



COURSE GEST-H-501

LOGISTICS ENGINEERING AND MANAGEMENT

Session n°11

Professor Alassane B. NDIAYE

COURSE PLAN 2024-2025 (*SESSIONS & DATES VIEW*)

- SESSION 01/M: 05/11/2024 – INTRODUCTION + BLOC 1 (THEORY & EXERCISES PLANNING & FORECASTING)
- SESSION 02/M: 09/11/2024 – BLOC 1 (THEORY & EXERCISES PLANNING & FORECASTING)
- SESSION 03/M: 12/11/2024 – BLOC 4 (THEORY & EXERCISES, WAREHOUSING & INVENTORY MANAGEMENT)
- SESSION 04/M: 16/12/2024 – *** BLOC 5 (EXPERT TALK, MAKE) + BLOC 8 (EXPERT TALK, REVERSE) ***
- SESSION 05/T: 19/11/2024 – BLOC 2 (SOURCING) + BLOC 3 (DELIVER)
- SESSION 06/T: 23/11/2024 – BLOC 9 (QUALITY)
- SESSION 07/M: 30/11/2024 – BLOC 6 (THEORY & EXERCISES, LOGISTICS NETWORK MODELLING & PLANNING)
- SESSION 08/M: 03/12/2024 – BLOC 4 (EXPERT TALK, INVENTORY) + BLOC 7 (EXPERT TALK, DISTRIBUTION)
- SESSION 09/M: 07/12/2024 – BLOC 7 (THEORY & EXERCISES, DISTRIBUTION LOGISTICS)
- SESSION 10/M: 10/12/2024 – BLOC 9 (EXPERT TALK, QUALITY)
- **SESSION 11/T: 14/12/2024 – BLOC 10 (SUPPLY CHAIN INTEGRATION) + BLOC 11 (SUPPLY CHAIN STRATEGIES)**
- SESSION 12/T: 17/12/2024 – BLOC 11 (SUPPLY CHAIN STRATEGIES) + BLOC 12 (SUPPLY CHAIN PERFORMANCE)

*** MAY BE CONVERTED TO WRAP-UP SESSION IN JANUARY BEFORE EXAM – (PREPARATION OF THE EXAM)***

BLOC 10:

LOGISTICS INTEGRATION TOWARDS SUPPLY CHAIN



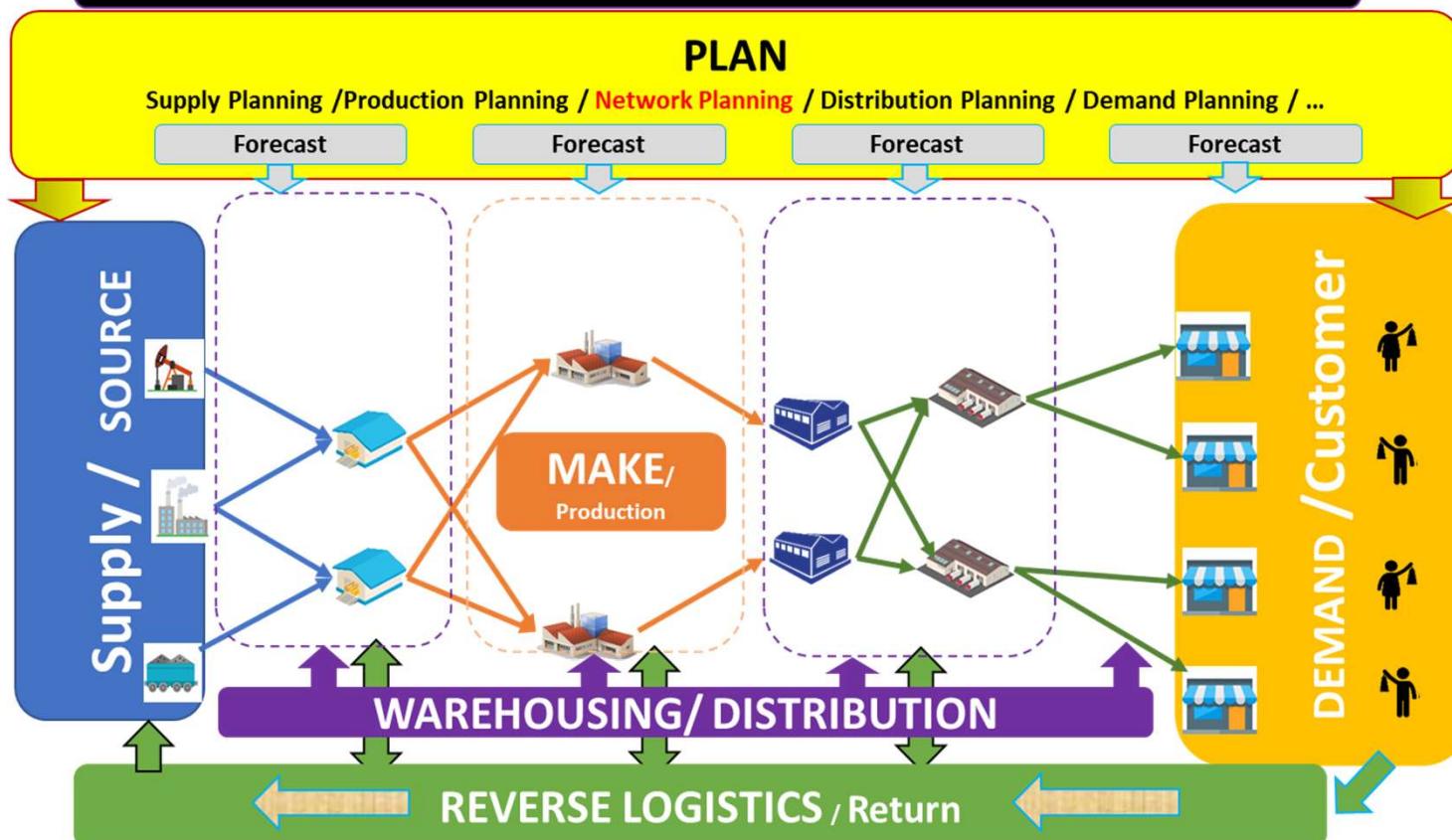
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CONTENT OF BLOC 10

LOGISTICS INTEGRATION TOWARDS SUPPLY CHAIN...

- 1. Integration Principles**
- 2. Measure of Integration: The Maturity Levels**
- 3. Audit of Supply Chain Integration**

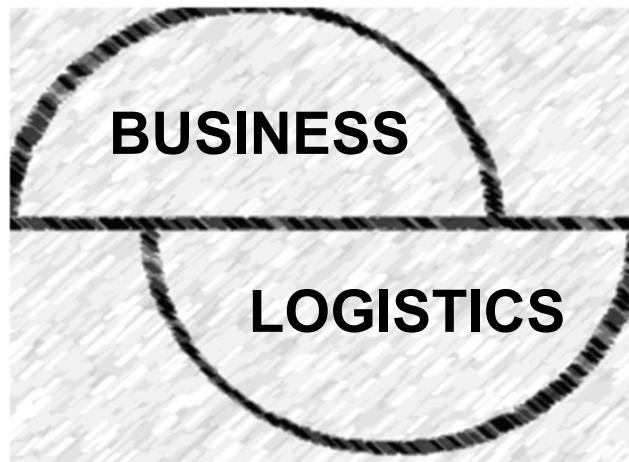
MAIN BLOCS OF LOGISTICS OPERATIONS



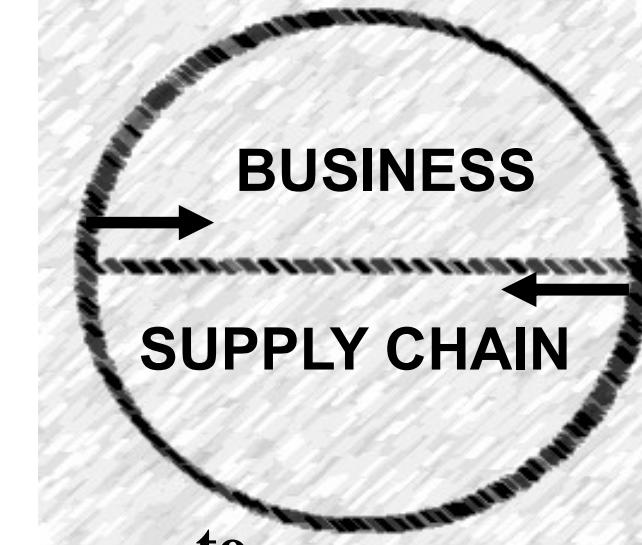
product good
material
finance cash activities
information
strategic value process
internal link service delivery
supplier customer
network demand cost
holistic flows right
integration time relationship
make manufacture

storage warehousing information
origin raw material
product physical service
supplier consumption plan distribution activities
movement transport right customer flow
finished goods management

The breakthrough to be targeted



To go from ...



to ...

A fragmented Logistics
A « Push » Logistics (from operations towards markets)
A monolithic Logistics

An integrated Supply Chain process
A « Pull » Logistics (from markets towards operations)
A differentiated Logistics based on a permanent trade-off process
« service value vs cost »

Logistics Operations: the challenge of optimisation...

Which approach for a better optimisation of logistics operations?

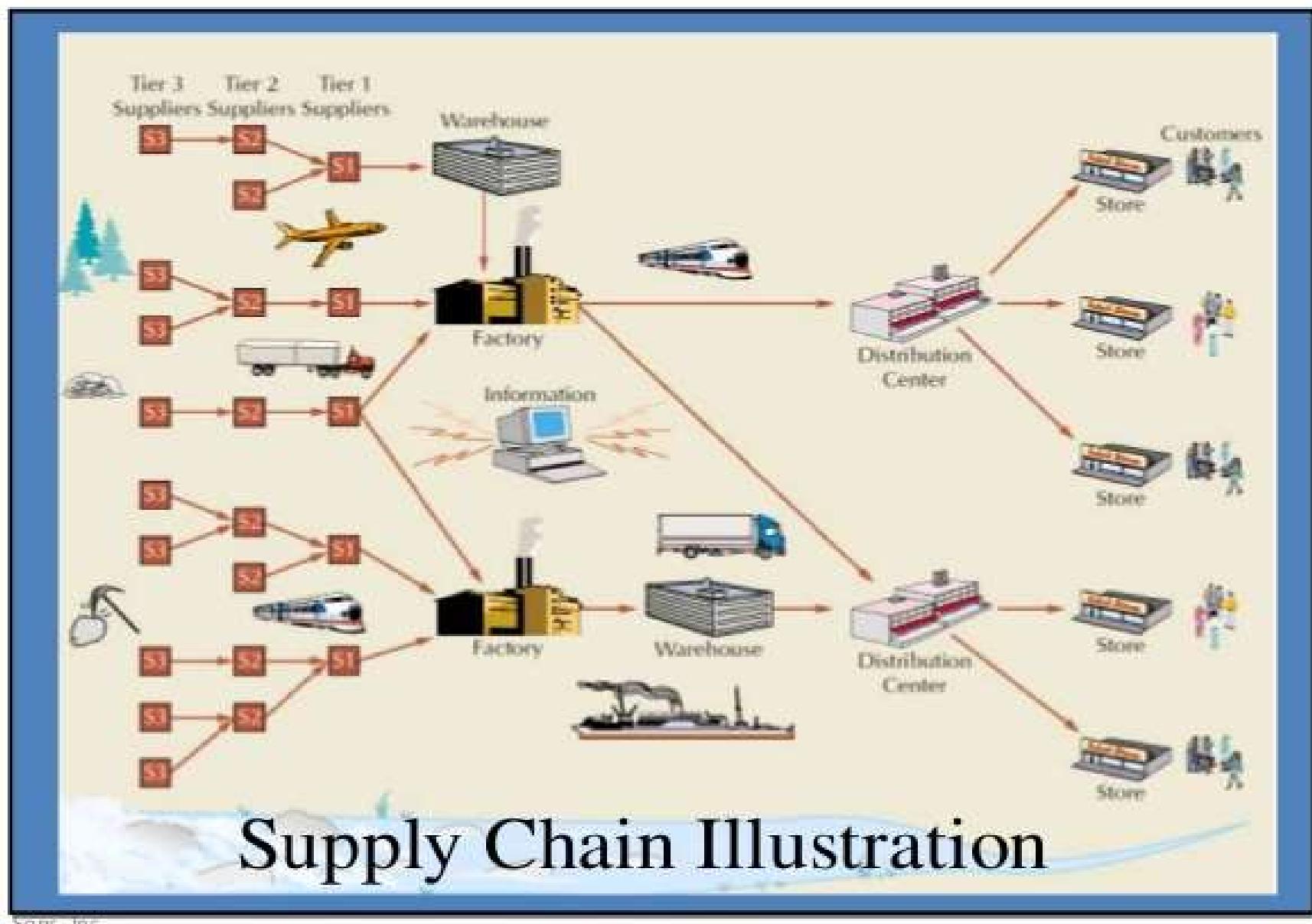
- *Optimise bloc per bloc leads to a high risk of accrual of local fluctuations and uncertainties: ► Bullwhip effect*
- *Optimise all blocs together raises some conceptual and mathematical complexities theoretically tractable but practically disconnected from reality.*
- *Optimise bloc per bloc or all blocs together raises the question of local versus overall performance.*

....Approach MUST target the system as a whole and considers trade-offs...

OBJECTIVE OF INTEGRATION TOWARDS SUPPLY-CHAIN

CONCEPTION AND PILOTAGE OF AN INTEGRATED AND COORDINATED SYSTEM (OF MATERIALS, INFORMATION, PROCESSES, FUNCTIONS AND RESOURCES) WHERE THE PRIORITY IS GIVEN TO THE OVERALL OPTIMAL PERFORMANCE AND NOT TO THE LOCAL OPTIMA .

- ***AN OVERALL OPTIMAL PERFORMANCE IS NOT THE ADDITION OF LOCAL OPTIMA.***
- ***LOCAL OPTIMISATION APPROACHES LEAD TO THE « BULLWHIP EFFECT »***
 - ⇒ ***Accrual of local fluctuations that leads to a final high uncertainty.***



Sons, Inc.

The importance of Supply chain “thinking”:

The adoption of *Supply Chain* thinking involves a move away from the functional stovepipe or silo approach to more seamless configurations. This transition from fragmented to more integrated approaches has been facilitated by a range of **information and communications technology (ICT)** tools that have developed over the years.

[Zhang et al., 2011].

The concept of Supply Chain Management:

Conception and pilotage of an integrated and coordinated system
(of materials, information, processes, functions and resources, etc.)
where the priority is given to the overall optimal performance and
not to the local optima .

Table 1.1. A sample of definitions of supply chain management

Authors	Definition
Oliver and Webber (1982)	Supply chain management covers the flow of goods from supplier through manufacturing and distribution chains to end-user
Jones and Riley (1987)	Supply chain management techniques deal with the planning and control of total materials flow from suppliers through end-users
Ellram (1991)	An integrative approach to dealing with the planning and control of the materials flow from suppliers to end-users
Christopher (1992)	Supply chain management is the management of a network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate consumer
International Center for Competitive Excellence (1994)	Supply chain management is the integration of business processes from end-user through original suppliers that provides products services and information that add value for customers
Harland (1994)	Supply chain management is defined as the management of the flow of goods and services to end customers to satisfy their requirements
Berry <i>et al.</i> (1994) [New and Westbrook, 2004]	Supply chain management aims at building trust, exchanging information on market needs, developing new products, and reducing the supplier base to a particular original equipment manufacturer (OEM) so as to release management resources for developing meaningful, long-term relationships

**Supply Chain Management:
Tentative definitions...**

Table 1.1. A sample of definitions of supply chain management

Authors	Definition
Cooper <i>et al.</i> (1997)	An integrating philosophy to manage the total flow of a distribution channel from supplier to ultimate customer
Lee and Ng (1997)	(<i>The management of</i>) a network of entities that starts with the suppliers' supplier and end with the customers' customers for the production and delivery of goods and services
Handfield and Nichols (1999)	The supply chain encompasses all activities associated with the flow and transformation of goods from the raw materials stage (extraction), through to the end-user, as well as associated information flows. Material and information flow both up and down the supply chain. Supply chain management is the integration of these activities through improved supply chain relationships to achieve sustainable competitive advantage
Simchi-Levi <i>et al.</i> (2000)	Supply chain management is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations and at the right time, in order to minimize system-wide costs while satisfying service level requirements
Ayers (2001)	Supply chain management is the design, maintenance, and operation of supply chain processes for satisfaction of end-users

[New and Westbrook, 2004]

Supply Chain Management: Tentative definitions...



THE FINAL TARGET OF A SUPPLY CHAIN MUST BE AN *EFFICIENT CONSUMER RESPONSE*

Provide to the:

1. Right Client
2. The Right Product
3. In the Right Quantity
4. At the Right Place
5. At the Right Time
6. At the Right Conditions
7. At the Right Price
8. With the Right Overall Carbon Footprint!



Supply chain oriented companies commonly report:

- Lower inventory, transportation, warehousing, and packaging costs
- Greater supply chain flexibility
- Improved customer service
- Higher revenues
- Increased profitability

LO¹

source: A. Close

Supply Chain Management is a structuring element of these companies' DNA



Sector: E-commerce
Position: "Largest internet based retailer in the world"
Net sales 2015: 107b\$
Employees 2015: 231 000

Business model at a glance:
Always seeking for innovation to gain market share, test new markets and/or drastically reduce prices for customers. Started from book retail in 1994 and spread progressively to become one of Internet big 4 of with Apple, Google, and Facebook. Now in position of 1st non food retailer in several major countries.

Supply Chain alignment:
Supply Chain is supporting cost efficiency model by implementing best of breed processes. Global strategy is including needs regarding logistics capacity extension. It leads to most advanced inventory mngr rules in warehouses, to drone testing for transportation...



Sector: Home furnishing retail
Position: "World's leading multi channel home furnishing retailer"
Sales 2016: 34.2b€
Employees: 164 000

Business model at a glance:
Built an entire model on customer experience maximization within furniture market (range rotation, product practicality, good value for money, creation of a shopping experience). Became a case study for marketing students worldwide.

Supply Chain alignment:
IKEA first succeeded in fitting the item development within business environment (short time to market, design to logistics...) while capturing changing expectation of customers. Then SC has always supported both business and profitability needs (successful multi channel implementation, pooling of sourcing for key sub components...).



Sector: Garment retail
Position: "One of the world's largest distribution groups"
TO 2016: 23.3b€
Employees: 153 000

Business model at a glance:
Range management is at the center of organization with rotation of collections every 15 days and time to market divided by 4 compared to competitors (1 month vs 4). ZARA is the creator of Fast Fashion approach that is the origin of brand's success (only 18% of items needs to go through sales vs the double for competitors).

Supply Chain alignment:
Footprint is entirely designed to meet time to market needs. Only permanent collections have far shore sourcing, high speed rotation articles are sourced from near shore suppliers (Spain in some cases). Processes are fitted accordingly.

[Alexandre Garnier,
2017]

Supply Chain

is paramount in times of economic uncertainty:

It's where the money is!

- *US business logistics costs are generally above \$1.3 trillion (approx. 9% of US nominal GDP)³*
- *Supply-chain generally accounts for between 60% and 90% of all company costs¹*
- *A 2% improvement in process efficiency for supply-chain processes has much more leveraged an impact compared to a 2% improvement in efficiency for... IT... HR... Finance¹... Sales...*

Fortune-10 Company Supply-Chain Cost as % of Total Costs ²	
GM	94%
Ford	93%
Conoco	90%
Wal-Mart	90%
Chevron	88%
IBM	77%
Exxon	75%
GE	63%
Citi ¹	0%
AIG ¹	0%

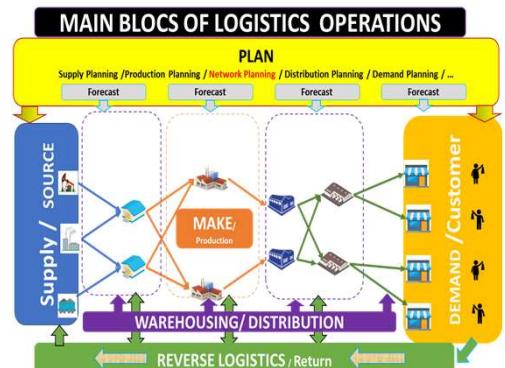
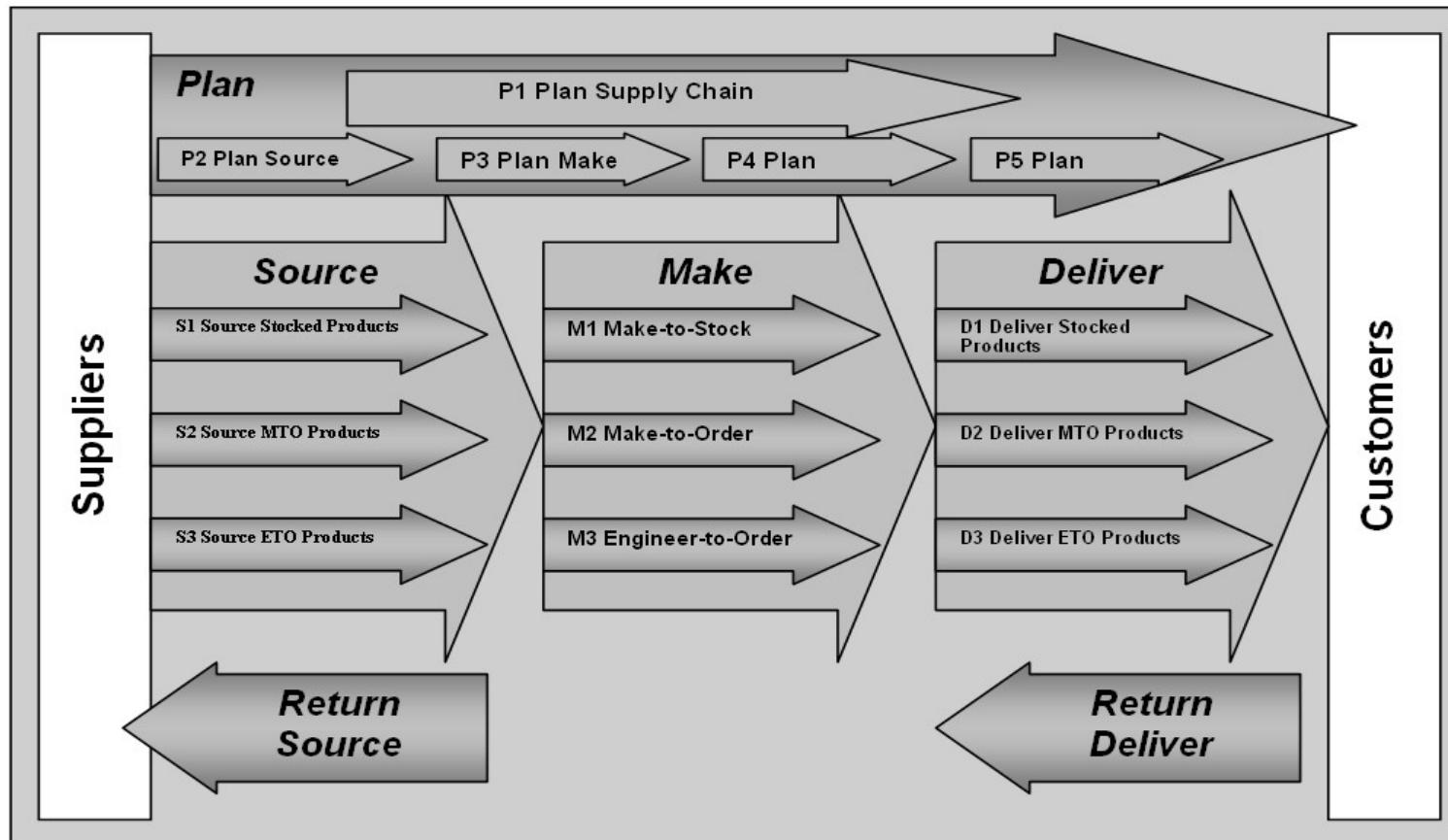
1: Exclusive of Financial Services companies

2: Source: Hoovers Financial Data, Supply-Chain Council Benchmark data on SCM cost for discrete & process industries

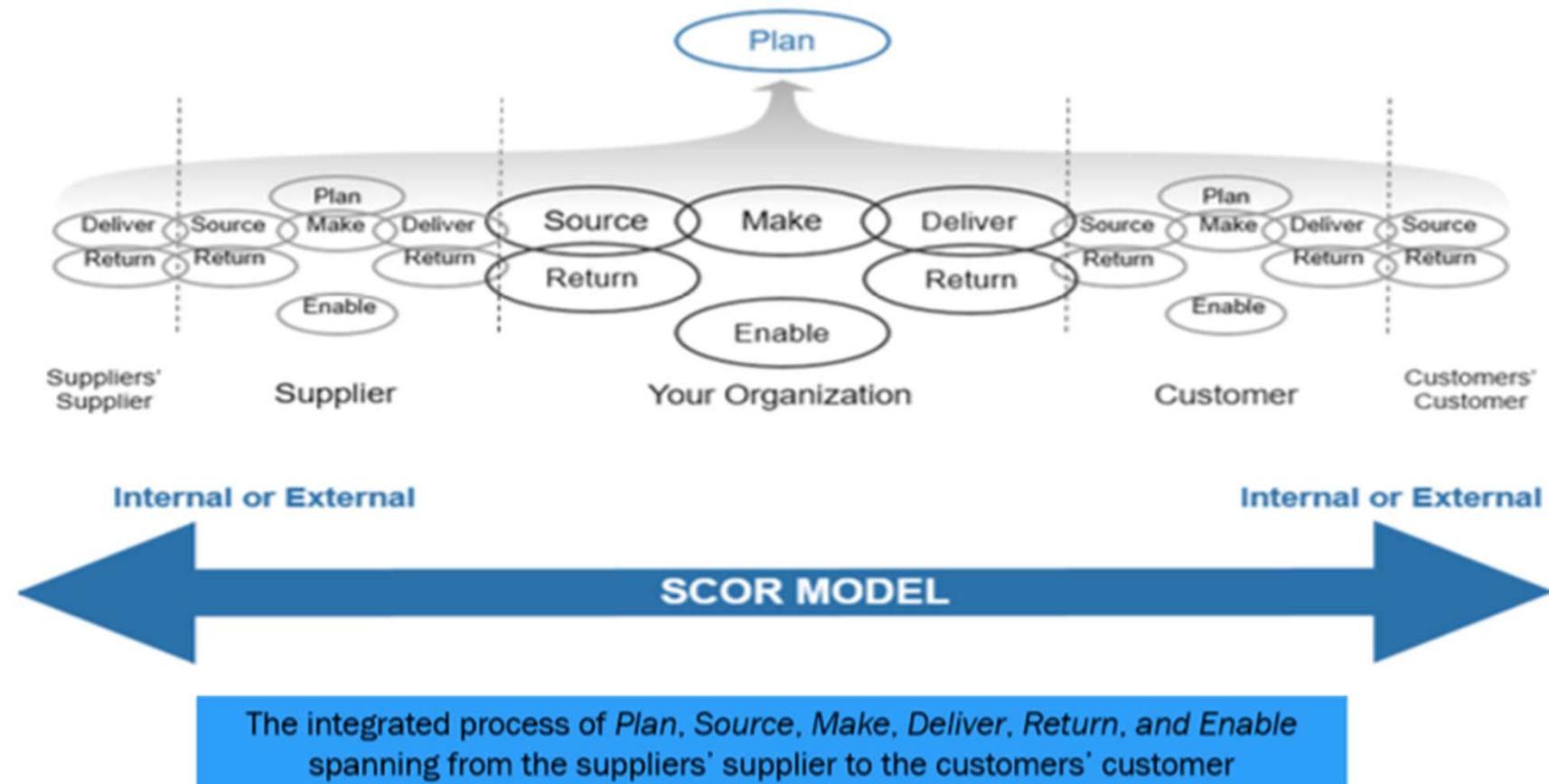
3: CSCMP Annual State of the Logistics Industry

THE SUPPLY CHAIN REFERENCE MODEL SCOR®

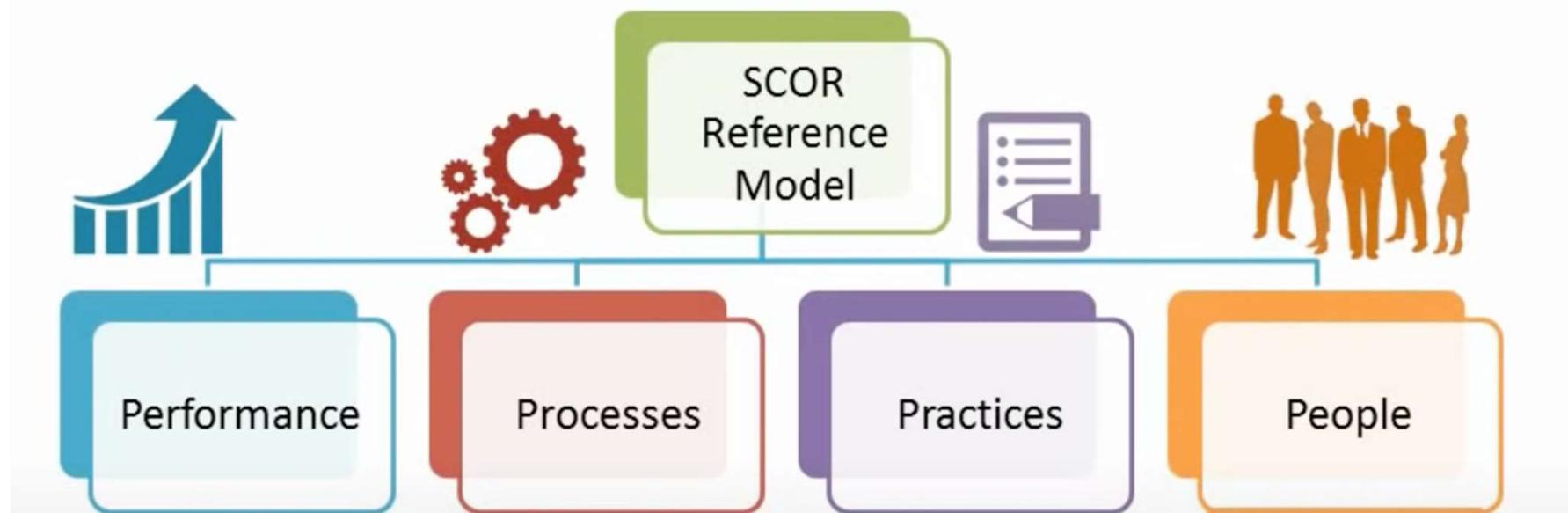
SCOR®: A REFERENCE MODEL, A CROSS-INDUSTRY OPEN STANDARD



THE SUPPLY CHAIN REFERENCE MODEL SCOR®



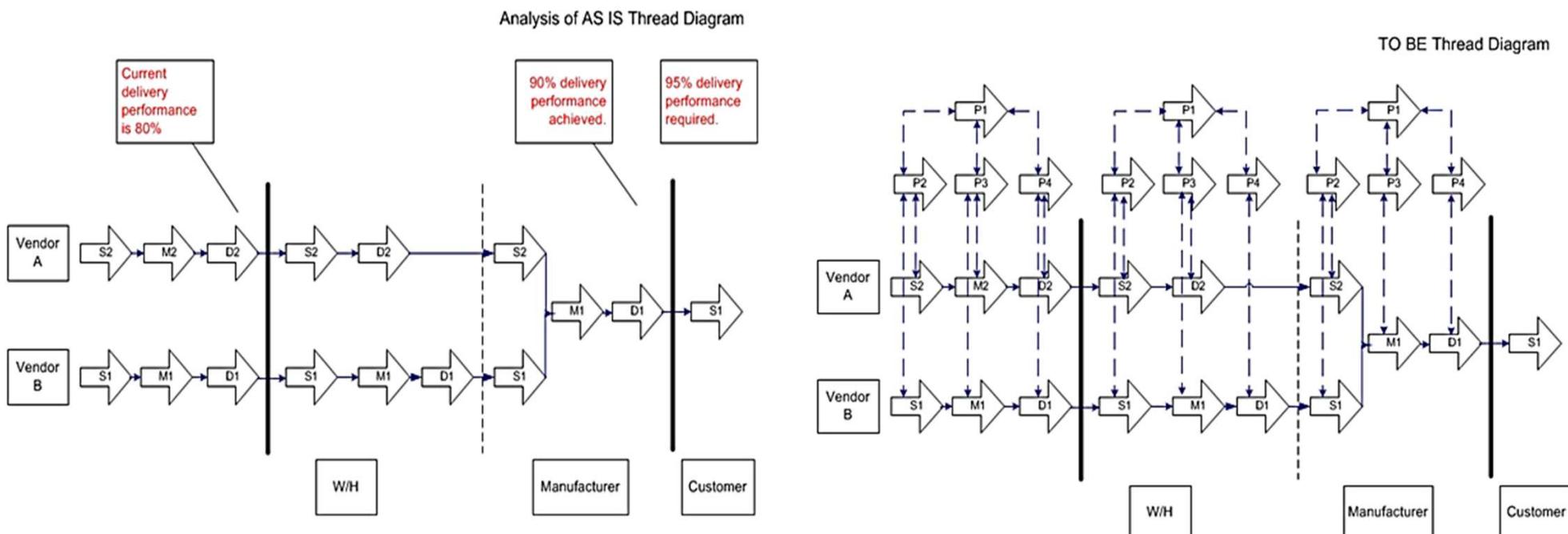
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Four Major Components

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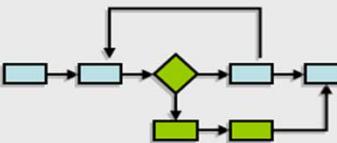
Process mapping

SCOR is a process reference model. The purpose of a process reference model, is to **define process architecture in a way that aligns with key business functions and goals.**



Process

THE SUPPLY CHAIN REFERENCE MODEL SCOR®

Level 1	Level 2	Level 3	Level 4	Level 5
Scope	Configuration	Activity	Workflow	Transactions
Supply-Chain Source	S1 Source Stocked Product	S1.2 Receive Product		EDI XML
Differentiates Business	Differentiates Complexity	Names Tasks	Sequences Steps	Links Transactions
Defines Scope	Differentiates Capabilities	Links, Metrics, Tasks and Practices	Job Details	Details of Automation
Sets Strategy	First Tier Diagnostics	Second Tier Diagnostics	Industry or Company Specific	Technology Specific

Standard SCOR definitions

Company/Industry definitions

THE SUPPLY CHAIN REFERENCE MODEL SCOR®

Process

Level	Description	Schematic	Comments
1	Major processes	(P)lan → (S)ource → (M)ake (D)eliver → (R)eturn → (E)nable	Defines the scope, content, and performance targets of the supply chain
2	Process categories	sD1 → sD2 → sD3 → sD4 MTS → MTO → ETO → Retail	Defines the operations strategy: process capabilities are set
3	Process elements	sD1.1: Process inquiry and quote sD1.2: Receive, enter, validate order sD1.3: Reserve inv. and delivery date sD1.4: Consolidate orders sD1.5: Build loads sD1.6: Route shipments	Defines the configuration of individual processes. The ability to execute is set. Focus is on processes, inputs/outputs, skills, performance, best practices, and capabilities
4	Improvement tools/activities	Diagram showing interconnected nodes representing kaizen, lean, TQM, six sigma, and benchmarking activities.	Use of kaizen, lean, TQM, six sigma, benchmarking

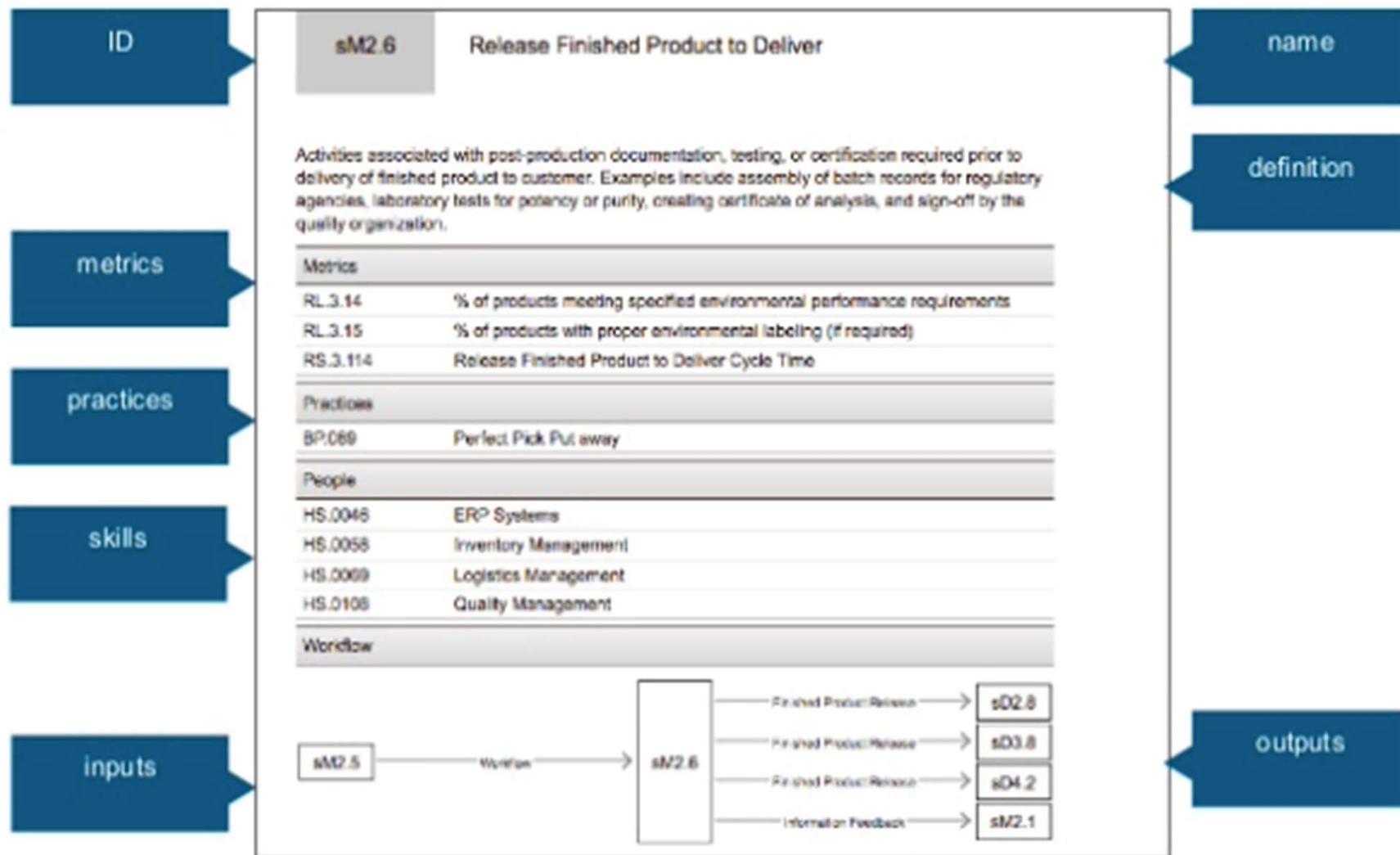
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Process

sP - Plan					sS - Source			sM - Make		
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	sM1 Make-to-Stock	sM2 Make-to-Order	sM3 Engineer-to-Order
<p>sP1.1: Identify, Prioritize and Aggregate Supply Chain Requirements</p> <p>sP1.2: Identify, Prioritize and Aggregate Supply Chain Resources</p> <p>sP1.3: Balance Supply Chain Resources with SC Requirements</p> <p>sP1.4: Establish and Communicate Supply Chain Plans</p>	<p>sP2.1: Identify, Prioritize and Aggregate Product Requirements</p> <p>sP2.2: Identify, Assess and Aggregate Product Resources</p> <p>sP2.3: Balance Product Resources with Product Requirements</p> <p>sP2.4: Establish Sourcing Plans</p>	<p>sP3.1: Identify, Prioritize and Aggregate Production Requirements</p> <p>sP3.2: Identify, Assess and Aggregate Production Resources</p> <p>sP3.3: Balance Production Resources with Production Requirements</p> <p>sP3.4: Establish Production Plans</p>	<p>sP4.1: Identify, Prioritize and Aggregate Delivery Requirements</p> <p>sP4.2: Identify, Assess and Aggregate Delivery Resources</p> <p>sP4.3: Balance Delivery Resources and Capabilities with Delivery Requirements</p> <p>sP4.4: Establish Delivery Plans</p>	<p>sP5.1: Assess and Aggregate Return Delivery Requirements</p> <p>sP5.2: Identify, Assess and Aggregate Return Resources</p> <p>sP5.3: Balance Return Resources with Return Requirements</p> <p>sP5.4: Establish and Communicate Return Plans</p>	<p>sS1.1: Schedule Product Deliveries</p> <p>sS1.2: Receive Product</p> <p>sS1.3: Verify Product</p> <p>sS1.4: Transfer Product</p> <p>sS1.5: Authorize Supplier Payment</p>	<p>sS2.1: Schedule Product Deliveries</p> <p>sS2.2: Receive Product</p> <p>sS2.3: Verify Product</p> <p>sS2.4: Transfer Product</p>	<p>sS3.1: Identify Sources of Supply</p> <p>sS3.2: Select Final Supplier and Negotiate</p> <p>sS3.3: Schedule Product Deliveries</p> <p>sS3.4: Receive Product</p> <p>sS3.5: Verify Product</p> <p>sS3.6: Transfer Product</p> <p>sS3.7: Authorize Supplier Payment</p>	<p>sM1.1: Schedule Production Activities</p> <p>sM1.2: Issue Material</p> <p>sM1.3: Produce and Test</p> <p>sM1.4: Package</p> <p>sM1.5: Stage Product</p> <p>sM1.6: Release Product to Deliver</p> <p>sM1.7: Waste Disposal</p>	<p>sM2.1: Schedule Production Activities</p> <p>sM2.2: Issue Sourced/In-Process Product</p> <p>sM2.3: Produce and Test</p> <p>sM2.4: Package</p> <p>sM2.5: Stage Finished Product</p> <p>sM2.6: Release Finished Product to Deliver</p> <p>sM2.7: Waste Disposal</p>	<p>sM3.1: Finalize Production Engineering</p> <p>sM3.2: Schedule Production Activities</p> <p>sM3.3: Issue Sourced/In-Process Product</p> <p>sM3.4: Produce and Test</p> <p>sM3.5: Package</p> <p>sM3.6: Stage Finished Product</p> <p>sM3.7: Release Product to Deliver</p> <p>sM3.8: Waste Disposal</p>

Process

THE SUPPLY CHAIN REFERENCE MODEL SCOR®





THE SUPPLY CHAIN REFERENCE MODEL SCOR®

People

Novice: Untrained beginner, no experience, requires and follows detailed documentation to be able to perform the work.

Beginner: Performs the work, with limited situational perception.

Competent: Understands the work and can determine priorities to reach goals.

Proficient: Oversees all aspects of the work and can prioritize based on situational aspects.

Expert: Intuitive understanding. Experts can apply experience patterns to new situations.

Practices

Emerging practices: introduce new technology, knowledge or radically different ways of organizing processes. (*Risk: High, Results: High*)

Best practices: Best practices are 'current', 'structured' and 'repeatable' practices that have had a proven and positive impact on supply chain performance. (*Risk: Moderate, Results: Moderate*)

Standard practices: are how a wide range of companies have historically done business by default. These well-established practices do the job, but don't provide a significant cost or competitive advantage over other practices. (*Risk: Low, Results: Low.*)

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Performances

Improving overall supply chain operational performance

Improving overall supply chain operational performance				
Reliability Responsiveness Agility Cost Asset Management				
Customer	Performance Attributes		Strategic Metrics	
	Reliability		RL.1.1 Perfect Order Fulfillment	
	Responsiveness		RS.1.1 Order Fulfillment Cycle Time	
	Agility		AG.1.1 Upside Supply Chain Flexibility	
			AG.1.2 Supply Chain Upside Adaptability	
Internal	Cost		CO.1.1 Supply Chain Management Cost	
			CO.1.2 Cost of Goods Sold	
	Assets Management		AM.1.1 Cash-to-Cash Cycle Time	
			AM.1.2 Return on Supply Chain Fixed Assets	
			AM.1.3 Return on Working Capital	

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LOGISTICS INTEGRATION TOWARDS SUPPLY CHAIN...

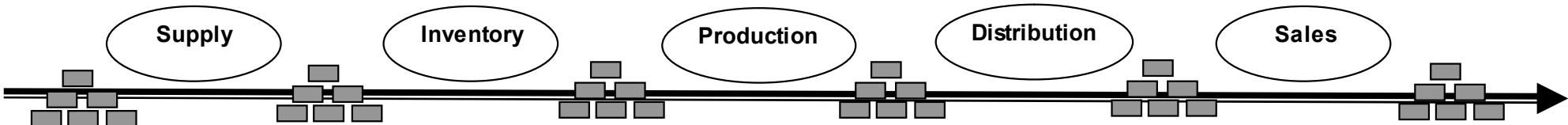
1. Integration Principles
2. Measure of Integration: The Maturity Levels
3. Audit of Supply Chain Integration

→ 4 LEVELS OF MATURITY CORRESPONDING TO 4 STAGES OF SUPPLY CHAIN INTEGRATION

STAGE 1: FUNCTIONAL

- **Clustered « Vertical functions and activities » (Supply, Production, Sales...)**
- **Target parameters: product cost**

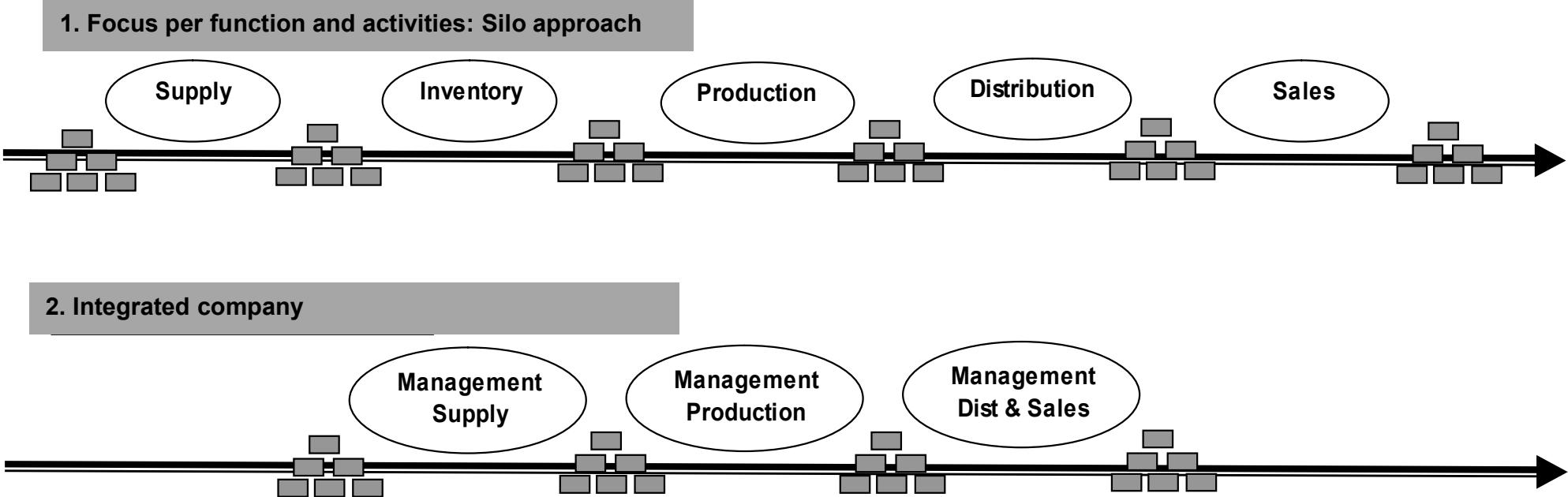
1. Focus per function and activities: Silo approach



→ 4 LEVELS OF MATURITY CORRESPONDING TO 4 STAGES OF SUPPLY CHAIN INTEGRATION

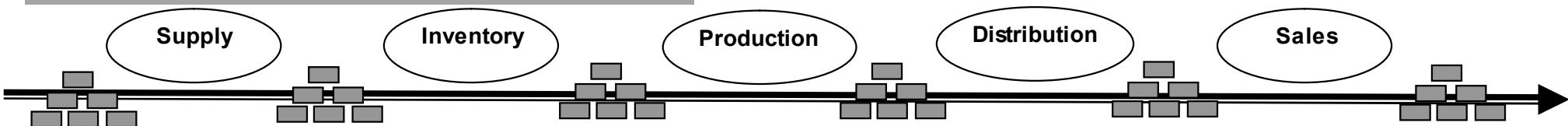
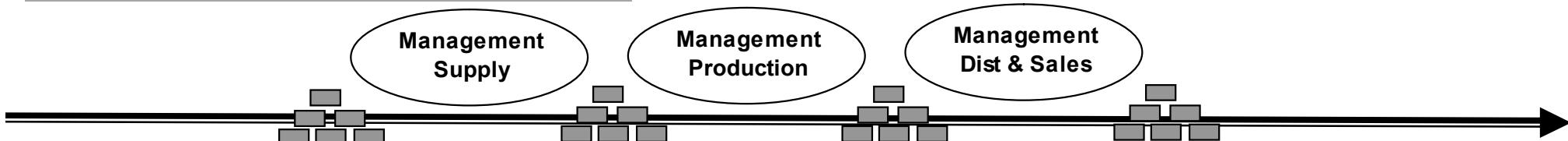
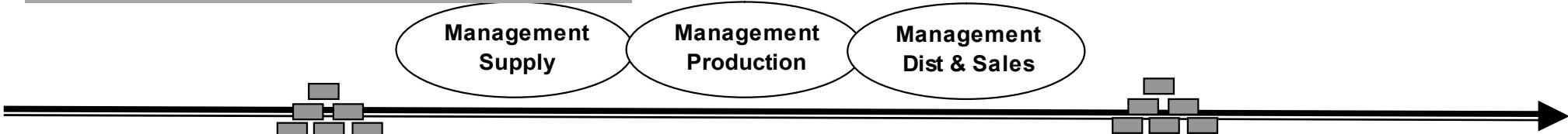
STAGE 2: INTEGRATED COMPANY

- Still clustered but some functions are grouped and managed per groups
- Target parameters: product cost and product quality



→ 4 LEVELS OF MATURITY CORRESPONDING TO 4 STAGES OF SUPPLY CHAIN INTEGRATION**STAGE 3: EXTENDED COMPANY**

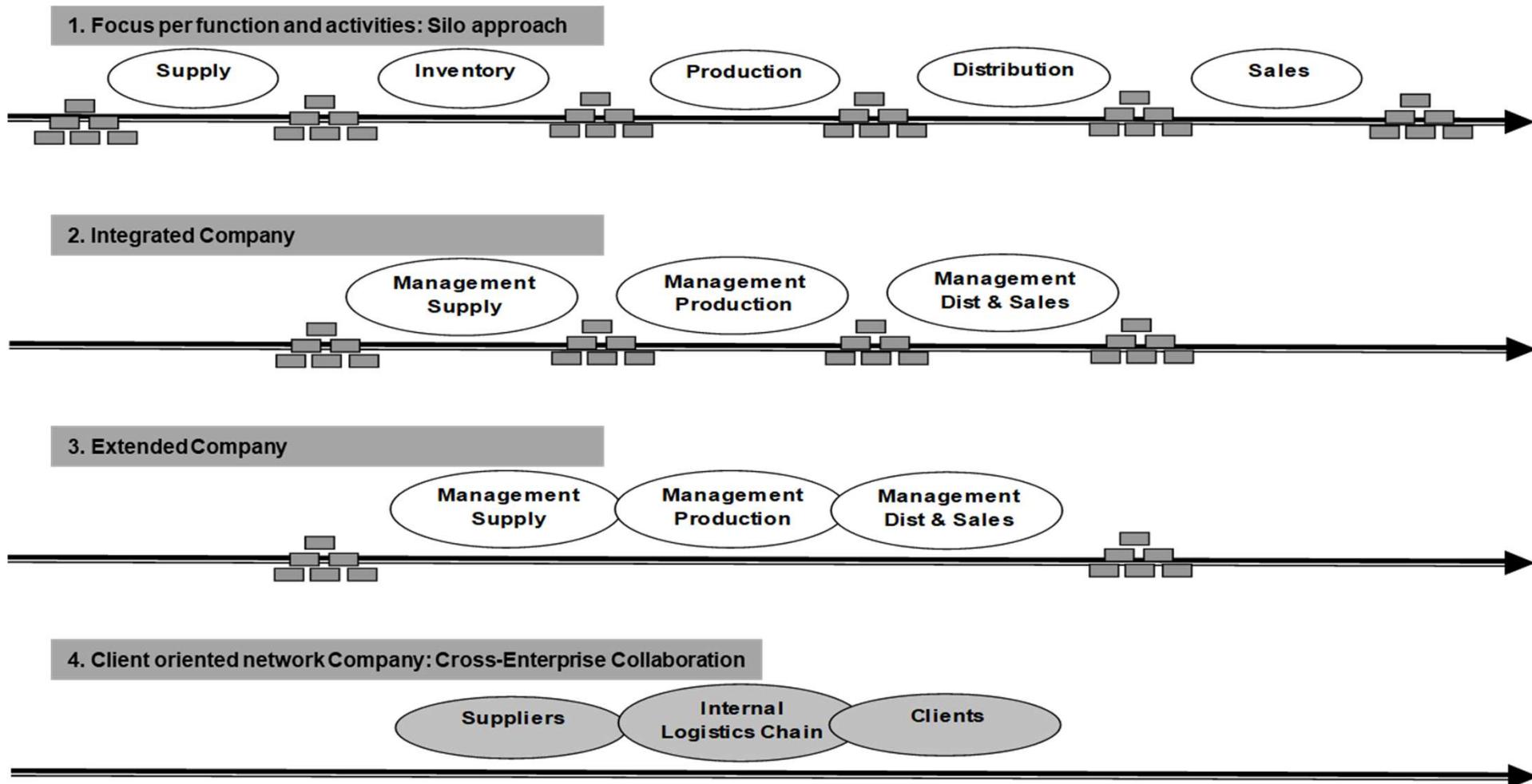
- **Stage 2 + Cooperation with Suppliers and Distributors**
- **Target parameters: cost, quality and respect of promises made to the client**

1. Focus per function and activities: Silo approach**2. Integrated Company****3. Extended Company**

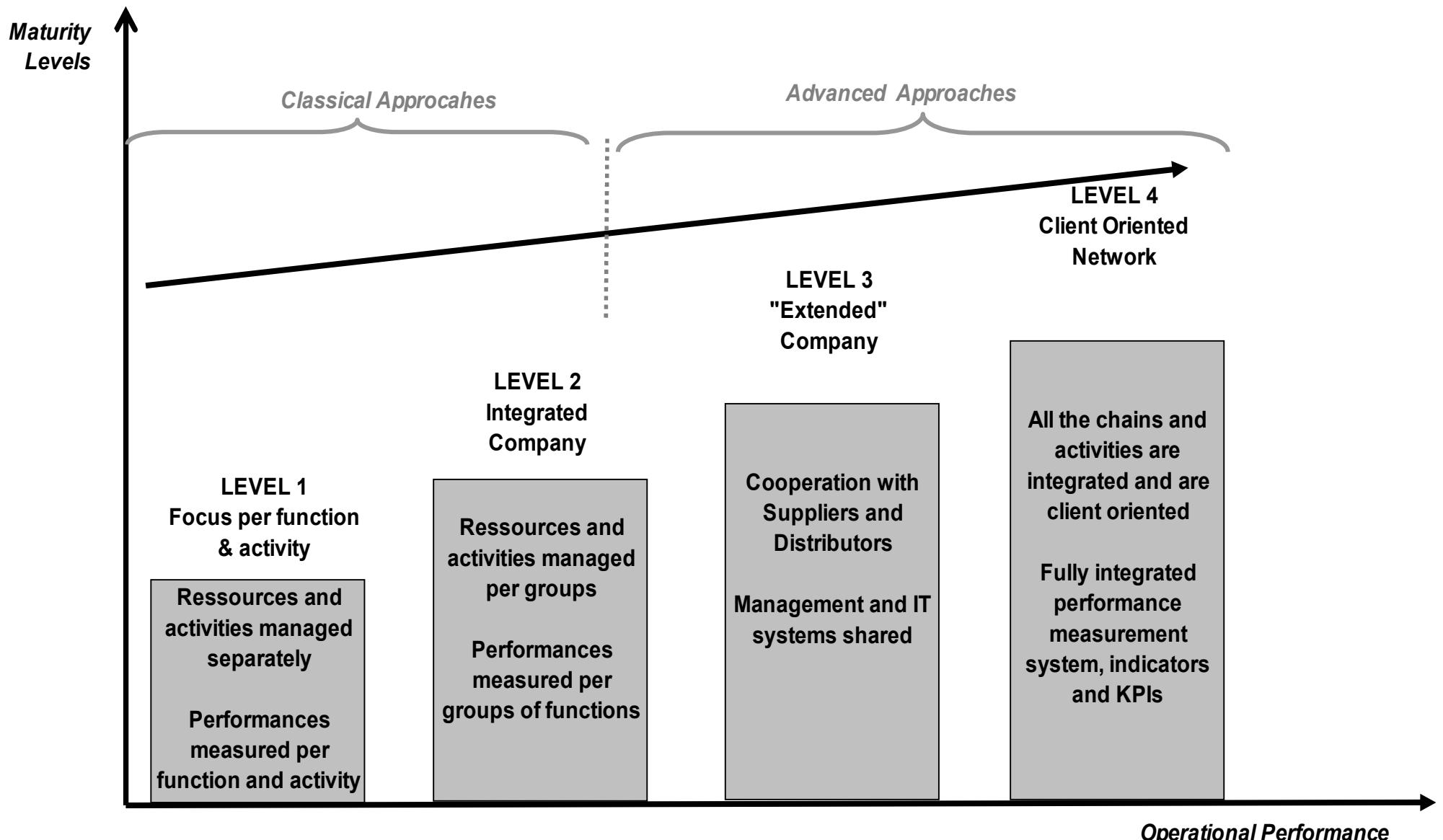
→ **4 LEVELS OF MATURITY CORRESPONDING TO 4 STAGES OF SUPPLY CHAIN INTEGRATION**

STAGE 4: < CLIENT ORIENTED NETWORK > COMPANY

- Cooperative approach, external integration from the supplier to the final client/customer.
- **Target parameters: build a strong competitive advantage**



→ **4 LEVELS OF MATURITY CORRESPONDING TO 4 STAGES OF SUPPLY CHAIN INTEGRATION**



	Stage 1: Functional Focus	Stage 2: Internal Integration	Stage 3: External Integration	Stage 4: Cross-Enterprise Collaboration
PLAN	Demand/supply planning is done internally, with no integrated processes and tools across plants.	Global demand/supply planning is consistently aggregated across the firm, focused on functional accountability, and continuously improved by comparisons to historical performance.	Strategic partnerships with customers and suppliers is facilitated by direct, collaborative, electronic data exchange, and governed by formal supply chain performance agreements.	Dynamic global demand forecasting and capacity utilization calculations feed demand/supply decision-making mechanisms. Joint demand/supply decision-making bodies leverage and share data globally.
SOURCE	Supplier partnerships are poorly defined; processes are informal; there is no integrated set of tools to allow common access to procurement data.	Cross-functional commodity management teams and supplier partnerships are in place. Common ERP systems are used effectively.	Strategic commodity/supplier partners participate in collaborative product development, process/TCO improvement programs, and consortia buying, and have access to select online data.	Integrated supply network uses e-enabled systems to automate/optimize all commodity and supplier transactions.
MAKE	Manual material and production control activities are driven by rudimentary implementation of MRP/MPS tools.	Material and production control data are tracked electronically to optimize internal scheduling and inventory management.	Customer-driven, APS (linked to suppliers); kanban demand pull manufacturing; real-time inventory control; automated product quality control; and total life-cycle product data management are dominant.	Fully-enabled, electronically-captured APS; product configuration specification; demand pull; inventory backflushing; product history; and quality-control systems allow instantaneous product changes and drive continuous improvement.
DELIVER	No formal, standardized processes or tools are in place for order management, channel rules, product delivery, or invoicing.	Formal outbound logistics processes, automated order management systems, specific channel rules (terms and conditions), delivery quality standards, and automatic invoicing exist. Variability exists in order entry and scheduling across product divisions.	Product and delivery process data maintenance systems function simultaneously throughout the supply chain, and are accurate and visible to all supply chain partners via e-commerce systems. Differentiated service levels and performance agreements are formalized.	Comprehensive e-commerce linkages throughout supply chain optimize warehousing (outsourced but integrated), tracking, transportation and delivery, and automated invoicing. Differentiated channel rules and order/service levels, including real-time commitments.

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Layers and scopes define integration.

Four intertwined layers of integration can be established including:

- (1) integration of flows (physical, information and financial);
- (2) integration of processes and activities;
- (3) integration of technologies and systems; and
- (4) integration of actors (structure and organisations).

The scope of integration: nature and number of stakeholders included may vary:

- Limited dyadic downstream. Integration between the company and its customers.
- Limited dyadic upstream. Integration between the company and its suppliers.
- Limited dyadic. Integration between the company and separately, downstream with customers upstream with suppliers.
- Limited triadic. Integration of suppliers, focal company and customers (without differentiating upstream and downstream).
- Extended. Integration between >3 parties along the chain: customers' customers, suppliers' suppliers or other stakeholders.

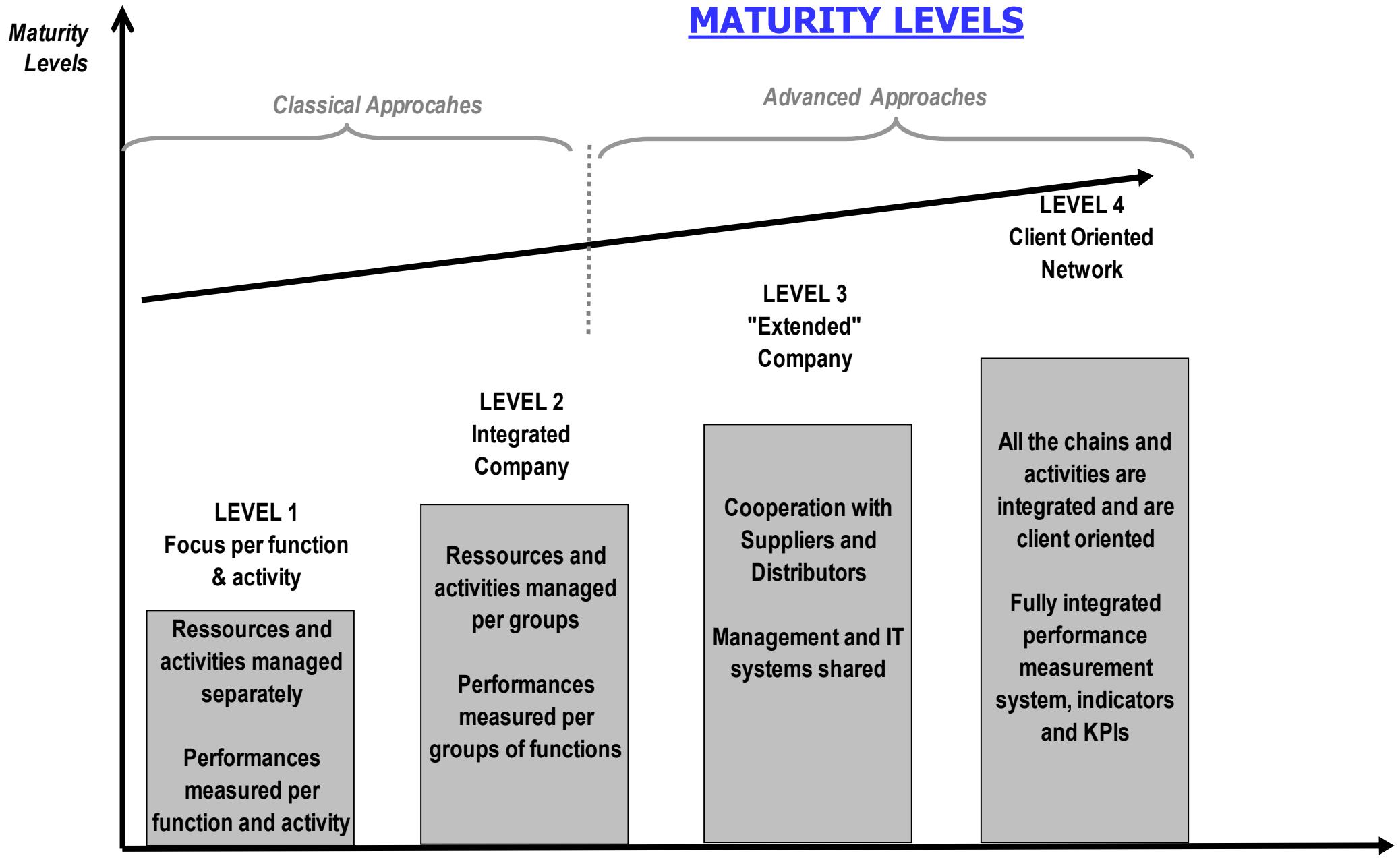
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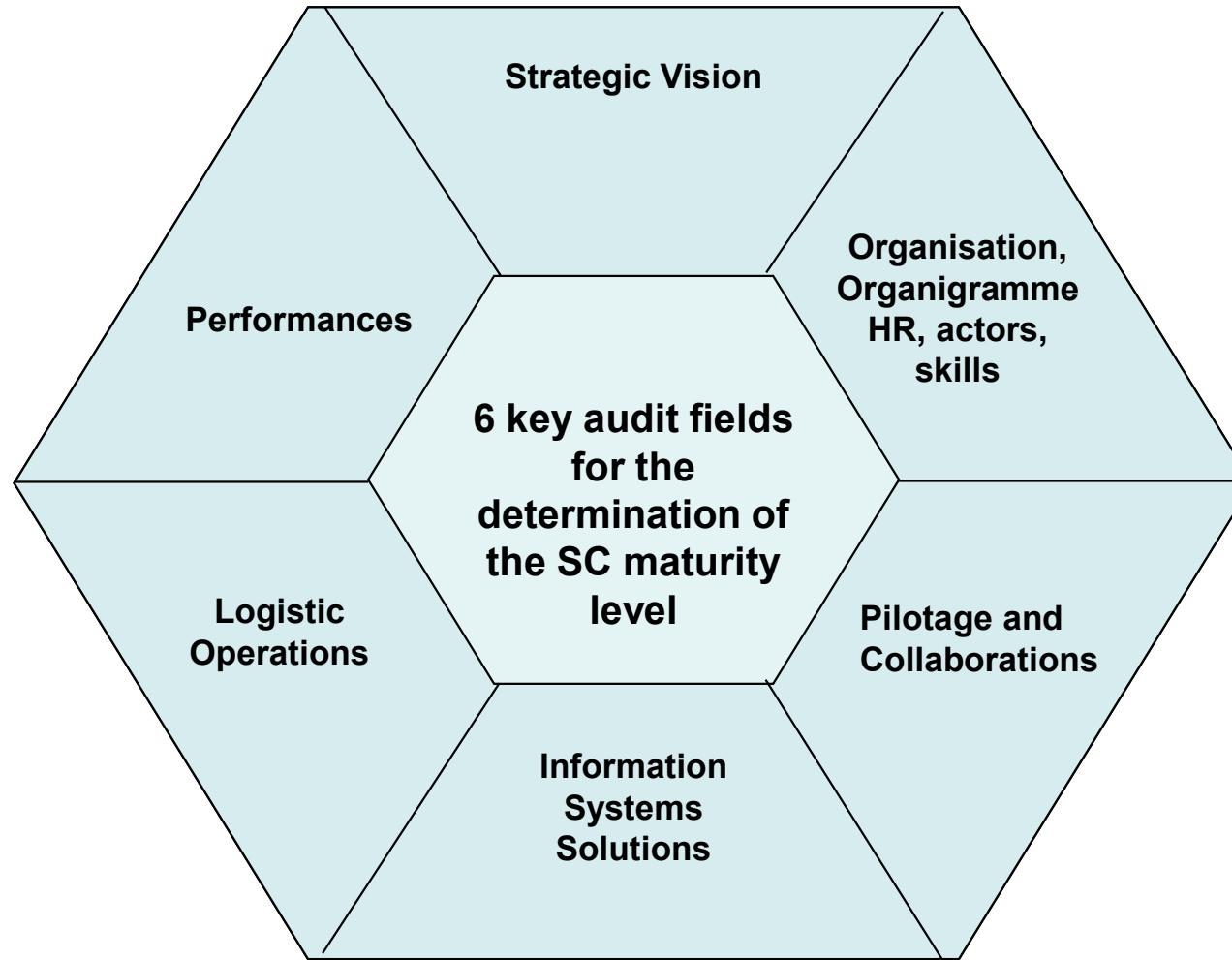
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OBJECTIVE

- **Assess the performances of the company's functions**
- **Determine the levels of maturity of the company's supply chain**
- **Highlight the potential for progress (Progress zones)**
- **Determine the decisions/plans to be put into place in order to reach a higher integrated level (move to the progress zone)**



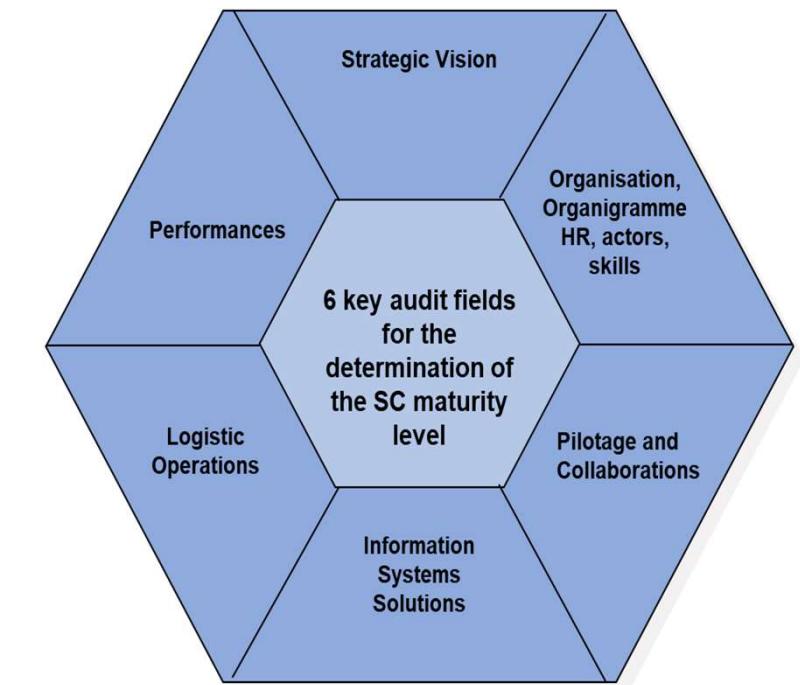
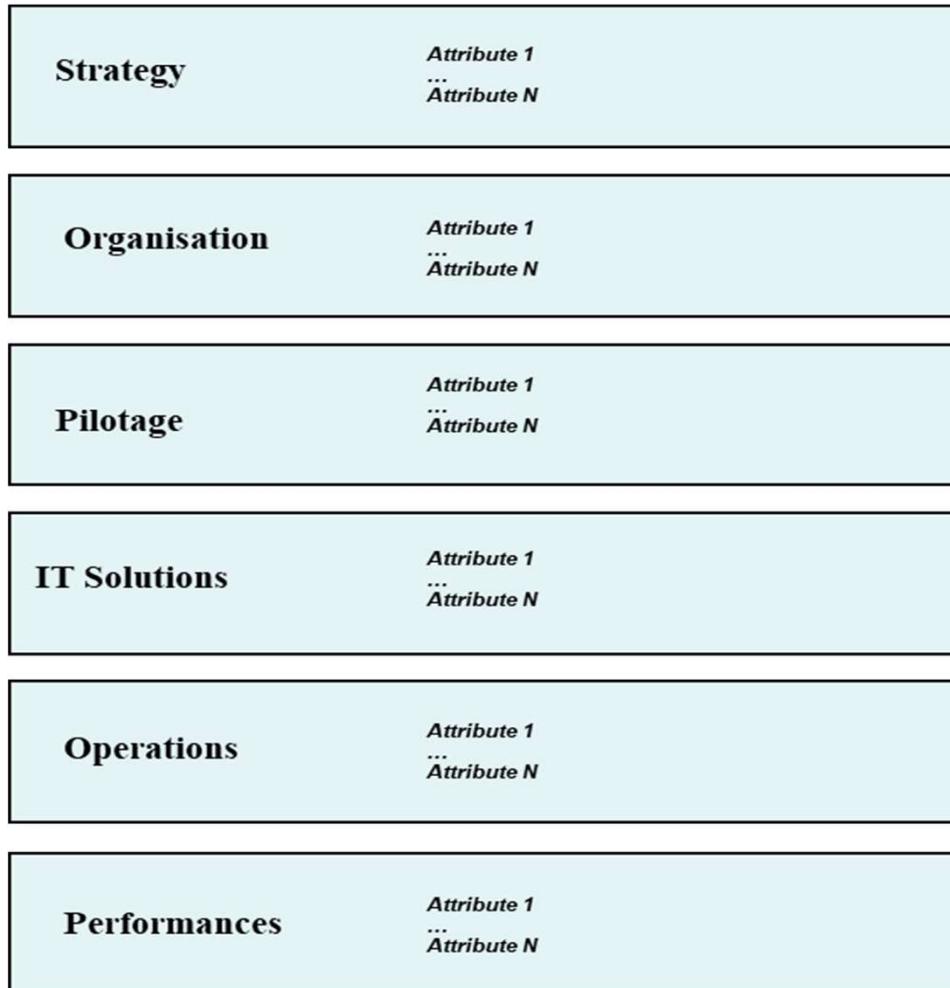
Framework for the determination of SC maturity level



DETERMINATION OF THE LEVEL OF SUPPLY CHAIN INTEGRATION

Methodology:

1. Each of the 6 fields is divided into attributes (subcomponents)

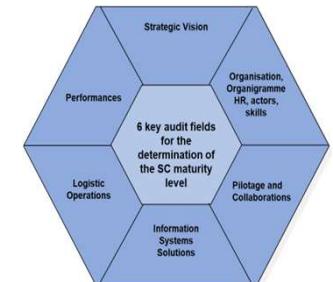


DETERMINATION OF THE LEVEL OF SUPPLY CHAIN INTEGRATION

Methodology:

1. *Each of the 6 fields is divided into attributes (subcomponents)*
2. Each of these attributes is evaluated with respect to the level of integration

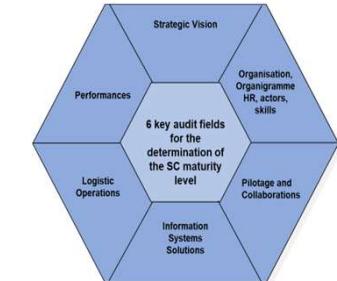
	Level 1	Level 2	Level 3	Level 4
Strategy Attribute 1 ... Attribute N				
Organisation Attribute 1 ... Attribute N	« Silos » <i>(Clustered operations and focus per function and activity)</i>	« Integrated Company » <i>(Resources and activities are managed per groups)</i>	« Extended Company » <i>(Level 2+ Cooperation with suppliers and distributors)</i>	« Client Oriented Network » <i>(All the chains of activities are integrated and client oriented: True Supply Chain Management)</i>
Pilotage Attribute 1 ... Attribute N				
IT Solutions Attribute 1 ... Attribute N				
Operations Attribute 1 ... Attribute N				
Performances Attribute 1 ... Attribute N				



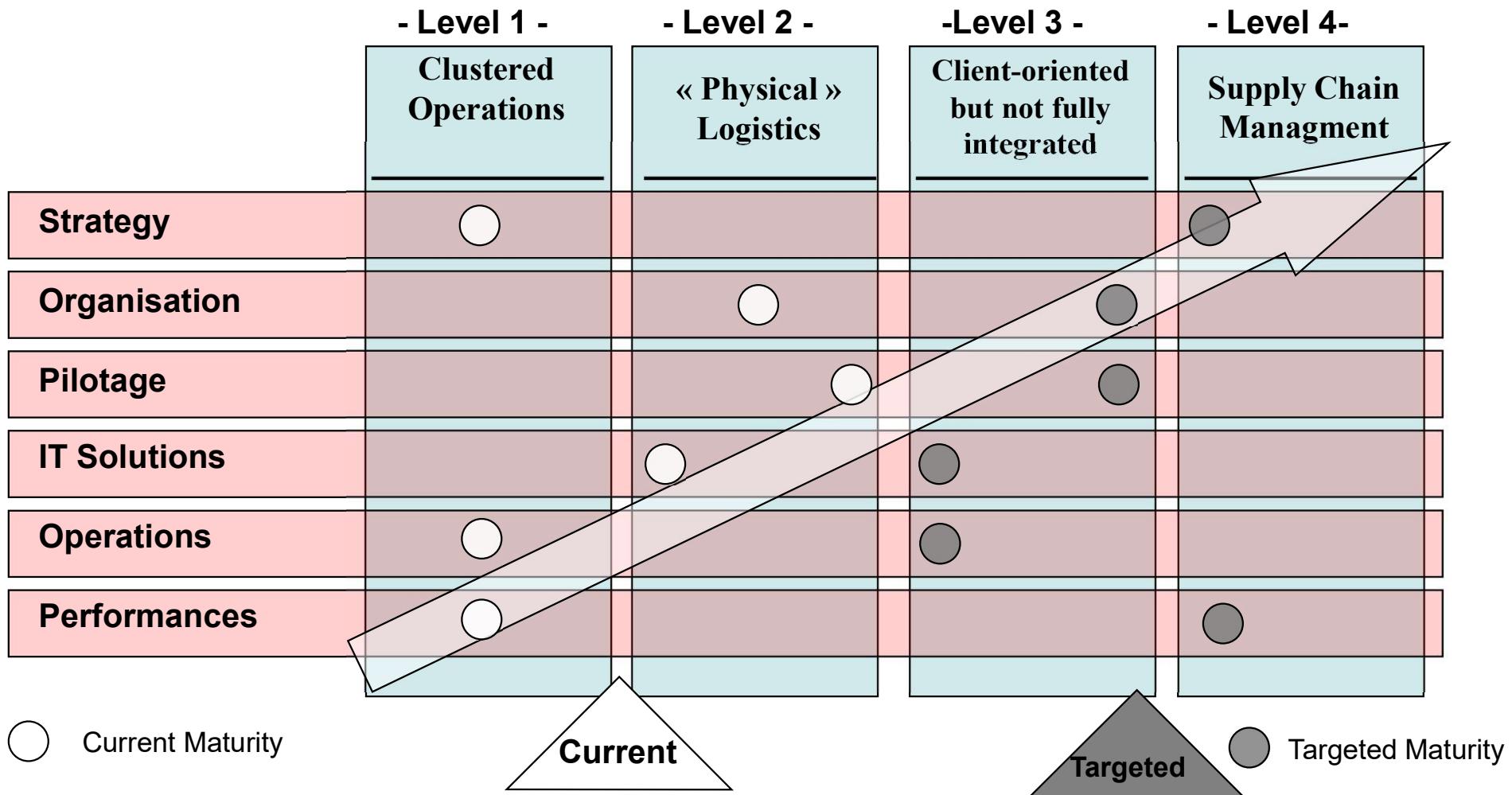
DETERMINATION OF THE LEVEL OF SUPPLY CHAIN INTEGRATION

Methodology:

1. *Each of the 6 fields is divided into attributes (subcomponents)*
2. *Each of these attributes is evaluated with respect to the level of integration*
3. The consolidation (aggregation) of the above evaluations helps in highlighting, for each field, the actual level of maturity. These are used:
 - To highlight the gaps with the highest or targeted maturity level;
 - To initiate the search of plans and measures to lift up integration
 - To benchmark with other companies' values and often the « best-in-class » company.



Diagnostic: This company's supply chain is mostly « operations » oriented. There is no external integration, no preventive management of unexpected events (f.e. supplier failure) no integration between internal functions. The performance parameters are all centered around product delivery, product cost, product quality and not the competitive advantage.



BLOC 11:

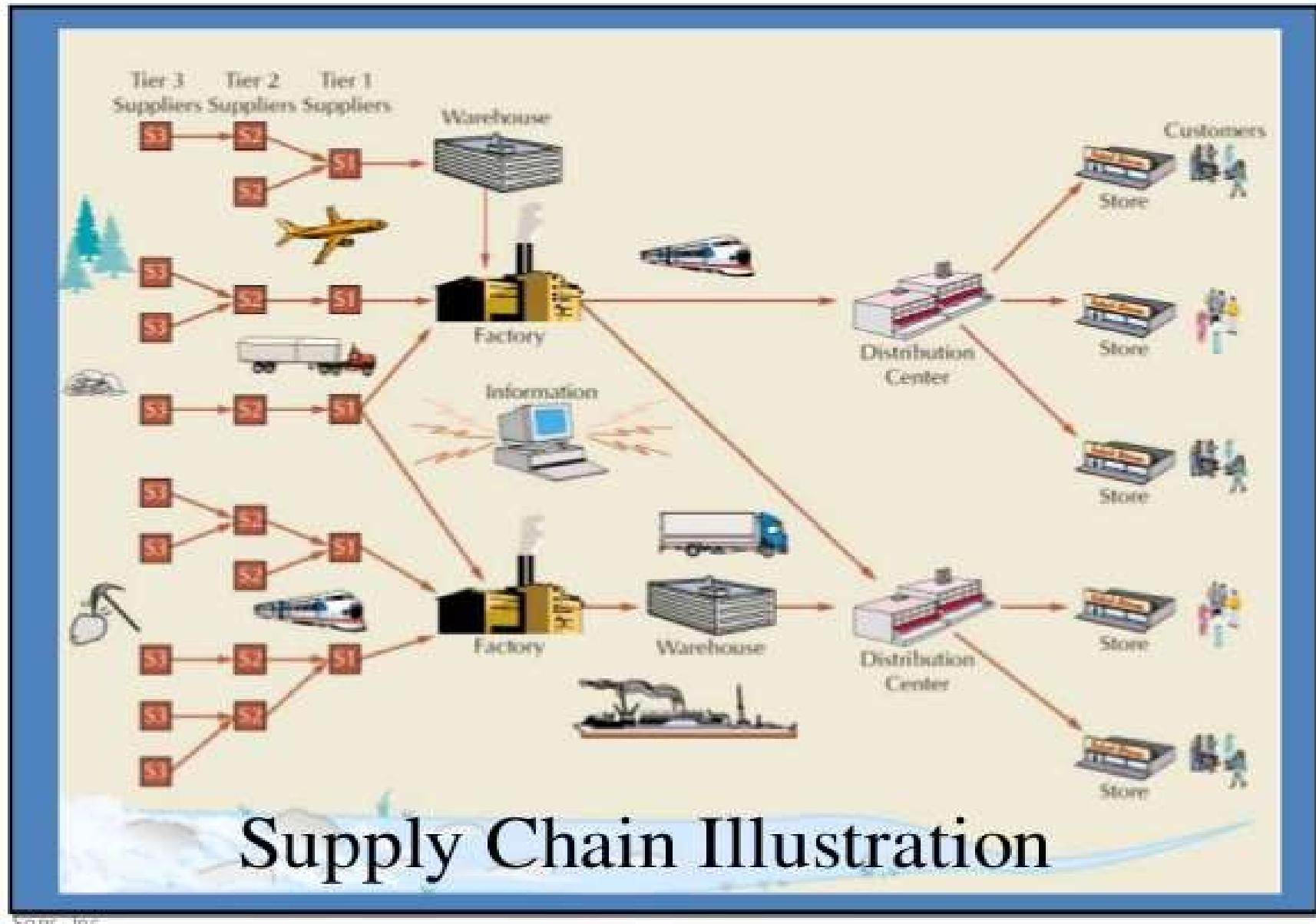
SUPPLY CHAIN MANAGEMENT STRATEGIES



CONTENT OF BLOC 11

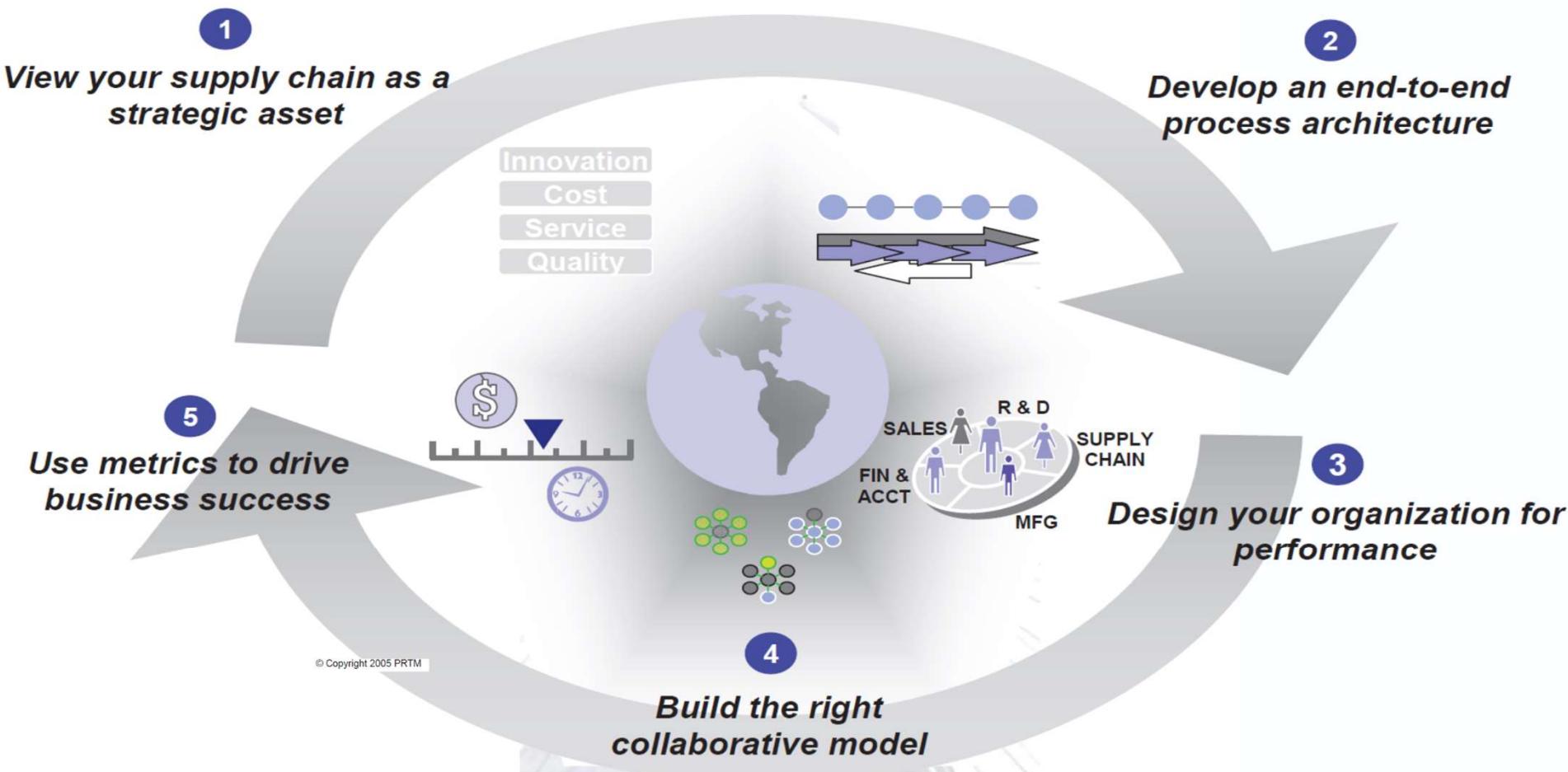
SUPPLY CHAIN MANAGEMENT STRATEGIES

- 1. Basics of Strategic Supply Chain Management**
- 2. Addressing uncertainties in Strategic Supply Chain Management**
- 3. The 4 Generic Strategic Supply Chain Management Strategies**
- 4. Focus on the AGILE Strategic Supply Chain Management Strategy**



Sons, Inc.

The Five Core Disciplines are the foundation for Strategic Supply Chain Management



Discipline 1: View Your Supply Chain as a Strategic Asset

Design the supply chain around a defined basis of competition to enable the overall business strategy

A Good Supply Chain Strategy Meets Four Basic Criteria

1. It is aligned with the business strategy

Each business strategy requires a distinct supply chain structure, processes, systems, and skills

2. It is aligned with customer needs

Understand each segment's requirements and configure the supply chain appropriately
If necessary, create separate or multiple supply chains

3. It is aligned with the company's power position

Before making big changes, understand who has the power in the supply chain

4. It is adaptive

Supply chains have a shelf life and should be continuously evaluated to see if change is needed

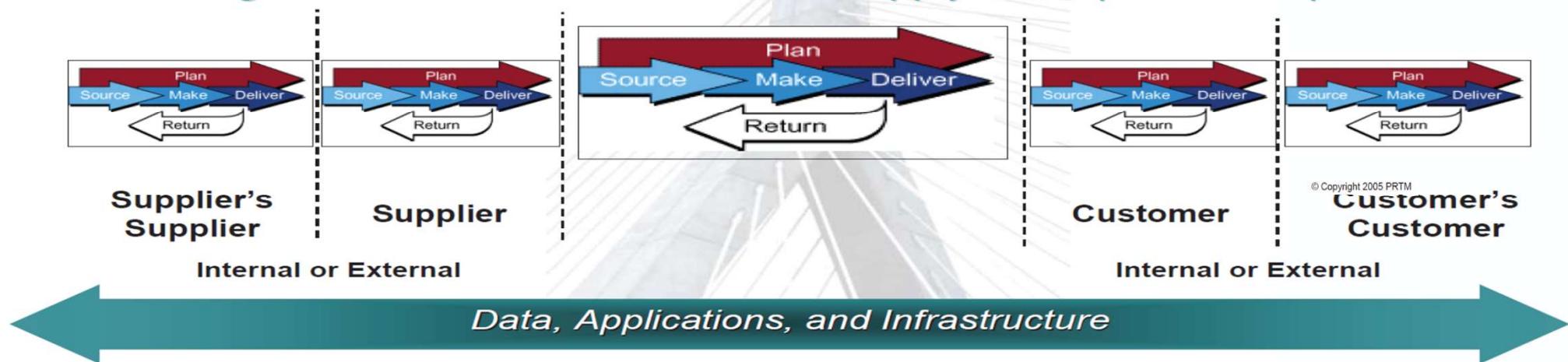
Discipline 2: Develop an End-to-End Process Architecture

Develop integrated supply chain processes and systems that interface efficiently with the rest of the enterprise

There Are Four Tests An Effective End-to-end Process Architecture Must Meet

1. Strategic Fit — Enables execution of your supply chain strategy
2. End-to-end Focus — Ensures end-to-end vision and management
3. Simplicity — Is composed of simple, streamlined processes
4. Integrity — Is highly reliable, with robust links between processes, data, and information systems

Leverage SCOR to set the context for supply chain process improvement

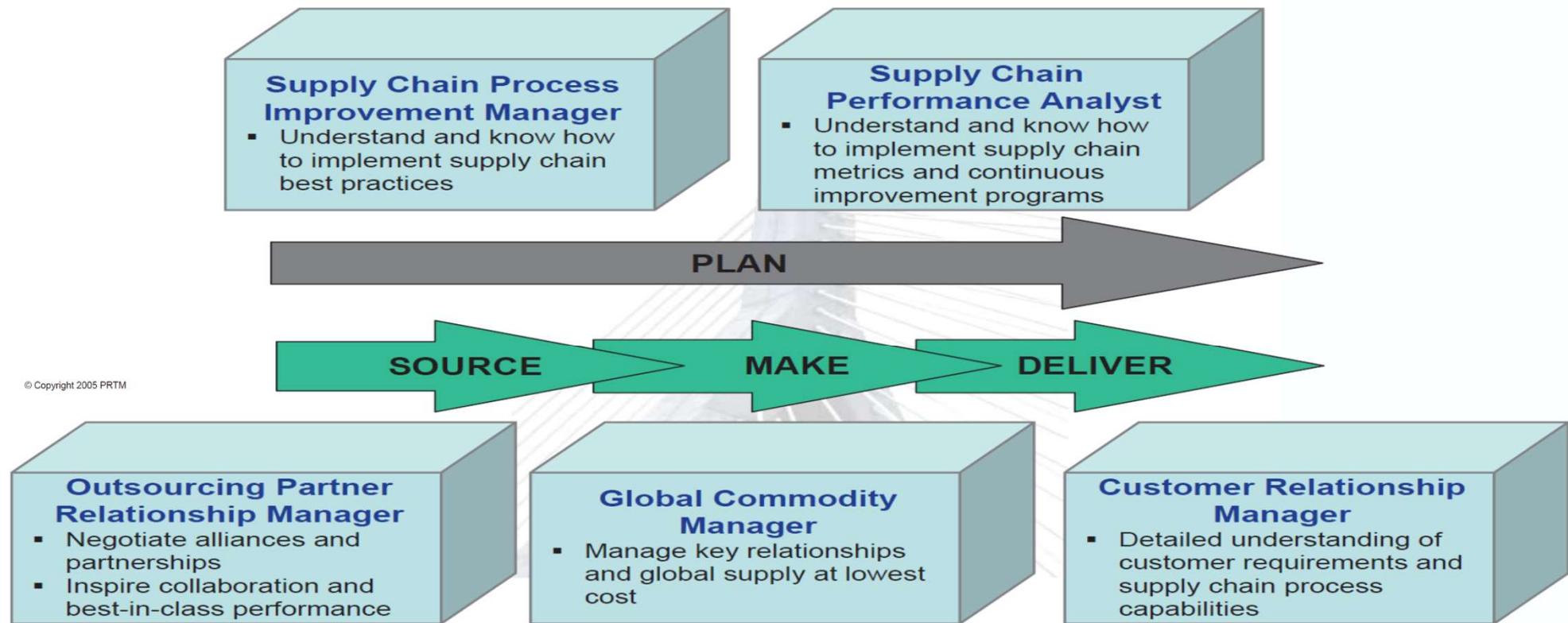


Discipline 3: Design Your Organization for Performance

Develop and maintain organizational structure and skills to define and manage the supply chain of the future

What Skills Will My Supply Chain Need In The Future?

The end-to-end supply chain will need new management skills that most companies do not possess today



Discipline 4: Built the Right Collaborative Model

*Understand core competencies
and choose partners to maximize
focus and profitability*

FOUR BASIC MODELS OF COLLABORATIONS: NOT ONE-SIZE-FITS-ALL

The Collaboration Spectrum

Extensive
Collaboration

Limited
Collaboration

Infeasible

Synchronized
Collaboration

Coordinated
Collaboration

Cooperative
Collaboration

Transactional
Collaboration

Low Return

Many Relationships

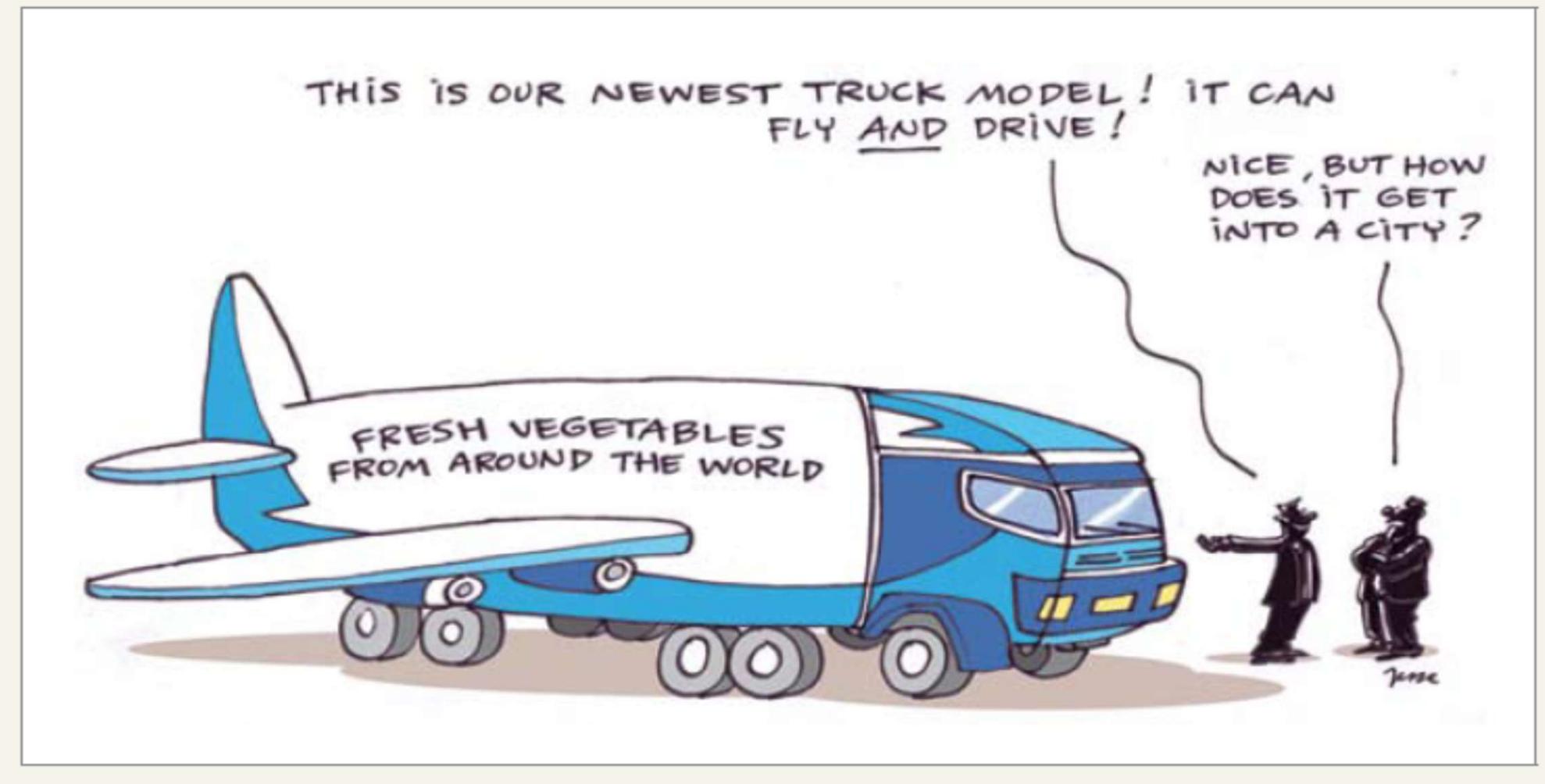
Few Relationships

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Discipline 4: Built the Right Collaborative Model

*Understand core competencies
and choose partners to maximize
focus and profitability*

3. Collaborative City Distribution



Cap Gemini, GCI 2016

Discipline 5: Use Metrics to Drive Business Success

Use metrics to measure the health of each core supply chain process and identify problem areas

SCOR Level 1 Metrics Provide A Starting Point For A Balanced Strategic Supply Chain Scorecard

Measurement is the only way to understand whether process performance is improving or worsening and whether action is required.

Key Supply Chain Management Metrics	Delivery Performance/Responsiveness	Flexibility	Cost	Asset Management
Delivery Performance	✓			
Order Fulfillment Lead Time	✓			
Production Flexibility		✓		
Total Supply Chain Management Cost			✓	
Value-Added Productivity			✓	
Inventory Days of Supply				✓
Cash-to-Cash Cycle Time				✓
Net Asset Turns				✓

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CONTENT OF BLOC 11

SUPPLY CHAIN MANAGEMENT STRATEGIES

1. Basics of Strategic Supply Chain Management
2. Adressing uncertainties in Strategic Supply Chain Management
3. The 4 Generic Strategic Supply Chain Management Strategies
4. Focus on the AGILE Strategic Supply Chain Management Strategy

- ➔ Managing supply chain is a complex and challenging task
- ➔ Uncertainty in Demand and Supply MUST be understood
- ➔ A product with stable demand and a reliable source of supply should not be managed in the same way as one with a highly unpredictable demand and an unreliable source of supply
- ➔ A management based on a "*one-size-fits-all*" or "*try-everything*" mentality will fail !

- Do a product's supply and demand characteristics affect its optimal supply chain strategy?

- Marshall Fisher proposed a link between the demand characteristics of a product and its optimal supply chain
- The Fisher framework did not account for supply characteristics

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Functional Product	Innovative Product
Low demand uncertainties	High demand uncertainties
More predictable demand	Difficult to forecast
Stable demand	Variable demand
Long product life	Short selling season
Low inventory cost	High inventory cost
Low profit margins	High profit margins
Low product variety	High product variety
Higher volume per SKU	Low volumes per SKU
Low stock-out cost	High stock-out cost
Low obsolescence	High obsolescence

- Predictability of demand is the key distinguishing feature of products in this dimension
- Demand uncertainty can be reduced by information sharing and close coordination

Demand Uncertainty

Low (Functional Products) High (Innovative Products)

Grocery, basic apparel,
food, oil and gas
Energy, etc.

Fashion apparel,
computers, pop music
High tech, etc.

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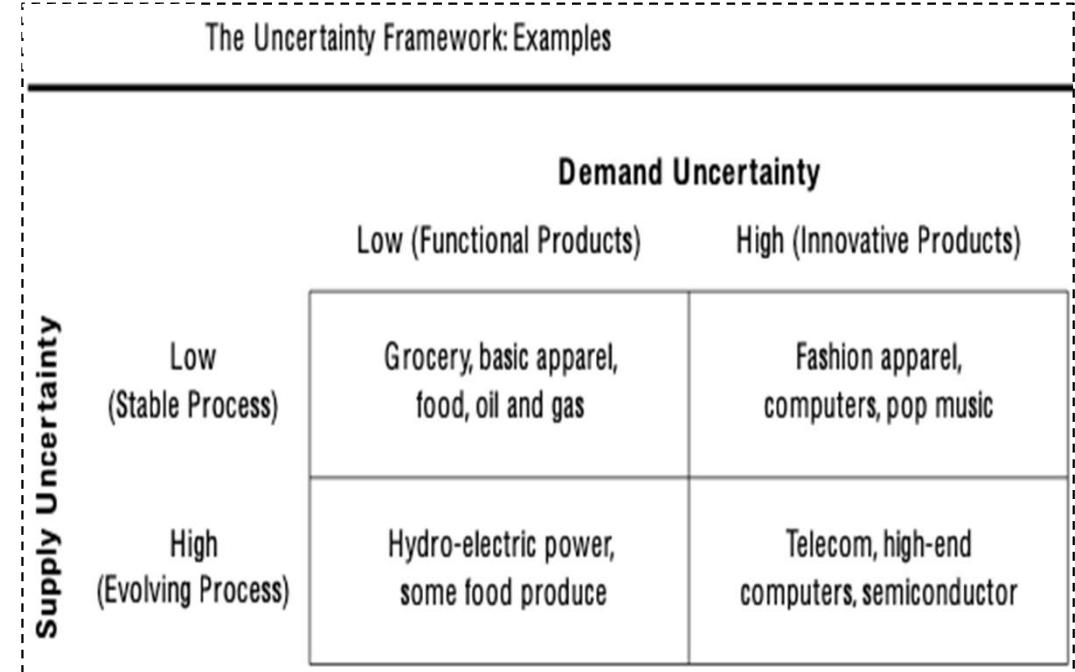
- Lee extended Marshall's work by introducing supply characteristics:
 - Stable processes – low supply uncertainty
 - Evolving processes – high supply uncertainty

Stable Process	Evolving Process
Less breakdowns	Vulnerable to breakdowns
Stable and higher yields	Variable and lower yields
Less quality problems	Potential quality problems
More supply sources	Limited supply sources
Reliable suppliers	Unreliable suppliers
Less process changes	More process changes
Less capacity constraint	Potential capacity constrained
Easier to change over	Difficult to changeover
Flexible	Inflexible
Dependable lead time	Variable lead time

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- Key driving features are the stability and maturity of the manufacturing process, underlying technology and supply base
- Free exchange of information, collaboration and supplier hubs decrease supplier uncertainty

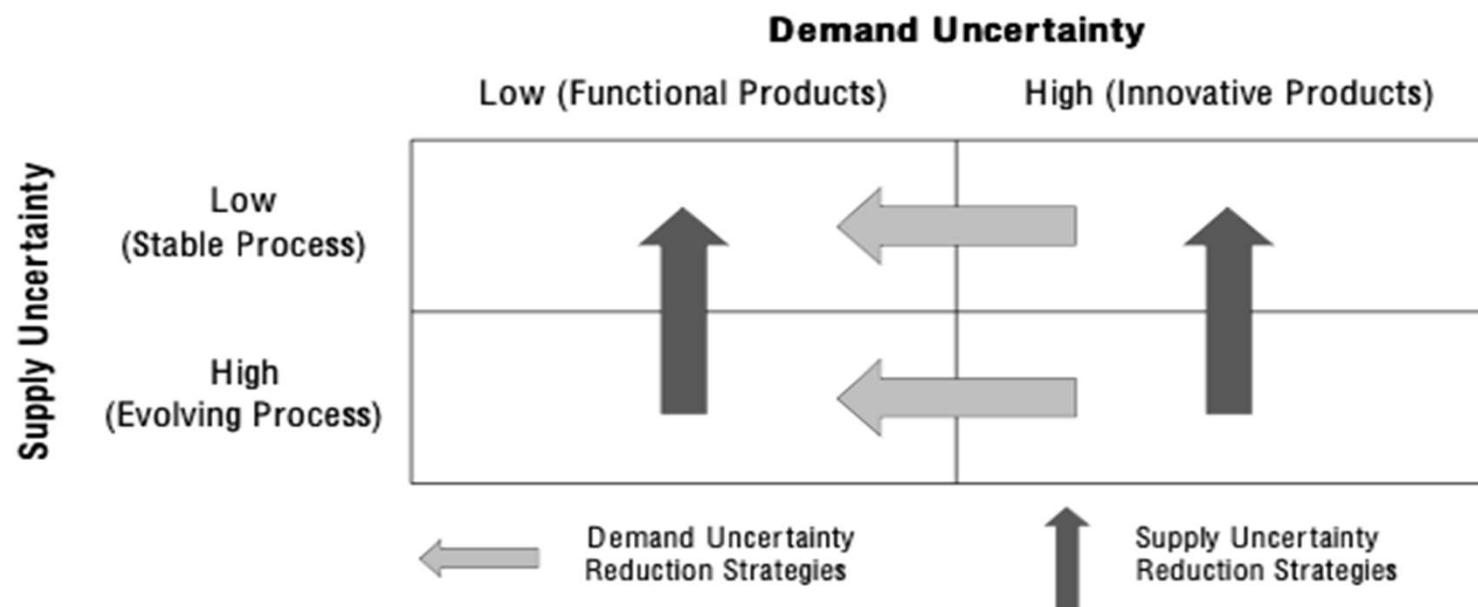
Prof. Hau Lee's extension results in an uncertainty framework consisting of 4 product categories



Hau Lee, California Management Review, vol.44, n°3

Changing the uncertainty landscape

The Uncertainty Reduction Strategies



Hau Lee, California Management Review, vol.44, n°3

UNCERTAINTY LANDSCAPE AND THE PRODUCT LIFECYCLE DYNAMICS

(clockwise)

Demand Uncertainty		
Supply Uncertainty	Low (Functional Products)	High (Innovative Products)
Low (Stable Process)		
High (Evolving Process)		New Product Introduction

Demand Uncertainty		
Supply Uncertainty	Low (Functional Products)	High (Innovative Products)
Low (Stable Process)		
High (Evolving Process)		Ramp up

Demand Uncertainty		
Supply Uncertainty	Low (Functional Products)	High (Innovative Products)
Low (Stable Process)	Maturity	Ramp up
High (Evolving Process)	End of Life	New Product Introduction

Demand Uncertainty		
Supply Uncertainty	Low (Functional Products)	High (Innovative Products)
Low (Stable Process)	Maturity	Ramp up
High (Evolving Process)		New Product Introduction

Product lifecycles are now shorter than ever!!!

CONTENT OF BLOC 11

SUPPLY CHAIN MANAGEMENT STRATEGIES

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Demand Uncertainty Mitigation Strategy

- Fisher's framework created two product categories based on demand characteristics:
 - Functional products – predictable demand, long product life cycle, low product variety, stock-out rate and contribution margin
 - Innovative products – unpredictable demand, short product life cycle, high product variety, stock-out rate and contribution margin
- Supply chain strategy should match product type
 - Functional products -> Efficient supply chain
 - Innovative products -> Responsive supply chain

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Demand Uncertainty	
Low (Functional Products)	High (Innovative Products)
Grocery, basic apparel, food, oil and gas Energy, etc.	Fashion apparel, computers, pop music High tech, etc.

Demand Uncertainty	
Low (Functional Products)	High (Innovative Products)
Efficient Supply Chains	Responsive Supply Chains

Demand Uncertainty Mitigation Strategy

- Efficient supply chains
 - Focus on cost efficiency
 - Initiatives: eliminate non-value adding activities, pursue scale economies, optimize capacity utilization and implement efficient information transmission
- Responsive supply chains
 - Focus on flexibility in responding to customer needs
 - Initiatives: Postponement, build-to-order processes, mass customization, information sharing and ensuring of order accuracy

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Demand Uncertainty

Low (Functional Products)

High (Innovative Products)

Grocery, basic apparel,
food, oil and gas
Energy, etc.

Fashion apparel,
computers, pop music
High tech, etc.

Demand Uncertainty

Low (Functional Products)

High (Innovative Products)

Efficient Supply Chains

Responsive Supply Chains

Demand Uncertainty Mitigation Strategy

Demand Uncertainty		Demand Uncertainty	
Low (Functional Products)	High (Innovative Products)	Low (Functional Products)	High (Innovative Products)
Grocery, basic apparel, food, oil and gas Energy, etc.	Fashion apparel, computers, pop music High tech, etc.	Efficient Supply Chains	Responsive Supply Chains

Responsive Supply Chains—These are supply chains that utilize strategies aimed at being responsive and flexible to the changing and diverse needs of the customers. To be responsive, companies use build-to-order and mass customization processes as a means to meet the specific requirements of customers. The customization processes are designed to be flexible. Order accuracy (i.e., accurate specification of customer requirements) is the key to the success of mass customization. Again, the Internet has enabled very accurate and timely capturing of highly personalized requirements of customers as well as fast transfer of order information to the factory or customization centers for the final configuration of the product.

Efficient Supply Chains—These are supply chains that utilize strategies aimed at creating the highest cost efficiencies in the supply chain. For such efficiencies to be achieved, non-value-added activities should be eliminated, scale economies should be pursued, optimization techniques should be deployed to get the best capacity utilization in production and distribution, and information linkages should be established to ensure the most efficient, accurate, and cost-effective transmission of information across the supply chain. The role of the Internet in this case is that it enables the supply chain to have tight and effortless information integration, as well as enabling production and distribution schedules to be optimized once the demand, inventory, and capacity information throughout the supply chain are made transparent.

Demand Uncertainty Mitigation Strategy

- Efficient supply chains seek to minimize physical costs – production, transportation and inventory storage
- Responsive supply chains seek to minimize market mediation costs – markdowns and stock-outs
- The most common supply chain mismatch is implementing an efficient strategy for an innovative product
- Less common mismatch is responsive strategy for a functional product

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Demand Uncertainty

Low (Functional Products)	High (Innovative Products)
Grocery, basic apparel, food, oil and gas Energy, etc.	Fashion apparel, computers, pop music High tech, etc.

Demand Uncertainty

Low (Functional Products)	High (Innovative Products)
Efficient Supply Chains	Responsive Supply Chains

Crossing Demand Uncertainty Mitigation Strategy and Supply Uncertainty

- Lee extended Marshall's work by introducing supply characteristics:
 - Stable processes – low supply uncertainty
 - Evolving processes – high supply uncertainty
- This results in 2 additional supply chains type: Risk-Hedging and Agile

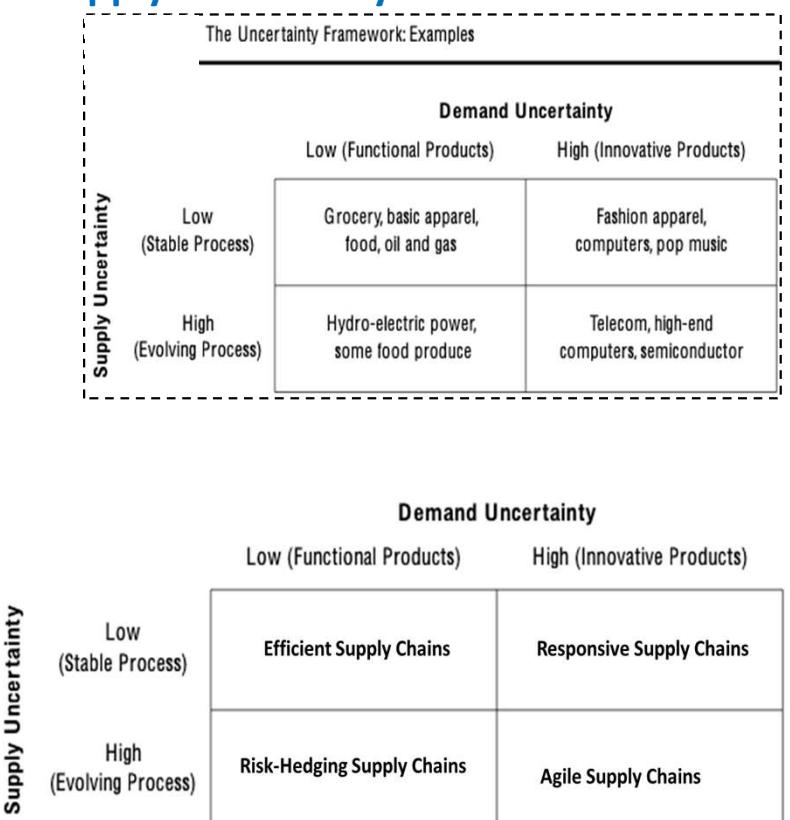
		The Uncertainty Framework: Examples	
		Demand Uncertainty	
		Low (Functional Products)	High (Innovative Products)
		Low (Stable Process)	Grocery, basic apparel, food, oil and gas
		High (Evolving Process)	Fashion apparel, computers, pop music
		Hydro-electric power, some food produce	Telecom, high-end computers, semiconductor

		Demand Uncertainty	
		Low (Functional Products)	High (Innovative Products)
Supply Uncertainty	Low (Stable Process)	Efficient Supply Chains	Responsive Supply Chains
	High (Evolving Process)	Risk-Hedging Supply Chains	Agile Supply Chains

Crossing Demand Uncertainty Mitigation Strategy and Supply Uncertainty

- Risk-hedging supply chains
 - Focus on pooling and sharing resources across the supply chain
 - Initiatives: increased safety stocks, multiple suppliers for critical components and real-time sharing of inventory and demand information
- Agile supply chains
 - Hybrid of responsive and risk-hedging strategies
 - Implement strategies that allow flexibility in response to changing customer needs and pool inventory and other resources to mitigate shortages and supply disruptions

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Crossing Demand Uncertainty Mitigation Strategy and Supply Uncertainty

Risk-Hedging Supply Chains—These are supply chains that utilize strategies aimed at pooling and sharing resources in a supply chain so that the risks in supply disruption can also be shared. It is therefore a risk-hedging strategy. A single entity in a supply chain can be vulnerable to supply disruptions, but if there is more than one supply source or if alternative supply resources are available, then the risk of disruption would be reduced. A company may want to increase the safety stock of its key component to hedge against the risk of supply disruption, and by sharing the safety stock with other companies who also need this key component, the cost of maintaining this safety stock can be shared. Such inventory pooling strategies are quite common in retailing, where different retail stores or dealerships share inventory. Distributors such as Ingram-Micro have also provided similar pooling of inventory for their customers. The Internet plays a key role in providing information transparency among the members of the supply chain that are sharing inventory. Having real time information on inventory and demand allows the most cost-effective transshipment of goods from one site (with excess inventory) to another site (in need).

		Demand Uncertainty	
		Low (Functional Products)	High (Innovative Products)
Supply Uncertainty	Low (Stable Process)	Efficient Supply Chains	Responsive Supply Chains
	High (Evolving Process)	Risk-Hedging Supply Chains	Agile Supply Chains

Agile Supply Chains—These are supply chains that utilize strategies aimed at being responsive and flexible to customer needs, while the risks of supply shortages or disruptions are hedged by pooling inventory or other capacity resources. These supply chains essentially have strategies in place that combine the strengths of “hedged” and “responsive” supply chains. They are agile because they have the capability to be responsive to the changing, diverse, and unpredictable demands of customers on the front end, while minimizing the back-end risks of supply disruptions.

Crossing Demand Uncertainty Mitigation Strategy and Supply Uncertainty

Role of the Internet in Supply Chain Strategy

12

- Efficient supply chains: the internet enables tight and cost-effective information integration among supply chain members
- Responsive supply chains: accurate and timely capturing and transfer of customer requirements can be done very effectively via the internet
- Risk-hedging supply chains: information transparency in real-time through the internet makes pooling risks more manageable

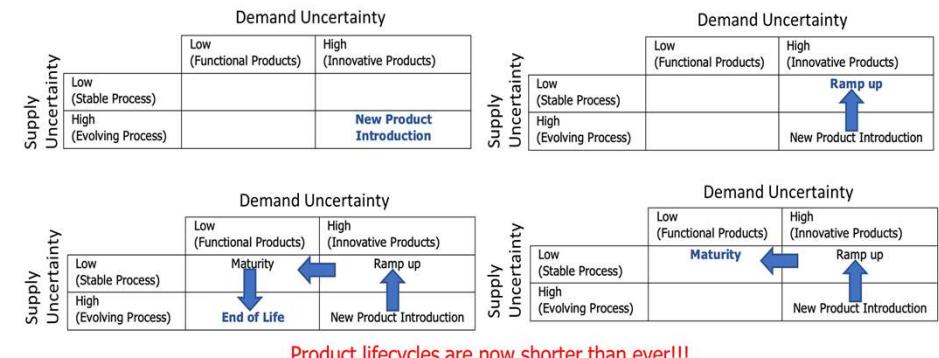
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		The Uncertainty Framework: Examples	
		Demand Uncertainty	
Supply Uncertainty	Low (Stable Process)	Low (Functional Products)	High (Innovative Products)
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		Demand Uncertainty
		Low (Functional Products) High (Innovative Products)
Supply Uncertainty	Low (Stable Process)	Efficient Supply Chains Responsive Supply Chains
	High (Evolving Process)	Risk-Hedging Supply Chains Agile Supply Chains

Takeaways from Marshall Fisher – Hau Lee Framework:

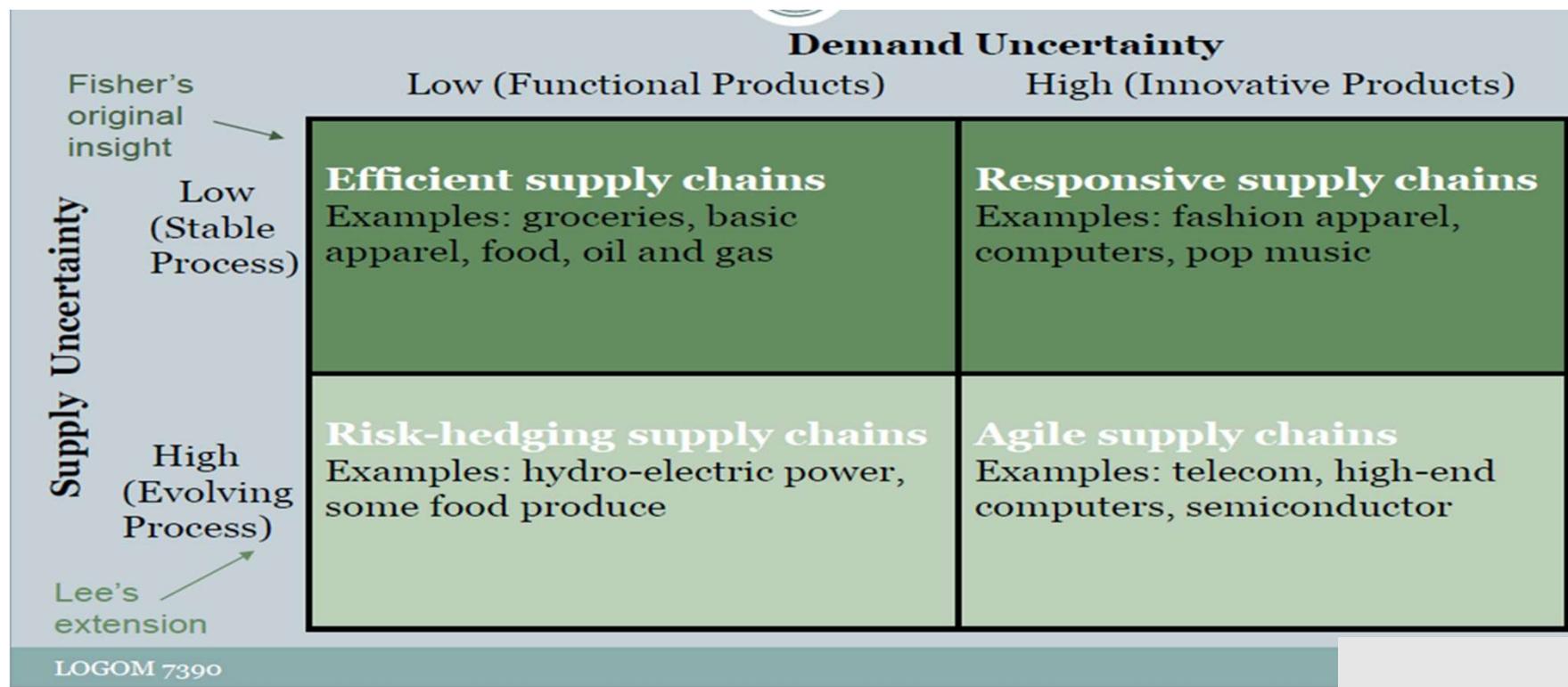
- One-size-fit-all strategy very risky: use right supply chain strategy that matches the uncertainties of the product, market, time and product life cycle.
- Mixed strategy to gain both efficiency and flexibility.
- Dynamic strategy based on changing time and product life cycle.



- Provides a workable framework for aligning a firm's strategy with its products
- Enables the coordination of the entire supply chain around common strategy
- Highlights the importance of variation and uncertainty in supply and demand to strategic alignment and performance
- Framework does not adequately address products whose dominant uncertainty is neither supply nor demand e.g. regulatory uncertainty for pharmaceuticals



THE 4 GENERIC STRATEGIC SUPPLY CHAIN MANAGEMENT STRATEGIES



CONTENT OF BLOC 11

SUPPLY CHAIN MANAGEMENT STRATEGIES

1. Basics of Strategic Supply Chain Management
2. Addressing uncertainties in Strategic Supply Chain Management
3. The 4 Generic Strategic Supply Chain Management Strategies
4. **Focus on the AGILE Strategic Supply Chain Management Strategy**

Focus on the **AGILE** Strategic Supply Chain Management Strategy

AGILITY should be built at every link of the

Agile Strategic Supply Chain Management Strategy :

6+1* rules of thumb:

1. **Quickly Provide data on changes** in supply and demand to partners continuously so they can respond quickly.
2. **Develop collaborative relationships** with suppliers and customers so that companies work together to design or redesign processes, components, and products as well as to prepare backup plans.
3. **Introduce postponement:** Design products so that they share common parts and processes initially and differ substantially only by the end of the production process.

Focus on the **AGILE** Strategic Supply Chain Management Strategy

AGILITY should be built at every link of the
Agile Strategic Supply Chain Management Strategy :

6+1* rules of thumb:

4. Keep a small inventory of inexpensive, nonbulky components that are often the cause of bottlenecks.
5. Build a dependable logistics system that can enable your company to regroup quickly in response to unexpected needs
6. Put together a team that knows how to invoke backup plans, contingency plans.

7*. Seek additions that can strengthen the **AGILE Strategic SCM Strategy**



Northeast Supply Chain Conference

PRM Management
Consultants

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bhouseholder@prm.com



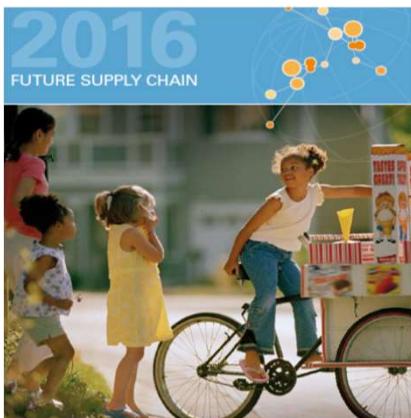
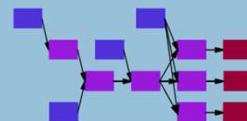
Leading thinking
for lasting results

Strategic Supply Chain Management:
The Five Disciplines for Top Performance

September 20, 2005

Supply Chains for the Information Age: Mastering Uncertainty and Change

M. Eric Johnson
Tuck School of Business
Dartmouth College



Serving Consumers
in a Sustainable Way



The Bullwhip Effect In Supply Chains¹

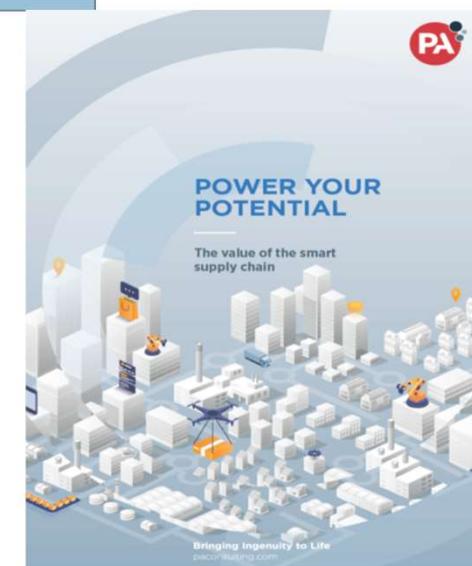
Hau L Lee, V Padmanabhan, and Seungjin Whang;
Sloan Management Review, Spring 1997, Volume 38, Issue 3, pp. 93-102



SUPPLY CHAIN WHITE PAPER

10 KEY TRENDS TO UNDERSTAND SUPPLY CHAIN MANAGEMENT

ALEXANDRE
GARNIER | APRIL
2017



System Initiative on Shaping the Future of Food Security and Agriculture

Innovation with a Purpose:
The role of technology innovation
in accelerating food systems
transformation



COMMITTED TO
IMPROVING THE STATE
OF THE WORLD

Prepared in collaboration with McKinsey & Company

January 2018



COURSE PLAN 2024-2025 (*SESSIONS & DATES VIEW*)

- SESSION 01/M: 05/11/2024 – INTRODUCTION + BLOC 1 (THEORY & EXERCISES PLANNING & FORECASTING)
- SESSION 02/M: 09/11/2024 – BLOC 1 (THEORY & EXERCISES PLANNING & FORECASTING)
- SESSION 03/M: 12/11/2024 – BLOC 4 (THEORY & EXERCISES, WAREHOUSING & INVENTORY MANAGEMENT)
- SESSION 04/M: 16/12/2024 – *** BLOC 5 (EXPERT TALK, MAKE) + BLOC 8 (EXPERT TALK, REVERSE) ***
- SESSION 05/T: 19/11/2024 – BLOC 2 (SOURCING) + BLOC 3 (DELIVER)
- SESSION 06/T: 23/11/2024 – BLOC 9 (QUALITY)
- SESSION 07/M: 30/11/2024 – BLOC 6 (THEORY & EXERCISES, LOGISTICS NETWORK MODELLING & PLANNING)
- SESSION 08/M: 03/12/2024 – BLOC 4 (EXPERT TALK, INVENTORY) + BLOC 7 (EXPERT TALK, DISTRIBUTION)
- SESSION 09/M: 07/12/2024 – BLOC 7 (THEORY & EXERCISES, DISTRIBUTION LOGISTICS)
- SESSION 10/M: 10/12/2024 – BLOC 9 (EXPERT TALK, QUALITY)
- SESSION 11/T: 14/12/2024 – BLOC 10 (SUPPLY CHAIN INTEGRATION) + BLOC 11 (SUPPLY CHAIN STRATEGIES)
- **SESSION 12/T: 17/12/2024 – BLOC 11 (SUPPLY CHAIN STRATEGIES) + BLOC 12 (SUPPLY CHAIN PERFORMANCE)**

*** MAY BE CONVERTED TO WRAP-UP SESSION IN JANUARY BEFORE EXAM – (PREPARATION OF THE EXAM)***