The Evolution of Forecasting

A transformation into a contemporary supply chain
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Abstract

“Big data and the rise of ecommerce has had a seismic shift in how organizations plan for and sell products. The ability to sell a wider variety of items online has both expanded sales opportunity and risk with a low barrier to entry for competition. Understanding how to adapt to increasingly more variable product demand and predict future demand has never been more important to deliver superior customer service.”
Key Trends: Changing Consumer Behavior

**What is 2nd Screen?**

- Need to start at the beginning... will it require things?
- Nice to have vs. have to have
- 2nd Screen Experience

**Key Consumer Data from the Consumer 2014 Report**

- Percentage of consumers who start their shopping journey in store: 52.3%
- Percentage of consumers who start their shopping journey on a retailer's website: 36%
- 41.5% describe their shopping behaviour as mainly in store
- 29% describe their shopping behaviour as mainly online
- 40.7% say convenience keeps them loyal to a retailer
- 28% use their smartphone for research when out shopping
- 31.4% of shoppers pay more for express delivery
- Percentage of consumers that say improving online services enhances their shopping experience: 50.9%
- Percentage of people who place price in their top five most valued elements when shopping online: 70.8%
- 34.7% of people say loyalty cards keep them more loyal than anything
Key Trends: Evolving Business Models

UNTUCKit

A SHIRT FOR EVERY OCCASION
UNTUCKit Shirts are a bold alternative to the usual. From casual gatherings to more formal events, our innovative 'untucked' design works effortlessly and goes with anything. Some would say it's the most versatile shirt on the market.

Learn more

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Key Trends: Technological Advances

2020

- 4 BILLION Connected People
- $4 TRILLION Revenue Opportunity
- 25+ MILLION Apps
- 25+ BILLION Embedded and Intelligent Systems
- 50 TRILLION GBs of Data

Source: Mario Morales, IDC
Key Trends: The Omni Channel Challenge

Retailers suffer high 'stock outs,' survey shows

William B. Cassidy, Senior Editor | Sep 01, 2015 6:38PM EDT

U.S. retailers are currently “destocking” high levels of inventory, while dealing with “unprecedented levels” of out-of-stock inventory, both online and in stores, according to GT Nexus. In a consumer survey, the supply chain technology company found that 75 percent of shoppers experienced an “out-of-stock” moment at a store in the last 12 months. The record online was hardly better: 63 percent of consumers suffered an e-commerce “out-of-stock.”

“Companies are all trying to run lean inventories, but we’re still finding stock-out levels of 55 to 65 percent,” Greg Kefer, vice president of corporate marketing, said in an interview. Stock-outs cost sales, while overstocked inventories can cost retailers millions of dollars a day.

Summary

How Is Macy’s Going To Jumpstart Growth Again?

Sep 24, 2015 1:29 PM ET | About: Macy’s Inc. (M) Includes: BBY

Investment Summary:

With Macy’s (NYSE:M) shares down 21% year to date, I thought it would be interesting to take a deeper look at management’s latest initiatives to help
Multiple Drivers Increase Demand Volatility and the Fragmentation of the Demand Signal
Multiple Drivers to Increasing Demand Volatility and The Long Tail

**Drivers**

- Closer to customer
- More responsive – high granularity replenishment cycles (time buckets smaller)
- Promotional Activity
- Product Variety
- Service & Availability

Sales Volumes vs. Sku Count

- Shrinking Forecastable
- Growing Un-forecastable
Drive an Integrated End-to-End Demand Signal and Replenishment Response Across the Value Chain
Demand Modeling Analytics defines the statistical demand behavior for each SKU/Location, in terms of: order/POS frequency, order line size, order quantity at a daily level.
Demand Modeling Analytics: Slower Moving Item at a Daily Level

Forecast is relatively low

But demand is 2X the forecast
Demand Modeling Analytics: Pattern Recognition

- **Green Bars = Historical orders/POS**
- **Red Line = Past and future forecast**
- **Orange Bars = Future probability of orders/POS demand occurring (day and quantity)**
Demand Modeling Analytics: Driving Daily Adjustments to the Forecast

Red Line = Past and future forecast RE: statistical or S&OP forecast

Green Line = Past and future demand (orders/POS)

Blue Line = Demand Sensing forecast that is automatically adjusting to the demand trend (pattern) of the green line

We are here 12/22/14

Rolling future horizon
Machine Learning is the Next Evolution in Forecasting

Machine Learning is a branch of Artificial Intelligence capable of modeling complex phenomena through the correlation among vast amounts of raw data.

A Machine Learning Engine (MLE) models demand shaping behavior as a function of a high number of external variables.

- Analyzing both quantitative and qualitative variables
- Creating boolean, human intelligible rules
- Creating a relevance ranking both of rules and single variables
- Automatic Model Construction
- Automatic multi-dimensional clustering
- Run very fast with low hardware requirements
Machine Learning Example: Adding Value to Demand Modeling / Promotional Forecasting

- Base Line Processing
- Uplift Projection
- Promotional Lift
- Halo Effect
- Segment Specific Lift
- NPI Launch Profiles
- Seasonality
- Web Lift

Market, Product, and Demand Datasets

- Media
- Promotions
- Web
- Market Model
- New Products
- Historical Demand

Web Indicators
- Promo Variables
- Media Variables
- Consumer Attributes
- NPI Variables
- Statistical
Case Study: Wayfair: Increased Efficiency with Dramatic Business Growth

**Program Growth vs Stock Out**
- Program Growth
- Stock Out

**Forecast Error (MAPE)**
- 2012 - BEFORE
- 2013 - AFTER

**Inventory Turns**

**Unhealthy Inventory**
- 2012 - BEFORE
- 2013 - AFTER
Case Study: Costa Coffee

_3x growth in business without adding headcount_  
_30% reduction in logistics cost_  
_20% reduction in field stock_  
_10% increased customer loyalty through improved service_  

**Predictive Commerce at Costa Express**

**Automatic Continuous Feedback Loop**

**Demand Sensing**

**Inventory Optimization**

**Real-time POS Data Feed (Telemetry)**

**3000 Kiosks**

_Millions of cups of coffee per year_  
_Happy customers_  
_Award winning_
Case Study: Danone

How Danone Used Predictive Commerce to Transform Their Business

Danone's planning processes were disconnected and disjointed. Predictive commerce enabled a cohesive planning process to improve Danone's forecasts, resulting in a significant improvement in growth and return on investment.

Managing demand volatility puts significant pressure on supply chain KPIs. Predictive commerce is the key to meeting KPI challenges by analyzing both upstream and downstream data from internal and external sources of data to produce surprisingly accurate forecasts.

Demand Shaping KPIs:
- Net ROI increased by 6% in 2011 and 8%
- Net uplift improved by 36% in 2011 and 55%

Beyond the Numbers:
- Planners' workload reduced by 50%
- Robust foundation of a value driven S&OP

Across the Board Improvements:
- Total forecast error reduced by 20%
- Lost sales reduced by 30%
- Product obsolescence reduced by 30%
- Forecast accuracy improved to 92%
- Service level goal

37 consecutive months have exceeded 98.7% service level goal
Drive an Integrated End-to-End Demand Signal and Replenishment Response Across the Value Chain
Key Takeaways

• Changes in consumer behavior will accelerate the requirement for increased responsiveness in the supply chain.

• The long tail of demand is a real issue that requires a different approach to drive the right inventory to service trade-off.

• Model demand don’t just forecast it.

• Cognitive learning is the future....there is ‘signal’ in ‘big data’ that can operationalized in the strategic to tactical planning process.

• Automation - Let the technology do the heavy lifting and shift the focus of the planning community to deliver the appropriate extrinsic input, the analysis, and insights from the technology to shorten the time to value.