RESTAURANTS SUCCESS

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1. Problem Statement

In the competitive world of restaurants, identifying what makes a business thrive is essential for all involved. This project leverages a dataset from Yelp to explore the connection between user activity (reviews, tips, and check-ins) and how well a restaurant performs (measured by review count and ratings).

1.1 About Yelp

Yelp is a web and mobile platform that functions as a crowd-sourced local business review site. Users can submit reviews, photos and tips about business, while also browsing information and rating left by others.

2. Research Objectives

1. Quantify the correlation between user engagement (reviews, tips, check-ins) and review count/average star ratings.
2. Analyse the impact of sentiments on reviews count and average star ratings.
3. Time trends in user engagement.

3. Hypothesis

1. Higher levels of user engagement (more reviews, tips, and check-ins) correlate with higher review count and ratings for restaurants.
2. Positive sentiment expressed in review and tips contributes to higher overall counts for restaurants.
3. Consistent engagement over time is positively associated with sustained business success for restaurants.

4. Data Overview

- This dataset is a subset of yelp and has information about businesses across 8 metropolitan areas in the USA and Canada.
- The original data is shared by Yelp as JSON files.
- The five JSON files are business, review, user, tip and check-ins.
- The JSON files are stored in the databases for easy retrieval of data.

- ## **Analysis and Findings**

Data Distribution

- Out of 150k businesses, 35k are restaurants business and are open.
- Fig1 showing distribution of business success metrics (review count and average rating)

average_review_count	55.975426
min_review_count	5.000000
max_review_count	248.000000
median_review_count	15.000000
average_star_rating	3.477281
min_star_rating	1.000000
max_star_rating	5.000000
median_star_rating	3.500000

Fig 1: Restaurant Data Distribution

Highest Review Count & Ratings Restaurants

- Higher ratings do not guarantee a higher review count, or vice versa.
- Success of Restaurants is not solely determined by ratings or review counts.
- Review count reflects user engagement but not necessarily overall customer
- satisfaction or business performance.

	name	review_count	average_star_rating
0	McDonald's	16490	1.868702
1	Chipotle Mexican Grill	9071	2.381757
2	Taco Bell	8017	2.141813
3	Chick-fil-A	7687	3.377419
4	First Watch	6761	3.875000
5	Panera Bread	6613	2.661905
6	Buffalo Wild Wings	6483	2.344828
7	Domino's Pizza	6091	2.290210
8	Wendy's	5930	2.030159
9	Chili's	5744	2.514706

	name	review_count	average_star_rating
0	ā café	48	5.0
1	two birds cafe	77	5.0
2	the brewers cabinet production	13	5.0
3	taqueria la cañada	17	5.0
4	la bamba	44	5.0
5	la 5th av tacos	24	5.0
6	el sabor mexican and chinese food	21	5.0
7	eat.drink.Om...YOGA CAFE	7	5.0
8	d4 Tabletop Gaming Cafe	8	5.0
9	cabbage vegetarian cafe	12	5.0

Fig 2: Restaurant with Highest Reviews Counts   Fig 3: Restaurant with Highest Ratings

Do restaurants with higher engagement tend to have higher ratings?

- Data shows a general increase in average review, check-in, and tip counts as ratings improve from 1 to 4 stars.

- Restaurants rated 4 stars exhibit the highest engagement and shows a downward trend for rating above 4.

- There are very few restaurants with a high number of reviews (over 50) that also have a 5-star rating. This suggests that restaurants with a consistent stream of customers tend to get a more balanced range of reviews, bringing their average rating down a bit.

- On the other hand, there are a bunch of restaurants with a perfect rating (5 stars) that only have a handful of reviews (around 10 or less). This aligns with the idea that customers are more likely to leave reviews if they had an exceptional experience, which could inflate the average rating for places with fewer reviews.
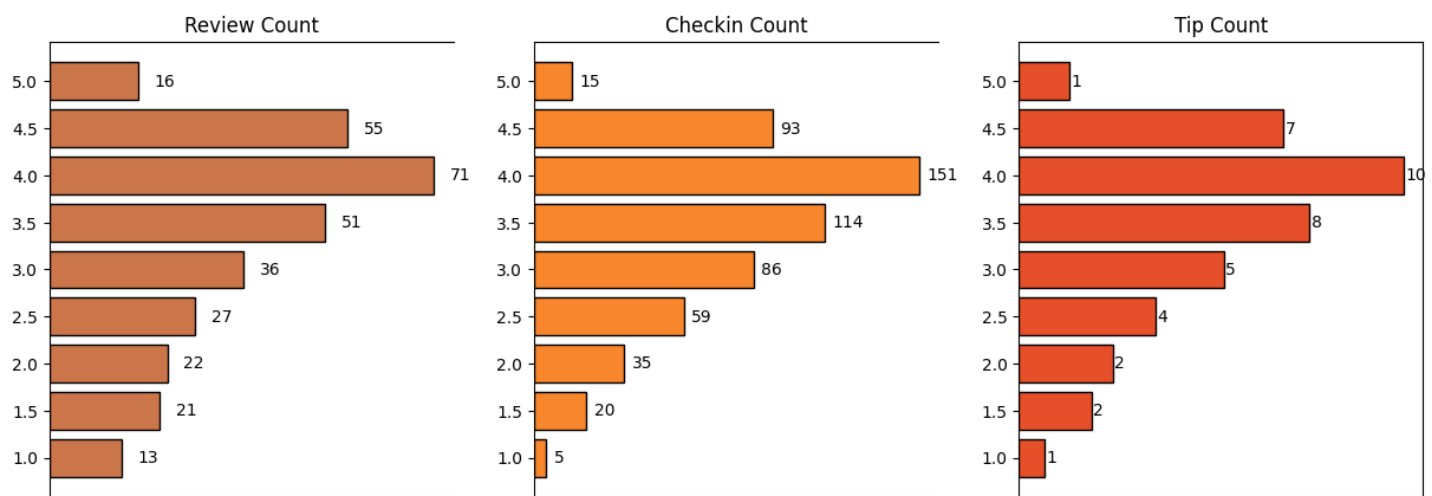

Fig 4: Average Engagement Based on Ratings

Is there a correlation between the number of reviews, tips, and check-ins for a business?

- These correlations suggest that user engagement across different platforms (reviews, tips, and check-ins) is interlinked; higher activity in one area tends to be associated with higher activity in others.

- The high positive correlations of around 0.77 between review_count and tip_count, as well as between review_count and checkin_count, suggest that restaurants with higher review counts tend to also have higher tip counts and checkin counts. This could indicate that more popular or highly-rated. Restaurants. receive more reviews, tips, and check-ins.

- The strong correlation between review_count and the other variables (tip_count, checkin_count) indicates that having more reviews is associated with higher customer engagement. Encourage satisfied customers to leave reviews by providing excellent service and food quality. Respond promptly to both positive and negative reviews.
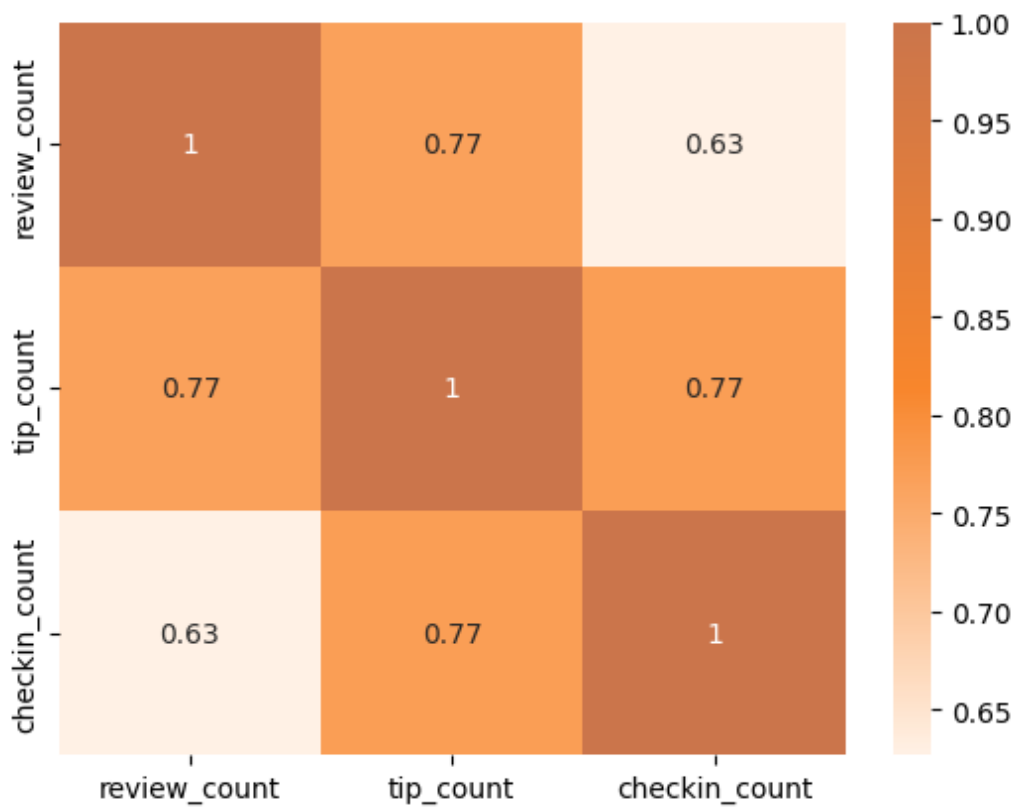
Fig 5: Correlation Heatmap of Customer Engagement Metrics

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

- Data indicates a clear relation between higher ratings and increased user engagement across reviews, tips, and check-ins.

- This pattern underscores the importance of maintaining high service and quality standards, as these appear to drive more reviews, check-ins, and tips, which are critical metrics of customer engagement and satisfaction.

category	review_count	tip_count	checkin_count
high-rated	72.291062	10.162766	122.066641
low-rated	42.123420	6.541689	88.880828

Fig 6: Relation Between Categories and User Engagement Metrics

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

- Philadelphia emerges as the top city with the highest success score, indicating a combination of high ratings and active user engagement.
- Following Philadelphia, Tampa, Indianapolis, and Tucson rank among the top cities with significant success scores, suggesting thriving restaurant scenes in these areas.
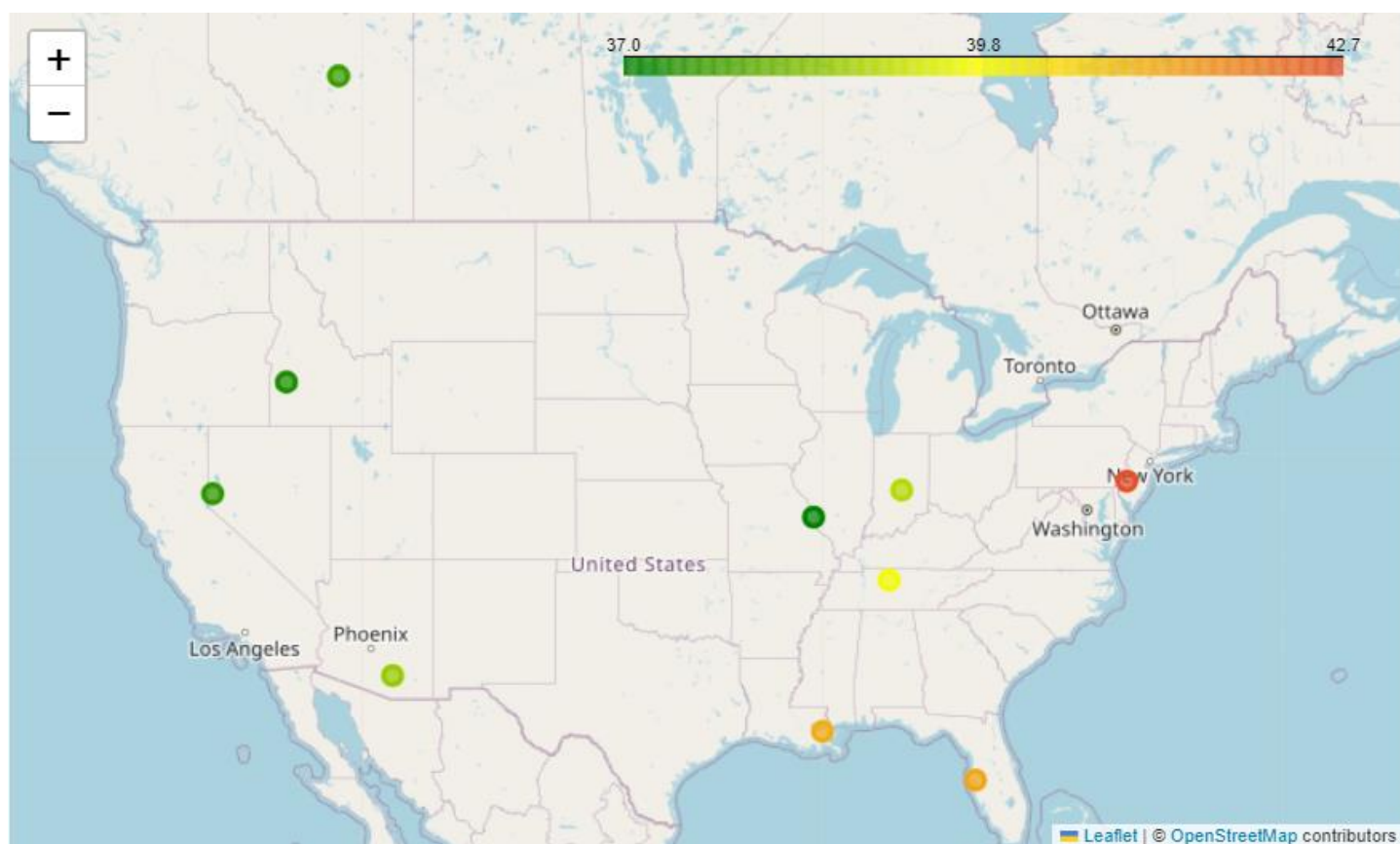

Fig 7: Top Cities with Highest Success Score

Are there any patterns in user engagement over time for successful businesses compared to less successful ones?

- Successful businesses, particularly those with higher ratings (above 3.5), exhibit and possibly consistent increasing user engagement over time.
- High rated restaurants maintain a steady or growing level of user engagement over reflecting time, ongoing and interest customer satisfaction.
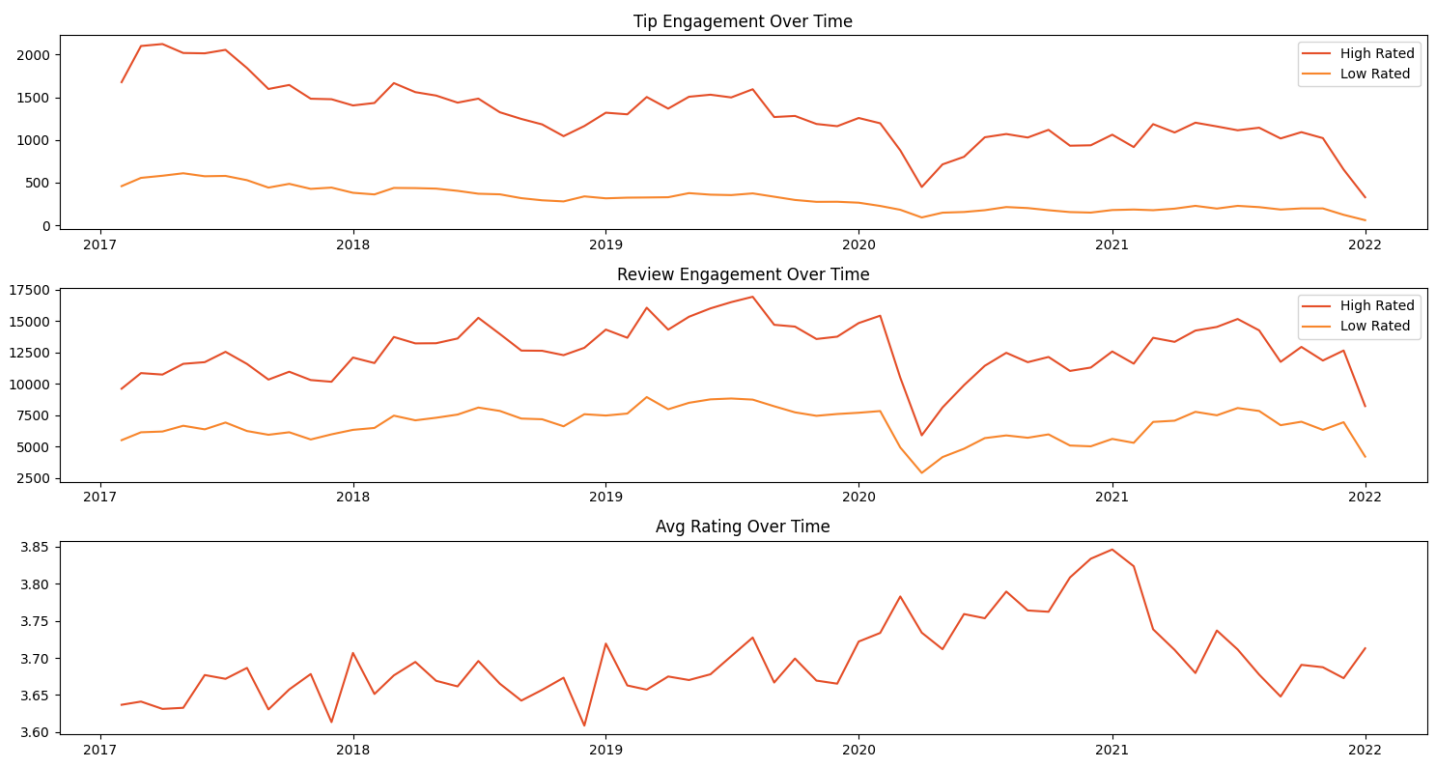
Fig 8: User Engagements over time

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

• "useful," "funny," and "cool" are attributes associated with user reviews. They represent the feedback provided by users about the usefulness, funny, or coolness of a particular review.

• Higher counts of useful, funny, and cool reviews suggest greater user engagement and satisfaction, which are key factors contributing to a restaurant's success.
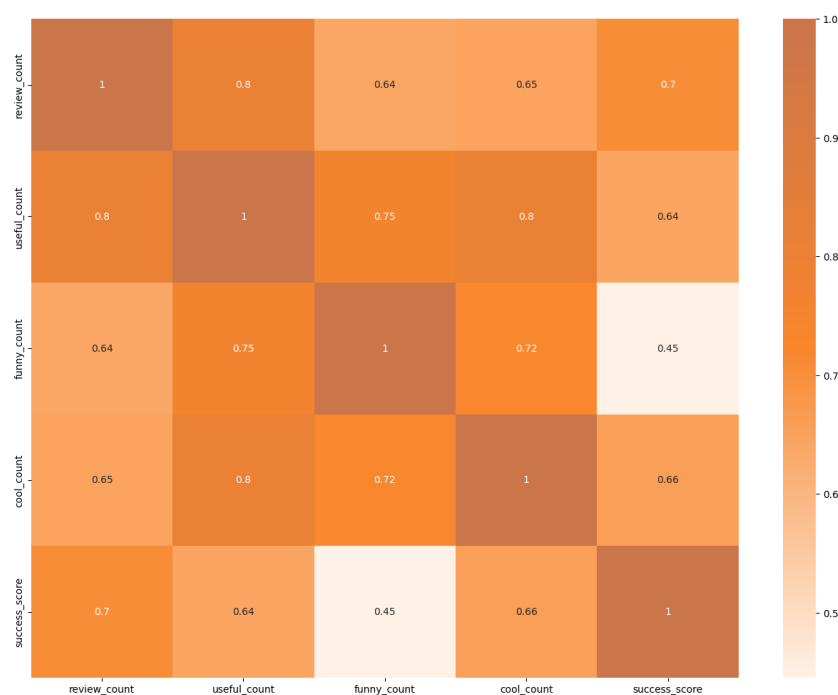

Fig 9: Correlation of User Reviews Attributes

What are Busiest Hours for restaurants?

• The busiest hours for restaurants, based on user engagement, span from 4 pm to 1am.

• Knowing the peak hours allows businesses to optimize their staffing levels pnd resource allocation during these times to Engagement ensure efficient operations and quality service delivery.

• The concentration of user engagement during the evening and night hours suggests a higher demand for dining out during these times, potentially driven by factors such as work schedules, social gatherings, and leisure activities.
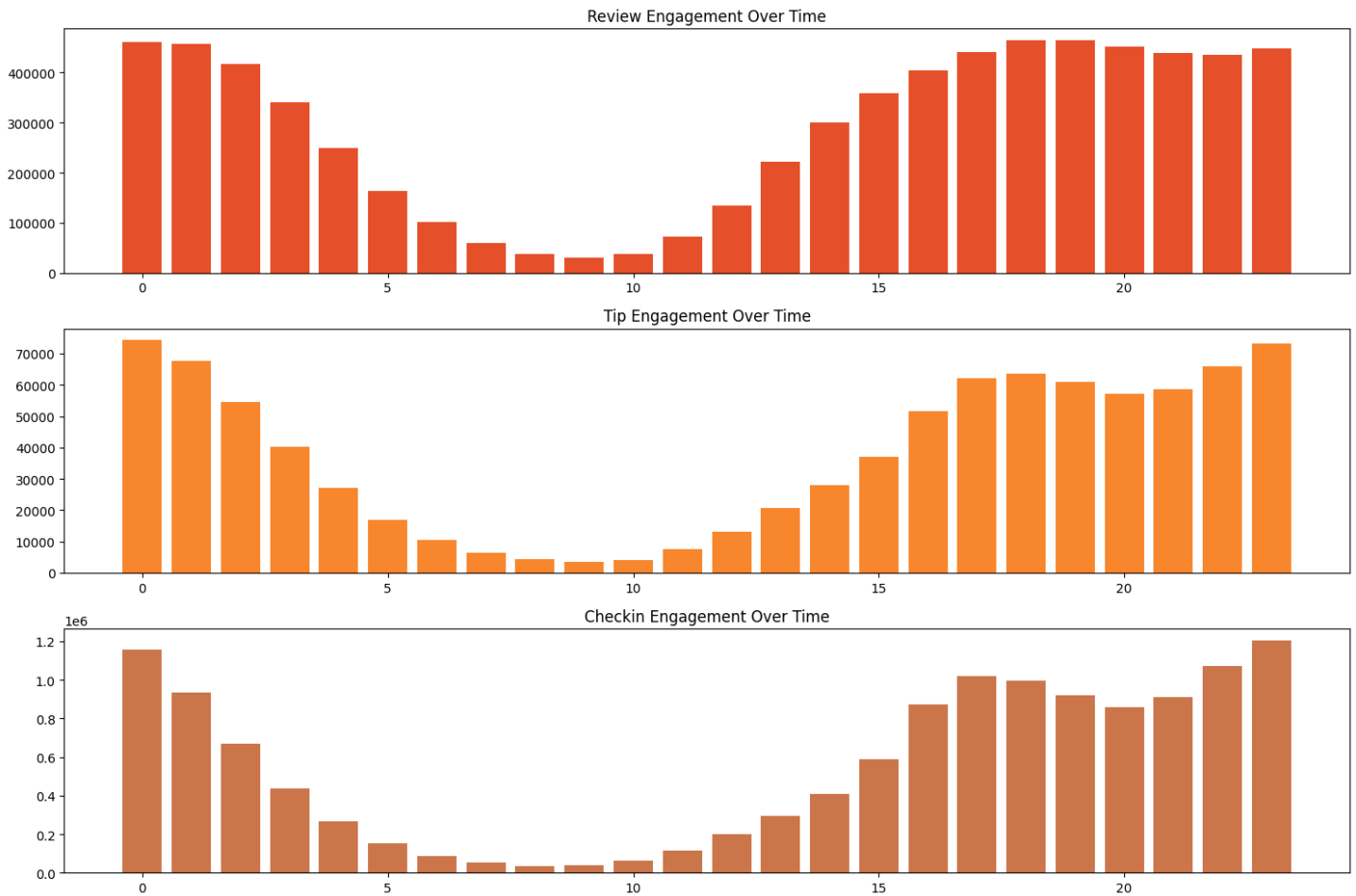

Fig 10: User Engagement by Hours

Recommendations

• Utilizing insights from the analysis of various metrics such as user engagement, sentiment of reviews, peak hours, and the impact of elite users, businesses can make informed decisions to drive success.

• Collaborating with elite users and leveraging their influence can amplify promotional efforts, increase brand awareness, and drive customer acquisition.

• Businesses can adjust their operating hours or introduce special promotions to capitalize on the increased demand during peak hours.

- Less successful businesses may need to focus on strategies to enhance user engagement over time, such as improving service quality, responding to customer feedback.
- Cities with high success scores presents opportunities for restaurant chains to expand or invest further.