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Analysis of Expected and Actual Waiting Time in Fast Food Restaurants

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Abstract

People are willing to queue and pay to get food. Knowing peoples' opinions on queuing is of interest to restaurant stakeholders since it and related actions have a direct effect on revenue. While most previous studies focused on dine-in restaurants, we observed queuing for fast food restaurants. Specifically, we observed the actual waiting time of customers for a number of fast food restaurants, and compared the metrics with waiting times that customers expected. During lunch time peak hours, customers spent on average 5.4 minutes waiting before they could get their orders. The 5.4 minutes consisted of 2.42 minutes of queuing time and 2.98 minutes of service time. This total waiting time is only slightly below the actual expected waiting time of 5.42 minutes. How the fast food restaurants try to manage the perceived waiting time of customers was also discussed.

Keywords: Restaurant, queuing time, queue management, waiting time, customer satisfaction

1. Introduction

In all cases in regards to a for-profit organization, profit growth is the objective of its activities. Restaurants that fall in this category optimize their opening hours, hire the right number of employees during busy periods, define room capacity and seat arrangements to accommodate the customers, set up the kitchen processes for a well-organized flow, and ensure that stock supplies are adequately scheduled and consumed. Inefficient management of this complex assembly would result in a loss of opportunity for higher profit growth. Hence, industries and scholars look into approaches to optimize the efficiency of restaurant management.

The history of the restaurant as an independent entity started a few hundred years ago. The French Revolution has been widely cited as the birthplace of the restaurant in the eighteenth-century, even though restaurants had existed long before the French Revolution in other places (Kiefer 2002; Walker 2011). Today's restaurant has its origins in taverns, inns and boarding houses. Taverns primarily focused on alcohol sales, while inns and boarding houses on the room rental and food sales. These institutions served a table d'hôte at fixed hours and a set price, and the diners were usually regular customers. In China, restaurants had existed long before the Mongol invasions. In the 13th century, in Hangchow, China, the largest city in the world at that time, restaurants had provided ideal settings. There had been teahouses and taverns. The menus sold at taverns were usually a variety of pies, bean-curd soup, and oysters (Kiefer, 2002). With a long history going back to Ancient Egypt, public dining places were recorded in 512 B.C.E, serving only one dish consisting of cereal, wild fowl and onion. Taverns existed around 1700 B.C.E, and in 1550 B.C.E the first café was established in Constantinople.

Nowadays, eating out is becoming a popular way of life for many families due to changes in lifestyle. This is partly caused by the financial situation in many families which force the wives to also work to support the family financially. This subsequently causes the amounts of time that can be spent to do house chores diminish significantly. Therefore, many families now count on quick service restaurants for fast, easy and convenient food service. Fast food restaurants, as part of the food service industry, began their modern history in the USA on July 7,

1912 with the opening of the Automat fast food restaurant in New York. It was followed by A&W Root Beer in 1919 and White Castle in 1921 that opened the first hamburger chain. In 1948, Richard and Maurice MacDonald opened the first McDonald's restaurant, selling a simple menu of hamburgers, french fries, shakes, coffee and coca cola.

One of the critical issues in the food service industry, especially for fast food restaurants, is queuing time and waiting time. A survey conducted by Law et al (2004), indicated that waiting time, staff attitude and food quality significantly influence the customers' return frequency and affect customer satisfaction. Environment and seat availability are other service factors that impact on the customers' return frequency, while food variety adds to customer satisfaction.

2. Literature Review

In general, restaurants can be divided into five categories; quick service, family dining, casual dining, dinner house and fine dining (Walker, 2011, p. 34-40). Quick service restaurants are restaurants where the food and drink are paid for before being served. The critical points for this type of restaurant are to have staff and food ready to serve the maximum number of customers in the least amount of time. The menus offered are usually limited and include burgers, sandwiches, hot dogs, tacos, burritos, fried chicken and so on. Family restaurants developed from coffee shop-style restaurants, offering simple menus and providing service for the family market segment. Due to their market type, most family restaurants do not serve alcoholic drinks. Casual restaurants or casual dining offers a relaxing lifestyle, signature food items, wine service, bar and comfortable décor. Fine dining is a type of restaurant that offers expensive cuisine and beverages such as wine, elegant service and luxurious ambiance. The table turnover is usually only once an evening.

Other sources (Jackson, 2011; Walker, 2011; Knutson, 2000) mention that the fast food restaurant is often categorized under quick-service restaurant, even though not all quick-service restaurants serve fast food. The main characteristics of quick-service restaurants are speedy service, inexpensive food items, simple décor, limited menu normally displayed on a wall, and convenience. This type of restaurant may also provide drive-thru, delivery, and take-out services.

Simplicity and limitation in a menu are important in a quick-service operation due to speed of service and high turnover rates to achieve high sales volumes. To realize speed, several factors are required: minimum food handling by food production staff, minimum handling by the service staff, and the ability to withstand a holding temperature since most of the food items are precooked (Drysdale and Galipeau, 2009, p. 207-208).

Restaurants fall into the category of a service industry. As such, researchers analyze the efficiency of restaurant services. Hummel and Murphy (2011) mapped out an entire service system to depict the impact of efficiency management on a restaurant and its industry. This technique was termed service blueprinting. One of their findings was that optimizing the time to serve the customers paying their bills would earn the restaurant three additional dining tables in a peak hour. Hummel and Murphy highlighted that the difficulties in producing a conclusion were due to service blueprinting requiring extensive research that observes larger samples than had previously been utilized.

Restaurants balance efficiency-for-profitability with customer satisfaction. As defined by Carbone and Haeckel (2002), customer satisfaction includes functional, mechanical, and humanic clues. Kimes (2004) discussed that efficiency and profitability could be represented in numbers, whereas customer satisfaction measurement was subjective. Sulek and Hensley (2004) showed that choice of foods, restaurant atmosphere and the fairness of the seating contributed a large part to a customer satisfaction model. Wall and Berry (2007) added performance, appearance, and behavior of the employees to the above dimensions.

3. Problem Statement

Most of the previous studies on restaurant management efficiency observed dine-in restaurants. Although concepts on how physical characteristics impacted customer emotion were studied (Carbone and Haeckel 1994; Fynes and Lally 2008), few of the studies measured how these characteristics were met in fast-food restaurants. The closest study has been to evaluate the effect of queue length on customer choice between similar restaurants (Raz and Ert

2008). In tourist areas, customers chose to join the longer queue given two restaurants that were similar in price and types of food. The findings suggested that creating a longer queue during a rush hour period could be of interest to restaurant management. The study also showed that the shorter queue was the choice of customers who were already familiar with local restaurants. Veeraraghavan and Debo (2009) analyzed similar studies on customers' perceptions of queue length through analytical models and suggested that waiting cost analysis be their future research.

We propose to observe how fast-food restaurant managements balance their serving efficiency and customer satisfaction. We hypothesized that customer satisfaction in fast-food restaurants is mostly affected by functional clues such as waiting time, rather than the mechanical and humanic clues defined by Carbone and Haeckel (2002). The goal of our study was to find if customers were satisfied with the waiting time at fast-food restaurants. In our study, waiting time means the total time spent by customers from the time they arrive at a restaurant until they obtain the food that they order. In other words, waiting time consists of queuing time and service time.

4. Methodology

4.1 Settings

Our data collection came from our observation in Senayan City Mall, a mall situated in the central business district of Jakarta. There were several office buildings and universities around the mall. This made the mall one of the main destinations for employees and students, especially during lunch time. We collected data from four international fast food chain restaurants. The flows of ordering food at the four restaurants were slightly different from one another. At restaurants A and B, the cashier also acted as the server who asked for the customers' orders and later on assembled or obtained the orders and passed them on to the customers. At restaurant C, customers queued for their turns, ordered and finally made the payment. Once the payment was made, if the food was not immediately available, the cashier would give the customer a number to be brought to his or her seat. And when the food was ready the waiters/waitresses would bring the food to the customers. Finally, customers at restaurant D were greeted by a server who let the customers choose the food. Once completed, the server passed the food to a cashier where the customers would pay for the food.

4.2 Data Collection

The data was collected at the restaurants' peak hours during lunch time from 11:30 to 13:00 over three days. At least 3 people were present at any one time to collect the data working together in recording the time of arrivals of each customer, when they started being served and when the service ended. The template of the data collection sheet is as follows:

[insert table 1 here]

For each of the fast food restaurants, we collected at least 100 customers' data. Once the "Arrival Time", "Begin Serve", and "End Serve" columns were filled in, the inter-arrival time, service time and waiting time for each customer could be derived.

Inter-arrival time is the time between the arrival of one customer and the next customer, service time is the time spent by a customer from the point the customer orders the food until (s)he gets the food, and waiting time is the time spent by a customer queuing in the line for his or her turn.

In addition, we surveyed 51 respondents asking them to give the three most important factors in choosing fast food restaurants. The options we gave were speed, menu variation, price, friendliness, cleanliness, atmosphere, and promotional items or discounts. We also asked about their maximum tolerable service and queuing times when dining at a fast food restaurant. The 51 respondents consisted of students and employees of one of the universities across the mall. The respondents' ages ranged from 17 to 45 years old, 30% of them were male and the rest were female.

5. Results & Analysis

The top three factors selected by our respondents were speed, price and cleanliness. Speed was selected as the one of the three most important factors by 43 out of 51 respondents. The following table summarizes the top factors

considered when choosing a fast food restaurant.

[insert table 2 here]

The result is similar to the findings of Knutson (2000) where cleanliness, price and speed are the top three factors influencing college students' choices of fast-food restaurants.

In Figure 1 and Table 3, we present a summary of the inter-arrival, service and queuing time data for each fast food restaurant and the survey results are as follows:

[insert figure 1 here]

[insert table 3 here]

From the table, it can be seen that all four restaurants satisfy the customers' expected queuing time. The average queuing time for all four restaurants is 2.41 minutes which is more than 1 minute less compared to the 3.70 minutes expected queuing time from the survey result.

However, when we look at the service time, it can be seen that restaurant C exceeded the expected service time by 2.10 minutes. This was in stark contrast with the average service time of the three other restaurants where their service time on average was 1.92 minutes lower than the expected service time.

Table 3, however, does not show the distribution of the different time measurements. In Table 4 it can be seen that most of the inter-arrival times, specifically for Restaurants A, B, and D, actually fell below 1 minute. Restaurant C was slightly different in that it had a more even distribution for the first four time intervals.

[insert table 4 here]

For the service time, most of our survey respondents considered that five minutes of service time is reasonable as can be seen in Table 5. This is longer than most of the service time data that we collected where service time is completed between one to three minutes except for restaurant C. At restaurant C, where we recorded service time as the time from when the customer orders the food until the food is delivered, more than 50% of the customers that we observed spent more than the 3.9 minutes average expected service time. One interesting point that we noted for restaurant A was that the cashiers always offered extra promotional items before customers paid for their orders.

[insert table 5 here]

While for the queuing time, all four restaurants had an average queuing time which was lower than the average expected queuing time. However, it should be noted that more than 30% of customers of Restaurant D spent more than the average 3.7 minutes of expected queuing time as can be seen in Table 6.

[insert table 6 here]

Jones and Peppiatt (1996) identified that one of the key aspects of queue management with regards to customers' perceptions of waiting time is that in service operations with relatively short wait times (probably less than five minutes), there is growing evidence to suggest that customers' perceptions of time are significantly greater than

actual time by up to 40 percent. This means that the survey results of expected service and queuing times, which could be seen as the perceived times, need to be divided by a factor 1.40. Hence the actual expected service and queuing times become 2.78 minutes and 2.64 minutes respectively. When we compared these numbers with the data that we collected, it is interesting to note that the percentage of customers that spent more than 2.64 minutes queuing at Restaurants A, B, C and D were 16.74%, 44.00%, 8.13%, and 56.88% respectively. And the percentage of customers that spent more than 2.78 minutes of service time were 23.31%, 4.67%, 89.74%, and 11.00% respectively. These numbers could indicate that not all customers were satisfied with the service provided by the restaurants in regards to service and queuing times.

Zhao et al. (2002) highlighted that research (Katz et al., 1991; Roslow et al., 1992) has identified how speed is becoming one of the most important factors in the service industry and that customers tend to perceive waiting for service as a negative experience. There are two common approaches in dealing with the possible negative impacts caused by waiting for service. First, restaurants can design operation flow that will minimize actual queuing and service times. Secondly, restaurants can also manage customer perception.

The longer actual service time was than the expected one at restaurant C could be accounted for by the slightly different flow of ordering food. By sending the customers to their seats once they made their payments and later delivering the food to their tables, restaurant C created the perception that it had a quick service and met the customers' expectations, especially when the customers come in groups which allow them to hang out with their friends while waiting for the food. According to Jones and Peppiatt (1996), one of the variables that makes customers have a shorter perceived waiting time than the actual waiting time is when they are waiting with others.

Other research done by Baker and Cameron, 1996 and Davis 1991, as stated by Sulek and Hensley (2004), suggest that furnishing and décor also have an impact on customers' perceived waiting times. Uncomfortable furnishings and non-appealing décor can increase customer dissatisfaction conflated with waiting as they perceived longer waiting times.

Restaurant A initiatives of offering extra promotional items to their customers could potentially add to negative experiences. This is especially true for returning customers who have been offered the promotional items in previous visits. This could potentially add to the negative experiences by customers since they will consider this initiative as something that is extending the service time and forces them to take more time before getting their food.

Davis and Heineke (1994) suggested that customers who are occupied while queuing tend to perceive shorter queuing times than the customers who are unoccupied. Restaurant D, which has more than 50% of its customers queuing for more than the 2.64 minutes average expected queuing time, may consider mounting audio-visual or television sets in strategic locations to keep customers occupied while queuing.

6. Limitations and Future Research

This study has several limitations. First, not all of the respondents that we surveyed for expected service and queuing times were customers of all four restaurants. We did this because we wanted to obtain expected service and queuing times for fast food restaurants in general. This, however, means that the expected service and queuing times for each restaurant may be longer or shorter than the survey results. In addition, for the restaurants which had multiple servers or cashiers operating in parallel, we only collected data for one of the servers. This was due to a limited number of data collectors. Secondly, we analyzed the four restaurants at one location during weekdays at lunch time. This means that we are only mainly considering two market segments, namely professionals and students around the particular area of the survey. The data could be different if collected at dinner time or at a different location which is closer to residential areas rather than office areas.

For future study, it would be interesting to collect and analyze the data of expected and actual waiting time for each single restaurant and also to investigate whether the restaurants have existing initiatives to manage waiting time. In addition, we also plan to analyze the degree of closeness of the speed of service with the level of satisfaction of customers, and to find out what other factors influence those satisfaction levels. In addition, it will also be interesting to study customer expectations toward waiting time in other types of restaurants discussed by Walker (2011). We hypothesize that customers who choose to dine in family dining, casual dining, or fine dining restaurants

will not be in such a rush compared to customers who opt to dine in fast food restaurants. Hence, the expected as well as the actual waiting times will also be longer.

7. Summary and Conclusion

Based on our study, we found that the most important factor considered by customers when choosing fast food restaurants is speed. This is in line with the categorization of fast food restaurants under quick service restaurants. During lunch time peak hours, customers spent on average 5.4 minutes waiting before they could get their orders. The 5.4 minutes consisted of 2.42 minutes of queuing time and 2.98 minutes of service time. This total waiting time is only slightly below the actual expected waiting time of 5.42 minutes.

Waiting time is something that needs to be managed seriously, especially in fast food restaurants. We highlighted several studies that stress the importance of managing customers' perceptions of waiting time and several ways how restaurants can do that.

This study is a first step in investigating how restaurants deal with customers' expected waiting times. Research analyzing the factors influencing the satisfaction levels of fast food restaurant customers would help fast food restaurant managers to better serve their customers. Further research can also be conducted into developing a simulation model of fast food restaurant operations and also to investigate waiting times in other restaurant types.

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Table 1. Data Collection Sheet

ID	Arrival Time	Begin Serve	End Serve

Table 2 – Factors in choosing a fast food restaurant

Factor	Percentage (n=51)
Speed	84.31%
Price	64.71%
Cleanliness	60.78%
Menu variant	35.29%
Friendliness	21.57%
Atmosphere	17.65%
Promotional items or discount	9.80%

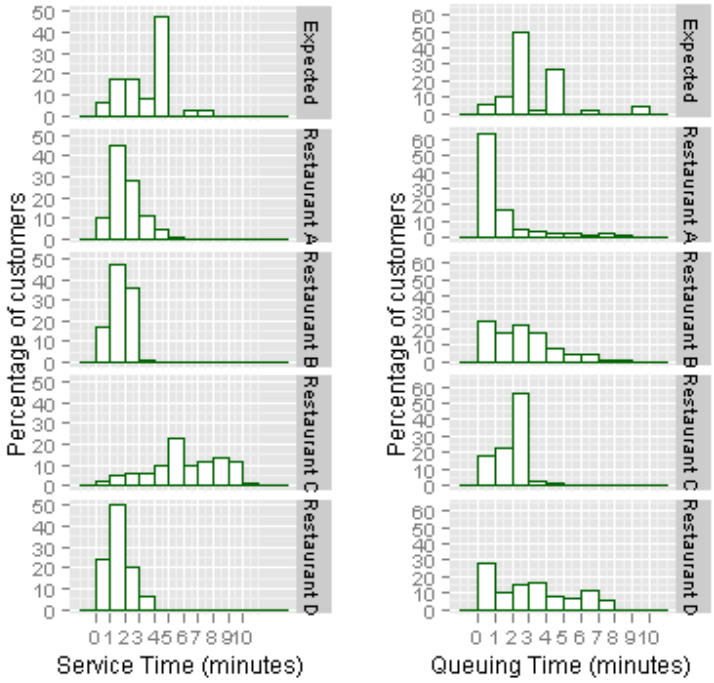

Figure 1. Summary of Service and Queuing Time

Table 3. Data Collection Summary

All data in minutes	Restaurant A	Restaurant B	Restaurant C	Restaurant D	Expected (Survey Result)
Inter-arrival time average	1.98	1.80	2.70	2.41	
Inter-arrival time standard deviation	1.92	1.36	1.34	2.27	
Service Time	1.85	1.70	6.00	2.37	3.90
Service time standard deviation	1.00	0.62	2.45	0.78	1.55
Queuing Time	2.22	2.57	1.81	3.05	3.70
Queuing time standard deviation	2.03	1.95	0.88	2.36	1.80
Number of visitors (11:30 – 13:00 over three days)	136	150	100	112	

Table 4. Inter-arrival Time

	Inter-arrival Time (a) in minutes									
	a ≤ 1	1 < a ≤ 2	2 < a ≤ 3	3 < a ≤ 4	4 < a ≤ 5	5 < a ≤ 6	6 < a ≤ 7	7 < a ≤ 8	8 < a ≤ 9	9 < a ≤ 10
Restaurant A	40.43%	25.11%	11.91%	9.79%	5.53%	1.70%	1.70%	2.13%	0.85%	0.85%
Restaurant B	36.36%	35.66%	16.08%	7.69%	1.40%	0.00%	1.40%	1.40%	0.00%	0.00%
Restaurant C	25.16%	16.98%	25.16%	19.50%	13.21%	0.00%	0.00%	0.00%	0.00%	0.00%
Restaurant D	43.93%	19.63%	9.35%	9.35%	7.48%	0.93%	2.80%	3.74%	1.87%	0.93%

Table 5. Service Time

	Service Time (s) in minutes									
	s ≤ 1	1 < s ≤ 2	2 < s ≤ 3	3 < s ≤ 4	4 < s ≤ 5	5 < s ≤ 6	6 < s ≤ 7	7 < s ≤ 8	8 < s ≤ 9	9< s ≤ 10
Expected	5.88%	17.65%	17.65%	7.84%	47.06%	0.00%	1.96%	1.96%	0.00%	0.00%
Restaurant A	10.59%	44.92%	28.39%	11.02%	4.24%	0.85%	0.00%	0.00%	0.00%	0.00%
Restaurant B	16.67%	47.33%	35.33%	0.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Restaurant C	2.56%	5.13%	6.41%	5.77%	10.26%	23.72%	9.62%	11.54%	13.46%	11.54%
Restaurant D	24.00%	50.00%	20.00%	6.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Table 6. Queuing Time

	Queuing Time (q) in minutes									
	q ≤ 1	1 < q ≤ 2	2 < q ≤ 3	3 < q ≤ 4	4 < q ≤ 5	5 < q ≤ 6	6 < q ≤ 7	7 < q ≤ 8	8 < q ≤ 9	9< q ≤10
Expected	5.88%	9.80%	49.02%	1.96%	27.45%	0.00%	1.96%	0.00%	0.00%	3.92%
Restaurant A	63.44%	17.18%	4.85%	3.96%	2.20%	2.20%	1.76%	2.64%	1.32%	0.44%
Restaurant B	24.00%	17.33%	22.67%	17.33%	7.33%	4.67%	4.00%	1.33%	1.33%	0.00%
Restaurant C	17.50%	23.13%	55.63%	2.50%	1.25%	0.00%	0.00%	0.00%	0.00%	0.00%
Restaurant D	27.52%	10.09%	14.68%	15.60%	8.26%	6.42%	11.93%	5.50%	0.00%	0.00%