

PANERA BREAD'S VIRTUAL KITCHEN

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Who are we?

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Why Does Panera Need
Simulation?



General Modeling
Approaches



Validation Methods



Testing Results

Who is Panera Bread?

Where We Started:

- Panera began in 1980 as a 400-square-foot cookie store in Boston, Massachusetts.
- Panera has set new industry standards for food quality, wellness and transparency of foods.

What We Are Now:

- Now is a leading restaurant brand with more than 2,300 bakery-cafes in the United States and Canada, 140,000 associates with annual system wide sales in the billions.
- Panera is leading the industry in clean food, digital sales, loyalty, delivery and catering.

Prior to Simulation

- Excel based modeling of each piece of equipment individually.
- No interaction modeling.
- Losing sight of the details due to the law of averages.
- No insight into speed of service (SOS) and other operational statistics.

Why Does Panera Bread Need Simulation?

To solve the good problems we are facing due to the expected increase demand in all business channels.

The Virtual Kitchen is used for:

- Identifying future equipment constraints based on a 5 year growth plan
- Developing the future kitchen layout to support the 5 year menu vision
- Optimizing labor allocation and deployment for all café types
- Evaluating the operational impact of potential menu items or process changes

A Look to the Future



General Modeling Approach

Customer arrival and ordering patterns modeled with statistical distributions



Programmed Panera's decisions and actions around the customers patterns in Simio

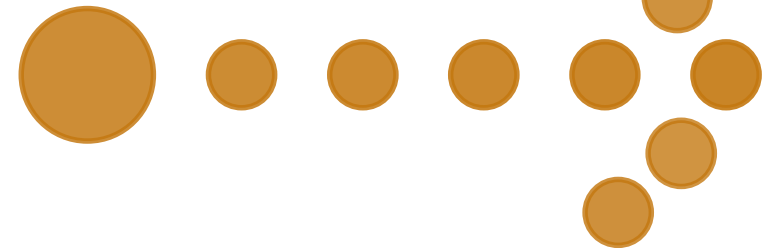


Used Panera's Time and Motion data to determine the amount of time required for all actions in the kitchen



Enabled with a full equipment package and toggles to matches specific configurations in current cafes.

Outputs SOS times, equipment and employee utilization, and other relevant statistics



General Model Inputs and Assumptions

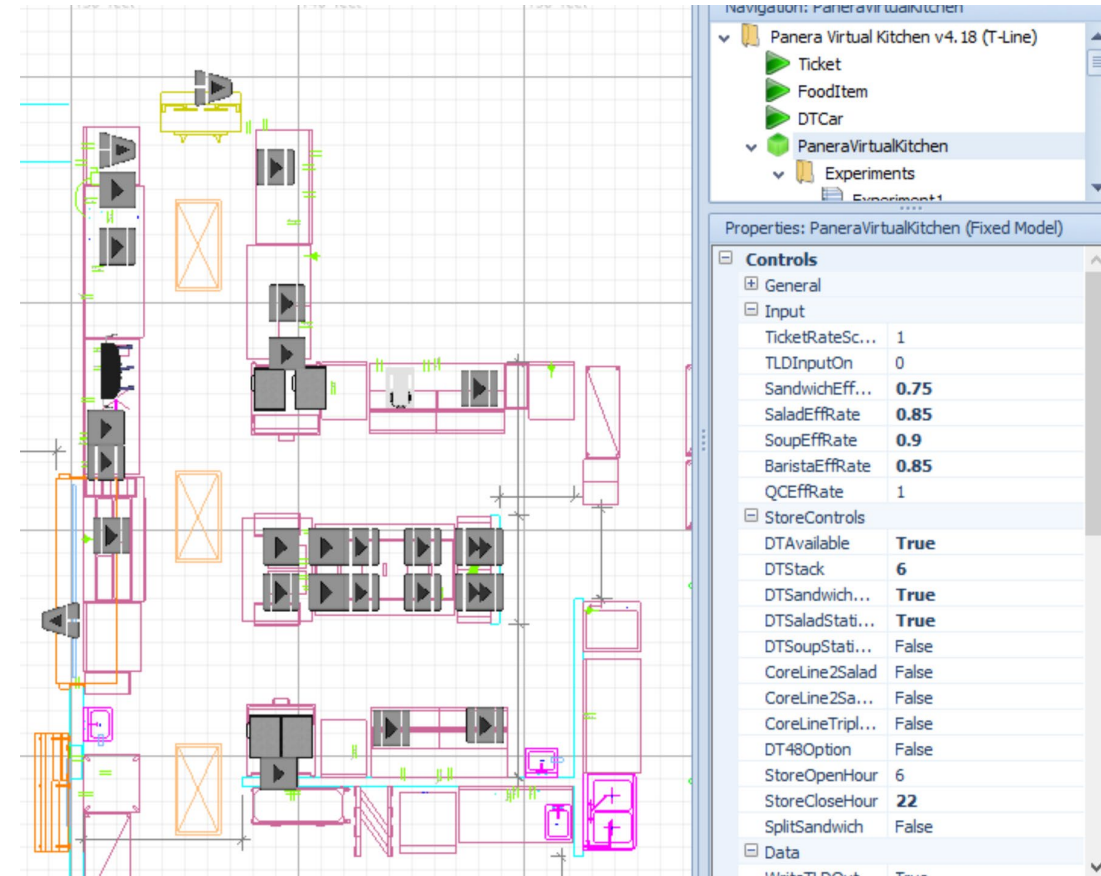
The model currently replicates all customer service and production activity from all sales channels except Catering.

The model is equipped to replicate any production configuration in the Panera system. Some of the inputs include:

- Any layout can be used in the model
- Drive Thru (On/Off)
 - DT Production Equipment Options of quantity and size
- Core Production Configuration
 - Ability to have 1-2 Sandwich or Salad Core Production Lines
- Cafes Operating Hour
- Table Counts

The model has some major assumptions included due the limitation of the programming timeline and data availability. Some of these assumptions include:

- All ingredient inventory is never depleted, so there are no stocks out on the line.
- Production accuracy is at 100%, so there are no re-makes.



Sales Based Data Inputs

Arrivals

Transactions by All Channels (Except Catering)

Broken down to every day of the week by 15 minute intervals

Used to create varying arrival rates for each Channel

Items Per Transaction

Average number of items per transaction by Channel

Also broken down to every day of the week by 15 minute intervals

Used to determine how many items are included with each order

Menu Mix

Average weekly units sold by Hour

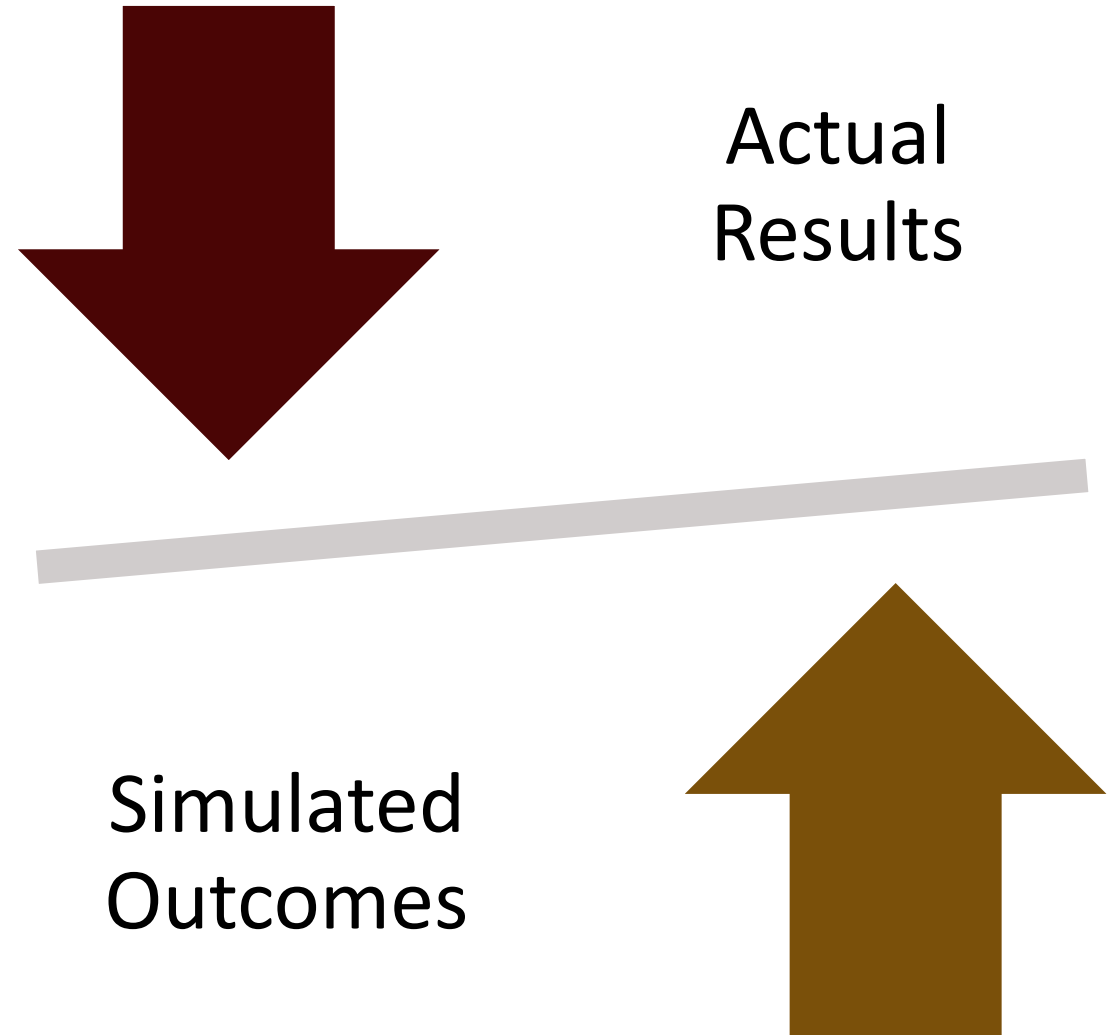
Includes all menu items excluding Catering

Used to determine what menu items are ordered

Validation Efforts

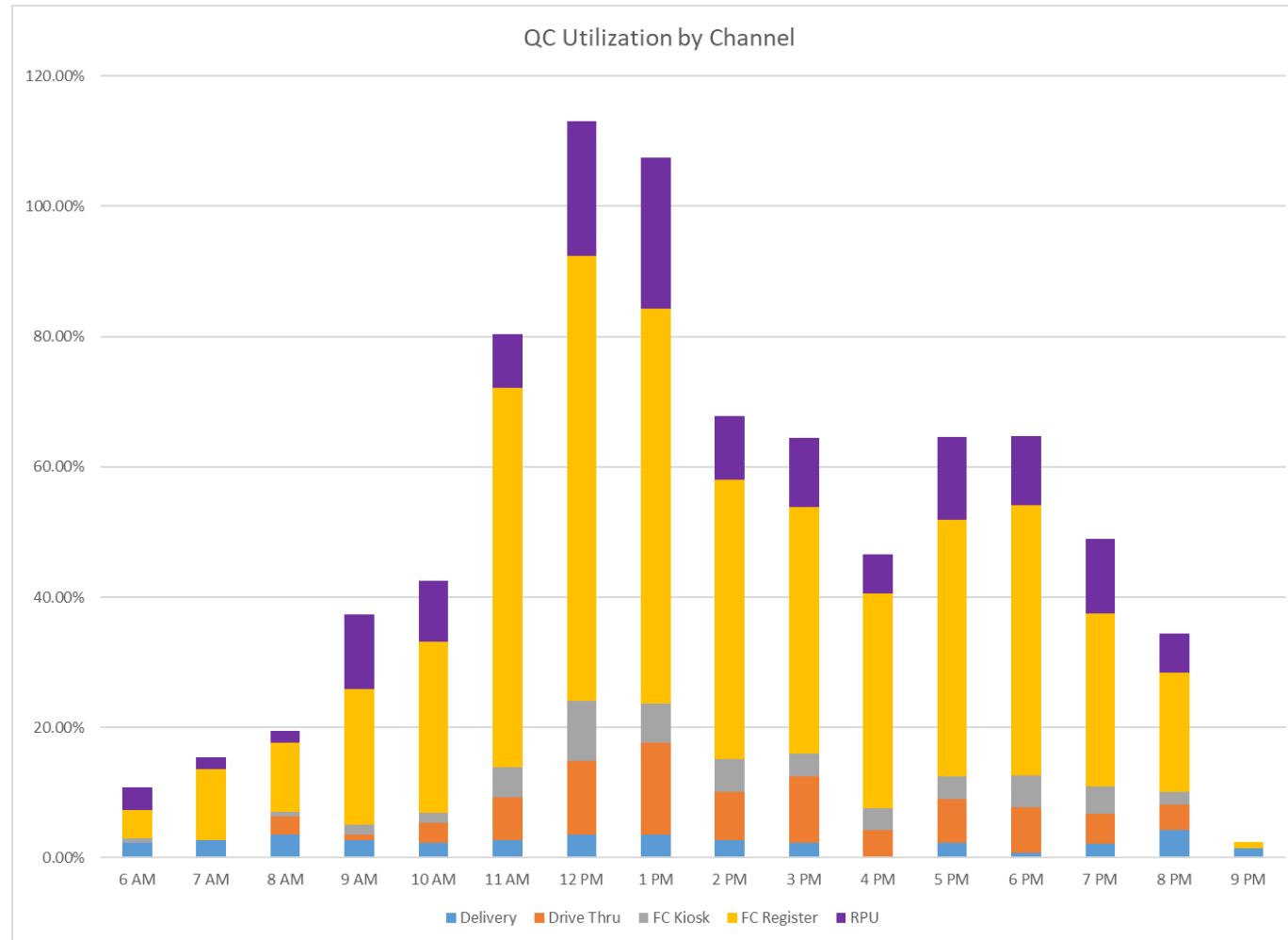
Transaction Level Detail input allows us to compare like-for-like café resource scenarios and balance the model results.

Using efficiency factors on independent workstations, we are able to align the model results very close to reality.

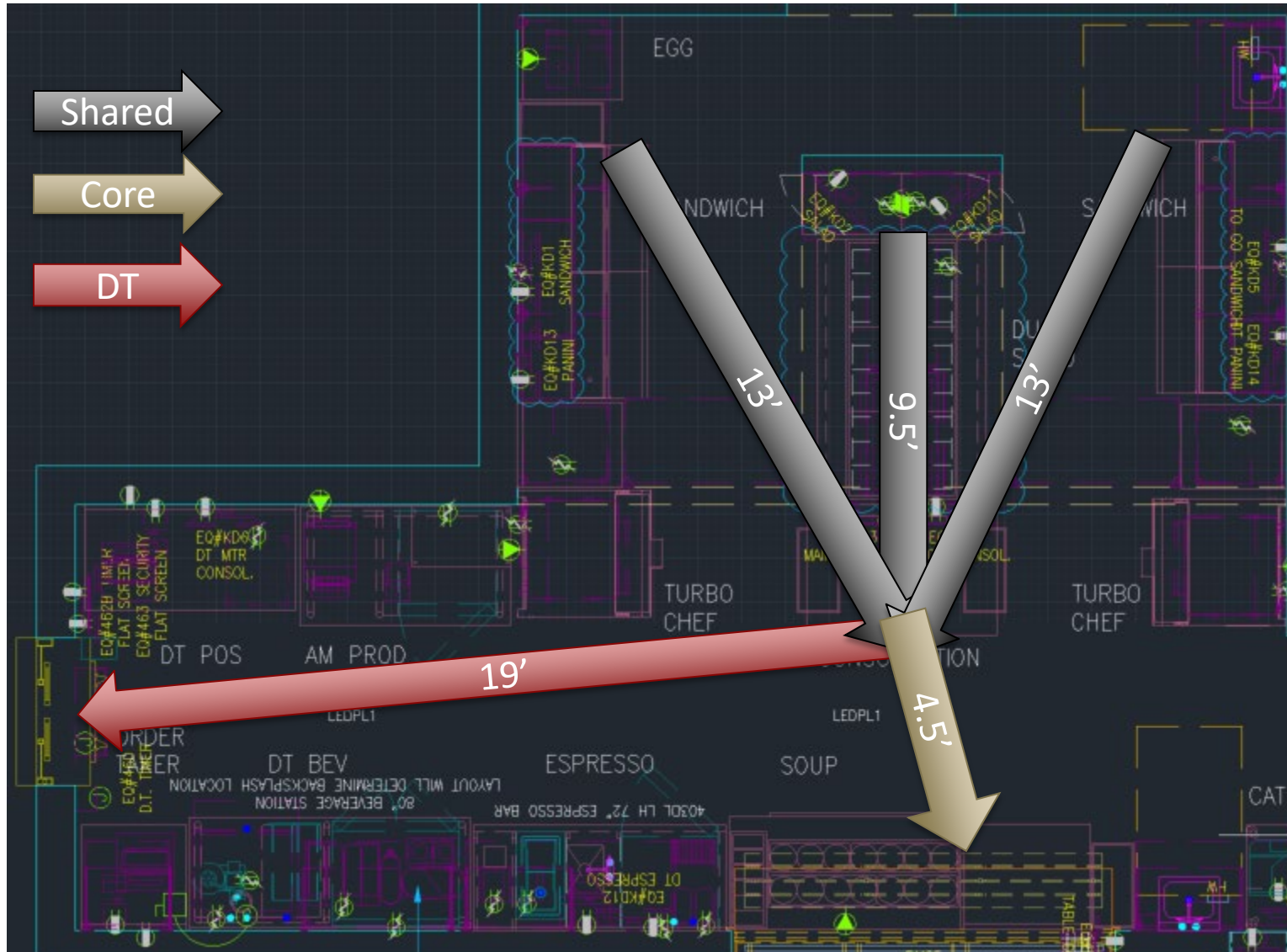


Equipment Utilization Table

Developed a method for tracking the amount of work completed by each resource by business channel.



Layout Testing



The model enables Panera to quickly evaluate the effectiveness of a layout design.

New Products Analysis

The model helps evaluate the impact of potential new menu items, and evaluate the cost/benefit analysis of current menu items.

Result Summary:

	<u>Avg C2 2019 SOS</u>	<u>Scenario 1</u>	<u>Scenario 2</u>
Dinner Core Production Constraints	0	0	0
DT Production Time Average (sec):	351.79	366.81	364.50
	Delta:	15.02	12.71
Production Time Average (sec):	282.09	294.14	292.28
	Delta:	12.04	10.19
Total Units	1844	1972	1799
	Total Prep Labor Impact (mins):	73.25	66.14