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IND E 495

Validation Platform

Increase Starbucks store manager’s capability by creating a staffing tool that level-loads tasks across a given amount of employees and minimizes customer wait time.

Play format = {POS, BAR, FOOD, SUPP}

- Number of partners: 5-7
- Store number: 302

Our project will aim to develop an improved and more dynamic model of a Starbucks store to test different assignment plays and

Create a model of a Starbucks store to test different assignment plays and

minimize customer wait time.

Simulation model is constructed based on actual store data including number of

working time.

Process

Pull Data from Starbucks Database

Objects, Stations, and Workers

- 7 working stations including 1 POS and 6 order prep stations (Espresso, Barista, Food, Warm Food, Ambient Food, Tea, Catering)
- 4 types of workers: POS, BAR, FOOD, CUST SUPP

Current State Opportunity

Keeping inputs constant, it produces the same output for every store.

Allocate workers by comparing the average customer time-in-system to that station and 1.4 meters per second.

Print remaining partners until

Treat each store uniquely and make allocations based on store specific historical data.

Current tool output vs. new tool output

- Expected time in system for tasks: Process Order, Tea, Brew, Espresso, Blended, Ambient Food, Warm Food
- Service times for stations weighted off of inter-arrival rates to that station
- No defective products and rework process.
- Exclude outliers such as extreme huge or small quantity orders.
- Service times for stations weighted off of inter-arrival rates to that station

Time of Day (1/2 hour increments)

8:30 am { 2, 2, 1, 2} {3, 2, 0, 2 } 2 min 49 sec 2 min 28 sec
Manager: What tasks should my 10 Starbucks employees be assigned to during the 9:00am shift at the University Village location so customer waiting time is minimized?

9:30 am { 1, 2, 1, 3} {3, 2, 0, 2 } 3 min 1 sec 2 min 37 sec

Order Channel

- Product mix (Blended, Brew, Espresso, Warm Food, Ambient Food, Tea)
- 5 working stations including 1 POS and 6 order prep stations:UP, Crew, Food, Ambient Food, Warm Food, Catering
- 4 types of workers: POS, BAR, FOOD, CUST SUPP

12:30 pm {1, 2, 1, 2} {2, 2, 0, 2} 2 min 56 sec 2 min 22 sec

4:30 pm {1, 2, 1, 2} {3, 2, 0, 1} 2 min 58 sec 2 min 8 sec

2:30 pm {1, 2, 1, 2} {3, 2, 0, 1} 2 min 58 sec 2 min 8 sec

5:30 pm {1, 2, 1, 1} {2, 2, 0, 1} 3 min 15 sec 2 min 28 sec

Current tool TIS = 4.12 min; New Tool TIS = 3.05 min

Assuming avg. customer transaction = $5.50

Potential to increase sales by approx. $440 per day

Model Verification

Comparing Output of Algorithm and Simio Model

- Current tool vs. New TIS
- Role: POSTasks Assigned: Process Order, Tea
- Partners Assigned: 2
- Average Partner Utilization: 82%
- Role: SUPP1
- Tasks Assigned: Espresso
- Partners Assigned: 3
- Role: BAR
- Tasks Assigned: Warm Food, Ambient Food, Tea, Catering
- Partners Assigned: 4
- Role: SUPP2
- Tasks Assigned: Espresso
- Partners Assigned: 3
- Average Partner Utilization: 80%
- Existing tool: 80.67%
- New tool: 81.42%
- Model logic: time in system is calculated from the initialized assignment vector with 1 partner on each role
- Time in system has to be at least two seconds lower in order to exit loop
- After running all scenarios, the best can be chosen which has the lowest expected time in system

Results

- Changing the number of workers for a shift
- Changing the number of employees across stores
- Visual aids: graphs, charts, tables
- Potential to increase customer satisfaction and sales
- Increase staff efficiency
- Potential to achieve profit

Impact on Starbucks

- Staffing and scheduling
- Increasing sales
- Reducing cost
- Improved customer experience

Accepted by the company and implemented for future use.