

OPRE-6378 Supply Chain Strategy

Project Milestone #6

Process Performance Analysis of UTD Subway

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Group: 5

Members: Stuti Sharma

Meenakshi Shastri

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Table of Contents

1.	Sum	mary	/	3
2.	Intro	oduct	tion	4
3.	Stra	tegic	Positioning of Subway	4
3	3.1.	Key	Competences of Chain	5
3	3.2.	Adv	antages from Value Chain Integration	6
4.	Why	/ Sub	way?	6
5.	Prod	ess A	Analysis	6
6.	Sub	way S	Sandwich Assembly Process:	7
(5.1.	Brea	ad-Meat-Cheese Selection stage:	8
	6.1.	1.	Bread Choices:	8
	6.1.	2.	Meat choices:	8
	6.1.	3.	Cheese choices:	8
(5.3.	Veg	gies, seasoning and packing	9
(5.4.	Billir	ng	9
7.	Com	pany	's value proposition for service	9
8.	UT [Dallas	Comet Café Subway Ideal Service Time	. 10
9.	UT [Dallas	Comet Café Subway Actual Service Time	. 10
10.	. Id	entif	ying Bottlenecks	. 11
:	10.1.	В	ottleneck: Toasting	. 11
:	10.2.	В	ottleneck: Post Toasting	. 11
11.	. V	/aitin	g Lines and Uncertainty in Customer Arrival	. 11
:	11.1.	W	/hat Causes Them?	. 12
	11.1	.1.	Uniqueness in order	. 12
	11.1	.2.	Customer population source	. 13
12.	. R	ecom	mendations to mitigate the waiting line issue	. 13
13.	. St	aff N	Nanagement & Scheduling	. 14
	13.1.	Tı	raining and Utilization Optimization	. 14
	13.2.	So	cheduling Improvements	. 14
:	13.3.	0	rder at the Billing	. 14
	13.4.	0	ther Recommendations	. 14
14.	. C	onclu	sion	. 16
Ар	pendix	·		. 17



1. Summary

The UTD Subway outlet is facing incessant sudden line built-up at different intervals during the lunch hour. Due to the nature of breaks between class, which is only 15 minutes long and occur at the same time for all the students, there is sudden rise in demand causing congestion. Long lines seem to discourage students from buying food during the short break leading to loss in revenue. Our objective will be to quantify the value that can be achieved by reducing waiting time and ultimately to streamline current system at the UTD Subway outlet, uncover ways to improve efficiency and reduce waiting time for customers leading to higher satisfaction.

Why is this problem relevant and why UTD Subway?

To understand the demand in UTD we conducted a survey in which UTD Subway came out with a clear dominance when it came to student's preference in campus. At the same time 69% students said that they will opt to skip meals instead of waiting in line to place their order at the cost of missing class. This seemed like a genuine widely prevalent problem faced by the students of UTD. To reach the above objective, the market situation, the customers and the competitive situation will be analyzed and evaluated.

We conducted a survey which was used as a tool to analyze customer preferences and gauge the value of the time in the view of the customer and its imminent effect on customer satisfaction. Our focus was on the Peak hour rush faced by the outlets and the strategies that can be used to meet with it. Also, finding causes for discrepancy between the value propositions of the food chains as opposed to their performance. Evaluating the Service logistics management and its trade off with customer satisfaction. The findings during the project showed that the waiting game was found to be the most vexing aspect for students and would greatly decrease their satisfaction in an average to 1 in a range of 0 to 5, 5 being the highest that a customer could feel satisfied. We go on to evaluate the recommendation that would increase this satisfaction level greatly.



2. Introduction

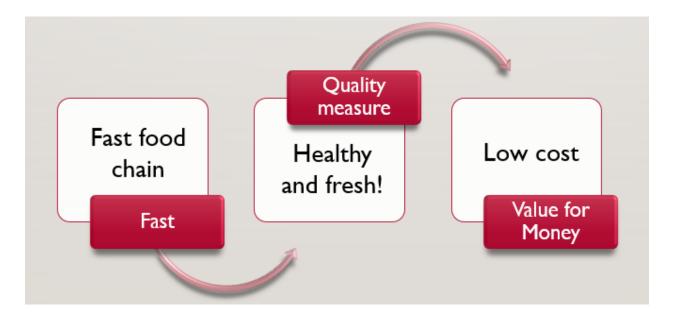
UTD Subway outlet first opened in 2009 and is managed by Chartwells Higher Education Dining Services. It is one of the integral chains that form the Comet Café in UTD Student Union. The Comet Café is unique as it gives students and visitors a chance to eat while in the heart of the campus that makes it an ideal place for hungry minds to gather. Subway was brought into Student Union after it established its popularity during multiple surveys that were conducted by the university to understand the demand of its student body.

Subway offers customers many kinds of fresh submarine sandwiches also called "subs". They also sells fresh wraps, salads and baked cookies. We will be focusing on the sandwich production for the project. In the make-to-order assembly process of subway, the customers always decide how they want their sandwiches to be served. Subway has given themselves competitive advantage by is based on freshness. Slogan "Eat Fresh" tells that Subway chain uses only freshly baked bread and fresh ingredients. Subway has a lot of competitors within the Comet Café such as Panda Express, Moe's, Chick-Fil-A, UTD Marketplace, Jason's Deli and The Pub etc.

3. Strategic Positioning of Subway

To understand the marketing and strategic positioning of Subway, it is important to understand its mission statement - "Delight every customer so they want to tell their friends — with great value through fresh, delicious, made-to-order sandwiches and an exceptional experience. "





This proposition gives Subway competitive differentiation by its importance on freshly made healthy fast food. Its slogan "Eat Fresh" tells that Subway chain uses only freshly baked bread and fresh ingredients. The process design in Subway is in such a way that it facilitates customer's decision to customize their sandwich according to their liking. Their vision is to ensure that customers are delighted by the firm's made-to-order, scrumptious sandwiches and salads. Subway sandwich shop employs a few basic principles of lean organization. Subway sandwiches are made to buyer's demand. Customers receive their precisely ordered sandwich they expect to receive at the precise time they desire it. Customers are processed one after the other in a one-by-one flow. This technique immensely decreases sandwich overproduction and defective products.

It was also a good idea to look at the macro environmental factors that were influencing inside Comet Café to understand the customer demand. When asked, students said that they were looking for healthy, cheap, fast and tasty food when choosing which meal to buy in UTD, in that order. As healthy came out to be the most important factor that influenced student's eating choices, it came as no surprise that subway ranked first among student's preference for eating in campus.

3.1. Key Competences of Chain

The core values:

- Subway is committed to customer satisfaction through offering high quality food with exceptional service and good value.
- Subway takes great pride in serving each other, the customers and the communities.



- Subway is seeking continuous improvement in everything.
- Subway values a sense of urgency and emphasizes an innovative, entrepreneurial approach to business.
- Subway expects fairness and mutual respect in all the activities.
- Subway knows that success depends upon the initiative is taken individually and the ability to work as a team.

3.2. Advantages from Value Chain Integration

After knowing the need of the customer, it is easier for Subway to evaluate its value proposition based on that. Subway can achieve competitive differentiation & opportunity by speeding up the delivery offered services to the final customers. It can be advantageous in the same way that Pizza Hut outpaced the competition by offering fast delivery of a less expensive product. Most of Subway's store are franchises therefore maintaining a stable service level and training becomes increasingly difficult and is bound to create some difficulty if the proper service measures are not met. We can manipulate expectations management through careful integration of the value chain in the outlet

4. Why Subway?

We conducted a survey which was used as a tool to analyze customer preferences in Comet Café and which qualities draw them to the outlet. Through survey we found that 73% of the customers opted for Subway for their meal preference. For further analysis, we asked them the specifics which made them choose Subway. The survey results showed that people chose Subway primarily for two reasons: Healthy (72%) & Cheap (32%).

5. Process Analysis

Subway follows MTO (Make to Order) process. However, ingredients for the sandwiches need to be prepared beforehand. Because of a need for long cycle times and to maintain freshness, outlet bakes bread around the clock, cut vegetables and slice cheese before opening stores. Ready raw materials are then stored in bins along assembly lines. Older bins are consumed first, and the newest will be placed last. In other words, customers get the freshest ingredients and simultaneously, the outlet inventory doesn't spoil either. Ingredient placement takes place according to the order of sandwich preparation, thus error-proofing the sequence of sandwich preparation. Sandwiches are prepared after receiving customer's orders means to start a pull-type supply chain operation because the process is performed

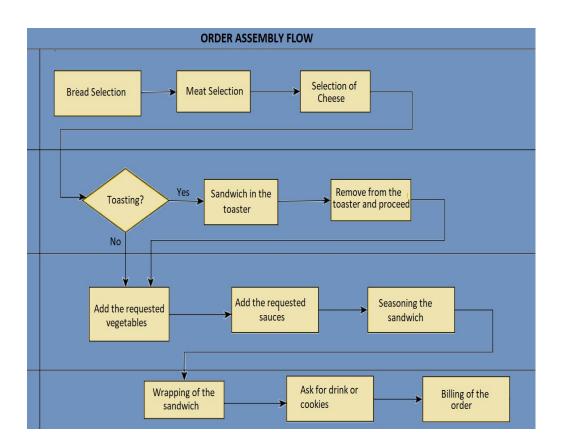


when demand is confirmed, i.e. being pulled by demand. UTD Subway adopts the simple policy of teamwork. A fixed number of student workers assemble the sandwich in parts and pass it on to the next stage of sandwich production. Every server is tasked with performing a definite sequence. With regard to Café organization and layout, the sandwich areas are arranged in 'assembly line' form, right from taking customer orders to billing. Outlet is provided with signs and pictures all along the process of sandwich assembly for supporting individual customer orders. All ingredients used in preparing a sandwich are displayed via clear-cut viewing panels along the line.

6. Subway Sandwich Assembly Process:

The sandwich assembly process can be understood in 4 sections:

- a. Bread-Meat-Cheese Selection
- b. Toasting
- c. Veggies, seasoning and packing
- d. Billing





6.1. Bread-Meat-Cheese Selection stage:

6.1.1. Bread Choices:

Subway provides customer with selection of breads among the following 6 types:

Bread Type	Calories per 6" serving
Italian	200
Flatbread	220
Monterey Cheddar	240
Italian Herb and Cheese	250
9-Grain Wheat Bread	210
Honey Oat	260

6.1.2. Meat choices:

Subway provides customer with wide range of selection from these proteins:

Turkey breast, Ham, Chicken breast, Tuna, Turkey salami, Meatballs, Pepperoni, Genoa salami, Turkey bologna, Teriyaki chicken breast

6.1.3. Cheese choices:

Subway provides customer with wide range of selection of cheese from: White American cheese, Cheddar cheese, Provolone cheese, Pepper-jack cheese, Swiss cheese and Shredded Monterey cheddar cheese blend

6.2. Toasting:

During the initial years, toasting was the black hole in Subway's galaxy. Subway being one of the biggest fast-food chains, didn't toast its sandwiches like its competitors did. Quiznos, an old rival of Subway, came up with the slogan "Mmm ... toasty!". This boosted to bring the concept of "Speed Oven" and put use of microwave to toast the bread with meat and cheese to bring that uniformity of heated protein along with flavor of cheese sunk into it. The sandwiches come out oven-baked-crispy, not microwave-soggy. The hit among all the sandwiches is the Meat-ball sub which when goes into the toasting oven, gives a crispiness to the bread gets crispy, bubbles up the cheese and makes the sauce taste heavenly. There are 3 ovens which are used for toasting here at UT Dallas Comet Café. 2 ovens are used for the non-vegetarian subs with a capacity up to holding four 6" subs or two 12"subs for 30-35 seconds depending on the length. Similarly, one oven for vegetarian subs with the capacity same as the other 2 ovens. The customer can opt to get the sandwich toasted without any extra charge. Based on the data we collected, 8 out of 10 people usually opt for getting their sandwiches toasted.



6.3. Veggies, seasoning and packing

Vegetable options at subway varies from place to place. It depends on the availability of a particular vegetable where a subway is located.

In general subway have lettuce, spinach, tomato, cucumber, onions, green bell pepper, olives, pickles, jalapeños and banana peppers. During the summer UT Dallas Subway has guacamole which is charged an extra dollar. Customers can choose up to 5 choice of vegetables here at Comet Café.

Subway provides a wide range of delicious signature sauces to finish off the sandwich or salad:
Red chili, Sweet Onion, Mustard, Honey Mustard, Mint/Light Mayonnaise, Harissa, Mayonnaise
South West Chipotle, Barbecue. Customers can choose up to 3 choice of sauces here at Comet Café.
For Seasoning, apart from salt and pepper Subway provides oregano, chili flakes, parmesan and a blend of salt, pepper, garlic, parsley, dill, and chives.

The packing of the prepared sandwich is pretty standard. The length of the packing paper is same for both 6" and 12" sandwiches.

6.4. Billing

The whole product is sent to the final section of billing where the customer is offered to choose for a fountain beverage or cookies for an extra dollar. The customers at UT Dallas have 3 modes of payment: Comet Card, Credit Card and Cash.

7. Company's value proposition for service

The ideal service time for any Subway franchise all over the world is 120-150 seconds. The below image shows time allotted for each activity in the process.

Section	Service Time
Bread-Meat-Cheese Selection	37 seconds
Toasting	30 seconds
Veggies, seasoning & packing	52-55 seconds
Billing	37 seconds



	Task	Seconds	3+ Support	
	Greet Customer	4		
	Take Order	5		
듵	Get Bread/Wrap/Salad Bowl	4		
Station 1	Cut Bread	3	1	
တ	Meat	12		
	Cheese	9		
	Toasting	30	Places Pulls	
	Onions	3		
	Lettuce	3		
	Tomatoes	4		
~	Cucumbers	5		
Station 2	Pick i es	4	2	
33	Green Peppers	4		
	Black Olives	3		
	Hot Peppers	2		
	Place Condiments	5		
	Wrap/Napkins & Bag	13		
က	Offer Fresh Value Meal [™]	3		
Station 3	Offer Cookies	14	3	
Š	Ring on Register	20		
Total Seconds 12		120 - 150		
	Phone/Fax Orders			
ج ج ج	Baking Bread/Cookies			
Support Position	Filling In on Line		4	
வ ஏ	Restocking Sandwich Unit			
	Cleaning Customer Area			

8. UT Dallas Comet Café Subway Ideal Service Time

During our research with the service time variation, we spoke to the supervisor at UT Dallas Comet Café-Subway. The supervisor mentioned that the ideal service time they expect for UTD Subway franchise at college is around 3 minutes.

Section	Service Time
Bread-Meat-Cheese Selection	1.5 minutes
Toasting	30 seconds
Veggies, seasoning & packing	45 seconds
Billing	37 seconds

9. UT Dallas Comet Café Subway Actual Service Time

To analyze the abidance to the service time at Comet Café, we sat in the cafeteria and observed the service time throughout the day. The actual service time came around 7 minutes and exceeded even more during peak hours. This establishes a dissimilarity between the company's value proposition and actual performance at the UT Dallas outlet.

OPRE-6378 Supply Chain Strategy

Process Performance Analysis of UT Dallas Subway



Section	Service Time
Bread-Meat-Cheese Selection	1 minute
Toasting	2.5 minutes
Veggies, seasoning & packing	1.5 minutes
Billing	2 minutes

10. Identifying Bottlenecks

We did expect a little deflection from the ideal service time mentioned by the Comet Café supervisor. But the observed was almost double the expected service time. This led us to revisit the whole sandwich preparation process step-by-step for a couple of hours. The bottleneck of the whole process was found at these sections: 1. Toasting section and 2. Post toasting.

10.1. Bottleneck: Toasting

As mentioned earlier, there are 3 ovens at UT Dallas Comet Café. 2 ovens are used for the non-vegetarian subs with a capacity up to holding four 6" subs or two 12"subs for 30-35 seconds depending on the length. Similarly, one oven for vegetarian subs with the capacity same as the other 2 ovens. The main issue we observed was that the ovens were not being utilized up to their capacity. Instead of putting 4 or 2 subs for toasting, the student workers 1 toaster to heat for each order irrespective of the nature of sandwich (vegetarian or non-vegetarian). This leads to an accumulation of sandwiches at the toasting section.

10.2. Bottleneck: Post Toasting

The activities followed after the toasting is only manual work. Bottleneck at the toasting section leads to an idle time at the veggies section. Once the toasting is done, the accumulation of order gets stagnant at vegetables-topping section. This is the stage where the server has to be neat in arranging the veggies one above the other, followed by putting the sauces in a particular way.

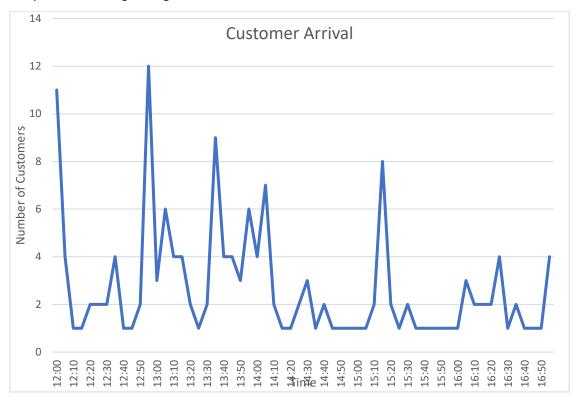
11. Waiting Lines and Uncertainty in Customer Arrival

Service perishability leads to many problems for service providers and those problems become more serious when capacity cannot match with demand. When demand and capacity cannot be matched, waiting lines will be found. During the waiting period, consumers face uncertainty about how long they have to wait, and experience stress. In our case, majority of our customers are students. And the times



when students visit the cafeteria is during their lunch breaks. The stress of waiting to get their meal comes out as either balking, reneging or skipping their meal altogether.

We observed the Subway outlet from 12pm till 5pm for a couple of days to understand the arrival pattern of the customers. The average customer arrival was found to be 40 seconds with a standard deviation of 60 seconds. The servicing during the peak hours was quite long, 7minutes. The length of the queue kept on increasing during such time.



Through survey we also understood that 67% of the customers are bearing to wait in the line for getting their meal. Since customer satisfaction depends on the understanding of customer needs, the authorities of the outlet must value the preciousness of their customers' time.

11.1. What Causes Them?

We understand that there are various reasons contributing to the increase in waiting lines.

11.1.1. Uniqueness in order

Since Subway has a huge sandwich selection, there are more than two million different sandwich combinations. Majority of the orders on campus tend to lean towards the meal of the day. Each week day has a specific non-vegetarian sandwich selected as the meal of the day. The students have flexibility to change the toppings even though the meat is fixed. Eventually, every order becomes unique in its own way. Each unique order, thereby, leads to different service time. This uncertainty of service time as



well as a temporary surge in demand during every hour, highly contribute to the increase in waiting time and waiting lines. The waiting line has different elements which can be causal factors:

11.1.2. Customer population source

The customers visiting the outlet can be in just students, family members, potential students with their families.

11.1.3. The arrival patterns

Since majority of the customers visiting the Café are students, they are likely to balk, renege or jockey during the waiting time. Balking occurs when the customer decides not to enter the waiting line. For example, a customer sees that there are already 15 students waiting in line to order, so the customer chooses to come back later. Reneging- occurs when the customer enters the waiting line but leaves before being serviced. For example, a customer enters the line waiting to order, but after waiting 15 minutes and seeing little progress, the customer decides to leave. Jockeying- occurs when a customer changes from one line to another, hoping to reduce the waiting time.

11.1.4. The service patterns

We got in touch with the people who work at the UT Dallas Subway outlet. The servers at the Subway outlet are mostly student workers working in 4-hour shifts. For a student worker, the shift usually starts from 9am in the morning while for fulltime workers like the supervisor of the outlet start their shift from 8 in the morning (8-hour shift). The student workers are entitled to take their 30minutes lunch break once they have worked for 2 continuous hours. Based on the given schedule, the 2 workers start with 9am shift along with the supervisor and 1 worker joins the shift on hourly basis. This arrangement leads to a smaller number of servers during the peak hour rush.

11.1.5. Line Controlling Priorities

UTD Subway outlet adopts First in First out (FIFO) technique for customer service. Although when uncertain events like re-ordering occurs, the system becomes unbalanced as the customer who has left the system is give first preference to serve.

12. Recommendations to mitigate the waiting line issue

Why is time valuable?

The changing lifestyles have proven that just quality products are not sufficient anymore. Today's customers require speed along with quality. We will be aiming to also make waiting time seem more tolerable for students who are not under pressure to rush to their next class between breaks. We will be



aiming to change people's perception of the waiting line along with solutions aimed at reducing the waiting line.

13. Staff Management & Scheduling

13.1. Training and Utilization Optimization

Student workers or new recruits at Subway outlet should be trained from the point-of-view of customers. During the training, they should be demonstrated with the process of sandwich preparation while being made to stand in the customer's spot, providing them the customer's perspective. Reduce process utilization by employing a minimum of five staff members at a time to reduce line build-up.

Number of Worker	Utilization	Length of the line	Average waiting time
3	1.167	36.24	24.11
4	0.875	20.48	13.68
5	0.702	11.35	2.52
6	0.583	6.24	0.83

13.2. Scheduling Improvements

Scheduling 4 student workers to start their shift from 10:30 am followed by 4 student workers from 1pm. This will maintain the availability of 5 servers during the peak hours.

13.3. Order at the Billing

This methodology can be tested for a fixed window period through a dry run for a week and can get feedbacks from customer in the form of survey. The customer can state the order at the billing counter with the specifications of the sandwich followed by completing the order by paying for the sandwich beforehand. The customer will get a token number in the bill and can occupy a seat in the dining area. The token number will be displayed through a LED display, acknowledge the customer regarding the completion of order and can be picked from the sandwich station. This methodology is inspired by Chick-fil-A at Comet Café and is quite successful.

13.4. Other Recommendations

Traditional methodologies of operations management express that the way to make customers feel they are spending less time in line is to physically reduce the length of the wait. What better way to identify ways to reduce the length of the wait, than to ask the customers themselves, what are their

OPRE-6378 Supply Chain Strategy

Process Performance Analysis of UT Dallas Subway

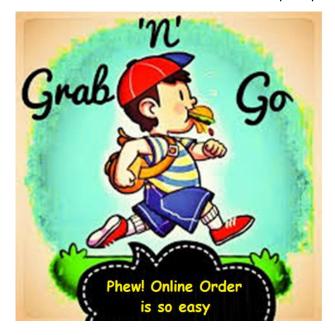


expectations in the form of improvement? We incorporated few practical concepts in the survey and asked for the customer's opinion. 75% of the customers preferred to order online & Grab-n-Go their meals from Subway. 47% of the customers preferred to have their orders to be done through kiosk machines with built-in menu.

Grab-n-Go

We are people living in a digital world. Interaction of human with technology has become one of the basic norms in terms of lifestyle. Mobile friendly applications can be created within 5 steps and marketing in a campus can be done through various social media platform rapidly. Following are the suggestions to be put forth to the Chartwells Management for introducing Grab-n-Go:

- To create a mobile-friendly Subway Comet Café application with in-built menu selection and display of meal of the day
- Students can install this application and use it to order their meals
- In built payment options: Payment through Comet card (10% discount) or Credit/Debit Card
- Enable order tracking and notify once when the order is prepared
- A window period of 15 minutes to be made available for the order pickup





e-Queue System

In UT Dallas, students are exposed to appointment system in almost all the resources of the university. Kiosk machines, which are usually used for food ordering in cinema halls, can be introduced in Comet Café. This machine will have the similar methodology as suggested in the Grab-n-Go technique.

- The machine will have with in-built menu selection and display of meal of the day
- Students can swipe their comet card and order their meal
- In built payment options: Payment through Comet card (10% discount) or Credit/Debit Card
- Enable order tracking through LED display and put in sandwich bin once prepared
- A window period of 15 minutes to be made available for the order pickup



14. Conclusion

There is no limit to the amount of frustration which waiting lines or waiting time can cause. The management should understand that the customers they are dealing with a majority student. Students have overwhelmed with their academics, social life and hence the need freer time deal with frustrations. Addressing this with high level service is the key to success. Assessing acceptable waiting will benefit the managers to set operational objectives and if met, will eventually improve customer satisfaction.



Appendix

- Qualtrics survey on Food Preference Choice at UT Dallas https://utdallas.qualtrics.com/jfe/form/SV 25KWM7UG0tYxQk5
- Subway origin at UT Dallas https://www.utdallas.edu/news/2009/02/05-001.php
- 3. Grab-n-Go image

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https://www.google.com/search?q=grab+and+go+cartoon&hl=en&authuser=0&tbm=isch&tbs=rimg:CQj4B5eJnNL1IjgDudCZW_1Yx5DFNV3_1WFwouCDMrz9PXW2VNqjMLe3J4R0A4v88ADrwk_11gFCxnp4TIUbdThE32s3yoSCQO50Jlb9jHkETH0gXakc7N6KhIJMU1Xf9YXCi4R-cKpnbSXkbcqEgkIMyvP09dbZRHXaf_1qDf4gYioSCU2qMwt7cnhHEakvX6aK2bT7KhIJQDi_1zwAOv

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4. Food Kiosk Machine image

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5. Customer Arrival Data

