MERCER UNIVERSITY

Stetson-Hatcher School of Business

Optimizing Service Efficiency in the Fast-Food Industry

A Case Study of McDonald's

Submitted by

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INTRODUCTION

1.1 BACKGROUND

In the service sector of the business, the most important part is service time, especially in the food service industry. There are plenty of examples of excellent restaurants and cafes without class products that went bankrupt just because of the time the customers had to wait for their orders or their products. In America, the largest economy, everything is exponentially faster, and the largest economy of the world, the competition is of the highest level. So, if a business wants to do well in the USA market, they have to perform at their best level and always provide the best of service/product in the least amount of time. The time part of the business becomes of the highest importance in the fast-food industry, as from name when can suggest that the quickest service gives the highest edge to a business here.

1.2 P URPOSE

Reducing Queue Wait Time:

Long lines can turn customers away and hurt profits. To make things better:

- **Better Line Management:** Use digital queues, manage staff well, or let customers help themselves.
- **Guessing the Busy Times:** Use past data to guess when it'll be busiest and plan ahead to avoid long waits.
- **Making Things Run Smoother:** Keep tweaking how things work to find and fix problems, like moving stuff around, changing how many people are working, or using technology to help.

Making Servers and Staff Work Better:

Using servers and staff wisely helps serve more customers without spending too much. Here's how:

- **Guessing How Many Customers:** Look at past data and use it to guess how busy it'll be, so you can have enough people working when you need them, but not too many when it's quiet.
- **Changing Who Does What:** Have staff who can do different jobs, so they can help out where it's needed most.
- **Using Technology:** Use special cash registers and software to schedule staff and keep track of how well they're working, so you can make changes to make things work better.

Making lines shorter and using servers and staff better makes customers happier, gets more done, and brings in more money. Keeping an eye on how things are going and making changes when needed is important for keeping up this success.

1.3 PROBLEM STATEMENT

The challenge we were facing was the best allocation of resources which would reduce the queue times and reduce the idle employees at a particular shift.

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DATA

2.1 DATA SET / DATA COLLECTION

To make the McDonald's queue work better, we spent three weeks carefully watching what happens when it's busiest, from 11 AM to 2 PM. We used Excel to track when people arrived, when they ordered, how long they waited, and how long it took them to get their food. We also noted if they ordered at the counter or the self-service machines, and if they wanted to eat in or take out. By doing this,

we wanted to figure out how customers move through the restaurant and find ways to make things smoother.

After collecting all this info, we looked at it closely to find patterns. We did some math to figure out how long people usually wait and when the busiest times are. Then, we came up with some ideas to make things better at McDonald's during rush hours. We suggested having more staff when it's super busy, making it quicker to order and pay, and maybe adding more self-order machines. If McDonald's follows these ideas and keeps an eye on how things are going, they can make customers happier and the restaurant run smoother when it's busy.

CHAPTER – 3

MODELS

3.1 JAAM SIM MODEL

A McDonald's restaurant's operations, including customer arrival rates, ordering procedures, meal preparation times, would all need to be simulated in order to create a JaamSim model. The following are some essential elements we think about putting in a JaamSim model for a McDonald's restaurant:

1. Customer Arrival Time
2. Ordering Process
3. Food Preparation
4. Queue Management
5. Customer Waiting Tim

3.2 JAAM SIM MODEL SELECTION

1. **Sim Entity:** This Object will help to create the Model.
2. **Entity Generator for Dine IN:** The model generator’s Customers from this Object which has Normal Distribution with mean 1.7 min and standard deviation of 2.9 min.

3. **Entity Generator for Drive Through:** The model generator's Customers from this Object which has Exponential Distribution with mean 4.3 min.
4. **Decision Making:** We have put some Branch in between the model because the customer's deciding whether to go to a self-order or front desk. With a discrete distribution we have allotted a probability of 20% and 80% to go to front desk and Self order respectively.
5. **Queues:** We have found out that queues were happening in Drive Through, Self-order and Kitchen.
6. **Entity Processor:** This Object will process the customers by taking and receiving orders.
7. **Entity Sink:** This Object helps our model to eliminate the the customers who have received the order and leaving the restaurant.

We looked at data from McDonald's about how long customers wait between arriving and how long it takes to serve them.

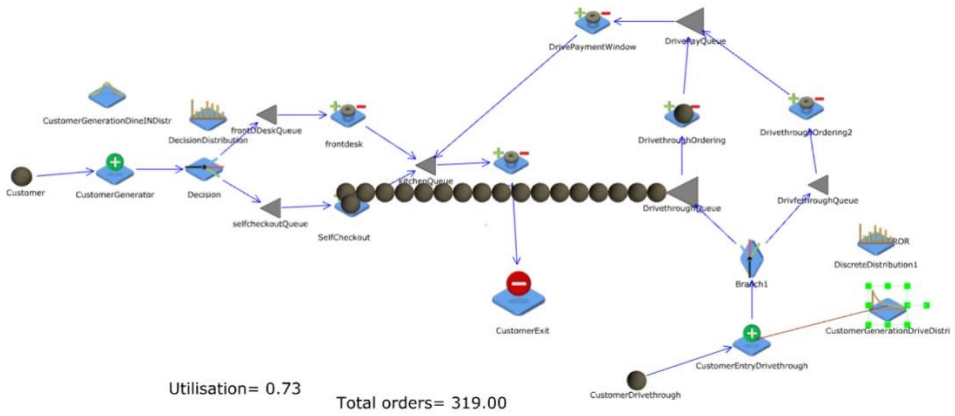

Fig 3.2: Initial Jaam Sim model

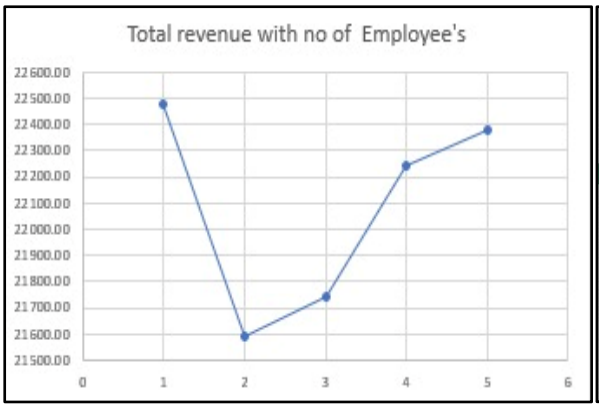

Fig 3.2.1: Revenue Model Graph

DATA						
No of Employees	1					
cost of employee	$ 12.00					
Number of orders	374					
avg order price	$ 77.00					
no of employees	1					
Objective function						
Total Revenue	$ 28,702.00					
Average Revenue		22474.71	21588.59	21740.81	22243.81	22380.60
	$ 28,702.00	1	2	3	4	5

Fig 3.2.2: Monte Carlo on the Mc Donalds Model

Adding one more employee to the kitchen helps reduce queues for big orders. This change can increase revenue by nearly $100 over an 8-hour shift per day. This makes sense and boosts monthly revenue overall.

We have done a Monte Carlo simulation for this model for the accuracy of the average. Thus, we finalize and say that our recommendations do work with our Jaam Sim model.

4.3 FINAL MODEL

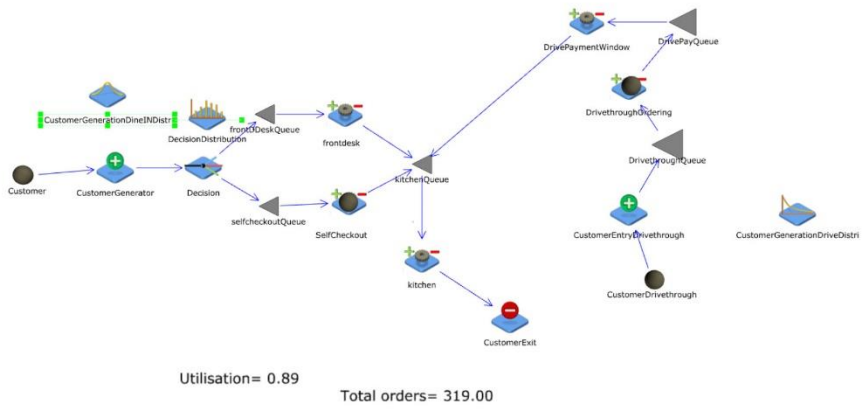

Fig 3.2.3 Final Jaam Sim

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CONCLUSION

4.1 CONCLUSTION

After thorough observation and analysis using our model, we propose two key strategies to optimize and manage the queues effectively at McDonald'

1. **Implementation of a Sign Board at the Drive-Thru Entrance:**
    a. During our observations, we noted that queues often formed because customers didn't switch to an available lane.
    b. To address this issue, we recommend installing a digital sign board at the drive-thru entrance.
    c. This sign board would indicate or suggest to drive-thru customers when a free lane is available, encouraging them to switch lanes promptly.
2. **Employing an Additional Service Employee:**
    a. Our analysis revealed that during peak hours, existing employees were not fully utilized.
    b. To alleviate this inefficiency, we suggest assigning an additional employee as a drive-thru order taker during rush hours. Given that there are usually spare employees in the restaurant during peak times, this adjustment can be easily implemented.

We have improved the over efficiency from **73 % to 89%** with the same order. The change in model can be referred with fig 3.2.1 and 3.2.3

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REFERENCE

[1] Class Notes

[2] Kiersten Hickman., “This Is the Worst Time to Visit McDonald’s, according to a Former Cook”. Available at: https://www.rd.com/article/worst-time-to-visit-mcdonalds/

[3] Food & Wine Editors., “World's Largest Fast-Food Chains”. Available at: https://www.foodandwine.com/lifestyle/worlds-largest-fast-food-chains

REVIEWER COMMENTS AND QUERIES FROM PRESENTATION

1. Include more graphs related to the project and show the optimized result in jaam sim

INDIVIDUAL CONTRIBUTION

INDIVIDUAL CONTRIBUTION OF SRIKAR VARMA NADIMPALLI

- Data Collection
- Developing the model
- Presentation & Report.

INDIVIDUAL CONTRIBUTION OF RUTWICK REDDY

- Data Collection
- Developing the model
- Presentation & Report.

INDIVIDUAL CONTRIBUTION OF MUHAMMAD MIQDAD

- Data Collection
- Developing the model
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INDIVIDUAL CONTRIBUTION OF HARSHAN RAGAVANDAR R

- Data Collection
- Developing the model
- Presentation & Report.