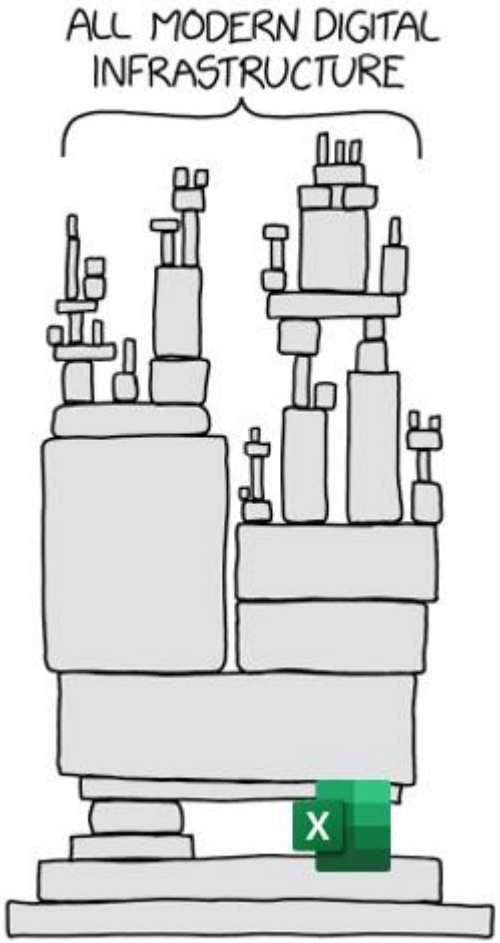
Decision Spot

# Improving Decision-Making with Practical AI

May 15, 2024

# State of Supply Chain Decision Making

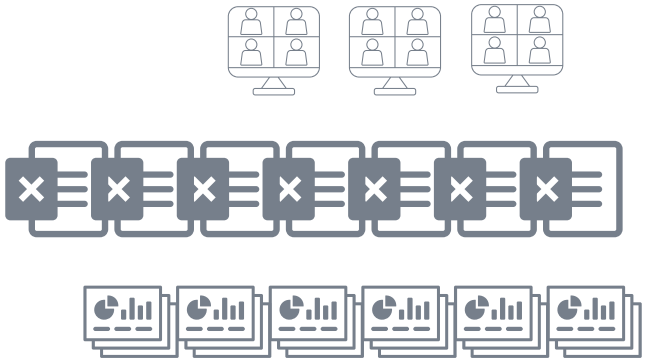



*Inspired by https://www.linkedin.com/in/radupalamariu/ and https://xkcd.com/2347/*

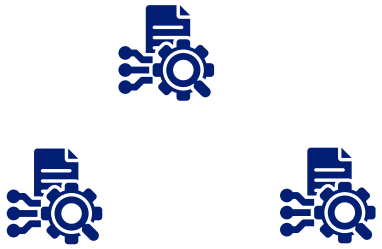
- Decisions are often based on basic spreadsheets and gut feelings despite available technologies.
- Planning software solutions aimed to enhance decision-making but leave some gaps due to low flexibility and analytical rigor, leading to continued reliance on spreadsheets.
- While big data projects enhanced data granularity and accessibility, they shifted decision-making from spreadsheets to dashboards without much improving analytical depth.

# How can Decision Intelligence Models help?

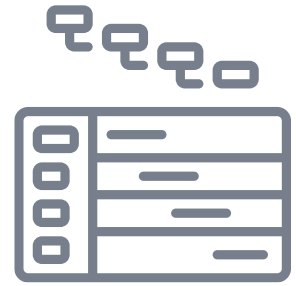
Meetings, Spreadsheets, Dashboards



Decision Intelligence Models



Planning Software



| | | | |
|---|---|---|---|
| Analytical Rigor | Low | High | Medium |
| Flexibility | High | Medium to High | Low |
| Adoptability | High | Medium to High | Medium |
| Maintainability | Low | High | High |
| Scalability | Low | Medium to High | High |
| Speed of Innovation | Low | High | Medium |

# Where to look for opportunities?

# What to look for?

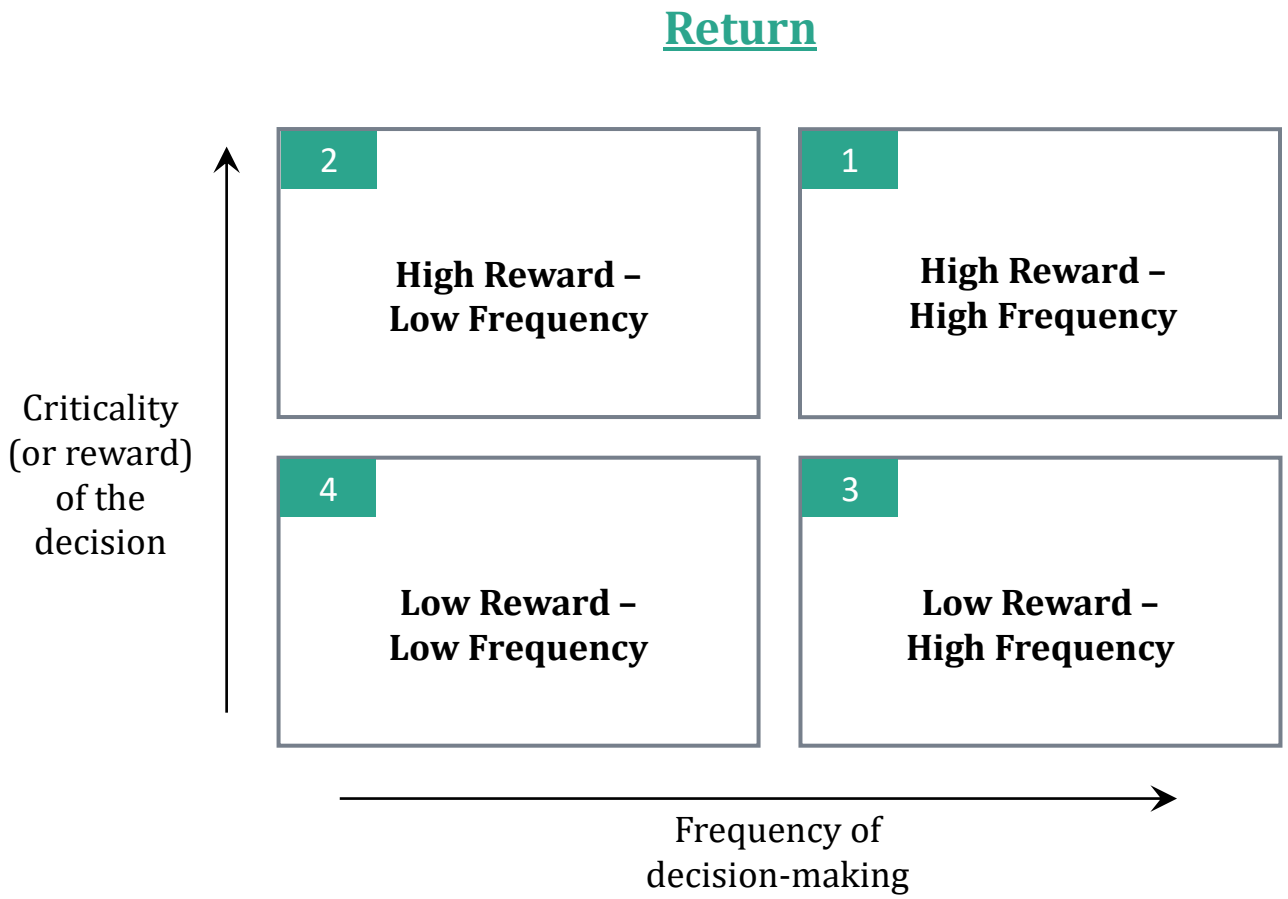
= Average(X, Y, Z)

= Sort(X, Y, Z)

# Where to start?

**ROI**

Return
On
Investment



# Case Studies

# Assign Route to Carrier

Automotive Industry

Daily Routes to be fulfilled

| Route ID | Route Details |
|---|---|
| 1 | Plant 1 → Dealer 1 → Dealer 3 → Dealer 4 |
| 2 | Plant 1 → Dealer 2 → Dealer 5 → Dealer 6 |
| 3 | Plant 2 → Dealer 10 → Dealer 14 |

List of carriers with lane rates

| Carrier | Lane | Rate |
|---|---|---|
| 1 | Plant 1 → Dealer 1 | $824 |
| 2 | Plant 1 → Dealer 1 | $852 |
| 3 | Plant 1 → Dealer 1 | $902 |

Yearly contractual targets

| Carrier | % |
|---|---|
| 1 | 45% |
| 2 | 30% |
| 3 | 25% |

<u>Before:</u>

Planners manually assigned routes to carriers one route at a time on spreadsheets by sorting the cost column and separately tracked contractual targets vs actual yearly assignments.

<u>After:</u>

Deployed an application that uses a mathematical optimization model that minimizes overall transportation cost while minimizing deviation from contractual targets.

5 - 10% $ savings + reduction of ~10 hours/week human-hours spent in analysis

# Inventory Rebalancing

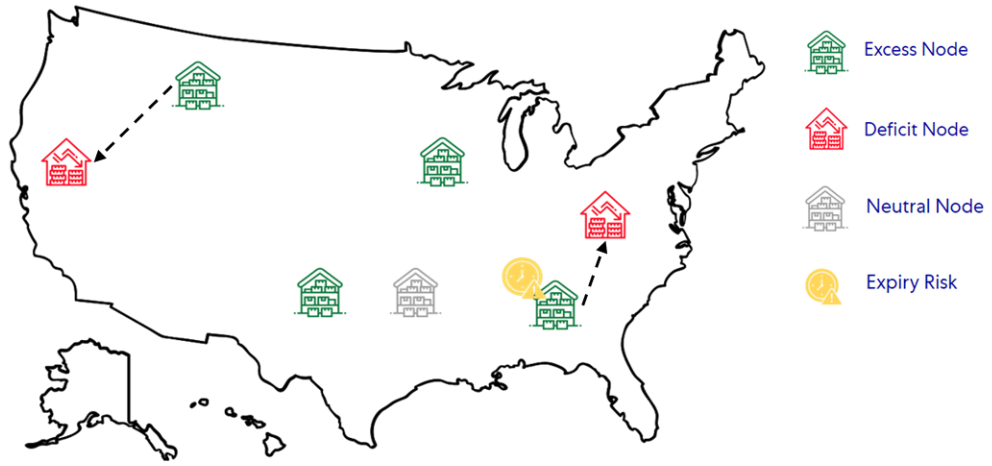
CPG Industry

Before:

- A large CPG company has a network of six DCs
- Over 2,000 diverse products, including regular stock, seasonal items, and unique marketing display products
- Used spreadsheets to calculate transshipments to balance inventory (140 human hours/week)
- Lacked analytical approach and standard process

After:

- Cloud application based on optimization model
- Integrated data from various sources, analyzes the entire range of products daily, and generates optimized stock transfer orders (STOs), seamlessly incorporating them into the company's SAP system




1. **$20 million** in incremental earnings.
2. A **30% reduction** in logistics costs, amounting to $4 million in savings, and a reduction of 13.4 kilotons in carbon emissions.
3. A **75% reduction** in decision-making time.

# Fulfillment Center Labor Planning

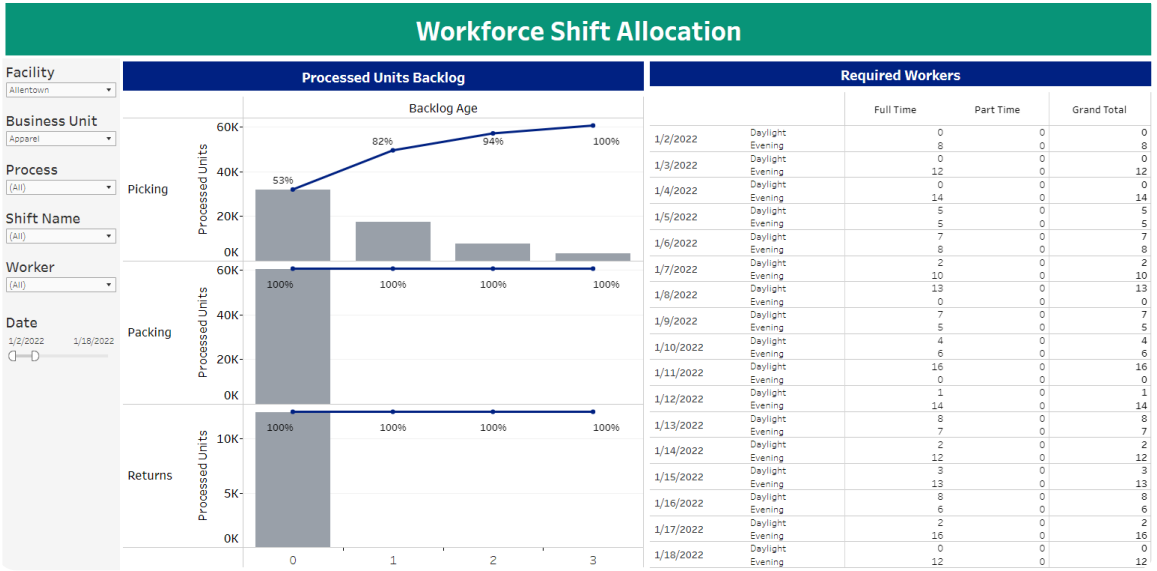
Retail / 3PL

Before:

- A large fashion retailer has three fulfillment centers to fulfill orders from its stores and online consumers
- Significant fluctuations in demand across different processes
- Team of three planners used a spreadsheet model to calculate labor requirements

After:

- Using cloud application to do labor planning and what-if scenario analysis
- Mathematical optimization and better modeling assumptions significantly improved the quality of recommendations




1. **Reduced labor costs by 5-8%.**
2. Improved Fulfillment Center service levels by more than 1000 basis points.
3. The planning team could analyze various fulfillment strategies to improve omnichannel operations.

# Delivery Scheduler

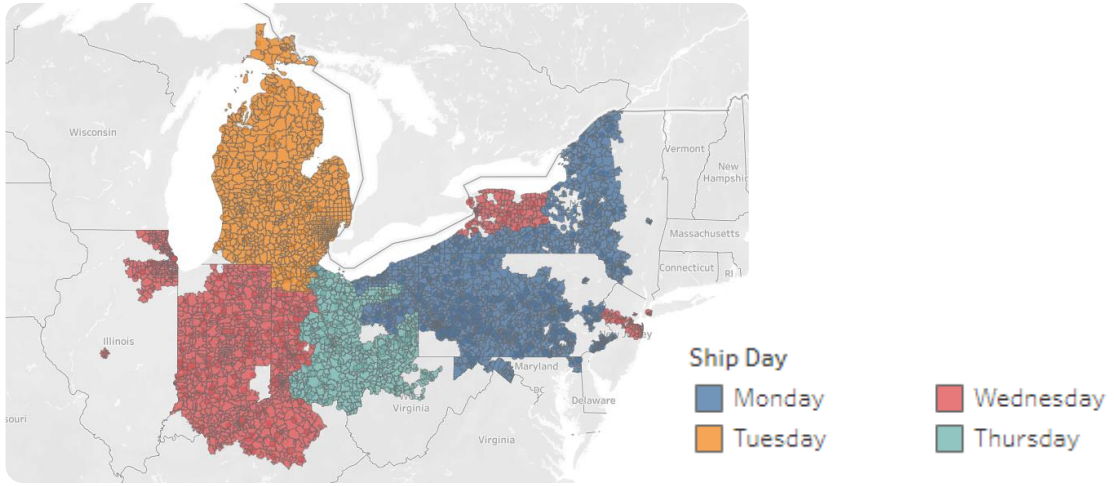
Distributor/CPG

Before:

- A housing products distributor used its private fleet to serve customers in the US
- Manually created customer regions and assigned a cutoff day for receiving and shipping orders
- Due to variabilities in order volumes, struggled to meet service levels and warehouse operations suffered as well

After:

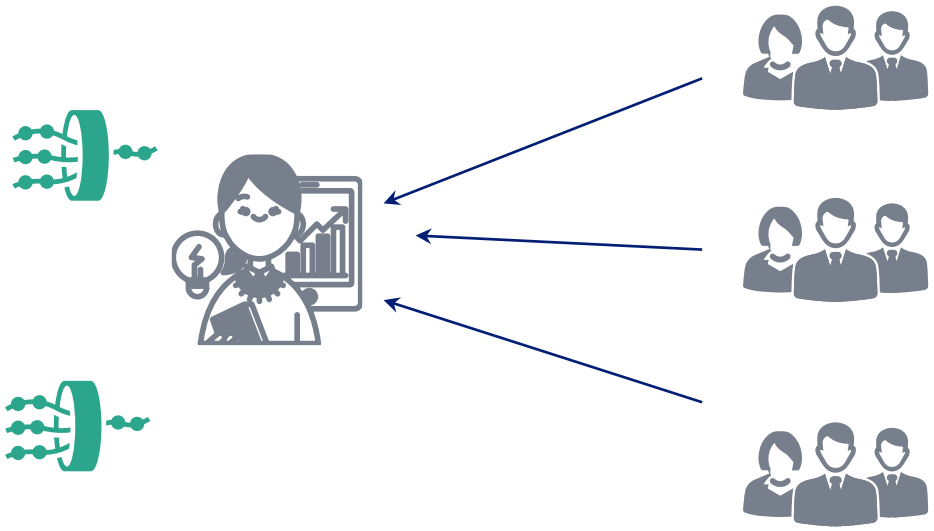
- Using customer regions created by a mathematical optimization model that balances load on warehouses as well as increase truck load utilization



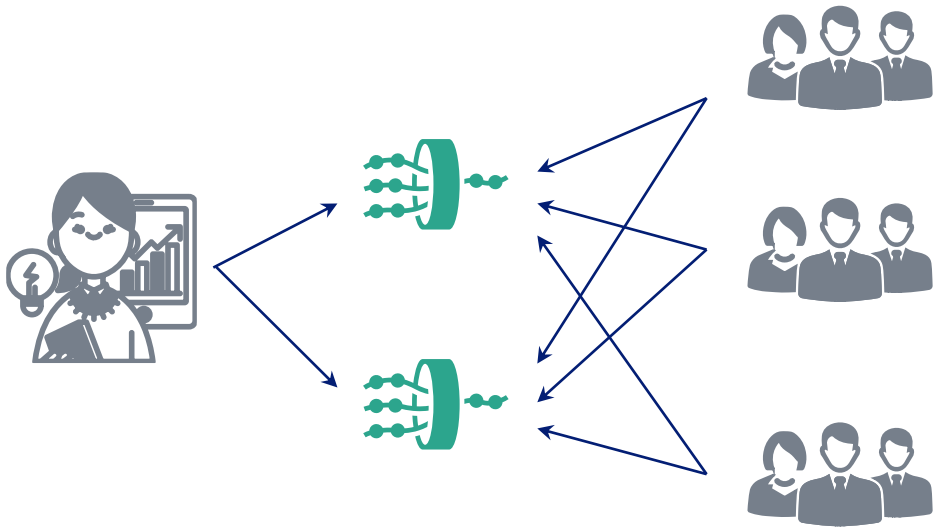

1. Improved cutoff maps + routing led to up to 13% cost reduction compared to the baseline over a year.
2. Balanced out the load on warehouses resulting in better service levels.

# Approach

# Democratize Advanced Analytics Solutions



Overwhelmed Data Scientists | Dissatisfied Business Users



Energized Data Scientists | Empowered Business Users

# Return On Investment

Decision Spot

Foresta®

GUROBI OPTIMIZATION

Python

Agile Development

# Foresta® - Decision Intelligence Platform

## Components for Powering Comprehensive Solutions

**Supply Chain Design**

Supply Chain Network Optimizer

Transportation Optimizer

Multi-Echelon Inventory Optimizer

**Innovative Applications**

Strategic Risk Planner

Tactical Risk Mitigator

Fulfillment Capacity & Workforce Optimizer

SKU Assortment

Network-Routing Optimizer (NO+TO)

Milk-run Routes Optimizer

Delivery Scheduler

**Utility Applications**

Transportation Rate Estimator

Cube Adjusted Weight Estimator

Workforce Productivity Estimator

Bullwhip Effect Meter

Seasonality Detector

Inventory Simulator

Outlier Detector

**Data APIs**

SMC3 Rates

FreightWaves Rates

Google Geocoding

Bureau of Labor Statistics

FRED

World Bank

Weather Data

← **Expandable by App Builder** →

# Expandable by App Builder

1. Data Scientists can build production-ready cloud applications from Python
2. Enables key functionalities including scenario management, easy to use user interface, review and override, user management and more
3. Improves users' acceptance by rapidly deploying applications in an agile approach by incorporating users' feedback

Automates:

- ✓ Cloud Infrastructure
- ✓ Database Infrastructure
- ✓ Embedding Visualizations
- ✓ User Interface
- ✓ Security
- ✓ Deployment
- ✓ What-if Scenarios Capability

*Democratize Advanced Analytics Solutions!*

*Reduces deployment time by 5-20X!*

# Demo

# Contact Details

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# Thanks!