Case Study

Rental Bike Analysis

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About Project

Bike sharing systems are an automated evolution of traditional bike rentals. There are 500+ bike share programs worldwide with over 500K bikes, potentially addressing traffic, environmental and health issues. The unique data from this system supports urban mobility research. This case study analyzes the bike sharing rental dataset from Kaggle using Google Sheet, SQL Server, and Tableau Public for insight and efficient decision making.

Analysis Questions

1. What is the total bike rental revenue?
2. How does the performance compare between casual users and registered users?
3. How do bike rental totals vary by time periods?
4. What is the impact of weather conditions on bike rentals?
5. How are bike rentals affected by temperature, humidity, and wind speed?

Data Preparation

Before the data was analyzed, I cleaned the data. By carrying out this process we can maintain data quality, make it easy to interpret, make visualization easier and so on. The data cleaning process is carried out using Google Sheet, here are the steps:

1. Check for duplicate values and missing values.
2. Removed the 'mnth' and 'day' columns, because for these values I can use the 'dteday' column.
3. Replacing values from several categorical columns to simplify the analysis and visualization process.
4. Renamed columns to make them easier to read and understand.

Analysis Result

#1 What is the total bicycle rental revenue?

3.292.679
Total Rental

189.5
Rental Average

#2 How does the performance between casual users and registered users?

2.672.662
Registered Users

620.017
Casual Users

2.052.645
Total Different

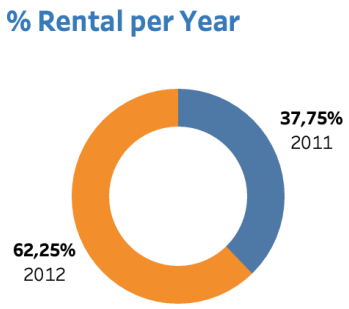
The number of registered bicycle rental users (2,672,662) is greater than the number of casual users (620,017), with a value difference between the two of 2,052,645. This shows that more people have registered or have accounts as regular renters than those who only use them casually, and this difference can be an indication of how much revenue or activity from registered users contributes to your bike rental business.

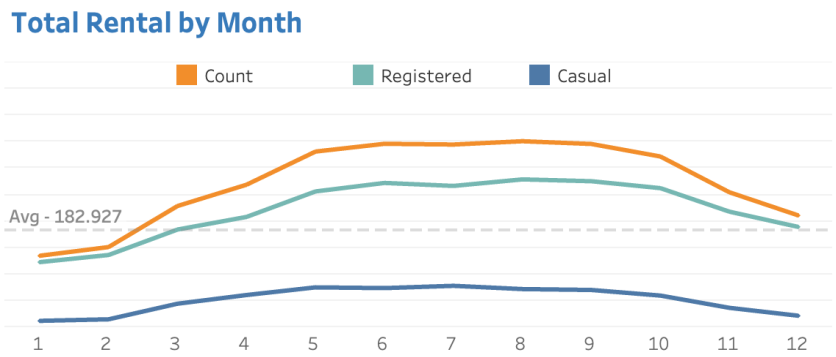
#3 How do bike rental totals vary by time periods?

Total Rental by Season

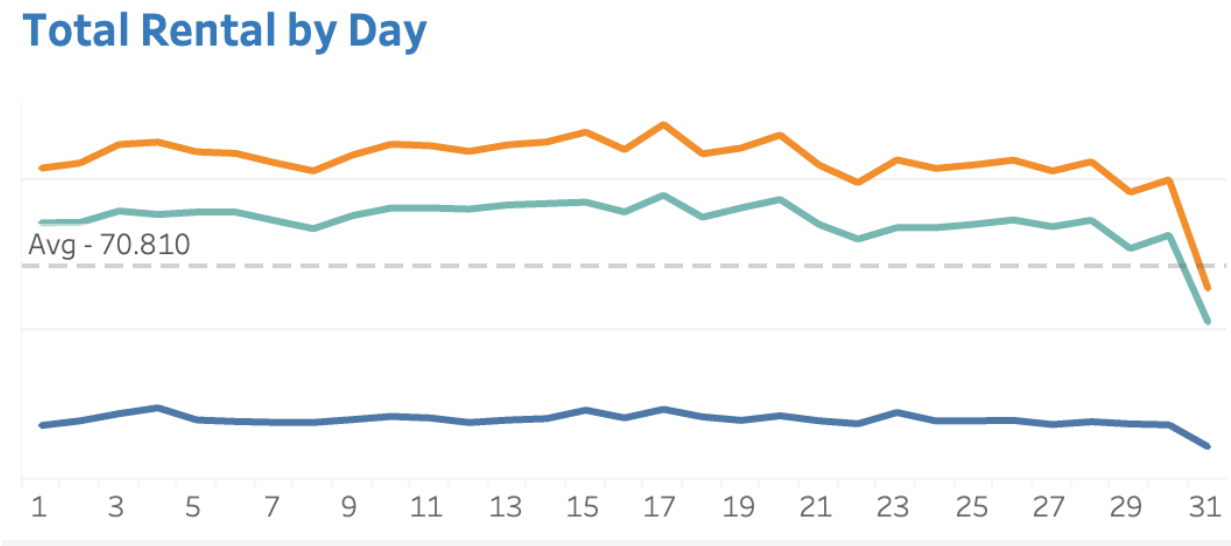
841.613	918.589	1.061.129	471.348
Fall Season	Spring Season	Summer Season	Winter Season

This indicates that summer is the busiest season for your bike rental business, while winter is the season with lower rental activity. This analysis can help you plan better strategies and inventory management according to fluctuations in demand during different seasons.



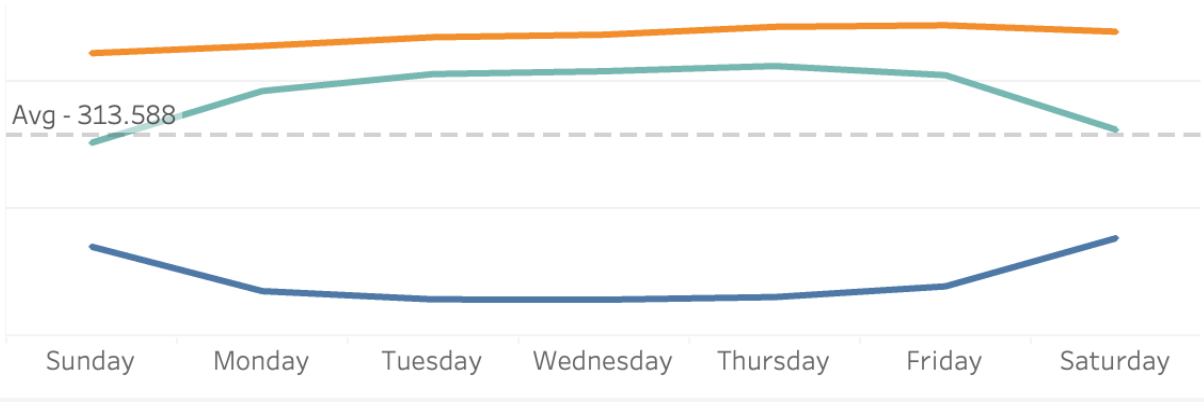


in 2012, the percentage of bicycle rental users was higher compared to 2011. This shows that the bicycle rental business experienced growth in the number of users or demand during 2012 compared to 2011. Bicycle rentals by month are highest from May to October and peak in June. At the beginning of the year and at the end of the year bicycle rentals decreased, the assumption is that this was because those months were winter. Registered users and casual users have the same pattern with total rental by month.



The 17th is the peak of bicycle rental activity. There was a decrease on the 8th, 18th, 22nd and 29th, the initial assumption was that it was caused by several factors such as weather, traffic jams, special events or bicycle repairs, thereby reducing the supply of bicycles that could be rented. For the waning that occurs on the 31st, it is assumed that not all months have 31 days.

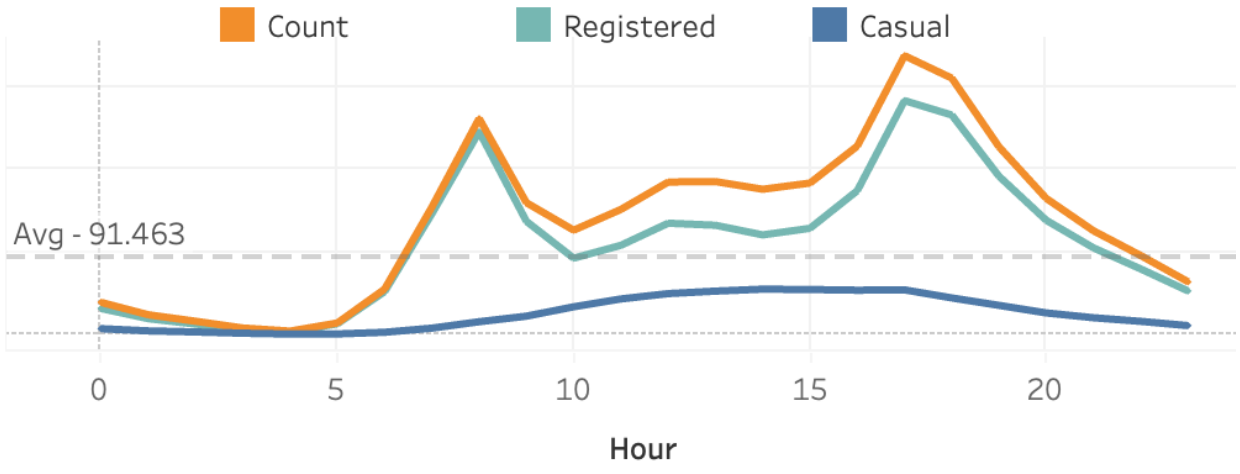
Total Rental by Week



The total number of bicycle rental users looks quite stable in 1 week, however, for registered users on weekends there is a decrease compared to weekdays, while for casual users the opposite is true on weekends. This can happen due to several factors, namely:

- Registered users tend to be more active on weekdays because they use bicycles as a means of daily transportation, whereas on weekends, when they have more free time, rental activity tends to decrease.
- Casual users are active on weekends because they are tourists or users who rent bicycles for recreation, and weekends are the most popular time for cycling with friends, family, or on vacation.

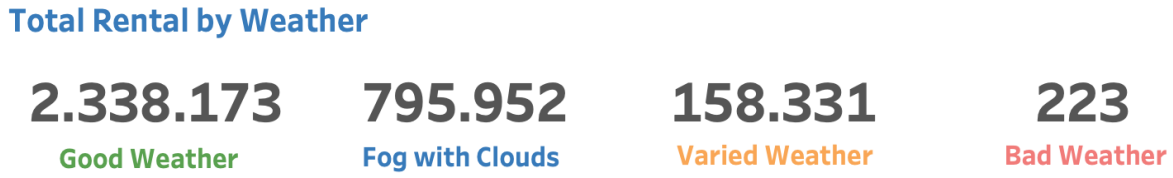
Total Rental by Hour



The busiest hours are in the morning and afternoon, because these are probably the times you go to work and come home from work. This is confirmed by the fact that Registered Renters who

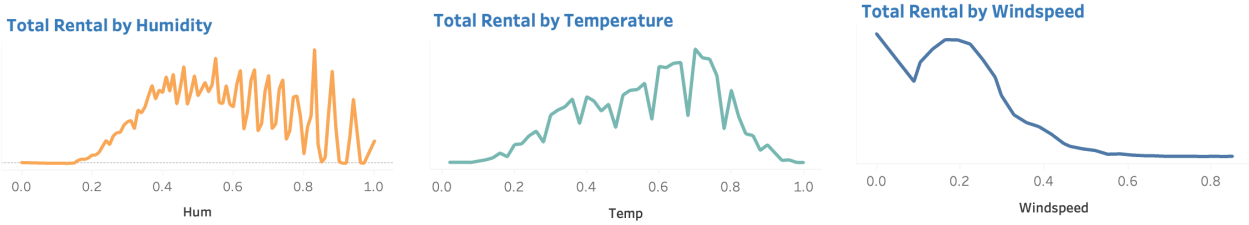
have a regular schedule of renting bicycles on weekdays have the same pattern as the total number of renters. Casual users have a different pattern with the highest number of hours renting between midday and evening.

#4 What is the impact of weather conditions on bike rentals?



The highest number of bicycle rentals occurs in good weather, followed by cloudy fog with a fairly high number, while variable weather has lower rental activity, and bad weather has a very low number of rentals.

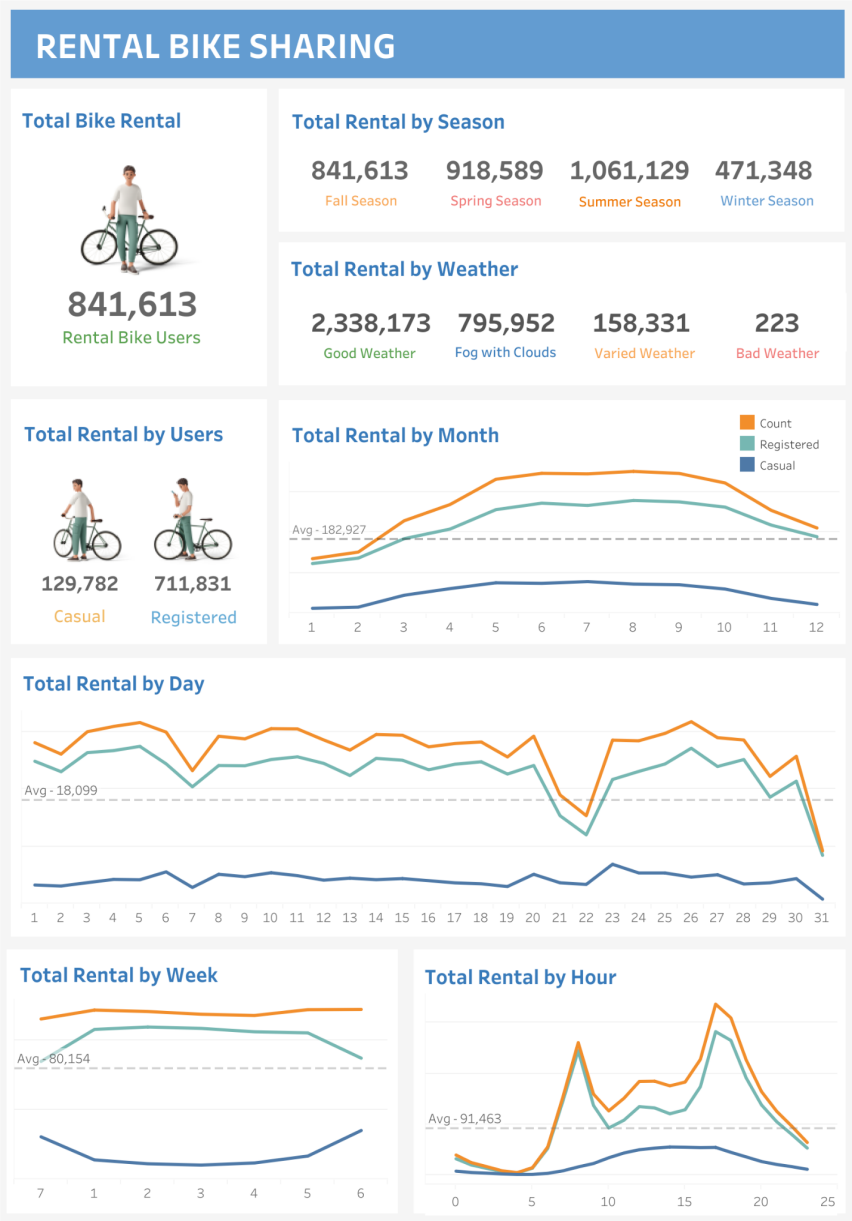
#5 How are bike rental affected by temperature, humidity, and wind speed?



Bicycle rentals are affected by weather, humidity, and temperature, but these patterns can fluctuate based on weather variations and user preferences. Additionally, there was a tendency for bicycle rentals to decrease with increasing wind speed, suggesting that strong winds may hinder cycling or make it less enjoyable for users.

Create Dashboard

After carrying out the analysis process, the next step is to create a dashboard to make it easier for businesses to see the insights in the data, see bicycle rental trends, and make it easier to make decisions. I created a dashboard using Tableau Public, and the result is like this:



[Link Dashboard Tableau Public]

Business Solution Suggestions

1. **Summer Promotions:** Take advantage of summer as a prime opportunity to increase revenue. You can launch special summer promotions, increase bike inventory, and provide better customer service during this season.
2. **Inventory Analysis and Planning:** Use bicycle rental pattern data to better plan inventory. Make sure that you have enough bikes during peak seasons and reduce inventory during slower seasons.
3. **Focus on Registered Users:** Since registered users contribute a lot to your revenue, consider offering special incentives or loyalty programs for them to keep them active, especially on weekends.
4. **Developing Services During Inclement Weather:** To overcome the decrease in activity during inclement weather, you may consider developing alternative services such as stationary bike rentals or indoor training.
5. **Pay Attention to Weather Factors:** Keep paying attention to weather factors such as humidity, temperature, and wind speed. You can provide users with weather information to help them make better rental decisions.
6. **Optimize Operating Hours:** Based on peak rental hour patterns, ensure your operating hours match customer demand. It may be necessary to adjust operating hours to accommodate different levels of activity between registered and casual users.

Source

Bike Rental Dataset - Kaggle

SQL Code & PDF Documentation

Link Dashboard Tableau Public