

FINAL PROJECT PRESENTATION



TRACY BUI - BUS 210B
Spring 2024

CONTENTS

- 1. Download and load data**
- 2. Data preprocessing**
- 3. Conduct exploratory data analysis (EDA)**
- 4. Business Analytics questions**
- 5. Summary**

1. Dataset

- Import the library and mount to Google Drive

```
[ ] import pandas as pd
import os
os.chdir('/content/drive/MyDrive/Colab_Notebooks/Data_BUS210B')
print(os.getcwd())
df = pd.read_csv("concert_sales_data.csv") #load data
```

 /content/drive/MyDrive/Colab_Notebooks/Data_BUS210B

2. Data pre-processing

```
▶ # Before checking anything, I need to display the first few rows of the dataframe to understand its structure
print("1. First five rows of the dataframe are:\n",df.head())

# After knowing the columns of the DF, now I check for missing values
missing_values = df.isnull().sum()
print("\n2. Missing Values:\n", missing_values)

# Next, convert the 'Date' column to datetime format
df['Date'] = pd.to_datetime(df['Date'])

# Besides the missing values, I need to check for duplicates to remain each line uniqueness and accuracy
print("\n3. Number of duplicate rows:", df.duplicated().sum())

# Remove duplicates if needed
df = df.drop_duplicates()

# Lastly, I use describe() function to summarize the statistics of df
print("\nStatistics Summary:\n", df.describe())
```

3. Conduct EDA

These codelines will set the format for the below code.

```
▶ import matplotlib.pyplot as plt
```

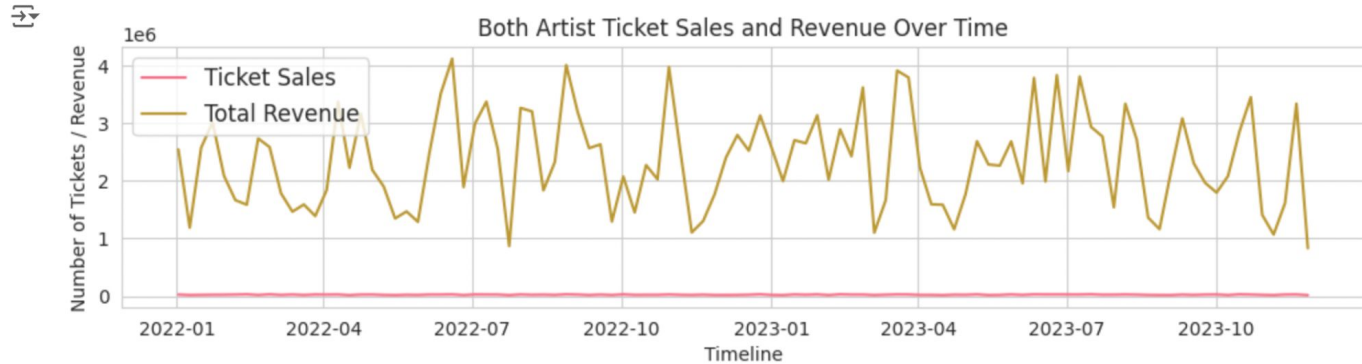
```
import seaborn as sns
```

```
# Set the style for seaborn plots for the whole workbook. I love the color pink and yellow so I chose to set the palette
```

```
sns.set_style("whitegrid")
```

```
sns.set_palette("husl")
```

A. Ticket sales and Total revenue over time



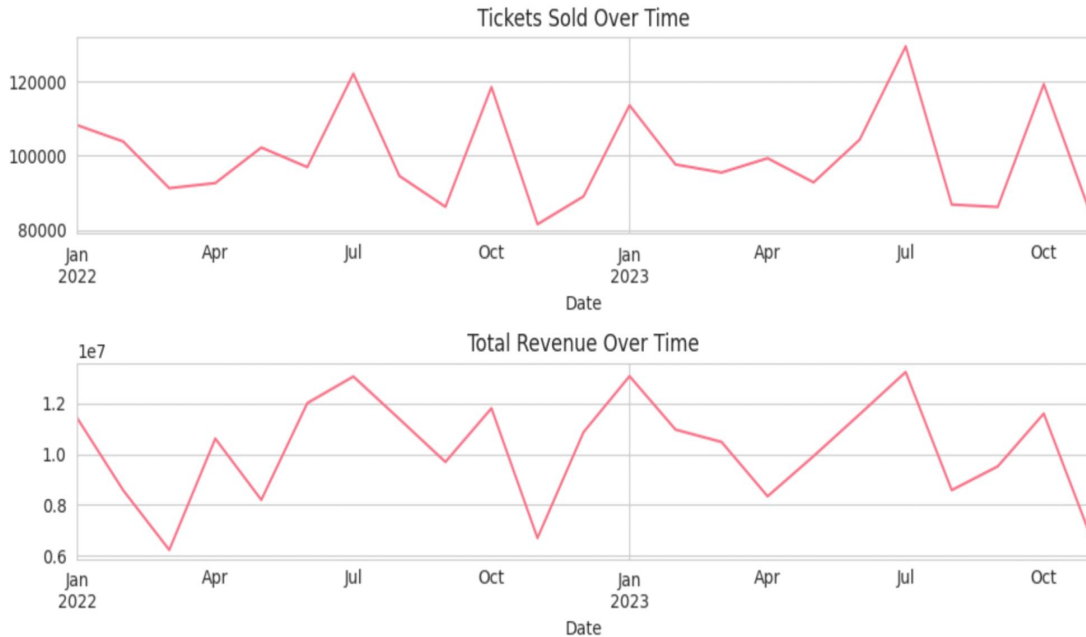
Total Revenue

- cyclical patterns and has many peaks and downpoints, indicating periods of high ticket sales, followed by periods of lower sales.
⇒ This pattern suggests that the business or event may have seasonal or periodic fluctuations in demand.

Ticket Sales

- remains relatively flat and consistent over the entire time period, indicating that the pricing strategy or revenue model may be designed to maintain a steady income stream.
⇒ This is a stable strategy with the effectiveness in price regulating, trend of demand and seasonal variation

Extra graph for more details

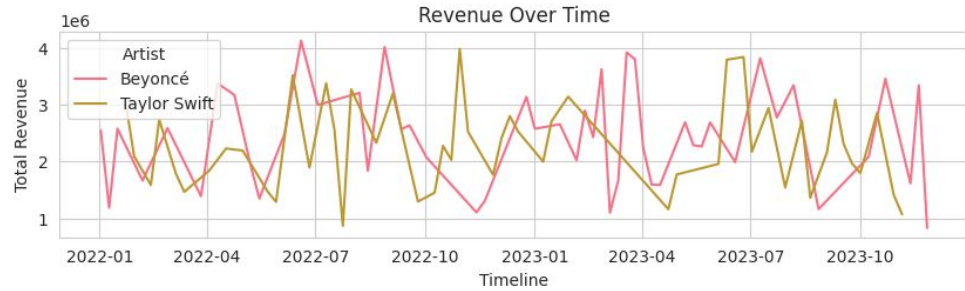


The 2 graphs have the parallel trend

1. The more tickets sold, the higher the revenue the artists earn.
2. The summer time (July) is the peak period while March, August, and September are the downpoint in making revenue for both artists.

**B. Compare the ticket
sales and total revenue**

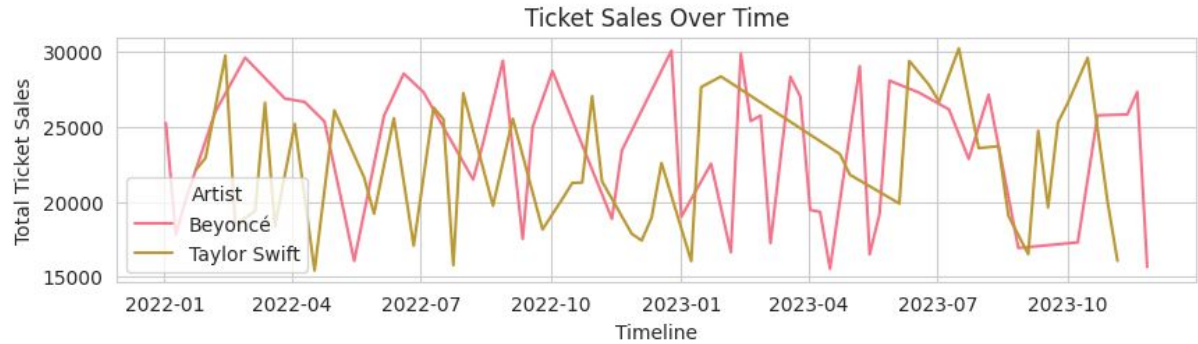
Total Revenue



- The total revenue **significantly fluctuated** across different time periods, indicating the cyclical nature of their business and potential variations in touring schedules, album releases, or other revenue-generating activities.
- While the revenue levels oscillate, Taylor Swift generally appears to generate higher total revenue compared to Beyoncé during most of the analyzed time frame. This could be attributed to factors such as differences in tour schedules, ticket pricing strategies, album sales, or overall popularity and demand during the given period.
- There are certain periods where one artist substantially outperforms the other in terms of revenue. For instance, Taylor Swift experienced a significant revenue peak around mid-2023, potentially due to a successful tour or album launch. Conversely, Beyoncé had a notable revenue spike in early 2022, indicating a potential high-grossing event or release during that time.

Ticket sales

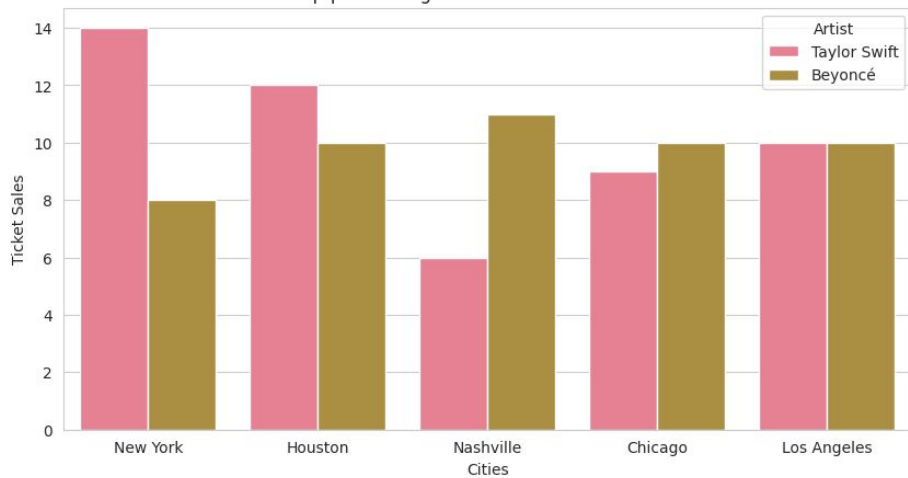
aligns closely with total revenue



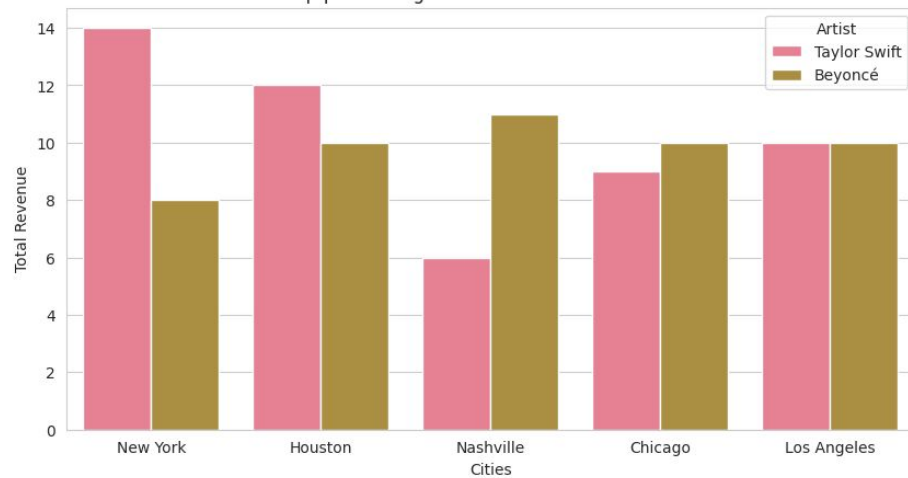
- Overall, the trend for the number of tickets sold between both artists is **parallel**
- **2022 is the year of Beyoncé**, there wasn't many fluctuations in ticket sales, it remains high, except for 2022-05 - nearly the lowest point in sales performance. But turn to 2023, the performance had more variations (more ups and downs).
- In contrast to Beyoncé, **2023 is the year of Taylor Swift**. She remains the high stable performance after many shifts in 2022.
- There are some periods that Taylor experienced the low sales while Beyoncé can keep her stable high peaks (2022-04, 2022-10, 2023-01). However, Taylor has
- **October of 2023** is the common downpoint for both artists in the number of tickets sold.

C. Top-performing cities

Top-performing cities based on ticket sales



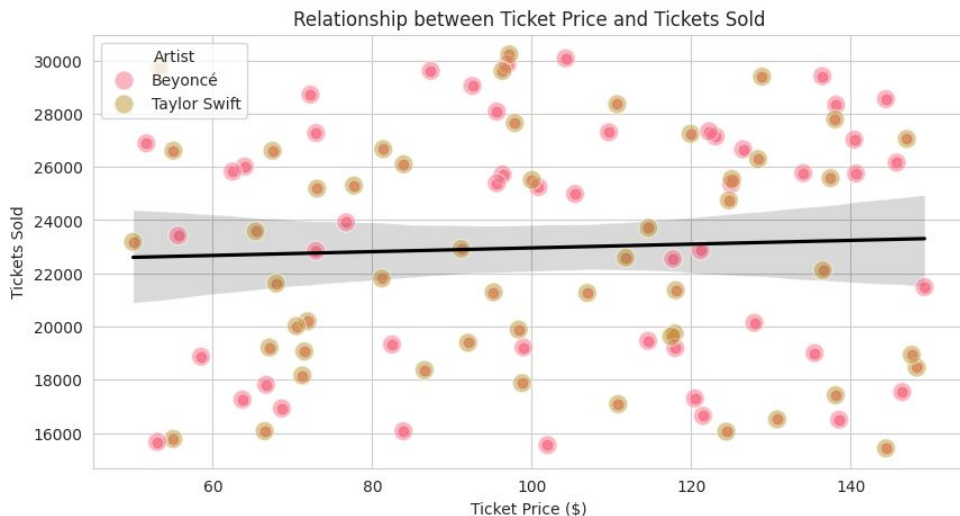
Top-performing cities based on total revenue



Findings

- By acknowledging the top-performing cities, the strategic planning can be conducted to boost stronger sales performance.
- For Beyonce, Nashville is the top cities, where the country music began. The second runner is Houston - her bornland. And the city stands at the fifth position is New York. This can be explained that Beyonce is more popular to the older generations -- Millennials, Gen X and Gen Y. Therefore, cities that have influence on country music, bornland are places that the singer gets more revenue stream.
- In contrast to Beyonce, Taylor Swift's top one is New York, then Los Angeles - the young, urban cities. This could be from Taylor Swift's immense popularity among young audience, her dedicated fan base, and potentially larger tour venues. These cities are typically major hubs for entertainment events and have large populations of fans. And the cities that Taylor earn the least revenue from is Nashville -- where Taylor pursued her country music path.

D. Relationship between ticket price and tickets sold



- The relationship: the higher the price is, the fewer number of tickets can be sold. However, I can see there are some outliers, particularly for Beyoncé, sell around 30000 tickets with \$140 price. This is possibly due to the high-demand shows or limited supply.
- Limitation: the data points for both artists are mixed up and hard to determine a particular trend for each artist. However, this also can suggest that the strategies in selling and promoting concert tickets of both artists are compatible

- Ticket price: ranging from ~\$60- over \$140. Both artists have a wide range of ticket prices. It depends on the seat position, the locations, and the extra profit from the ticket sellers want to charge
- Tickets Sold: averagely around 20000 - 25000 tickets for both artists.

⇒ Overall, regardless of price, tickets can be sold with high volume for both artists. The sales performance are both strong. This can be explained by various factors

04. Business Analytics

Which artist had the highest total revenue and ticket sales across all concerts?

Total revenue between Beyonce and Taylor Swift:

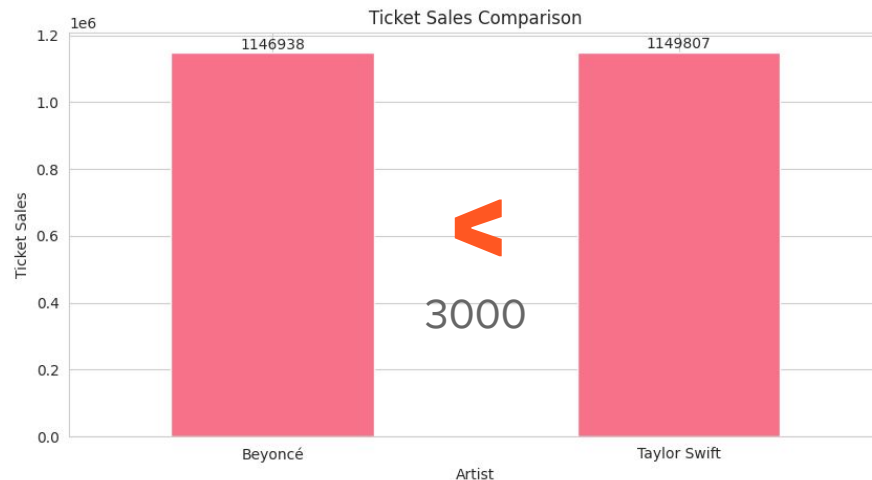
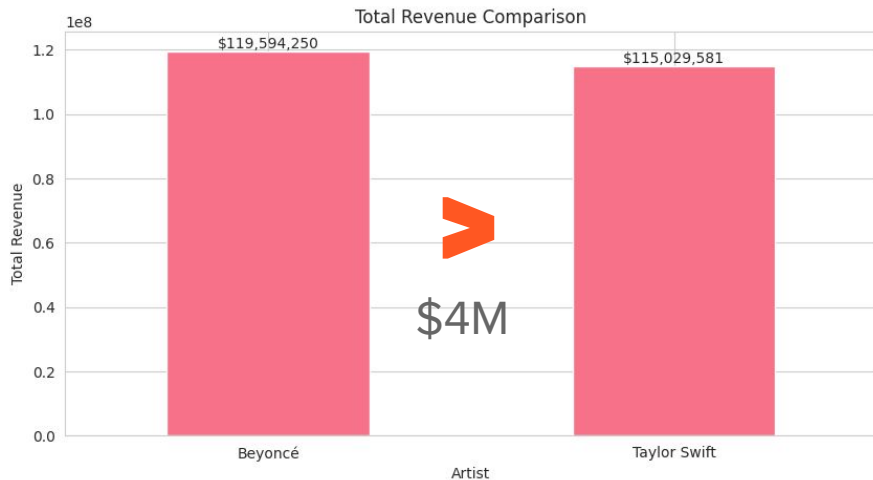
Beyonce: \$ 119594250

Taylor Swift: \$ 115029581

Ticket sales between Beyonce and Taylor Swift:

Beyonce: 1146938

Taylor Swift: 1149807



Though Taylor can sell more tickets than Beyonce, she has fewer revenue than that of Beyonce. Indicating that Beyonce's ticket price might be higher than Taylor's, or Beyonce's fans are willing to pay more for premium tickets than Taylor's one.

Top 5 cities with highest revenue for each artist

Beyonce:

City

Nashville 29852941

Houston 23898354

Los Angeles 23417515

Chicago 23254280

New York 19171159

- For Beyonce, Nashville is the top cities, where the country music began.
- The second runner is Houston - her bornland.
- And the city stands at the fifth position is New York.
- This can be explained that Beyonce is more popular to the older generations -- Millennials, Gen X and Gen Y. Therefore, cities that have influence on country music, bornland are places that the singer gets more revenue stream.

Taylor Swift:

City

New York 31985405

Los Angeles 23495941

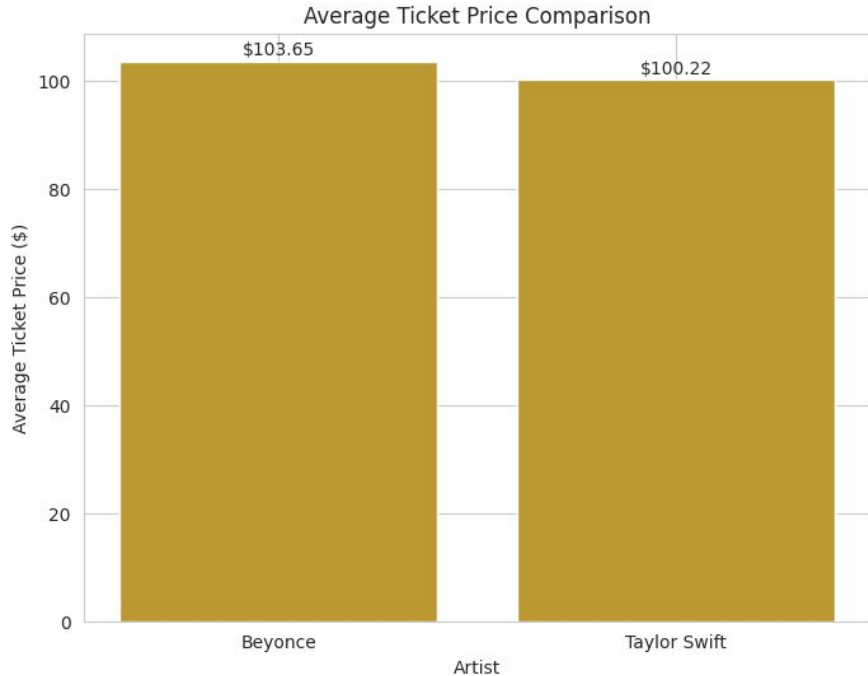
Houston 23158895

Chicago 22858770

Nashville 13530569

- In contrast to Beyonce, Taylor Swift's top one is New York, then Los Angeles - the young, urban cities.
- This could be from Taylor Swift's immense popularity among young audience, her dedicated fan base, and potentially larger tour venues.
- These cities are typically major hubs for entertainment events and have large populations of fans. And the cities that Taylor earn the least revenue from is Nashville -- where Taylor pursued her country music path.

Average ticket price vary for each artist



This answer aligned with the above statement that Beyonce's total revenue is higher though she sells less tickets than Taylor Swift.

⇒ Turns out, Beyonce's ticket price averagely is higher than Taylor's one.

This difference in ticket pricing could be due to various factors, including the artist's perceived value, venue selection, and concert experience.

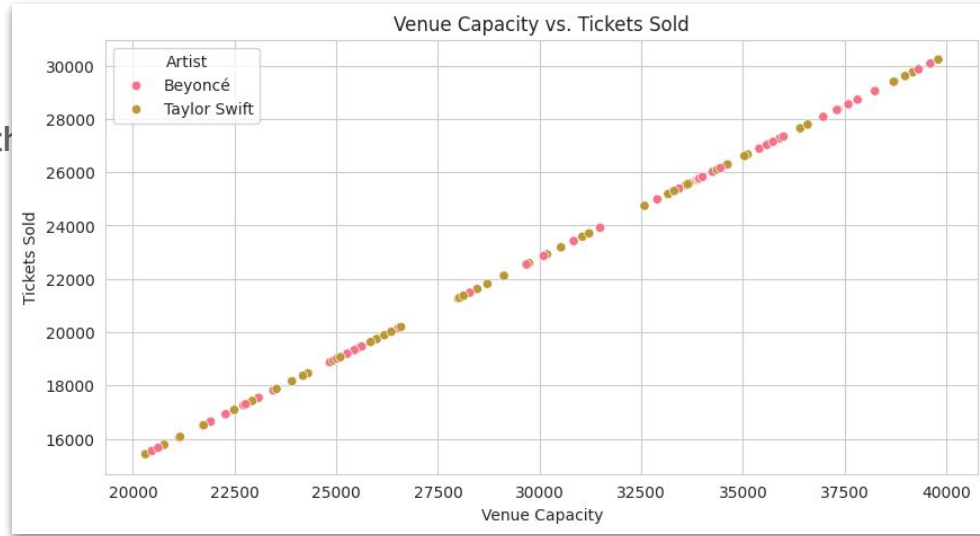
Beyonce may have implemented premium pricing strategies, offering VIP packages or exclusive experiences, which could justify the higher average ticket price.

Did the venue capacity impact on the number of tickets sold?

- The slope between venue capacity and tickets sold is **positive** => The venue capacity impacts the number of tickets sold
- Concerts held at venues with larger capacities tended to sell more tickets.

=> Venue selection is important in maximizing ticket sales.

Artists may strategically choose venues that match the demand of their fan base while also considering factors like accessibility, quality, and overall concert experience to retain audience's engagement.



The analysis suggests a correlation between venue capacity and ticket sales.

Peak months for ticket sales

Overall both artists peak months for ticket sales:

Month

7 251603

10 237794

1 221814

2 201455

6 201254

- **July is the peak month for ticket sales.** July is a hottest month during summer time, therefore, the demand for entertainment is relatively high. In this month, students and young people are having their summer holidays. The tendencies to have fun and go concerts are higher than other months. They often call July is the month of concert and vacations.
- October, and January are also two months that have many holiday days or it's relevant to the strategies of the artist when release new music. October is nearly the end of the year and the beginning of the Christmas holidays. January and February are the New Year Eve and in the Winter Break period, so artists often want to kick off their year by the concert to promote their names.

For each artist

For Beyonce:
Month

2	153253
5	128082
3	122345
8	118863
11	111103

The first half of the year, Beyonce seems to sell more tickets than the other half end of the year.

This may coincide with the release of her frequent new music or events to celebrate or kicks off the new year.

For Taylor Swift:
Month

7	175287
10	166017
9	129874
6	119720
1	117083

In contrast to Beyonce, the late half of the year is Taylor's golden period in selling tickets.

During the summer months when outdoor concerts and festivals are prevalent. Moreover, Taylor tends to hold her concerts during the summertime and break.

05. Summary

From a business analytics standpoint, this analysis could be used to identify:

- revenue drivers (venue capacity)
- optimize tour scheduling (use peak months analysis)
- pricing strategies (use total revenue over time)
- promotional efforts (use top-performing cities analysis)

to maximize revenue generation and capitalize on peak demand periods and increase engagement of fans.

Additionally, understanding the cyclical nature of the revenue patterns can aid in forecasting, budgeting, and resource allocation for both artists.

Key insights (1)

1. Overall trend in total revenue and ticket sales:

- Beyonce has higher total revenue than Taylor's. But Taylor has more tickets sold than Beyonce.
- The revenue streamline and sales performance of both artists overall are compatible and show a strong and stable trend throughout 2 analyzed years.

2. Top-performing Cities indicating music taste and target audience

- Beyonce and Taylor Swift's top cities are inverse, indicating the different range of target audience, strategies, and music taste in each cities.
- Urban and young cities like New York and Los Angeles are the rich markets for Taylor, while they're the least nutritious market for Beyonce.
- Cities of country music like Nashville and Houston have a large popularity that stands for Beyonce than Taylor.

Key insights (2)

3. Ticket Price

- The average ticket price for Beyonce's concerts was higher than that of Taylor Swift's - around \$3.
- Though some tickets have higher price, the number of attendees seem not to decrease. The willingness to pay for higher prices to get the tickets implied the precious level of the slots to get in both artists' concerts.
- This can suggest the limited supply can lead to the increase in price and profit the artist might earn, as long as their reputation is good and their fans are supportive.

4. Impact of venue capacity

- There is a positive correlation between venue capacity and ticket sales
- Larger venue capacities generally resulted in higher ticket sales, highlighting the importance of selecting appropriately sized venues.
-

5. Peak months for ticket sales

- The peak months suggest the seasonal differences in audience demand.
- Beyonce - first half of the year, Taylor - summer and late half of the year.
- This aligns with their different music genre, target audience, and the vibes of the concerts

2 Recommendations

1. Planning Strategies for Promotion

- Marketing campaigns should be different in locations, depends on the strategy of the artists.
- For example, they can tailor in the locations that have most of their fans to increase the engagement and loyalty in their 'real' fans. Or, they want to widespread their reputation, they can promote in cities that don't have a strong fan base.
- By using data, proposing strategic planning for upcoming concerts, promotional activities and conducting an appropriate ticket price are crucial. This directly contributed to the artist's success.
- For Beyonce, she might need to increase her popularity for the young audience, create a dynamic shift in target audience

2. Optimized Venue Selection

- The venue can impact on the amount of ticket solds and the experience feeling for the audience - an important factor to retain audience's heart.
- Use data to expect the amount of ticket solds, demand for each location, the ekip of each artist can choose a suitable venue to best demonstrate the quality of the concert, low renting fees might make revenue as well.
- Big cities might have higher venue renting fees. This might be one of the reasons that vary the revenue for each artist and the ticket price.

Citations:

External Help: Chat GPT

1. I asked for codelines' idea and the function in Python.

Most asked questions: How to rotate the x-label, how to add labels on the bar graph, how to change the size of the chart.

2. I looked up to the recommended charts on Excel to choose an appropriate chart type to best demonstrate my ideas.

3. I double-checked my code in Python and sometime use 2 chart types in 1 question.

THANK YOU