

Demand Planning for eCommerce

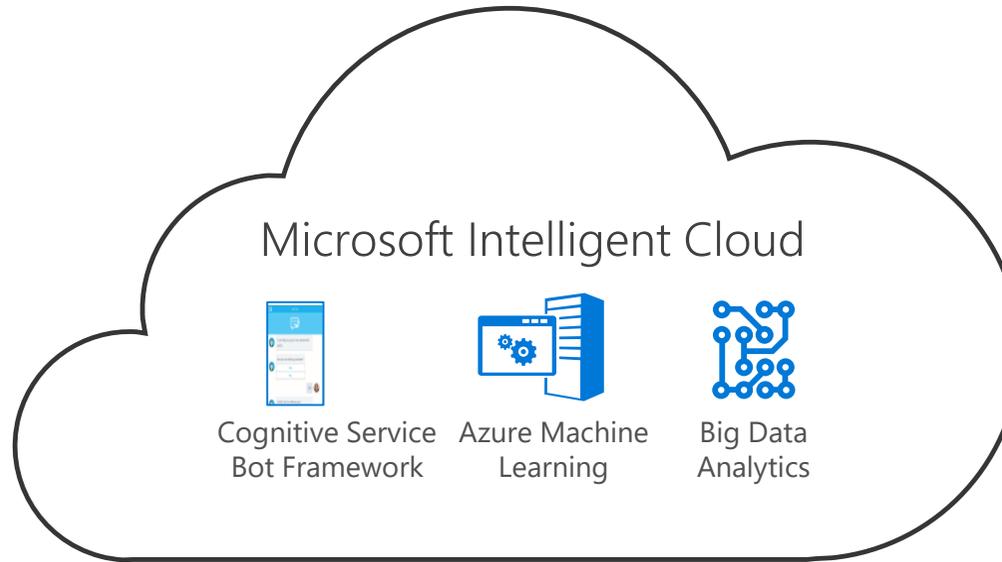
BVL Workshop 23.05.2019

Microsoft in eCommerce & AI

Jet.com powers innovative e-commerce engine on Azure in less than 12 months



Top online retailer bets on Azure to provide a stellar experience for 15.4 million customers worldwide



- Conversational Commerce / Bots
- Personalization / Recommendations
- Predictive Demand Planning

- Anticipatory Logistics
- Predictive Capacity Planning
- Warehouse Automation

prevedere



Microsoft Supply Chain

Empowering employees with easy-to-glean data

Challenge Facing shorter product lifecycles and a virtualized and distributed supply network, the Microsoft Supply Chain needed to transform its aging processes and systems.

- Solution**
1. MSC leveraged the cloud to connect, automate, and visualize an end-to-end view of business.
 2. Move from Reactive to Predictive with big data, machine learning, and IoT.
 3. **Sales Forecast with intelligence** from key accounts, product lifecycle, promotional & seasonal rhythms resulting in a Unit, Revenue & GM consensus demand which is locked quarterly
 4. **Cognitive planning:** Amplify with algorithmic decision making and automated execution to improve Demand Accuracy, Supply Fulfillment and Inventory Risk

- Benefits**
- Improved yield by 30% and reduced scrap by \$2m with predictive insights from machine learning
 - Enabled collection and analysis of billions of unique data points each day
 - Reduced 850 hours of data preparation time
 - Increased collaboration of employees



>77M
Units manufactured & shipped

>42,000
Number of active SKUs

~\$8B
Total amount of annual spend

>390
Number of suppliers
(includes component suppliers)

1TB
Total daily SC data generation

33
Number of mfg & distribution
operations

1.7M+
Est. FY17 number of retail and
commercial sales orders

2.0M+
Est. FY17 SAP deliveries

107
Countries serve

30K
Ship to locations

“ This digital transformation will allow us to spend more of our time on the complex problems and let the computers take care of the easy problems. It's making us smarter, faster, more collaborative, and connected.



—Jerry Knobon
CVP Manufacturing, Microsoft

The challenge: Inaccuracy of demand planning

Are your Demand Management Systems Ready for the Digital Age?
Not if demand decisions are driven by scattered market visibility and hundreds of spreadsheets



- Handling Omni-channel, multi-region, large product portfolio complexity
- Manual & slow processes
- Low collaboration

Average one-year food and beverage forecast have been found to be off by

17%

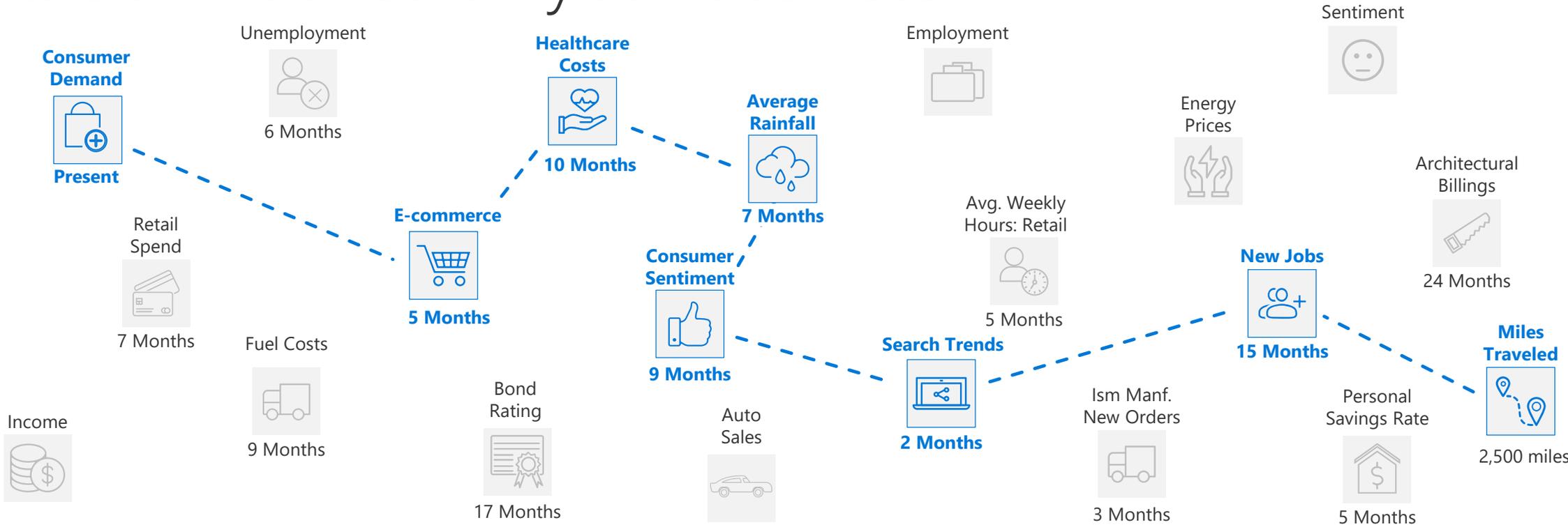
**UNPREDICTABLE
DEMAND**

“Most general planning tools we have used in the past are number crunchers and plan repositories. The intelligence is all in the planners head.”

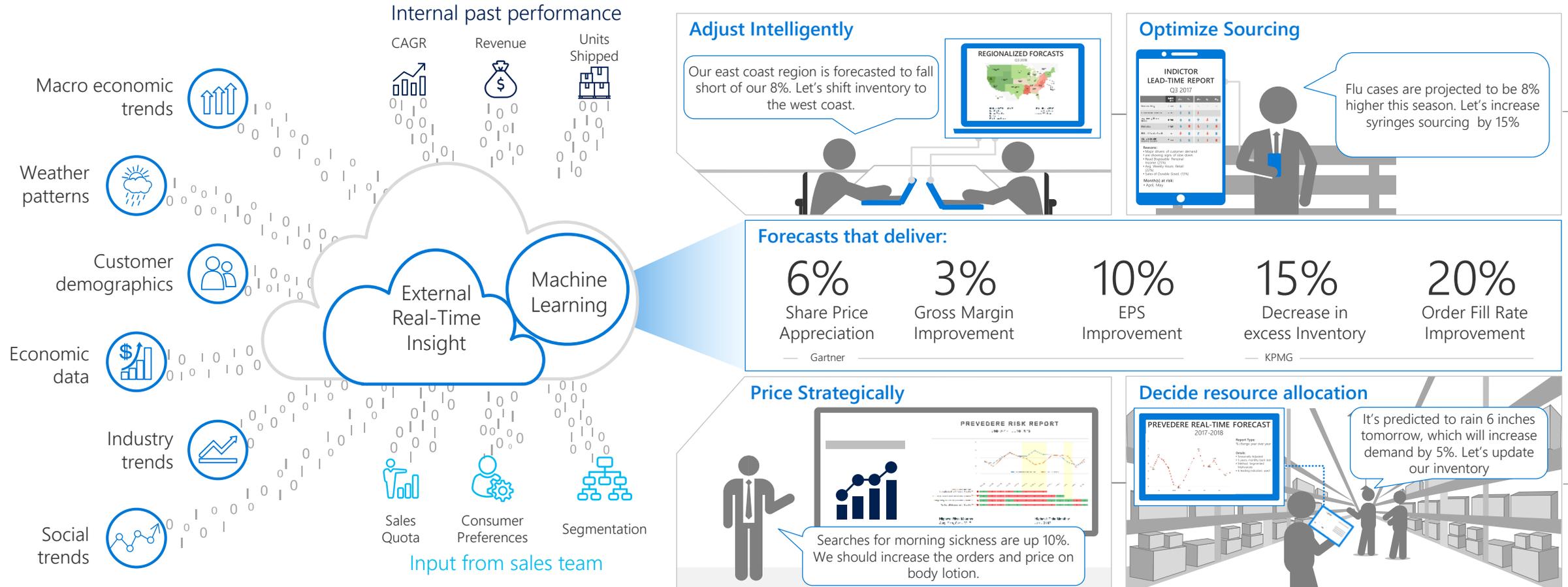
The challenge: Complexity of demand planning



Calling for a solution that easily navigates each unique outside influence on your business



Empower teams with data-driven forecasting



Aggregate global data

- Automatically compile the right external demand drivers relevant to the business for improved forecast accuracy.

Generate forecasts

- Analyze internal performance data against external factors with External Real-time Insight to identify leading indicators of demand change.

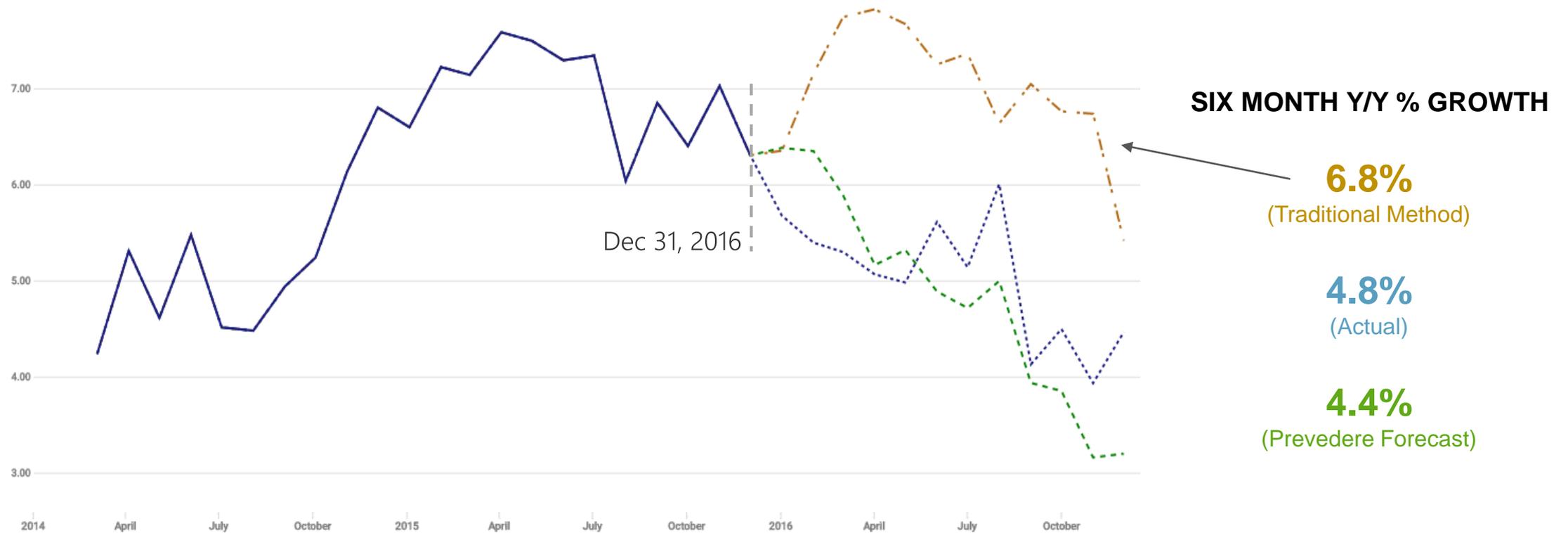
Optimize with advanced analytics

- Leverage advanced analytics, statistical algorithms, and machine learning to reduce forecasting errors by up to 50%.

Adjust forecasts in real time

- Respond to adjusting forecasts by adjusting procurement/production, resource allocation, and prices as various external markets affect the market.

Decrease the margin of error around demand planning



Global candy company

Objectives

A global candy company wanted to validate their understanding in to which external global factors had the greatest impact on candy sales.

Tactics

They consolidated five years of historical data on top five product categories (e.g. chocolate, gum, candy, etc.) to create a single repository for data to explore the different variables that impacted sales.

Results

- Increased forecast accuracy by 28% using external data sets from Prevedere.
- Discovered strong correlations between hourly wage, employment, housing status, and buying patterns.
- Eliminating the need for people to hunt and gather data.
- Optimized workflow to focus team on analysis.



Global beer producer

Objectives

A global beer producer was consistently missing quarterly forecasts by 30%, despite annual revenue earnings of \$46 billion. A decrease in inventory write-offs and out of stock situations was needed, as internal analysis showed just a 1% improvement results in \$7 million to bottom line.

Tactics

This beer producer incorporated five years of historical sales & volume data of 140,000 products, along with a data extract from North America (SAP APO) and China forecasting software (SAS). They then built 200 predictive models to support business decision making.

Results

- Increased forecast accuracy by 18% = \$9 million in savings annually in China alone.
- Identified leading drivers of major product by distribution center.
- Implemented rolling weekly forecast process.



Apply Machine Learning to forecast seasonality patterns and improve demand planning for beverages

Challenge

- Differentiate sales drivers across markets and geographies
- Identify SKU's with negative sales lift (cannibals)
- Optimize SKU distribution

Solution

- Processed data through 200 regression models with 20,000 coefficients like demographics, weather, sports events, competitor pricing, holidays, employment,

Benefits

- Increase sales by 8% by having the right items in stock
- Increased inventory turns and revenue
- Reduced supply chain complexity from retiring or drawing down under-performing SKU



"Project "Why" and the advanced analytics solution on Azure ML will transform the way we take business decisions through all business processes, from sales and promotions up to warehousing and logistics."

— Ruben Dario Torres Martinez, IT Manager, Arca Continental

Variables by Season and Market

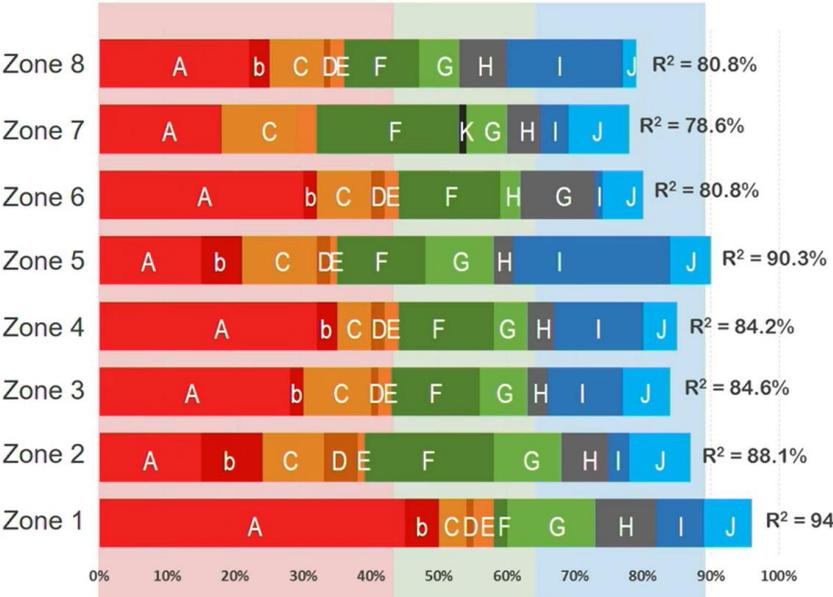
Waterfall Charts: Weekly "Due-To" by Zone



Monthly Sales Δ By Measure Group – Zone 1



- STRATEGIC**
 - Nielsen Price Gap
 - Promotion
 - Price
 - Advertising
 - Stockup
- OPERATIVE**
 - Sales Coverage
 - New Consumer
 - RTM
 - ICE
- EXTERNAL**
 - INEGI
 - Weather



FABLETICS

FABLETICS



CONNECTING ONLINE AND INSTORE
DATA ENABLED SELECTION
OPTIMIZATION TO BETTER SUIT THEIR
CUSTOMER AND DROVE **+38% SALES**

JJ Food Service

Predicting what customers want before they order

 Personalization

Watch video 

The challenge

JJ Food Service wanted to optimize availability for items customers want, anticipate additional items they may need. With Azure Machine Learning using historic order information and local event schedules they iterate over time, space and data to come up with targeted recommendations on what kinds of goods they should stock up,

Machine Learning in action

- **Increased cart size by over 5%** through auto-populating, predictive shopping lists
- **Improved relevance of cross-sell and upsell product recommendations** by training a model to identify customer behavior and serve up personalized offers
- **Optimized inventory distribution and truck routing** to ensure orders arrive fresh every time

“With Azure Machine Learning, the wow factor is huge. Customers are amazed that we can predict so accurately what they need.”

Mushtaque Ahmed
COO at JJ Food Service



Optimize Supply Chain with Demand Prediction

What's the secret to fitting more cargo into fewer ships?

Challenge Kotahi relied on a time-consuming manual process to match perishable produce with available shipping space. It needed a quicker, more accurate method to manage its continued rapid business growth.

Solution Kotahi decided to automate its demand-forecasting process. The solution, based on R and Azure Machine Learning, uses historic demand data from Microsoft Dynamics AX, Azure SQL Database, and Kotahi's transport management system and helps Kotahi to choose the right-size container ships, at the right times, and dispatch them to the right ports.

Benefits

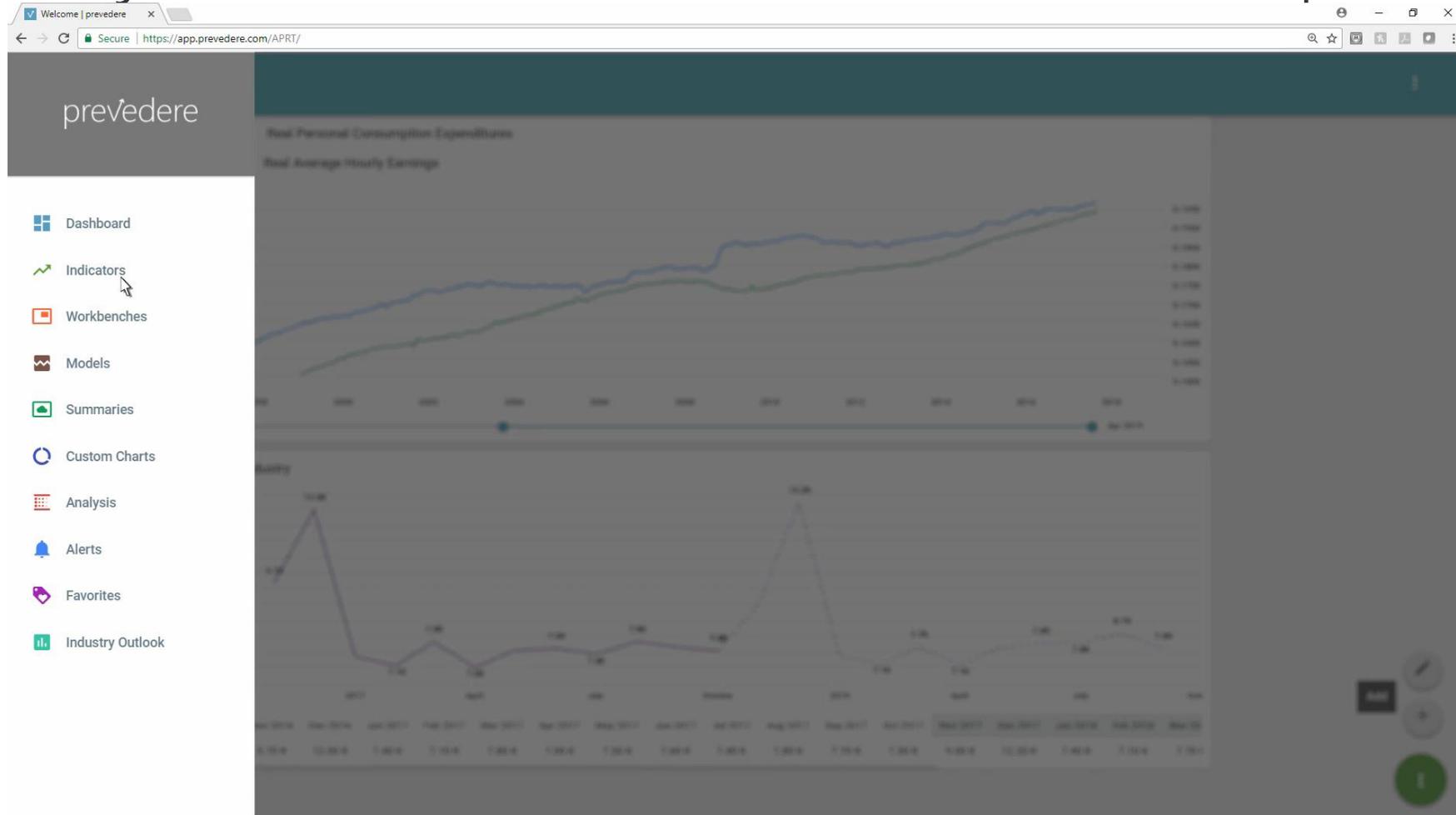
- Reduced demand forecasting from four days to 30 minutes, and boosted accuracy from 80 percent to more than 90 percent.
- Optimized container capacity and improved supply chain efficiency.
- Estimated saving more than US \$1 million in annual supply chain costs.



“Machine Learning can provide new insights that we just didn't have access to before. It can help us discover something that we've never thought of and use that to tune the response so that the customer gets better service.”

— Neville Richardson,
Group IT Manager at Kotahi

Easy analysis of external demand data with prevedere



Free demand planning AI trials on <https://appsource.microsoft.com>

Preconfigured Azure ML experiments on

- <https://gallery.azure.ai/Collection/Retail-Forecasting-Template-1>
- <https://gallery.azure.ai/Solution/Demand-Forecasting-for-Shipping-and-Distribution-2>

Q&A / Wrap Up

Workshop



If you're looking to avoid churn in meetings

Our usual spring promotion isn't working in the Midwest this year.

Well, spring sales last year were off the charts. Why the turnaround?

Winter was very harsh this year. Maybe it's weather related.

I told you we need to spend less there. Let's run that promotion on the West Coast!



And overcome challenges across the organization

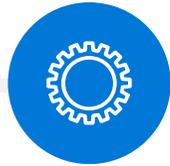
I'm under pressure to optimize an increasingly complex supply chain without new resources.

VP of Supply Chain



Our bottom line isn't looking good for our new expansion, despite all signs pointing towards it being successful.

Chief Financial Officer



We're spending too much on our campaigns with limited efficacy. How do I improve our ROI?

Chief Marketing Officer



I'm struggling to understand the lack of consumer demand and interest towards our offering.

VP of Customer Insights



I'm worried if we don't improve our plan allocation by geography and channel our competitors will gain superior market share.

VP of Sales



I need better visibility to future headwinds and tailwinds of my business.

Chief Executive Officer



Get real-time, actionable insights delivered at the speed of business

Validate current strategy



- **Capitalize** on industry shifts before competitors.
- **Drive** sales forecasting discussions with facts and data.
- **Revise** budget estimates for labor and material costs based on latest insights.
- **Confirm** expansion plans and market viability through future modeling.

Discover hidden performance drivers



- **Refute or defend** long held institution-driving beliefs.
- **Identify** future economic risks with enough lead time to make meaningful changes in production.
- **Provide** better insights to shareholders/investors on past, current, and future sales performance.

Gain a 360 view of consumer demand



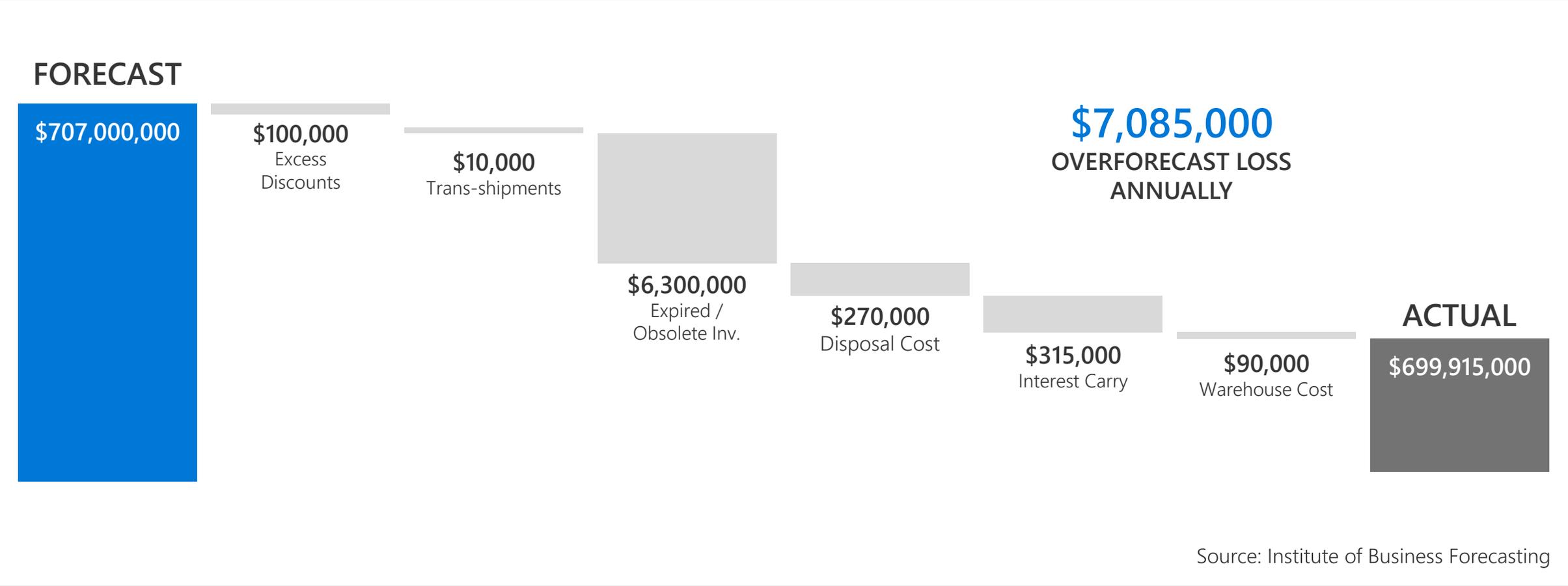
- **Understand** and act upon the consumer drivers and purchase behavior of customer segments.
- **Adjust** marketing and sales priorities based on the latest consumer sentiment.
- **Adjust** resource allocation based on predicted changes in demand.
- **Increase** accuracy of future sales predictions.

Maximize ROI on operational spend



- **Take intelligent action** to optimize return on capital expenditures.
- **Easily understand** the best time and region to make capital investments.
- **Evaluate** promotion and pricing efficacy based on market results.

With tight margins, improving predictions by just 1% makes a meaningful difference



Customer Evidence

o9's AI Powered IDM

Superior Differentiation against Competition



AI Powered Integrated Demand Management

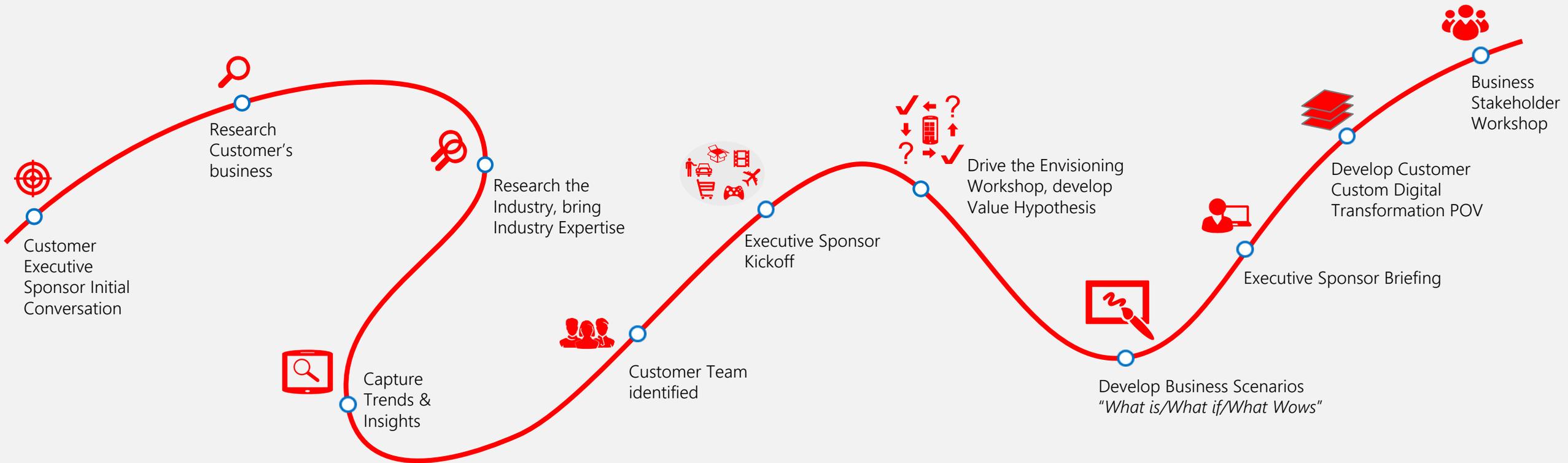
	Traditional Demand Planning Solutions	AI Powered Integrated Demand Management
Qualitative Data Management	Limited to No Email Integration	Email integration, Unstructured Data (Excel, files, images, hyperlinks, social, text messages etc.)
Consensus Forecasting	Manual entry, computational measure	Fully configurable and flexible (computational, time phased rule, buffer logic)
Smart Collaboration	Simple collaboration (No smart tagging, requires separate license)	Intuitive and pervasive contextual collaboration (Smart tag, alerts, pulse, tasks)
Smart Analytics	KPI Dashboard (Alerts requires separate license)	Post game (accuracy, bias, variability) and Exception based risks and opportunities management
Initiative Management	Few initiative types, separate integration to other promotion modules	Marketing, trade promotion, new product, sales execution initiative management
Scenario Planning	Limited Usability	Real-time scenario creation and what-if planning
Connected Excel	Planning can be done only in Excel (No flexible pivoting, basic planning capability, cell comments)	Real-time sync with Web UI, advanced planning features (Cell navigation, Assumptions, Pulse Management, Full Pivoting w/ Edits)

Mini Envisioning Sessions

GROUND RULES

- Put the customer at the center
- No idea is a bad idea
- Break your mental blockers/paradigms
- Not a solution or a technology conversation

Microsoft Digital Advisory Services Digital Transformation Motion



- Customer's Team:

- Influential Thought Leaders
- Commitment to refine ideas together: 2-day Envisioning Workshop (Design Thinking, Scenario-Focused Engineering)

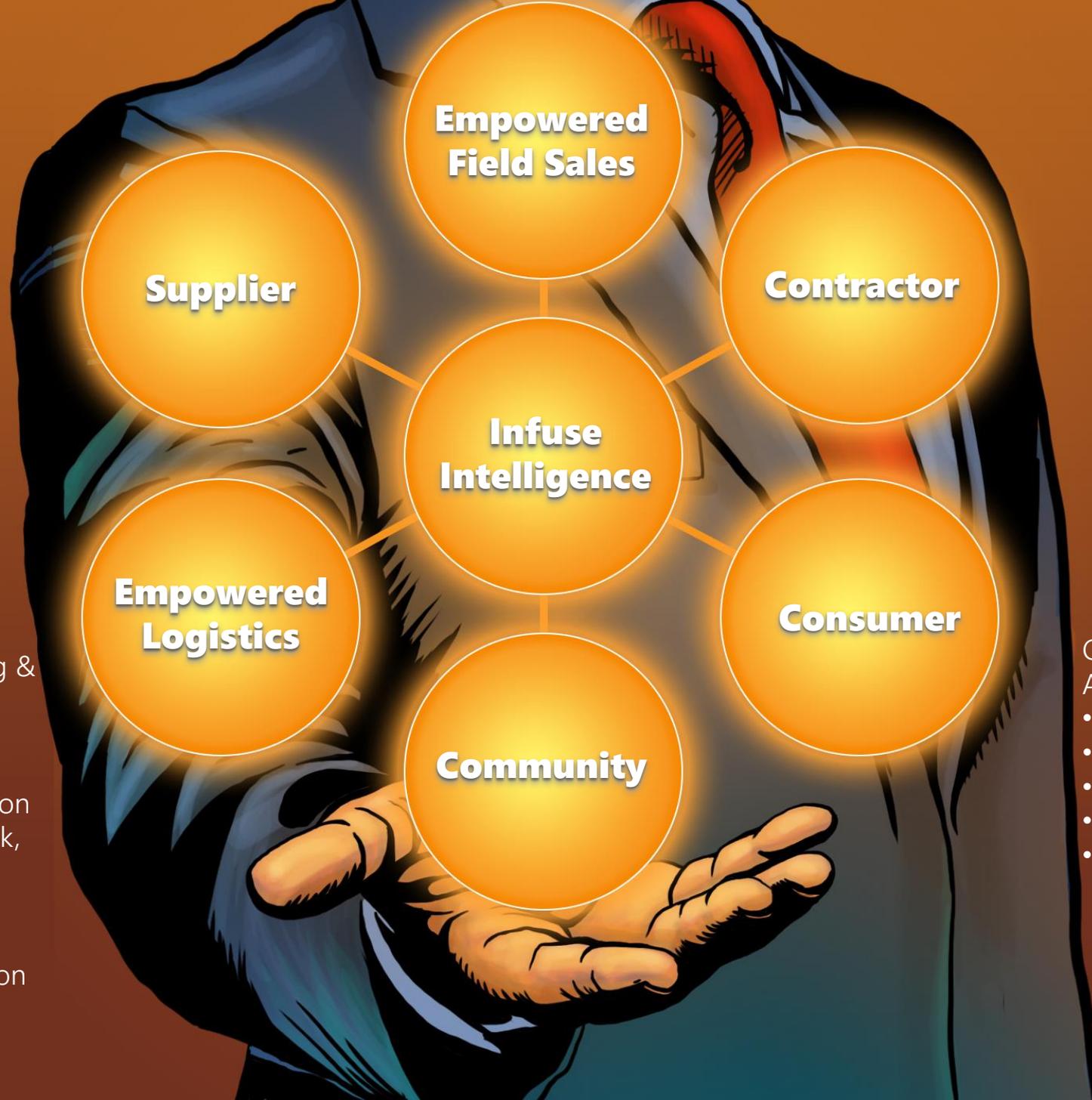
- Strong, proactive Executive Sponsorship
- Spirit of embracing partnership
- C-level Business Stakeholder Workshop

Efficient Supply Chain

- Product Portfolio Optimization
- Price & Promotion Elasticity
- Trade Inventory
- Weather
- Patterns
- Seasonality

Distributed order fulfillment

- Demand Planning & Availability Management
- Store Location
- Inventory allocation
- Receive, stow, pick, pack & ship
- Fleet Preventive Maintenance
- Route Optimization



Store Management

- Trade Marketing & Retail Execution
- POS Analytics
- Real-Time Trade Promotions Management
- Category Optimization
- Planograms

Consumer Insights & Analytics

- Contractor Bot
- Pro Customer
- Public Education
- Investor tools
- Infotainment, advertisement, educational videos

Rapid envisioning workshop goals

Gather detail

- Gather enough detail to initially scope the project
- Create a prioritized backlog of user stories
- It is *not* a collection of user experience & tribal knowledge

Identify constraints

- Call out business and non-functional constraints

Understand the user

- Understand the problem from the user's perspective
- Identify with the user's pain points and business objectives

Pain Points & Value Lost – anonymisieren als Bsp

Outcome Pain

Value Lost *Estimated value lost: **\$24MM** per year

1. The **accuracy & latency of customer demand** reduces the ability to make predictions and business decisions.
2. Customer contract changes are not easily trackable & don't always **flow downstream** to understand impact to capacity plans

1. Lack of measurement of the accuracy and timeliness of the customer demand, market adjusted data & BI drive an increase in **premium freight** and significant operational overhead (**OT, increased expenses** etc.)
2. Inability to track Long Term Customer commitments vs. Actual purchase counts.

1. Management of the **forecast of new parts** (both new products & change orders) [drives an unbalanced capacity plan].
2. SCM has no way to know when there is a capacity constraint (there's no place to look)
3. SCM has no way to know the volumes that have been won to create a *big-picture view* of supplier demand

1. Limitation of the current process & tools drive the **lack of new parts forecast, event correlation & downstream impact.**
2. Not able to **predict/react to capacity** constraints
3. Lack of **price leverage** (missed opportunity for cost savings)

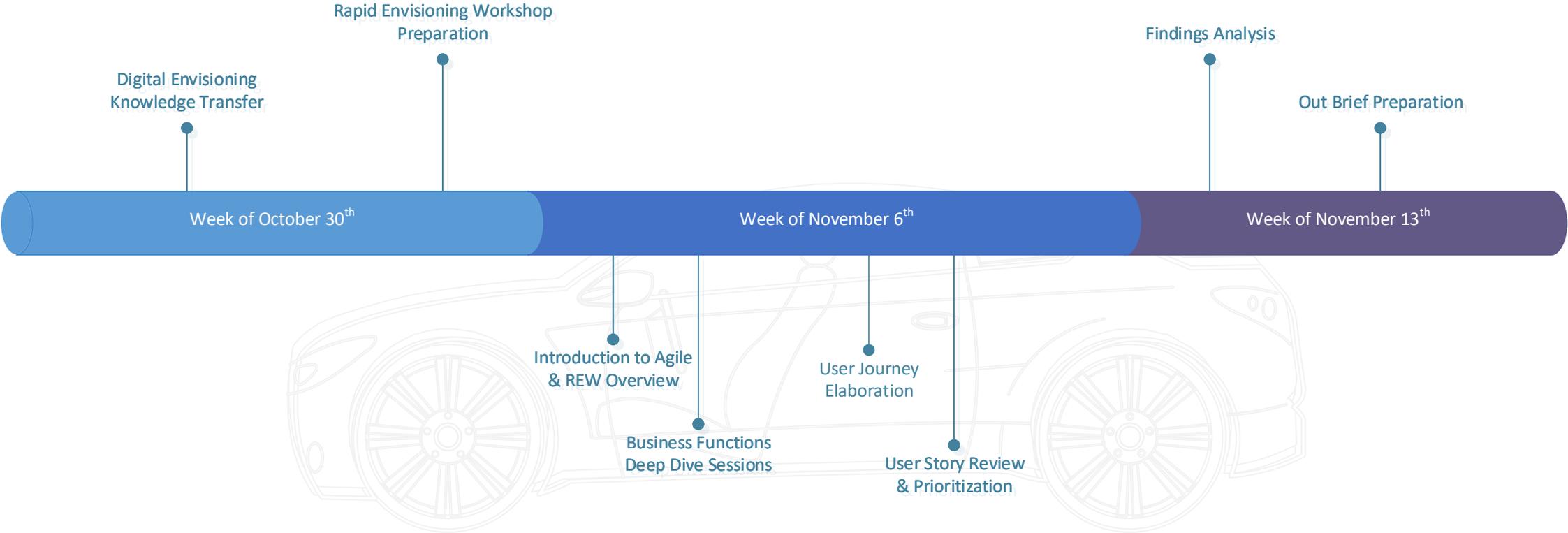
1. Lack of supplier commitment to Delphi forecast, confirmation, communication, collaboration (i.e. **no communication back from the suppliers**).

1. Limitation of the current process & tools drive **the lack of Supplier forecast, event correlation & downstream impact.**

1. Lack of a **centralized, "Go To" place for Customer contracted volumes**
2. Lack of a centralized, "Go To" place for current capacity available/reserved for each program.
3. Lack of a centralized, "Go-To" place for tracking shipped parts.
4. No end-to-end capacity management tool.

1. **Time spent digging up contracted volumes data & verifying** it which delays downstream decisions (intelligent responses to customer & internal discussions)
2. **Time spent digging up current capacity available/reserved data for each program & verifying** it which delays downstream decisions (intelligent responses to customer & internal discussions)
3. Time consuming, lack of efficiency

Timeline of Rapid Envisioning Workshop Activities

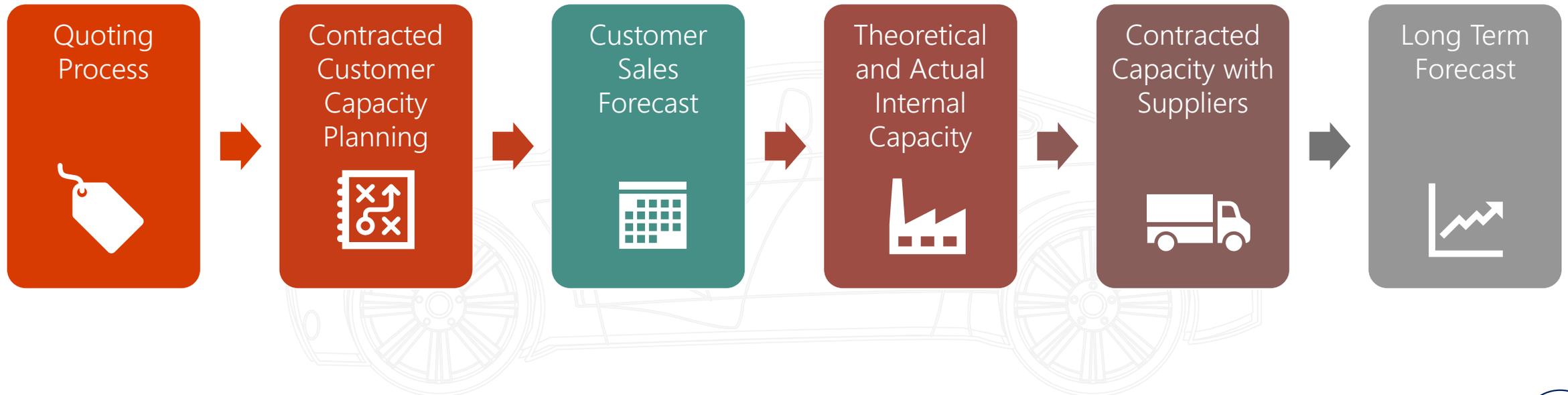


Attendees (Delphi)



Kataria, Vijay | Sanchez, Laura | Wrobel, Theresa | Heiman, Jim | Willis, Lester C | Johnson, Wayne C | Hargraves, Tab | Holmes, Robin | Amorim, Fernanda | Morris, Stephan J | Galley, Chip | Fruth, Randolph | Stewart, Marta | Sowa, Piotr

Topics Covered



Approach



Team identified the above areas and held 2-3 hour long deep dive sessions covering tools, processes & challenges.

Contracted Customer Capacity Planning

User Journey

Current State

The Sales Manager validates the Purchase Order against the previously quoted order and enters confirmed information into Salesforce.

The Planner downloads a custom excel spreadsheet, the "SPS Report", from Salesforce to update his own custom worksheets for capacity and capital investment plans.

With this new information, The Planner works with the manufacturing floor and The Engineer to validate that the tooling requirements, cycle times, shared lines and machines, and floor layouts necessary to produce the contracted capacity are planned for.

Once the capacity plan and capital investment plan is finalized. The Manufacturing Planner attend the Program Kickoff to manually transfer the plans to the production and engineering teams.

Desired Future State

When the Sales Manager updates the Purchase Order on Salesforce, the Manufacturing Planner is automatically notified of status change. The Manufacturing Planner opens the Quoting/Costing application and requests a capacity plan template that comes preloaded with all known data from the original costing exercise. The Planner can now update this Capacity Plan to produce a Capital Investment plan. The Capacity Plan and Capacity Investment Plan are automatically stored to the data warehouse.



Manufacturing Planner

- Once the contract has been finalized, updates the original costing and capacity planning information with any new details from the actual purchase order.
- Uses various heavily customized Excel spreadsheets to perform capacity planning stores them in SharePoint.
- Works with Production Control to understand resource availability, plant configuration and capabilities to update capacity plan.
- Provides input to project plan.
- Assesses original quote against current costs.



Sales Manager

- Enters purchase order information into SPS (Salesforce)
- Validates Purchase Order against original quotes to ensure alignment.



Engineer

- Provides updated part details from design phase such as specifications, part numbers, updated cycle times, bill of materials.

Long Term Forecast

User Journey

Current State

Sales forecasts are derived from a combination of IHS Markit research data and the Sale Manager's confidence level in customer follow through. Individual forecast values are entered by Sales Manager into SPS (Salesforce) and are usually broken down by Deliverable Line Items (as defined in contract). It's important to note that this level of definition is higher than the level required for a Manufacturing Planner to update their Capacity Plan / Production Schedule which is at the part definition level. This implies a mapping has to happen between the two sources, which is done on the fly by the Manufacturing Planner.

Long term forecasts reports are manually generated on a monthly basis, the process to create the forecast snapshot is executed by a Data Analyst and involves extracting Sales Forecast data from SPS (Salesforce) into an Excel workbook and applying some cell calculations (formulas). These reports are stored in a SharePoint folder and distributed via email (notification).

Desired Future State

Long term forecast snapshots are automatically generated, stored in a data warehouse and distributed to the right users without human intervention. Sales forecasts are now derived from many more data sources and rely less on human opinion. Using improved data analytics and machine learning Sales Managers are empowered to make better informed forecasts that are backed by real data.

Forecast data is now available to everyone in the organization through reports and dashboards driven by the underlying data warehouse. Manufacturing Planners can see forecast data side by side with their Capacity Plans and Production Schedules.



Manufacturing Planner

- Uses long term demand forecasts to improve decision making during capacity planning and production.



Sales Manager

- Uses a variety of data and knowledge, including IHS Markit forecasts to determine long term sales forecasts for customers.
- Uses SPS (Salesforce) to enter sales forecast values.



Reimagine Retail

The retail industry is undergoing a seismic transformation. Sitting still is not an option. Innovate and differentiate your business to unlock your future.



Deliver intelligent supply chain

The clock speed in retail is getting faster. Optimize your supply chain to exceed customers' expectations.

AGILITY IS THE NUMBER ONE PRIORITY IN YOUR SUPPLY CHAIN

TRAFFIC



DWELL TIME



CONVERSION



INTELLIGENT SUPPLY CHAIN ENABLES YOU TO BETTER SERVE YOUR CUSTOMER

Retailers detect trend signals from customer browsing and post purchase behavior that kicks off product development cycle.

Enabling intelligent manufacturing processes allows speedy production and manufacturing to ensure the trend hits the market while top of mind with the customer.

Product delivered to customers doorstep in record time, building trust and brand loyalty.

AZURE DYNAMICS 365 MICROSOFT 365

REIMAGINE A FUTURE OF POSSIBILITIES WITH US TO ENABLE INTELLIGENT RETAIL

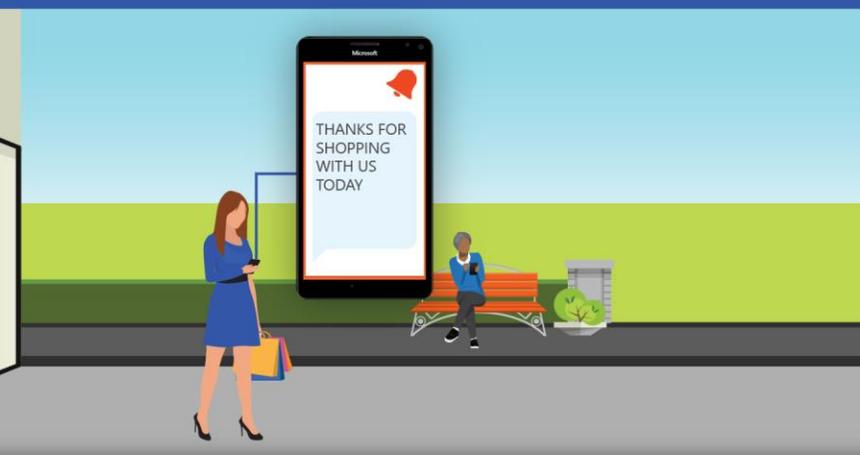
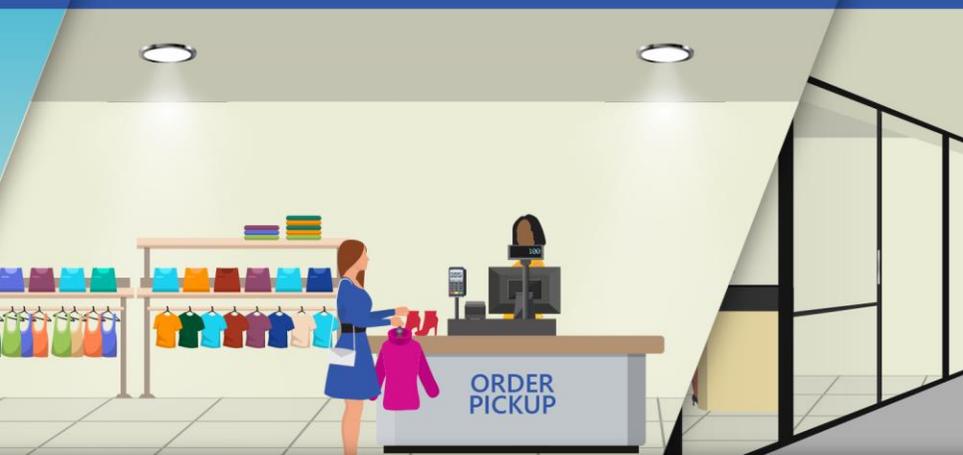
NEW WAYS TO DRIVE TRAFFIC



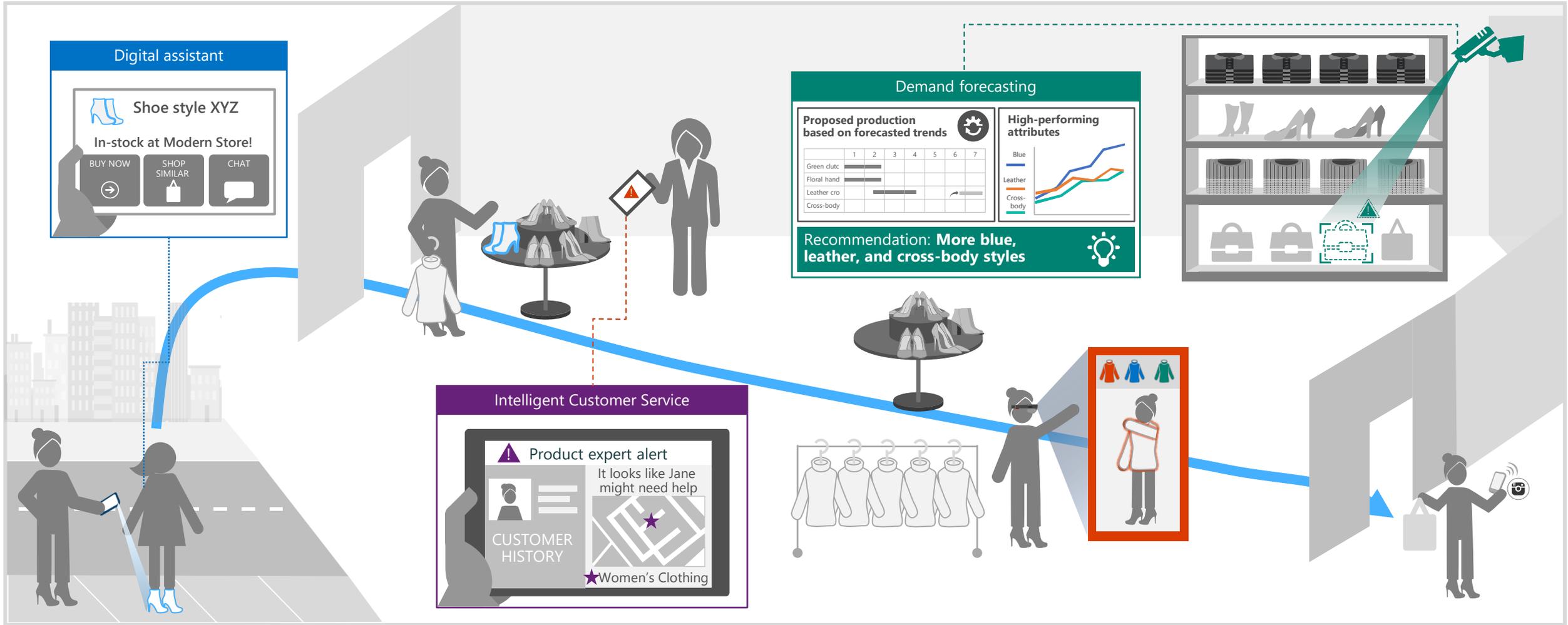
INNOVATIVE SOLUTIONS TO DRIVE DWELL TIME



REIMAGINE NEW WAYS TO DRIVE CONVERSION AND BUILD CUSTOMER LOYALTY



Harnessing business intelligence in the retail space



Delight your customers with personalized experiences



Empower your workforce to provide differentiated customer experiences



Optimize your supply chain with intelligent operations



Transform your products and services

Transform your products and services to deliver new value to customers



Identify customer preferences from multiple sources and match them to the most relevant piece of inventory

Enable customers to test, model, and customize products on the sales floor

Aggregate and analyze sentiment collected throughout the buying process to further fine-tune the customer journey



ijet

Arca Continental

Driving effective marketing campaigns
from extensive market insight

The challenge

Arca Continental wanted to improve their beverage manufacturing and distribution marketing strategy by understanding why certain products sell better at different times or in particular locations. They needed a way to identify subtle patterns and correlations in their data to draw this insight.

Machine Learning in action

- **Drove targeted marketing using key insight** gleaned from 200 regression models used to analyze over 20k internal and external data points
- **Created a way to measure impact of marketing efforts** in order to improve future campaigns
- **Enabled business managers to spend more time on strategy** rather than analysis

“This first project was about marketing. But there are other areas we want to pursue, like production, logistics, and warehousing. We can use Azure ML to generate answers for each individual area and get combined answers for the entire company.”

Ruben Dario Torres Martinez
IT Manager at Arca Continental