NAME: FELIX ASIBOR

TECHNICAL REPORT FOR SPOTIFY MOST STREAMED SONGS FOR 2023

Introduction

Objective of the Project

The objective of this project is to analyze music streaming data to determine the total number of streams, identify the artist with the most songs, and find out the most-streamed artist. The analysis aims to recognize top-performing artists and gain insight into streaming trends.

Problem Being Addressed

The project addresses the following questions:

- What is the total number of streams across all songs?
- Which artist has the most songs in the dataset?
- Which artist has accumulated the most streams overall?

This helps in identifying high-performing artists and understanding listener preferences.

Key Datasets and Methodologies

Datasets Used

Music streaming data including song title, artist name, and number of streams

Methodologies in Microsoft Excel

- Pivot Tables to aggregate the number of streams and count songs per artist
- Sorting artists from highest to lowest based on total streams and number of songs
- Charts (such as bar charts) to visually represent the top-streamed artists and those with the most songs

Story of Data

Data Source

The dataset is sourced from Kaggle, specifically from the Top Spotify Songs 2023 dataset. It provides detailed information on popular songs streamed on Spotify and other platforms throughout 2023.

Data Collection Process

The data was compiled by the dataset creator using publicly available streaming and chart data, likely collected through web scraping or APIs from major platforms like Spotify, Apple Music, Deezer, and Shazam.

Data Structure

The dataset is structured in a tabular format where rows represent each song and columns include a range of features such as:

- **Track Information:** Track Name, Artist Name, Artist Count
- **Release Details:** Release Year, Month, Day, Date, Day of the Week, Week
- **Platform Metrics:** In Spotify/Apple/Deezer Playlists & Charts, Shazam Charts, Streams
- **Audio Features:** BPM, Key, Mode, Danceability (%), Valence (%), Energy (%), Acousticness (%), Instrumentalness (%), Liveness (%), Speechiness (%)

Important Features and Their Significance

- **Artist Name:** Essential for identifying which artist has the most songs and the highest total streams
- **Streams:** Core metric used to rank artists and evaluate popularity
- **Artist Count:** Helps distinguish solo performances from collaborations

- **Platform Presence:** Indicates reach and success across streaming services
- **Audio Features:** Provide insight into the characteristics of popular songs, helpful for genre and style analysis

Data Limitations or Biases

The dataset focuses on top-charting songs, which introduces a bias toward popular artists and mainstream music

- Artist naming inconsistencies (e.g., due to collaborations or formatting) could affect the accuracy of groupings
- No regional or country-specific data, so analysis is limited to global trends
- No missing values in the dataset, which improves data quality and ensures more accurate analysis

Data Splitting and Preprocessing

Data Cleaning

The dataset was already well-structured and clean, requiring minimal intervention. Specific checks revealed that:

- No duplicate records were present
- No blank rows or columns were found

Data types were accurate, enabling smooth use of Excel functions and pivot tables without additional formatting or correction

Handling Missing Values

There were no missing values across any fields in the dataset. This allowed for complete and comprehensive analysis without the need for imputation or deletion techniques.

Data Transformations

- The Release Date field was transformed to derive Day of the Week (e.g., Monday, Friday)
- Additional sorting and ranking operations were performed in Excel using pivot tables and charts to extract metrics like total streams and song count per artist

Data Splitting

The dataset was logically separated into dependent and independent variables as follows:

Dependent Variables

- In Spotify Playlist
- Artist Count
- In Spotify Chart

- Streams
- In Apple Playlist
- In Apple Chart
- In Deezer Playlist
- In Deezer Chart
- Shazam Charts
- BPM, Key, Mode
- Danceability (%), Valence (%), Energy (%)
- Acousticness (%), Instrumentalness (%), Liveness (%), Speechiness (%)

Independent Variables

- Track Name
- Artist Name
- Release Year, Month, and Day

Industry Context

This dataset belongs to the music streaming industry, specifically within the digital music and entertainment sector.

Stakeholders

Key stakeholders include music streaming platforms, artists, record labels, producers, playlist curators, marketing teams, and data analysts. They use the data to track trends, optimize releases, curate playlists, and predict hit songs.

Value to the Industry

Success in the music streaming industry means high engagement for platforms, more streams and revenue for artists and labels, impactful music for producers, influential

playlists for curators, effective promotions for marketing teams, and accurate trend predictions for analysts.

Pre-Analysis

Key Trends

- Tracks released on Fridays tend to have higher streams, likely due to the industry trend of releasing new music before the weekend when listeners have more free time.
- There's a noticeable spike in streaming performance for tracks released on weekends (Saturday and Sunday). This could reflect increased weekend listening activity and playlist promotions.
- Some artists have multiple tracks in the top charts, indicating that certain performers dominate streaming platforms. These artists tend to release frequently or have a significant presence across multiple platforms (Spotify, Apple Music, Deezer, etc.).

Potential Correlations

- There appears to be a positive correlation between release dates (particularly Friday releases) and higher stream counts, suggesting that timing plays a crucial role in a song's success.
- Artists with more songs in the dataset seem to accumulate higher total streams, indicating that frequent releases or broader catalogues contribute to greater visibility and engagement.
- Tracks with higher Danceability percentages appear to be more successful on charts, possibly linked to their appeal for dancing or active listening. This may correlate with higher Valence (a measure of positivity or happiness in music).
- Faster songs with higher BPM values are typically associated with higher Energy percentages, which may correlate with more streams, especially for high-energy genres.

Potential Insights

- More playlist placements, especially on high-visibility playlists like "Today's Top Hits" on Spotify or "Hot Tracks" on Apple Music, correlate with higher chart rankings. Tracks with multiple playlist inclusions tend to receive consistent exposure, which boosts streaming numbers and helps maintain a higher chart position over time. Songs with extensive playlist coverage may experience faster chart rises, while those with fewer placements might struggle to break into the top charts.
- Songs with higher BPM, higher danceability, and energy levels often see more streams. Upbeat, energetic tracks are favored for party, workout, and social playlists, which significantly drive engagement and visibility.
- Songs released in the spring and summer months tend to perform better, possibly due to seasonal playlist trends and higher social activity during these seasons. Summer anthems in particular dominate the charts due to outdoor events, festivals, and social gatherings. Conversely, winter months may see a dip in music releases, though holiday-themed tracks or warm, introspective music may perform well during this time, often due to Christmas playlists or cozy listening experiences.
- Playlist placements vary by platform, with Spotify favoring upbeat, chart-focused songs and Apple Music often curating more genre-specific or mood-driven playlists. Deezer tends to highlight more global or regional hits, which can be advantageous for international artists. The nature of playlist algorithms also differs across platforms. Spotify’s algorithm is more data-driven, suggesting songs based on user behavior, while Apple Music often includes editor-curated playlists, which can be more selective.
- High valence (happiness) songs often perform better, particularly in mainstream genres like pop and dance music. These songs with positive emotional tones tend to be favored in social playlists and resonate with a broader audience, making them more likely to accumulate streams.
- Highly danceable tracks, especially in genres like pop and EDM, see higher streams. These songs with upbeat tempos and rhythmic hooks resonate with

listeners, particularly in playlist-centric platforms, where energy drives engagement.

- Weekends generally see higher streaming numbers, as people have more free time to listen to music. However, songs linked to specific activities, such as studying or working, might see higher streams on weekdays when people engage with music during their tasks.
- High speechiness, common in rap or spoken-word genres, correlates with higher playlist placements, as these tracks cater to a different demographic, including niche listeners who prefer lyrical focus over melodies.
- Newer songs tend to chart higher, as modern trends and emerging genres capture more audience attention. Older songs, though nostalgic, may not receive as many streams unless they've had a lasting cultural impact or are rediscovered by a new generation of listeners.

In-Analysis

Unconfirmed Insights

1. There is a dramatic increase in streaming activity from 2010 onward, peaking in 2021, likely due to the pandemic and digital streaming adoption. A dip in 2022 still reflects a higher baseline than previous years, but further analysis is needed to confirm whether this drop was a temporary anomaly or a new trend.

2. The close competition between The Weeknd, Taylor Swift, and Ed Sheeran suggests strong global fanbases and consistent performance. The tiered structure among the top 10 artists—spanning pop, rap, and alternative genres—indicates diverse audience preferences. Further study is needed to understand the factors driving their individual successes.

3. Surprisingly, songs with moderate danceability (score ~70) had the highest streams, while songs with higher danceability scores (73–94) showed a decline. This raises questions about optimal energy levels for mass appeal and whether overly “danceable” tracks lose broad appeal.

4. Contrary to expectations, Friday had the highest streaming volume (235.5B), while Saturday and Sunday were lowest. This suggests pre-weekend music engagement, possibly tied to new music releases or pre-party listening habits. Further exploration is required to determine whether this trend holds across different genres or demographics.

5. Major mode dominates, with 550 entries compared to 403 in minor mode. This may point to a listener preference for upbeat or emotionally neutral music. Further

sentiment analysis could clarify whether mode correlates with streaming performance.

6. Taylor Swift tops the list with 34 songs, indicating that volume of content may correlate with overall streaming success. However, some artists like Morgan Wallen, with fewer releases, still maintain high visibility—suggesting that song quality or marketing strategy may offset quantity.

7. The Weeknd leads across all platforms, particularly on Spotify with over 144K playlists, which likely contributes to his streaming dominance. Taylor Swift and Ed Sheeran also benefit from high playlist inclusion. This supports the idea that playlist visibility is a key success driver, though variations across platforms (e.g., Deezer's favoring of Ed Sheeran) require further verification.

Recommendations

1. With streaming growth peaking in 2021 and a notable drop in 2022, platforms should focus on sustaining engagement through personalization, exclusive releases, and diversified monetization. This shift may also encourage artists and labels to experiment with interactive content or cross-platform strategies.

2. Top-tier artists like The Weeknd, Taylor Swift, and Ed Sheeran maintain dominance through consistent output and broad global appeal. New and legacy acts can coexist successfully by using data-driven marketing, targeted fan engagement, and platform-savvy strategies to maintain relevance across demographics.

3. Moderately danceable songs outperform highly danceable ones, suggesting that listener preference leans toward emotional balance over pure rhythm. Producers should consider tailoring music to fit varied moods and use-cases, not just energy-driven appeal.

4. Friday is the prime day for streaming activity, with users actively seeking new content. Labels and independent artists should schedule new releases on Thursdays or Fridays to maximize early traction. Understanding user behavior patterns can refine playlist placement timing as well.

5. Major key compositions receive higher streams, pointing to a preference for uplifting or positive-sounding music. Artists and marketers might benefit from aligning releases with emotionally resonant tones to enhance mainstream appeal and playlist inclusion.

6. Taylor Swift's frequent releases maintain fan momentum, while Morgan Wallen's selective drops build anticipation. Artists should customize their release strategy—either high-frequency content for visibility or limited drops to build exclusivity—based on their brand and fanbase.

7. The Weeknd's playlist saturation across platforms, particularly Spotify, highlights the value of playlist-driven visibility. Given the differences across Spotify, Apple Music, and Deezer, artists should develop platform-specific strategies, leveraging editorial curations where needed or targeting algorithm-driven placements for broader reach.

Analysis Techniques Used in Excel

The following Excel tools and functions were applied to analyze the dataset and derive insights:

Pivot Tables

Used extensively to summarize and explore key metrics, such as total streams by year, artist, release day, and playlist count across platforms. Pivot Tables allowed for dynamic grouping and aggregation, which made pattern discovery more efficient.

CONCAT Function

The CONCAT() function was used to join the day, month and year of release together.

INDEX Function

The INDEX() function was applied to extract the name of the day of the week from a numerical weekday value. This enabled deeper analysis of streaming behavior based on specific days (e.g., Friday vs. Monday).

Charts & Graphs

Excel’s charting tools, such as line charts, bar charts, and column charts, were used to visualize data trends—e.g., total streams by year, top artists by streams, and stream behavior by danceability or release day.

Post-Analysis and Insights

Key Findings

1. Taylor Swift peaked in 2022, with her most-streamed songs showing a strong preference for major mode and moderate danceability. Friday was her top streaming day.
2. The Weeknd reached his streaming peak in 2019, with top songs averaging around 50% danceability and Friday as the most active day for listeners.
3. SZA had peak streaming years in 2021–2022, especially for tracks with 46–64% danceability, again with strong Friday engagement.
4. Bad Bunny saw peak performance in 2022, followed by a noticeable drop. His most-streamed tracks had 63–80% danceability, with Friday and Saturday showing the highest stream activity.
5. Harry Styles was most active from 2019–2022, with best-performing songs having 51–52% danceability and highest streams on Fridays.
6. Kendrick Lamar peaked in 2017 and had a unique profile—his top tracks featured 86%+ danceability, with Thursdays seeing the most streams.
7. Morgan Wallen showed exponential growth in 2022–2023, especially with songs at 52% and 69–73% danceability, and again Fridays being the most active streaming day.

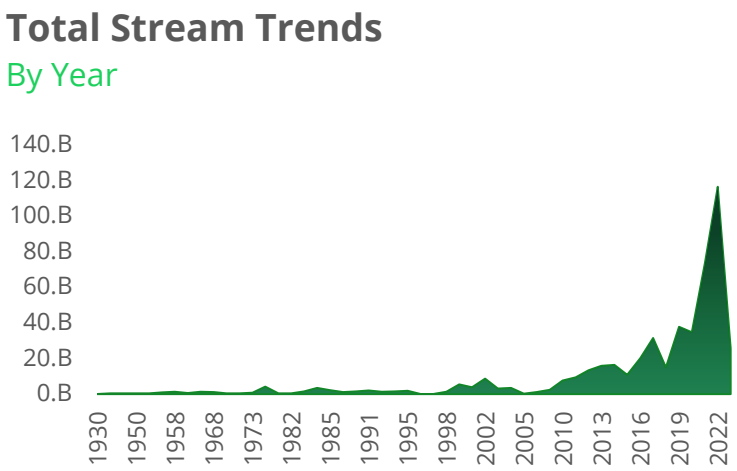
Comparison with Initial Findings

1. The dominance of Fridays as a peak streaming day across almost all artists confirms earlier assumptions about the strategic importance of end-of-week releases.
2. While moderate danceability consistently correlates with high stream counts, Kendrick Lamar’s high-danceability success presents an interesting outlier, suggesting that genre or lyrical depth may shift typical engagement patterns.

3. The drop in Bad Bunny’s streams post-2022 was unexpected, highlighting how even top-performing artists may experience rapid shifts in popularity or algorithmic exposure.
4. Genre and style appear to affect danceability sweet spots—with artists like Taylor Swift and Harry Styles thriving around 50–52%, while others like Bad Bunny lean toward higher energy, 63–80%.
5. The year-by-year variance in artist peaks supports the idea that streaming success is cyclical, and tied to consistent output, cultural relevance, and strategic timing.

Data Visualizations & Charts

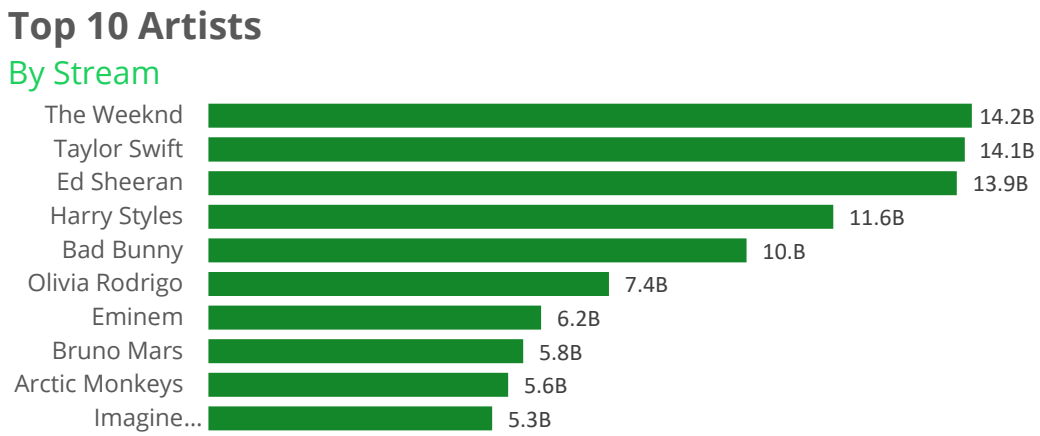
1. Total Stream Trends by Year



Explanation

Songs released between 1930 to 1997 had almost zero streams, streaming started gaining momentum from songs released between 2007 to 2022, with the peak being around 120B streams

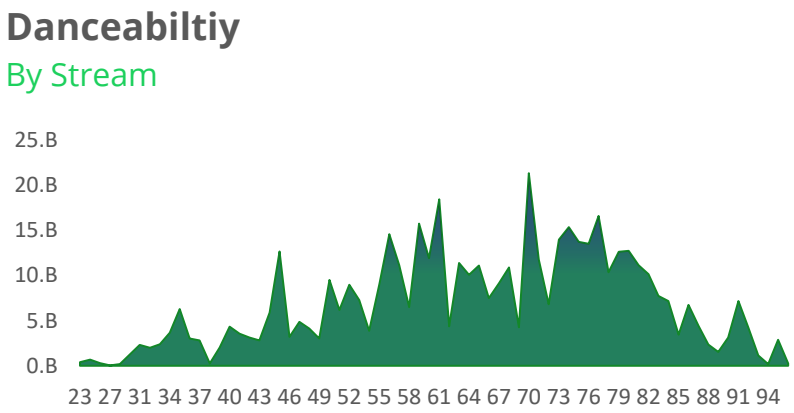
2. Top 10 Artists by Streams



Explanation

The Weeknd has the highest streams, grossing 14.2B streams, while Imagine dragons have the lowest streams with 5.3B streams.

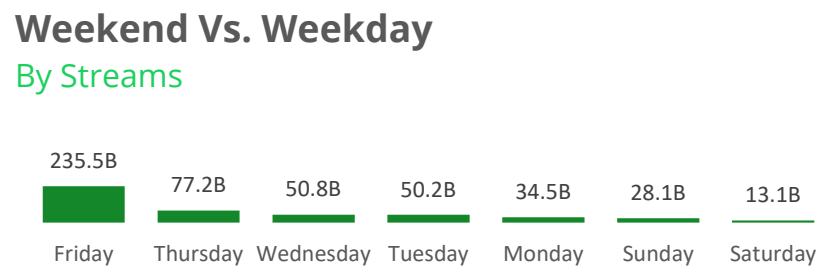
3. Danceability by Streams



Explanation

Highly danceable songs don't really mean high streams from listeners. Just like the chart tells, the highly danceable songs with 80% or more score have some of the lowest streams

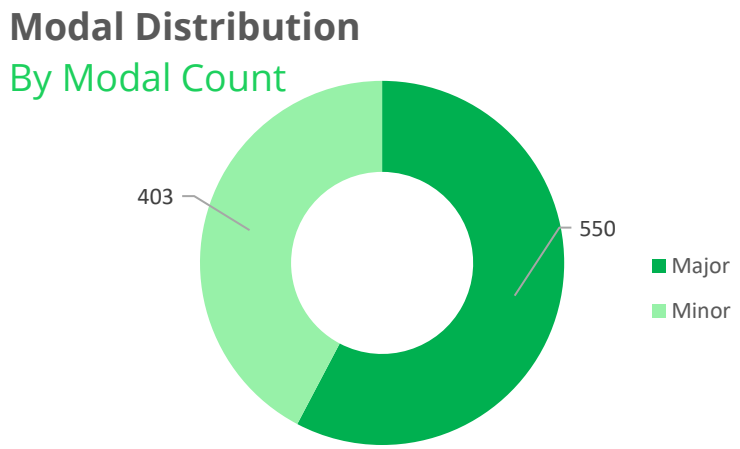
4. Weekend Vs. Weekday by Streams



Explanation

From the chart, Friday has the highest streams, with 235.5B streams followed by Thursdays. The least is Saturday with 13.1B streams. From this chart, it's possible that there are other factors that may affect why Friday has the highest streams, while Saturday has the lowest streams.

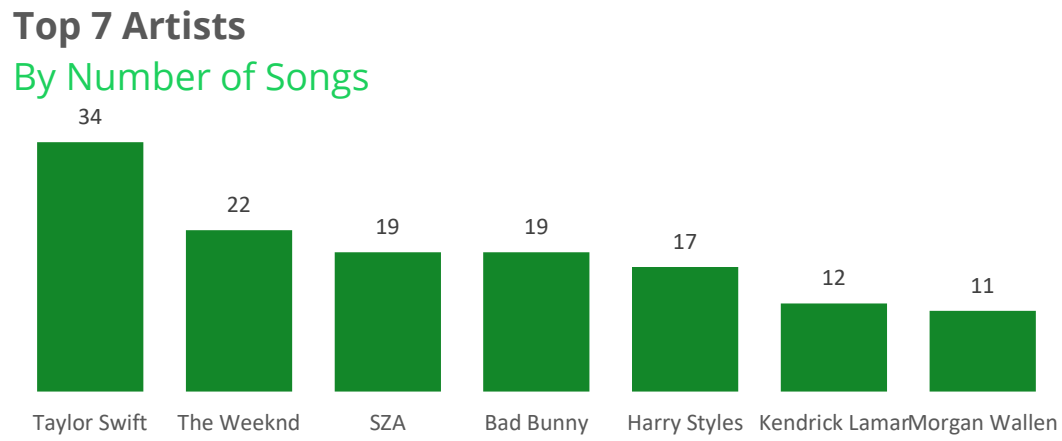
5. Modal Distribution by Modal Count



Explanation

Songs with Major modes have higher score than minor modes, this is as a result of how calm and soothing major modes are.

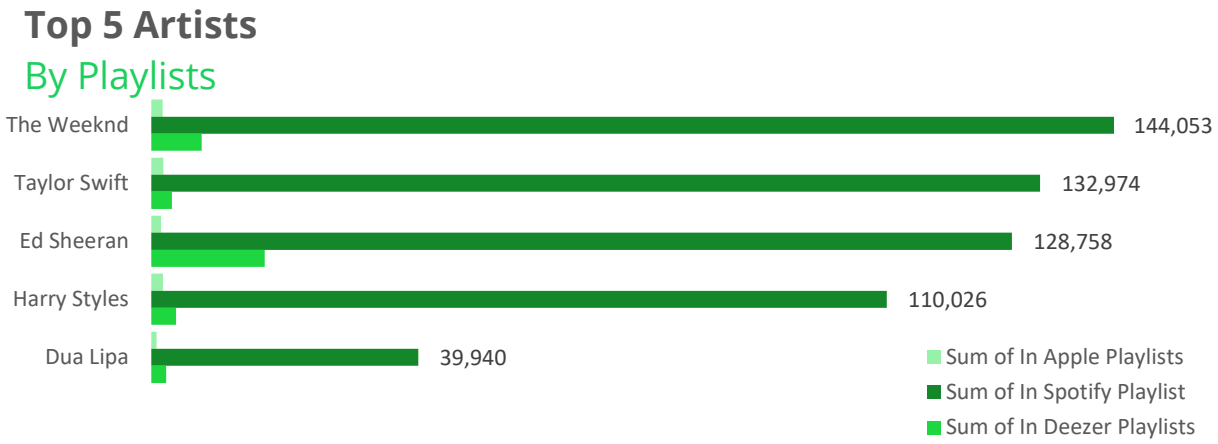
6. Top 7 Artists by Number of Songs



Explanation

Taylor swift has the highest number of songs, while Morgan Wallen has the least.

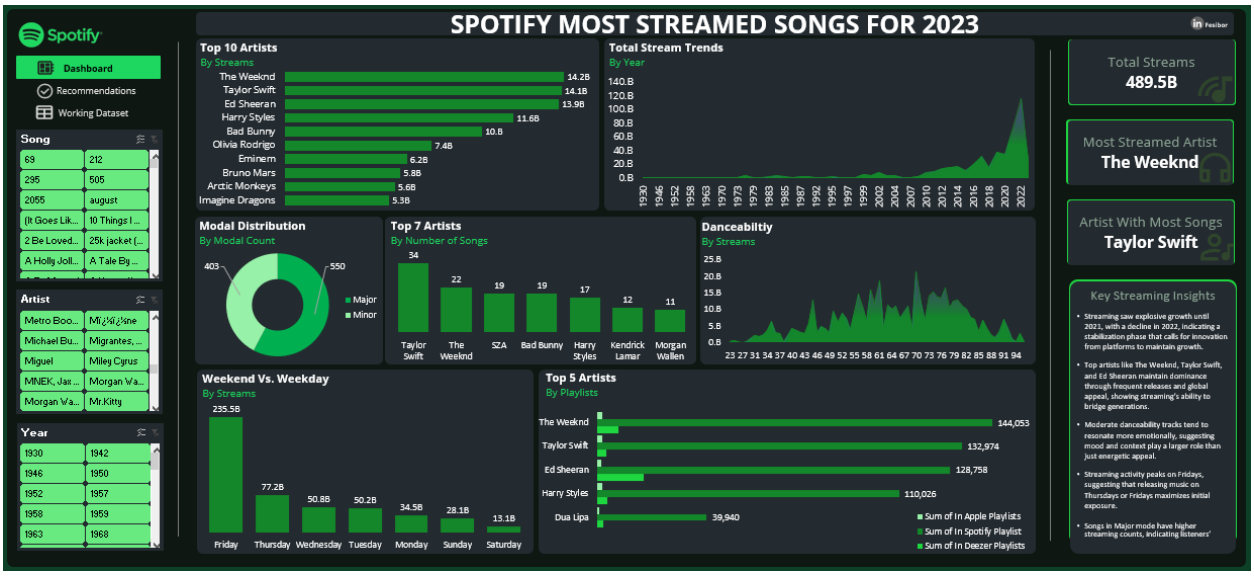
7. Top 5 Artists by Playlist



Explanation

The Weeknd has the highest playlist on Spotify but doesn't rank much in Apple playlists. Same goes for other artists. No artist from this data tops the rank on all streaming platforms.

8. Final Dashboard



Recommendations and Observations

Actionable Insights

1. Taylor Swift should continue releasing music on Fridays, emphasizing major-mode songs with moderate danceability, and sustain a consistent release schedule to retain strong fan engagement.
2. The Weeknd can capitalize on Friday releases, target moderately danceable tracks, and enhance fan loyalty with exclusive content and platform-specific campaigns, particularly on Spotify.
3. SZA should release tracks with 46–64% danceability on Fridays and work on boosting her visibility on Apple Music and Deezer through curated promotions.
4. Bad Bunny should continue producing high-danceability content, focus releases on Fridays and Saturdays, and explore genre-blending collaborations to sustain engagement post-peak.
5. Harry Styles should align music drops with Fridays, prioritize tracks with 51–52% danceability, and expand reach on Deezer through exclusive content and fan-oriented experiences.
6. Kendrick Lamar should drop high-danceability tracks (86%+) on Thursdays, improve his reach on Apple Music and Deezer, and boost engagement via visual storytelling like docuseries or themed videos.
7. Morgan Wallen should focus on Friday releases, optimize for tracks with 52% and 69–73% danceability, and invest in playlist growth on Deezer and Apple Music to tap into broader audiences.

Optimizations or Business Decisions

1. Artists should customize promotional efforts by platform. For example, The Weeknd's dominance on Spotify suggests replicating that approach on Deezer and Apple Music for balanced reach.

2. Strategically aligning future releases with the artist’s most successful danceability range (e.g., 86%+ for Kendrick Lamar, 46–64% for SZA) can help maximize stream potential.
3. Friday releases remain optimal, but Kendrick Lamar’s Thursday peak offers a test case for early-week drops to capture pre-weekend attention.

Unexpected Outcomes

1. Contrary to expectations, streaming drops significantly on Saturdays and Sundays, indicating listeners may be less digitally engaged on weekends. This supports focusing release strategies on Thursdays and Fridays.
2. While moderate danceability dominates for most artists, Kendrick Lamar’s success with high danceability (86%+) may reflect his genre's rhythmic strength and dedicated fanbase. This highlights how genre and lyrical complexity can override general platform trends.

Conclusion

Key Learnings

- The analysis revealed that Friday is the most optimal day for music releases, with nearly all top artists experiencing peak streaming activity on this day.
- Danceability plays a crucial role, but the sweet spot varies by artist—moderate danceability (46–73%) tends to perform best across the board.
- Artists like Taylor Swift and The Weeknd thrive on major-mode compositions, while high danceability benefits artists like Kendrick Lamar and Bad Bunny.
- Platform-specific playlist placements significantly influence stream volumes, highlighting the importance of cross-platform engagement strategies.

Limitations

- Some limitations include gaps in the dataset regarding exact listener demographics, platform engagement metrics, and promotional campaign timelines, which could have added more context to the trends.
- The analysis was also limited to only a select number of artists, genres, and features, which may not reflect broader industry behavior.
- Additionally, the impact of non-musical factors (e.g., social media trends, tours) was not accounted for.

Future Research

Further analysis could incorporate sentiment analysis of lyrics, social media activity, and touring data to enrich the insights. Expanding the artist sample size and including more features like instrumentalness, acousticness, and lyrical content would provide a more holistic view. Incorporating user engagement metrics from platforms like TikTok or YouTube could also reveal how viral moments influence streaming trends.

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