

# Visual Analysis on the Covid-19 Pandemic

## Recovery of Hong Kong

### 1 Overview of the project

For this project, we analyze three key indicators to conclude about the recovery status of Hong Kong from COVID-19 pandemic. Specifically, we compare the differences of official vacancy, transportation ridership, retail sales before and after the COVID-19. And finally, we find that although Hong Kong hasn't completely recovered from the pandemic, the trend is optimistic.

### 2 Individual tasks

#### 2.1 Details

##### 2.1.1 Dataset

Public transportation is an indispensable part of citizens' daily life. By analyzing the public transportation ridership, we could have an insight about whether people have got out of the impact of COVID-19. The following data is provided by the Transportation Department of the Hong Kong Government (except for the confirmed cases of COVID-19), which could guarantee the accuracy and integrity.

##### 2.1.1.1 Public transportation ridership (thousands)

In this section, I collect data of different transportation types to get a comprehensive insight about the situation. It should be mentioned that, in reality, there are around seven transportation types calculated. Nevertheless, some of them only take limited proportions of the amount. To align with cross harbor transportation for clear comparison and emphasis, three major transportation types are picked, which are railway, ferry and franchised bus. Since the total counts of these transportation types distribute in a quite wide range, the ridership is summarized in thousands to generate a rational axis scale.

##### 2.1.1.2 Cross Harbor transportation ridership (thousands)

Cross harbor transportation indicates passing the sea inside Hong Kong. For this part, transportation ridership of crossing harbors is classified into different transportation types to demonstrate details. The amount is also displayed in thousands. Actually, the data is initially represented with harbor codes. However, in the late analysis, they contribute little to the topic. And to highlight the topic precisely, this part is omitted.

##### 2.1.1.3 Control points transportation ridership (thousands)

For this part, I represent ridership of passing different control points, such as Shen Zhen Bay and Sha Tau Kok. Also, I collect ridership about arrival and departure at each control point to observe the attitude of the Immigrants towards different travel types. The axis scale is the same as before.

#### 2.1.1.4 COVID-19 confirmed cases

This data is collected to visualize the correlation between the transportation and the pandemic. I fetch monthly data from the Department of Health and cluster it into quarters. The time range of the data is from 2020 to 2022.

#### 2.1.1.5 Timespan

To cover the pandemic period and compare the difference before and after COVID-19, the time range is generally from Jan. 2019 to Sep. 2023. Furthermore, the period is split into three sections to benefit the comparison:

- Jan. 2019 – Dec. 2019: Pre-pandemic period.
- Dec. 2019 – Dec. 2022: In-pandemic period. The landmark event is that several unknown pneumonia cases were reported from Wuhan in Dec. 2019.
- Jan. 2023 – Sep. 2023: Post-pandemic period. The landmark event is that the National health Commission announced that COVID-19 would be under Class B control from Jan. 2023.

For more details, the time scale is clustered quarterly to keep a balance between precision and workload. Due to delayed update and loss of historical documents, data at some specific time points is unreachable, I will try the most to mitigate such problem in the following analysis.

#### 2.1.2 Design

After the data processing, I consider how to arrange and visualize the data to achieve our objectives. Given the content and the structure of the data, analyzing the data from the intra-city aspect and the inter-city aspect could be an acceptable choice.

The intra-city transportation indicates ridership among Hong Kong, which could directly reflect the impact of COVID-19 on people's daily activities. To visualize this sub-topic, publication transportation data and cross harbor transportation data are required.

The inter-city transportation indicates arrival as well as departure ridership of Hong Kong and it requires control points transportation data. As the center of finance and commerce in the world, the recovery of Hong Kong unavoidably concerns with the other cities and countries. Therefore, this part of analysis essential for the integrity of the conclusions.

Among diverse kinds of charts, line chart is appropriate to illustrate the trend of ridership according to quarters. Also, pie chart could compare the relative portion in pre-pandemic period and post-pandemic period to visualize the recovery status.

### 2.1.3 Visualization

With all preparations done, the visualization results are demonstrated as follows. Figure 1 demonstrate the situation of intra-city transportation. The line charts represent quarterly ridership in thousands. And different lines indicate different transportation types. Filters for transportation types and period are provided to go into details about the charts.



Figure 1 Intra-city Transportation(initial)

By clicking the two icons in the upper side, the chart of COVID-19 confirmed cases and the chart of comparison between 2019 and 2023 are shown in the right side as Figure 2. These two charts are initially hidden to emphasize the content for different points at the story line.



Figure 2 Intra-city Transportation (complete)

Then Figure 3 represents inter-city transportation from 2019/Q2 to 2023/Q4. Two charts in the left side show control points passengers. The pie charts for comparison are hidden at the beginning and are controlled by the icon in the top left corner.

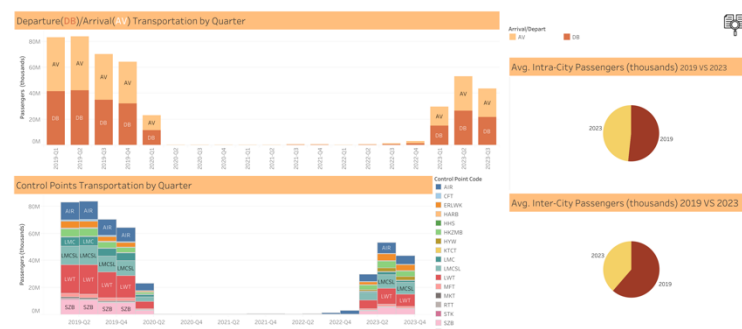


Figure 3 Inter-city Transportation

### 2.1.4 Findings

According to Figure 3, we could see that there is an obvious decrease in the first

quarter in 2022. This could be explained by the outbreak of COVID-19. Data of confirmed cases increases in the corresponding period. Then the data decreases in the second quarter, followed by intra-city transportation ridership increasing from the same time point. Additionally, we could find that the relative numerical relationships of these three types of transportation are stable during the whole period.

With respect to the inter-city transportation, we could clearly see that there is almost no ridership between 2020 to 2022. This is because the Hong Kong government took a very strict policy about passing the port. Besides, the ratio of departure and arrival remains consistent during the period although the amount sharply decreased in the pandemic period. This implies that the government is equally stringent about different types of traveling. As for the ridership distribution, we could find that the proportions of some main control points such as Airport, Shenzhen Bay, Lok Ma Chau Spur Line remain almost unchanged.

Now back to the recovery status of Hong Kong, we would like to conclude that for the intra-city transportation, the ridership is slight lower than that before the pandemic. However, for the inter-city transportation, the data is obvious lower than that in 2019. The recovery of inter-city transportation is worse than that of the intra-city transportation. Considering the recovery of the whole world, the government is more cautious about worldwide communications.

Back to the complete process, the method of combining different charts achieves to build a bridge between transportation and COVID-19. The ridership trend during the pandemic is intuitively displayed and the comparison is effectively to illustrate the recovery of two aspects about ridership.

## 2.2 Conclusions

Generally speaking, citizens' daily life has nearly recovered. However, the interactions between Hong Kong and other parts of the world are still under the impact of COVID-19. If suggestions are favored, I would like to say that the carefulness of the Hong Kong government is adoptable. There is no need to risk public health on economy recovery. Given the positive trend of the recovery, the appearance of the whole recovery is decided by time.

## 2.3 Limitations

For this part, two factors should be mentioned. For one thing, due to the time limitation, I don't go into details about the underlying relationships between three indicators. Intuitively, transportation could be more or less related to online retail sales and offline retail sales.

Another thing is that the analysis of transportation is partly limited by incomplete data. Specifically, some earlier data is missed, and some recent data has not been updated yet. Therefore, the time range is shortened to align the start point and the end point of the comparisons and the total value is replaced by average value in some cases.