Supply Chain Analytics

Trends and Emerging Issues

Supply Chain Complexity and Risk

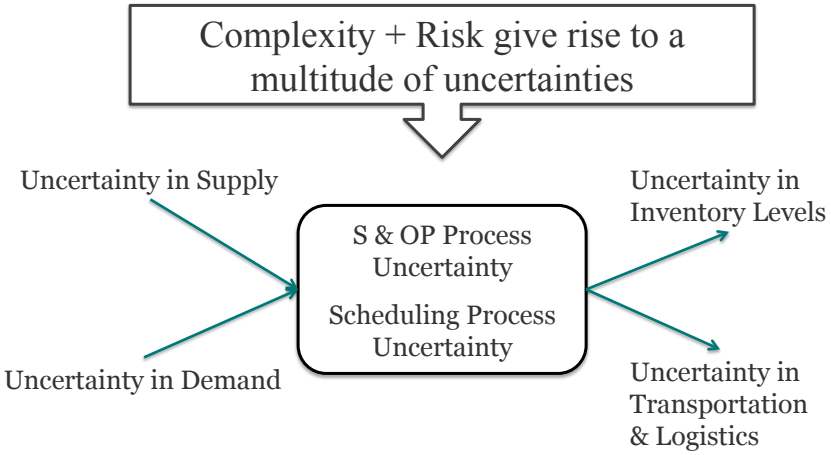
Complexity:

- Global nature
- Government regulations
- Product design
- Customized logistics
- Urban logistics
- Emerging markets

Risk:

- Labor costs
- Energy and fuel costs
- Uncertainty due to weather, economy, port closures, …
- Developing countries

Supply Chain Uncertainty



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How to Deal with Supply Chain Uncertainty

- Analytical Models:
  - Demand Forecasting models
  - Sales and Order Planning models
  - Production and Inventory planning and control models
  - Scheduling models
  - Supply Chain Risk models
- Typically these models use historical data
  - Data is housed in departments or vertical silos
  - Internal to the organization
  - Not available for analysis in real time

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Models for Dealing with Supply Chain Uncertainty

- Mathematical Models:
  - Deterministic in nature
  - Assume away variation
  - Assume that historical data can predict future
  - Unable to incorporate or react in real-time to
    - Supply Chain disruptions
    - Changes in demand patterns
    - Customer sentiment
    - Weather
    - Economic shifts

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Supply Chain Analytics

- Merges departmental silos of information across your organization
- Permits linking and processing of massive amounts of data for real-time predictive analytics across the supply chain
- Incorporates real-time external data into the predictive models

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The Amazon Supply Chain

http://www.youtube.com/watch?v=HA_gwzx39LQ\

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Supply Chain Analytics at TESCO

- Worked with Dunnhumby – the "Customer Science company," to
  - Eliminate waste
  - Optimize promotions
  - Minimize stock outs and markdowns by matching inventory with changes in demand
- Millions of £ in savings

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Supply Chain Analytics at TESCO

- Predictive Supply Chain Analytics:
  - Incorporated external weather data in predictive demand and inventory models
  - Hot weather ➔ increased sales
    - Barbeque Meat
  - Cold Weather ➔ increased sales
    - Cat Litter
  - Pattern Recognition
    - Increased sales in barbeque-meat-related products when warm weather follows a cold snap
    - Reduced stock outs of fair weather items by 400%

BIG ORANGE BIG IDEAS

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Supply Chain Analytics at TESCO

- Analytics to predict impact of promotions
  - To minimize stockouts and markdowns associated with promotions
    - Non-perishable Items: Buy One, Get One Free (BYGO) outperforms a "50% Off" promotion
    - Produce: "50% Off" promotion outperforms BYGO

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Predictive Supply Chain Analytics at Autometrics

- Autometrics Demand Sensing.
  - Gathers data from 150 different 3rd-party automobile sales websites
- Incorporates the data in a predictive model to more accurately predict automobile demand information that Autometrics sells to auto manufacturers

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Predictive Supply Chain Analytics at Autometrics

- Traditional Forecasting: Projects future behavior based solely on past behavior and data
- Demand Sensing: A new forecasting methodology that incorporates a broader range of demand signals in as near real-time as possible.
  - Demand Sensing: Adds information in the form of real-time events such as weather changes, changes in consumer buying behavior, social network sentiment, and POS data.

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Predictive Supply Chain Analytics at Autometrics

- Automotive Manufacturers can incorporate Sales, Marketing, and Supply Chain data into its forecasting models
- Better understand effectiveness of Marketing and Sales promotions to improve Production and Inventory decisions:
  - Does the plant add another shift?
  - Does it make a change in the product mix?

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Demand Sensing at Nestle Foods to Reduce Supply Chain Costs

- Direct store delivery business: Ice cream and Pizza
  - Promotions driven
  - Predicting success of promotions critical
  - Integrated own data across functional areas of marketing, sales and supply chain into a model to predict success of store promotions
- Results: Reduced inventory, storage, and freight costs

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Supply Chain Analytics at L'Oreal

- Goal: Strip out excess inventories and excess lead times that currently buffer against uncertainty, absent any shared information.
  - System will connect production and planning systems at 42 L'Oreal factories with thousands of its suppliers

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Supply Chain Analytics at L'Oreal

- Goal: "Real-time sharing of forecasting and planning data . . . to react more quickly to changes in the Company's Fast-moving Consumer Goods marketplace"
- Step 1 for L'Oreal: Integrate data across all organizations and business units
- Step 2 for L'Oreal: Develop analytic models to improve supply chain performance

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Supply Chain Analytics in Your Company?

- Are you using Supply Chain Analytics in your organization? If so, where are you along the continuum?
  - Descriptive Models in the form of reports?
  - Predictive Models?
  - Prescriptive Models to recommend optimal solutions to supply chain problems?

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Supply Chain Analytics at Your Company?

- Biggest potential benefit from Supply Chain Analytics in your organization?
  - Issues?
- Demand Sensing Forecasting Models?
  - Issues and challenges?
  - Areas best suited for applying demand sensing forecasting models?
  - Biggest potential benefit from demand sensing forecasting models?

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Supply Chain Analytics in Your Company?

- Where does your data reside - in independent silos or in a shared integrated data management system?
  - Issues and challenges?
- What are your plans to integrate the data across your organization? With suppliers and customers?
  - Issues and challenges?

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