**Part 2: Recommendations for Businesses/Data-Driven Business Plan**

1. According to the EDA Figure 1 No.6 line in the table below, we can see that pubs without delivery may have a higher star, so we use chisq-test to see whether it can influence the stars, because it’s p-value is 0.007, we refuse the null hypothesis, thinking delivery can influence the stars. Besides, from the reviews with low ratings, 36.8% people mentioned “service”, 13.7% people mentioned “server”, 14.5% people mentioned “staff”, so pubs should pay attention to it. From the tips with high ratings, 7% people mentioned “service”, 2% people mentioned brunch, these pubs have done a good job this area. Our advice is:
   1. Cancel the delivery service to save money.
   2. To pubs with low ratings, put more people and money on staff training and rear service.
   3. To pubs with high ratings, pub should keep encouraging staff and provide more kind service.
   4. If possible, the pub can open at noon or closed at 13:00 to provide brunch for customers.
2. According to the EDA Figure 4 and No.3 line in the table below, we can see that the pubs without TV will have a tendency to get high ratings, even if the percentage is small, but it shows the trend. Then we do the chisq-test to see whether it can influence the stars, because it’s p-value is 0.002, we refuse the null hypothesis, thinking TV can influence the stars. Besides, 3% of the tips among high ratings mentioned “atmosphere”. The coefficients in the regression of ambience are nonnegative, so our advice is:
   1. If the pub has installed TV, it can be used to play music MV to build a good atmosphere instead of broadcasting news.
   2. If the pub doesn’t have a TV, try to buy something else that can make people flee from the burden of reality like music stand.
3. According to other tests listed in the table below, we can see that their p-values are all greater than the 0.05, so they don’t have relations with ratings. Besides, from the reviews with low ratings, 53% people mentioned “food”, 21% people mentioned “drink”, 17% people mentioned “price”, they are essential to a pub. Among the tips with high ratings, 14% people mentioned “food”. From all above, we give the advice below:
   1. To pubs with low ratings, they should pay high attention to the taste of their food and drink, especially cheese, salad, sauce, pizza, beer.
   2. To pubs with high ratings, they can try more tastes on the food, like cheese, burger, fish, fries, beer.
   3. Because ratings are not related with takeout, group activities, Wifi, dancing place and open time on Friday(maybe weekday), so the pub can cut the open time on weekday and decrease the money on the things above, in this way, they won’t earn less money even they lower the price.

|  |  |  |  |
| --- | --- | --- | --- |
| No | H0 | method | p-value |
| 1 | High Ratings are not related with the existence of takeout | chisq-test | 0.466 |
| 2 | High Ratings are not related with the GoodforGroups | chisq-test | 0.528 |
| 3 | High Ratings are not related with the existence of TV | chisq-test | 0.002 |
| 4 | High Ratings aren’t related with the appearence of word 'love' | wilcox-test | 0.071 |
| 5 | High Ratings are not related with the existence of Wifi | chisq-test | 0.911 |
| 6 | High Ratings are not related with the existence of delivery | chisq-test | 0.007 |
| 7 | High Ratings are not related with Goodfordancing | chisq-test | 0.763 |
| 8 | High Ratings are not related with the opentime on Friday | wilcox-test | 0.125 |

1. Even the suggestions are based on the analysis, there are still some shortcomings:
   1. Our suggestions are relying on the data from Yelp, but there are still some NA in the dataset, so if NA are more than the other data in one column, the analysis maybe not precise.
   2. If every pub chooses to decrease its price, the situation will not change too much, besides, in the reality, there can’t be this situation because the owner may come out new good with a high price to earn more money if he/she decreases the price of other goods, this will lead to new attributes in the analysis.