A Comparative Brand Analysis of Adidas and Lululemon

Analytics Specialization and Application
Twitter Brand Analysis Coursework

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A. Executive Summary:

This exploratory study analyzes public perception and engagement with Adidas and Lululemon on Twitter to inform a company's understanding of the activewear market landscape of two sportswear brands—Adidas and Lululemon—on Twitter. A structured analytics pipeline was applied, including data collection, text cleaning, sentiment analysis, topic modelling, and network analysis, using over 44,000 tweets collected over a **93-day period**, from **October 2021 to January 2022**. This snapshot captures the emotional tone, thematic trends, geographic distribution, and audience behaviour related to each brand. While one brand exhibited greater visibility and campaign-driven spikes in engagement, the other showed a more focused, community-based interaction pattern. These findings informed a set of actionable insights, including the identification of one high-potential micro-influencer per brand. The outcomes of this report provide strategic guidance on brand positioning, influencer marketing, and audience engagement, forming a foundation for the client's future decision-making and potential market entry strategy.

B. Methodology:

To analyze and interpret Twitter discussions surrounding Adidas and Lululemon, a multi-step analytical process was implemented.The project began with the **collection and merging of two brand-specific tweet datasets**, one for Adidas and one for Lululemon. **Data preprocessing** was then conducted to prepare the combined dataset for analysis—this included removing duplicates, standardizing time formats, cleaning text fields (e.g., removing URLs, mentions, and emojis), and lemmatizing words for consistency. User location data was normalized to extract geographic patterns, and metadata such as user verification, follower count, and engagement metrics (retweets and favorites) were retained to support deeper analysis.

Following preprocessing, the cleaned dataset was analyzed through several lenses. **Sentiment analysis** (using VADER) classified tweets as positive, neutral, or negative to gauge public perception. **Topic modeling** using Latent Dirichlet Allocation (LDA) uncovered thematic structures in the conversation, while **time-series analysis** revealed how sentiment and topic engagement evolved. **Network analysis** of user mentions identified structurally central accounts, and engagement metrics helped surface high-potential **Micro-influencers** for each brand. These results were then summarized through visualizations, comparative breakdowns, and sentiment distributions to draw meaningful conclusions about each brand's digital strategy, audience interaction, and influence potential.

C. Data PreProcessing:

The dataset used in this study comprises 44,380 tweets, collected over a 93-day period from October 1, 2021 to January 1, 2022, offering a consistent temporal window for brand comparison. These tweets were drawn from two brand-specific subsets: 38,212 referencing Adidas and 6,190 referencing Lululemon, and represent contributions from over 33,000 unique Twitter users. Each tweet record originally contained 16 features, including timestamp, tweet content, user ID, location, follower metrics, verification status, and engagement indicators (retweets, favourites). This provided a rich basis for both behavioural and sentiment-based analysis.

Initial data handling was performed using Pandas, where 12,147 missing user location values were imputed with "Unknown" and 22 duplicate tweets were removed based on tweet ID. The created_at field was converted to datetime format, and a date column was extracted to enable time-series analysis. A total of 10,642 unique user location entries were identified, with a strong geographic skew toward the United States, particularly major cities such as Chicago, Los Angeles, Miami, and New York.Tweet text was preprocessed to support sentiment analysis and topic modeling. A

clean_text column was created using a custom 'clean_tweet()' function with NLTK, spaCy, and standard Python tools. This process involved lowercasing, removing URLs, mentions, emojis, and stopwords, followed by lemmatization. Over 8,000 tweets became blank after cleaning due to non-informative content. The full dataset was preserved to maintain temporal integrity and ensure consistent input for all downstream analyses, including sentiment scoring and network modeling.

D. Exploratory Data Analysis

i. Tweet Analysis

This analysis explores brand-specific Twitter activity over a 93-day snapshot period from October 1, 2021, to January 1, 2022. Adidas recorded 38,211 tweets from 29,144 unique users, while Lululemon generated 6,169 tweets from 4,446 users, confirming Adidas's broader reach and audience engagement. Tweet frequency was significantly higher for Adidas, averaging over 410 tweets per day compared to 66 for Lululemon. Notable spikes occurred on October 18 and October 27, respectively—likely linked to promotional events or viral campaigns (refer **Figure 1).**
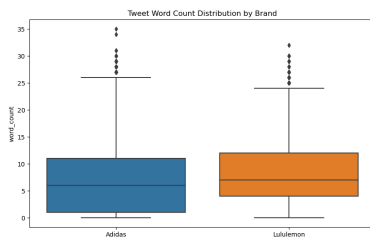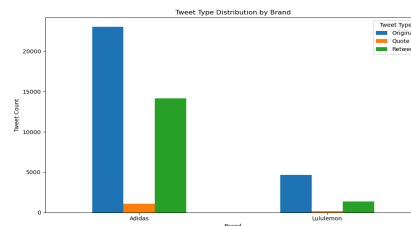

Figure 1. Tweet Word Count Distribution by Brand

Figure 2.Tweet Type Distribution by Brand

Tweets were categorized as Original, Retweet, or Quote (refer **Figure 2**). Adidas posted a higher volume in all categories, particularly original tweets, indicating more proactive content creation. Lululemon tweets were slightly longer in word and character count, suggesting a more descriptive, message-driven tone.
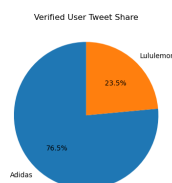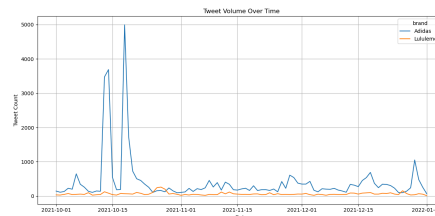

Figure 3.Verified User Tweet Share by Brand

Figure 4.Tweet Volume Over Time by Brand

Adidas tweets contained more hashtags and mentions on average, pointing to stronger tagging strategies and broader conversational intent. Verified accounts contributed a far greater share of Adidas tweets (76.5%) than Lululemon (23.5%), reinforcing Adidas's reach among official and influential users (refer **Figure 3**). These patterns suggest Adidas prioritizes campaign virality, while Lululemon leans toward sustained, narrative-led engagement.

ii. Location Analysis

Location data highlights geographic trends in user engagement. After standardizing over 10,000 unique entries, the U.S. led with 14,527 tweets, far ahead of the UK (541), followed by Canada, Germany, and India. A choropleth map (Figure 5) shows strong North American activity, especially in cities like Miami, Atlanta, and Los Angeles. Vague or non-geographic entries (e.g., "earth," "metaverse") were grouped as "Other," reflecting the informal and inconsistent nature of Twitter location data.

Figure 5. Global Distribution of Tweets by Country (Log-Scaled)

Iii. Twitter User Behavior Analysis

User behavior patterns further illustrate the contrasting strategies between the two brands. Adidas's most influential tweet—a collaboration with Xbox—received over 19,000 retweets and 21,000 likes, totaling an influence score of 41,361.Adidas also attracts more high-profile users, with its most followed user having 17 million followers, compared to 4.5 million for Lululemon's top user..Adidas consistently drew broader direct engagement, with over 44,000 tweets explicitly tagging the brand, and dominated user influence scores based on combined retweet and favorite counts. Lululemon's most engaged tweet reached just over 1,000 likes and fewer than 2,000 retweets. Adidas also had greater verified user activity, with its top verified user posting 33 tweets versus 14 from Lululemon's top verified account. This disparity reinforces Adidas's stronger foothold among high-profile users and influencers.
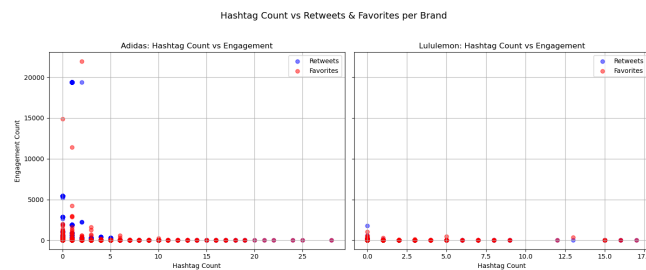

Figure 6. Hashtag Count vs Engagement (Retweets & Favorites) by Brand

Brand tagging was widespread, with over 44,000 tweets explicitly mentioning official Adidas or Lululemon handles, highlighting active audience-brand interaction. Hashtag use showed key differences: Adidas tweets, especially with **#xboxsweepstakes** and **#impossibleisnothing**, had strong correlations with retweets and favorites (see Figure 6). These were used thousands of times, while Lululemon's top hashtags like **#thesweatlife** or **#fossilfreefashion** appeared under 120 times. Together, these patterns suggest Adidas drives large-scale, campaign-based engagement amplified by influencers, whereas Lululemon cultivates smaller but more consistent community-focused conversations grounded in lifestyle and sustainability themes.

E. SENTIMENTAL ANALYSIS

Sentiment analysis was conducted to understand how users emotionally engaged with Adidas and Lululemon on Twitter, offering valuable insight into brand perception and audience response. The analysis used **VADER** (Valence Aware Dictionary for Sentiment Reasoning), a tool designed for analyzing social media language. Each tweet's cleaned text was scored on a scale from -1 (most negative) to +1 (most positive), then classified as Positive (≥ 0.05), Neutral (between -0.05 and 0.05), or Negative (≤ -0.05). VADER was chosen for its proven effectiveness in handling short, informal, and emotive text typical of Twitter content, outperforming traditional lexicon-based methods in this context.

As shown in **Figure 7**, overall sentiment was favorable, with 47.4% of tweets being positive and only 11% negative. Lululemon showed slightly higher positivity 51% than Adidas 46.7% but also had more negative sentiment 15%, suggesting its audience expressed stronger emotional contrasts.
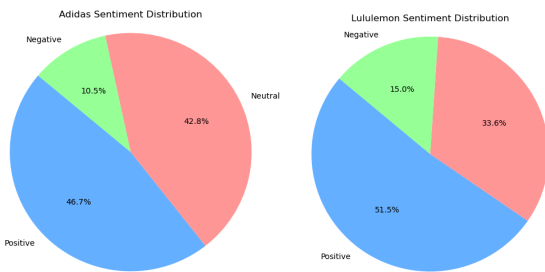
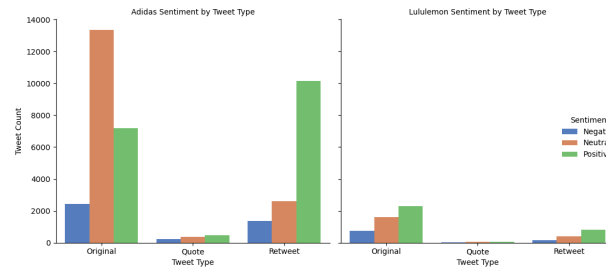

Figure 7.Sentiment Distribution for Each Brand

Figure 8.Sentiment by Tweet Type for Adidas and Lululemon

Deeper analysis revealed how sentiment varied across tweet types, user verification, and follower groups. Adidas retweets were predominantly positive, indicating successful amplification of promotional content, while original tweets attracted more critical feedback, especially around customer service. Verified users across both brands leaned toward neutral or positive sentiment, whereas unverified users—who made up the majority—accounted for a wider emotional range, including most of the negative posts (refer **Figure 8**). Follower count also played a role. Adidas received more positive sentiment from users with fewer followers, pointing to broad grassroots appeal. Lululemon's strongest positivity came from high-follower users, suggesting effective influencer engagement (refer **Figure 9**).
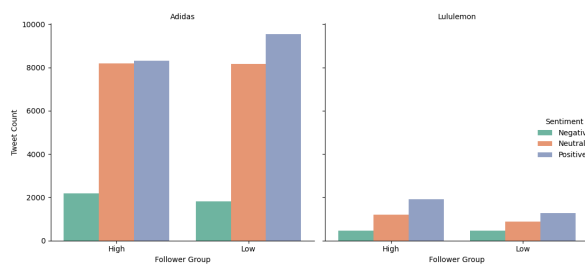

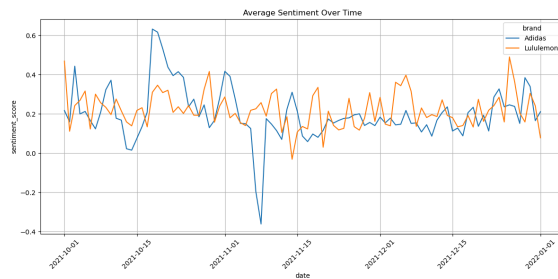*Figure 9.Sentiment Distribution by Follower Group Figure*

Figure 10.Average Sentiment Over Time by Brand

Looking at changes over time in Figure 10, Adidas sentiment showed sharper rises and dips, often tied to specific events like the Xbox collaboration. These spikes reflect a reactive audience driven by campaign moments. Lululemon, in contrast, maintained a steadier sentiment pattern, indicating more consistent engagement. This highlights two distinct strategies: Adidas relies on high-impact, campaign-led bursts, while Lululemon builds ongoing positivity through stable, narrative-driven relationships. The sentiment analysis suggests Adidas could benefit from maintaining engagement between campaigns, while Lululemon might strengthen its impact by expanding influencer-driven moments into broader community traction. Each brand reflects a unique approach to emotional connection and audience activation.

F. TOPIC MODELLING:

Topic modeling was employed in this project to uncover the underlying themes and patterns in social media conversations surrounding Adidas and Lululemon.Topic modeling helps uncover underlying themes in large volumes

of tweet data, making it possible to identify how people perceive each brand, what conversations they engage in, and which marketing messages gain traction—directly supporting the project's goal of mapping brand perception and audience engagement.

To perform topic modeling, the cleaned text data was vectorized using **CountVectorizer**, then analyzed using several models—**Latent Dirichlet Allocation (LDA), Non-negative Matrix Factorization (NMF), and TF-IDF with KMeans clustering**—to determine which produced the most interpretable results. LDA proved to be the most effective across both brands, offering clearer topic separation, higher coherence scores, and better alignment with campaign themes and user engagement. The final selection of five topics for Adidas and four for Lululemon was based on peak coherence scores, ensuring the most semantically meaningful structure in identifying key themes within each brand's Twitter discourse.To support topic interpretation, **WordClouds** were generated for each brand using the most frequent and weighted terms from the LDA model outputs(refer Figure 12 & 13). Additionally, **PyLDAVis** was used to create an **interactive HTML visualization** of the topic distribution and keyword relevance, enhancing interpretability.

Figure 11. Topic Categorization and Sentiment Breakdown for Adidas and Lululemon

The LDA-derived topics for Adidas reveal distinct brand-driven initiatives that significantly influenced audience engagement. **Topic 1** centers on the **Adizero Launch and NFT Giveaway**, highlighting Adidas' innovative push into digital experiences and product hype, which generated widespread interest and excitement. **Topic 2**, themed around **Impossible-Is-Nothing ft. Donovan Mitchell**, reinforced the brand's motivational ethos and athlete-led storytelling, eliciting strong positive sentiment. **Topic 3** reflects **NFL Gear and Game Day Promotions**, showing Adidas' alignment with seasonal sports events and the resulting engagement peaks during those periods. T**opic 4** focuses on the **XboxxAdidas Sweepstakes**, leveraging cross-brand collaboration and prize incentives to broaden reach and boost participation. Finally, **Topic 5** captures buzz around **Limited-edition Sneaker releases**, where consumer anticipation and exclusivity drove emotionally charged conversations and viral traction.Collectively, these topics illustrate how Adidas strategically leveraged innovation, athlete partnerships, cultural moments, and exclusivity to not only drive engagement but also to shape brand perception, reinforce loyalty, and cultivate a dynamic, emotionally resonant presence within digital conversations.

Figure 12.WordCloud for Adidas

Figure 13.WordCloud for Lululemon
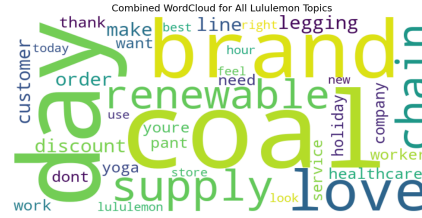
The LDA-derived topics for **Lululemon** reflect a deliberate blend of advocacy, wellness, and experiential marketing, each eliciting distinct audience sentiment. **Topic 1**, focused on **Holiday Climate Activism**, was driven by sustainability concerns and sparked neutral sentiment, as climate advocates called for eliminating coal from Lululemon's supply chain. The conversation, while not emotionally charged, signaled growing public expectations for corporate environmental responsibility. **Topic 2**, centered on the **25% Healthcare Worker Discount**, generated a highly positive response, reflecting public appreciation for frontline workers and the brand's gratitude efforts. However, a small portion of negative and neutral sentiment emerged around perceived exclusions. **Topic 3**, themed **The Sweat Life & Yoga Advocacy**, was more mixed, showing moderate positivity alongside neutral sentiment , suggesting a blend of aspirational engagement and everyday commentary. **Topic 4**, covering Mental Health Partnerships under the **"Your Wellbeing Matters" campaign**, elicited strong positive sentiment, as audiences resonated with Lululemon's corporate social impact messaging and nonprofit collaborations. Collectively, these topics reveal how Lululemon's community-focused and purpose-led strategies cultivated trust, emotional connection, and brand loyalty—anchoring its identity in both wellbeing and responsible leadership.

Figure 14. Topic Distribution Over Time for Adidas & Lululemon

Figure 14 reveals distinct engagement rhythms for Adidas and Lululemon across the final quarter of 2021. For Adidas, the distribution over time shows pronounced spikes in October, particularly around mid-month, driven by time-sensitive campaigns such as product giveaways, sneaker launches, and NFL promotions—strategies that fueled viral bursts of conversation. These sharp peaks suggest Adidas' reliance on event-based hype to drive immediate public interest. In contrast, Lululemon's topic distribution chart shows a more sustained and balanced pattern, with consistent engagement throughout October to December. Topics tied to mental health advocacy, wellness messaging, and sustainability initiatives maintained steady relevance across months, especially around the holiday season in December. This suggests that while Adidas captured attention through short-term excitement, Lululemon fostered ongoing emotional resonance and brand alignment over time, reflecting two different but effective models of consumer engagement

G. Micro Influencer Identification

Network Analysis

To systematically uncover influential voices within the Twitter ecosystems of Adidas and Lululemon, a network-based micro-influencer identification framework was employed. This approach centers on constructing mention networks, where nodes represent users and directed edges indicate user mentions — a proxy for influence, recognition, or community interaction. By analyzing these structures, the goal was to identify users who, while not necessarily celebrities or macro-influencers, demonstrate high structural centrality, meaningful engagement, and positive sentiment , traits characteristic of effective micro-influencers.

$$Engagement\_rate = (\text{no. of retweets} + \text{no. of favourites}) / \text{no. of followers}$$

Adidas Network Metrics:
Total nodes (users): 29,144
Total edges (mention links): 39,324
Network density: 0.0046%

Lululemon Network Metrics:
Total nodes (users): 4,463
Total edges (mention links): 1,360
Network density: 0.0068%

Figure 15. Engagement Rate Formula

Figure 16.Mention Network Metrics by Brand

The resulting network for Adidas was significantly larger, with over 29,000 users and nearly 39,000 mention-based connections. In contrast, Lululemon's network was smaller, with around 4,500 users and 1,360 directed edges. Despite the size difference, both networks showed very low densities, reflecting the typical sparsity of social media graphs where a few users occupy central positions and most engage infrequently or peripherally. To understand user influence, centrality metrics were calculated, including **in-degree** (number of mentions), **betweenness** (a user's role in connecting network segments), and **closeness** (how quickly a user can reach others). These metrics provided insights into each user's prominence and function.These structural insights laid the groundwork for identifying influential individuals within each brand's network.This analysis prioritizes users with balanced profiles—**moderate reach, positive sentiment, high engagement, and structural influence**—making them strong candidates for micro-influencer roles.

Micro-influencers were ranked based on four key metrics:
- **Structural Influence**: Measured using in-degree (the number of mentions received) and betweenness centrality (how often an influencer bridges connections between other users), which indicate their network positioning and potential for spreading content.
- **Reach:** The number of followers indicates the influencer's ability to engage a broad audience, with a higher follower count reflecting greater reach.
- **Sentiment**: The sentiment score of tweets reflects the influencer's alignment with a positive brand image, focusing on content that conveys favorable sentiments.
- **Engagement:** Calculated via engagement rate (interaction per follower) and average retweet/favorite counts, this metric shows how effectively the influencer engages their audience.

Each of these metrics was normalized using MinMaxScaler and combined into a composite score. The influencers were then ranked based on their composite scores, with the top influencers selected for their overall influence, reach, sentiment, and engagement.

Figure 17. Recommended influencers Adidas and Lululemon

@NicholasFerroni is a micro-influencer for Adidas with 94,334 followers and a neutral sentiment score of 0.1. He has an in-degree of 18, indicating moderate interactions, with an average retweet count of 24.3 and a favorite count of 344.67. His engagement rate is 0.03, and his composite score is 0.3345, showing him as a valuable but modest influencer for Adidas.**@Elamite**, with 30,579 followers and a high sentiment score of 0.8, is a micro-influencer for Lululemon. Although he has a low in-degree 0, his average retweet count of 19,396 and a high engagement rate of 0.6 indicate strong reach and influence. His composite score of 0.4752554 underscores his relevance and positive impact within the community.

In summary, @NicholasFerroni and @Elamite offer distinct strengths. Ferroni's moderate engagement suits Adidas' balanced approach, while Elamite's high engagement and positive sentiment align well with Lululemon's brand advocacy—each contributing unique value to their respective digital strategies.

H. Conclusion

The analysis of Adidas and Lululemon's digital presence on Twitter has provided valuable insights into their audience engagement and sentiment. **Adidas** demonstrated a strong capability in generating excitement and engagement, especially through its collaborations, product launches, and viral campaigns. **Lululemon**, on the other hand, maintained a more focused and consistent brand presence, particularly around wellness, sustainability, and mental health advocacy. Both brands received positive sentiment from their respective audiences, with Adidas benefiting from its extensive reach and Lululemon from its emotionally resonant content. However, despite the overall positive sentiment, there remains room for improvement, particularly in how these brands can maintain engagement beyond major campaigns and expand their reach through micro-influencers.

I. Recommendations

- **Influencer Strategy:** Focus on leveraging micro-influencers to increase brand visibility and engagement, especially during key campaigns or product launches. Encourage these influencers to engage with their audience more actively to strengthen brand presence.
- **Content Strategy:** Tailor content to align with trending topics and the preferences of different audience segments. Incorporating more engagement-driven content such as giveaways or Q&A sessions could increase interaction.
- **Monitoring**: Continuously monitor sentiment trends and user engagement over time to ensure that marketing efforts are aligned with audience interests. Expanding the analysis to other platforms and international markets would help gain a broader understanding of global brand perception.