

Assignment 2 – Sticks Kebob Shop

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Question 1

How do people choose the fast-food restaurant to visit? What is important?

Business Issue

Sticks is attempting to be the go-to restaurant for anyone that wants quick, healthy food, in a friendly and casual environment. The company is interested in expanding its locations. Before deciding on the new location, the restaurant wanted to know what their target market is by determining the factors by which customers choose fast-food restaurants to eat at. Once this is known, the location can be chosen based on the people residing and dining in that area.

Statistical Questions

There are certain factors that people consider when deciding whether to get fast food, and when deciding the location for their meal consumptions. Some of the factors that will be taken under consideration are:

1. How important it is for a customer to carefully plan their meals.
2. How well they think they control their spending.
3. The importance of purchasing food locally.
4. The importance of eating healthy meals.

The importance of each factor can be determined and compared to see which factor is the most important.

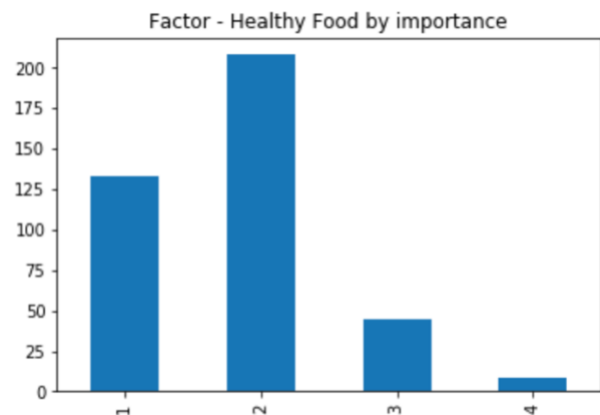
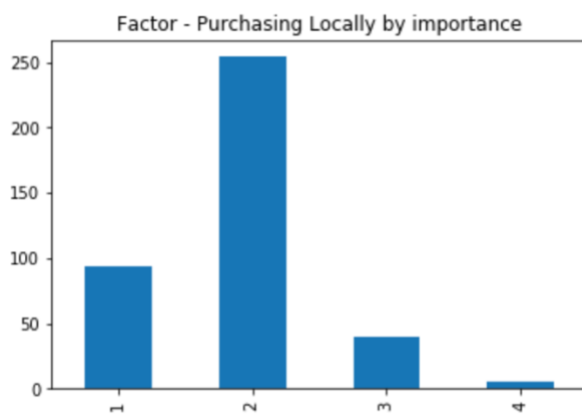
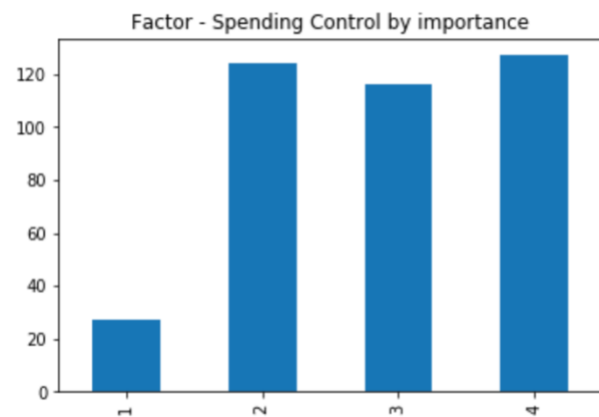
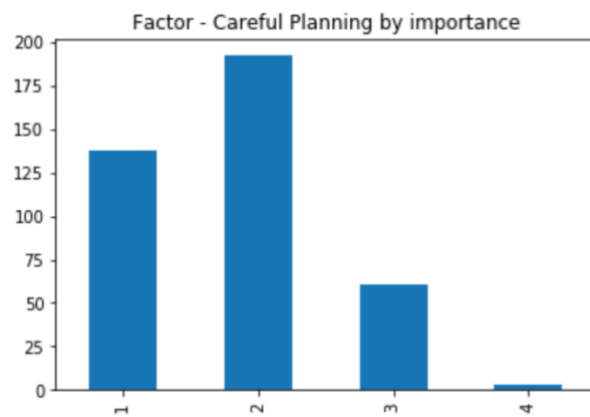
Statistical Tests and Statistical Results

From the customer survey dataset, the missing values in the “segment” column are filled by determining the most likely segment the user would fall under based on their responses to the survey questions. One row was eliminated due to multiple missing values.

The frequency of each rating the users gave for how important they consider each of the above factors is plotted (Graph 1) in order to determine the importance of each factor. From the plots, the median value of each of the four factors is 2, 3, 2, and 2 respectively.

From the graphs, it can be seen that least importance is given to spending – most people believe that they do not have trouble controlling their spending. This group of people are happy to eat in a more casual restaurant, which does not give a lot of importance to ambience. Healthy food and careful planning are given the most importance.

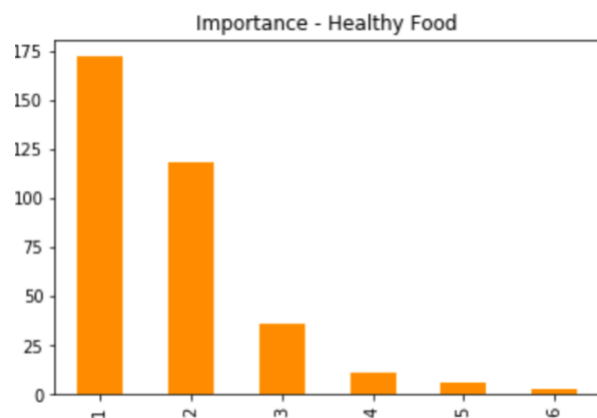
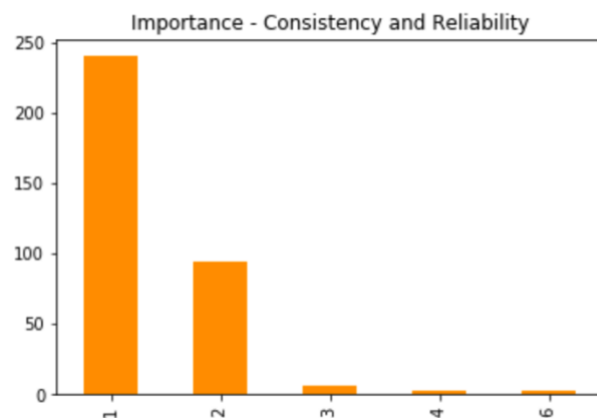
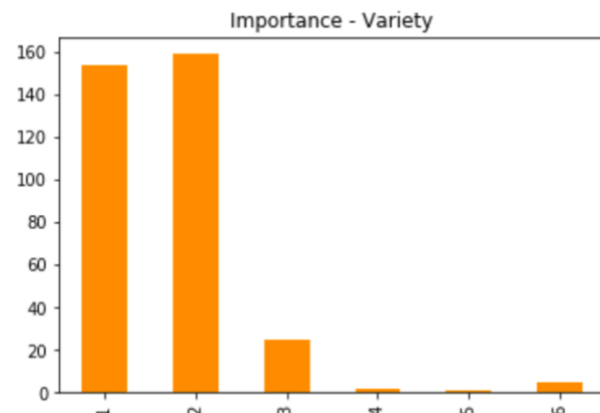
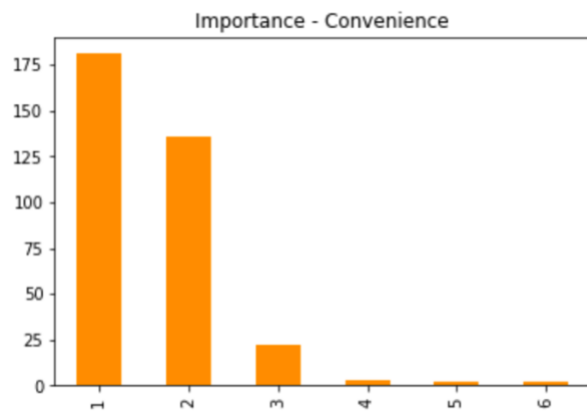
	plan_carefully	spending_control	local_purchase	health_benefits
count	394.000000	394.000000	394.000000	394.000000
mean	1.819797	2.870558	1.893401	1.817259
std	0.710169	0.946936	0.625015	0.707723
min	1.000000	1.000000	1.000000	1.000000
25%	1.000000	2.000000	2.000000	1.000000
50%	2.000000	3.000000	2.000000	2.000000
75%	2.000000	4.000000	2.000000	2.000000
max	4.000000	4.000000	4.000000	4.000000

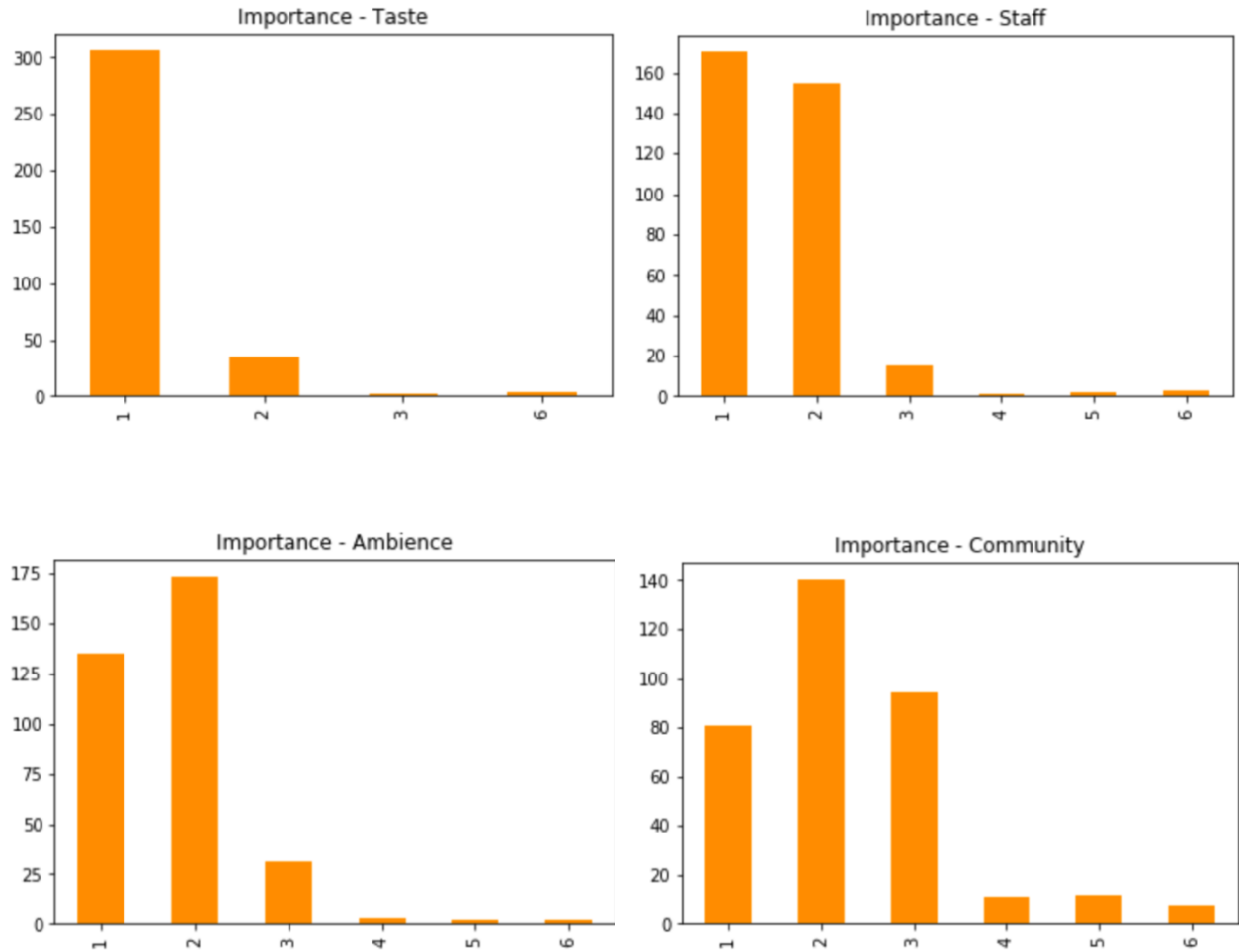


Graph 1

Based on the responses to the different factors people consider important in a restaurant, it seems that “Taste” is the most important factor people look for when selecting a restaurant while the restaurant being part of the community is the least important factor. The median for most of the factors falls at the value “2”, except for taste which has a median response of “1”, indicating that its more important.

	factor_convenience	factor_variety	factor_moneyvalue	factor_healthy	factor_taste	factor_staff	factor_ambience	factor_reliable	factor_community
count	346.000000	346.000000	346.00000	346.000000	346.000000	346.000000	346.000000	346.000000	346.000000
mean	1.598266	1.705202	1.33815	1.757225	1.156069	1.609827	1.757225	1.375723	2.297688
std	0.778626	0.844300	0.66253	0.983350	0.563561	0.765803	0.775731	0.704347	1.109038
min	1.000000	1.000000	1.00000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000
25%	1.000000	1.000000	1.00000	1.000000	1.000000	1.000000	1.000000	1.000000	2.000000
50%	1.000000	2.000000	1.00000	2.000000	1.000000	2.000000	2.000000	1.000000	2.000000
75%	2.000000	2.000000	2.00000	2.000000	1.000000	2.000000	2.000000	2.000000	3.000000
max	6.000000	6.000000	6.00000	6.000000	6.000000	6.000000	6.000000	6.000000	6.000000





Key Insights

People choose restaurants based on the taste of the food – taste is one of the most important factors according to the survey results. Another important factors is reliability – customers want to be assured that the standards of the restaurant are maintained no matter when or how many times they come into the restaurant. The other important factor is the value they get for their money; people want good quality food, without having to spend a huge amount of money for it. Community is by far the least important factor to the customers. People are willing to eat anywhere, whether the food is local or not, as long as the food is good and cheap. The healthiness of the food is also considered an important factor when selecting a fast food restaurant, therefore this may be a great selling point for Sticks Kebob Shop. When looking for fast food restaurants, people do not give a lot of importance to ambience, therefore Sticks should continue with its plan of maintaining a casual and “non-stuffy” atmosphere in their restaurants.

Questions 2 & 3

Who do you think are Stick's customers and what are their motivations for visiting Sticks?
What does the survey data tell us about differences between customers and non-customers?

Business Issue

For any targeted marketing and customer retention, it is important to know the attributes of the group that is being targeted. Knowing the demographics of the customers of Sticks will allow them to determine the type of people that are more likely to visit their restaurant, which will allow them to bring in more customers. Analysis of their customers will also give them insight into why customers visit their stores, and the restaurant can take steps to prioritise the aspects of the restaurant they promote to non-customers.

Statistical Issues

In order to determine the motivations for customers to come to Sticks, the results of the survey with the average rating for each factor is determined. From this, it is possible to determine the aspects of Sticks that has the highest appeal to existing customers.

Profile differences are calculated between customers and non-customers to determine if there is a particular demographic that is more likely to be a customer of Sticks. Missing data was filled with the most likely value – which was '0' for the number of visits to Sticks – with the assumption that if the user did not fill out a number, it was most likely because they did not visit at all during the specified time. Missing values in demographics was filled with the median value, and restaurant factor importance was filled with the most commonly occurring value for that customer based on the other factors.

The differences between the factors that customers and non-customers find important will be determined, and statistical tests will be carried out to determine whether these differences are significant.

Statistical Tests and Analysis

1. Demographics

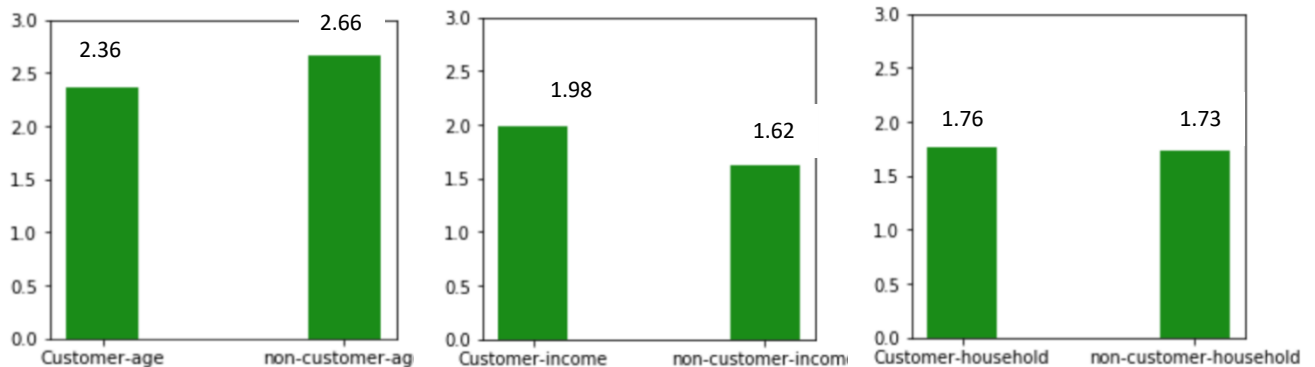
Null Hypothesis (H_0) : There is no significant difference between the demographics {age, income, household type} of customers and non-customers.

Alternate Hypothesis (H_a) : There is a significant difference between the demographics {age, income, household type} of customers and non-customers.

The first significance test will be done on the demographic data of customers and non-customers. The means of the different demographics of customers are as shown. As none of the demographics follow a normal distribution and the sample sizes are slightly different, a non-parametric Mann-Whitney U test was run in order to determine if the differences were significant. The results of the t-test are shown below.

Age: Statistics=14985.000, p=0.000
Income: Statistics=19180.500, p=0.422
Household Type: Statistics=16397.000, p=0.001

From the results, the Null Hypothesis can be rejected for the demographics *Age* and *Household Type*. *Income* however has a p-value greater than the significant value of 0.05, therefore the Null Hypothesis cannot be rejected for *Income*. Therefore, there is no significant difference between the incomes between customers and non-customers. The means of the various groups are shown in Graph 4 below.



Graph 4

2. Fast-food restaurant factor importance

Null Hypothesis (H_0) : There is no significant difference between the factor importance between customers and non-customers.

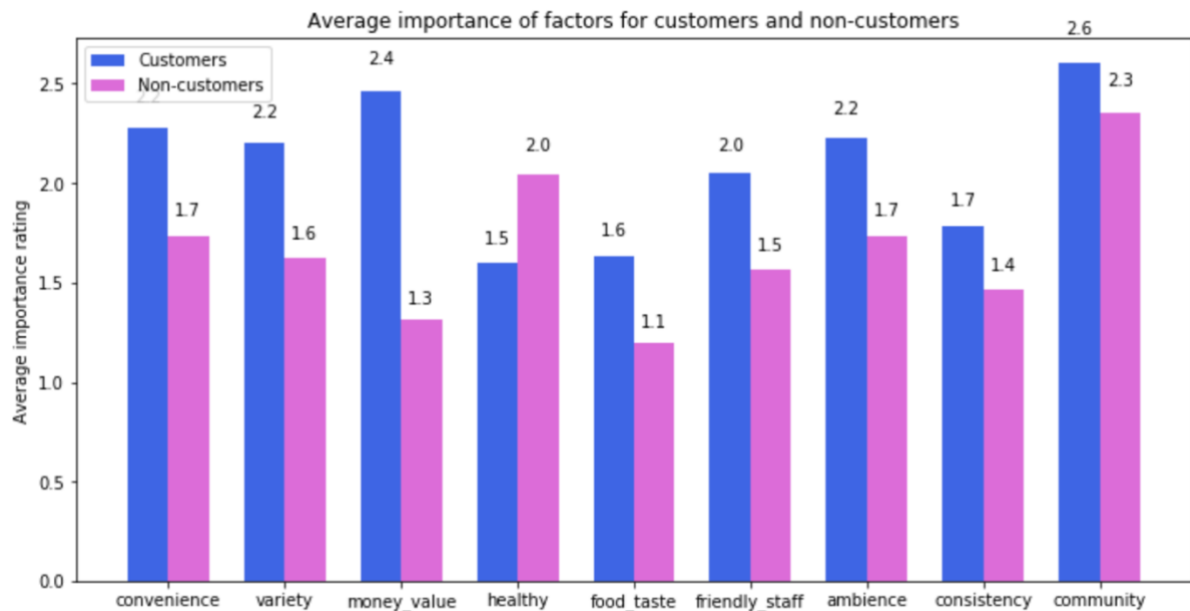
Alternate Hypothesis (H_a) : There is a significant difference between the factor importance of customers and non-customers.

Factors refer to the various aspects of a restaurant that draw in customers. A Mann-Whitney U test is again performed to determine whether the differences in amount of importance given to each factor is statistically significant – which presents a clearer picture as to what sets customers of Sticks apart from those who are not customers. As seen from the t-test below, the p-value for all factors are less than the significant value of 0.05. Therefore, any differences in the average rating of importance given to these factors is significant between customers and non-customers. The biggest difference is in the “money value” factor – as seen from Graph 5. Customers of Sticks have an average rating of 2.4 while non-customers have a rating of 1.3. Non-customers consider getting value for money to be more important than the customers that were surveyed. Many of the customer comments indicated that Sticks was quite expensive for a fast-food place, but continued to go there due to convenience and to be a part of the community. The customers of Sticks consider healthy food to be more important than non-customers.

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Convenience: Statistics=10083.500, p=0.000
variety: Statistics=9390.000, p=0.000
money_value: Statistics=5916.000, p=0.000
healthy: Statistics=13424.500, p=0.005
food_taste: Statistics=9999.500, p=0.000
friendly_staff: Statistics=10445.000, p=0.000
ambience: Statistics=10009.000, p=0.000
consistency: Statistics=11708.000, p=0.000
community: Statistics=14001.500, p=0.030

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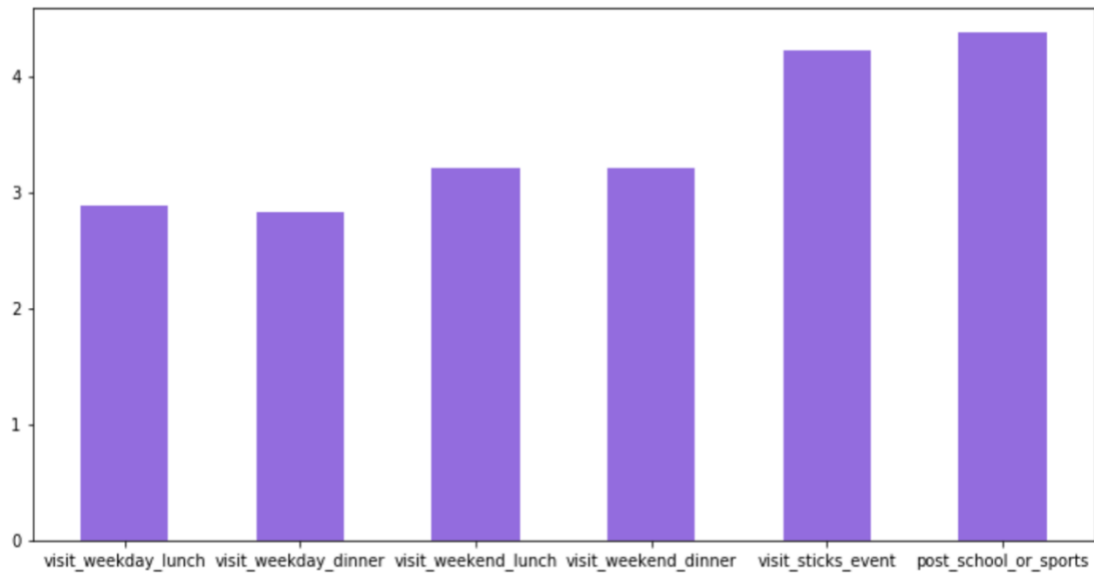
Graph 5

Statistical Analysis

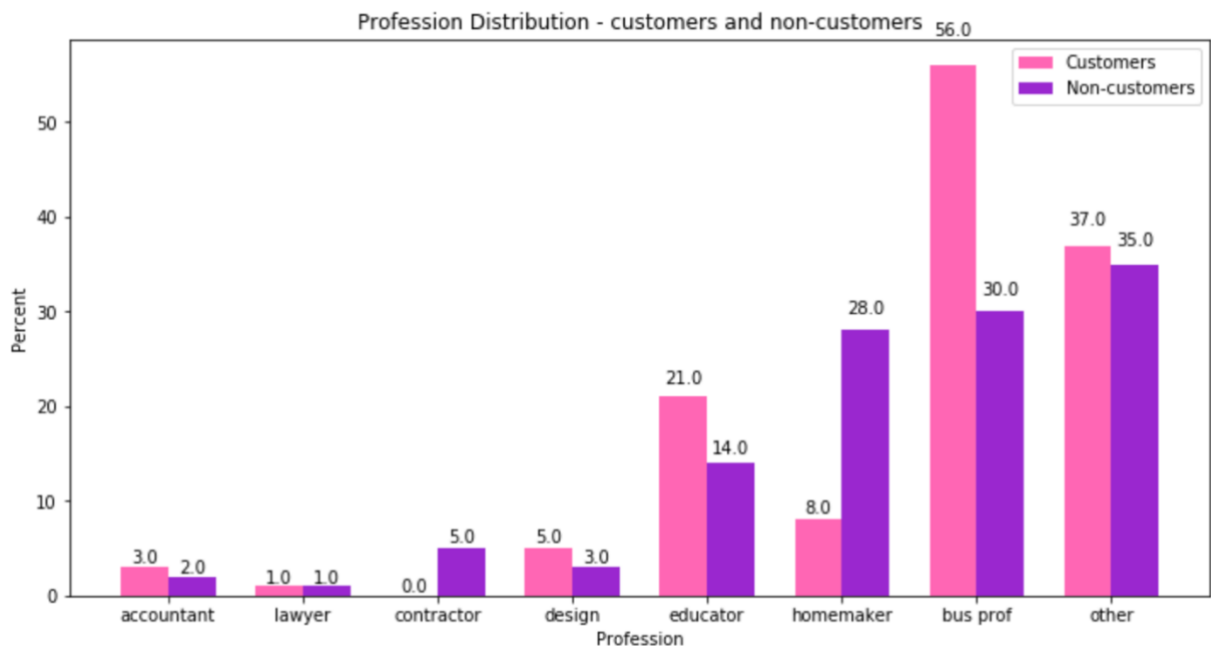
Many customers like going to Sticks' events and visiting it after their kids' school or other events. This is highlighted by Graph 6, which shows that Sticks events and quick visits after school or sports events are the most popular reasons for visiting the restaurant.

There is also a difference in the careers of customers and non-customers (Graph 7). There is a 20% difference in the number of people who are *homemakers*, with less 'customers' in that profession. This could indicate that Sticks does not have a huge market with people who are stay-at-home parents, and should target business professionals and other career types, who are likely to come in for a quick lunch while they are already out at work.

The differences in the top 5 preferred fast-food restaurants between customers and non-customers are highlighted in Appendix A.



Graph 6 – Visits to Sticks



Graph 7

Business Conclusions

Sticks' customers on average are younger than non-customers, with a majority falling in the age group of 26-40 years. The age range for non-customers are slightly higher, therefore the marketing would be more useful targeted at a younger demographic. The value for money is **less** important for customers. It will be beneficial for Sticks to target those who are willing to pay more for good, consistent food and quality service. These people are more likely to be business professionals than homemakers. Finding healthy food is on average more important to Sticks' customers, therefore investing in targeting people who are looking for healthy meals may be a good strategy to attain customers.

Question 4

What survey questions would you use to identify the customer segments?

Identifying customer segments is useful for several reasons; Figuring out the characteristics, demographics and motivations of current customers can assist in marketing for new customers to visit the restaurant. Determining the different customer segments and the reasons for which they visit Sticks can also aid in providing food and services that caters to these segments, which will increase customer satisfaction, ensuring that they continue to eat at Sticks Kebab Shop.

Based on the survey questions, segmentation can be done based on several goals. The first goal is to determine the motivation for people to visit fast food restaurants and how important these motivations are. If customer segmentation is carried out based on these survey questions, along with demographics, it will be possible to derive conclusions about motivations for visiting based on demographic data, and hence target different services and foods to different segments.

Segmentation can also be done based on factors – what people in general consider important when they are visiting a fast food restaurant. The demographics of each segment can be determined, and targeted marketing can be done for each segment, as the restaurant will then have an idea on the demographics of each segment.

Question 5

What is the best and most useful number of customer segments based on the survey data?

Business Issues

It is important to determine the ideal number of segments to divide the customers into and the segmentation factors. By focusing on customer habits, demographics and what they consider important, this information can be used to determine exactly which non-customers to target, and the best way to market to them in order to gain them as customers.

Once the customers have been segmented based on their preferences, behaviours and motivations, it is possible to profile each segment, and determine whether there is a certain demographic characteristic that is more dominant for certain preferences, behaviours or motivations.

Statistical issues

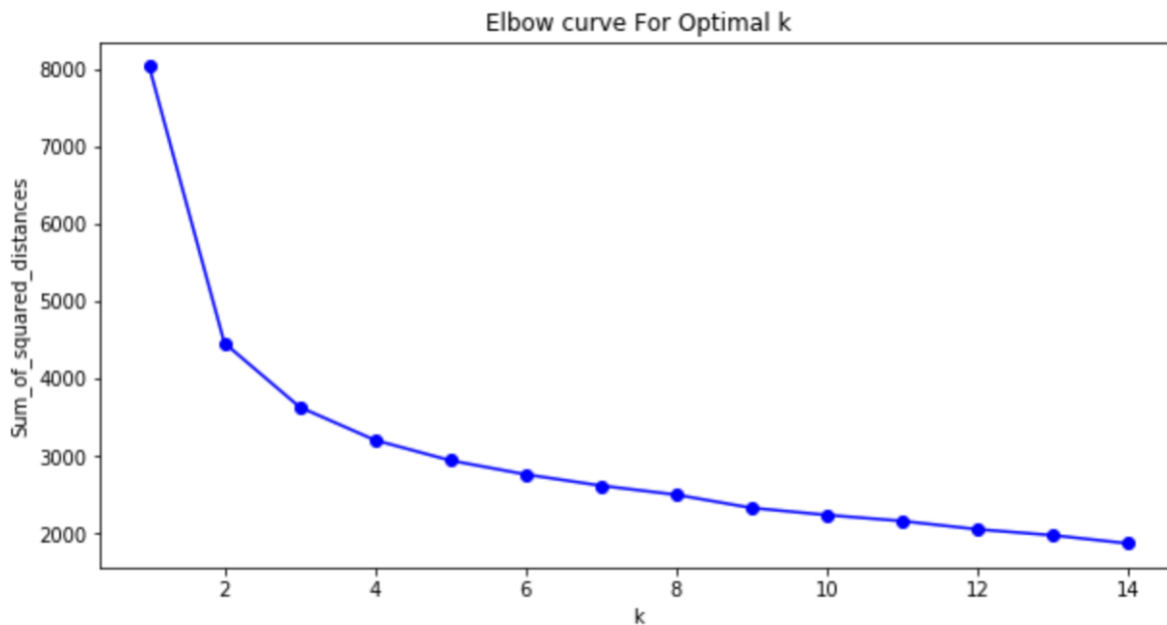
Once the segmentation factor has been determined, the ideal number of segments can be determined by plotting the elbow curve for the variables that are to be included while clustering. Having too many clusters will make the target marketing too specific, which will drive up costs, while not having enough clusters will cause the wrong type of marketing to be targeted towards certain people. Once the segments are identified, the specific characteristics of each cluster or segment can be determined by grouping the data by segment.

Statistical Tests

The first segmentation is carried out on the customer survey dataset, based on the following survey questions:

1. In the last month, how often have you visited Sticks for the following occasions?
2. Please indicate how important the following factors are when you visit a restaurant.
3. Customer Demographics

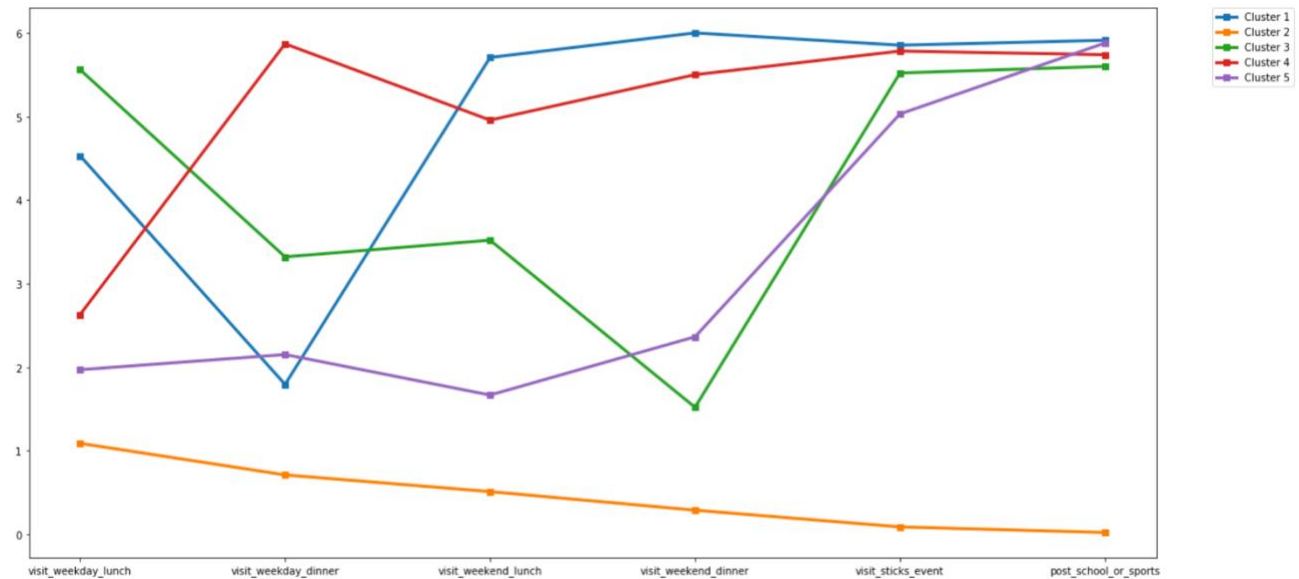
An elbow curve is plotted, and the ideal cluster number is chosen when increasing the number of cluster no longer decreases the distances between points within a segment, i.e. the intra-cluster distance.



From the elbow graph above, a cluster size = 5 is chosen, and segmentation was carried out to divide the customers into 5 segments.

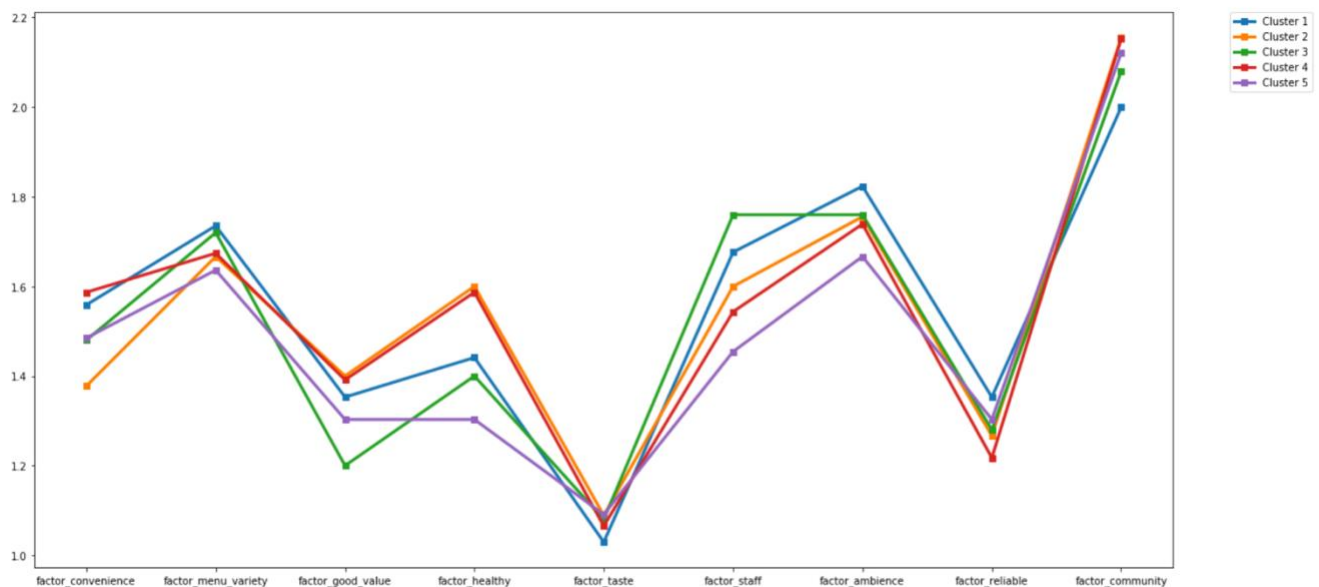
Statistical Analysis

Part 1 – Restaurant Visits: Graph 8 below shows the number of times customers visit Sticks for different occasions during the week. The segmentation was done based on the survey questions above as well as customer demographics. The results are displayed based on the segments. Segment 2 visits Sticks the least amount of times during the week, however all other segments have a high number of visits after their kids' school or sports events. Segment 1 tends to prefer weekend visits, segment 3 prefers weekday lunches and segment 4 prefers visiting the restaurant on weekends, and less so on weekdays. Cluster 5 on average only visits Sticks 2-3 times for regular meals and prefers to go in only for events and after kids' school.

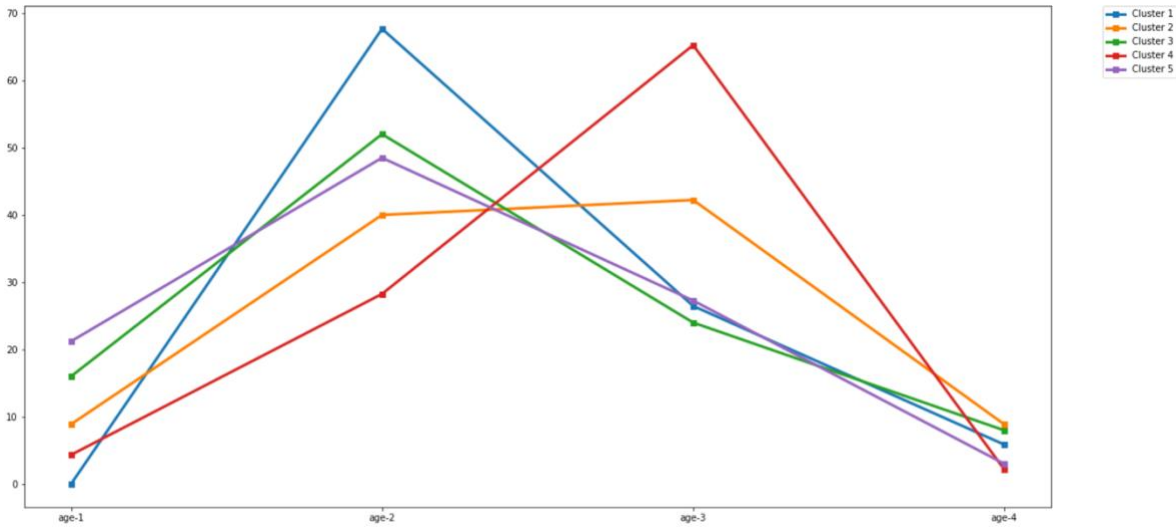


Graph 8

Part 2 - Important factors when visiting a restaurant: The segments rate the reasons for going into restaurants quite similarly as seen above. However, on, average, Those belonging to segment 1 give more importance to convenience – it is likely they only go to Sticks due to convenience – which would also explain why this segment tends to go there very few times in the week compared to other segments. Rather than deliberately going there for the food, friendly staff or any other factor, Sticks appears to be the go-to place for them when they quickly need a meal. Using the same segments, visualisations of the percentage of various demographics within each segment is visualised as shown in Graph 10.

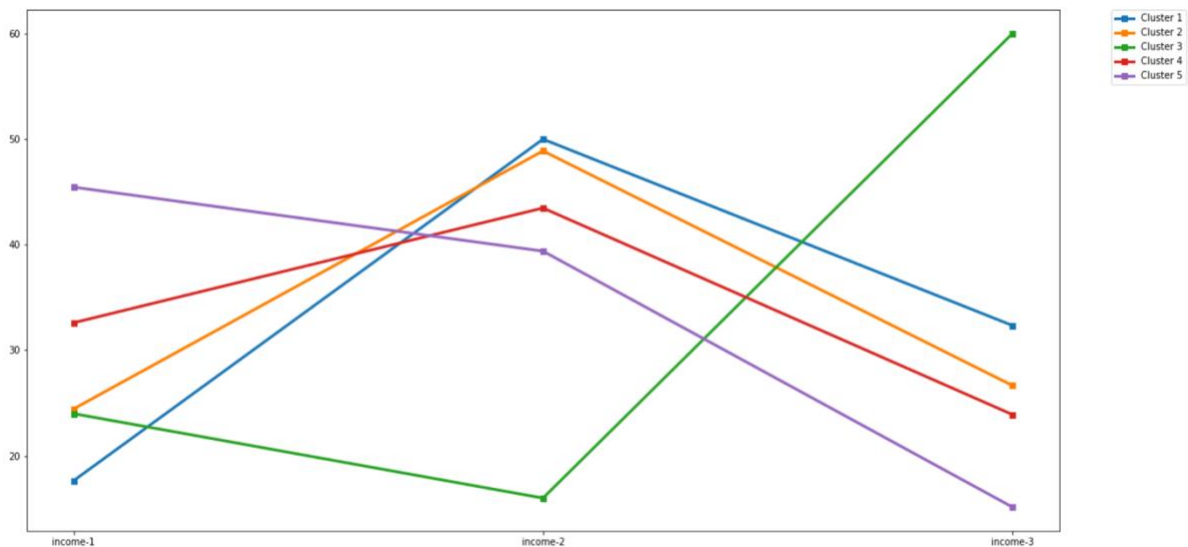


Graph 9



Graph 10

Part 3 - Demographics: Cluster one has the highest percentage in age group 2 (26-40 years). Cluster 4 has a high percentage of people in age group 3 (41-65 years). The number of people in age group 4 is quite low in the customer survey data. The income clustering below shows segment 3 as having a high percentage of customers in the higher income group and segment 5 having the lower income group. Clusters 2, 3 and 4 have a majority of customers in the second income group.



Graph 11

Segmentation analysis on gender is not done as there is a bias in the dataset towards female customers.

Business Conclusions

The following conclusions are drawn based on the statistical results:

1. Segment 2 visits Sticks for convenience, more than any other factor – usually during weekdays at lunch. Sticks can market themselves to be a convenient stop during a busy workday.
2. Segment 3 has a high percentage of customers in the highest income group, and visit the restaurant mostly during lunchtimes on weekdays and for events and after kids' school and events. As they earn more money, they may be more inclined to visit a non-fast-food restaurant during their weekends. Although they belong to a high-income group, they give the highest importance to value for money at a restaurant, compared to other segments.
3. Segment 5 has the highest percentage of people in the low-income group – and don't visit Sticks as much as the other segments for lunch and dinner. The majority of their visits are during Sticks' events or after school.
4. The higher income customers are visiting Sticks for lunch and dinner more often than those in the lower income groups. This may be an indication that Sticks is quite expensive for the fast food they provide, and if they want to target the lower-income groups, they should consider lowering their prices.

Question 6

What characterizes each identified customer segment?

Segment 1

Segment 1 prefers weekend visits to Sticks compared to weekdays. The customers care more about the taste of the food than the ambience of the restaurant. They are primarily in the 26-40 year age group, with majority of them with an annual income in the 50k-100k range.

Segment 2

Segment 2 visits Sticks significantly less than any other segment – with the highest preference for visiting being weekdays during lunchtime. They give high importance to convenience and restaurant reliability – indicating that they may visit Sticks because it is conveniently located near their workplace. Most of the customers in this segment belong in the middle two age groups (26-65 years) and largely earn between 50k and 100k.

Segment 3

Customers in this segment come to Sticks largely for lunch during weekdays, and for Sticks events and after school or other activities. Getting value for their money is more important to those in this segment compared to others, and they give less importance to what the staff is like. Around 60% of this group is in the highest income group, earning more than 100k per year. This is also the reason for around 75% of the group being in the age range of 26-65.

Segment 4

Segment 4 contains customers that come in less during weekday lunchtimes, and is predominantly in the 41-65 age group, with the majority having an annual income in the 50k-100k range.

Segment 5

This segment has low-medium income customers, with less than 10% of customers falling in the 100k+ annual income group. The majority fall in age group 2. They give more importance to healthy food, having a variety of menu options and the ambience of the restaurant.

Appendix A

