## STATISTICAL ANALYSIS FOR A RESTAURANT CHAIN’S IMPROVEMENT

How to be more successful in the brick-and-mortar retailing industry, especially in operating a network of restaurants with many branches located at different places across the country is a great challenge facing the management teams, requiring their adjustments and updates in their policies whenever necessary. In this paper, I am making a statistical analysis based on the data collected on a number of factors considered important and influential in their food serving business operation leveraging the knowledge we have learnt in business statistics. The problem is that Pastas R Us, Inc. prioritizes the expansion criteria of their chain aiming to satisfy the demographic group of certain ages, income, and the percentage of educated people. Whether or not they are choosing the right factors to be the key metrics of a successful business with expected outcome or outstanding performance will be analyzed in this section and discussed more in the following parts.

Totally, there are 74 restaurants in the database:

For n = 74, x(74) = 18.5

The whole number part of 18.5 + 1 = 19.5 is 19, so the 25th percentile is located at the 19th value of each column after sorting the values into an ascending array.

For n = 74, x(74) = 37

Q2 = , the average of the 37th value and the 38th value.

For n = 74, x(74) = 55.5

The whole number part of 55.5 + 1 = 56.5 is 56, so the 75th percentile is located at the 56th value of each column after sorting the values into an ascending array.

Though having a sufficient resource of books and documents explaining the meanings as well as the ways to calculate all of the above statistical measures, here we can utilize the Excel functions as a fast and convenient tool.

For a visual view, I sort all columns into ascending order arrays without paying attention to the correlations among those columns so we can manually check the results generated by Excel formulas for all measures (figure 1).

Next, let Microsoft Excel implement all the related calculations for mean, mode, Q1, Q2, etc. instead (figure 2).

Below are the scatter plots of four pairs of sets of information along with regression equation and coefficient values:

A moderate positive correlation between these two sets of data shown in the plot tells us the percentage of citizens out of the given population possessing a bachelor’s degree partly influences the total revenue of the restaurants. And the rule is quite clear that the sales increases when the rate of educated people in the areas increases.

A weak negative correlation between these two sets of data shown in the plot tells us the median age element does not actually contribute much to the total income of the network, but gives small random changes from place to place.

A weak negative correlation between these two sets of data shown in the plot gives the fact about a randomly small decline in the sales in accordance with the increase in median income. Opening a restaurant at a city with many high income man and women does not guarantee success? Is anything wrong here?

A nearly moderate negative correlation between these two sets of data shown in the plot shows the ineffective deployment of incentive and engaging programs towards loyal consumers. This should be adjusted as soon as possible.

Looking at the scatter plots in part II, we can find out the one and only moderate positive correlation among the four pairs of sets of data suggested is the relationship between the “percentage of bachelor’s degree” and the “sales per square foot”. Though this correlation is not considered a permanent effect but an obvious trend happening in reality proving the company has planned and implemented appropriate programs to target this characteristic of those locations. Now, continuing with the correlation between “loyalty card” and “sales growth”, it is obviously a moderate negative value indicating they are not deploying any efficient incentive programs to engage customers to their service from favorite food to valuable rewards, or things like that, etc. How about the two remaining pairs? The answer is nothing impressive. Median income and median age should not account for the main criteria influencing the restaurants’ revenues with these two correlations being slightly negative. In my opinion, practically and strategically, this corporation should either change their target group of customers or organize their business in a way that many more suitable and effective programs would be implemented corresponding to their expected outcomes and the top trends in our modern world. Those trends include the takeaway habits of busy people, the online ordering from home or office, and so on.