

# LECTURE 02: SUPPLY CHAIN PERSPECTIVE AND STRATEGY

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# OUTLINE

- 1 PERSPECTIVES IN SUPPLY CHAIN MANAGEMENT
- 2 SUPPLY CHAIN OPERATION REFERENCE MODEL
- 3 SUPPLY CHAIN STRATEGY
- 4 STRATEGIC FIT AND SUPPLY CHAIN STRATEGY
- 5 SUPPLY CHAIN PERFORMANCE MATRIC
- 6 INFORMATION AND BULLWHIP EFFECT

General Reference: [?] [?] [?] [?]

# SCM DEVELOPMENT TIME LINE



## Basic Transportation

- 1970s
- cost-service focus
- paper
- month
- leveraging



## Emerging Logistics

- 1980s
- cost@quality
- Barcode/LAN
- week
- partnering LSP, KPI, branding



## World-Class SCM

- 1990s-2000s
- core competency
- ERP/internet
- day
- global, mix mode relationship, agile

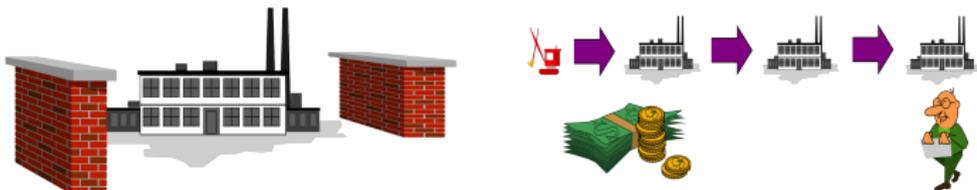


## Collaborative Demand Network

- 2000s-present
- platform/ on-live
- mobile/5G/ data
- hour
- meme/ lagile

source: Mamun Habib. "Supply Chain Management-Applications and Simulations"

# CHANGING VIEW OF COMPANY



	Traditional	Value creation
<b>Parties</b>	one company	every companies
<b>Concept</b>	winner takes all	focus on my 'things'
<b>Lv Decision</b>	operation	strategic
<b>Values</b>	cost	revenue stream
		, engagement, equity
<b>Tools</b>	price & quality	speed & information

## QUESTION 1

Do your customers care? If not, why bother?

**Effect:** cost-availability, reliability-flexibility, quality, convenience, fluctuation

# FOR CUSTOMER, SUPPLY CHAIN IS

Goals of Supply Chain is to ensure that **customers** got

- the right **item** (national VS store brands)
- in the right **quantity** (EA VS DOZEN)
- at the right **price** (7Eleven VS Makro)
- at the right **place** (ENG canteen VS Airport)
- at the right **time** (iPhone Camping)
- in the right **condition** (edible gelatine VS photo gelatine)
- at the optimum cost to the **organization(s)**

source: CSCMP, "SCM Goals – The Seven Rights" 2011

# OTHER PERSPECTIVE OF SCM

**FLOWS:** movement of 'things' along SC (traditional views)

	Upstream	Downstream
<b>Materials:</b>	return, repair, disposal	RM, WIP, FG
<b>Information:</b>	sales, promotion plan	capacity, delivery schedule
<b>Funds/Values:</b>	payment, consignment	credit, invoice, payment

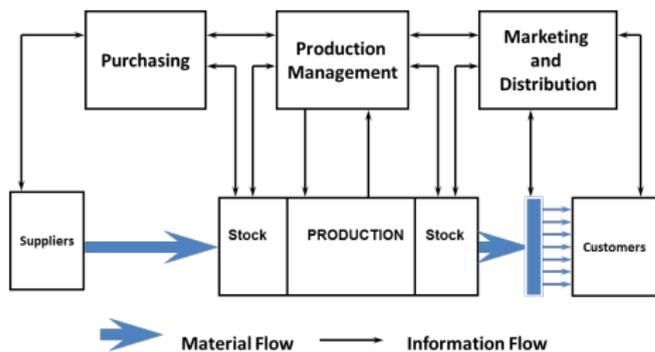
**PROCESS:** supply chain activity repeats itself (system views)

- **Cycle order:** process in SC as series of cycles each performed by interfaced parties
- **Push/Pull:** processes in SC as responding (**pull**) or in anticipating (**push**) to order

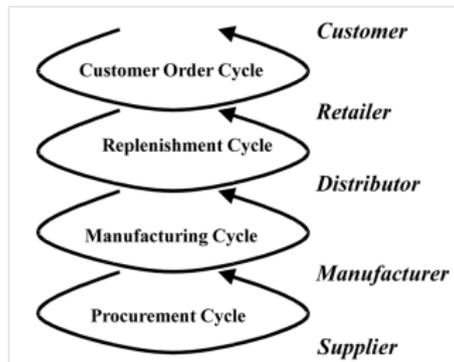
**SCOR:** supply chain activity can be grouped by business function

- standardizing & combining flow and process
- introducing KPIs
- allowing benchmark between companies

# CYCLE OR PROCESS PERSPECTIVE



source: Martin Christopher, 2011 [?]



source: Chopra and Meindl 2010 [?]

## QUESTION 2

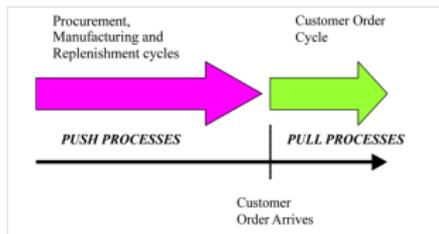
What are triggers/information of these processes?

# PRODUCTION/INVENTORY SYSTEMS

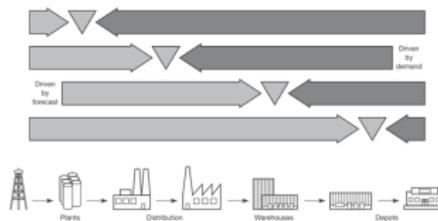
	Push	Pull
Shipment	large & infrequent	small & frequent
Suppliers	many & short term	few & long term
Information	minimal exchange	constant exchange
Geographic	unimportant	adjacent
Application	MRP	JIT

## Assembly Line Simulation

# PUSH/PULL PERSPECTIVE



source: Chopra and Meindl 2010 [?]



source: Martin Christopher, 2011 [?]

## QUESTION 3: THINKING POINTS

What are good characteristics of push (pull) products? and How to leverage?



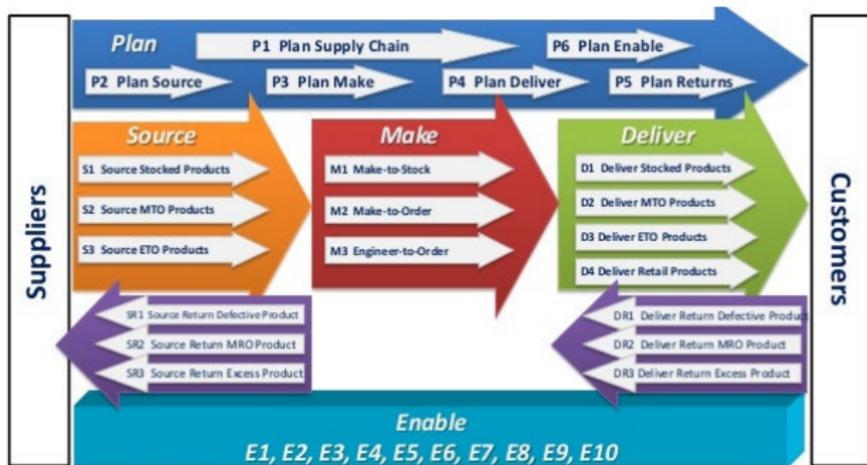
# OVERVIEW OF SCOR MODEL



source: Cohen, S. and Roussel, J 2001. "Strategic Supply Chain Management"

- **What:** hierarchy business process framework
- **Scopes:** all customer's interaction, product transactions, market interactions
- **Benefit:** std process, best practice, matrices for benchmark,
- **Issues:** no details operation, ignored sale and markets, R&D

# SCOR MODEL: SEMI-PERFECT CONCEPT



source: Cohen, S. and Roussel, J 2001. "Strategic Supply Chain Management"

- **Lv1: Model** set scope, content, performance, product-segment
- **Lv2: Strategy** decide configuration, i.e., strategy, capability
- **Lv3: Process** identify key business process, i.e., input, output, best practice
- **Lv4: Activity** improve activates using lean, TQM, benchmark

# SCOR MODEL Lv 1 METRIC

Performance Attribute	Level-1 Strategic Metric
Reliability	<ul style="list-style-type: none"> <li>• Perfect Order Fulfillment (RL.1.1)</li> </ul>
Responsiveness	<ul style="list-style-type: none"> <li>• Order Fulfillment Cycle Time (RS.1.1)</li> </ul>
Agility	<ul style="list-style-type: none"> <li>• Upside Supply Chain Adaptability (AG.1.1)</li> <li>• Downside Supply Chain Adaptability (AG.1.2)</li> <li>• Overall Value at Risk (AG.1.3)</li> </ul>
Cost	<ul style="list-style-type: none"> <li>• Total Supply Chain Management Costs (CO.1.1)</li> <li>• Cost of Goods Sold (COGS) (CO.1.2)</li> </ul>
Asset Management Efficiency	<ul style="list-style-type: none"> <li>• Cash-to-Cash Cycle Time (AM.1.1)</li> <li>• Return on Supply Chain Fixed Assets (AM.1.2)</li> <li>• Return on Working Capital (AM.1.3)</li> </ul>

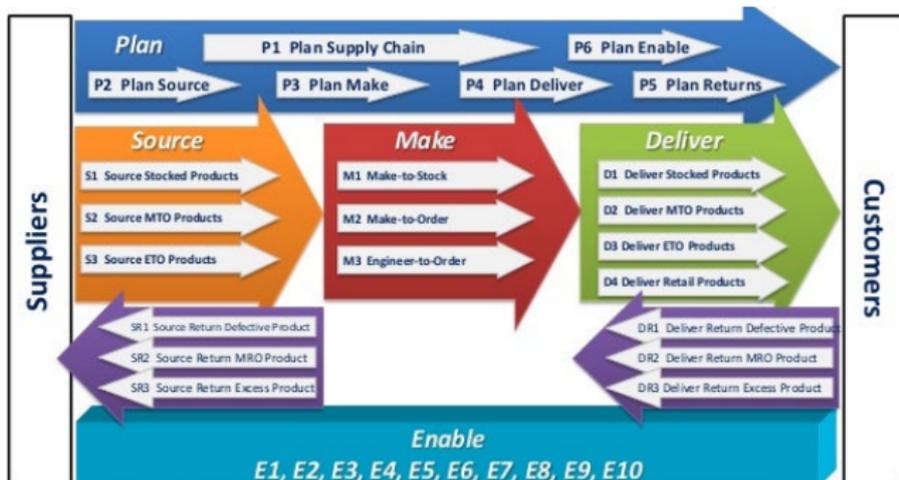
source: <http://supply-chain.org/scor>

# SCOR MODEL LV 1 SCOPE

- **Plan:** balance aggregate demand and supply → actions
  - assess & acquire **resources** within requirements
  - plan inventory and distribution and communicate plan
- **Source** procure components of goods for planned demands
  - **schedule** deliveries, transfer, contract, payment
  - certify, select & assess suppliers (except ETO)
- **Make:** transform product to a finished goods to meet demands
  - schedule production, resource, & infrastructure
  - cover assemble, repair, overhaul, recycle
- **Deliver:** react, maintenance, and fulfillment of orders
  - validation, consolidate, pick, pack, ship and invoice the ordered quantity
- **Return:** returning or receiving returned products
  - decide to return good & container
  - perform return, substitution, refund, restock
- **Enable:** managerial activities
  - business rules & procurement
  - mgt of performance, resources, data, contracts, network, compliance, risk

source: <http://supply-chain.org/scor>

# SCOR MODEL: LEVEL 2 CONFIG



source: "A review and analysis of supply chain operations reference" [?]

# SCOR LEVEL 3: EXAMPLE AND INSIGHTS

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sP - Plan					sS - Source		
sP1 Plan Supply Chain	sP2 Plan Source	sP3 Plan Make	sP4 Plan Deliver	sP5 Plan Return	sS1 Source Stocked Product	sS2 Source Make-to-Order Product	sS3 Source Engineer-to-Order Product
<p><b>sP1.1:</b> Identify, Prioritize and Aggregate Supply Chain Requirements</p> <p><b>sP1.2:</b> Identify, Prioritize and Aggregate Supply Chain Resources</p> <p><b>sP1.3:</b> Balance Supply Chain Resources with SC Requirements</p> <p><b>sP1.4:</b> Establish and Communicate Supply Chain Plans</p>	<p><b>sP2.1:</b> Identify, Prioritize and Aggregate Product Requirements</p> <p><b>sP2.2:</b> Identify, Assess and Aggregate Product Resources</p> <p><b>sP2.3:</b> Balance Product Resources with Product Requirements</p> <p><b>sP2.4:</b> Establish Sourcing Plans</p>	<p><b>sP3.1:</b> Identify, Prioritize and Aggregate Production Requirements</p> <p><b>sP3.2:</b> Identify, Assess and Aggregate Production Resources</p> <p><b>sP3.3:</b> Balance Production Resources with Production Requirements</p> <p><b>sP3.4:</b> Establish Production Plans</p>	<p><b>sP4.1:</b> Identify, Prioritize and Aggregate Delivery Requirements</p> <p><b>sP4.2:</b> Identify, Assess and Aggregate Delivery Resources</p> <p><b>sP4.3:</b> Balance Delivery Resources and Capabilities with Delivery Requirements</p> <p><b>sP4.4:</b> Establish Delivery Plans</p>	<p><b>sP5.1:</b> Assess and Aggregate Return Requirements</p> <p><b>sP5.2:</b> Identify, Assess and Aggregate Return Resources</p> <p><b>sP5.3:</b> Balance Return Resources with Return Requirements</p> <p><b>sP5.4:</b> Establish and Communicate Return Plans</p>	<p><b>sS1.1:</b> Schedule Product Deliveries</p> <p><b>sS1.2:</b> Receive Product</p> <p><b>sS1.3:</b> Verify Product</p> <p><b>sS1.4:</b> Transfer Product</p> <p><b>sS1.5:</b> Authorize Supplier Payment</p>	<p><b>sS2.1:</b> Schedule Product Deliveries</p> <p><b>sS2.2:</b> Receive Product</p> <p><b>sS2.3:</b> Verify Product</p> <p><b>sS2.4:</b> Transfer Product</p> <p><b>sS2.5:</b> Authorize Supplier Payment</p>	<p><b>sS3.1:</b> Identify Sources of Supply</p> <p><b>sS3.2:</b> Select Final Supplier and Negotiate</p> <p><b>sS3.3:</b> Schedule Product Deliveries</p> <p><b>sS3.4:</b> Receive Product</p> <p><b>sS3.5:</b> Verify Product</p> <p><b>sS3.6:</b> Transfer Product</p> <p><b>sS3.7:</b> Authorize Supplier Payment</p>

- **Plan:** requirements  $\pm \approx \pm$  resources  $\rightarrow$  plan
- **Source**<sub>ETO</sub> = Source<sub>MTO</sub> + identify + select supplier
- **Delivery**<sub>ETO</sub>  $\approx$  Delivery<sub>MTO</sub> w/ negotiation + sch. installation
- **Return**<sub>src</sub> = Return<sub>dvy</sub> + identify + disposition - transfer

# HOW A COMPANY COMPETE WITH OTHERS?

- **Price** : Wal-mart, Big Cola, Daiso
- **Agility & Responsive**: Zara, Dell, JAL (on time)
- **Superb Quality**: Leica, Louis Vuitton
- **Innovation & Flexibility**: Apple, Intel
- **Convenience & Presence**: 7-Eleven, Starbucks, McDonald
- **Service & Coverage**: 3M, AIS, Facebook, CitiBank, IG

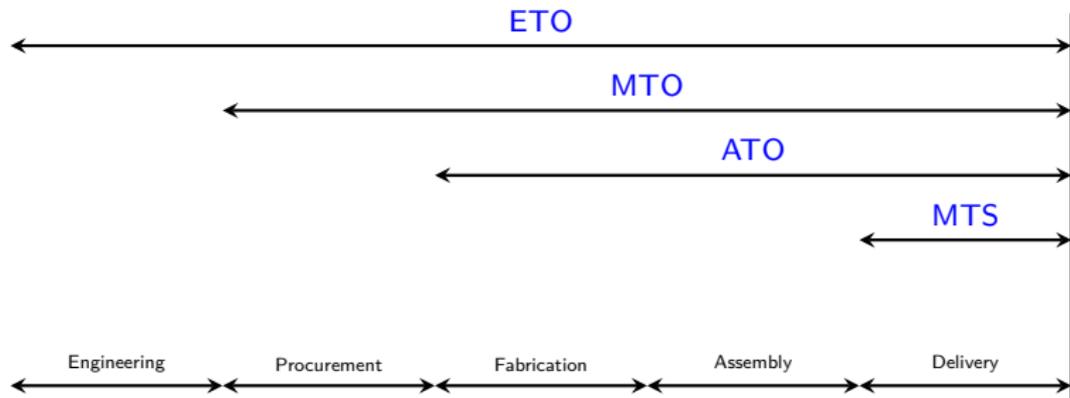
What are strategic components to compete?

# UNDERSTANDING STRATEGIC COMPONENTS

- **Operation strategy:** how to produce goods and services?
- **Outsourcing strategy:** how to get products and services to buyers/  
consumers? Pg:Outsourcing
- **Channel strategy:** what are in-house skills and expertise? Pg:Channel & Service
- **Customer service strategy:** what are customer's needs and how to turn  
into profits ? Pg:Channel & Service
- **Asset network:** what are organization of resources? Pg:Asset

source: Cohen, S. and Roussel, J 2001. "Strategic Supply Chain Management"

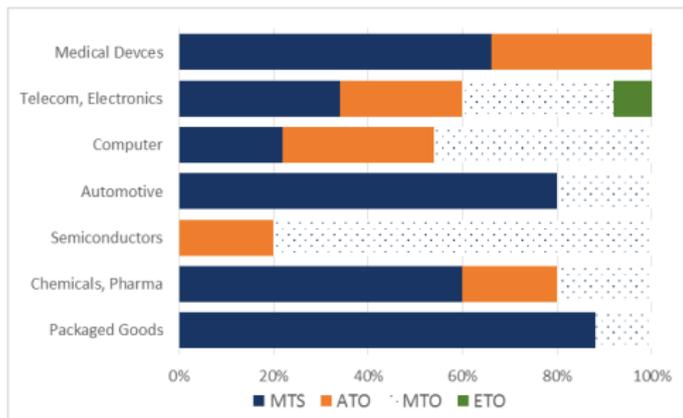
# OPERATION STRATEGY



source: Jacob and Chase 2010 [?].

- **ETO:** work with the customer to design and then make the product
- **MTO:** make the customer's product from raw mat'
- **ATO:** combine a number of preassembled modules to meet customer's specifications
- **MTS:** serve customers from finished goods inventory

# WHICH OPERATION STRATEGY?



source: Performance Measurement Group, 2004

Type	Condition	Key benefits
MTS	standard product w/ <b>high volume</b>	cost & response
ATO	product w/ <b>high variation</b>	reduce inventory
MTO	customized or infrequent demand product	low FG, many option
ETO	complex product w/ <b>unique customer</b>	response to requirement

# OUTSOURCING STRATEGY

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benefit	concern
ramp-up/down (scope/scale)	balancing value & power
flexibility	culture & execute
focus on core	proprietary

Every company eventually needs profit

SHOULD YOU OUTSOURCE?

- What give you competitive advantage (rolex, cisco)?
- What is your capability when fluctuation?
- What is your internal uniqueness of business process (BTV)?
- What is your power to negotiate (blink)?

Pg:Strategic Components

# CUSTOMER SERV. & CHANNEL STRATEGY

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WHAT ARE SUITABLE CHANNELS?

- Who is a targeted customer?
- What are costs and value of sale?
- What are channel partners should we have?

## ASSET NETWORK

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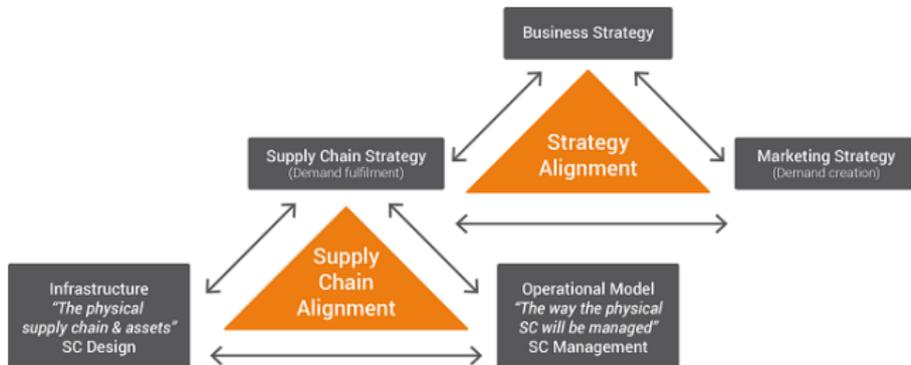
เกิดขึ้นในไทย และต่างประเทศ	เกิดขึ้นในไทย					เกิดขึ้นในไทย และต่างประเทศ	
	← อุตสาหกรรมต้นน้ำ →		← อุตสาหกรรมกลางน้ำ →			← อุตสาหกรรมปลายน้ำ →	
การวิจัยและ พัฒนา การ ออกแบบ ผลิตภัณฑ์	การผลิตชิ้นส่วน ขั้นพื้นฐาน	การผลิตชิ้น ส่วนย่อยหรือ ระบบย่อย	การผลิตชิ้นส่วน ระบบหลักเพื่อ ป้อนโรงงาน ประกอบรถยนต์	การประกอบ รถยนต์	การกระจาย สินค้าใน ประเทศและการ ส่งออก	การค้าปลีก	บริการหลังการ ขาย
บริษัทผู้ประกอบ รถยนต์	ผู้ผลิตในระดับ Third-tier  <u>กิจกรรมสนับสนุน</u> - วัสดุขั้นพื้นฐาน เช่น เหล็ก กระดาษ พลาสติก เครื่องมือ ซีโรคม - เครื่องมือเครื่องจักร - โลจิสติกส์	ผู้ผลิตในระดับ Second-tier  <u>กิจกรรมสนับสนุน</u> - เครื่องมือเครื่องจักร - โลจิสติกส์	ผู้ผลิตในระดับ First-tier  <u>กิจกรรมสนับสนุน</u> - เครื่องมือเครื่องจักร - โลจิสติกส์	บริษัทผู้ประกอบ รถยนต์	บริษัทผู้ประกอบ รถยนต์ตัวแทน จำหน่าย  <u>กิจกรรมสนับสนุน</u> - การส่งออก - การประกันภัย - โลจิสติกส์	บริษัทผู้ประกอบ รถยนต์ตัวแทน จำหน่าย  <u>กิจกรรมสนับสนุน</u> - สถาบันการเงิน	ศูนย์บริการผู้ซ่อม  <u>กิจกรรมสนับสนุน</u> - ประกันภัย - สถาบันการเงิน - อุปกรณ์อะไหล่ยนต์ - อะไหล่และชิ้นส่วน - ซ่อมบำรุง

ที่มา: สถาบันระหว่างประเทศเพื่อการค้าและการพัฒนา (2553)

## GEOGRAPHY OF ASSET NETWORK: why multiple locations?

- **Global model** collaborate components , capital investment (intel)
- **Regional model:** trade agreement (Asian Auto)
- **Country model:** language, local content (TH Auto)

# STRATEGIC ALIGNMENTS



- **Business strategy:** how to win customers & make money
- **Marketing strategy:** what is positioning of market and product
- **Supply chain strategy:** mean to fulfill customer's need

# ALIGNMENT OF SC AND BUSINESS STRATEGY

<b>Business Strategy</b>	<b>Source of Advantage</b>	<b>Basis of Competition</b>	<b>Key supply chain Contribution</b>
COST	cost-eff. operation & mass	lowest cost & economy of scale	efficient, cost improv risk & global <sup>n</sup>
INNOVATION	brand, tech & niche	hype, desirable, & innovative	time2market, volume & manuf flex
SERVICE	superb service	fitted with need & after sale	designed for customer & network
QUALITY	safest & reliable	always work & durable	SC excellence, QC & source
AGILE	speed & flex	responsive	locations, mode & sync

source: Johnson, M. and Stevens, G. "Integrating the Supply Chain... 25 years on"

# CATEGORY AND EXAMPLES OF SC STRATEGY

- **Structure:** vertical integr<sup>n</sup>, horizontal integr<sup>n</sup>, virtual integr<sup>n</sup>, collaborative,
- **Competitive Advantage:** low cost, differentiation
- **Market:** board, focus, best-value, platform, collaborative
- **Technology:** ecosystem, data centric, cyber-security, synchronization
- **Resilience:** multi-sourcing, near-shoring, harmonization, sustainability, buffer
- **Manufacturing:** diversification, globalization, localization, standard process

● How to select to achieve **Strategic Fit**? Examples

Pg:SC-Fit

● Is there any simplify or generic supply chain strategy?

Pg:SC-Strategy

# ACHIEVING STRATEGIC FIT

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Alignment between **business strategy** and **supply chain**

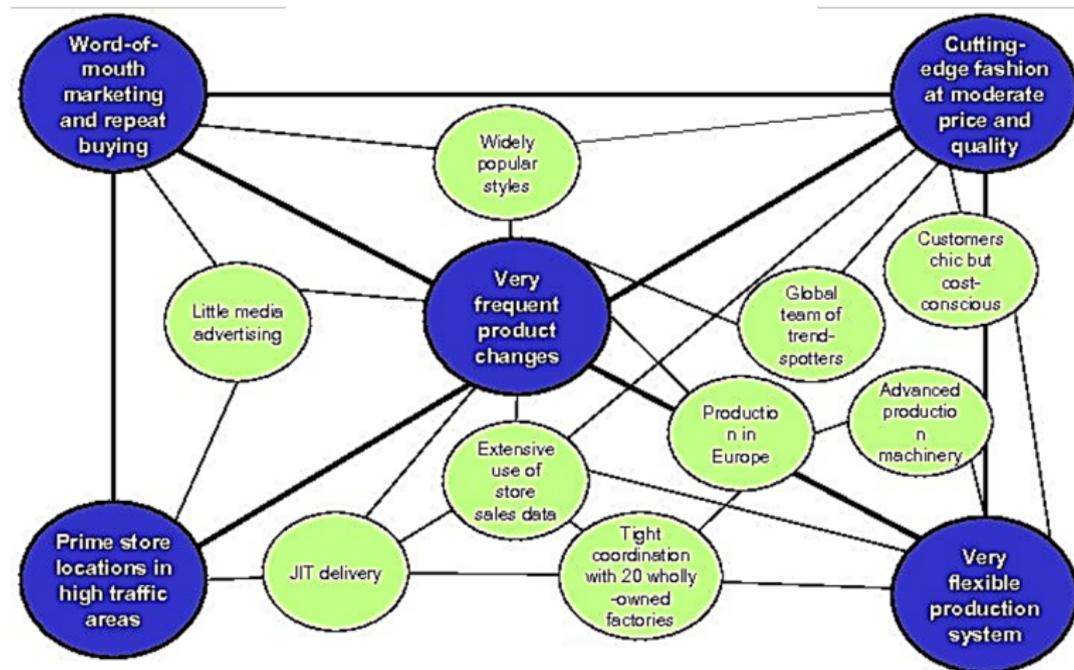
- Understand **nature of business**, i.e., customer, uncertainty, capacity
- Build **sufficient capabilities**,
- Deliver **what customers value**

## EXAMPLES

- **Airline industry:** perishable capacity → dynamic price & channels
- **Automotive industry:** variation, regulation, → JIT, module
- **Consumer electronic industry:** innovation, short life cycle → roll-out, leased capacity
- **Retail industry:** price & availability → single DCs & online, house brand

# MORE EXAMPLES OF STRATEGIC FIT

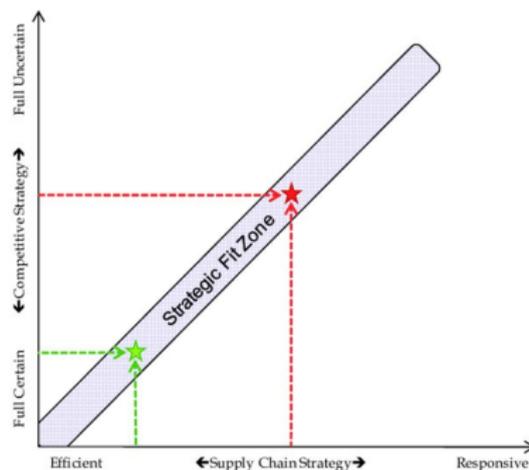
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source: Porter, M.

# OBSTACLES TO STRATEGIC FIT

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source: Chopra and Meindl 2010 [?]

- **Business Nature:** variability (GM, FMCG), new feature (phone)
- **Fragmentation:** many ownership, too much outsourcing e.g., K-Mart
- **Globalization:** price, regulation, e.g., clothes
- **Business environment:** tech, e.g., internet, EV

# UNDERSTANDING DEMAND AND SUPPLY

Demand

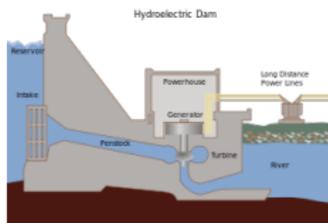


functional products

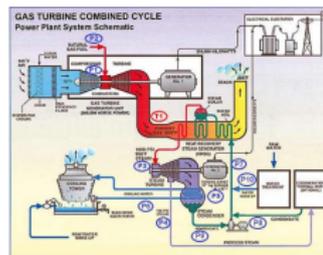


innovative products

Supply



stable processes



evolving processes

## QUESTION 4

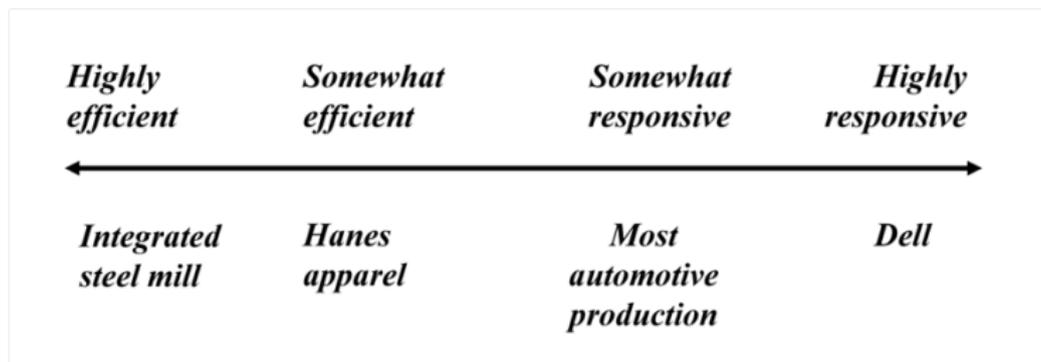
- What are characteristics of **functional products** and **innovative products**
- What are characteristics of **stable processes** and **evolving processes**

# UNCERTAINTY MATRIX

		Demand Fluctuation	
		<i>Functional</i>	<i>Innovative</i>
Supply Processes	<i>Stable</i>	oil, gas, food basic clothes	fashion apparel, computer, music
	<i>Evolve</i>	hydro electric, some food	telecommunication iPhone, iPad, CPU

source: "Aligning Supply Chain Strategies with Product Uncertainties". Lee, H.L. 2002 [?]  
"Introduction to Supply Chain Management". Raz, Gal 2009

# SUPPLY CHAIN CAPABILITY



source: Chopra and Meindl 2010 [?]

- **Efficient/Lean:** lean & cost driven, e.g. grocery
- **Responsive:** flexible and tailor to needs of customer, e.g. fashion apparel
- **Risk-Hedging:** pooling and sharing resources with alternative sources, e.g. hydro-power
- **Agile:** combining responsive and risk hedging, e.g. high tech, telecom (react & quick execute)

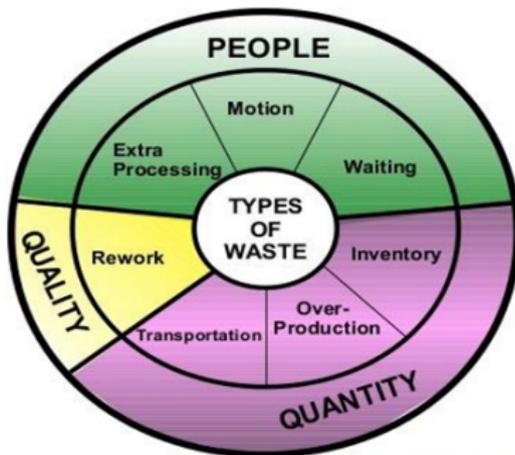
# LEAN SC VS AGILE SC



source: Chopra and Meindl 2010 [?]

	Lean SC	Agile SC
product	community	fashion
cust.driver	cost	other
profit margin	low	high
main cost	operation	marketing

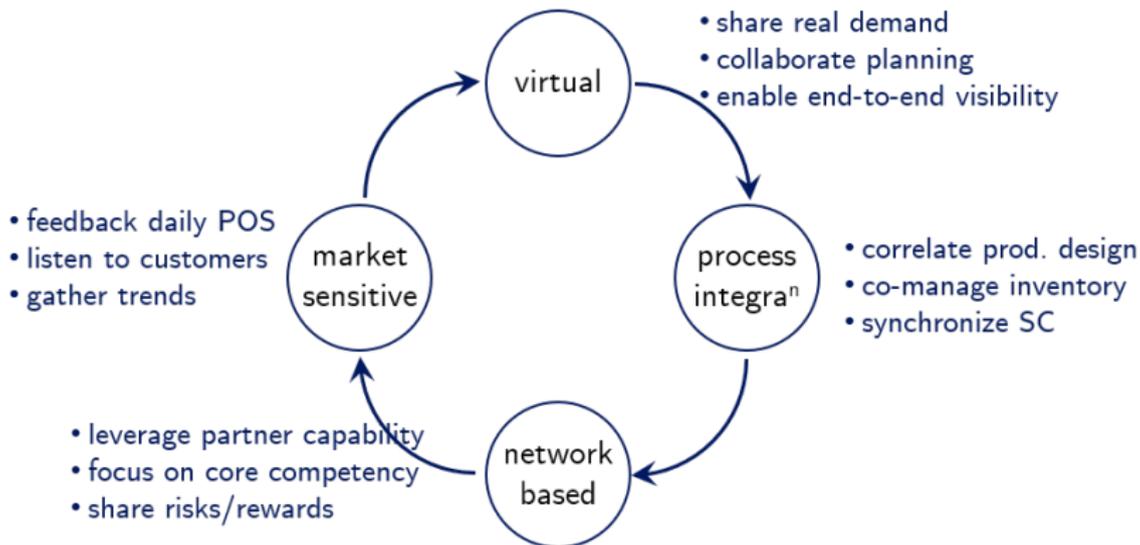
# PRINCIPLES OF LEAN SUPPLY CHAIN



source: Chopra and Meindl 2010 [?]

- **Principle:** eliminating wastes by marginal gain, bottom up, training
- **7Wastes:** TIM WOOD B.
- **Basic:** 5S, layout, work procedure with visual,
- **Adv.** value stream mapping, reducing batch size & # suppliers
- **Logistics:** crossdock, back haul, postponement

# PRINCIPLES OF AGILE SUPPLY CHAIN



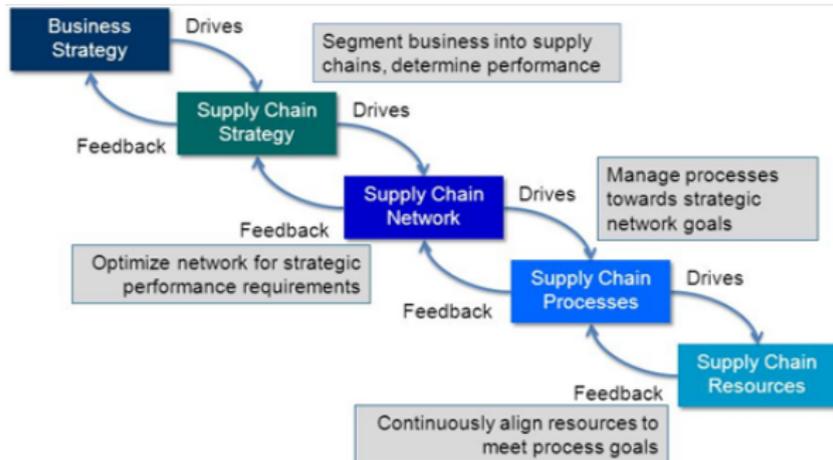
source: Chopra and Meindl 2010 [?]

- **What:** rapidly response to **unpredictable market demand** driven by innovation
- **Scope:** extend **end-to-end** of supply chain

# SCM: STRATEGIC COST MANAGEMENT

*If you can not measure it, you can not improve it.*

source: William Thomson (Lord Kelvin)



# PERFORMANCE MATRIX

## PERSPECTIVE

- **Customer Service:** indicator of ability to meet **customers** timely needs and create values
- **Operational:** indicator of **processes** and **decisions** to meet customer expectations
- **Financial:** indicator of value creation for **shareholders**

## DIMENSIONS

- **Cost:** **capital** required to meet expected process and operation
- **Responsiveness /Time:** speed in which expectations is met
- **Reliability:** trust/**quality** of service and accuracy of information
- **Agility:** ability and flexibility to **respond to external** influences
- **Asset Management Efficiency:** ability to efficiently utilize **assets**

# IMPORTANCE PERFORMANCE MEASURE

Discuss the following popular SCM indicators in terms of perspective and dimension

- inventory day
- cash-to-cash cycle time
- on-time delivery
- return of equity (ROE)
- perfect order fulfillment
- forecasting accuracy
- overall value at risk
- order fulfillment lead time
- rate of good return
- $\frac{\text{logistic cost}}{\text{cost of good sold}}$

Elaborate activities or department effected by these indicators

## QUESTION 5

- Elaborate activities or department effected by these indicators
- How should we improve SC of our company?

Pg:Design Improve

# BENEFITS OF PERFORMANCE MEASURE

- **Learning:** comparing and evaluating an organization **internally**
- **Coordination:** indicating 'weak' points and **re-allocate resources**
- **Motivation & Goal:** communicating business strategy to operational **goal**
- **Benchmark:** comparing 'our' performance and adopting **best practice**

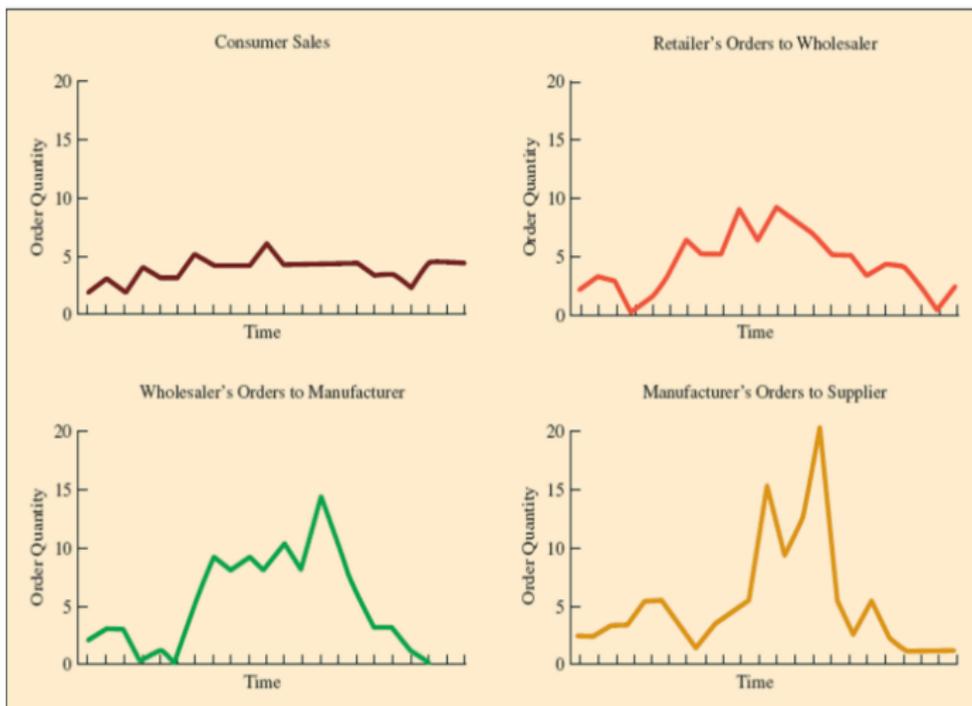
## OKC'S NOTE ON MEASUREMENT

- **Measuring = Non-Value Added:** require **time**, effort, **tool**, revision
- **Measuring → Action:** aware of top-down (econ<sub>K9</sub>, art), find **conflicts**
- **RE-Method in Business:** KPI VS Balance Scorecard VS OKR

# BULLWHIP EFFECT

- **What:** **distortion** of **demand information** within SC
- **Nature:** distortion **increases in** higher **upstream** of SC
- **Causes:**
  - Information delay: **uncertainty** in quantities and pattern of demand
  - Length of chain: **aggregated demands** of each party
- **Effects:** inventory (dead stock, backlog), production smoothness, expedition
- **Examples:** Proctor & Gamble (Pampers); HP (printers); Barilla (pasta)
- **Remedy:** coordination (POS, forecasting), shorten SC, volume discount in fixed period

# DEMAND FLUCTUATION



source: Chase and Jacob. 2011.

# ART OF SUPPLY CHAIN IMPROVEMENT

## SUPPLY CHAIN BASIC STEPS

- **[D] Begin with customers:** need of **every customers** (Amazon.com, Zippo.com)
- **[D] Keep SCM simple:** focus on process (i.e., purchase, analyze, transport), not function
- **[I] Measure what important, and improve them:**
- **[I] Build bridge, eliminate wall:** Realtime communication (UF), quantify investment, focus on people

## SUPPLY CHAIN ADVANCE

- **[D] Focus on core, outsource others:**
- **[D] Aware roles change:** technology, opportunity, new comer
- **[D] Catch the vision, map it out:** know critical weak spot/ people, what value created
- **[I] Use Tech. as enabler:**
- **[I] Remind Fair  $\neq$  equal relationship:**

source: Fawcett, S. and Magnan, G. 2004.

# REFERENCE

- [Bal07] Ronald H Ballou.  
The evolution and future of logistics and supply chain management.  
*European Business Review*, 19(4):332–348, 2007.
- [Chr16] Martin Christopher.  
*Logistics & supply chain management*.  
Pearson Higher Ed, 2016.
- [CM07] Sunil Chopra and Peter Meindl.  
*Supply chain management. Strategy, planning & operation*.  
Springer, 2007.
- [Goe11] Marc Goetschalckx.  
*Supply chain engineering*, volume 161.  
Springer, 2011.
- [HSW04] Samuel H Huan, Sunil K Sheoran, and Ge Wang.  
A review and analysis of supply chain operations reference (scor) model.  
*Supply Chain Management: An International Journal*, 9(1):23–29, 2004.
- [JC10] F Robert Jacobs and Richard B Chase.  
*Operations and supply management: The core*.  
McGraw-Hill Irwin New York, NY, 2010.