



Accelerating Business Innovation with Prescriptive Analytics

Restaurant Equipment Evaluation

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Nov. 16, 2016



About HAVI

A global, privately
owned company



Serving customers in
over 100 countries



More than
9,000 employees

We offer a unique combination of expertise, experience and services in...

Supply Chain
Management

Packaging

Logistics

Recycling
& Waste

Our supply chain services are complemented by customer engagement services offered through our affiliated company, The Marketing Store



HAVI Service Lines

Supply Chain Management

Planning, sourcing, optimization and analytics solutions and tools that will transform your supply chain from the inside out

Packaging

Packaging services that support optimal movement of your products from concept development, through production, in market and end of life

Logistics

Procurement, warehousing, distribution and freight management service, making sure you get the right products to the right place at the right time... and much more

Recycling & Waste

Sustainable end-to-end waste management solutions that drive savings, uncover revenue and protect your brand



Innovation @ McDonald's

Innovation has been a cornerstone at McDonald's and is key to continued business success



1979



2001



2002



2015

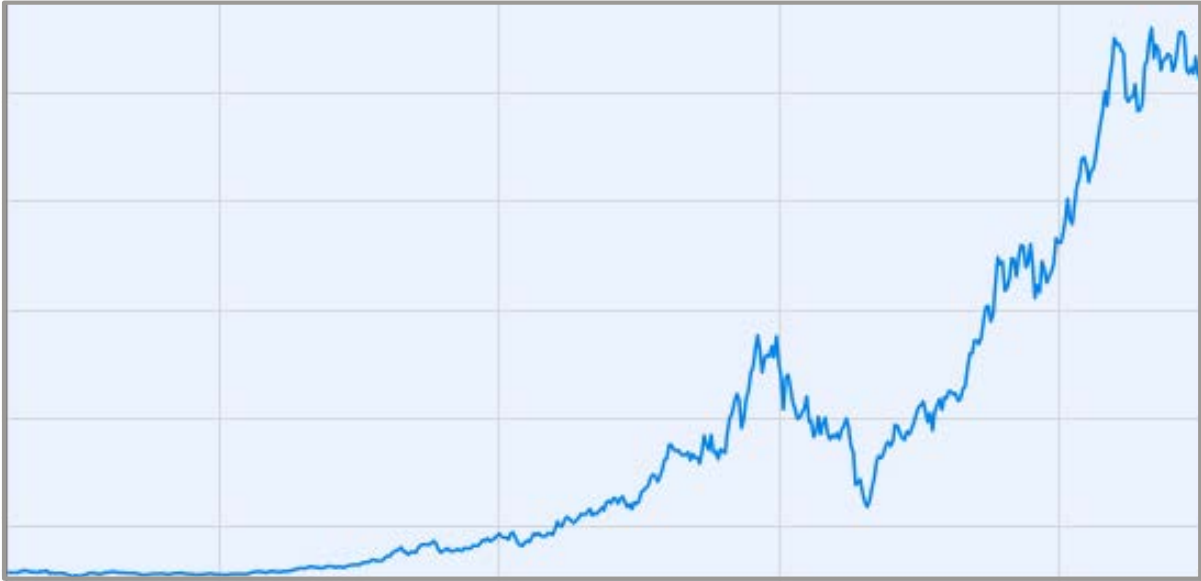


McDonald's Growth

Over the past four decades, McDonald's has led a tremendous amount of business growth in the food service industry



Source: wikipedia.org



Source: seekingalpha.com



Supply Chain Complexity

The size of McDonald's footprint alone presents enormous complexity to its supply chain and restaurant operations

Business Challenges

- Demand forecast
- Assured supply
- Optimal network
- Regional variation
- Inventory optimization
- Staff scheduling
- Equipment portfolio



Analytics Challenges

- Scale
- Uncertainties
- Volatility
- Inter-dependencies
- Speed of decisions
- Speed of change



Innovation Challenges

Any innovation that brings change to all of its 14,000 restaurants at the same time presents significant challenges in decision-making, planning and change management



Decision Challenges

Strategy

Tactics

Regional testing

Menu management



Planning Challenges

Uncertain demand

Long lead time

Vendor (network) changes

Operational dependencies



Change Management Challenges

New product / vendor

New equipment

New operating procedures

New system metrics



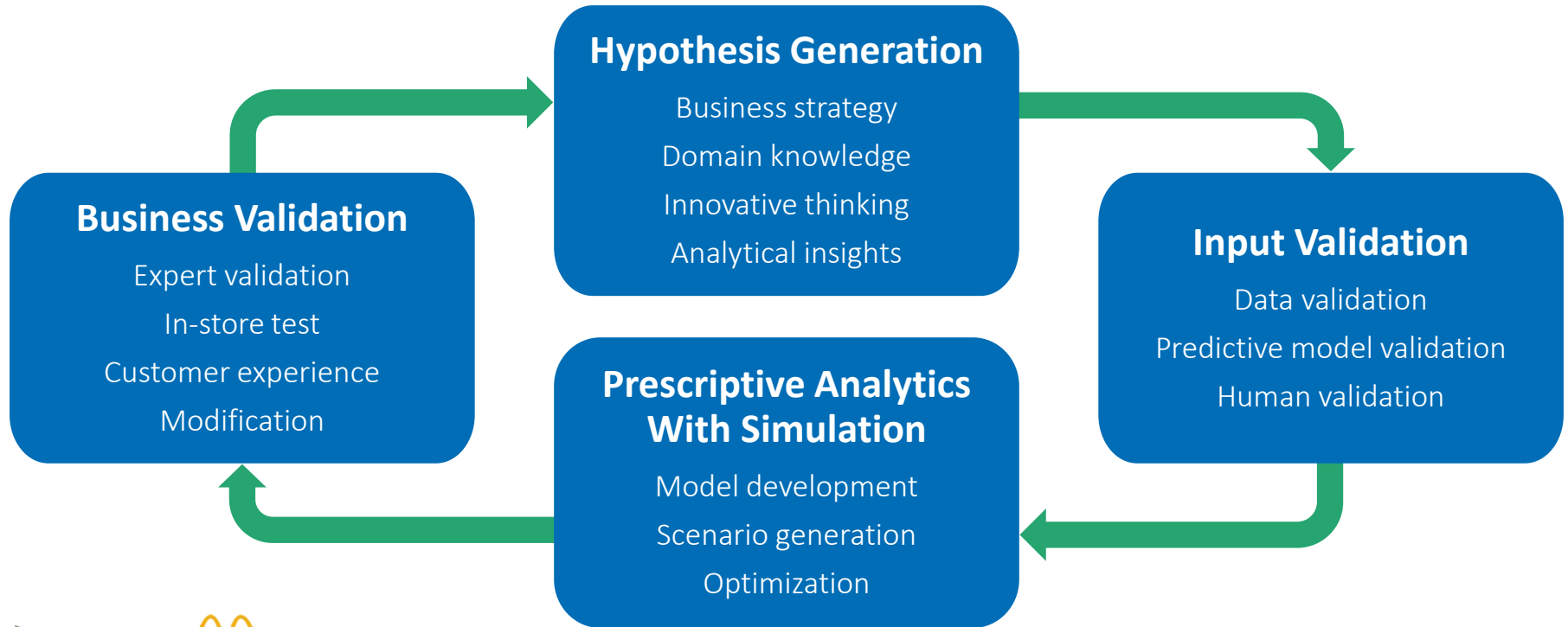
Analytics Ecosystem

To support this level of business complexity and innovation, HAVI uses a sophisticated portfolio of descriptive, predictive, and prescriptive analytics that includes simulation



Analytics Rigor and Process

For simulation, as with any analytics practice, to truly add value we use a hypothesis-driven process which balances data with expert human knowledge



Case Study – Product Expansion in All-Day Breakfast

While launching All-Day Breakfast in 2015 was both challenging and successful for McDonald's, adding additional menu items still requires a lot of careful consideration

All Day Breakfast Launch

Same-store-sales boosted
as much as 3.5%

Source: Business Insider

McDonald's overcame
challenges:

- Regional preferences
- Menu complexity
- Cooking space

2015

All Day Breakfast Expansion



Three Times As Awesome.
Now with **Biscuit**, **McMuffin** and **McGriddles** sandwiches.

New challenges:

- Increased variety of items cooked at once
- Menu complexity
- Right equipment, staffing

Two more sandwich types added to All-Day menu

2016



Business Objective

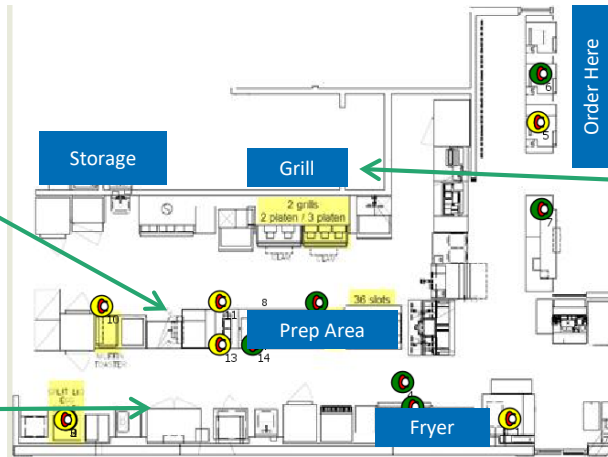
Kitchens must be equipped and staffed to obtain the best financial yield possible for a promotion

**What equipment investments are needed?
What should staffing be?**

Egg Cell B



Batch Toaster



Grill A



Simulation Model

The spatial constraints and variety of equipment-labor configurations call for simulation modeling

Decision Variables

Equipment

{egg cell A, egg cell B, batch toaster, grill A, New oven, Holding X}

Limited Space

Incremental cost

Labor

{ $n, n+1, n+2$ } core crew

Incremental cost

Conditions

Demand Rate

Product Mix

Batch size

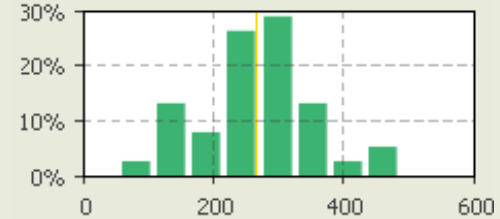
Physical layout

% Drive-Thru demand

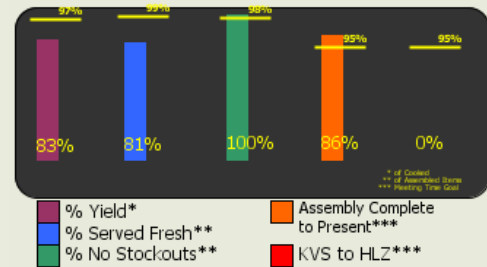
Scenario Generation

Customer Experience
(Service Metrics)

Service Time

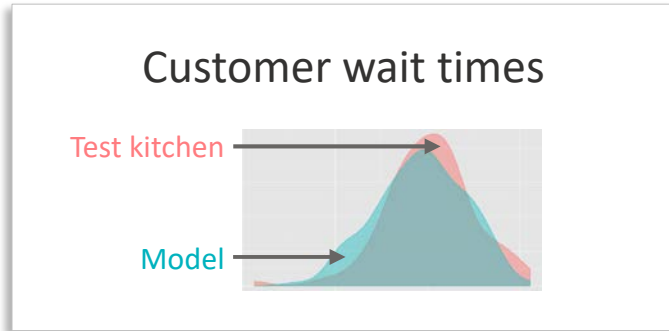
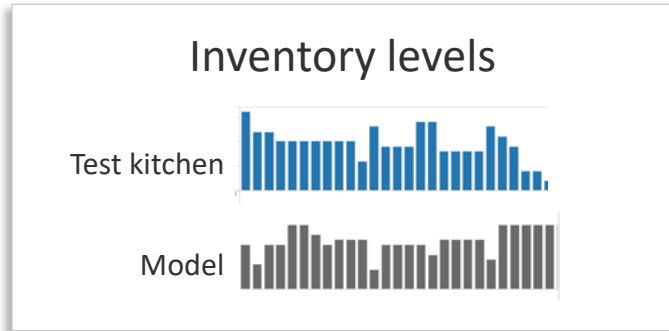


Freshness & Waste



Validation and Calibration

Test kitchens provide model calibration and allow stakeholders to observe new equipment



Test schedule for Equipment Bundle 1

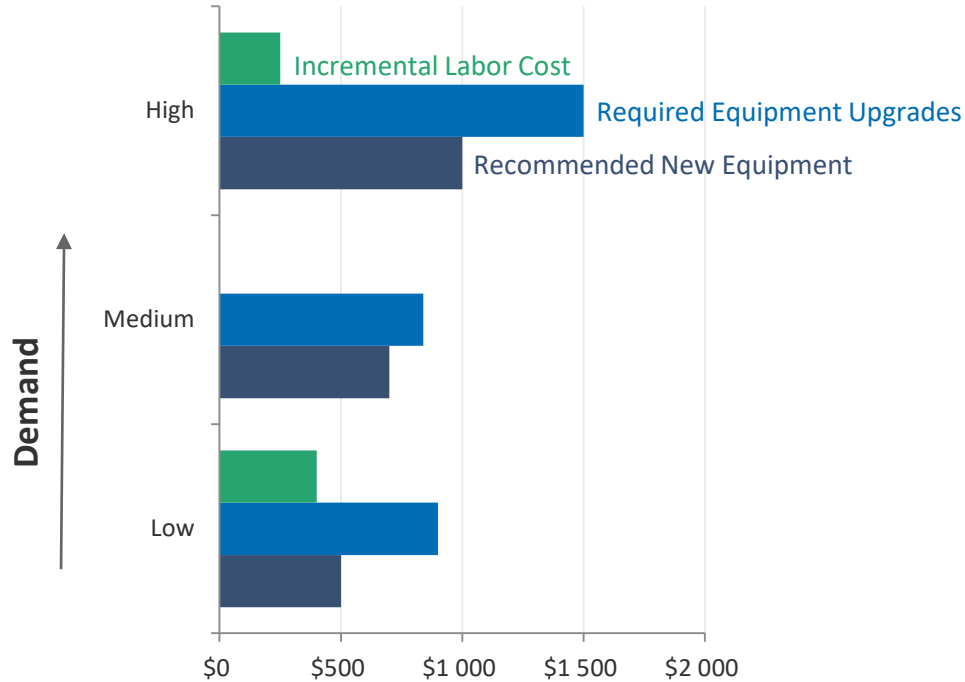
Conditions	Day 1: Baseline	Day 2: Labor + 1
Demand = 250	4 crew	5 crew
Demand = 300	5 crew	6 crew
Demand = 350	6 crew	7 crew

Illustrative



Outcomes

McDonald's was able to make a more informed decision through simulation



Illustrative

Outcomes

- Equipment recommendations for 14,000 restaurants to support a national promotion
- Cost estimates for meeting customer service level thresholds

Benefits

- Savings through tailored equipment recommendations by restaurant
- Optimized cost tradeoff between labor and equipment



Advantages of Simulation

Each zone of the restaurant presents challenges suited for simulation

Customer flow modeling

- Movement / customer flow analysis
- Wait time and cycle time
- Throughput analysis
- Seating utilization

Inventory & Storage Modeling

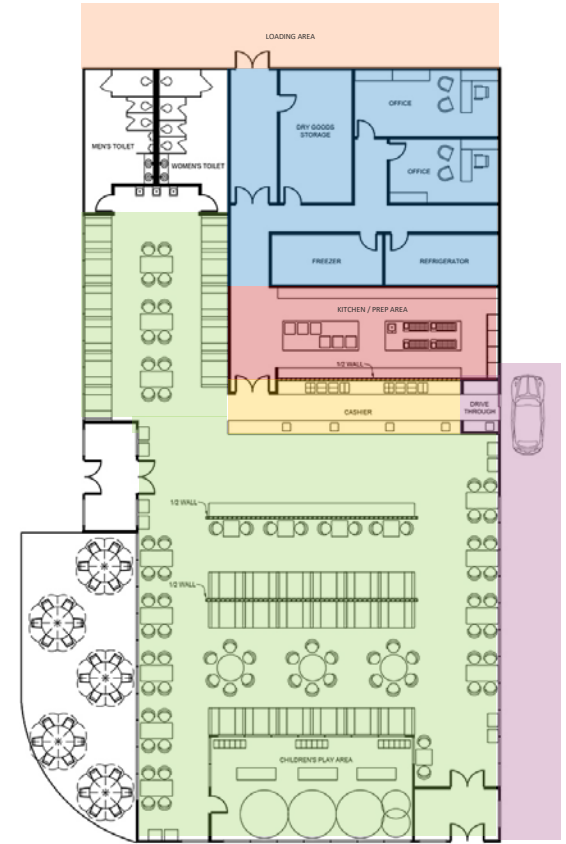
- Inventory policies
- Storage process / operations
- Freezer utilization
- Casepack optimization

Menu Analysis

- Effect of menu changes
 - Operations
 - Profitability
- Growth over time
- Trade-off (halo and cannibalization)

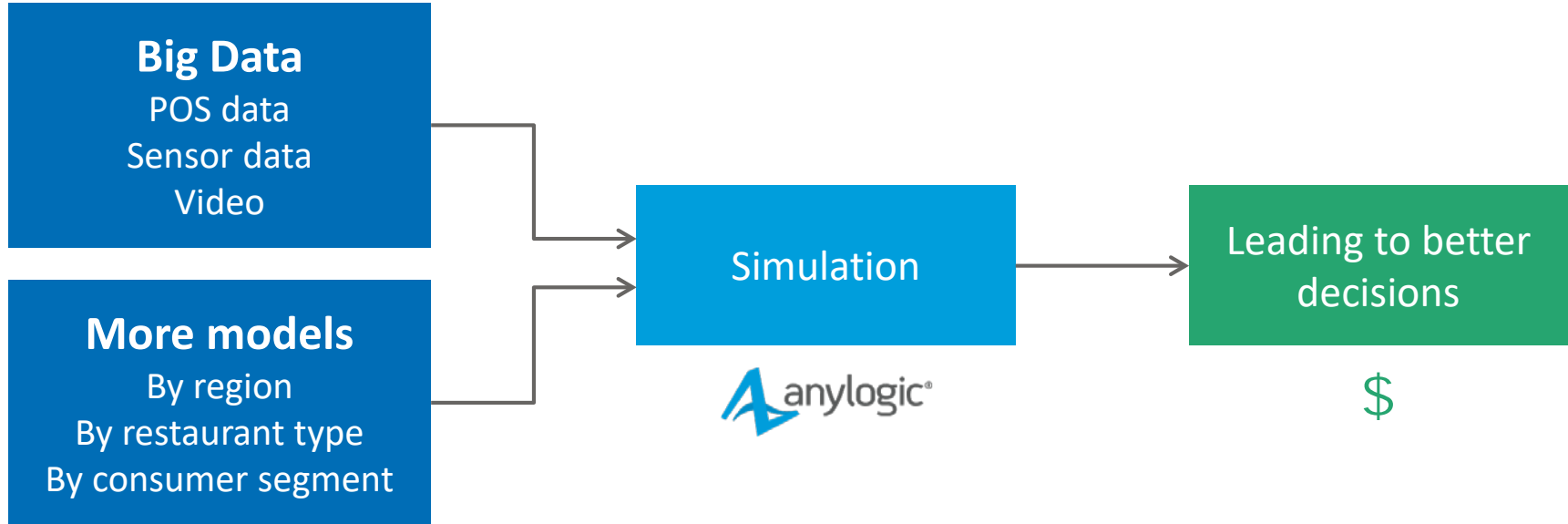
Local Distribution Modeling

- Delivery scheduling
- Routing
- New tools:
 - AnyLogistix
 - AnyLogic - Road Traffic library



Value of Simulation

With the proliferation of data availability and the rapid growth of technology, we believe simulation will become ever more important and remain a critical element to accelerate business innovations





THANK YOU



Modeling Challenges

Working with an inherited legacy model presented unique challenges

- Crew utilization burn-in
- Built in AnyLogic 6.4, doesn't run in AnyLogic 7.X
- Lots of custom Java code
- Model calibration
- Crew, especially managers, don't always follow a defined role

