COURSE GEST-H-501

LOGISTICS ENGINEERING AND MANAGEMENT

Session n°5

Professor Alassane B. NDIAYE

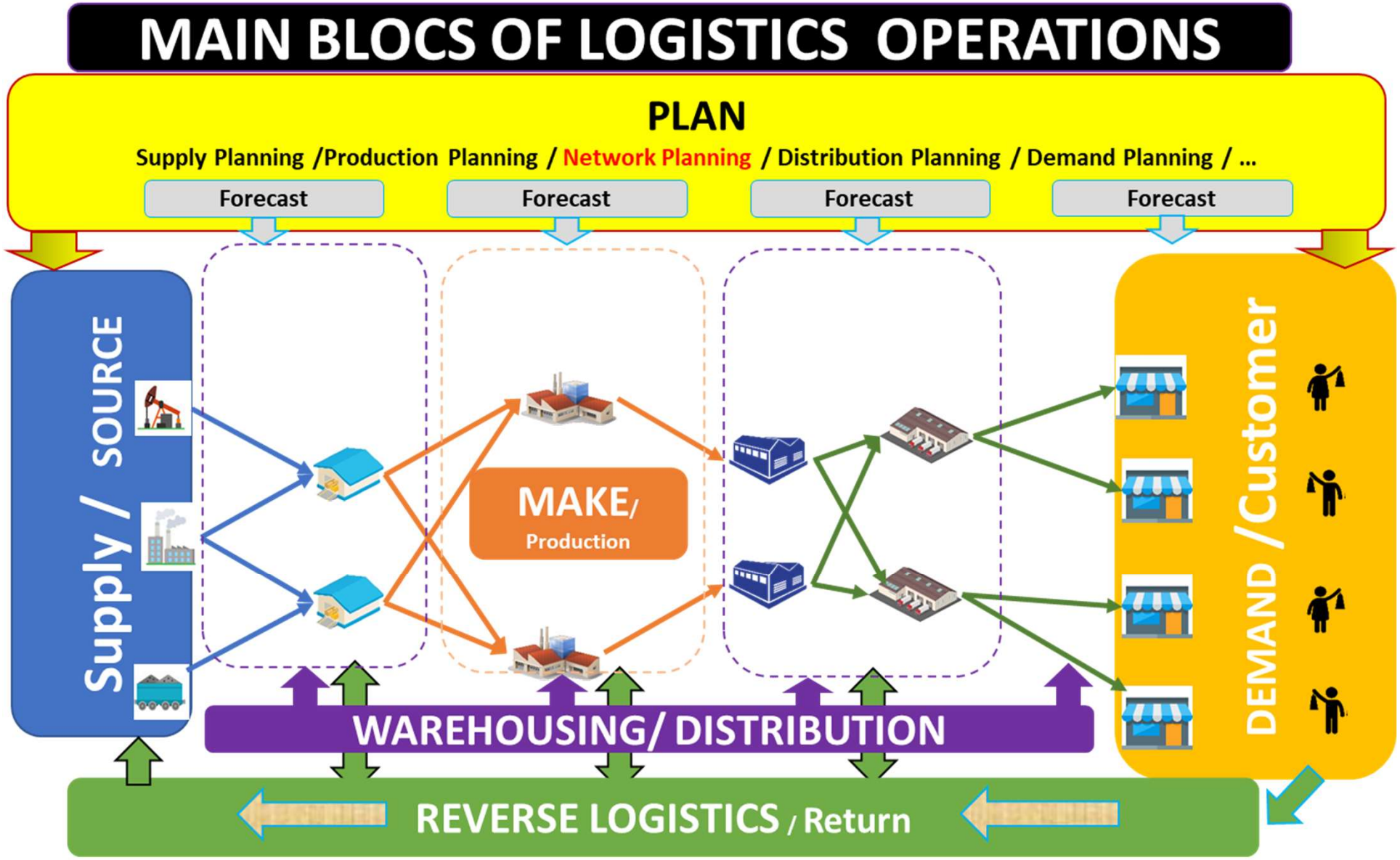
COURSE PLAN 2024-2025 *(SESSIONS & DATES VIEW)*

- 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 2

BASIC CONCEPTS OF SOURCING LOGISTICS


MAIN BLOCS OF LOGISTICS OPERATIONS
PLAN
Supply Planning /Production Planning / Network Planning / Distribution Planning / Demand Planning / ...
Forecast
Forecast
Forecast
Forecast
Supply / SOURCE
MAKE/ Production
DEMAND /Customer
WAREHOUSING/ DISTRIBUTION
REVERSE LOGISTICS / Return

CONTENT OF BLOC 2

Basic Concepts of Sourcing Logistics

1. Introduction
2. Mission & Operational Objectives
3. The Sourcing Portfolio
4. Purchasing Strategy
5. Sourcing and Elaboration of the Suppliers Panel
6. Company-Suppliers Relationships
7. Conclusion and further readings

➢ SOURCE

- *Input materials (supply, purchase)*
- *Input flows (continuous, on demand)*
- *Storage of input materials*
- *Timing of arrivals of input materials*
- *Variability of input materials' costs*
- *Quality of input materials*
- *Unexpected event or change*
- *Etc.*

KEY CHALLENGES

- *Identification and selection of the suppliers*
- *Quality control*
- *Integration of suppliers' constraints*
- *Collaboration with the suppliers*
- *Partnership with suppliers*
- *International risks (political, legal, etc.)*
- *Etc.*

- ***Purchases & supplies are needed to acquire the necessary inputs in order to manufacture finished products or provide services.***
- ***The Function "Supply and Purchasing" has a great impact on the level of competitiveness of a company.***
- ***This Function is of a changing nature and it is becoming a strategic issue for the companies.***
- ***Studies tend to show that at least 50% of the companies' income statements is attributable to that function ! (any gain on it is therefore important!)***

- ***Purchasing* : once quantities (and types) of inputs required and date of availability are known, it is about selecting the appropriate suppliers (specifications).**

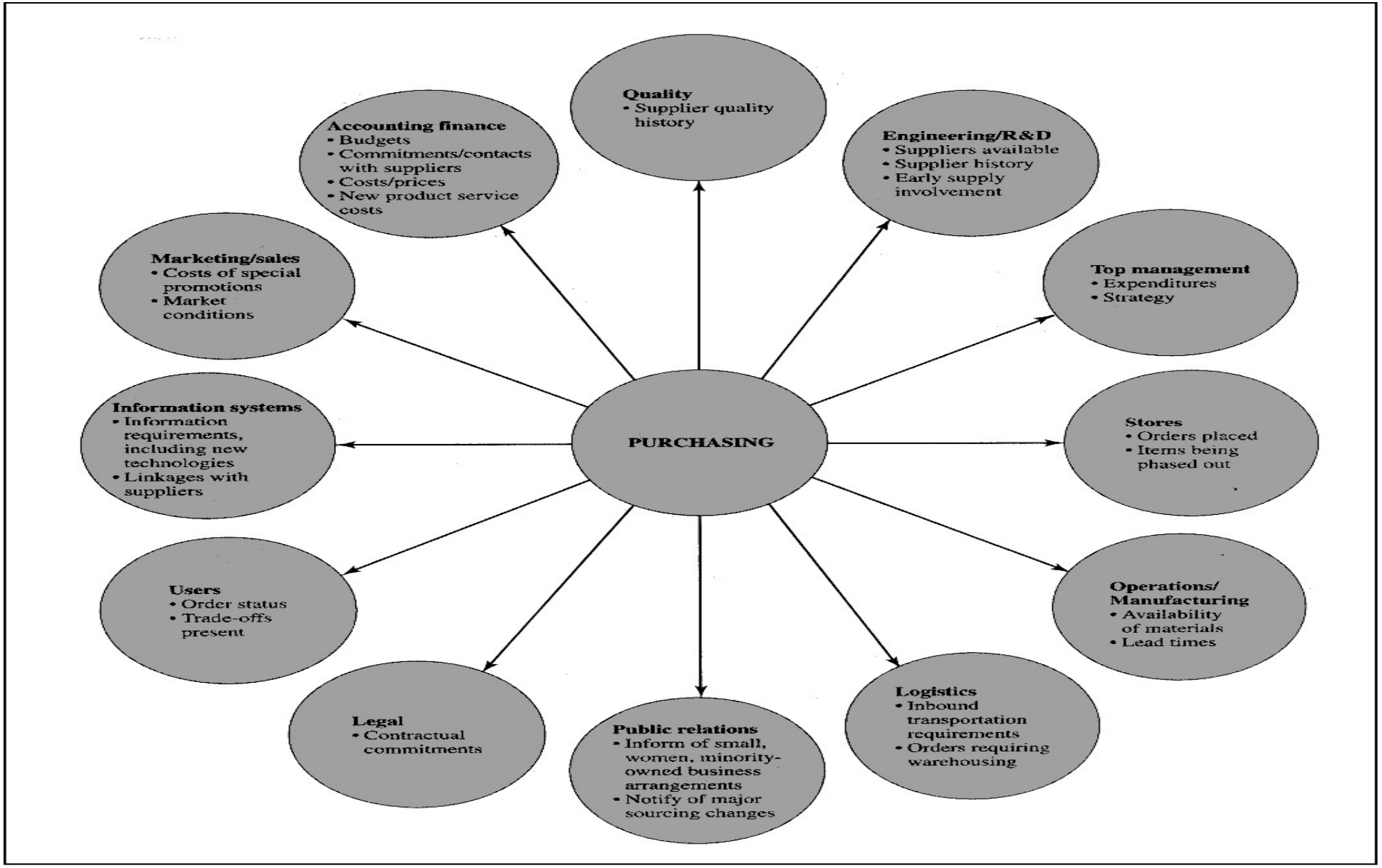
- ***Supply*: purchase order to suppliers, order tracking, receipt of order & quality control, transfer to the warehouses.**

- ***The fluctuating (and sometimes unpredictable) nature of the economic environment proves the necessity to have flexible suppliers and products with an adequate quality at the right time.***

► ***Importance of Purchasing***

Overview of internal information flows from purchasing

Lambert D. & al, Fundamentals of Logistics Management, Mc Graw Hill



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1. Introduction
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SEVEN KEY POINTS: MISSION OF SOURCING

1. ***Find and acquire the necessary inputs according to clear and precise specifications.***
2. ***Target an objective quality level from the supplier.***
3. ***Ensure the flexibility of the supplier (response to short delays, unforeseen variability of etc.).***
4. ***Guarantee the level of services expected by internal customers.***
5. ***Ensure a full control of related upstream risks.***
6. ***Design & control company's supply and purchasing policy.***
7. ***Contribute to the innovation policy of the company through a good knowledge of upstream (suppliers) innovations.***

THE PORTFOLIO

Definition : All goods, services and facilities purchased by the company and clustered according to a given logic :

a) Purchase of direct (input) production materials: raw materials

b) Purchase of outsourced services/products

c) Purchase of transport and logistics services

d) Purchase of technical and R&D services

e) Purchase of energy

f) Purchase of investments

g) Purchase of overheads

► These clusters often cope with the tasks' distribution observed within the Company's Purchasing Department

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FOUR MAJOR STEPS

1. ***First step: clustering of the Purchasing Portfolio into homogeneous segments***

2. ***Second step: on each segment, identify:***
   i. ***the economical stakes ,***
   ii. ***the various associated risks,***
   iii. ***the priority and specific leverages.***

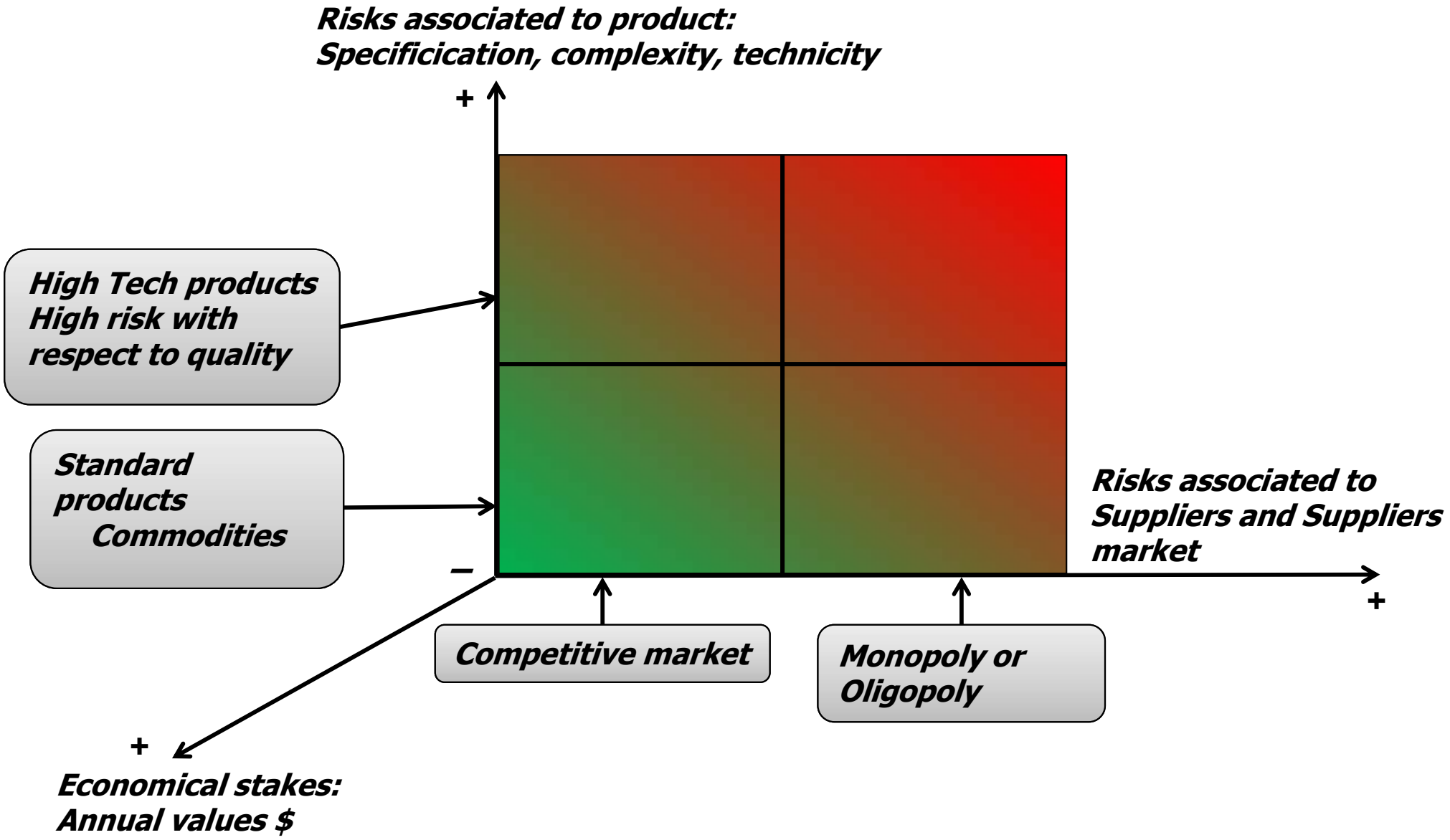
3. ***Third step: for each segment, definition of an operational action plan***

4. ***Fourth step: finally, definition of a performance measurement system for each segment and for all the segments***

Focus on the second step
Analysis according to three main axes

- ***Axis 1*: Economic stakes (Annual values of purchases)**
- ***Axis 2*: Risks associated to suppliers and suppliers market**
- ***Axis 3*: Risks associated to product features & technicity, and products internal risks, recurrence of purchase, etc…**

Focus on the second step



Focus on the second step

Risks associated to product: Specificication, complexity, technicity

Risks associated to Suppliers and Suppliers market

Economical stakes: Annual values $

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THE IDENTICATION OF THE SUPPLIERS THAT CAN MEET THE NEEDS OF THE COMPANY IN TERMS OF COST, TIME, INNOVATION AND QUALITY

FOUR MAJOR STEPS

1. ***Market, Risk and Change Analysis***
2. ***Assessment and approval of suppliers***
3. ***Selection of the Suppliers Panel (use of multi-criteria analysis)***
4. ***Management (tightening) of the Suppliers Panel***

THE IDENTICATION OF THE SUPPLIERS THAT CAN MEET THE NEEDS OF THE COMPANY IN TERMS OF COST, TIME, INNOVATION AND QUALITY

FOUR MAJOR STEPS

1. Market , Risk and Change Analysis

- *Technological Foresight*
- *Benchmarking (between suppliers)*
- *Market trends*
- *Products trends/evolution*
- *Risks Analysis*

THE IDENTICATION OF THE SUPPLIERS THAT CAN MEET THE NEEDS OF THE COMPANY IN TERMS OF COST, TIME, INNOVATION AND QUALITY

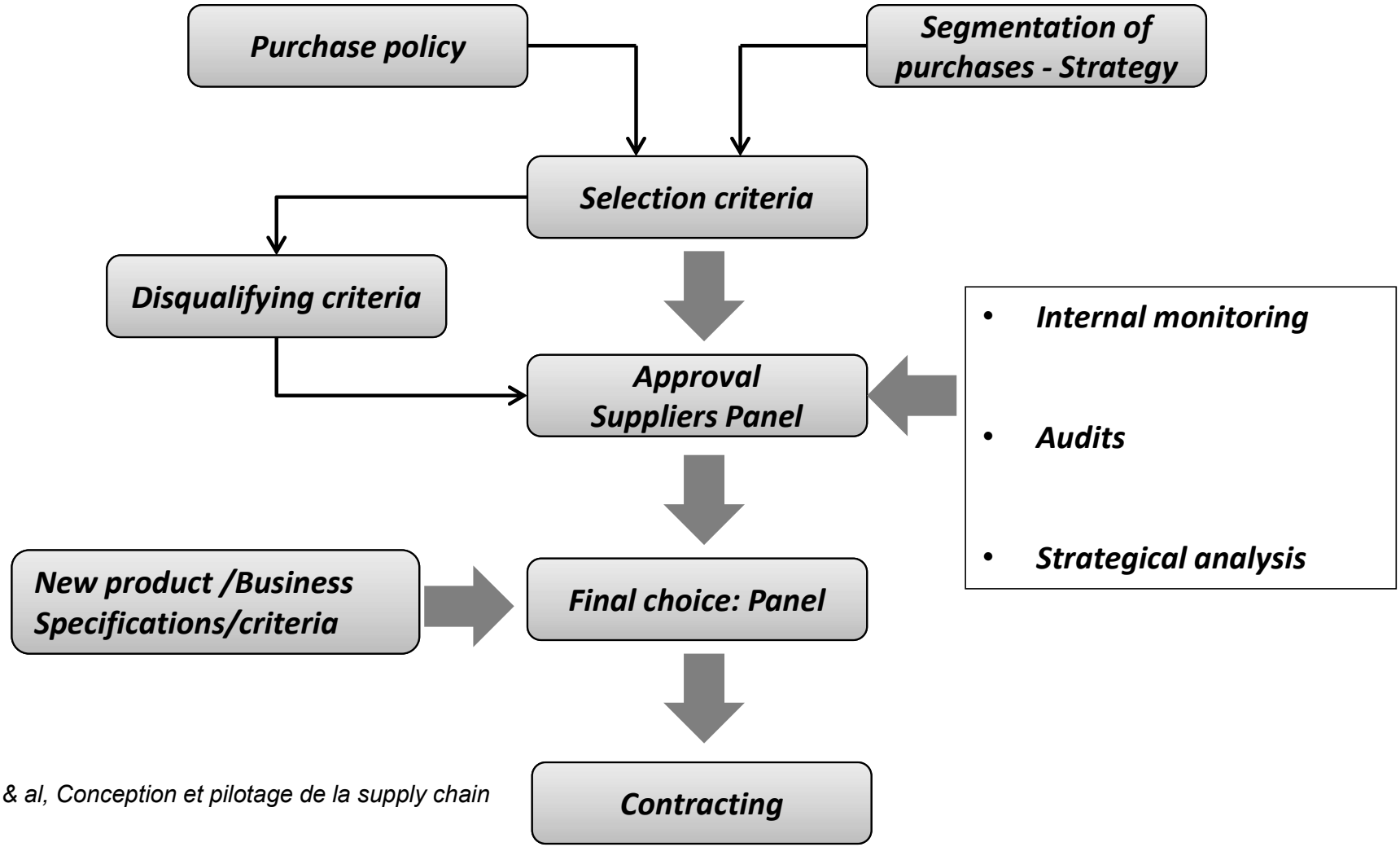
FOUR MAJOR STEPS

2. Assessment and approval of suppliers

- Competence and quality management system
- Competence and R&D innovation capacity
- Industrial competence
- Flexibility, logistics organization
- Reactivity / Additional services provided
- Level of competitiveness
- Compliance with sustainable development's requirements
- Competence in terms of management skills
- Terms/conditions of delivery
- Total cost of acquisition (TCA) / economic conditions

THE IDENTICATION OF THE SUPPLIERS THAT CAN MEET THE NEEDS OF THE COMPANY IN TERMS OF COST, TIME, INNOVATION AND QUALITY

3. Constitution of the Suppliers Panel through a multicriteria analysis



Baglin & al, Conception et pilotage de la supply chain

THE IDENTICATION OF THE SUPPLIERS THAT CAN MEET THE NEEDS OF THE COMPANY IN TERMS OF COST, TIME, INNOVATION AND QUALITY

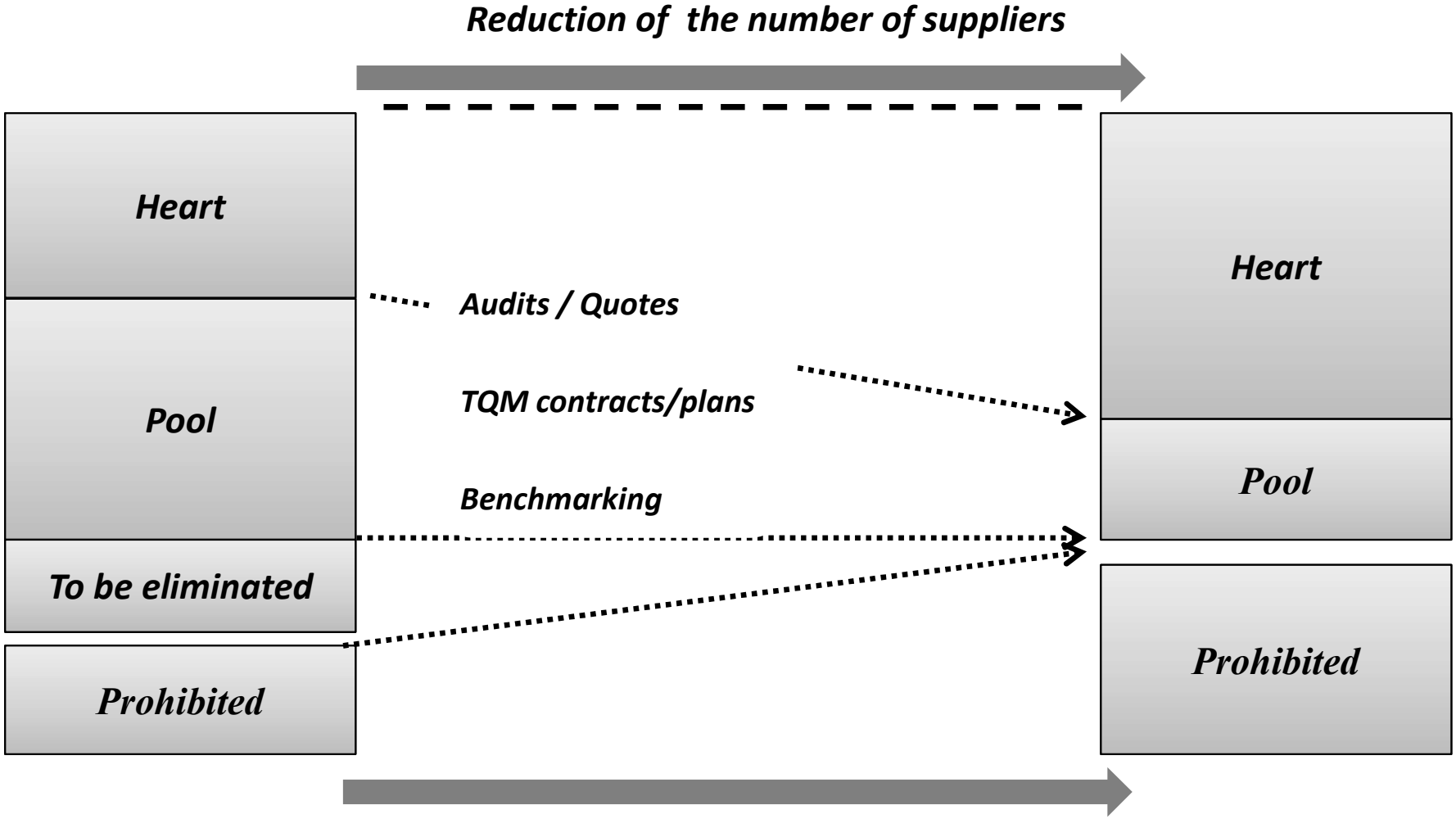
FOUR MAJOR STEPS

4. Management (tightening) of the Suppliers Panel

- The panel should not be (is not) "frozen"
- Definition of a set of indicators to monitor suppliers performance
- Creation of subsets/pool of suppliers especially for riskier purchases
- Tighten progressively the Suppliers Panel, in order to avoid a scattering of purchases throughout many sources .
- Pay particular attention to new suppliers (newcomers)
- Set a Total Quality Management Plan with each supplier (win-win)
- Manage "ruthlessly" the elimination of bad suppliers if ever the recovery plans fail

THE IDENTICATION OF THE SUPPLIERS THAT CAN MEET THE NEEDS OF THE COMPANY IN TERMS OF COST, TIME, INNOVATION AND QUALITY

4. "Tightening" of the Suppliers Panel



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A VERY GOOD MANAGEMENT OF COMPANY – SUPPLIERS RELATIONSHIPS IS CRITICAL !

- ***Makes more effective business links between a company and its suppliers***
- ***Contributes to the decrease of production costs***
- ***Contributes to the increase of the quality of raw materials supplied***
- ***Increases the quality of services from suppliers (responsiveness, …)***

Three type of relationships

1. Traditional (oriented cost optimization)

- **Goal : increase profits through the control of costs (of purchases)**
- **Formal systems of evaluation and certification**
- **Open contracts (invitation to "deliver" rather than call for tenders)**
- **Reliable forecasts of supply needs**

Three type of relationships

2. Collaborative relationship (oriented towards operational optimization)

- ***It is not only the cost /price of purchases that matters***
- ***Quality and high level of service required***
- ***Real-Time Exchange of operational information between the company and the supplier***
- ***Multi-annual plans (horizon)***
- ***Overlapping of logistics systems, distribution systems, quality systems etc…***

Three type of relationships

3. Partnership (oriented towards true performance)

- ***To cope with new business challenges*: customization, rapid changes, short time-to-market, ability to innovate quickly, etc..**
- **Suitable in the case of high level of risk or fast-changing technologies (IT, aeronautics, defense, electronic business, etc.).**

→ *Supplier is given a direct contribution in the design and evolution of the products*

→ *Long-term relationship, reciprocal commitments , mutual respect and transparency in information exchange*

→ *A technical co-contracting of final products /processes by joint R&D*

FOCUS ON THE 3rd TYPE : PARTNERSHIP

A specific tool: Supplier Relationship Management (SRM)

SRM is a set of tools to increase exchange of information between a company and its suppliers.

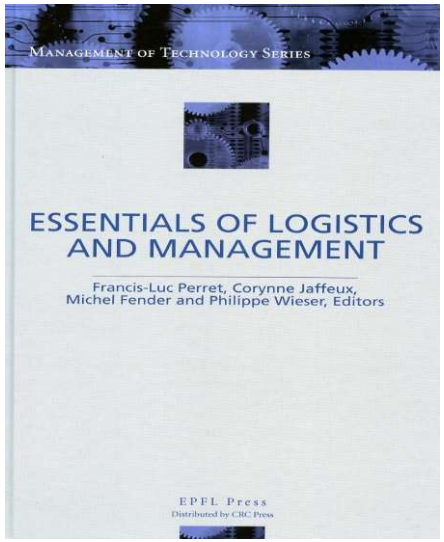
- ***When the relationship is mature and based on solid trust:***
  - ***Standardization of data exchange systems***
  - ***Integration of supply chain activities and processes , for instance the implementation of a CPR tool - Collaborative Planning & Replenishment:***
    - → *A specific tool that retailers, distributors, manufacturers and suppliers can use to collaborate on operational planning, forecasting, supply and replenishment.*

➢ *Concluding words…*

As the suppliers play a fundamental role in the logistics operations ecosystem, it is absolutely important to:

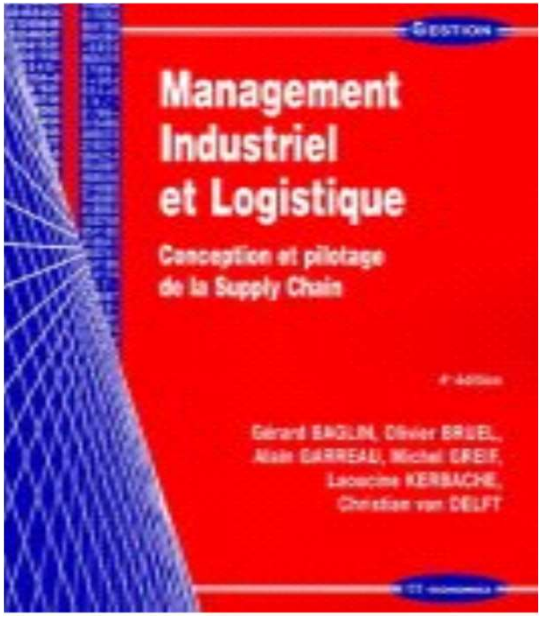
- ***Pay attention to the identification and selection of the suppliers***
- ***Enhance collaboration with the critical suppliers by building gradually a partnership which can be extended to planning (for instance a CPR Collaborative Planning & Replenishment)***

➢ REFERENCES/ESSENTIAL READINGS – "SOURCE"



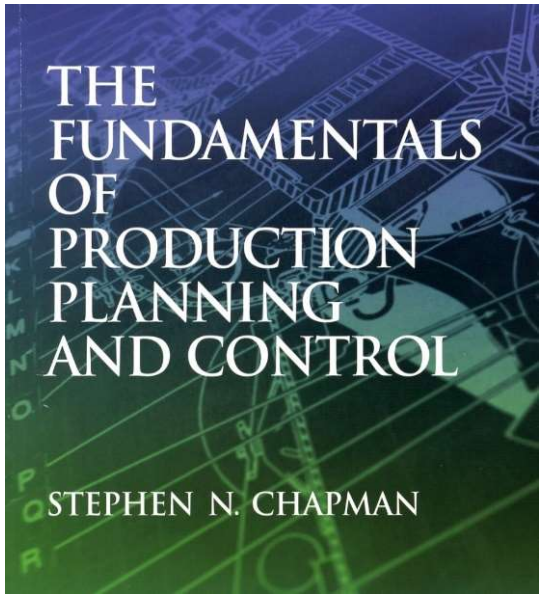
EPFL-Press, ISBN 978-1-4200-4619-9

Chapter 8: Marketing and Purchasing Management



Economica, ISBN 2-7178-5017-1

Chapitre 8: Sourcing et stratégie fournisseurs

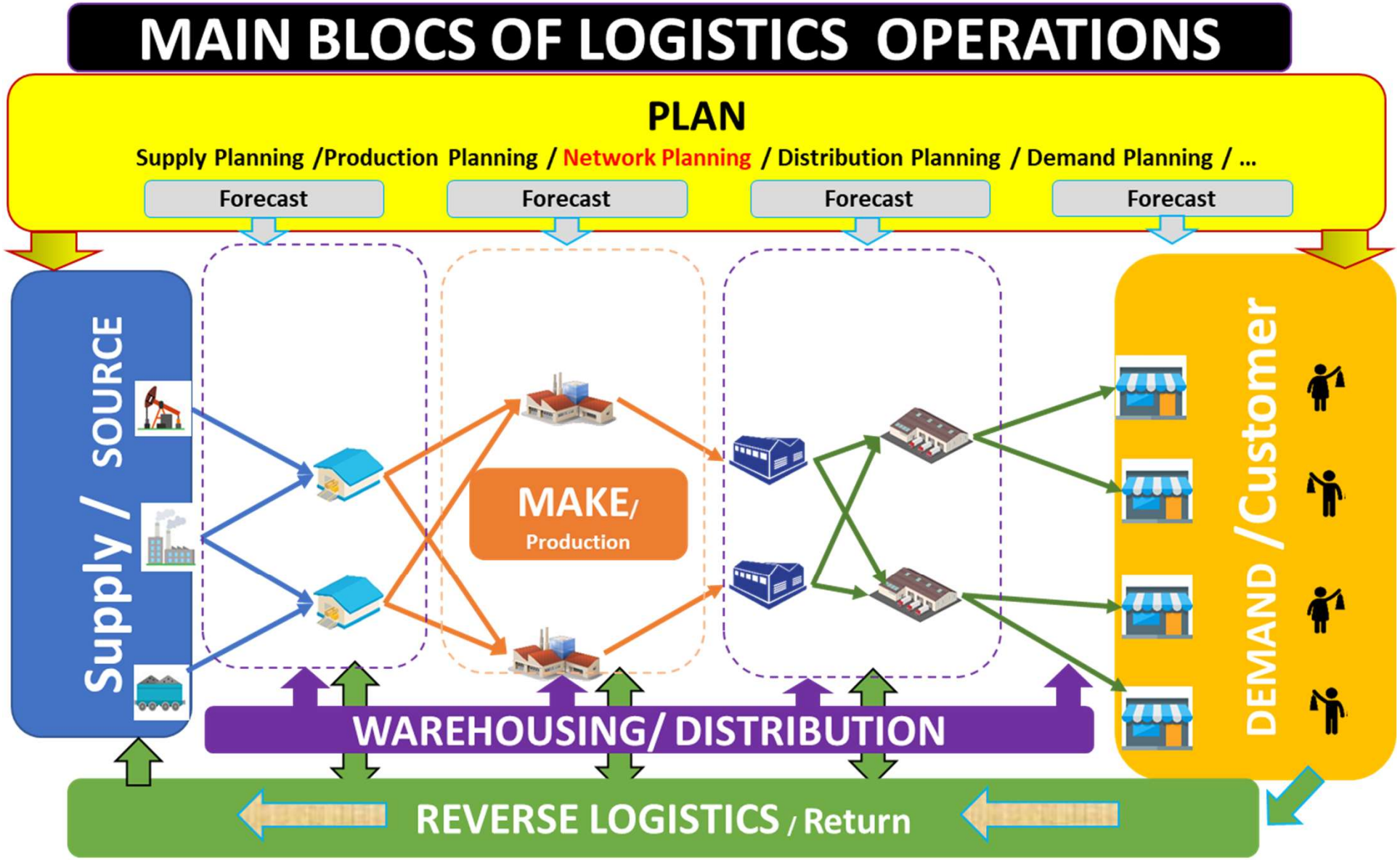


Pearson Prentice Hall, ISBN 0-13-017615-X

Chapter 11: Partnering Functions: Purchasing and Distribution

BLOC 3:

BASIC CONCEPTS OF WAREHOUSING AND DELIVER (DISTRIBUTION LOGISTICS)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DEMAND /Customer
WAREHOUSING/ DISTRIBUTION
REVERSE LOGISTICS / Return

CONTENT OF BLOC 3

Basics Concepts of Warehouse and Distribution Logistics

1. Introduction warehousing and distribution network
2. Role of warehousing, functions and types of warehouses
3. A particular warehouse type: the Platform
4. A particular warehouse function: Cross-docking
5. Warehouse management
6. The distribution network
7. Basic structures of a distribution network
8. Optimisation of a distribution network
9. Transport
10. Conclusion and further readings

- **DISTRIBUTION/DELIVER = important function in the logistics operations' ecosystem**
- **It is the interface producer-customer**
- **It's quality is critical since it shapes the first customer's impression (which SHOULD BE positive!)**
- **It often requires a physical distribution network**
- **It often involves a WAREHOUSE (upstream or downstream) and/or an additional processing**

  → ***a good inventory management system is critical !***

- **The use of warehouses in a distribution system can be justified by the need to:**
  - *Cope with any variability of climate, market, prices, etc.*
  - *Ensure delivery at the right time (shortening customer lead times)*
  - *Group products from different producers/suppliers*
  - *Save space in the manufacturing plant*
  - *Increase quality of services*
- **Warehouses can belong to the company or to a third party**
- **Role= to store items used to support production (raw materials, etc.) or finished goods to be delivered.**
  - ***CHALLENGE: TO REDUCE INVENTORY COSTS!!!***

Main warehouse functions:

RECEIVING
- *Carrier*
- *Unloading*
- *QC*
- *Administrative*

STORAGE
- *Move in*
- *Move out*

SUPPORT FUNCTIONS
- *HR*
- *ICT*
- *Security*
- *Legal*
- *Sales*
- *Quality*
- *SRM*
- *Engineering*
- *…*

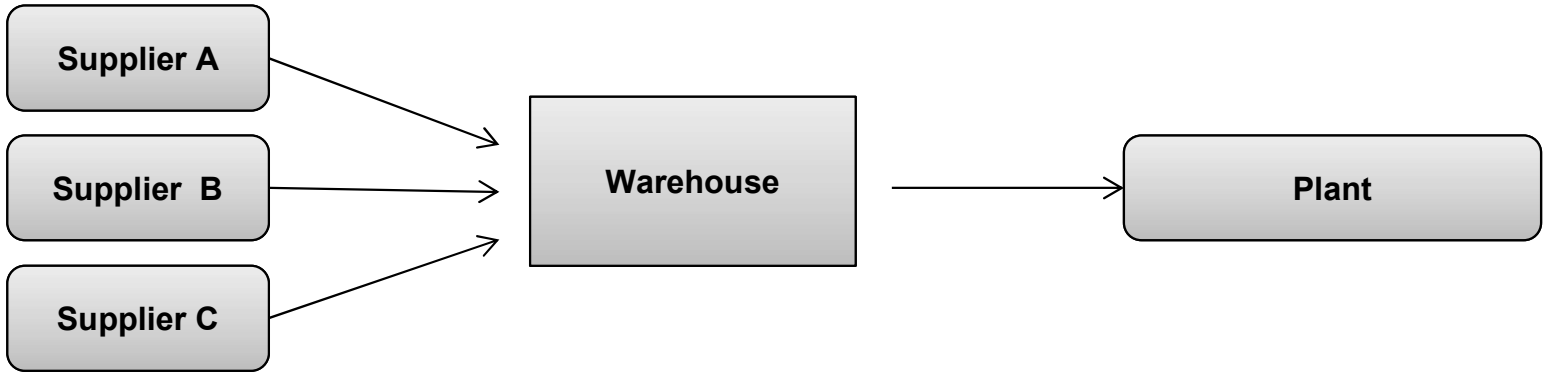
SPECIFIC ACTIVITIES
- *Labelling*
- *Kitting*
- *Differentiation*
- *Cross docking*

PICKING
- *Picking*
- *Control*
- *Assembling*
- *Customs*

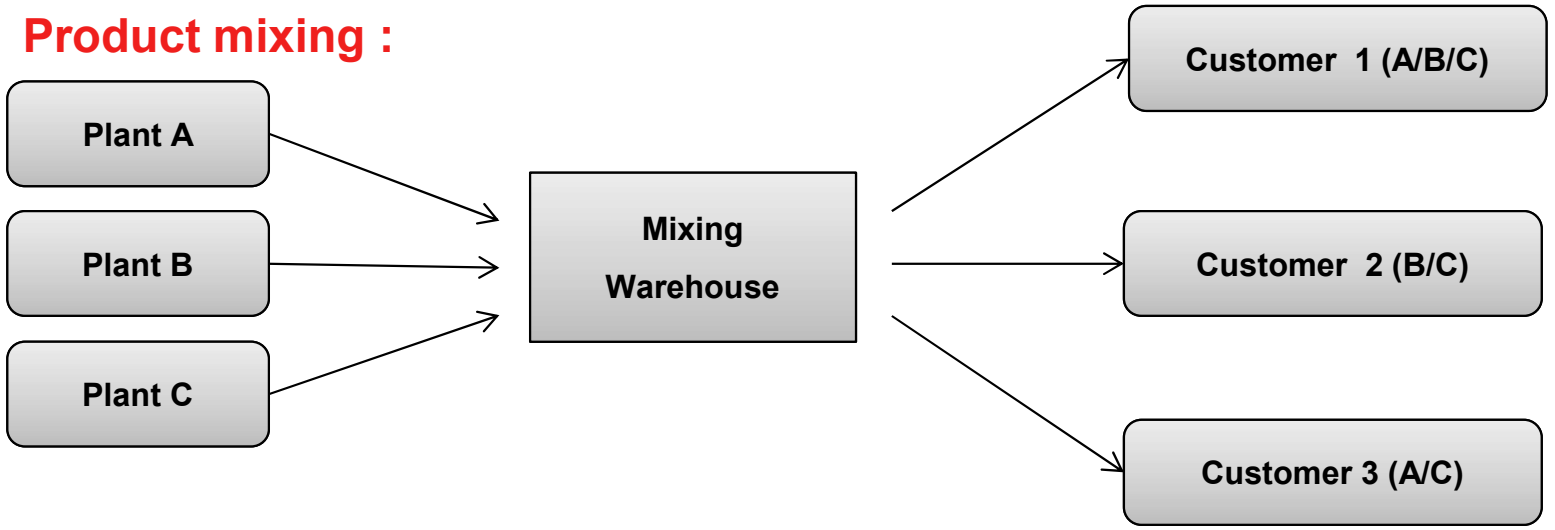
SHIPPING
- *Loading*
- *QC*
- *Dispatching*

Types of warehouses

Manufacturing support:

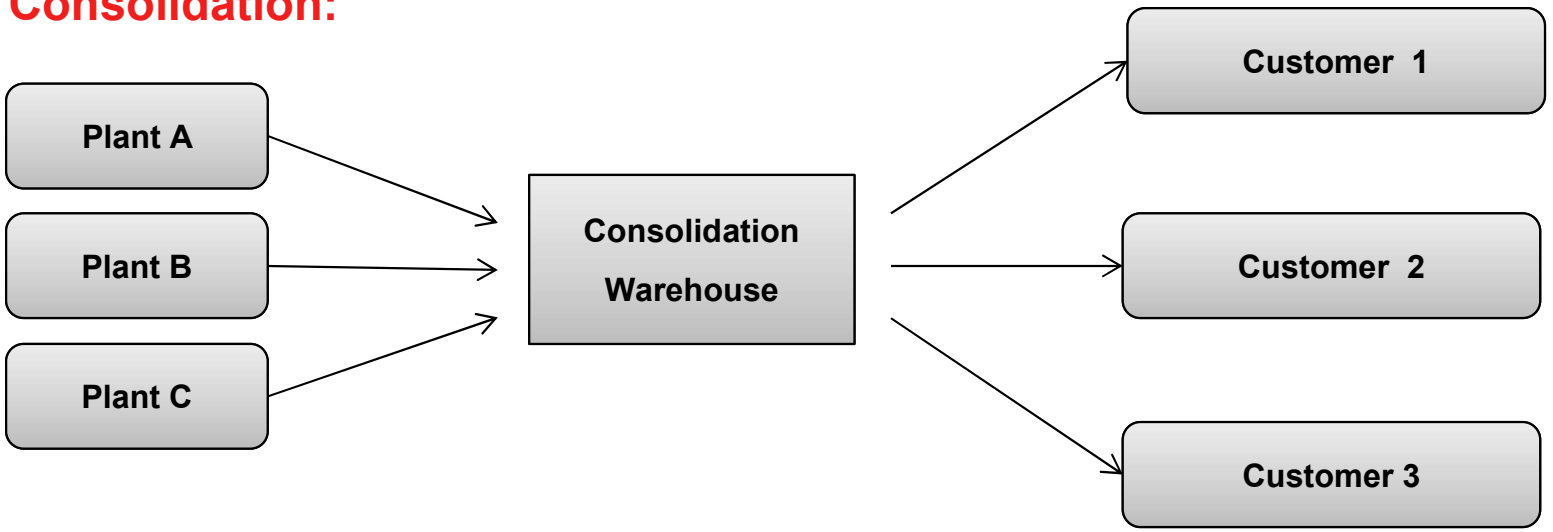


Product mixing :

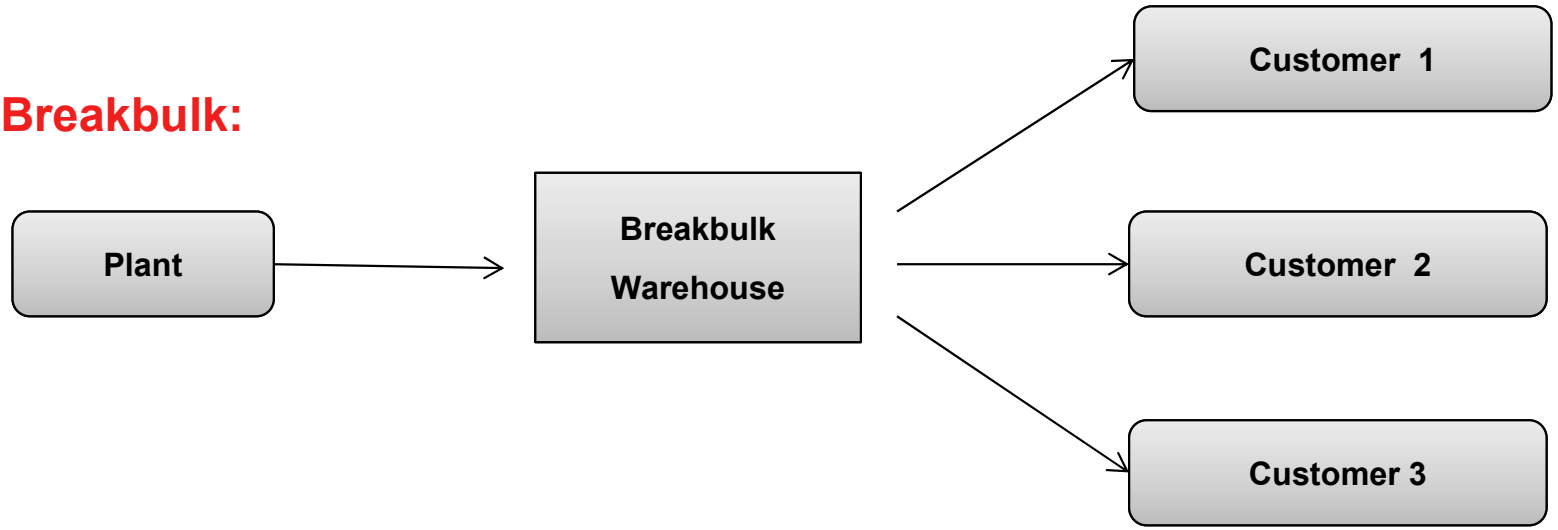


Types of warehouses

Consolidation:



Breakbulk:



A PARTICULAR TYPE OF "WAREHOUSE" : THE PLATFORM

- ***Intermediate physical entity in the distribution process which allows unloading, repackaging and shipping of goods.***

- ***<u>Not intended to store goods</u>, but facilitates transfers between means of transport.***

  - ***Main types of platforms***
    - ✓ ***Distribution platform***
    - ✓ ***Consolidation platform***
    - ✓ ***"Breakbulk" or "Re-sorting/Re-assembly" Platform***

Platform:

RECEIVING
- Carrier
- Unloading
- QC
- Administrative

STORAGE (crossed out)
- Move in
- Move out

SUPPORT FUNCTIONS
- RH
- ICT
- Security
- Legal
- Sales
- Quality
- SRM
- Engineering
- …

SPECIFIC ACTIVITIES
- Labelling
- Kitting
- Differentiation
- Cross docking

PICKING
- Picking
- Control
- Assembling
- Customs

SHIPPING
- Loading
- QC
- Dispatching

A PARTICULAR FUNCTION: CROSS-DOCKING

Principle

- ***Reception at the platform of pallets from multiple suppliers***
- ***Fragmentation of pallets, sorting and repackaging (each package may contain products from multiple suppliers)***
- ***Shipping packages to customers***

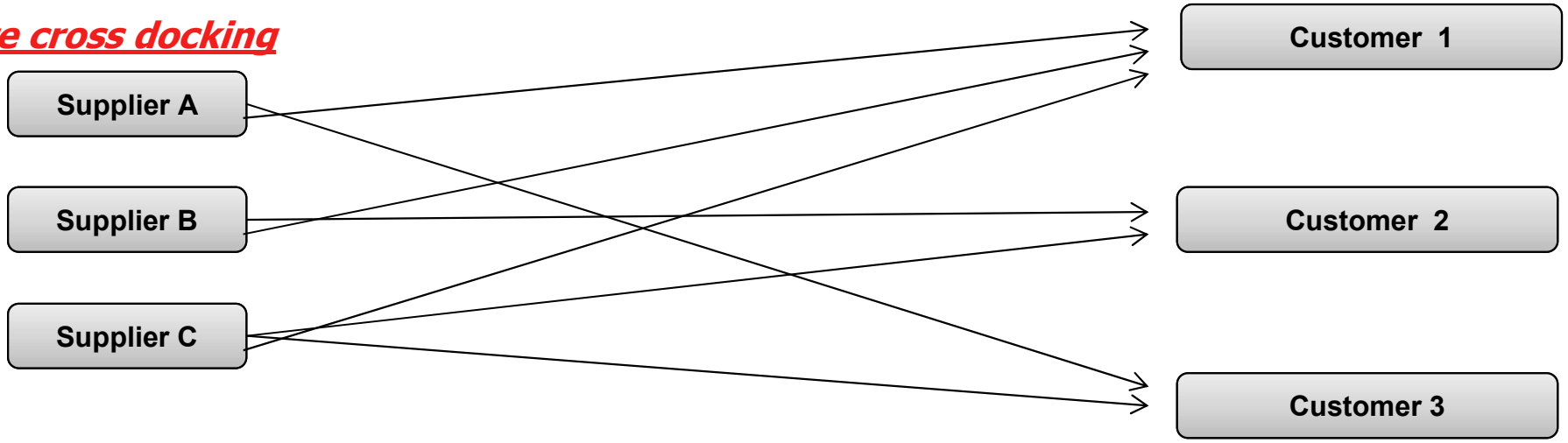
Benefits of cross docking

- ***Reduction of inventory costs in the central warehouse***
- ***Increased Gross Leasable Area (GLA) of shops***
- ***Reducing of storage points***
- ***Greater frequency of products delivery***
- ***Increase in product availability***

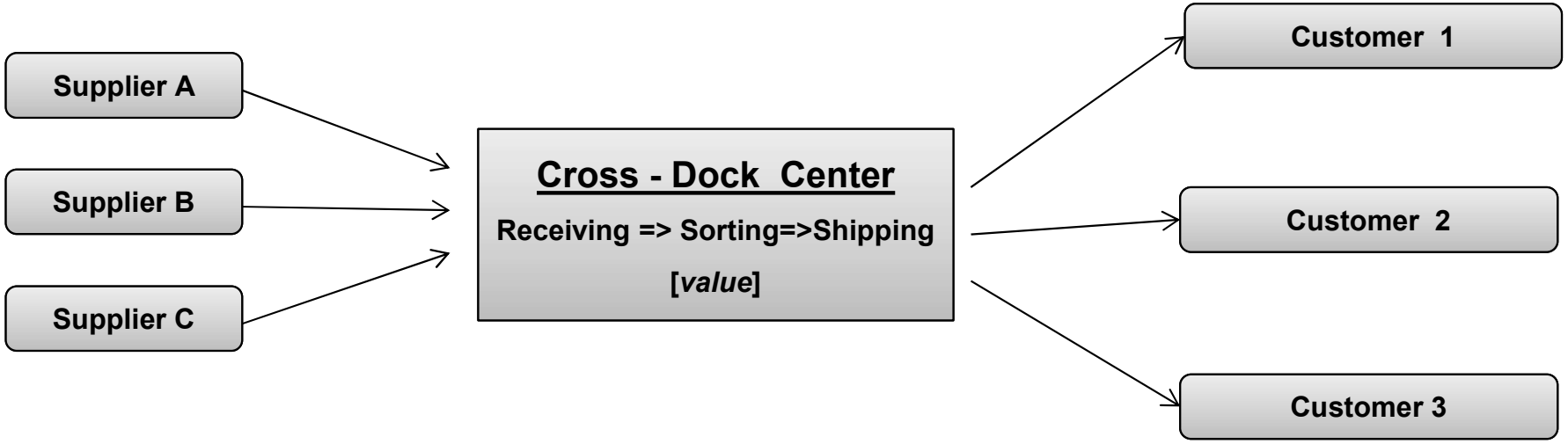
➢ ***average gains of +/- 20% of the storage time of a product***

CROSS-DOCKING

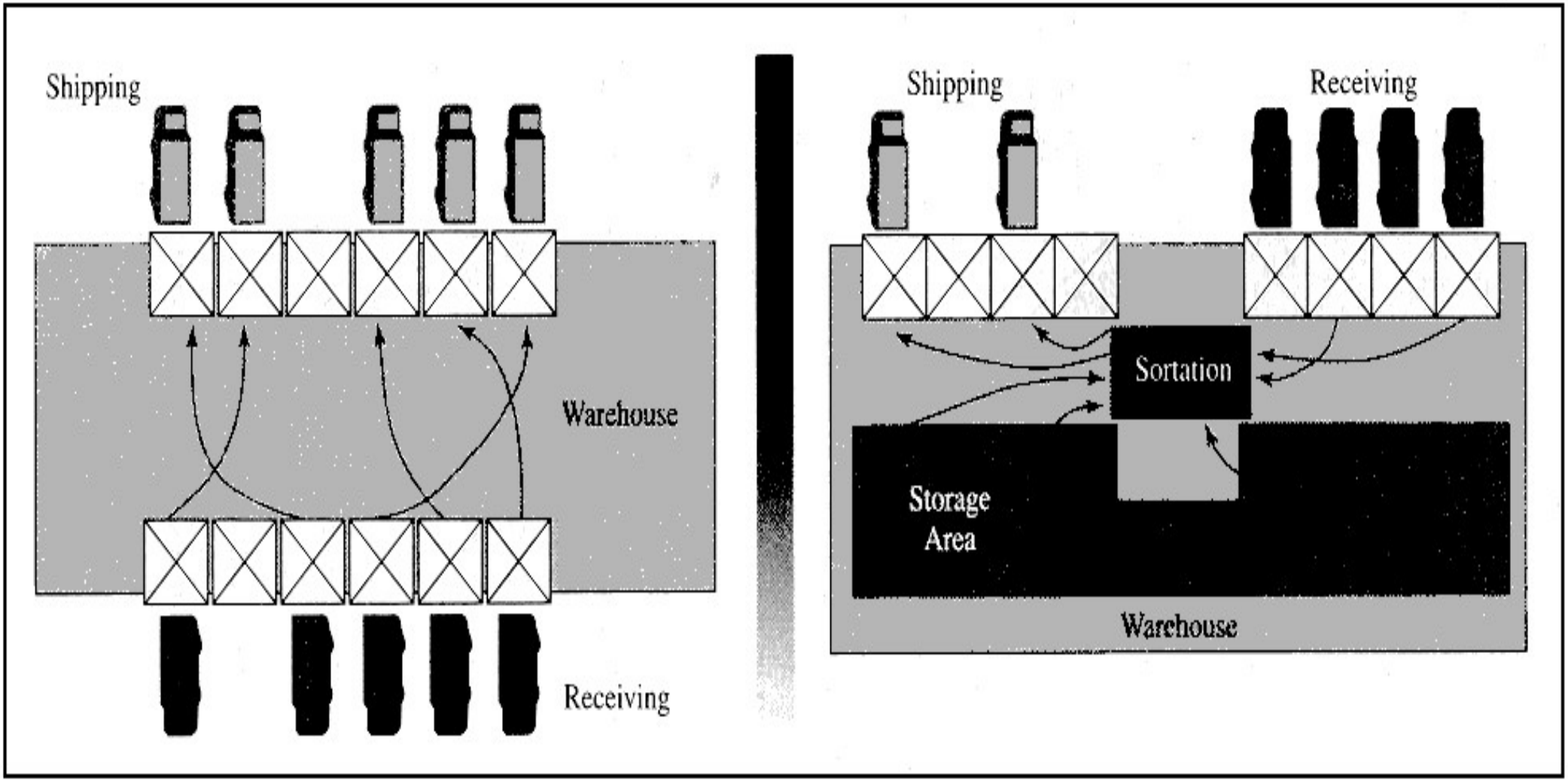
Before cross docking



After cross docking



Two examples of cross-docking



WAREHOUSE MANAGEMENT: BASIC QUESTIONS

SUPPLIER - WAREHOUSE

Supplier management policy

- ***When to order ?***
- ***What quantity ?***

WAREHOUSE

Equipment?

Localisation ?

Traceability?

Capacity?

Order Scheduling ?

Quality Control ?

Labour force?

Picking System ?

Safety stock ?

KPI's?

IT system?

…

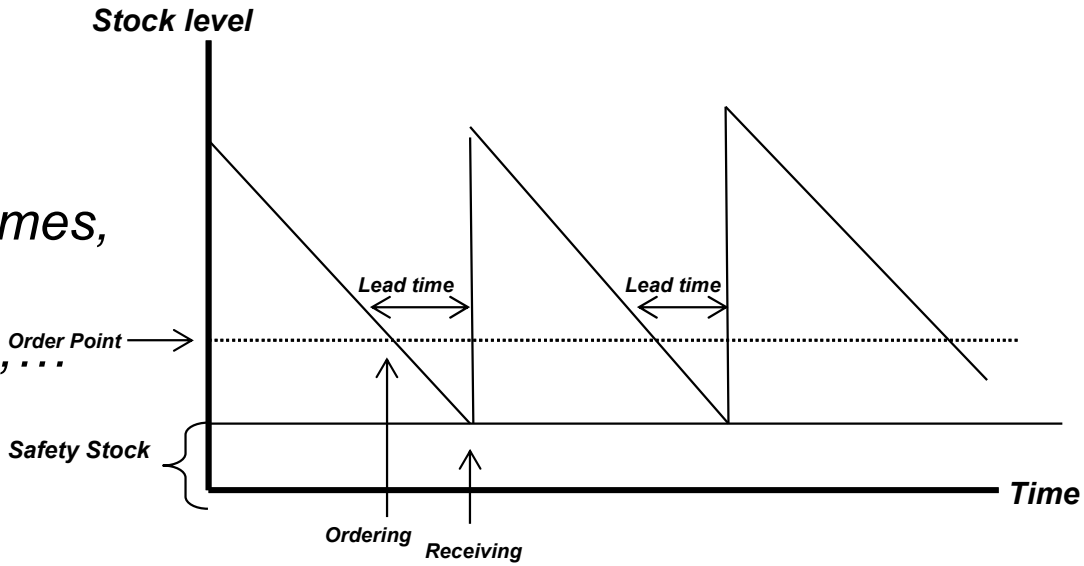
WAREHOUSE - CUSTOMERS

Customers management policy?

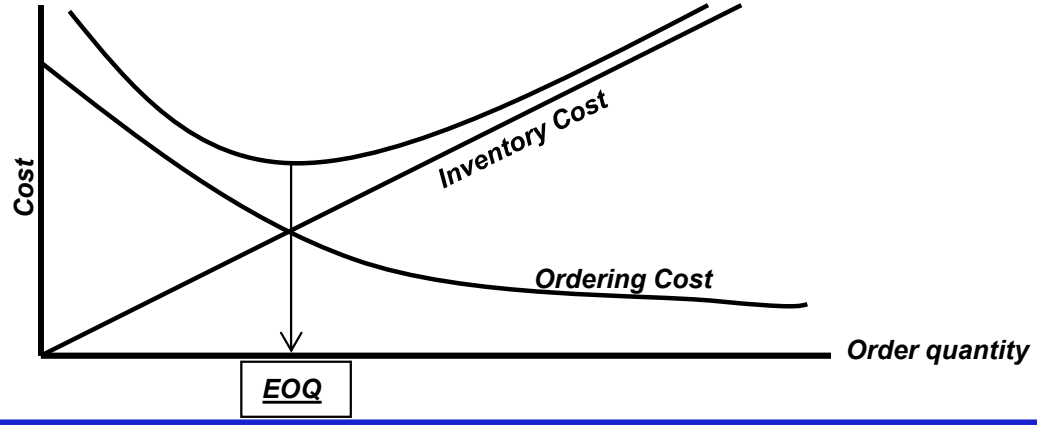
- ***When to deliver?***
- ***Transportation Management?***
- ***KPI's?***

WAREHOUSE MANAGEMENT: SUPPLIER→WAREHOUSE RELATIONS

- ***When to order : Order point***
  - *Depends on safety stock , Lead times, Average demand, acceptable threshold of stockouts,…*



- ***What quantity?***
  - *Calculation of economic quantity order (EOQ): it is an optimal order quantity considering inventory cost and ordering cost*



WAREHOUSE MANAGEMENT: STORAGE OF PRODUCTS

- ***Identification/coordinates (3 items: x, y, z)***
  - ***span/rack,***
  - ***column***
  - ***level***
- ***Assignment of a location:***
  - ***random (unmarked)***
  - ***fixed (dedicated)***
  - ***mixed***
- ***<u>CHALLENGE</u>: To optimise the allocation of space***

➲ ***Could Pareto ABC approach be helpful? How?***

- ***According to the importance of flows and turnovers: fast-moving products should be located close to the shipping area.***

WAREHOUSE MANAGEMENT: PICKING

- ***Collect stored items in the warehouse and prepare them before shipping to customers.***
- ***Optimization of this operation can both increase productivity and improve the quality of service***
- ***Rules: FIFO, FEFO (persihable products), LIFO (export goods)***
- ***Orders can be prepared in different ways:***
  - ***Pick and pack****: items for a customer are "packed when picked" then transferred to the shipping area*
  - ***Pick then pack****: All items for a customer are picked and transferred to the packaging area for packing before transfer to the shipping area*
  - ***Pick and sort then pack****: Items for several customers are picked and transferred to the sorting area then to packaging area then to shipping area*
  - *Etc.*

WAREHOUSE MANAGEMENT: CAPACITY OPTIMISATION

Determination of the needed storage capacity

This is a typical math optimization problem.

Input: forecasts (5 years +) of quantity of products to be received, stored, delivered, frequency of delivery (in and out)

Output:

- *Storage space required*
- *Building dimensions/size (L, l and h)*
- *Technical resources needed (equipment, etc.)*
- *Human resources needed*
- *Necessary investments*
- *Operating costs*
- *…*

WAREHOUSE MANAGEMENT: KEY PERFORMANCE INDICATORS (KPI):

- ***Relating to Productivity***
  - *Level of service [% tasks completed on time]*
  - *Processing time (of orders)*
  - *Cost / transit time*
  - *Error rates*
  - *Fill rate of the warehouse / platform*
  - *Number of pallets handled / person / hour …*
- ***Relating to HR***
  - *« No shows »*
  - *Accident rate*
  - *satisfaction of workers…*
- ***Relating to financial issues***
  - *Inventory*
  - *Assets*
  - *etc.*

WAREHOUSE MANAGEMENT: TRENDS

- *Automation and computerization of warehouses: is a key factor to reduce costs and significantly increase productivity*
  - *Automated storage and retrieval system*
  - *robotisation*
  - *Automatically guided vehicles (AGV): Via GPS system or laser*

WAREHOUSE MANAGEMENT: TRENDS

- **Use of Warehouse Management System (WMS):**
  - *Manages all activities of the warehouse, starting from the reception through the optimization of storage until shipping of products*
  - *Monitoring of KPIs*
  - *E.g of WMS: Infolog, Generix, Crystal, Gold*
- **Co-managed inventory (CMI)**
  - *Collaborative approach which consists in the exchange information relating to the level of inventory*
  - *Allows suppliers to make directly their forecast and planning*
  - *helps in sharing the risks and monitor KPIs*
  - *Products are picked up and delivered when customers need it (PULL)*
  - *Real time exchange of information between warehouse and customers*
  - *Sound transportation management system: delivery with adequate transportation at reasonable cost, safety & security issues, etc.*

CONTENT OF BLOC 3

Basics Concepts of Warehouse and Distribution Logistics

1. Introduction warehousing and distribution network
2. Role of warehousing, functions and types of warehouses
3. A particular warehouse function: Cross-docking
4. A particular warehouse type: the Platform
5. Warehouse management
6. **The distribution network**
7. **Basic structures of a distribution network**
8. **Optimisation of a distribution network**
9. **Transport**
10. **Conclusion and further readings**

MAIN OBJECTIVE OF A DISTRIBUTION NETWORK

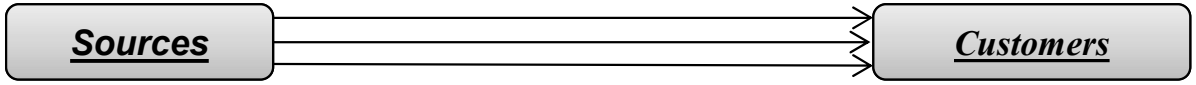
Ensure at the lowest cost, a high level of service delivery (shorter and flexible)

A successful achievement of the above depends on:

- *Number and location of customers to be served (or suppliers)*
- *Type of distribution networks*
- *Number and location of warehouses / platforms*
- *Characteristics of transport networks*
- *Characteristics of available of transportation means*
- *Rules / constraints in transport*
- *Etc…*

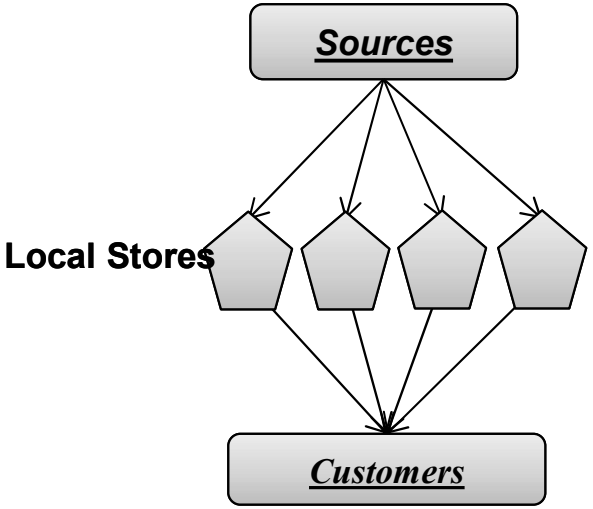
BASIC STRUCTURES OF A DISTRIBUTION NETWORK

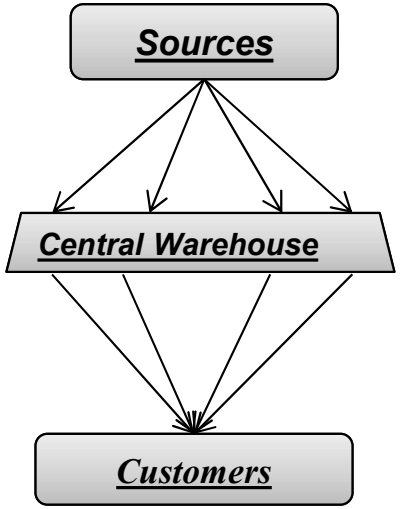
A. Direct delivery (without transfers)



B. One-level structure

- *A central warehouse (Adv= close to the customers and possibility to consolidate. Disadv= number of transfers and breaking of loads)*
- *A network of local stores (Adv = faster delivery. Disadv = inventory level, difficulty to consolidate)*





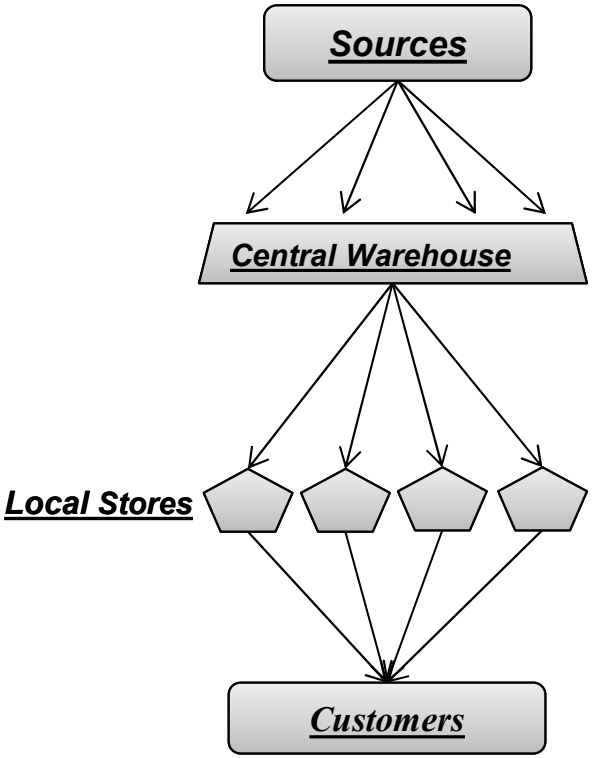
C. Distribution structure with two levels

a. Central warehouse with a network of regional stores

Plants supply warehouse that supply local stores that deliver to customers

→ *advantage = consolidation is possible*

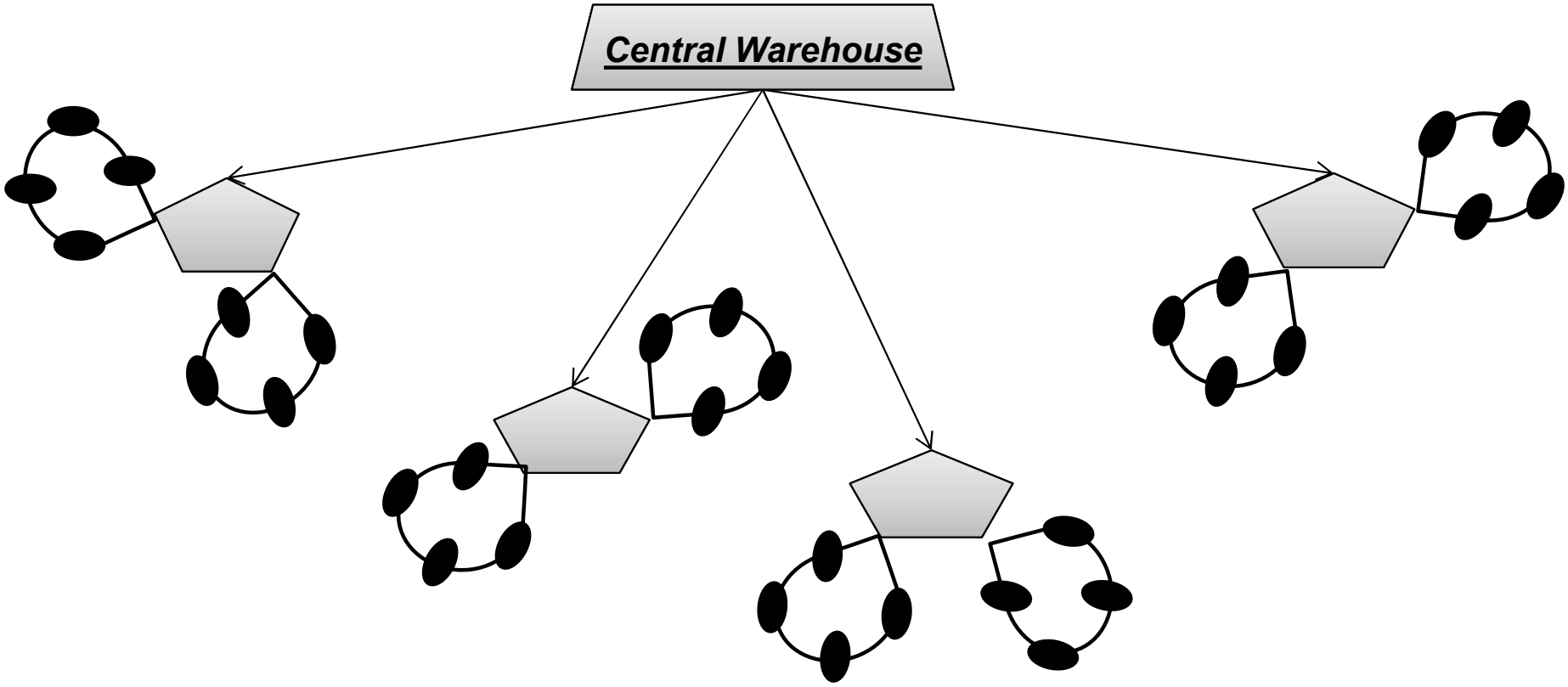
→ *Disadvantage = high inventory costs*



C. Distribution structure with two levels

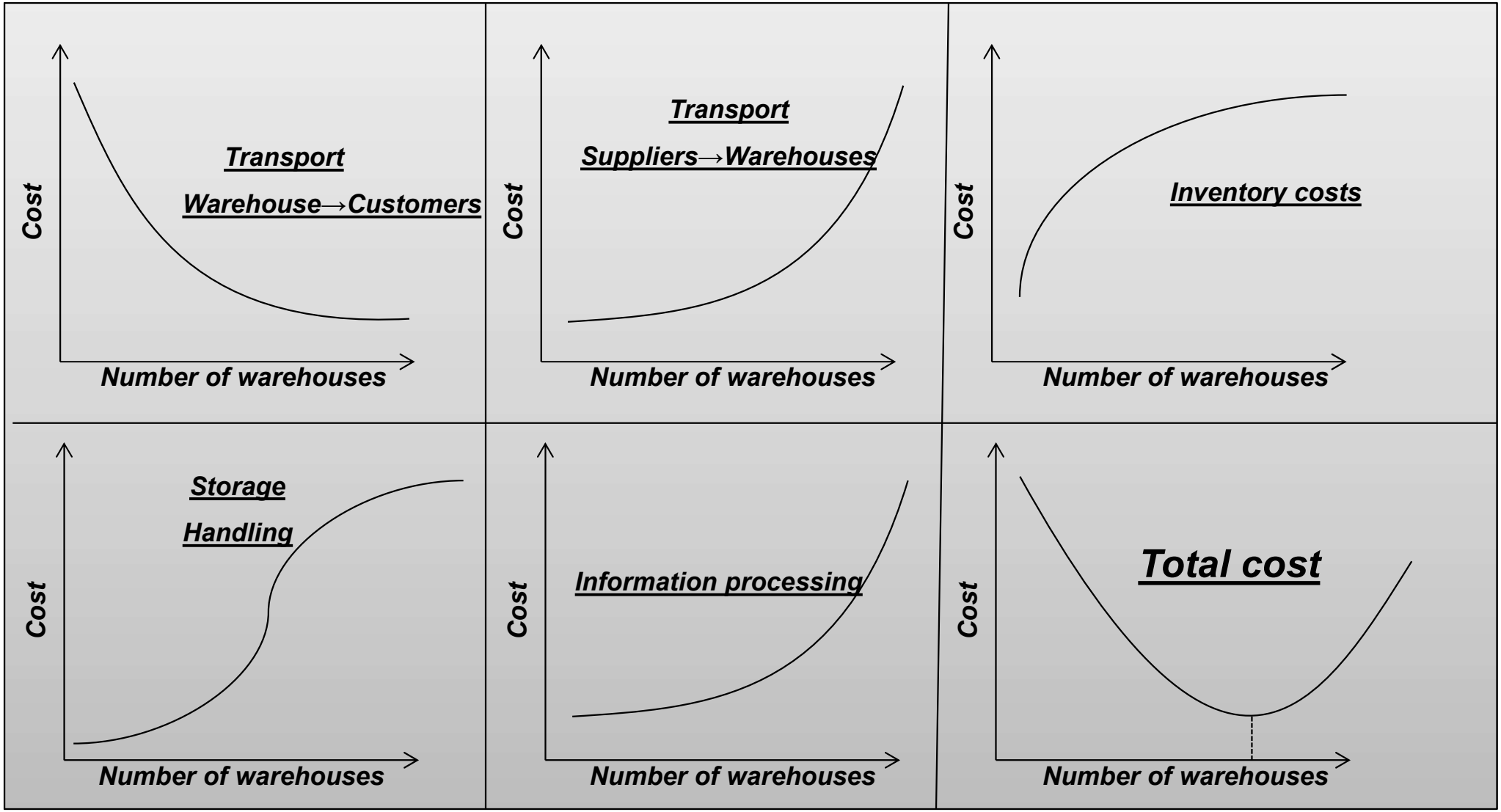
b. Central warehouse and a network of distribution platforms

- *Orders are prepared in the central warehouse then disaggregated in and distributed from the platforms*



Economic optimization of a distribution network

Depends on number, size and location of warehouses, stores, platforms and needs of inventory / shipment



TRANSPORT :

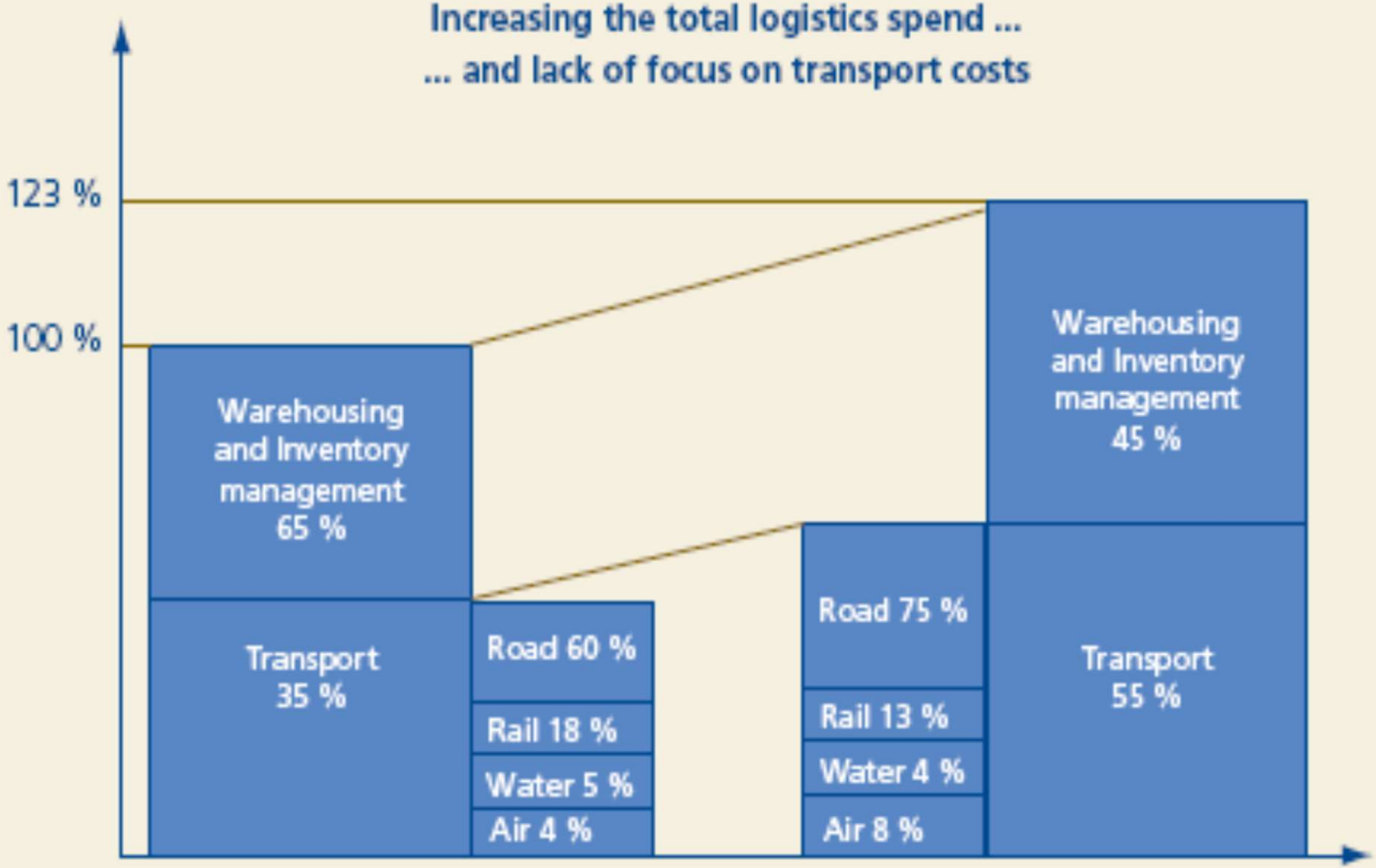
- ***Connection between the levels and between the components of the distribution network***

- ***It's quality is a key component of overall service quality***

- ***Transport modes***
  - *Road*
  - *Rail*
  - *Waterways*
  - *Maritime (↑ containerization, >75% of global freight traffic)*
  - *Air*
  - *Multimodal*
  - *Intermodal*
  - *New modes (drones, etc.)*

Graph 8: Transport costs have been increasing over the past 10 years

Deloitte

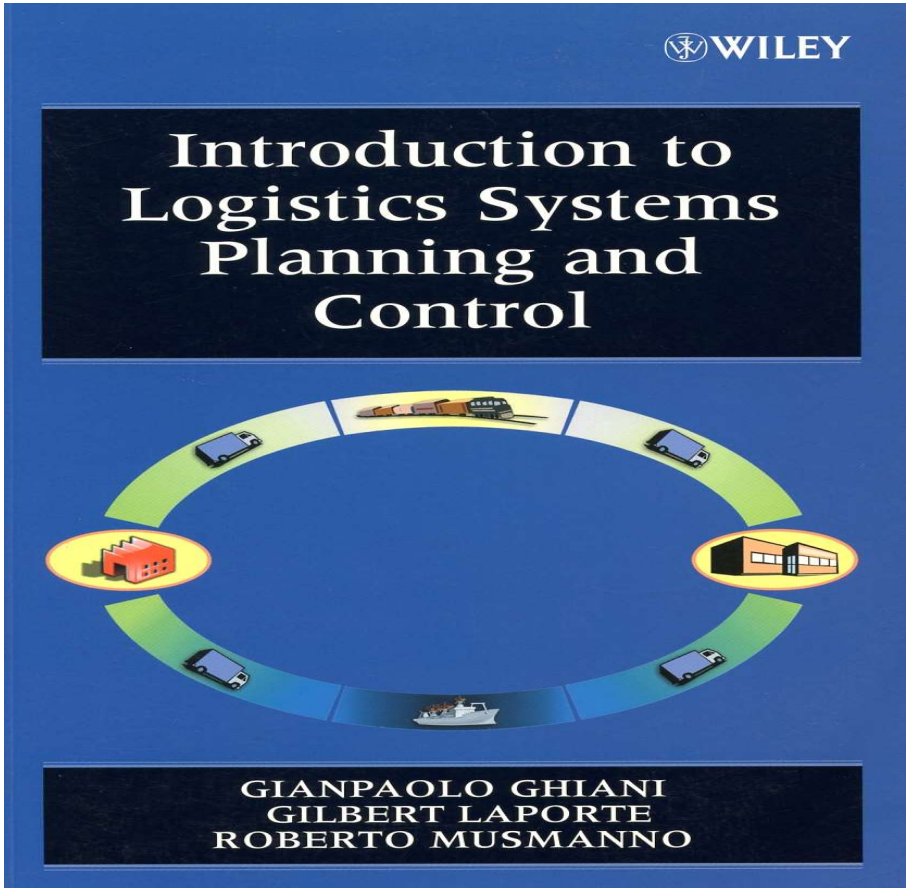


CRITICAL ISSUES

- ***Increasing environmental concerns ($C0_2$ reduction)***
- ***Globalization, international transport***
- ***Need for transport***
- ***Transport fleet needed***
- ***Transport costs (fixed, variable, overheads)***
- ***Choice of transport mode***
- ***Route optimization***
- ***Autonomous/automated transport***
- ***Safety and security***
- ***Greening of transport activities (absolute necessity)***

AS THE PRIMARY ROLE OF A WAREHOUSE IS TO STORE ITEMS USED TO SUPPORT PRODUCTION (RAW MATERIALS, ETC.) OR FINISHED GOODS TO BE DELIVERED, THE CRITICAL CHALLENGE IS TO REDUCE INVENTORY COSTS!!!

A PARTICULAR TREND IS TO INTRODUCE WITHIN THE WAREHOUSES, COST EFFICIENT ACTIVITIES/ACTIONS THAT ADD VALUE TO THE PRODUCTS THEREIN STORED.



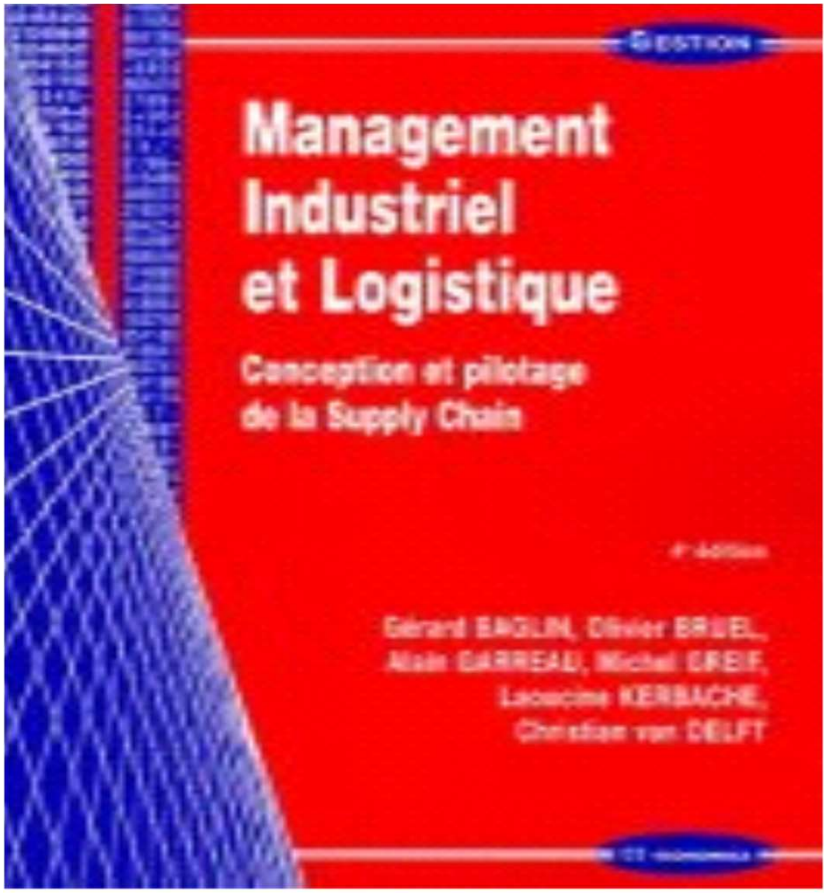
WILEY, ISBN 0-470-84917-7

Chapter 3: Designing the logistics network

Chapter 4: Solving inventory management problems

Chapter 5. Designing and operating a Warehouse

Chapter 6 & 7: Planning and managing freight transportation



Economica, ISBN 2-7178-5017-1

Authors: G. Baglin, O. Bruel, A. Garreau, M. Greif, et al.

Chapitre 7: Réseaux de production, distribution (…)

Chapitre 9: La prévision de la demande

Chapitre 13: Systèmes et modèles de gestion des stocks

Chapitre 16: Traitement des commandes et entreposage

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)****