USER ENGAGEMENT ANALYSIS FOR RESTUARANT SUCCESS

About Yelp

Yelp is a web and mobile platform that serves as a crowd-sourced local business review site. It allows users to discover, review, and rate businesses, share photos, and provide tips based on their experiences. Businesses can also engage with customers, update their profiles, and respond to reviews, making Yelp a valuable resource for both consumers and business owners.

AGENDA

This project analyzes Yelp data to identify trends, test hypotheses, and provide actionable recommendations.

- Problem Statement
- Research Objectives
- Hypothesis
- Data Overview
- Analysis and Findings
- Recommendations

Problem Statement

In the competitive restaurant industry, understanding the key factors driving business success is essential for stakeholders. This project leverages the Yelp dataset to analyze the impact of user engagement—measured through reviews, tips, and check ins—on business success metrics such as review count and ratings.

Research Objectives

Measure the correlation between user engagement (reviews, tips, check ins) and business success metrics, including review count and average star rating.

Analyze the impact of review sentiment on review count and average star rating.

Analyze time trends in user engagement, including variations in reviews, tips, and check-ins over time.

Hypothesis

- Restaurants with more reviews, tips, and check-ins tend to have higher ratings and review counts.
- Positive reviews and tips help boost a restaurant's overall rating and review count.
- Regular customer engagement over time supports long-term restaurant success.
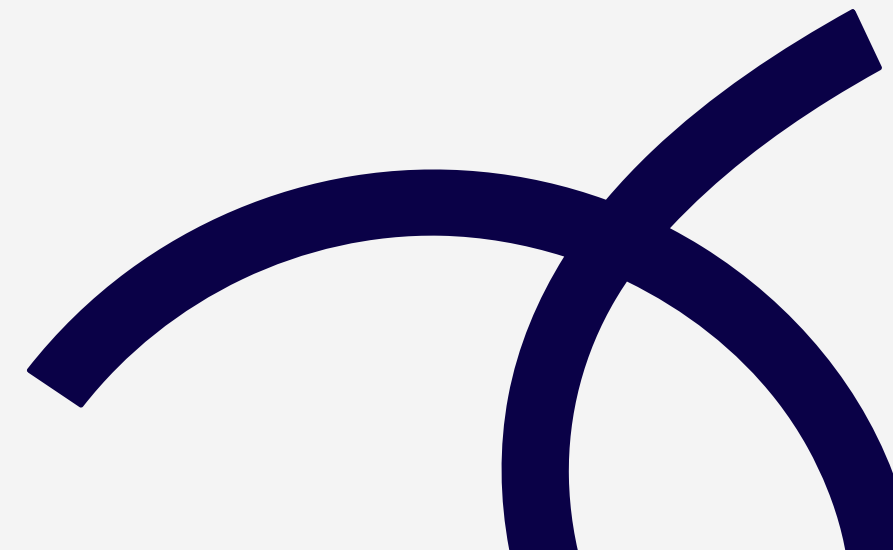
Data Overview

- Subset of Yelp data covering businesses in eight metropolitan areas in the USA and Canada.
- Provided by Yelp in JSON format.
- **Includes five JSON files:**
  - Business – Details about businesses.
  - Review – User submitted reviews.
  - User – Information about Yelp users.
  - Tip – Short user tips for businesses.
  - Check ins – User check in activity.
- Data is stored in a database for easy retrieval and analysis.

Analysis and Findings

avg_review_count	55.975426
min_review_count	5.000000
max_review_count	248.000000
review_count	15.000000
avg_star_ratings	3.477281
min_star_ratings	1.000000
max_star_ratings	5.000000
median_star_ratings	3.500000

Out of 150K businesses, 35K are open restaurants, making up a significant portion of the dataset.

Business Success Metrics:
The table below highlights key success indicators—review count and average rating—which help assess customer engagement and overall business performance. Higher reviews and ratings typically indicate strong customer satisfaction and business credibility.

Highest Rating

name	review_count	avg_rating
Healthy N Fresh Cafe	238	5.0
Yolk White & Associates	229	5.0
Sundae's Ice Cream & Coffee	225	5.0
Ali'i Poke Indy	223	5.0
Barrio Bread	221	5.0
Tortilleria San Roman	219	5.0
Hole In One Donut	214	5.0
D'Andrews Bakery & Cafe	212	5.0
Tlaolli	209	5.0
Kpicu	203	5.0

Highest Review Count

	name	review_count	avg_rating
0	McDonald's	16490.0	1.868702
1	Chipotle Mexican Grill	9071.0	2.381757
2	Taco Bell	8017.0	2.141813
3	Chick-fil-A	7687.0	3.377419
4	First Watch	6761.0	3.875000
5	Panera Bread	6613.0	2.661905
6	Buffalo Wild Wings	6483.0	2.344828
7	Domino's Pizza	6091.0	2.290210
8	Wendy's	5930.0	2.030159
9	Chili's	5744.0	2.514706

- A higher rating does not always mean a higher review count, and vice versa.
- A restaurant's success is influenced by multiple factors, not just ratings or review counts.
- Review count indicates user engagement but does not fully reflect customer satisfaction or overall business performance.
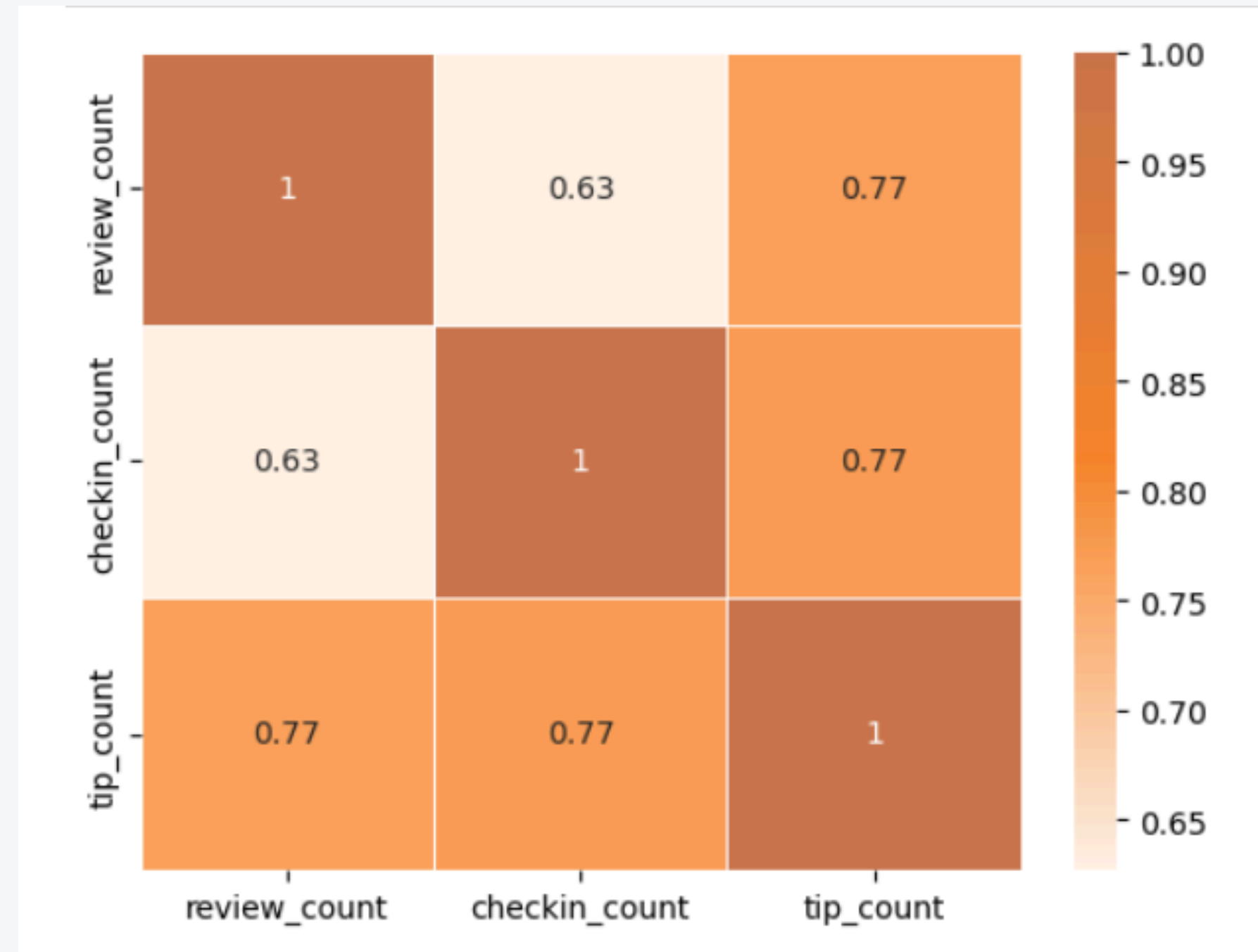
Is there a correlation between higher engagement and higher ratings in restaurants?
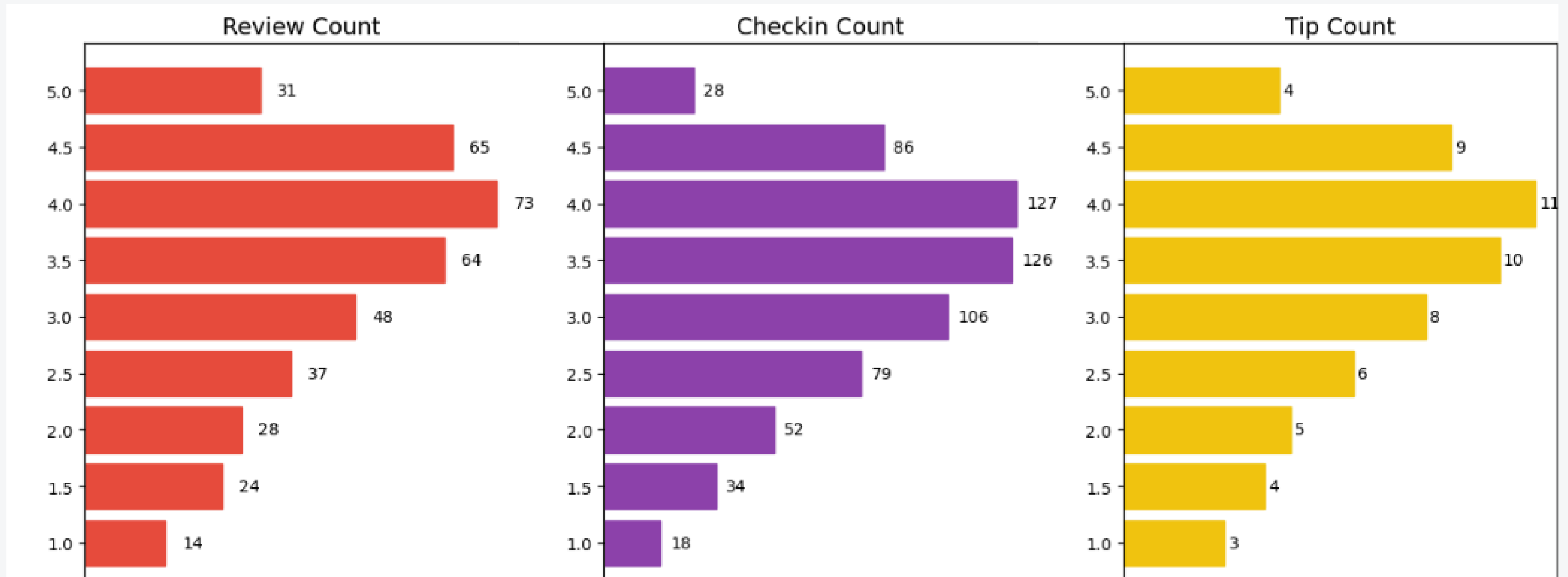
- **Engagement Trend:** More reviews, check-ins, and tips as ratings go from 1 to 4 stars, showing higher customer activity.
- **Peak Engagement:** 4-star restaurants get the most attention, balancing popularity and satisfaction.
- **5-Star Drop:** Fewer reviews at 5 stars, possibly because only a small, loyal group visits or people feel no need to review.

Is there a relationship between a business's number of reviews, tips, and check-ins?

- **Interlinked Engagement:** Higher activity in reviews, tips, or check-ins often corresponds with increased activity in the others.
- **Business Strategy:** Boosting one type of engagement can positively impact others, improving visibility and customer interaction.

Is there a difference in the user engagement between high-rated and low-rated businesses?

category	review_count	checkin_count	tip_count
High-Rated	72.291062	122.066641	10.162766
Low-Rated	42.123420	88.880828	6.541689

- **Correlation Insight:** Higher ratings are linked to increased reviews, tips, and check-ins.
- **Business Impact:** Maintaining high service and quality standards drives customer engagement, boosting key metrics like reviews and check-ins.

How do the success metrics restaurants vary across different states and cities?

- Top City: Philadelphia leads with the highest success score, showing strong ratings and engagement.
- Other High-Performing Cities: Tampa, Indianapolis, and Tucson also rank among the top, indicating a vibrant restaurant scene.
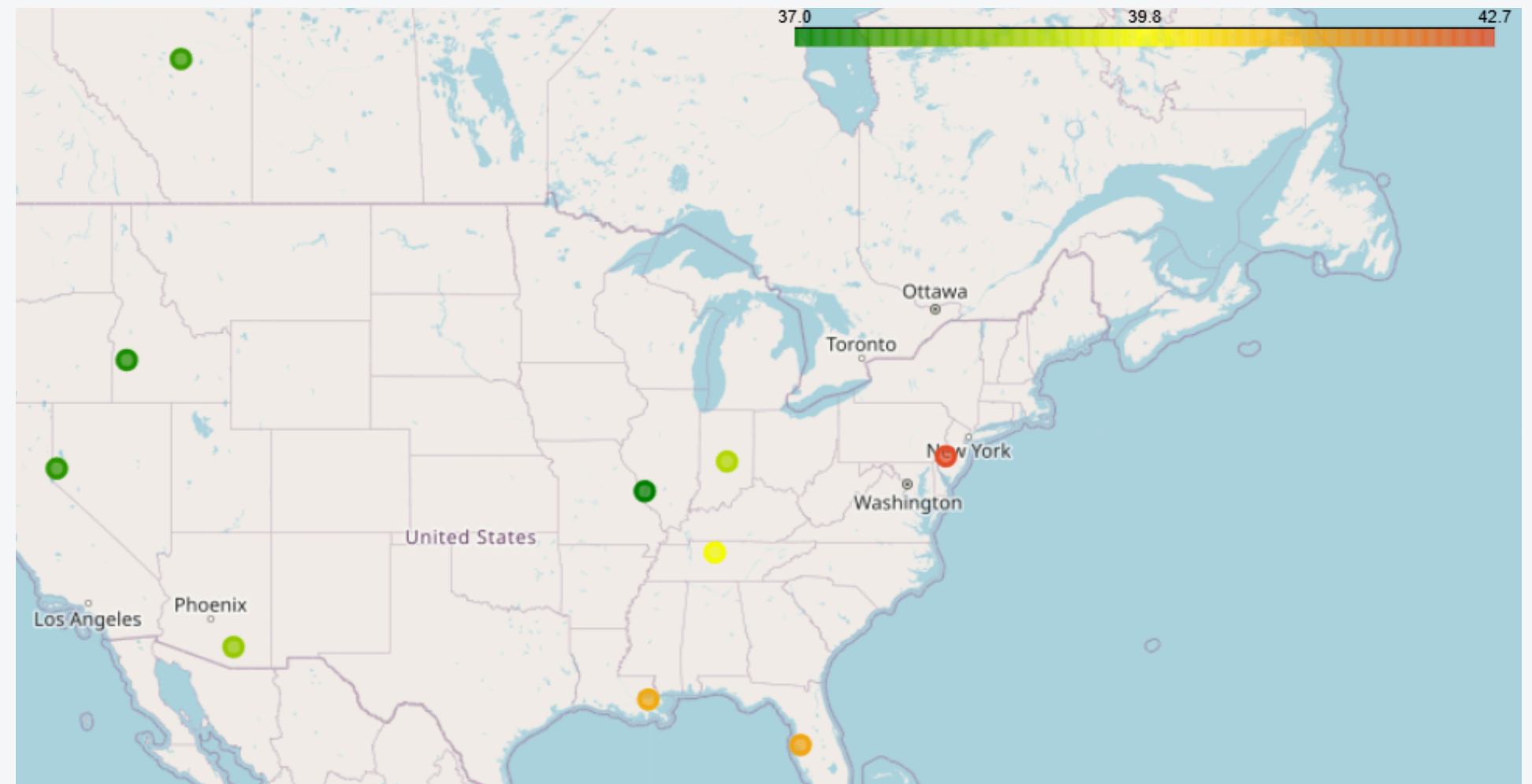
Are there any patterns in user engagement over time for successful businesses compared to less successful ones?

- **Consistent Engagement:** Businesses with ratings above 3.5 show steady or increasing user interaction over time.

- **Sustained Success:** High-rated restaurants maintain strong engagement, indicating continuous customer interest and satisfaction.
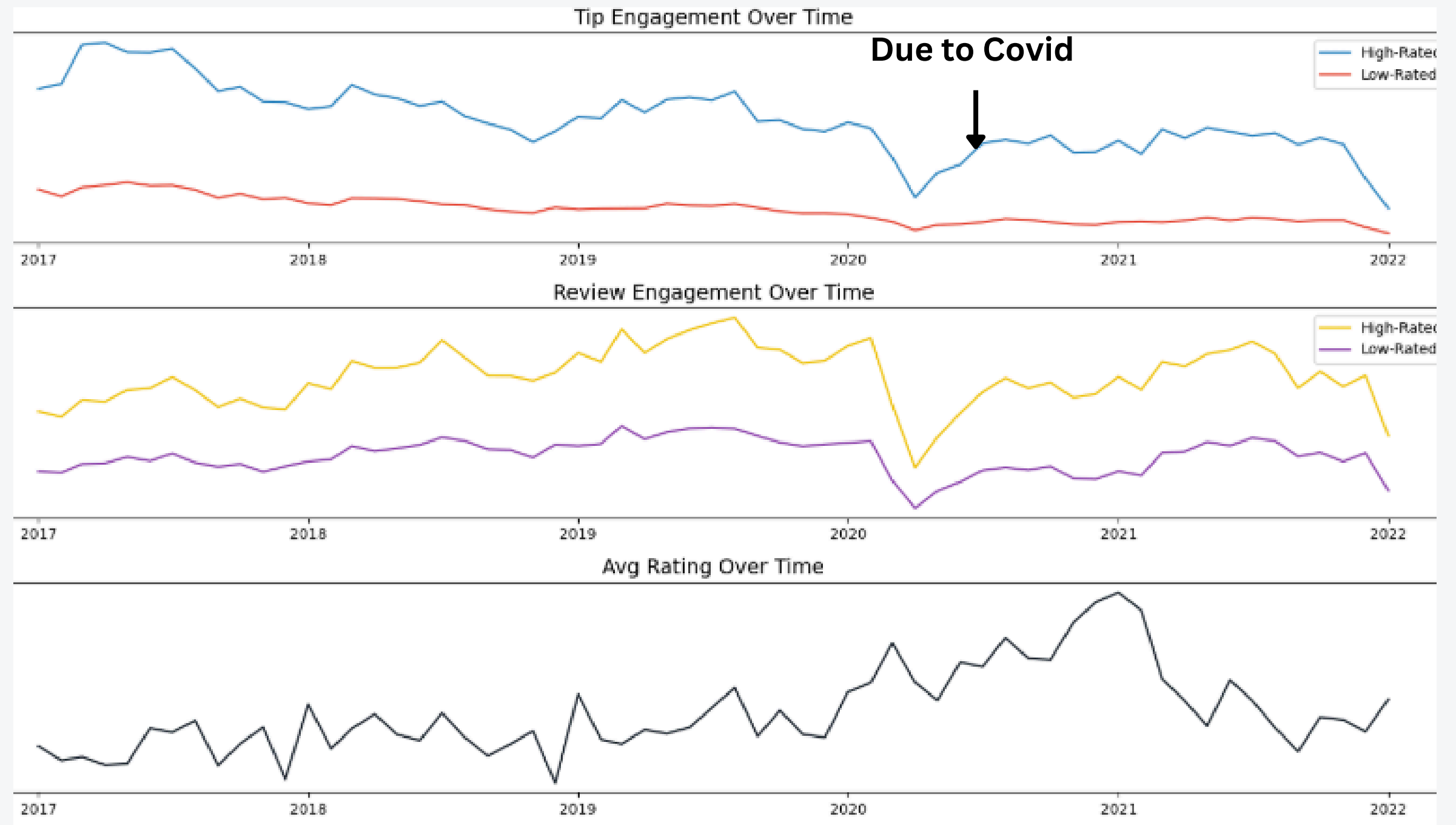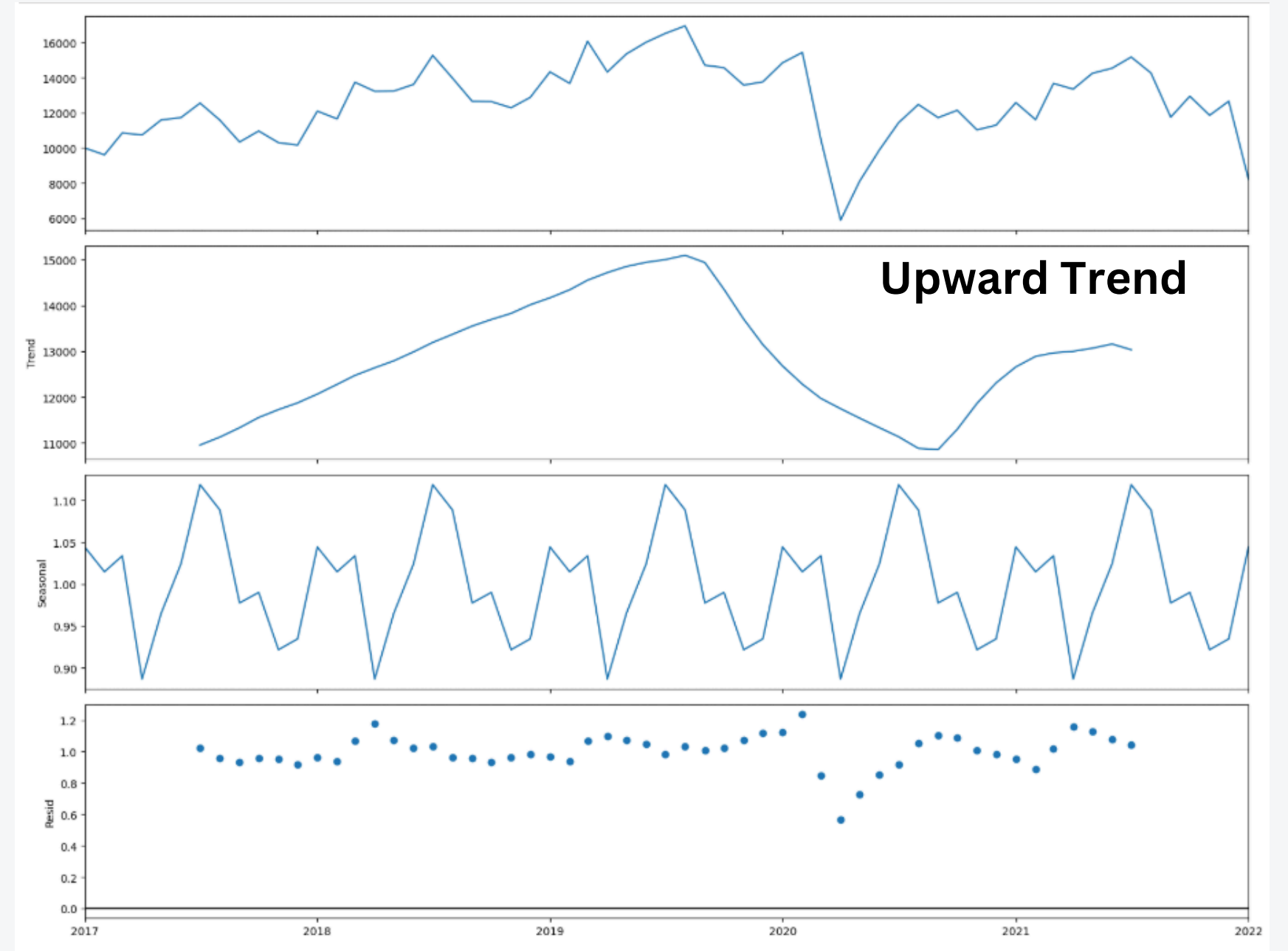
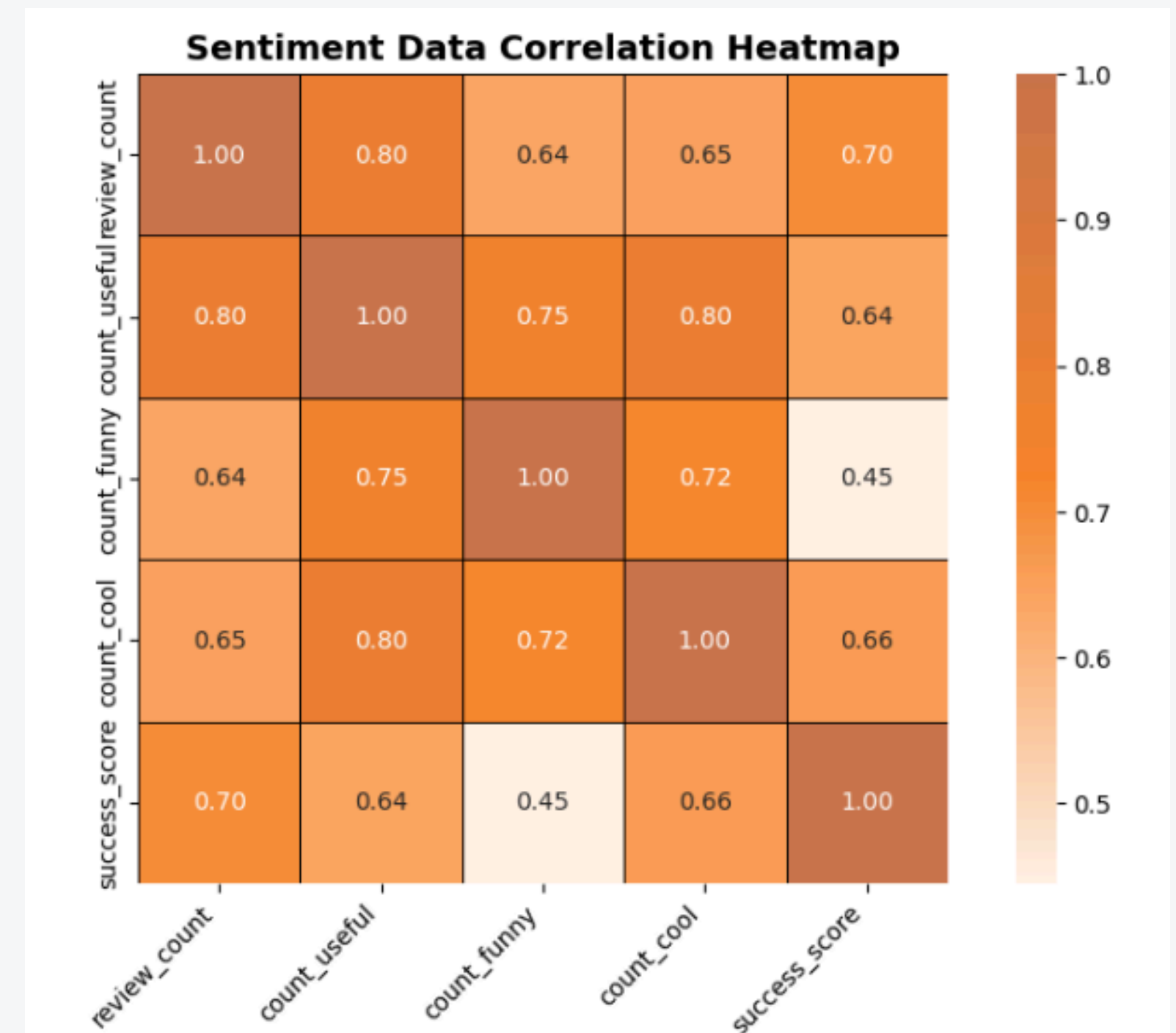# Trend and Seasonality Analysis

Tip count

Review Count

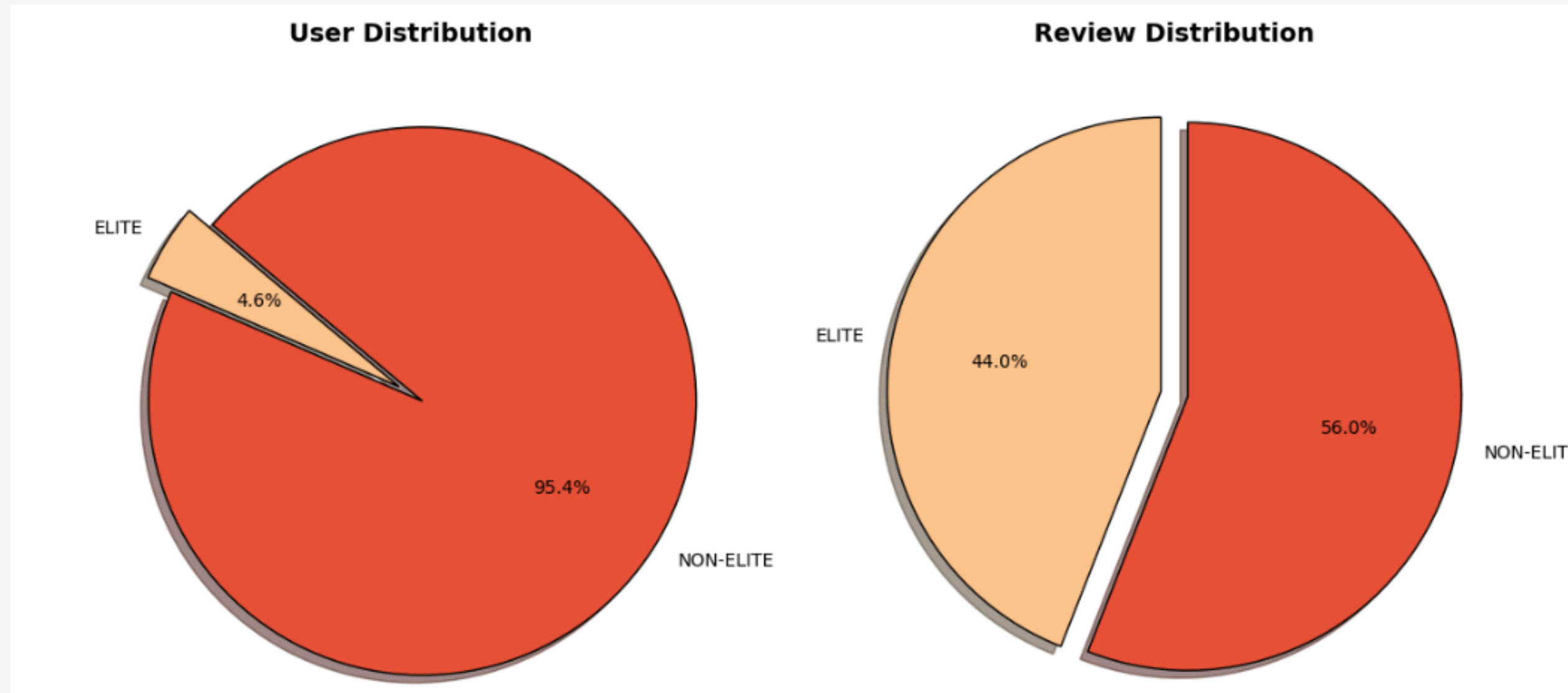
Downward Trend

Upward Trend
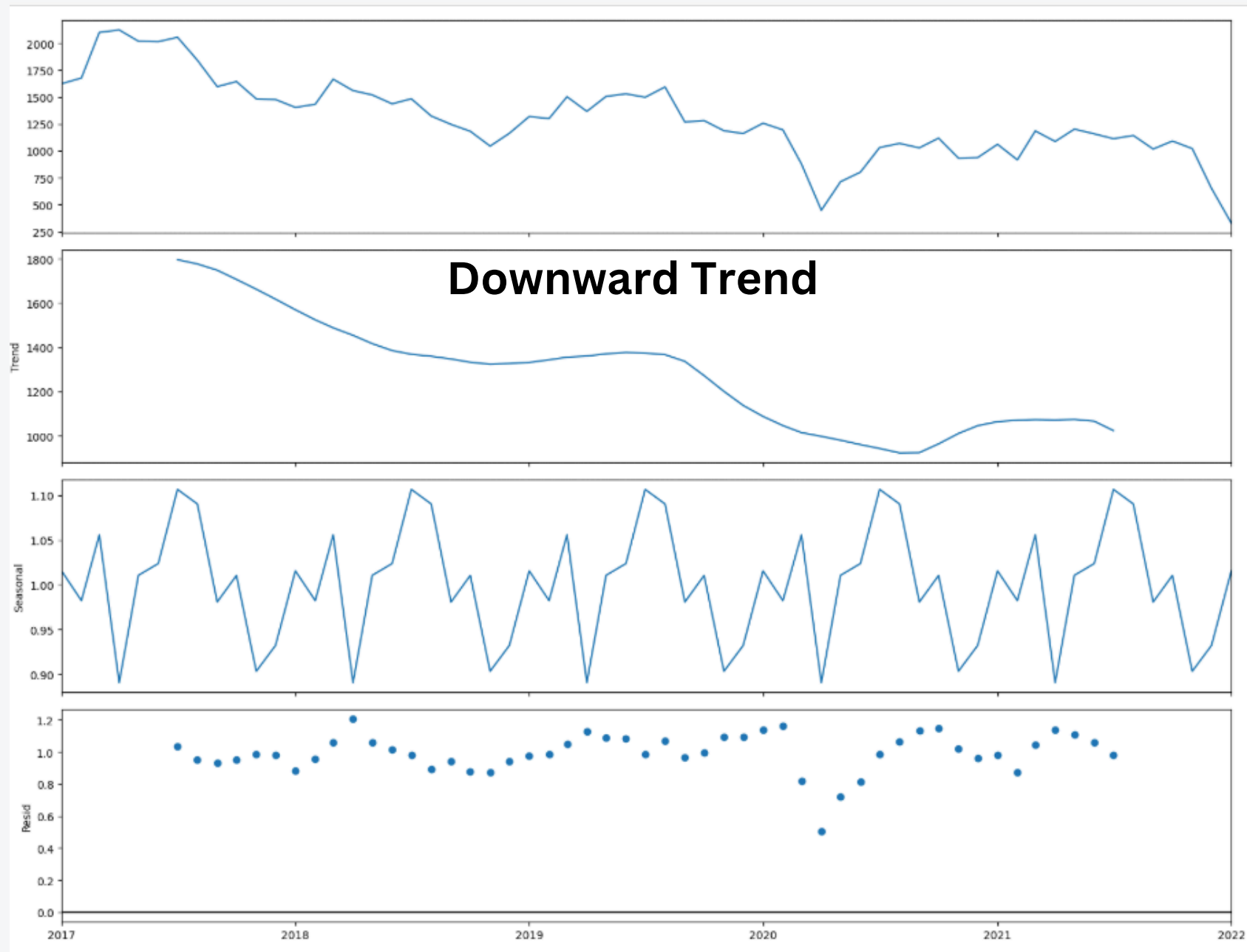
How does the sentiment of reviews and tips (useful, funny, cool) correlate with success metrics of restaurants?

- **Strong Relationships**: Review count, usefulness, and "cool" votes are closely linked, meaning businesses with more reviews often get more useful and cool votes.
- **Success Score Impact:** Higher success scores are moderately correlated with review count and "cool" votes, suggesting that popular businesses tend to have better engagement.
- **Weaker Correlation with Funny Votes:** The "funny" vote has the lowest correlation with success score, meaning humor in reviews does not strongly impact a business's overall success.

Sentiment Data Correlation Heatmap

	review_count	count_useful	count_funny	count_cool	success_score
review_count	1.00	0.80	0.64	0.65	0.70
count_useful	0.80	1.00	0.75	0.80	0.64
count_funny	0.64	0.75	1.00	0.72	0.45
count_cool	0.65	0.80	0.72	1.00	0.66
success_score	0.70	0.64	0.45	0.66	1.00

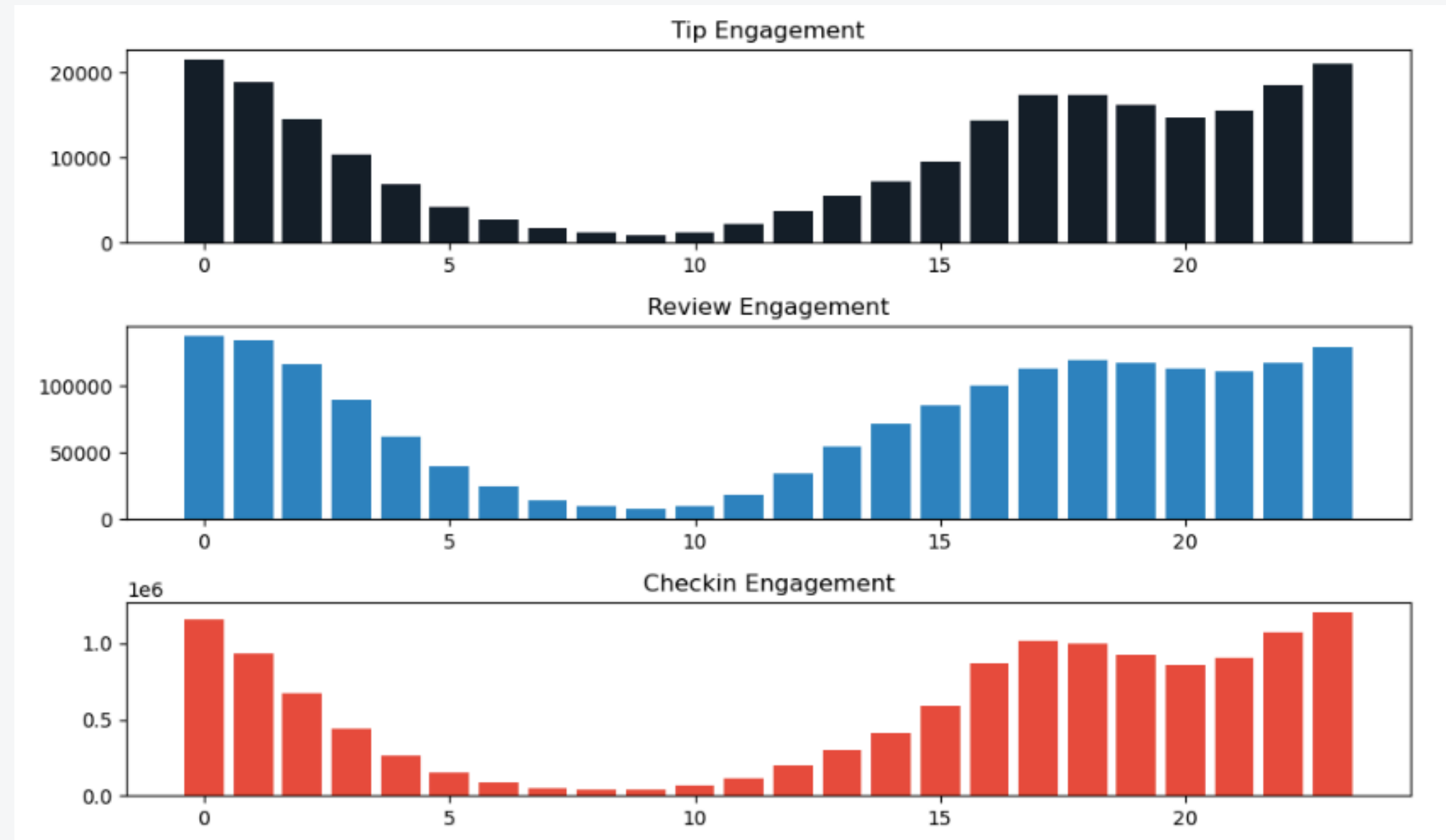# Do elite users engage differently compared to non-elite users?

- **Elite Users Are Few but Active:** Only 4.6% of users are elite, but they contribute 44% of the total reviews.
- **Non-Elite Users Dominate in Numbers:** 95.4% of users are non-elite, yet they contribute only 56% of the reviews.
- **Higher Engagement from Elite Users:** Despite being a small group, elite users are significantly more active in writing reviews.

Are there specific business hours that impact engagement and success?

1. **Early Morning Dip** – Engagement is decreasing during early morning hours (0-5 AM) across all metrics (tips, reviews, check-ins).
2. **Afternoon Growth** – A steady increase in engagement begins around midday (12 PM), peaking in the late afternoon and evening.
3. **Evening Peak** – The highest engagement occurs between 6-10 PM, when check-ins, reviews, and tips are at their highest.
4. **Late Night Decline** – After 10 PM, engagement slightly declines but remains relatively high compared to early morning hours.

Restaurants and businesses see the most engagement in the evening, making this the ideal time to attract customers and encourage interactions.

Thank You