Problem Statement:

Xoxoday, a Bangalore-based gifting startup valued at $400 million, has made its place in experiential gifting, aiming to be a brand that is known for creating lasting memories with close friends and family. However, despite a strong 60% retention rate, the company struggles in acquiring new customers. Their social media engagement is poor, preventing them from reaching their goal to reach a $1 billion valuation.

Social media is a cost-effective tool for expanding reach and acquiring customers. However, without analyzing user interactions and adjusting content based on engagement metrics, the impact of social media marketing can plateau. To understand the underlying issue, I examined social media interactions on Twitter from January 2017, which consisted of 4,565 instances of interactions involving Xoxoday's tweets, mentions, replies, and retweets.

Network Overview and Description:

I constructed three directed graphs based on this data, where nodes represent users and edges represent interactions like mentions, replies, and retweets. I used directed graphs as social media interactions are inherently directional (a person liking another's tweet is a directional action). I excluded standalone tweets as both the nodes in those interactions were Xoxoday which would distort the analysis. The main columns I used were the vertexes, hashtags, tweets, and relationship. The tweets were dominated by mentions, with 3,184 edges for mentions and only 94 for replies. The average degree of 1.29 suggests a sparse network as can be seen in the graph with only a few influential nodes at the center which are the main connectors, indicating weak community engagement. I created a second graph from the retweets which had 467 edges, further indicating limited retweeting activity.

Centrality Measures:

Degree Centrality: Degree centrality measures user activity, with high in-degree values identifying users who are frequently mentioned and high out-degree values identifying users who mention others. High degree centrality was found mostly among contest-related accounts like **contesttable**, which do not represent actual customers but instead focus on finding and showing contests from multiple companies. The retweets network had higher degree centrality than the mentions, suggesting more engagement in retweeting than mentioning which had the lowest degree centrality.

Eigenvector Centrality: Eigenvector centrality identifies influential users connected to other highly connected users. Users with high eigenvector centrality could help amplify Xoxoday's reach, given their ability to spread content through well-connected parts of the network so it's important for them to identify and engage with these users.

PageRank: PageRank measures user importance based on the quality and quantity of connections like done by Google for web pages. Accounts like **Uber** and **Olacabs** had relatively high PageRanks, indicating they have significant influence even while engaging minimally. Replies

had the highest PageRank, followed by retweets indicating that users involved in replies and retweets had more user importance.

Betweenness Centrality: Betweenness centrality identifies users who connect different communities serving as bridges to spread information amongst communities. However, the overall low betweenness centrality (0.000070) in the mentions and replies graphs indicates that most users are isolated, showing the lack of community.

Closeness Centrality: Closeness centrality measures how quickly information can spread through the network. Despite the fragmented network, some users exhibited high closeness centrality (0.029020), meaning they can quickly reach others within the network. However, these users were mostly contest-related accounts. Replies had the highest closeness centrality (0.055171), suggesting that users in replies were closer to others in terms of network distance, which makes sense because users generally only reply if they know or are comfortable with the other person.

Katz Centrality: Katz centrality combines direct and indirect connections to measure influence. The relatively higher Katz scores in replies (0.017312) indicates that information spreads efficiently across the network(lots of indirect connections). However, again contest-related accounts dominated this measure, not genuine users. Retweets had the lowest Katz centrality, indicating that retweets did not significantly contribute to influence, probably since it's more of a passive action, you're not adding more information, you're just sharing it again.

HITS (Hubs/Authorities): HITS differentiates between hubs (users who engage with authorities) and authorities (users who attract engagement). Although Xoxoday had the highest authority score, it was not significantly higher than contest accounts, which suggests users were not did not consider Xoxoday at a higher position than small contest accounts.

Connected Components Analysis:

The combined graph (mentions + replies) showed a weakly connected network with 2,493 nodes but 2,406 strongly connected components. This indicates limited reciprocal communication (as also shown in the column Reciprocated? with most instances having No), confirming that the network is more about broadcasting content than creating genuine conversations and lasting relationships. Broadcasting with these contests gets people to come across the brand but not learn anything important about the brand which is critical for customer acquisition and retention. The replies graph had small clusters with slightly better reciprocal connections but still showed significant isolation.

Text Mining:

The top 10 hashtags revealed a strong focus on contests, with hashtags like **#contest** (186 mentions), **#live** (151 mentions), and **#contestalert** (103 mentions) dominating the conversation. This aligns with Xoxoday's strategy during the period, which was centered on contest promotions. I performed stopword removal, lemmatization, and cleaned out usernames to focus on the content themes. The TF-IDF analysis confirmed that the interactions were heavily contest-driven, with terms like "rt," "join," and "contest" dominating the content. Additionally,

the analysis also shows that Xoxoday should leverage partnerships more as even with only a few tweets the partnerships with **Uber** and **Olacabs** stood out.

Word cloud, n-gram analysis, and Latent Dirichlet Allocation confirmed that the network was focused on contests rather than brand-driven messaging, though the prizes did reflect the experiential aspect of the company. But in the end users were predominantly engaging with contests and prizes and their prize experience, not with the brand itself.

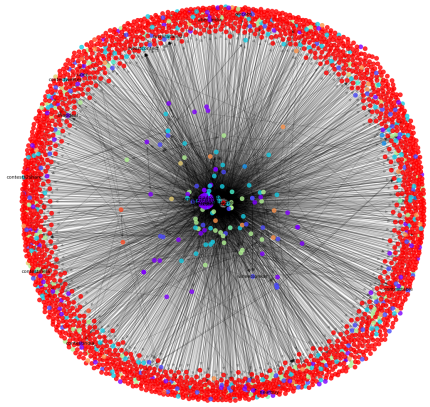
Business Recommendations:

1. **Shift from Contests to Brand-Driven Engagement:** Xoxoday should reduce its reliance on contest-driven interactions and focus on creating meaningful content that highlights the personality and essence of the company, and their value of giving and sharing experiences. A few seasonal contests are fine but they have more impact when you already have a strong network since they lead to more mentions which have shown to be less engaging than replies and retweets. In addition, they give more space for contest accounts to gain attention rather than the brand account. The content should target customers who are likely to engage meaningfully with the brand and be actual customers, rather than contest-driven content that only generates temporary interactions and finds customers who are unwilling to buy experiences and looking for them for free instead.

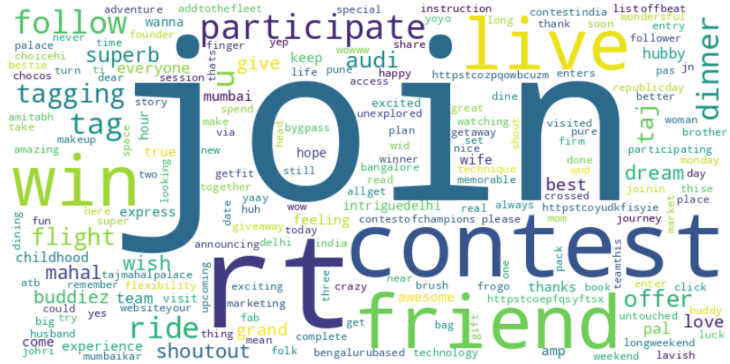
2. **Foster Discussions and Increase Engagement:** Encouraging more reciprocal communication by creating discussions that expand outside their following rather than one-way broadcasting will increase engagement, garner attention as discussions reach different communities, and help build a loyal social media follower base. Xoxoday could focus on initiating conversations with users who exhibit higher closeness centrality, send funny replies to comments, find users who mention the company in non-contest contexts and retweet them, and ask repeating users to share their funny or emotional experiences with a special hashtag like #UnboxTheJoyXOXO to showcase their loyal customers as currently though they have a high retention rate that loyalty doesn't reflect in their social media. This is supported by the fact that the replies which have content similar to this perform better according to the analysis and have more engagement.

3. **Focus on Partnerships:** Collaborating with high-status partners like **Uber** and **Olacabs** can further enhance Xoxoday's reach since even with a few posts they garner influence. However, these partnerships should shift from contest-focused promotions to more authentic, brand-aligned campaigns, possibly with hotels or other travel and tourism companies.

Twitter Network with Communities



Word Cloud Based on TF-IDF Scores

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Average centrality measures for Mentions:
  - in_degree: 0.000514
  - out_degree: 0.000514
  - betweenness: 0.000070
  - closeness: 0.028551
  - eigenvector: 0.015327
  - pagerank: 0.000402
  - hubs: 0.000402
  - authorities: 0.000402
  - katz: 0.017672

Average centrality measures for Replies:
  - in_degree: 0.011477
  - out_degree: 0.011477
  - betweenness: 0.000933
  - closeness: 0.055171
  - eigenvector: 0.031724
  - pagerank: 0.010989
  - hubs: 0.010989
  - authorities: 0.010989
  - katz: 0.084185
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Identified 15 topics:
Topic 1: participate, rt, contest, follow, u, tag, live, shoutout, everyone, give
Topic 2: u, rt, bengalurubased, contest, firm, enter, market, offbeat, plan, marketing
Topic 3: join, rt, wife, big, contest, live, participate, tag, follow, buddiez
Topic 4: tagging, rt, best, awesome, friend, pal, dream, come, true, brother
Topic 5: one, bygpass, access, flexibility, allget, pas, getfit, complete, yep, huh
Topic 6: dinner, love, rt, experience, amp, grand, hubby, palace, lavish, new
Topic 7: rt, dine, always, fun, woman, crazy, ti, session, real, brush
Topic 8: ride, win, rt, taj, audi, contest, dinner, live, friend, tag
Topic 9: wish, dinner, mumbai, team, give, day, soon, mom, could, win
Topic 10: express, feeling, childhood, yes, amazing, finger, make, try, done, life
Topic 11: buddiez, husband, adventure, book, spend, dining, via, long, special, wud
Topic 12: rt, gift, chocos, thise, contest, keep, hour, watching, space, frogo
Topic 13: rt, contest, friend, live, win, superb, super, excited, big, tag
Topic 14: offer, flight, thanks, list, here, wid, intriguedelhi, looking, thing, longweekend
Topic 15: rt, win, winner, announcing, weekend, still, near, mean, monday, three
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Average centrality measures for Retweets:
  - in_degree: 0.001902
  - out_degree: 0.001902
  - betweenness: 0.000000
  - closeness: 0.003305
  - eigenvector: 0.000000
  - pagerank: 0.002016
  - hubs: 0.002016
  - authorities: 0.002016
  - katz: 0.028337
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Basic Text Statistics:
total_documents: 4565
total_words: 14152
unique_words: 507
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Top 10 bigrams:
contest live: 482
rt contest: 431
rt tag: 375
tag friend: 322
live rt: 321
friend win: 306
follow u: 299
u participate: 299
participate rt: 218
dinner taj: 168

Top 10 trigrams:
rt tag friend: 322
contest live rt: 307
tag friend win: 306
follow u participate: 299
rt contest live: 281
participate rt tag: 218
u participate rt: 172
contest live follow: 160
live follow u: 160
live rt tag: 157
```