The Retail Analytics Challenge: Smarter Retail through Advanced Analytics & Optimization
88.8% increase in buying from mobile devices between Q1 2011 and Q2 2012

192 million US consumers will shop online by 2016 (up 15% from 2012)

45% shopping in store leave and complete their purchases online for a discount as low as 2.5%

39% of Supply Chain executives identified real time demand data as their number one blind spot

4 in 10 Smartphone users search for an Item in a store
Smarter consumers create opportunities for retailers to deliver a superior shopping experience ….

- Smarter Shopping Experience
- Smarter Merchandising & Supply Chains
- Smarter Operations

Business Analytics helps retailers stay ahead of Smarter Consumers
Business Analytics & the Smarter Consumer

Retailers must stay ahead of smarter consumers and offer an outstanding shopping experience and differentiated assortment for each of their stores.

Deliver a smarter shopping experience. Enable customers to shop however, whenever and wherever they want. Match inventory and brand experience on the Web, in stores and via mobile devices.

Develop smarter merchandising and supply chains. Gather customer information continuously and at every touch point. Manage and deliver assortments based on customer insights.

Build smarter operations. Update systems to better handle today’s customer demands. Improve management across production, new product development labor, assets and business processes.
Retailers must offer differentiated merchandise, while being profitable, flexible and efficient in an environment of accelerating market shifts.

Develop smarter merchandising and supply chains.

Source: RSR Research, September 2009
Smarter Merchandising Means Tailored Assortment

**Retailer**
- Too much of the wrong product
- Sales lost due to out-of-stocks
- Inventory depreciation
- Wasted shelf/storage space

**Customer**
- Selection does not meet needs
- Preferred product is not offered
- Desired product is out of stock
- Few new/seasonal items

**Operational Inefficiencies**
- Supply chain disruption

**Customer dissatisfaction**
- Erosion of customer loyalty

**DECREASED REVENUE**
**POOR CUSTOMER SATISFACTION**
**LOWER PROFITS**
**LOST MARKET SHARE**
Tailor Assortments by Store to Better Meet Customer Demand

So chains can:

- Increase merchandise sales and manage margins
- Optimize inventory levels: fewer out-of-stock / over-stock situations
- Increase ROI on inventory investments, maximize working capital position
- Assort individuals stores or clusters to meet local customer needs and drive higher customer loyalty, basket size and satisfaction

To do this merchants need to:

- Understand purchase patterns by store by SKU over time
- Understand store / cluster characteristics
- Accurately predict sales / assortment at a granular level
- Appropriately time Inventory investment and use of scarce shelf space
- Increase forecast accuracy for higher ROI on inventory investment
- Address under-performance SKUs
- Improve sales of key items, categories
- Enact plans to make smart inventory investments
- Manage stock levels to drive sales and protect profits
- Measure merchandise and sales performance
- Course-correct quickly to address changes in demand

Advanced business intelligence and analytics will become table stakes for large-scale retail.

Analytics has been important in retail for the past 20 years. What has changed is the level of granularity of the data. Customer and store/product data will influence everything.

From the ability to predict by store/customer which products will sell, at what price, and in what quantity, based upon who shops at the store.
Store-Level Assortment – Process Flow

**Capture**
Identify and access relevant data
- Internal data: POS Data, Store data
- External data (e.g., demographics)

**Predict**
Apply predictive and advanced analytics to generate optimized assortment plan by store for specific time period

**Act**
Execute plans, place orders, stock stores

**Measure**
Understand merchandise performance, measure store sales by SKU against plan

**Update Plans**
Review predictions, model scenarios

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**Store-Level Assortment Business Analytics Process:**
- Understand store profiles, item-level sales history, external data
- Determine likelihood of SKU-level sales/units by store for upcoming period
- Generate optimized assortment plan by location
- Understand performance vs plan vs prediction

**Business Results:**
- Ensure right products at right quantity are ordered for each store to meet customer demand, which will:
  - Increase revenue
  - Raise profits
  - Improve ROI on inventory investment
  - Increase customer satisfaction and basket size
Business Analytics Can Enable Smarter Merchandising

- Improve the demand forecast to prevent empty shelves
- Better predict demand for slow-moving, high-cost or key items
- Predict likelihood of a product sale for individual SKUs on a store-by-store basis
- Facilitate optimizing category of goods
- Reduce out-of-stock / over-stock situations
- Assort stores / store clusters based on their individual attributes and characteristics for better customer experience
- Improve new product introduction process
- Support SKUs rationalization initiatives
- Determine best set of SKUs to stock in each category in each store
- Minimize shipping costs associated with emergency replenishment
- Manage inventory investment by anticipating demand at specific locations
- Reduce volume of unsold merchandise needed to be shipped back to distribution centers
For Big Data there are use cases across all industries

**Financial Services**
- Fraud detection
- Risk management
- 360° View of the Customer

**Utilities**
- Weather impact analysis on power generation
- Transmission monitoring
- Smart grid management

**Transportation**
- Weather and traffic impact on logistics and fuel consumption

**Health & Life Sciences**
- Epidemic early warning system
- ICU monitoring
- Remote healthcare monitoring

**Telecommunications**
- CDR processing
- Churn prediction
- Geomapping / marketing
- Network monitoring

**IT**
- Transition log analysis for multiple transactional systems
- Cybersecurity

**Retail**
- 360° View of the Customer
- Click-stream analysis
- Real-time promotions

**Telecommunications**
- CDR processing
- Churn prediction
- Geomapping / marketing
- Network monitoring

**Law Enforcement**
- Real-time multimodal surveillance
- Situational awareness
- Cyber security detection
State of the Art: Analytics Can Tell You Who Your Customers Are

- Start with 30-40 modeled variables – “Feature Vectors”
- Each feature vector is like a gene, which describes a facet, or set of customer behavior traits
- 8-15 Feature Vectors are used to define Action Clusters, all 40 can be used to create sub-groups

5-dimensional typical segmentation ≈ 16,000 views
12-dimensional Action Clusters ≈ 3,138,000,000,000 views
30 Feature Vectors ≈ 17,400,000,000,000,000,000,000,000,000,000 views

Most segmentation approaches only focus here
State of the art: Actionable Insights Through Advanced Analytics

Social Analytics

- Front-end Reporting for Discovery
- Create Point of View
- Analyzing Taxonomies
- Analyzing Relationships

Customer Analytics

- Revolutionize tailored models
- Predict ROI by area
- Optimize investment strategies

= Actionable Insights
Optimize marketing spend, Target the right customers, Shape public opinions, Stay ahead of emerging trends, Build brand awareness and loyalty
Neck & Neck

Background

- Spanish retail store change
- Caters to children
- Online, catalog and store presence

Business Goals

- Needed a statistics tool which supports decision making
- Manage the huge amounts of fidelity club data.
- Needed catalog sending optimization feature

Solution

- IBM SPSS Modeler
- Create optimization models
- Develop appropriate customer outreach
- Reduce cost for catalog mailing.

Results

- Improved target segmentation by campaign
- Easily variable weight knowledge on each model
- Customer consumer reactivation

“IBM SPSS Modeler helps to enhance our model and to find a balance between forecast and cost-effectiveness.”

— Julio Quiñonez
Business Intelligence Director
Neck & Neck
Dilliard’s Improves Customer Knowledge and Action

**Background**

- A major department store chain in the U.S.
  - About 330 stores in 30 states, covering the Sunbelt and the central US
  - Caters to middle- and upper-middle-income women
  - Annual revenues exceeding $7.7 billion

**Business Goals**

- Mining approach involves Customer Segmentation (clustering) and market basket analysis.
- The target data is in its customer purchase history table.
  - Selection process and results performed by the warehouse and remain in the warehouse
  - No data is “extracted” or moved out of the warehouse,
    - Decreases the data selection time process
    - Decreases time and risk of moving large amounts of data out of the warehouse

**Results**

"I see winners and losers more quickly; in 20 minutes I have the facts! Saves me at least 8 hours a week!"
"It’s a competitive imperative – without it, we’d be behind the eight ball!"

- Improved customer view and understanding
- Change in “traditional” understanding of customer behaviour, and of profitable customers
- Ability to action customer trends quickly and accurately
Advance Auto Parts Increases revenue by reducing both lost sales and non-working inventory

Background
- #2 auto parts retailer
- 3,300 stores in 40 states

Business goals
- Stock the correct mix of SKUs in every store
- Increase sales within “Do it for me” channel
- Increase sales within slow turning part categories
- Reduce handling costs by delivering the appropriate mix of SKUs to the correct point in the supply chain

Solution
- IBM SPSS Modeler
- Models created to predict SKU demand at the store level
- Solution scales to handle 500K+ SKUs
- Analytic assets are managed in one place and executed automatically every 120 days
- Integrate analytics with existing merchandising systems

Results
- Reduce non working inventory (low and slow turning SKUs over 13 periods) by $54.7M
- Increase sales in the back of store segment by $109M per year
- Predictive models for SKU demand have proven to be 70+% accurate
- Significantly lowered resource cost through automation
Summary: Advanced analytics drive smarter retailing

Marketing Analysis & Demand Generation
- Business Planning and Forecasting
- Market Basket Analysis
- Marketing Mix Modeling
- Site Selection
- Brand Health and Reputation

Merchandizing & Planning
- Localization & Clustering Analysis for Assortment
- Demand Forecasting (Halo & Cannibalization Effects)
- Pricing / Markdown Optimization
- Shrink Analysis & Management
- Out of Stock Analysis & Management

- Site Selection
- Localization
- Demand Analysis & Optimization
- Price Optimization
- Out of stock Analysis

- Clustering & Segmentation
- Predictive Analytics
- Assortment Planning
- Market Basket Analysis
Thank You
Solutions for a Smarter Planet