

# Shaping demands to achieve corporate financial objectives

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## Agenda

This presentation is intended to review

- Challenges in the current business environment
- Importance of demand shaping
- Demand shaping activities
- Use cases and sample product capabilities
- Summary

# Industry Challenges



# Typical Challenges

## **Shorter Product Lifecycles**

- Frequent new product introductions putting increased burden on operations
- Shorter life span of the product making it difficult to forecast

## **Extreme Product Segmentation**

- Extreme segmentation of the product by color and aesthetic attributes to meet various demographic needs causing stock-outs or excess inventory of certain products.
- Product variations to meet different geographical and legal requirements. For example, manuals, labeling and software to meet various language needs.

## **Disconnected sales and operations**

- Lack of integration between sales/marketing and operations
- Planning and review process is extremely manual and time consuming

## **Inferior business processes and systems**

- Manual processes, low visibility in a globalized business climate
- Multiple non integrated local systems

# What are the implications?

## **Impact to customer service levels**

- Stock outs due to insufficient forecast can cause customers to switch suppliers or be dissatisfied
- Reduced pricing power; affecting the margins

## **Improper capital allocation**

- Forecast created for the wrong product could cause your supply chain to be over-driven resulting in excess inventory
- Impact to resources such as capital, space, production resources, etc.
- Lost opportunity to sell your products and increase revenue and profits

## **Inability to react to changing market conditions**

- If changing market conditions are not turned into advantage, profitability may suffer
- Competitors may gain

## **Unmet expectations**

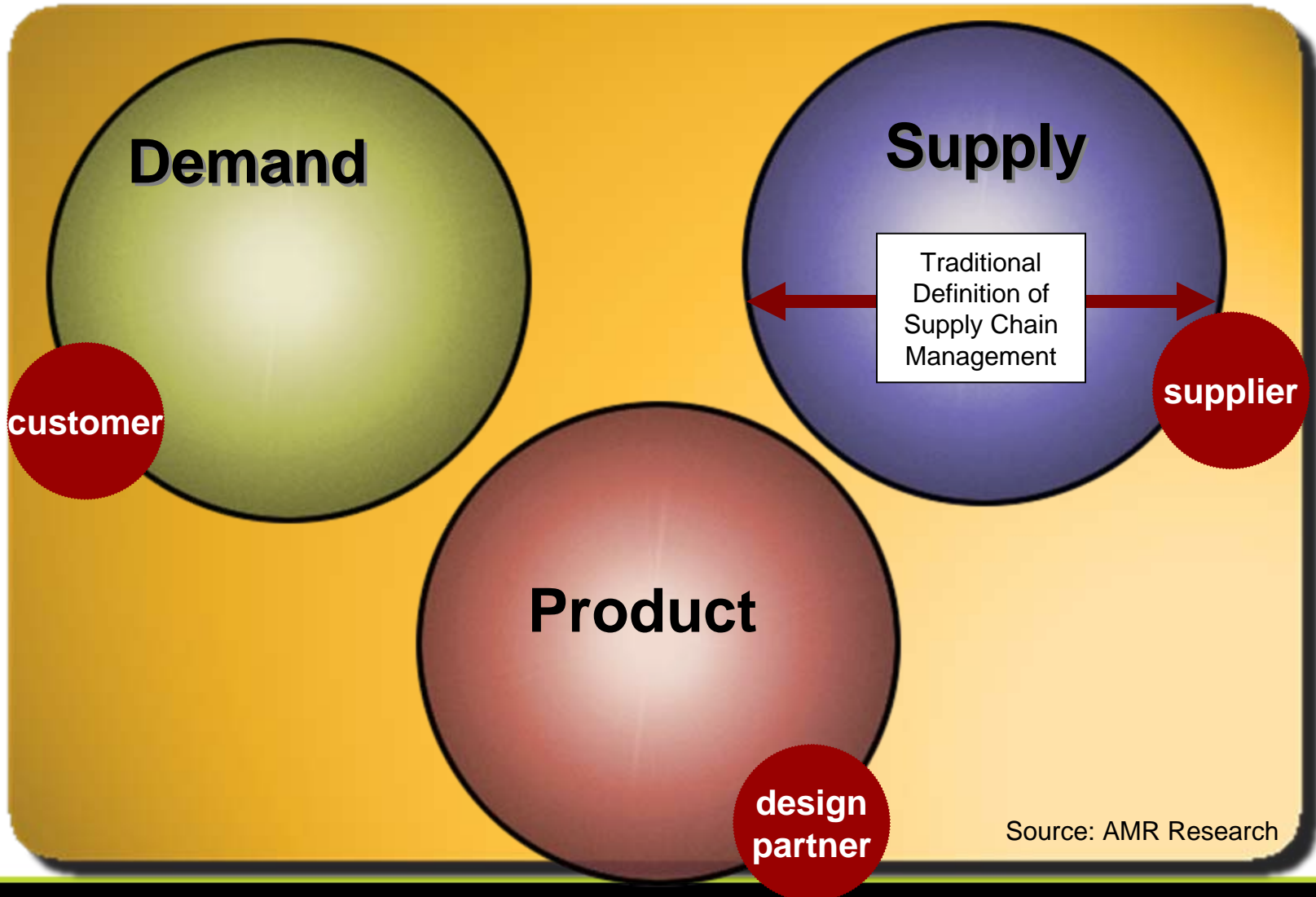
- All of the above could result in unmet corporate expectations and decline in shareholder value

# Importance of demand shaping

## How 'shaping demand' can help

- Proactive approach to demand management
- Makes your supply chain demand driven
- Improved profitability due to proper prioritization of demands, building right products at the right time
- Promotes collaboration amongst all stakeholders
- Supports replenishment system with immediate visibility to changing needs

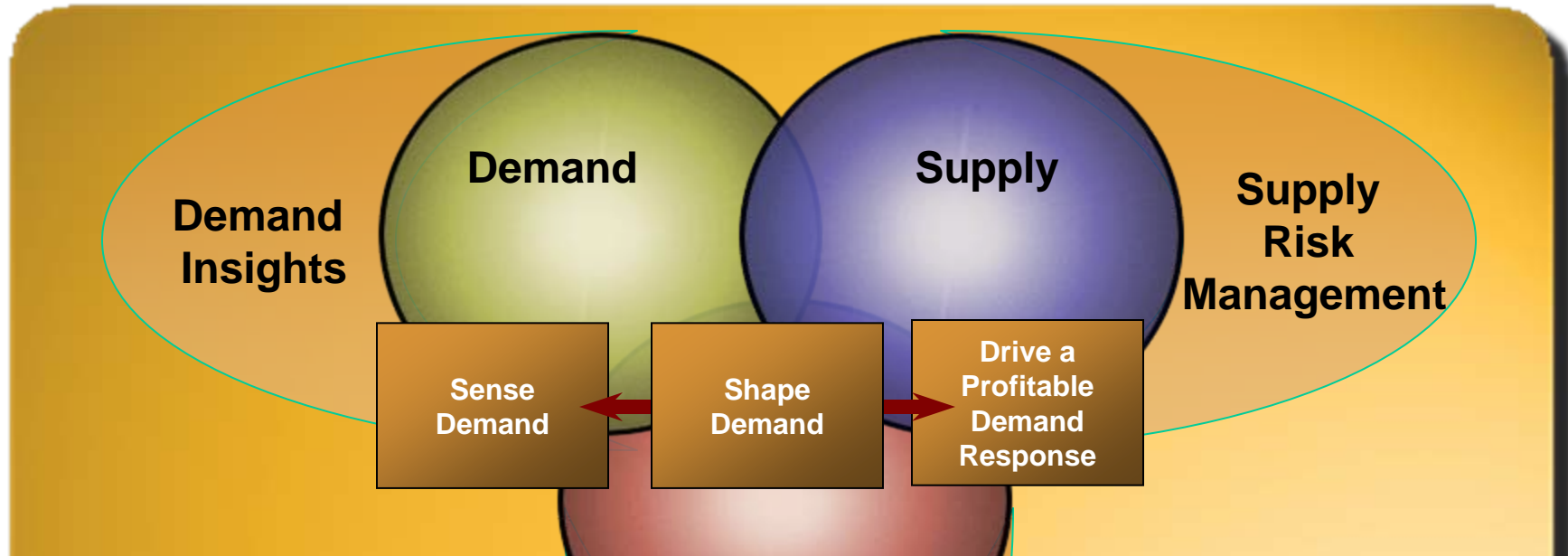
# Traditional Supply Chains



Source: AMR Research



# Demand-driven Processes



- Proactive approach to demand management
- Makes your supply chain demand driven
- Improved profitability due proper prioritization of demands, building right products at the right time
- Promotes collaboration amongst all stakeholders
- Supports replenishment system with immediate visibility to changing needs

# Demand shaping

# Shaping demands at the heart of a Demand Driven Supply Network (DDSN)

## What is “Shaping Demands”?

- Shaping demands can be defined as aligning your forecast to reality by taking all possible variables into consideration. For example:

### **Strategic predictive forecasting**

- Collaborate with stakeholders
- Historical demand patterns
- Managing new product introductions
- Discounts and promotions
- Trade promotion and promotion optimization

### **Operational planning to satisfy demands**

- Sales and operations planning
- Supply planning based on global forecasts
- Supply positioning

# Strategic Predictive Forecasting

## **Collaboration**

- Collaborate to incorporate inputs from different stake-holders in the organization – such as marketing/sales/Operations
- Forecast at the appropriate level of aggregation. For example, there may not be enough information for forecast at an individual item/location combination

## **Historical demand patterns**

- Seasonality and Trends
- Shape Modeling
- Causal Factors

## **Manage new product introductions**

- New item / store introductions
- Lifecycle / supersession / Product phase-in and phase-outs

## **Discounts and promotion optimization**

- Effect of discounts and promotions
- Promotion optimization

# Operational Planning

## **Tolerance along time and organization dimensions for fulfilling demands**

- Global forecasting and consumption
- Automatically sourcing forecasts to appropriate organizations that fulfill demands

## **Sales and Operations Planning**

- Review current demand fulfillment
- Consider constrained supply
- Re-prioritize demands

## **Supply Positioning**

- Consider forecast accuracy measures to determine inventory levels
- Postponement optimization

# Use cases to shape demands

# Scenario#1: A consumer electronics manufacturer's predicament

**Popular line of mobile devices works with multiple technologies, caters to multiple demographics, sells through out the world.**

***What is needed to effectively manage the forecasts of a wide variety of related products?***

- Collaborate between various account owners and regional and global managers to arrive at a consensus:
  - I. Send/receive information between stakeholders back and forth
  - II. Manage by exception
  
- Ability to take forecasts entered at higher level and disaggregate them to appropriate lower level SKUs, while considering the following:
  - I. Historical distribution
  - II. Order Backlog
  - III. Any additional weights specified

# Workflow enabled collaboration

## **Why collaboration capabilities are important?**

- It is extremely critical to bring sales, operations, finance and marketing to agreement on a single forecast number.
- A platform that enables collaboration between these stakeholders will result in a better aligned corporation marching towards a common goal.

## **Ability to easily tailor process flows that is custom to each business**

- Web based workflow development tool allows creating new workflows and modifying canned workflows easy.
- For example, you can have a workflow that enables collaboration between account manager, regional manager and country manager before finalizing the forecast.

## **Process to define and handle exceptions**

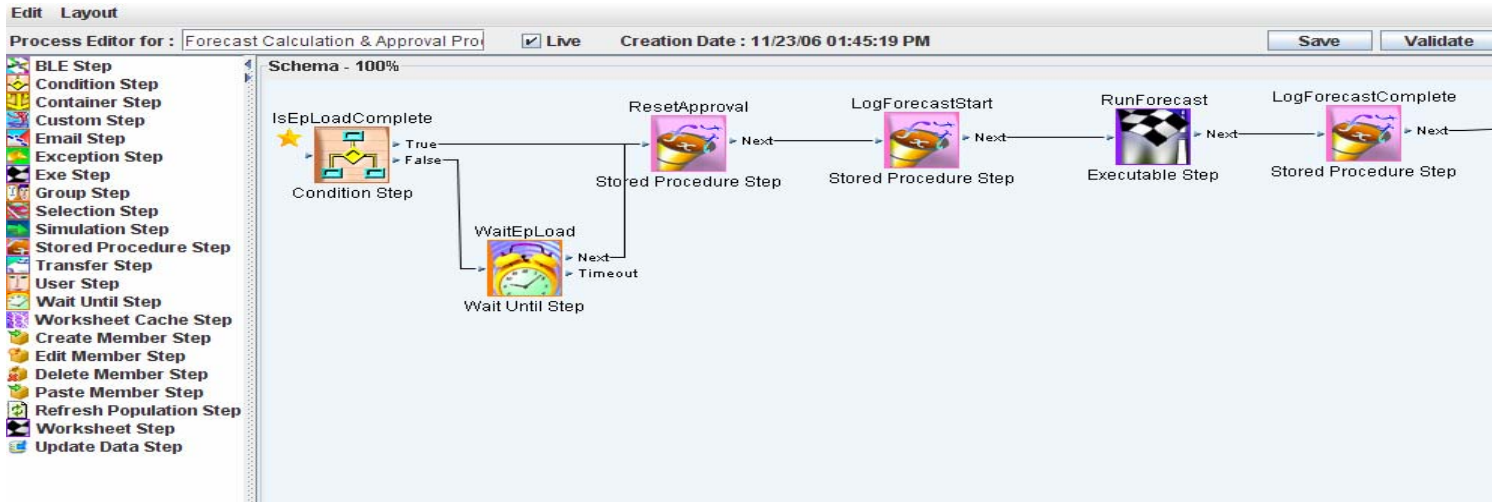
- Create workflows to handle exception events such as over/under forecasting and remediation plans

## **Workflows to integrate external systems**

- Facilitate integrating external systems' data through workflows
- For example, allocate around intersections that have sales orders



# Workflow enabled collaboration between stakeholders



Welcome sop | My Collaborator Workbench | 02/13/08

Contents | Planning Applications | Tools and Applications | Process Monitor

### My Tasks

Done	Message	Select value	Source	Assign date	Due date
<input type="checkbox"/>	<a href="#">Weekly Consensus Fcst</a> Hi - Sales forecast for next quarter updated - sync'ed with main customers now.	None	Sales4	06/06/07 10:47:57 PM	None
<input type="checkbox"/>	<a href="#">YTD Target vs Plan</a> Hi - need to discuss current performance against target - marketing should be involved to promote latest SKU's to DRIVE our DEMAND	None	Finance1	06/06/07 10:52:29 PM	None

My Worksheets

Name	Description	Send as Task
<a href="#">Baseline - Overview</a>	Introduction to User Navigation and Features	<input type="button" value="Send"/>
<a href="#">Baseline - Detail</a>		
<a href="#">Baseline - Causal Example</a>		
<a href="#">Baseline - Manual Splitting</a>		
<a href="#">Baseline - Prospect Data</a>		
<a href="#">Demand - Profiles</a>		
<a href="#">Demand - Weather Effect</a>		
<a href="#">Demand - Forecast Accuracy</a>		
<a href="#">Demand - POS Consumption</a>		
<a href="#">RT SOP - Consensus - Final Plan - SOP Lead</a>		
<a href="#">RT SOP - SIOP Review</a>		
<a href="#">NPI - Shape Modeling</a>		
<a href="#">NPI - Shape Alignment</a>		

Send task to user - Windows Internet Explorer provided by Comcast

**To...** dm;

**Message:** Forecast review

**Description:** Please review my baseline forecast and let me know if you agree

**WorkSheet:** Baseline - Overview

**File attachment:**

**Mandatory fields**

# Disaggregating higher level entries to lower level SKU/Location

## Why is this important?

- If the forecast quantities end up entered for the wrong products/locations, it could result in overconsumption and hence result in excess inventory
- Can be mitigated with robust disaggregation mechanisms

## Demantra supports multiple disaggregation schemes

- Proportional – where the allocation logic is based on another series
- Proport Mechanism to control disaggregation during analytical engine runs

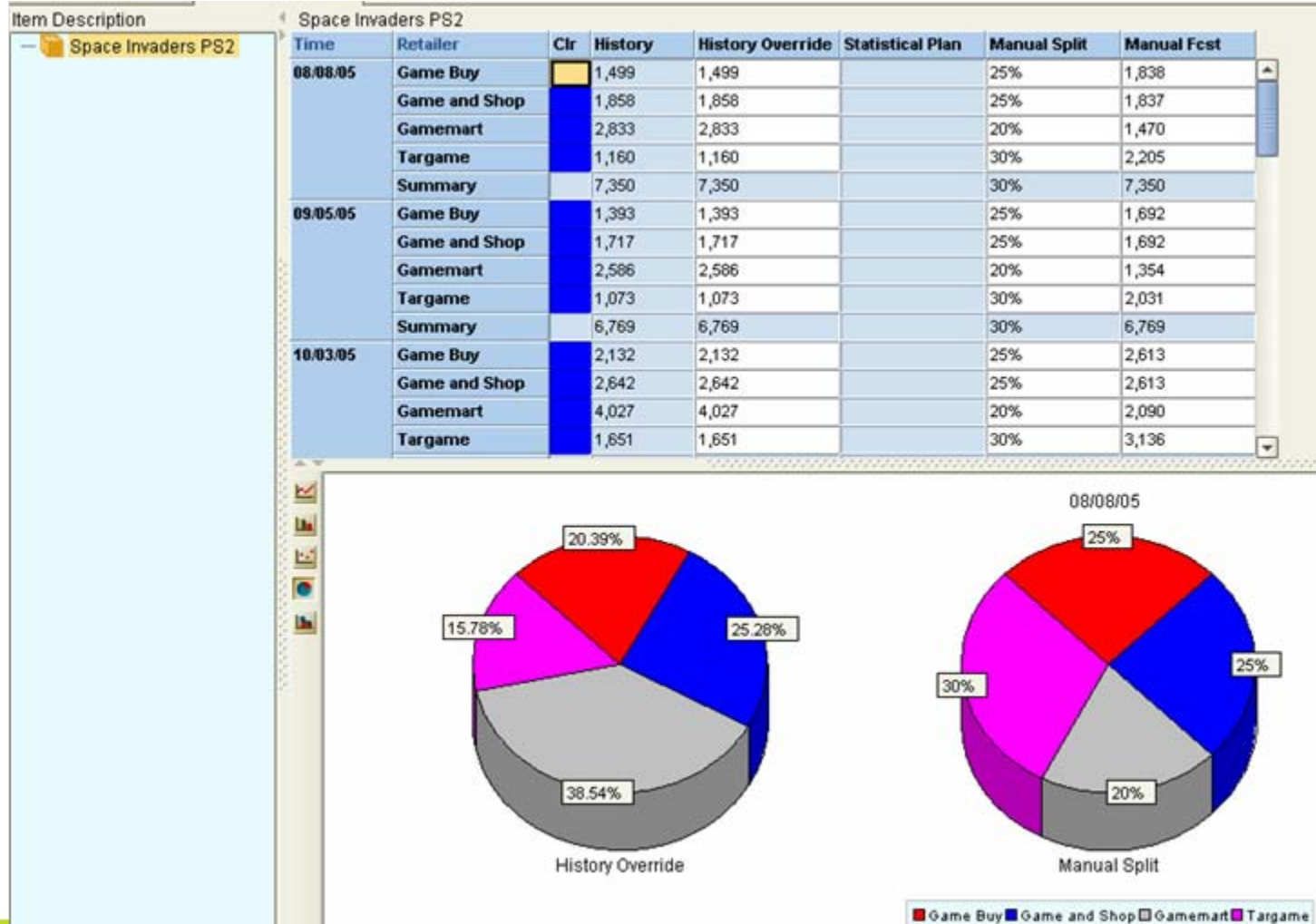
### Proportional

- When a “series” is defined, modelers have the ability to define the allocation to be based on another series.
- The basis series could be computed based on a business specific logic or could be collected data series such as order history and backlog.

### Custom Methods

- Define custom methods that can be invoked for any special allocation logic.
- For example, allocate around intersections that have sales orders

# Disaggregating higher level entries to lower level SKU/Location



# “Expressions” to facilitate numerical calculations / quick review

## **Server Expressions**

- These are expressions that uses database grouping functions such as average, sum, etc.
- For example, you could have an expression that computes the average selling price at the category level and determine profitability.

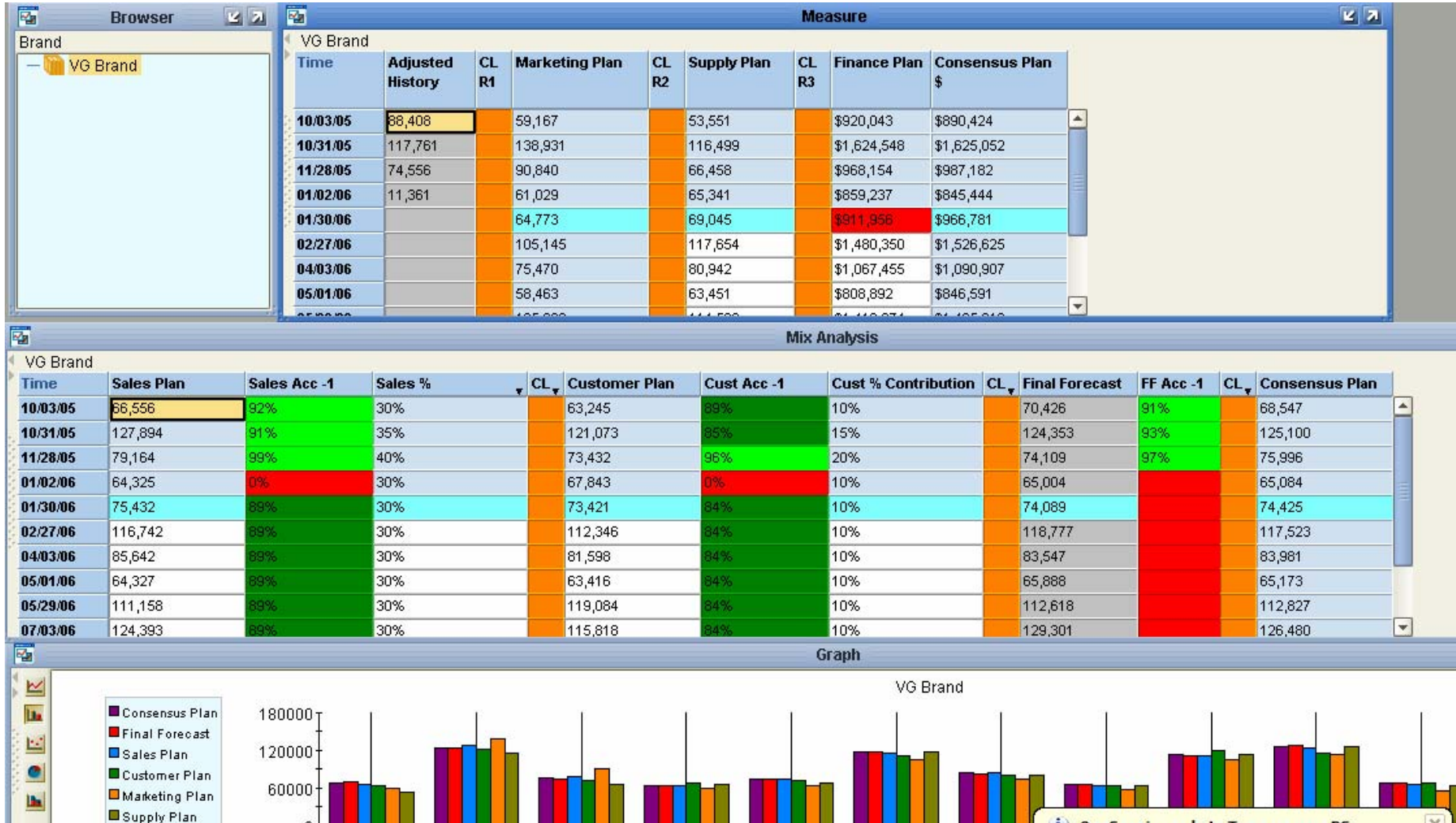
## **Client Expressions**

- These are expressions that enable using mathematical formulas and if-then-else statements using different series data.
- For example, you could have an expressions that makes the forecast equal to or above the sales order quantity for any given combination.

## **Color expressions**

- These are expressions that color code the cell based on conditionality.
- For example, you could color all cells red when the forecast variance is above a certain percentage.

# Expressions / Color Coding



## Scenario#2: A manufacturer of construction equipment

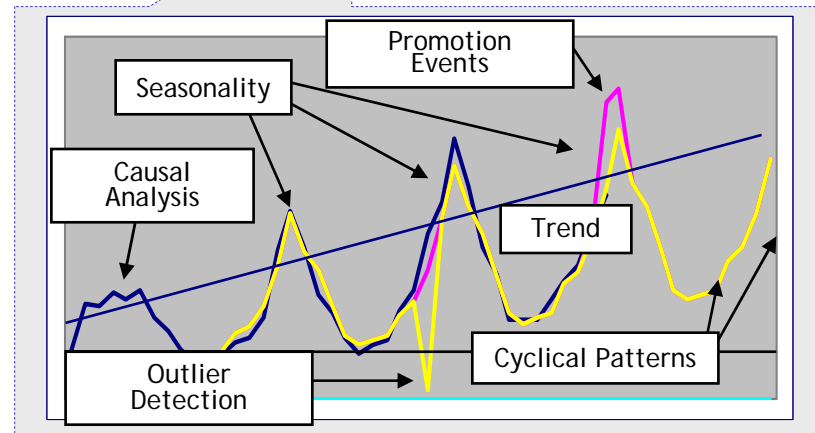
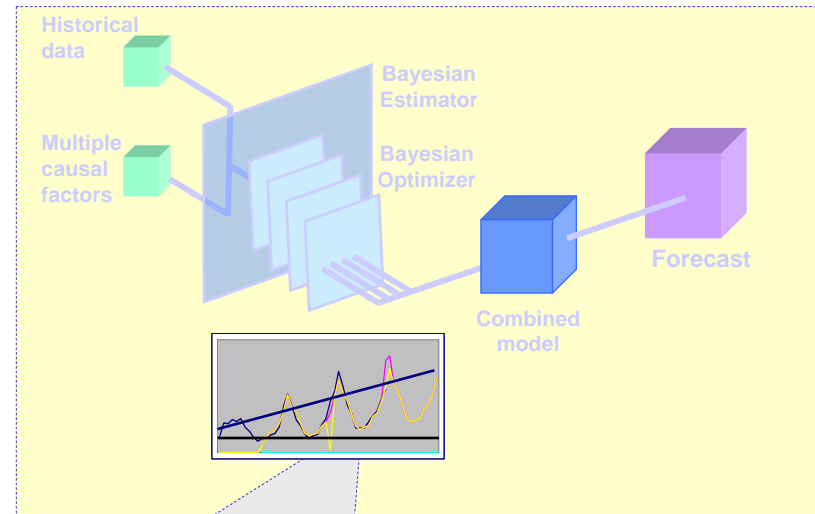
**The business is growing but also depends on continued economic indicators. Seasonal business with the type of equipment sold depending on the weather patterns.**

***What is needed to accurately forecast considering all the factors that affect the business?***

- Ability to consider the historical trends and seasonality to predict forecast.
  - I. Sophisticated algorithm
  - II. Ability to tune the forecasts
  
- Mimic trends occurred in the past
  - I. Ramp up / Ramp down
  
- Consider all the causals that influence the forecast one way or the other
  - I. Global causal factors
  - II. Local causal factors

# Demantra's Statistical Forecasting Capabilities

- Bayesian-Markov algorithm uses a mixed model that is better than best-fit approaches.
- Unlimited dimensions and hierarchies
- Forecast tree uses hierarchy to determine the best levels to forecast
  - For example, start at the lowest levels in the hierarchy and then move up one step at a time.
- Attribute based forecasting capabilities
- Nodal tuning capabilities
- Advanced reporting capabilities such as graphs, charts, various summarization capabilities.



# Shape Modeling

## **Activity based shape modeling**

- Demantra captures the profile of historical demand over a period of time
- Apply shapes scaled for volume and time to future forecasts
- Alignment of future forecasts shape dictated by Quantity Alignment Duration specified in another series
- Supported in Demand Planning mode and Promotion Effectiveness mode

## **Promotion Shape Modeling**

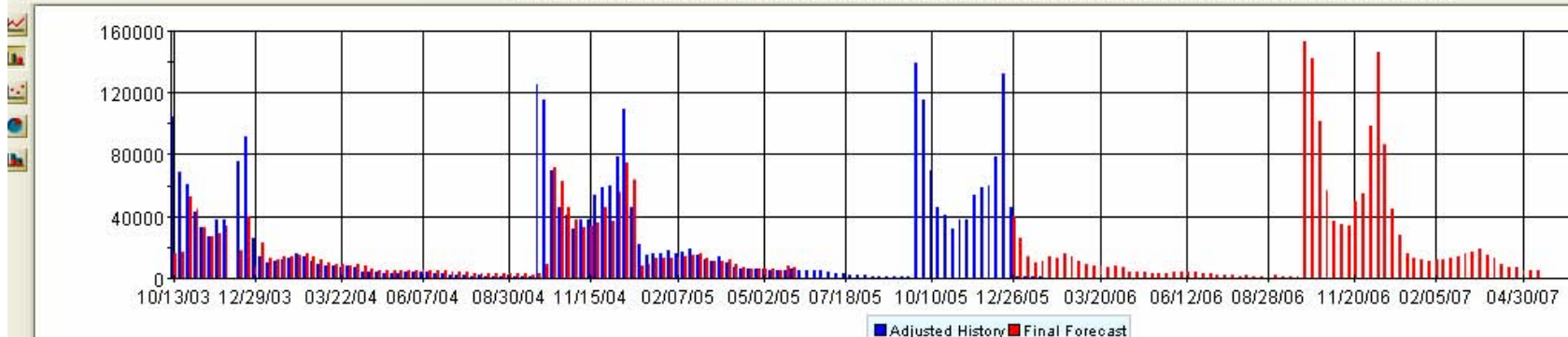
- Similar to Activity based shape modeling but in addition considers promotion attributes
- Available only in PE mode

**Shape modeling applicable only when there is continuous stream of demand data**



# Activity Based Shape Modeling

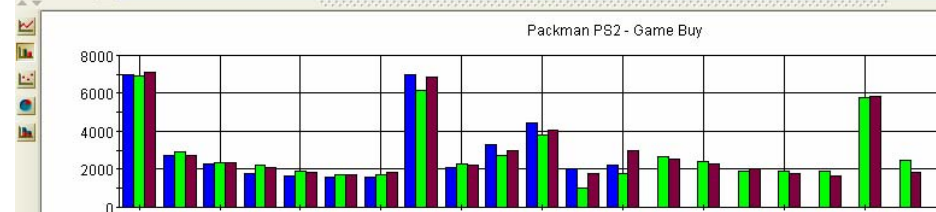
File	Worksheet	Edit	View	Options	Data	Help	Window		
Time	Clr	Demand Factor	Adjusted History	Simulation	Final Forecast	Approval	Approved By	Time Fence	Product Launch
10/13/03		0%	104,675		15,575	<input type="checkbox"/>			Active
10/20/03		0%	68,222		16,723	<input type="checkbox"/>			Start
10/27/03		0%	60,449		52,836	<input type="checkbox"/>			Active
11/03/03		0%	42,461		44,791	<input type="checkbox"/>			Active
11/10/03		0%	32,364		32,964	<input type="checkbox"/>			Active
11/17/03		0%	27,084		26,967	<input type="checkbox"/>			Active
11/24/03		0%	38,134		28,333	<input type="checkbox"/>			Active
12/01/03		0%	37,516		34,213	<input type="checkbox"/>			Active
12/08/03		0%			0	<input type="checkbox"/>			Active
12/15/03		0%	75,312		18,268	<input type="checkbox"/>			Active
12/22/03		0%	91,291		39,795	<input type="checkbox"/>			Active
12/29/03		0%	26,304		7,504	<input type="checkbox"/>			Active
1/05/04		0%	13,878		22,641	<input type="checkbox"/>			Active
1/12/04		0%	10,088		13,166	<input type="checkbox"/>			Active



# Causal Factors

- **Global Factors**
  - Model global causal factors that apply to all products and locations
  - For example, holidays such as Thanksgiving and Christmas, seasons, etc
- **Local Factors**
  - Local causal factors apply to a specific product and location
  - For example, a snow plough is more likely to sell more during snowy season in the North-East than in Arizona.
- Improved forecast accuracy as a result of better incorporation of the causals.

Time	Clr	History	History Override	Demand Factor	Adjusted History	Easter Holiday	Statistical Plan	Simulation	Base Override
02/21/05		3,138	7,000	0%	7,000	YES		6,920	
03/21/05		2,720		0%	2,720	NO		2,907	
04/18/05		2,269		0%	2,269	NO		2,319	
05/16/05		1,770		0%	1,770	NO		2,204	
06/13/05		1,678		0%	1,678	NO		1,884	
07/11/05		1,618		0%	1,618	NO		1,727	
08/08/05		1,570		0%	1,570	NO		1,733	
09/05/05		1,504	7,000	0%	7,000	YES		6,172	
10/03/05		2,095		0%	2,095	NO		2,314	
10/31/05		3,301		0%	3,301	NO		2,739	
11/28/05		4,440		0%	4,440	NO		3,795	
12/26/05		1,291	750	0%	2,041	NO		1,023	
01/23/06			2,250	0%	2,250	NO		1,761	
02/20/06				0%		NO	2,549	2,661	
03/20/06				0%		NO	2,272	2,414	
04/17/06				0%		NO	2,028	1,873	
05/15/06				0%		NO	1,787	1,911	
06/12/06				0%		NO	1,641	1,895	
07/10/06				0%		YES	5,830	5,752	



## Scenario#3: A retailer on an aggressive growth trajectory

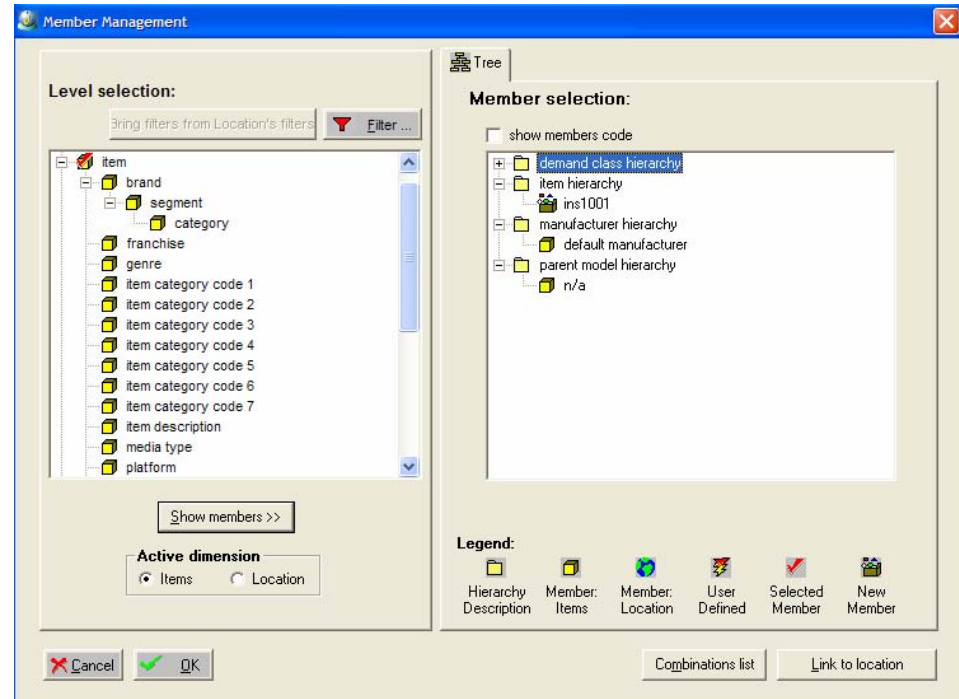
**10 – 20 new stores being opened every year. New products being introduced in existing stores.**

***New products and stores don't have any history. How do they predict demand for their new locations and products? How to effectively promote a product and provide incentives to push slow moving products?***

- Member management
  - I. Introduce new products
  - II. Introduce new stores
  
- Chaining
  - I. Copy history of like stores/like products for new stores and products respectively
  - II. Life cycle and super-session

# Member Management

- New Products Introduction
  - All “combinations” are stored at lowest levels
  - Most members have “combinations” with sales data and hence enabled for forecasting
  - For introducing new, use tools such as Member Management to enable them for forecasting
  - Create a new member at any aggregation level in the product hierarchy – but typically lowest level members
- Link new products to Locations
  - Link a new product to a location or an existing product to a new location
  - Create combinations of product/locations
- Dummy history creation
  - Insert dummy historical records
  - Enables viewing combinations in worksheets



# Chaining

## **Forecasting new product / stores**

- Chaining is the process of copying series data from one set of combinations to new set of combinations.
- If you have new product/location combinations, use chaining to create history so Demantra can generate forecast.

## **Item Similarity**

- For example, you created new store X which sells same items as existing store Y
- Chaining creates all the relevant item combinations for new store X based on Y

## **Location Similarity**

- For example, you created a new item B which is similar to item A and sold in all locations
- Chaining creates all relevant location combinations for B based on A

## **Proport Mechanisms**

- Multiple proportionality options exist for disaggregating to new combinations – such as Target, Source, Equal and Similar

## Scenario#4: A global telecommunications equipment manufacturer shipping products from many facilities

***Forecasting by a specific “ship-from” organization can lead to over/under driving the supply chain.***

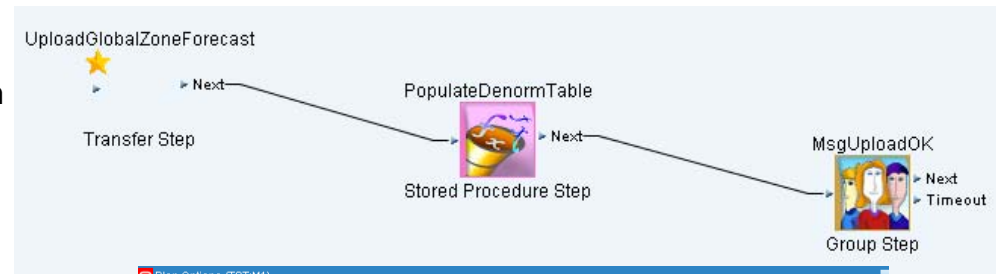
***Company needs the ability to forecast at a global level and let the operations determine the right source at fulfillment time.***

- Global Forecasting
  - I. Consumption by different levels in Location/Item hierarchy
  - II. Dynamic sourcing of the forecast to appropriate fulfillment centers
  
- Consumption tolerance along time dimension
  - I. Backward and Forward days
  - II. Consume within time bucket

# Global Forecasting – Publish from Demantra, Consume and Distribute within ASCP

- Publish forecast from Demantra to ASCP without the context of an Organization
  - Define sourcing rules to distribute the forecast to appropriate fulfillment centers based on regions/category/Item and Instance.
  - ASCP utilizes the sourcing rules to distribute the remaining forecast after consumption.
- Consumption at multiple levels in location hierarchy
  - Zone / Region
  - Ship to Location
- Consumption by multiple levels in Item hierarchy
  - Item
  - Demand Class

634	<a href="#">EBS Upload Local Forecast</a>	dm	12/16/06	01/21/08	0	●	<a href="#">Edit</a>
635	<a href="#">EBS Upload Global Zone Forecast</a>	dm	12/16/06	02/12/07	0	●	<a href="#">Edit</a>
636	<a href="#">EBS Upload Local Fcst. Demand Class</a>	dm	12/16/06	02/19/07	0	●	<a href="#">Edit</a>
637	<a href="#">EBS Upload Global Zone Fcst. Demand Class</a>	dm	12/16/06	02/19/07	0	●	<a href="#">Edit</a>



Plan Options (TST:M1)

Plan: Optimized | Optimized Plan | Plan Type: Manufacturing Plan

Main | Aggregation | **Organizations** | Constraints | Optimization | Decision Rules

Global Demand Schedules

Name	Description	Type	Ship To	Consumption Level
Global Zone Cns Fcst(t)	Global Zone Consensus F	DPSCN	Zone	

Organizations

Org	Description	Net WIP	Net Reservations	Net Purchases	Plan Safety Stock	Ir Salt
TST:M1	TST:Seattle Manufacturing	✓	✓	✓	✓	
TST:S1	TST:Chicago Subassembl	✓	✓	✓	✓	
TST:M2	TST:Boston Manufacturing	✓	✓	✓	✓	

Demand Schedules

Name	Description	Include Targets	Ship To Consumption Level	Inter Plant
		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>		<input type="checkbox"/>

Supply Schedules

Name	Description	Type

Subinventory Netting

# Consumption tolerance along time dimensions

- **Backward Days**
  - First look for the forecast on the day of the sales order.
  - Then days backwards from sales order date the forecast should be consumed.
- **Forward Days**
  - After scanning backwards, scan forward to look for forecast to consume.
- **Consume within time bucket**
  - For non-daily buckets, force the consumption of the forecast only within that bucket and not allow spanning backwards and forwards.
- **Criticality of consumption**
  - If the forecasts are not consumed properly, supply chain will be overdriven causing excess inventory
  - All these different options can be taken advantage to shape forecast demands to align with reality.

The screenshot shows the 'Plan Options (TST.M1)' window with the following settings:

- Plan:** Optimized (Selected), Optimized Plan
- Plan Type:** Manufacturing Plan
- Main Tab:** Aggregation, Organizations, Constraints, Optimization, Decision Rules
- Planned Items:** Demand schedule item...
- Material Scheduling Method:** Order Start Date
- End Item Substitution Set:** (Empty)
- Schedule By:** Schedule Ship Date
- Assignment Set:** TST:Supplier Scheduling
- Item Simulation Set:** (Empty)
- Demand Priority Rule:** Schedule Date
- Overwrite:** All
- Demand Class:** (Empty)
- Use for Sales and Operations Planning
- Planning Time Fence Control
- Demand Time Fence Control
- Calculate Key Performance Indicators
- Include Critical Components
- Forecast Allocation and Consumption:**
  - Do Not Spread Forecast
  - Spread Forecast Evenly
  - Consume by Forecast Bucket
  - Explode Forecast
- Backward Days:** 10
- Forward Days:** 20
- Enable Pegging
  - Peg Supplies by Demand Priority
- Reservation Level:** None
- Hard Pegging Level:** None



# Summary

# Shaping demands to achieve financial objectives

## **Start with the corporate objectives**

- Identify and prioritize corporate objectives
- For example, improve forecast accuracy by 10% or reduce stock-outs of certain product line, etc.

## **Drill down to specifics**

- Determine what is needed to accomplish the objectives
- For example, better collaboration among stakeholders or improved statistical forecasting capability, etc.

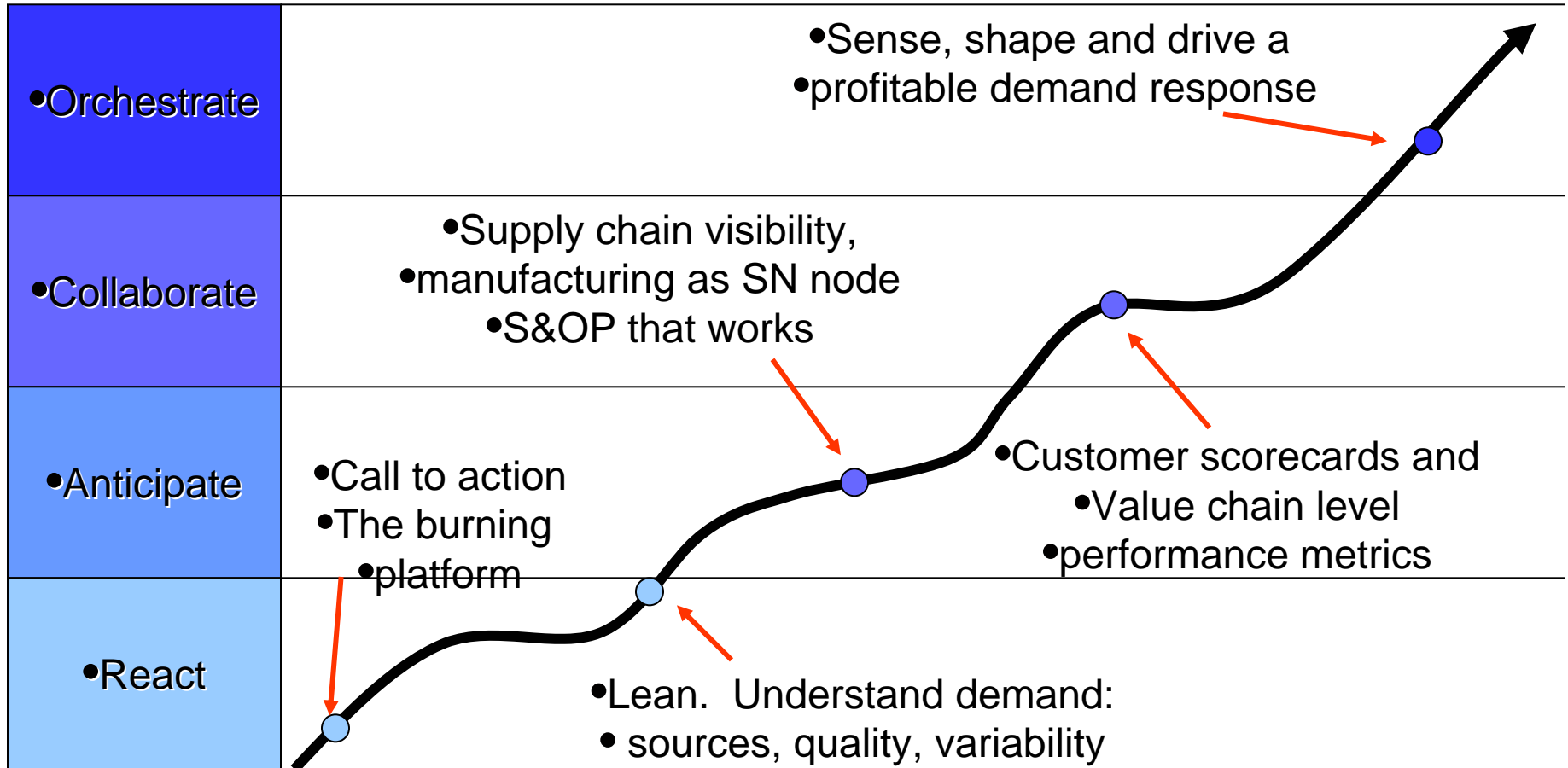
## **Map the software functionality to meet specific requirements**

- Demantra is a suite of products within larger APS umbrella with many components and overlapping features
- Identify the specific features that meet your needs
- Then choose the components that provide those features

## **Layout an incremental rollout plan**

- Start with the quick wins
- Expand the footprint with minimal change management impact

# Journey....



# Call to Action

**Simple questions to determine the call to action.....**

- **Do you know what your forecast accuracy is?**
- **How much more profits will be added by improving your forecast accuracy by 5%?**
- **Are your financial metrics better than your industry average?**
- **Do your internal teams such as sales, marketing, operations and finance talk to each other on customer wins, losses, financial targets, promotions, etc?**
- **Do you arrive at a single forecast that all stakeholders agree upon?**
- **Can your IT systems/processes facilitate quickly reacting to changes in supply or demand picture? For example, provide ability to execute daily/weekly planning cycles.**