Mapping the Rise:
Streaming Success of Female Rappers by City

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Hip hop has always been rooted in place—shaped by block parties in the Bronx, Southern bounce in Houston, and West Coast beats in Los Angeles. But while geography has long influenced the sound of rap, it also shapes success, especially for female rappers, who continue to fight for recognition in a male-dominated industry.

In recent years, female rappers have undeniably gained in visibility, streams and influence. Yet behind headline wins lies a more complicated truth: women remain underrepresented across charts, playlists and label rosters.

While the city of origin is crucial in rap music, there are no official city-by-city streaming statistics for female rappers published by major music platforms or industry organizations.

So which cities produce successful female rap artists? Is there a connection between a city's representation and its artists' streaming numbers or hit rates? And most importantly, which US cities are most likely to produce and sustain female rap talent?

1. Context

For decades, female rappers have navigated significant barriers in the music industry, from limited radio play to industry bias and underrepresentation in major playlists. However, official statistics reveal they've steadily increased their presence and success in recent years.

While some have achieved remarkable commercial milestones, most continue to face challenges compared to their male counterparts. The overall landscape remains marked by persistent gender disparities in chart representation, recognition, and industry treatment.

According to the USC Annenberg Inclusion Initiative, women accounted for 23.3% of artists on the Billboard Hot 100 Year-End Chart in 2021, compared to 76.7% men. Over the decade from 2012 to 2021, women made up just 21.8% of credited artists on these charts, despite representing about 51% of the US population. By 2024, the percentage of women on the Hot 100 Year-End chart rose to 37.7%—a significant increase from 22.7% in 2012, though still showing a male majority.

Even though female rappers have achieved major commercial success—Nicki Minaj has sold over 100 million records, outselling many male peers—her case remains exceptional. Most best-selling and most-awarded rappers continue to be men.

Industry challenges and inequality

Since hip hop's emergence in the 1970s, female rappers have faced heightened scrutiny, higher standards, and less respect than their male counterparts. They often have to work "*twice as hard to get half the respect*," as noted by Nicki Minaj and echoed throughout academic and media analyses.

Moreover, they're frequently pressured to conform to industry expectations around sexuality and appearance, while their lyrical content faces more criticism than that of men. They're also more likely to be compared to one another and pitted against each other in the media—a treatment male rappers rarely experience.

The importance of the city of origin in rap music

Despite the fact that the biggest streaming hits by female rappers tend to come from major hip hop centers such as New York, Houston, Los Angeles, and Atlanta, comprehensive city-specific streaming data for female rap artists remains unavailable from leading music platforms and industry bodies.

In rap music, an artist's city of origin plays a fundamental role, influencing their sound, aesthetic choices, lyrical themes, and career development. The distinct cultural heritage and historical context of each major urban center has enriched the genre's varied landscape, driving its creative evolution and lasting cultural impact.

2. Project goals

This capstone project explores the intersection of gender, geography, and success in hip hop—with a focus on amplifying the visibility of female rappers. The project is guided by three primary objectives:

- **Identify which US cities have produced the most successful female rappers**

The first goal is to map the geographic landscape of female rap by identifying which cities have launched the highest number of prominent female artists. By quantifying platform and chart presence at the city level, we aim to uncover which local scenes are driving national visibility—and which may be under-recognized.

- **Analyze artist representation across streaming and chart platforms**

We examine how female rappers are represented across various platforms—including Spotify, TIDAL, and Billboard—to understand where success is most visible and where it may be emerging. This analysis reveals not only which artists are making waves, but also how different types of platforms (editorial vs. algorithmic vs. commercial) shape their exposure.

- **Build a machine learning model to predict the kikelihood of future success**

Finally, the project seeks to build a predictive model that estimates the probability of a female rapper becoming a "hit" artist based on her metadata—particularly platform presence and city of origin. This model offers a data-driven tool that can be used by music industry professionals to anticipate emerging talent and support equitable artist discovery.

3. Methodology

This analysis draws from five datasets:

- **Spotify Top Hip-Hop Tracks:** Provides data about artists and songs streaming, allowing to analyze the popularity of female rap artists compared to their male counterparts.
- **Spotify Top 10K Streamed Songs:** Helps in identifying the most streamed songs, enabling a comparison of the streaming success of female rappers versus male rappers.
- **TIDAL Female Rappers Playlist:** Features curated tracks from influential female rappers, offering both qualitative and quantitative insights into their music styles and thematic preferences.
- **Billboard Hot 100:** Provides historical chart performance of songs, allowing to analyze how female rappers have evolved over time in mainstream rankings.
- **Complex Magazine's Best Rap Cities:** Helps contextualize the geographic influence on the success of female rappers by mapping their origins to top-ranked hip hop cities.

To prepare the data for analysis and modeling, I combining manual data review, AI-assisted tagging, and several preprocessing techniques.

First, I addressed missing information by using a mix of manual validation and AI tools to tag each artist with their gender and city of origin. I then normalized geographic data by grouping boroughs and neighborhoods into unified metropolitan

areas — for example, Queens, Brooklyn, and Harlem were consolidated under "NYC." To ensure the dataset focused strictly on rap, I removed non-rap artists and singers, such as Beyoncé and Rihanna.

Once this initial cleaning was complete, I grouped artists by city and platform and merged the five datasets to create a unified view of artist activity. I calculated a total "mention count" for each artist, based on their appearances across platforms like Spotify, TIDAL, Billboard, and Complex. Using this total, I defined a binary target variable: an artist was labeled a "hit" (1) if they had five or more total mentions, and "non-hit" (0) otherwise.

Before building the model, I conducted additional preprocessing steps to enhance data quality. These included one-hot encoding categorical variables such as city, and scaling numerical features. I also addressed missing values through either imputation or row removal depending on the context.

With a clean and structured dataset in place, I trained a Random Forest Classifier to predict which female rappers were likely to make hits based on their platform presence and city of origin.

4. Key visualizations and findings

- **New York City leads the way**

New York City remains the undisputed powerhouse of female rap. Its legacy as the birthplace of hip hop continues to shape the genre, with iconic artists like Nicki Minaj and Cardi B contributing significantly to its dominance. The data reveals that NYC-based artists not only have more tracks but also appear more frequently across streaming and chart platforms, underscoring the city's continued influence in launching and sustaining female rap careers.

- **New York City, Houston, and Los Angeles are the top cities for female rapper success**

Top 10 Cities by Total Hits Across All Datasets
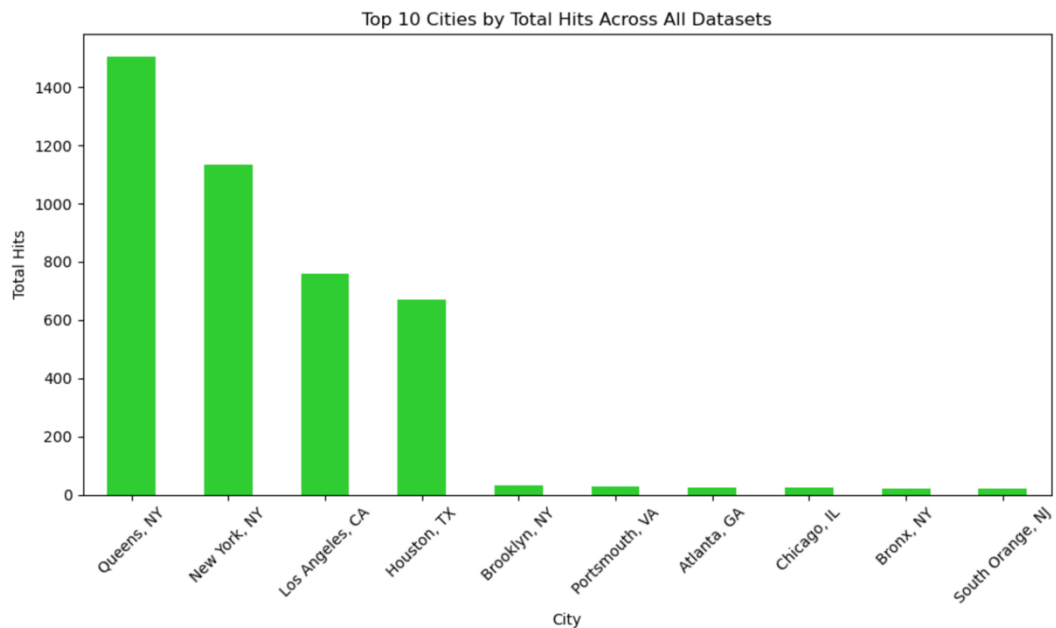
New York City, Houston, and Los Angeles create a geographical triangle of female rap excellence. While NYC anchors the East Coast legacy, Houston has emerged as a rising force with talents like Megan Thee Stallion, known for blending regional flavor with global appeal. Los Angeles contributes through strong entertainment infrastructure and artists like Doja Cat. Together, these cities provide the cultural ecosystems, industry networks, and fan bases that elevate female rappers to prominence.

- **Artists from New York City, Houston, and Los Angeles dominate across the TIDAL, Spotify and Billboard datasets**

The dominance isn't confined to just one platform—it's consistent across curated playlists (TIDAL), user streaming behavior (Spotify), and commercial success metrics (Billboard). This suggests that artists from New York City, Houston, and Los Angeles not only break through industry gatekeepers but also connect with audiences and maintain sustained popularity. Their multi-platform visibility serves as a key indicator of both quality and marketability.

Hits by City Across All Datasets
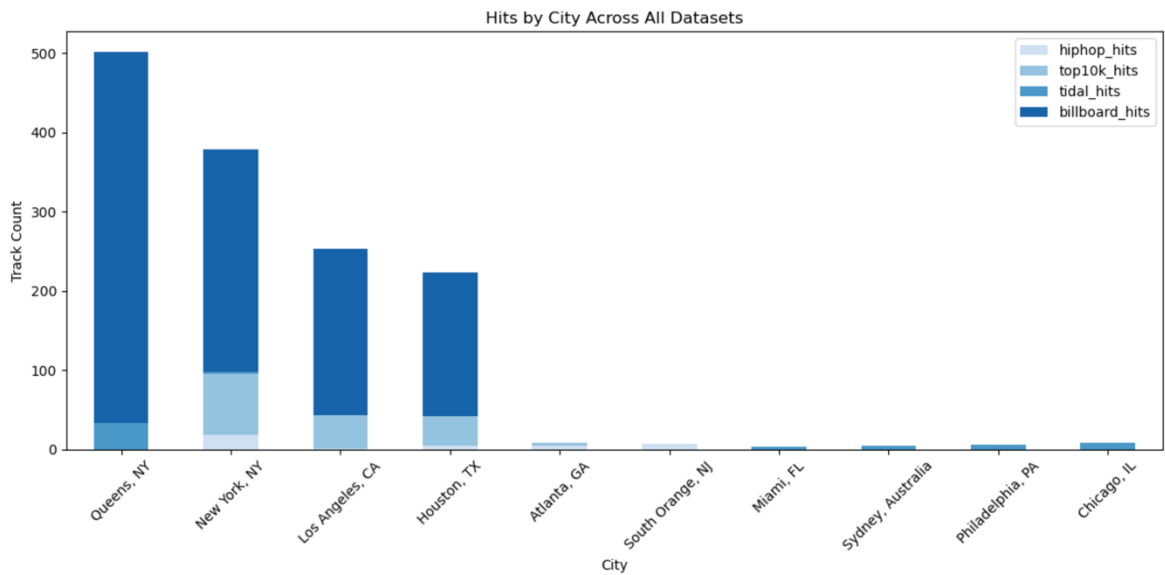
- **Nicki Minaj leads with the highest total mentions across all platforms**

Nicki Minaj stands out as the most visible and impactful female rapper in the dataset, with the highest number of appearances across TIDAL, Spotify, and Billboard. Her consistent presence reflects both longevity and cross-platform appeal. She bridges generations and genres—maintaining credibility in rap while securing mainstream popularity. Her dominance also reinforces NYC's role as a launchpad for top-tier talent in female rap, holding the record for the most Billboard Hot 100 entries among female rappers.

Top 10 Female Rappers by Total Mentions Across All Datasets
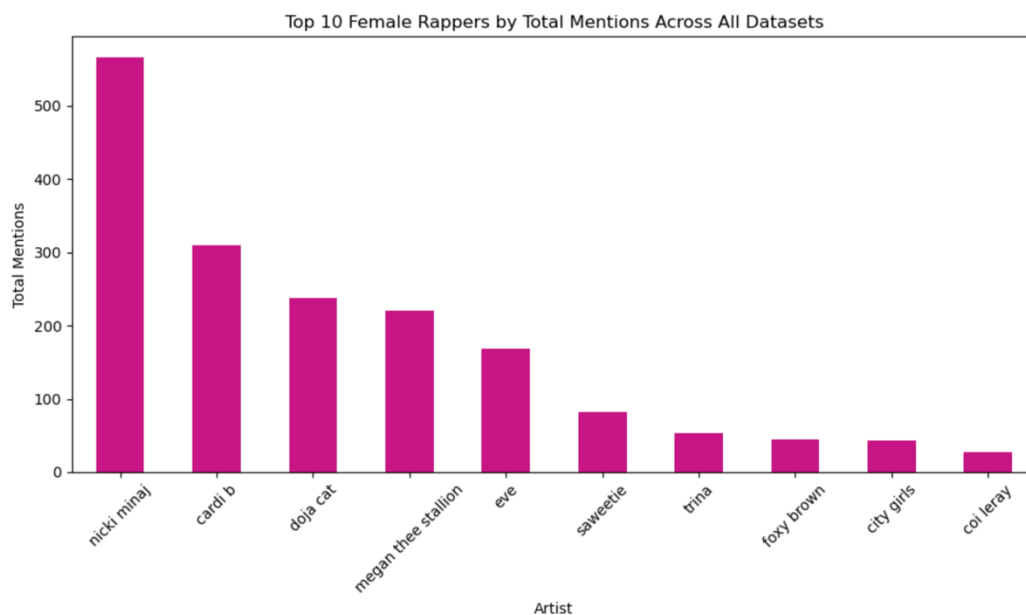
- **The new wave: Cardi B, Megan Thee Stallion, and Doja Cat**

These artists represent the new wave of female rap excellence, each bringing unique sounds and city influences:

Cardi B (New York City): Raw, viral energy with strong chart presence and social media traction. Her "Bodak Yellow" made her the first solo female rapper to top the Billboard Hot 100 in nearly two decades, while her album Invasion of Privacy won a Grammy in 2019.

Megan Thee Stallion (Houston): Southern swagger and lyrical dexterity with deep ties to local culture and international reach. She won three Grammys in one night for "Savage," becoming a major Gen Z icon for confidence and empowerment.

Doja Cat (Los Angeles): Genre-bending, internet-savvy, and pop-accessible, she expands the boundaries of what female rap can sound like.

Together, these artists reflect a geographically diverse and stylistically varied top tier—showing that while New York City leads, innovation is happening across multiple regions.

- **Track duration patterns align with industry standards**

Most TIDAL tracks by female rappers fall between 3 and 4.5 minutes, aligning with industry standards for streaming and suggesting that mainstream-friendly durations are common among successful female artists.

Distribution of Track Durations (TIDAL)
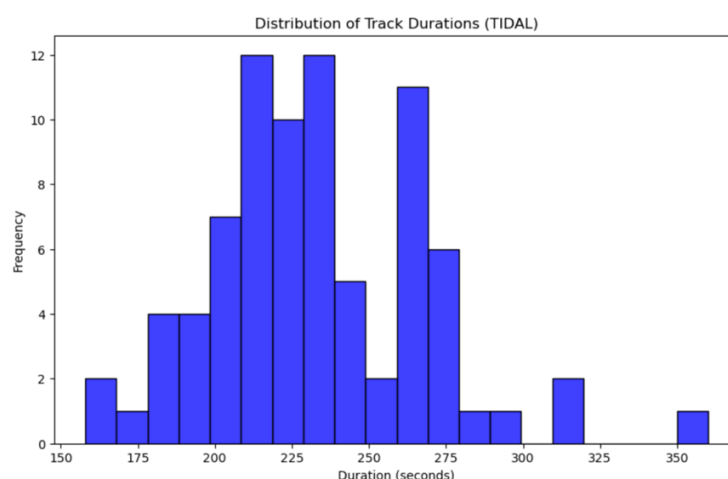
- **Billboard and Spotify Top 10k show strongest success correlation**

Mentions on Billboard charts and the Spotify Top 10k are the clearest indicators of mainstream success. These platforms reflect both audience engagement (streams) and industry validation (charting), making them powerful predictors. Their strong correlation with overall artist mentions suggests that early visibility on these platforms reliably signals an artist's breakout potential.

- **TIDAL and Complex playlists provide additional context**

While TIDAL's curated playlists and Complex editorial content highlight emerging voices and niche talent that may not yet have mass exposure, their influence is less predictive of large-scale success. Still, their inclusion broadens the cultural picture and proves especially useful for early-stage scouting or identifying rising talent before they peak.

Model performance

- **Confusion matrix: 100% accuracy**

On the held-out test data, the model perfectly classified all artists—correctly identifying both hits and non-hits. While encouraging, the test sample is small (n = 11), so these results should be viewed as a positive early signal rather than a final verdict.

Confusion Matrix - Random Forest Model
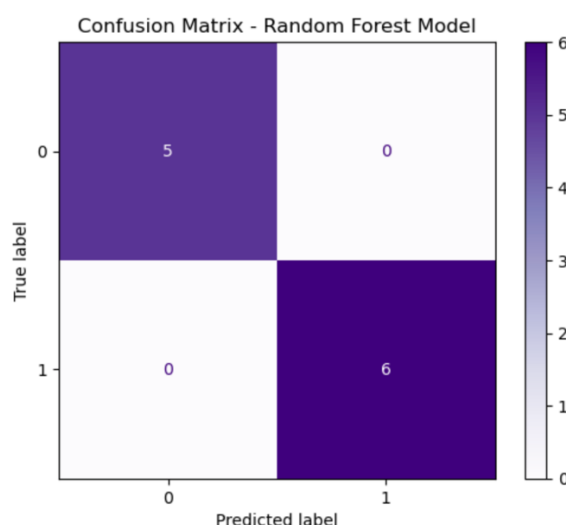
- **Cross-validation: 88% mean accuracy**

Across five folds of validation, the model achieved an average accuracy of 88%, demonstrating consistent performance and strengthening confidence in its real-world potential.

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CV accuracy scores: [0.71428571 1.        0.85714286 1.        0.83333333]
Mean accuracy: 0.880952380952381
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- **Validation needed on larger datasets**

To ensure robustness, the model should be retrained and re-evaluated using larger and more diverse datasets. This would help assess how well it handles variation across artists, cities, and platforms, and whether the same features remain predictive at scale.

5. Recommendations

- **Scout where it counts**

Focus scouting and artist development efforts in the cities that consistently produce successful female rappers: New York City, Houston, Los Angeles, and Atlanta. The data clearly shows that artists from these hubs dominate across multiple platforms— from curated playlists to top-streamed charts. These cities offer the right mix of industry infrastructure, cultural relevance, and fan engagement to nurture and launch talent.

- **Watch early platform momentum**

Use Spotify Top 10k and Billboard Hot 100 appearances as strategic indicators of rising momentum. These platforms are not just reflections of current popularity — they are early signals of future mainstream success. Artists who enter these rankings often go on to secure label deals, increase tour demand, and achieve viral traction. By tracking early movements in these channels, A&R teams and marketers can move quickly to support and amplify emerging talent before competitors do.

- **Use predictive tools in A&R strategy**

Integrate machine learning models into your A&R and marketing workflows. By analyzing features such as city of origin and platform mentions, predictive tools can help identify high-potential artists before they reach commercial peak. These models offer a data-driven layer to complement human intuition — enabling faster, more objective, and scalable talent scouting. Used correctly, they can empower labels to diversify their rosters and reduce the risk of missing out on the next big name in female rap.

6. Future work

This project opens several exciting directions:

- **Add musical features: lyrics, collaborations, tempo, mood**

To deepen the predictive model, future versions could integrate musical characteristics such as lyrical content, featured collaborations, tempo, and song mood. These elements are often central to audience appeal and could help explain why certain tracks break through. Natural Language Processing and audio analysis tools like Spotify's audio features or Genius annotations could unlock new layers of insight into what defines a hit.

- **Extend analysis to international scenes**

The U.S. is a major hub for hip hop, but female rap is growing fast across the globe. Expanding this analysis to international artists — particularly in the UK, France, Brazil and South Africa — could offer a richer, more inclusive view of the genre's evolution. This would also allow for cross-cultural comparisons and highlight emerging regions that deserve industry attention.

- **Explore the impact of social media platforms like TikTok**

Future research could examine how social media virality, particularly on platforms like TikTok, contributes to the rapid rise of female rappers. Viral moments, challenges, and trending sounds have become powerful accelerators for music

discovery. For example, artists like Ice Spice and GloRilla have leveraged TikTok to reach millions of listeners and break streaming records — Ice Spice's hashtag alone has generated over 4 billion views.

- **Use more advanced models**

While the Random Forest model performed well, future iterations could explore more powerful machine learning algorithms like XGBoost, CatBoost, or ensemble stacking. These models are often better at handling small datasets, uncovering non-linear relationships, and delivering more precise probability estimates.

- **Build a dashboard for label executives to filter top female talent by city, genre, or charting potential**

To make these insights actionable for industry stakeholders, a visual dashboard could be developed. This tool would allow label executives, scouts, and marketers to filter artists by city, genre, platform presence, or predicted hit probability. With real-time updates and data visualization, such a dashboard would support data-informed decision-making and help uncover hidden gems before they break into the mainstream.

7. Conclusion

The success of female rappers isn't random — it's traceable, measurable, and increasingly predictable. Geography, platform placement, and cultural capital all play crucial roles in shaping careers.

The data tells a clear story: talent exists everywhere, but opportunity remains concentrated in specific cities with the right cultural and industry infrastructure. As the industry continues to evolve, understanding these patterns becomes essential for anyone committed to supporting the next generation of female rappers.

By spotlighting these patterns, this project provides a framework for more equitable, data-informed discovery in the music industry — one that helps female rappers not just rise, but thrive.

8. References an data sources

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