Without this additional data representation, conclusions about customer groups by internet service may have been incorrect; it is beneficial to have created additional representations to ensure erroneous conclusions were not made.

C7. Audience Analysis

An analysis of the intended audience for this Tableau dashboard helped inform the presentation in the following ways:

- The **Senior Vice President for Customer Experience (SVP)** focuses on the relationships between the characteristics of customers and their engagement with WGU’s products and services, aiming to maximize customer retention. The dashboard has been designed to easily break customers down into groups based on their characteristics and measure their retention by churn rates and average tenure. By comparing these values to corresponding values from the Competitor company, the SVP will gain valuable insights from this presentation by identifying areas of strengths and weaknesses (such as by contract type or internet service) in terms of WGU customer engagement.
- The **Executive Vice President of Sales (EVP)** focuses on developing new products and promotions, with an emphasis on both recruitment of new customers and retention of current customers. The insights presented in the dashboard primarily focus on the latter, as explained above, but applications of the analysis would certainly be beneficial in recruiting new customers as well. In areas where it has been determined that WGU performs worse than the Competitor in customer retention, further research may help inform ways to not only prevent customers of a particular group from leaving WGU but also to attract new customers to the service. The EVP can use connections established between various factors and customer retention to improve the development of new promotions and products.
- The **Panel of Regional Vice Presidents (Regional VPs)** works with the SVP and EVP to roll out promotions and new WGU products to their specific regions. Since the dashboard has been designed to assist the SVP and EVP in understanding the relationship between WGU’s services and its customer retention, any insight gained by the SVP and EVP will flow down to the Regional VPs. Any improvements in the application of promotions and new products in one region will help enact similar improvements elsewhere.

C8. Presentation Accessibility

By creating this dashboard in **Tableau Public**, the presentation is available to anyone with its URL link and an Internet browser. By contrast, a similar dashboard created outside of Tableau Public would require payment and/or a separate installation by users wishing to access the research. The choice to use Tableau Public was made specifically to ensure the presentation was universally accessible to all potential audience members.

C9. Elements of Effective Storytelling

The following elements of effective storytelling were utilized in the presentation of this dashboard and were intended to engage the audience in the following ways:

- **Building a narrative:** to fully understand the scope and context of the key results and insights to be gained from this analysis, a narrative was built and presented to hook the audience into the data's story. People are naturally more attentive to analytics when they are enhanced by a narrative that grabs their interest and guides them through a progression from beginning to end. By centering the narrative around the audience's goals to increase customer retention, and then guiding them through the breakdown of customers by their characteristics and subgroups, and finishing by making recommendations based on insights gained, the audience follows a narrative from initial intent to final results. This intends to keep the audience's interest in the topic at hand and make the results more meaningful.
- **Supporting the narrative with visualizations:** to reinforce the main points of the story's narrative, data science often relies on data visualizations as supporting evidence. Rather than simply presenting long lists and convoluted tables of endless numbers, representations are created to hook an audience with welcoming visuals, following the common adage that "a picture says a thousand words." By establishing the narrative centered around the audience's goals to increase customer retention and supporting the narrative with visualizations intended to describe customers by their characteristics and subgroups, the audience receives evidence of the main points in the narrative, and any initial reluctance to believe the results is cast aside.

D. Sources

The additional data set used as a comparison to the WGU data set was obtained from:

<https://www.kaggle.com/datasets/blastchar/telco-customer-churn>

Information about Tableau's colorblind-friendly palette was obtained from:

<https://www.tableau.com/blog/examining-data-viz-rules-dont-use-red-green-together>.