WAITING LINE ANALYSIS AT FROTH COFFEE AND DESSERT BAR

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AGENDA

❖ Current Waiting Line Situation

❖ Simulation 1 (Current Waiting Line)

❖ Simulation 2 (Modified Waiting Line)
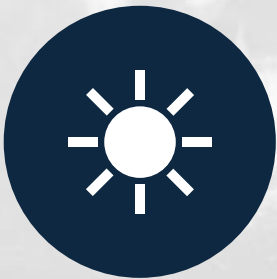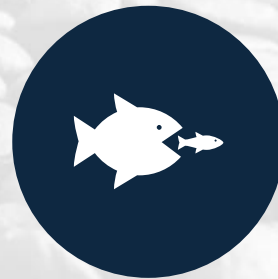
❖ Analysis and Recommendations

Overview

Local coffee shop, operates from 7AM to 8PM

Characteristics include strong branding, convenient location and competitive prices

Location poses as a primary benefit, can also slow down business (high rent prices and slower business during the Summer).

Local competitive advantage.

Wait & Service Times (Data Analysis Pt.1)

Waiting Time Combined Averages		
Avg. Time Waiting (Per Minute)	1.91	1:55 Minutes
Avg Service Time (Per Minutes)	4.91	4:13 Minutes
Average Time In System (Minutes)	6.82	6:49 Minutes
How Many Customers per minute	0.3	
Number of Servers	2	
Service Rate per minute	0.2036	
Interarrival Time (Minutes)	3.48	

❖ Steady times (3PM-6PM) and peak times(12PM-3PM), employed 2 servers taking and preparing orders.

❖ Utilizing the average of the 4 days recorded, on a given day, a customer can expect a waiting time of 1 minute and 55 seconds.

❖ Service time took around 4 minutes and 13 seconds, with an average time in the system of 6 minutes and 82 seconds.

❖ Froth can expect a rate of 0.3 customers per minute, with an average interval of 3.48 minutes per customer on average.

Wait & Service Times (Data Analysis Pt.2)

Daily Averages For Froth Coffee and Desert Bar
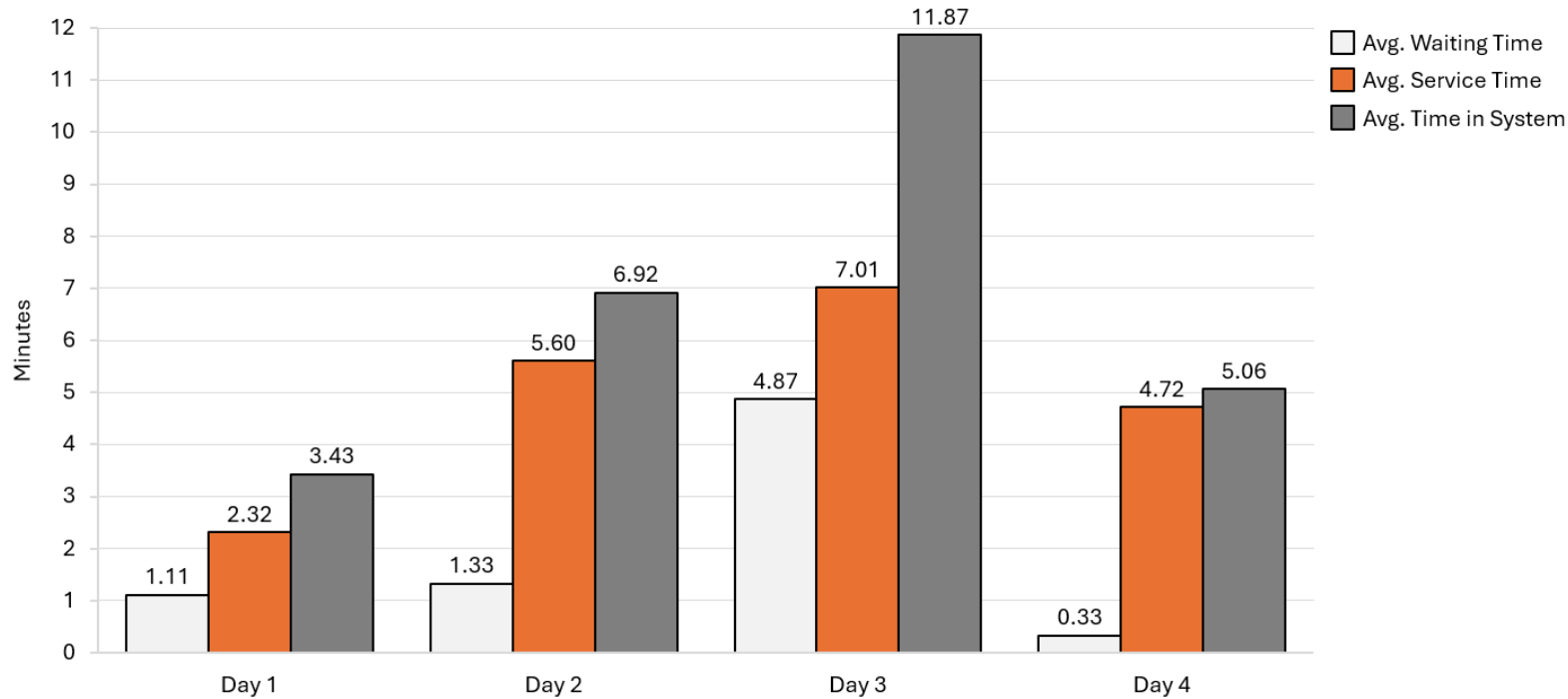
❖Shown is our data taken on various days, with **day 3 being our peak service time**.

❖Without day 3, the average total time in the system is **5.13 minutes**. This value is increased to **6.82 minutes** including day 3 data.

❖Summary statistics proved this day provided negative values and thus at peak times is unstainable in its queue.

❖Utilizing a third server could improve overall service time, as well as optimizing peak hours.
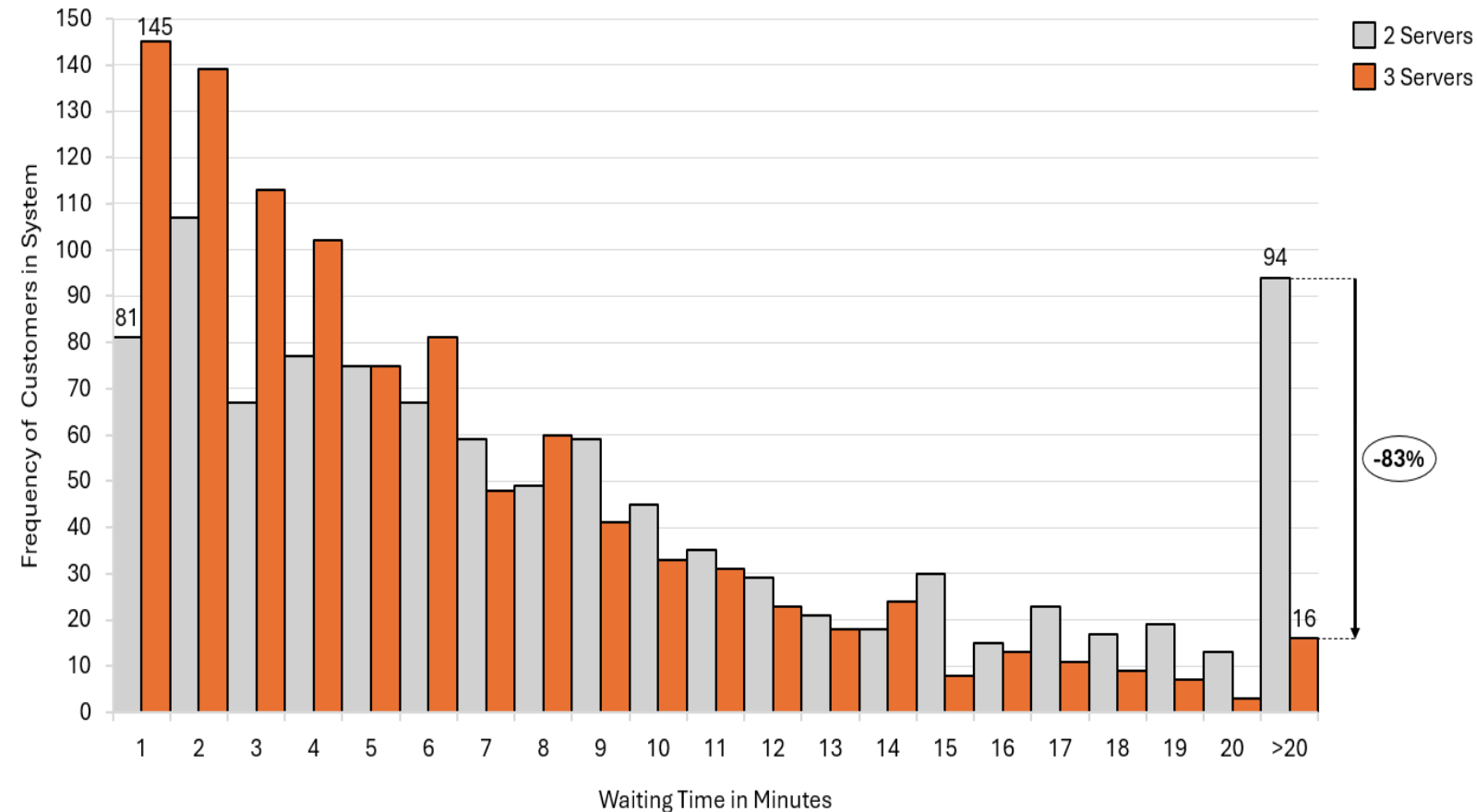
Simulation 1: (2 Servers)

❖ Here, a simulation of 1000 customers was created to simulate multiple days of business within Froth Coffee Bar with 2 servers.

❖ Based on the simulation results, an average of 4.5 days is needed to serve 1000 customers, (222 customers per day).

❖ Average wait time of the 1000 trials came out to be 4.19 minutes. The average total time in the system was 8.9 minutes, with a maximum service time of 49 minutes.

❖ During our analysis, we discovered that one trial had a maximum wait time of 40 minutes. This means that the maximum service time was around 9 minutes, which seems reasonable.

❖ There is potential room for optimization within our waiting line system.

Frequency of Customers in Waiting Line in Minutes (2 Server System)
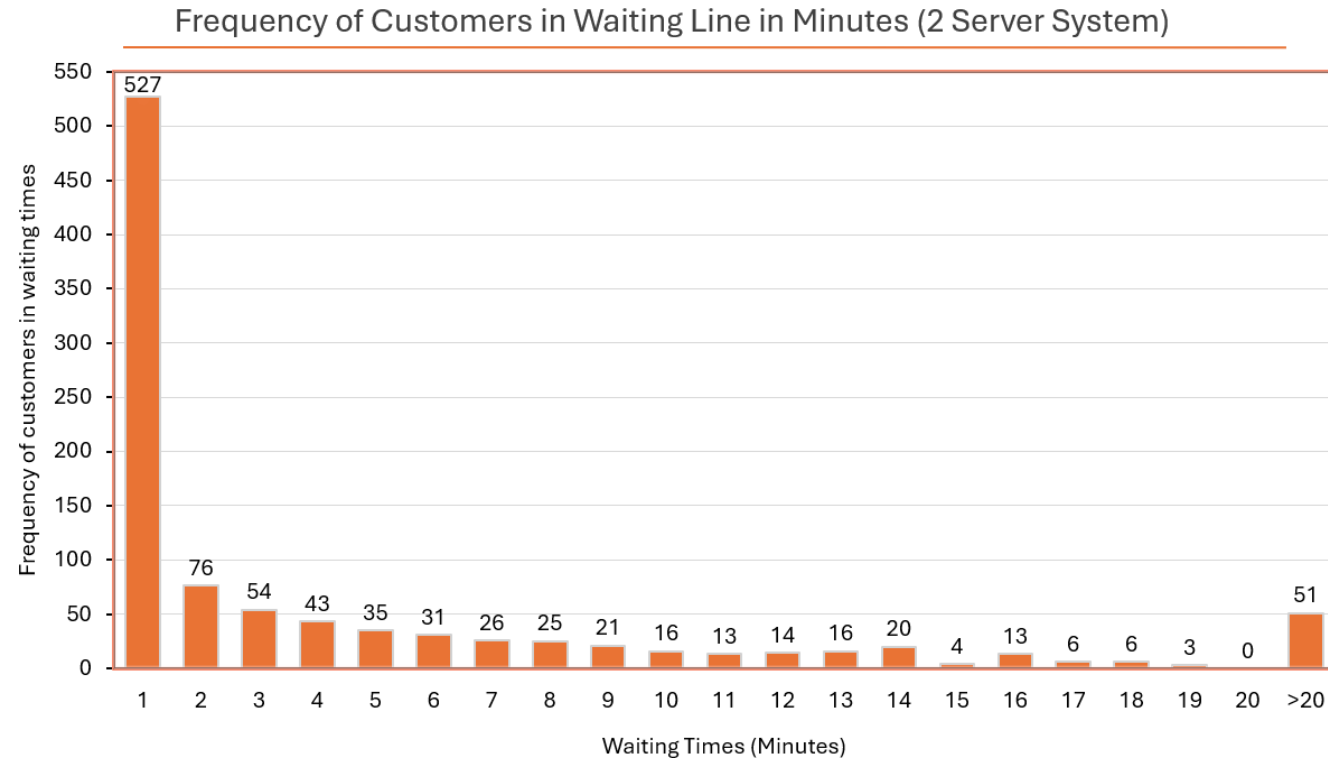
Simulation 1: (2 Servers) cont.

- Results show a large majority of customers (52%) had a wait time no longer than one minute.

- In the acceptable range, which we determined to be a 2-minute wait, is at 60% success rate.

- Simulation also shows that approximately 5% of customers will have to wait over 20 minutes

- Proved need for improvement within the waiting line system (third server system).

Simulation: 3 Servers

Frequency of Customer's Time in System per Minute

❖The three-server simulation is based on 1000 customers, creating an average wait time of **38 seconds**; a **91%** improvement over the 2-server simulation.

❖The average service time was **decreased 38%** to 5.5 minutes.

❖Maximum waiting time was reduced to 15.4 minutes, a 61.5% decrease.

❖Orders **over 20 minutes** have decreased 83%, along with the overall probability of a customer having to wait being only 10%.

❖The total service decreased to the point where **65%** of orders are complete **by 6 minutes** and 40% of orders are done in 3 minutes or less.

Recommendations & Analysis Pt 1.

Addition of third server:

❖ Observations show that Froth pays its servers $10 USD according to their website and uses Square's POS system.

❖ Benefits of a third server are clear from the simulation and the pricing is outweighed by the benefits of being able to serve more orders during these peak times.

❖ POS system used by Froth cost a one-time payment of $800 USD, as well as 2.6% + 10 cents per transaction.

❖ Froth may reduce their servers after peak hours (12PM – 2PM).

Recommendations & Analysis Pt 2.

Self-Service tablet-based kiosk:

❖ A self-service tablet can be easily integrated into Froth (single purchase of $800 with same pricing structure).

❖ The company could disguise its waiting time and allow servers to focus purely on servicing and preparing orders, preventing walk-outs due to long wait times.

Optimization of online platforms:

❖ Lack of UberEats and DoorDash pickups reveal special opportunities for discounts with in-app purchases.

❖These promotions could better manage waiting times and reduce overall service times.

Questions