Supply Chain 2.0:
Managing Supply Chain Complexity in an Age of Uncertainty

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Agenda

- Supply chain management: time for a re-think?
- Volatility and turbulence become the norm
- The impact of complexity on supply chain performance
- Supply Chain 2.0: the search for structural flexibility
“Through our study of firms in a variety of industries...we found that the traditional approach of seeking trade-offs among the various conflicting objectives of key functions – purchasing, production, distribution and sales – along the supply chain no longer worked very well. We needed a new perspective and, following from it, a new approach: **Supply-chain management.**”

R.K. Oliver & M.D. Webber

“Supply-chain management: logistics catches up with strategy”

*Outlook*, 1982

Picture source: http://www.cargo-express.co.uk/logistics_supply_chain_management.htm
The World in 1982

- The Commodore 64 8-bit personal computer is launched
- Michael Jackson releases *Thriller* - the biggest selling album of all time
- Yuri Andropov replaces Leonid Brezhnev as head of Soviet Union
- The first compact discs appear
- Epcot Centre opens in Florida
Volatility Index

List of constituents: EUR/GBP (WMR&DS) exchange rate; USD/GBP (WMR&DS) exchange rate; Crude Oil Brent FOB US/BBL; Gold Bullion LBM US/Troy Ounce; LME-Copper, Grade A 3 Month £/MT; UK Clearing Banks Base Rate - middle rate; VIX from 1986; Baltic Dry Index from 1985

Source: Datastream; EIA (for crude oil data), Chicago Board Options Exchange (for VIX data)
Increasing Supply/Demand Uncertainty

![Graph showing increasing supply/demand uncertainty with quadrants for low and high supply and demand uncertainty. The graph has a diagonal line indicating an increase in uncertainty.]
Conventional supply chain design

- Based on conditions of relative stability
- Designed to optimise production flows
- Often based on ‘lean’ thinking
- Network optimisation based on cost rather than responsiveness
The Supply Chain’s Centre of Gravity is Shifting

**Supply Side Vectors**
- Labour Costs
- Materials and resource availability
- Skills
- Transport Costs

**Demand Side Vectors**
- Changing demographics
- Disposable Income
- Changing consumer preferences
- Industry development

Picture source: http://www.troyrawlings.com/images/scales_20of_20justice.jpg
Complexity impedes agility

- One of the biggest barriers to improving agility in the supply chain is complexity.

- Complexity is also one of the major drivers of cost in the end-to-end supply chain.

- Supply chain managers must become ‘complexity Masters’ if the goal is to enhance agility at less cost.
Complexity in the global supply chain: the Boeing 787

THE COMPANIES

U.S.
- Boeing
- Spirit
- Vought
- GE
- Goodrich

CANADA
- Boeing

AUSTRALIA
- Boeing

JAPAN
- Kawasaki
- Mitsubishi
- Fuji

KOREA
- KAL-ASD

EUROPE
- Messier-Dowty
- Rolls-Royce
- Latcoeré
- Alenia
- Saab

WING TIPS
- Korea

MOVABLE TRAILING EDGE
- Australia

TAIL FIN
- Fredrickson, Washington

HORIZONTAL STABILIZER
- Foggia, Italy

AFT FUSELAGE
- Charleston, S.C.

WING
- Nagoya, Japan

NAGoya, Japan

FIXED TRAILING EDGE
- Nagoya, Japan

WING NACELLES
- Chula Vista, CA

CENTER FUSELAGE
- Grottaglie, Italy

FORWARD FUSELAGE
- Wichita, Kansas

CARGO/ACCESS DOORS
- Sweden

WING/BODY FAIRING
- Winnipeg, Canada

LANDING GEAR DOORS
- GE-Evendale, Ohio
- Rolls-Royce-Derby, UK

FIXED AND MOVABLE LEADING EDGE
- Tulsa, Oklahoma

MAIN LANDING GEAR WHEEL WELL
- Nagoya, Japan

CENTER WING BOX
- Nagoya, Japan

LANDING GEAR
- Gloucester, UK
Seven types of supply chain complexity

- Network complexity e.g. too many nodes and links
- Process complexity e.g. too many steps
- Range complexity e.g. too wide a range
- Product complexity e.g. too many unique components
- Customer complexity e.g. too many service options
- Supplier complexity e.g. too many suppliers
- Organisational complexity e.g. too many levels and ‘silos’
Coping with supply chain complexity

- Deep customer insight to identify the things that customers value - the ‘order winning criteria’

- Supply chain processes must align with the value proposition

- Eliminate the complexity that customers will not pay for

- Exploit the complexity that customers value but seek to minimise the costs involved

- Use appropriate KPIs to ensure that complexity is a business priority
**Dynamic flexibility** is a reflection of the agility of the supply chain, particularly its ability to respond rapidly to variations in volume and mix.

**Structural flexibility** is the ability of the supply chain to adapt to fundamental change, e.g. if the ‘centre of gravity’ of the supply chain changes, can the system change?
Moving from dynamic to structural flexibility

- **Efficient Supply Chain**
- **Adaptable Supply Chain**
- **Traditional Supply Chain**

Dynamic Flexibility

- Low
- High

Structural Flexibility

- Low
- High
Gaining structural flexibility

- Investigate ‘local-for-local’ alternative to global sourcing and centralised manufacturing

- Focus on the ‘economies of scope’ rather than the ‘economies of scale’

- Create ‘bandwidth’ through asset sharing, e.g. capacity and inventory

- Adopt a ‘real options’ approach to supply chain decision making
Changing business models

• From vertical to virtual
• From stand-alone to network competition
• From lean to agile to ‘leagile’
• From dynamic to structural flexibility