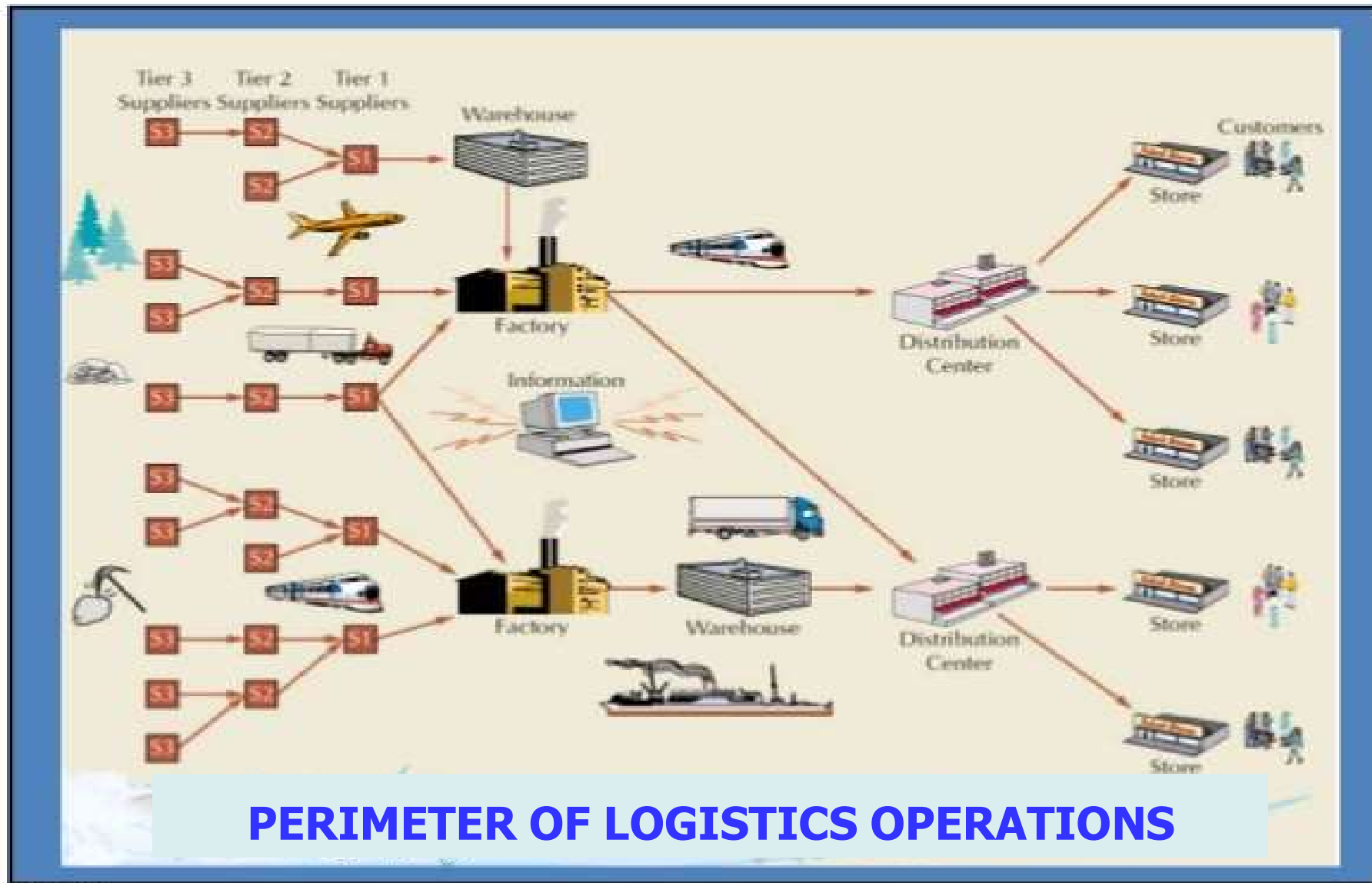


COURSE GEST-H-501

LOGISTICS ENGINEERING AND MANAGEMENT

Session n°1

Professor Alassane B. NDIAYE



PERIMETER OF LOGISTICS OPERATIONS

Sans, Inc.

- **Importance of logistics operations in everyday's life**
 - *Supply of shops*
 - *Supply of manufacturing companies*
 - *Emergency operations*
 - *Defense operations*
 - *Banks*
 - *Leisure centers*
 - *Hospitals*
 - **affects every day's life, its viability and smooth functioning**

- **Often called under different names**
- ***Business logistics***
 - ***Distribution/Physical logistics***
 - ***Industrial logistics***
 - ***Supply chain logistics***
 - ***Productions logistics***
 - ***Internal/External logistics***
 - ***etc.***

What these terms have in common:

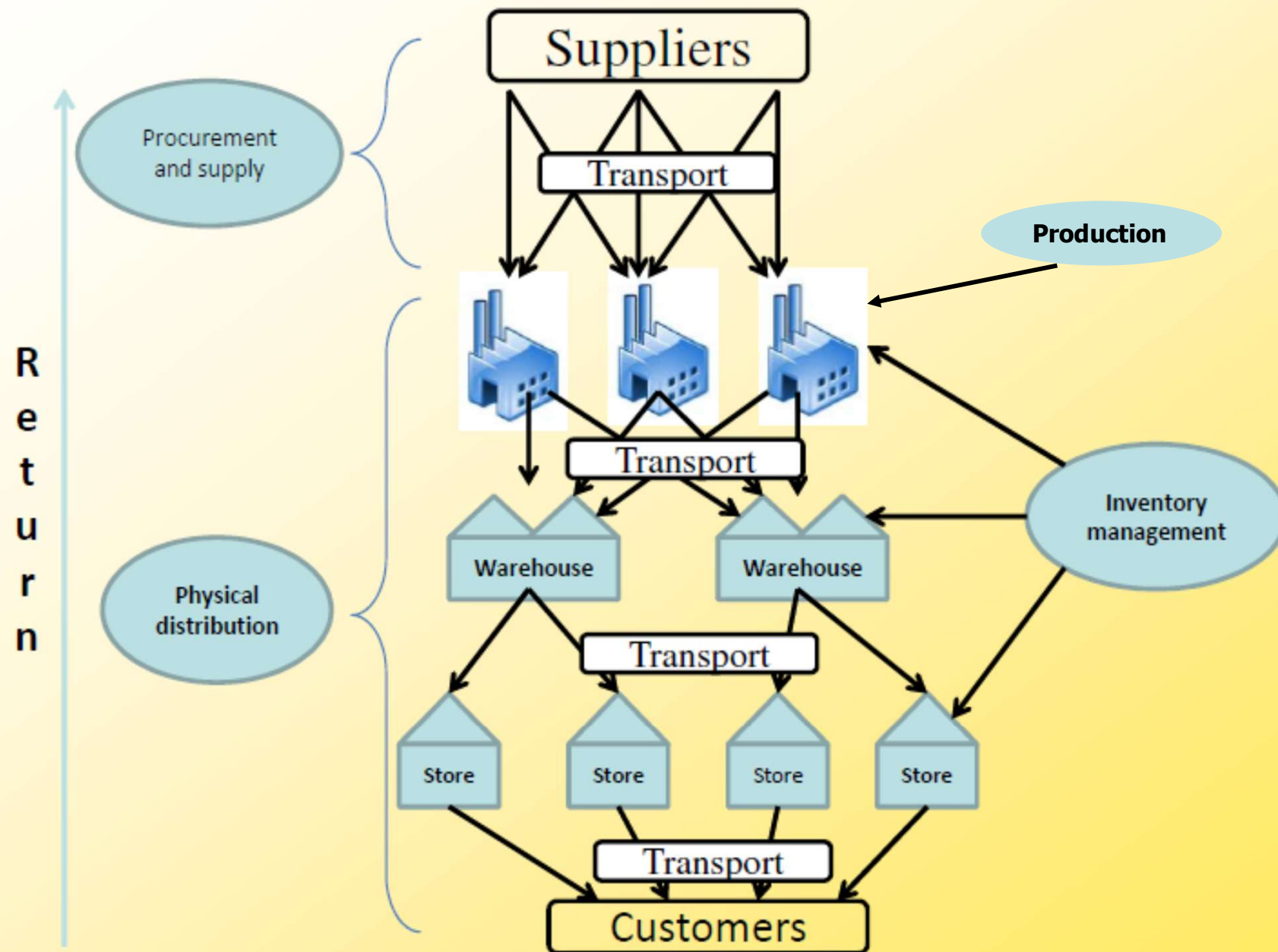
... the management of the operations involving flows of goods, materials and information from the point of origin to the point of consumption, and even beyond, to the point(s) of disposal.

- **Logistics is not only relating to the manufacturing sector but also to the government, hospital, banks, school, retailers, sports, family, etc., operations.**
- **Present in the animal life as well. (e.g. bees)**
- **Not always understood or managed the same way throughout human history.**

But the use of advanced scientific methods to understand, formalize and manage logistics operations is quite "recent".

- **Four main steps in this chain of operations:**
1. **Supply of raw (input) material**
 2. **Processing (Production operations)**
 3. **Physical distribution of the finished goods → customer**
 4. **Reverse / Return operations**

A chain of interrelated operations tightly linked to the other company functions



➤ **Not a new topic in itself**

- ***Before JC : construction of pyramids, etc.***
- ***Before JC: supply of war troops***
- ***Since the emergence of "organised" trade:
problems of supply and distribution of goods***
- ***14° c: Venetian naval shipyards***
- ***1776: Adam Smith's theories on labour organisation that
have largely contributed to the development of the industry***

- ***Taylor (20th century): a scientific approach to labor management in manufacturing (1911)*** ***MLESTONE***
 - *Dominated industrial organizations over hundred years*
 - *Goal was to increase the productivity*
 - *Main specificity: the used of unskilled labor force*
 - *Principle 1:*
 - *Horizontal division of operations into successive simple tasks*
 - *Principle 2:*
 - *Vertical division: separation of management and execution tasks*
 - *New tasks: quality control, maintenance, planning*
 - *Advantages:*
 - *Easy training of labour force*
 - *High productivity*
 - *Low wages and low mental workload*
 - *Disadvantages*
 - *Remove all sense of responsibility*
 - *Lack of motivation*

– ***Ford: Assembly lines and standardization (1913)***

MILESTONE

- To cope with growing demand
- Invention of the concept of assembly line
- To reduce production costs, Ford establishes the principle of standardization
- System of mass production:
 - privileges quantity over quality
 - Does not cope with the diversification of industrial products

– ***Harris & Wilson: Economic order quantity (EOQ)(1913-1924)***

– ***Fayol: Principles of management (1916)***

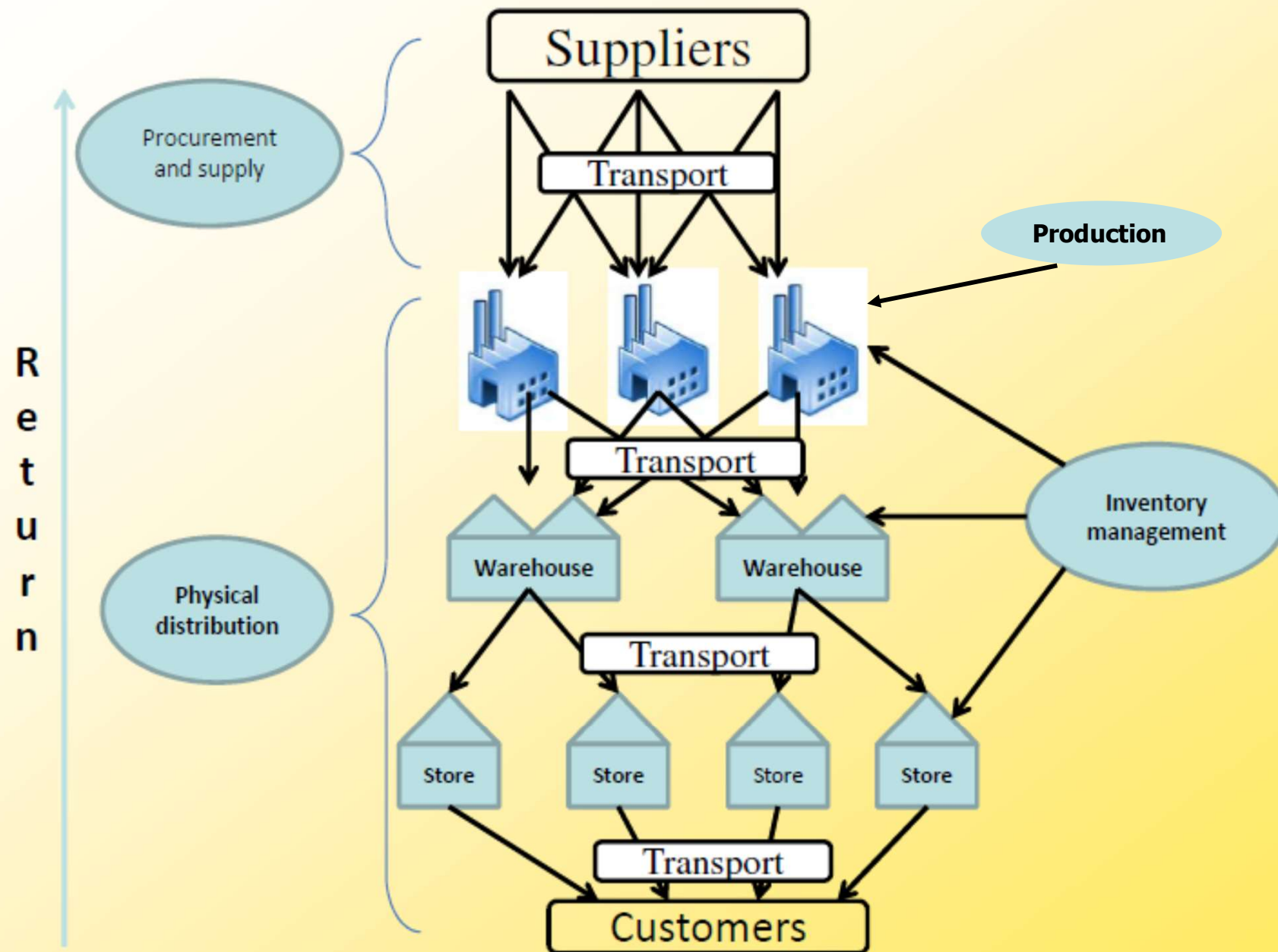
– ***Gantt: Principles of scheduling (Gantt chart) (1917)***

– ***Shewart: Quality control with the use of maths tools (1930)***

- ***Operations research methods (Post war, 1950)***
- ***Class IBM (1960)***
 - First application of IT to manage a complex production
- ***CAMM (1970): computer-aided management and Manufacturing***
- ***Early 1980s: JUST-IN-TIME concept (JIT)***
 - Concept formalized by Mr. Taiichi Ohno (Head of Toyota Industrial)
 - Produce what you need just at the right time (**from PUSH to PULL logistics**)
 - Reduce stocks and response times throughout the logistics process
 - Production equals to customers demand -> zero inventory
 - Key Conditions
 - *zero delay (absolute respect of production plans)*
 - *zero defects (total quality)*
 - *zero failure (preventive maintenance)*
 - *zero paper (Reduction of administrative procedures and unnecessary tasks)*
 - *Redefine relationships with suppliers (collaboration, partnership, risk sharing)*

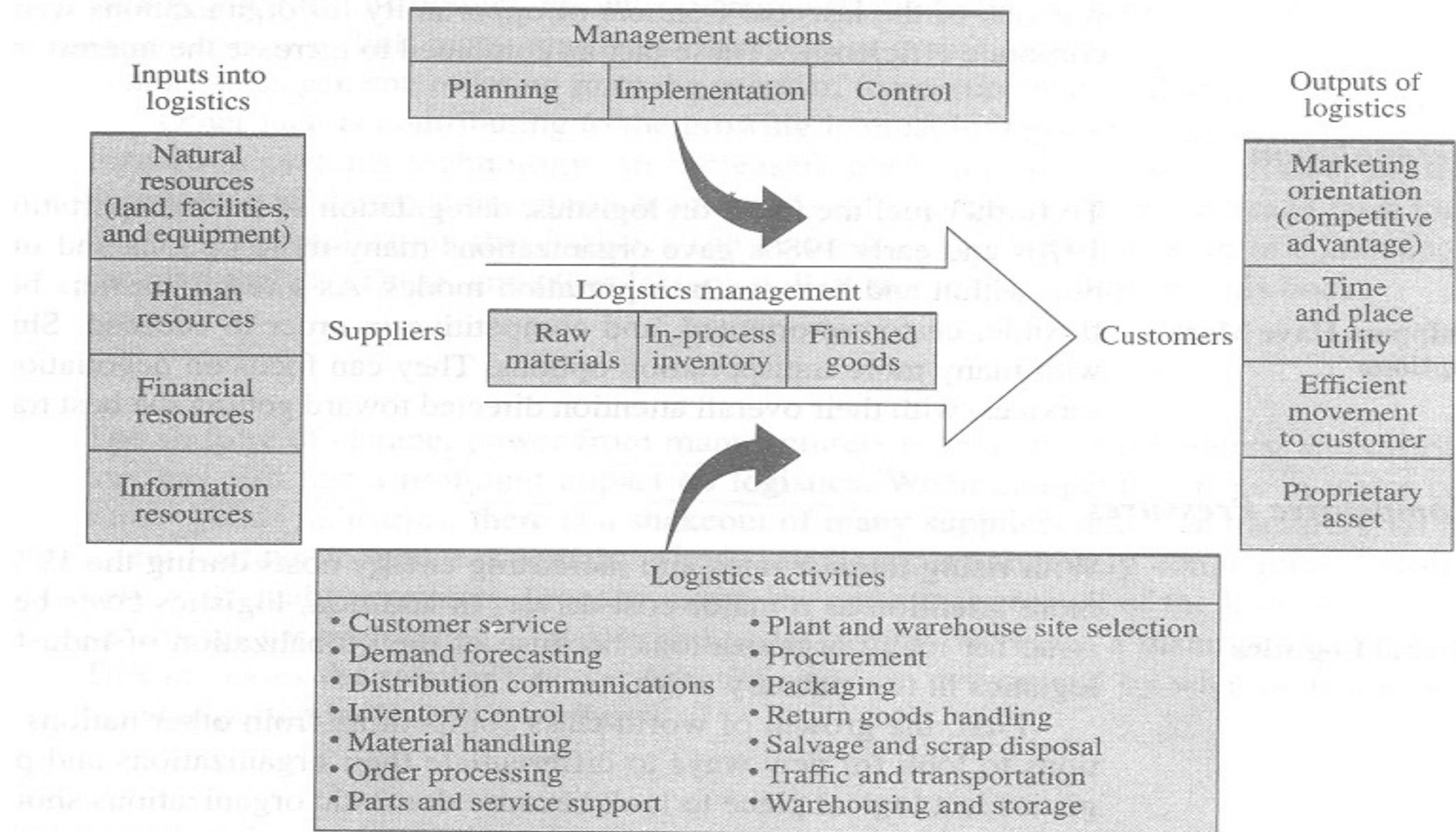
– ***1990-2000 : the Total Productivity concept***

- Over the years, companies have accumulated a huge range of services and functions: These must be reduced and unproductive functions/services cut!
- Lean production: mobilize ONLY the (strictly) necessary resources and avoid waste, duplication of operations, and etc.
- Business Process Reengineering (BPR) :
 - *Restructure the processes from the customer perspective*
 - *Look for gains at the interface of the operations*
- Growing use of IT and Digital technology
- Etc.

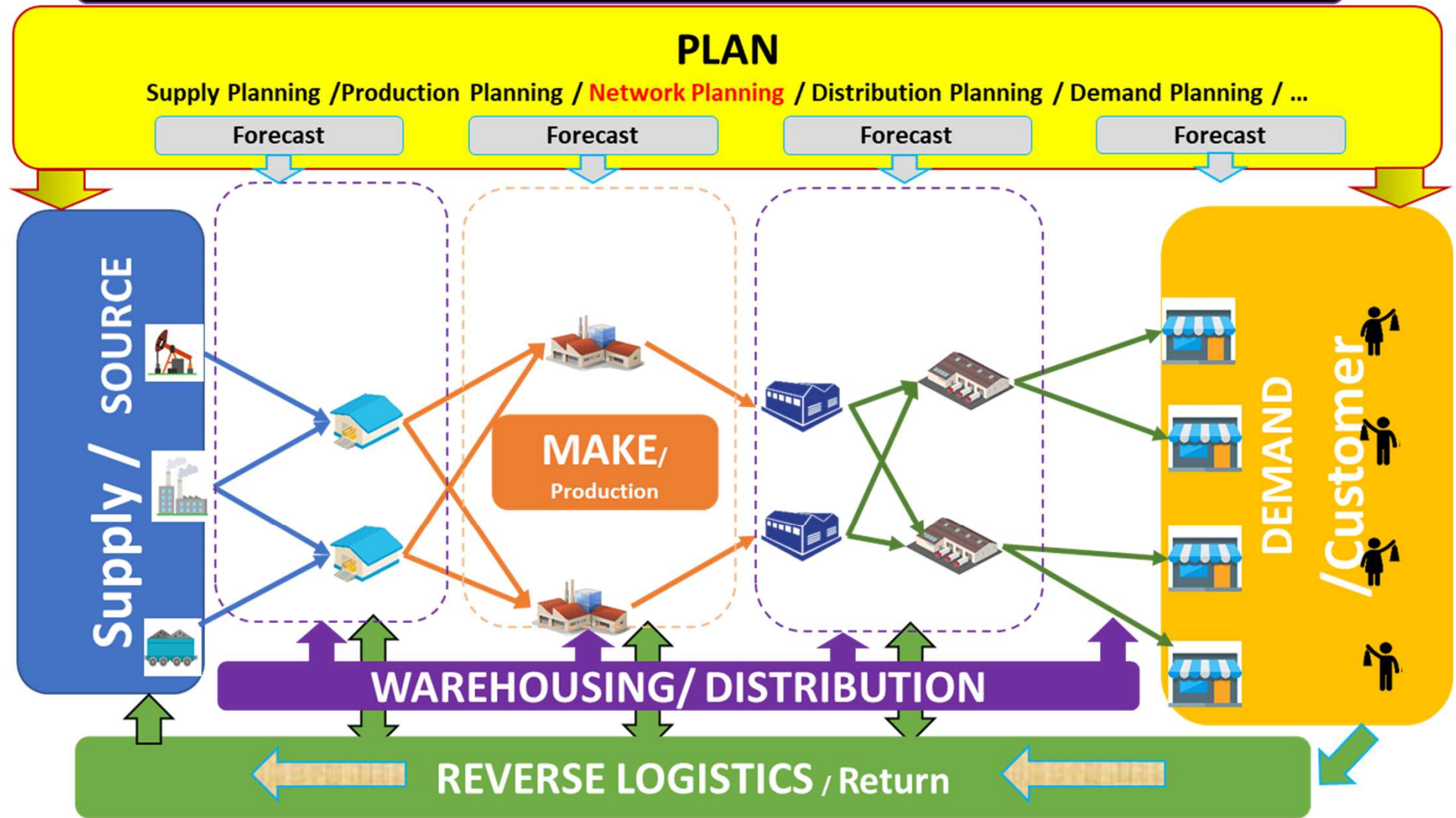


Components of logistics management

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

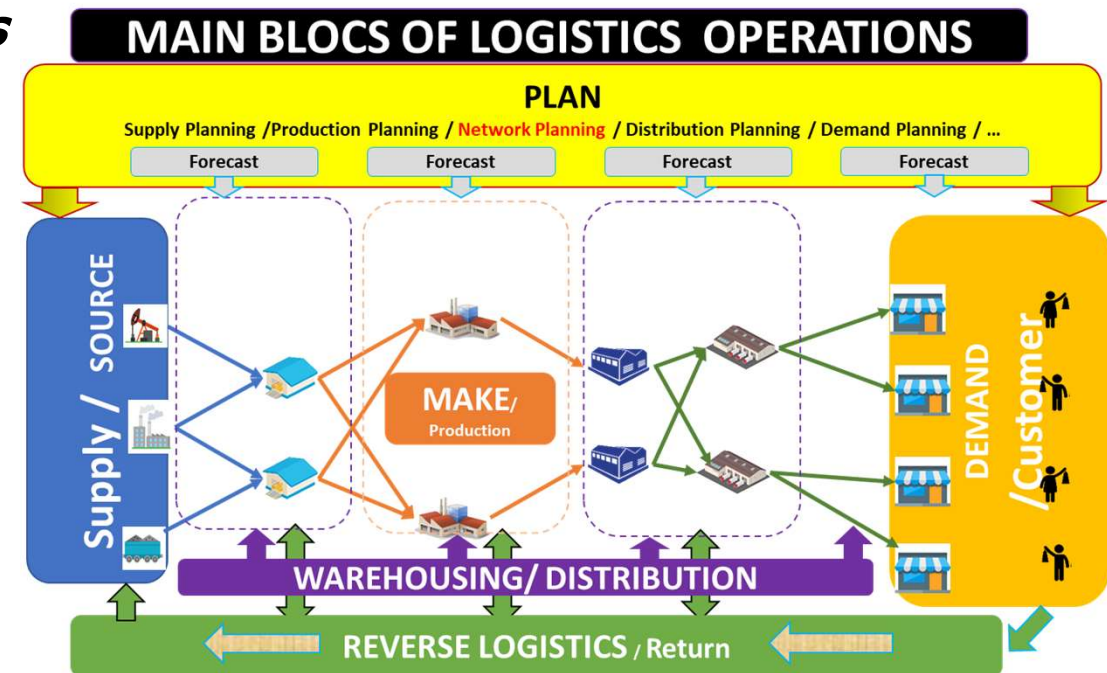


MAIN BLOCS OF LOGISTICS OPERATIONS



➤ PLAN

- *Market demand*
- *Quantities of finished goods*
- *Input materials*
- *Human resources*
- *\$*
- *Manufacturing equipment*
- *Distribution systems*
- *Delivery operations*
- *Etc.*



KEY CHALLENGES:

- *Variability of market demand and new trends*
- *Variability of the costs of input materials*
- *Unexpected events*

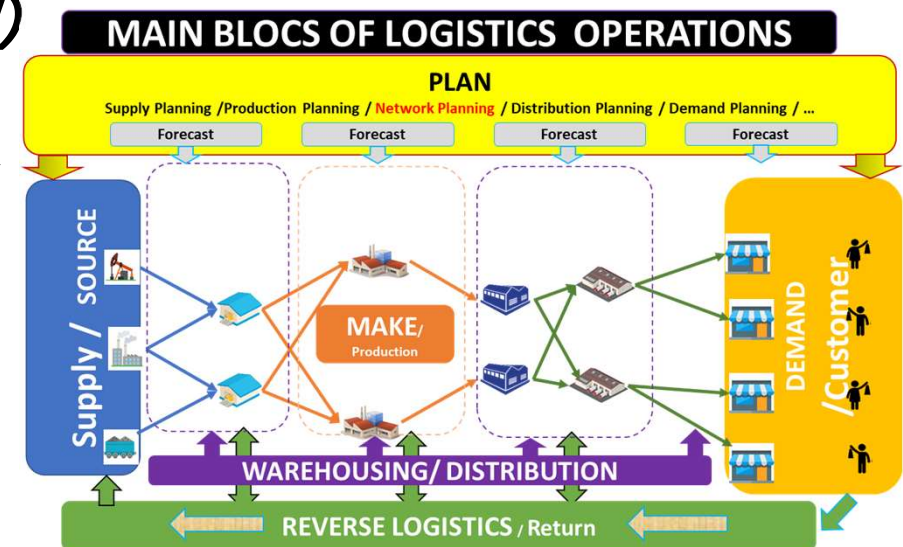
A VERY IMPORTANT PHASE OF LOGISTICS MANAGEMENT!!!

➤ 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*

KEY CHALLENGES

- *Identification and selection of the suppliers*
- *Quality control*
- *Integration of suppliers' constraints*
- *Collaboration with the suppliers*

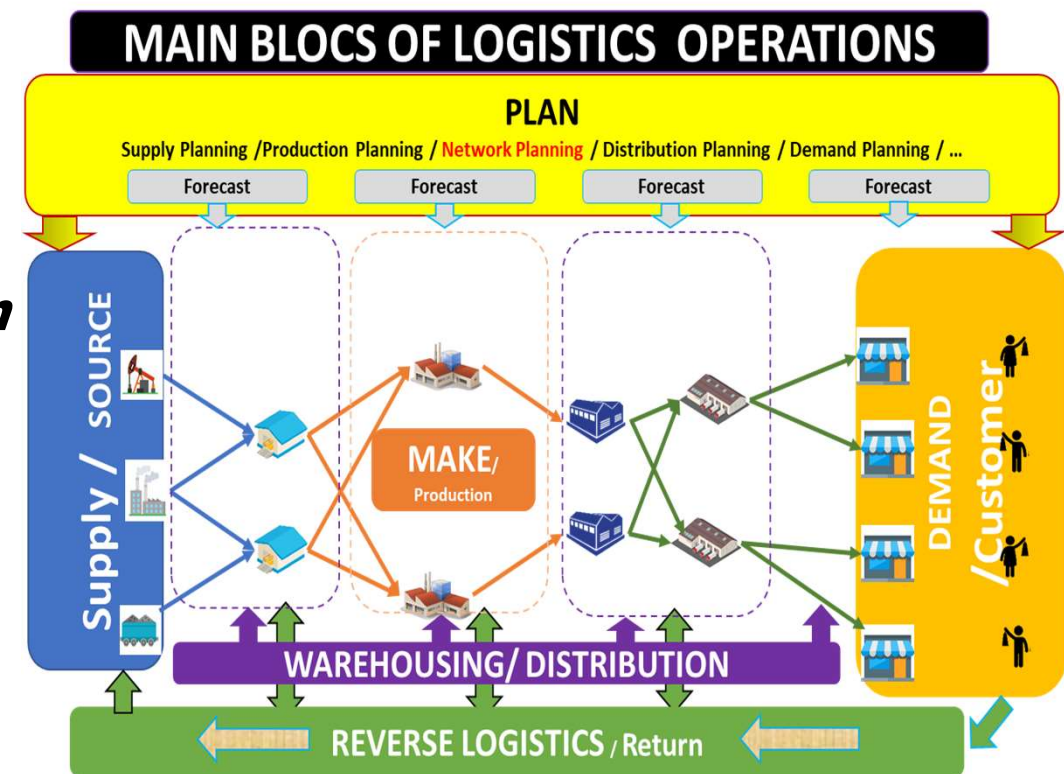


➤ MAKE

- *Types of finished goods*
- *Manufacturing plans/processes*
- *Manufacturing equipment*
- *Manufacturing rhythm (continuous, on demand)*
- *Storage of semi finished goods*
- *Arrivals of input materials*
- *Storage of finished goods*
- *Quality of finished goods*
- *Unexpected event or breakdown*

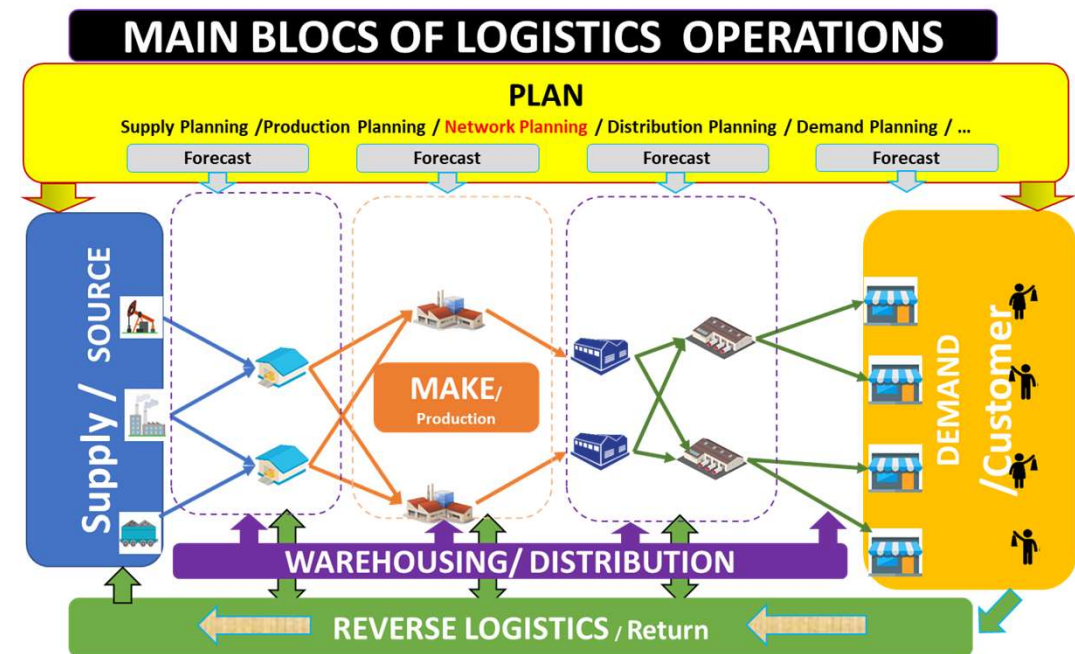
KEY CHALLENGES

- *Optimal manufacturing plan*
- *Availability of input materials*
- *Reliability of the equipment*
- *Reliability of resources*
- *Quality issues*



➤ WAREHOUSE AND DELIVER

- *Type and function of warehouses*
- *Storage of finished/semi finished goods*
- *Packaging/Cross-docking*
- *Handling of finished goods*
- *Orders' management*
- *Selection of transport means*
- *Delivery to customers*
- *Customer support services*
- *Etc.*



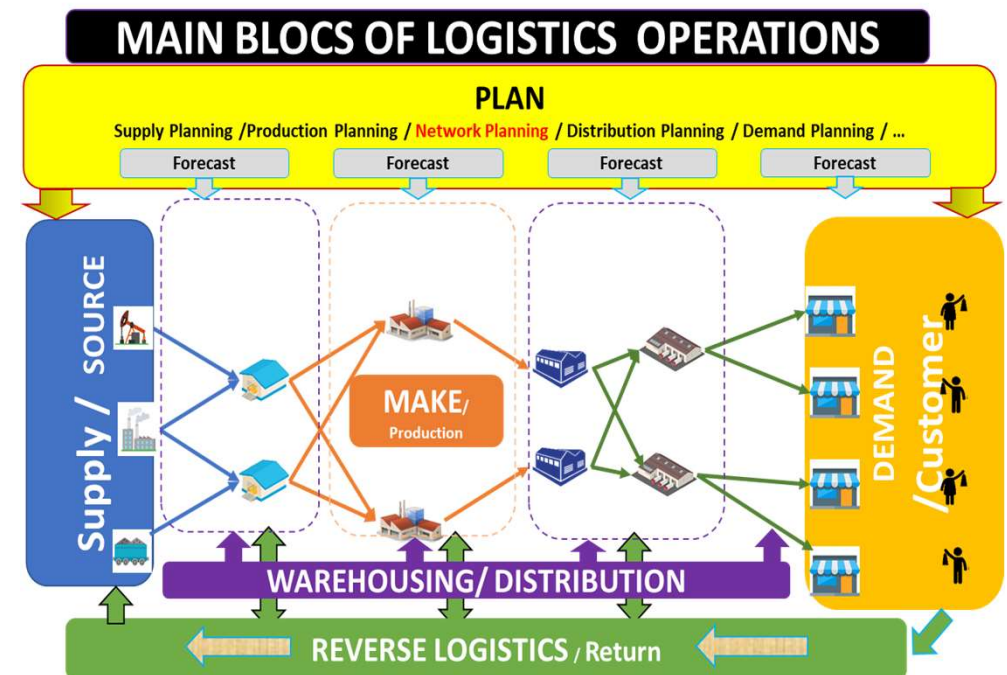
KEY CHALLENGES

- *Location, number and size of warehouses*
- *Handling equipment, human resources, available technologies*
- *Transport modes and delivery operations*

➤ RETURN / REVERSE LOGISTICS

- *Location & number of return facilities*
- *Handling of return products*
- *Storage of return products*
- *Transport of return products*
- *Recycling operations*

Critical aspect due to growing concerns about climate change, exhaust of natural resources and environmental protection !!!



**IT BECOMES A VALUE CREATING
BUSINESS AVENUE !**

➤ **Logistics operations face critical challenges**

- ***Globalisation of production/trade***
- ***Fierce global competition***
- ***Tough quality requirements***
- ***Fast changing (and volatile) consumer habits***
- ***Ever increasingly variety of demanded goods***
- ***Fast changing IT & tech (digitalisation, robotisation, etc.)***
- ***Shortened times-to-market and product lifecycles***
- ***New social, ethical and environmental constraints***
- ***Ever intertwined flows of materials, \$, information***
- ***Etc.***

THE FINAL TARGET OF THE MANAGEMENT OF LOGISTICS OPERATIONS MUST BE

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!**



MAIN BLOCS OF LOGISTICS OPERATIONS

PLAN

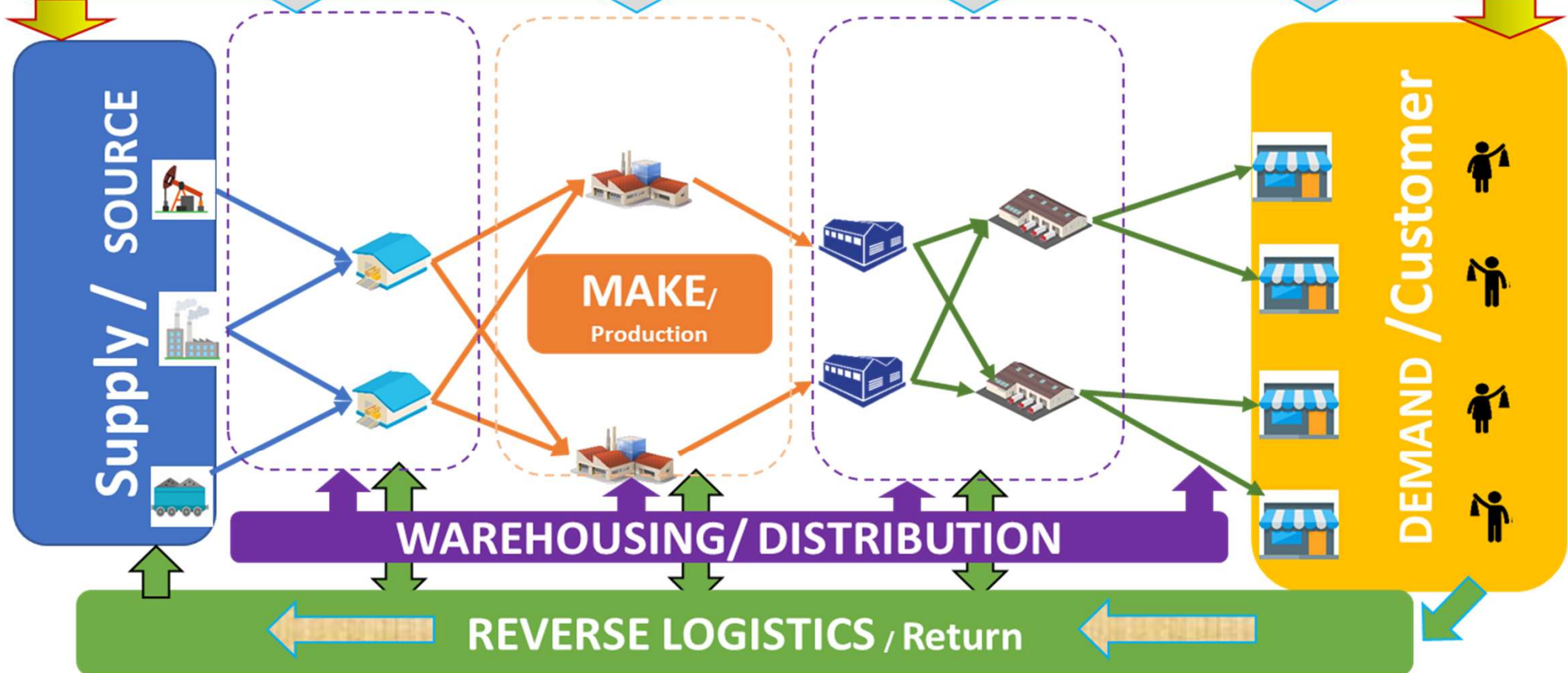
Supply Planning / Production Planning / **Network Planning** / Distribution Planning / Demand Planning / ...

Forecast

Forecast

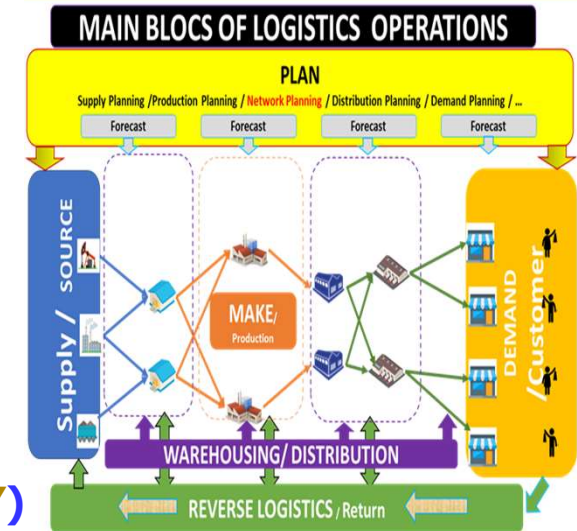
Forecast

Forecast



COURSE PLAN (12 BLOCS VIEW)

- **BLOC 1 : LOGISTICS PLANNING & FORECASTING (PLAN)**
- **BLOC 2 : SOURCING LOGISTICS (SOURCE)**
- **BLOC 3 : CONCEPTS OF DELIVER (DELIVER)**
- **BLOC 4 : WAREHOUSING & INVENTORY MANAGEMENT (INVENTORY)**
- **BLOC 5 : CONCEPTS OF PRODUCTION LOGISTICS (MAKE)**
- **BLOC 6 : LOGISTICS NETWORK PLANNING & MODELLING (NETWORK)**
- **BLOC 7 : DISTRIBUTION LOGISTICS PLANNING & MODELLING (DISTRIBUTION)**
- **BLOC 8 : REVERSE LOGISTICS (REVERSE)**
- **BLOC 9 : QUALITY MANAGEMENT (QUALITY)**
- **BLOC 10 : LOGISTICS INTEGRATION TOWARDS SUPPLY CHAIN (SUPPLY CHAIN INTEGRATION)**
- **BLOC 11 : SUPPLY CHAIN MANAGEMENT STRATEGIES (SUPPLY CHAIN STRATEGIES)**
- **BLOC 12 : SUPPLY CHAIN PERFORMANCE MANAGEMENT (SUPPLY CHAIN PERFORMANCE)**



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)*****

AGENDA COURSE GEST-H501 LOGISTICS ENGINEERING & MANAGEMENT, 2024-2025

Dates	MC	Hour 1	Hour 2	Hour 3	Hour 4
Tuesday, 05/11/2024	A/Y	Introduction	PLAN & FORECAST	Tutorial - PLAN & FORECAST	
Saturday, 09/11/2024	Y	Tutorial - PLAN & FORECAST			
Tuesday, 12/11/2024	X	Expert Talk & Tutorial - INVENTORY & FORECAST			
Saturday, 16/11/2024	X	Expert Talk - PRODUCTION & REVERSE [<i>**may be shifted to January as a wrap-up session**</i>]			
Tuesday, 19/11/2024	A	SOURCING	DELIVER	Introduction to QUALITY MANAGEMENT	
Saturday, 23/11/2024	A	QUALITY MANAGEMENT			
Saturday, 30/11/2024	Y	Tutorial - LOGISTICS NETWORK MODELLING			
Tuesday, 03/12/2024	X	Expert Talk & Tutorial - INVENTORY		Expert Talk & Tutorial - DISTRIBUTION & TRANSPORT	
Saturday, 07/12/2024	Y	Tutorial - DISTRIBUTION LOGISTICS			
Tuesday, 10/12/2024	X	Expert Talk & Tutorial - QUALITY MANAGEMENT			
Saturday, 14/12/2024	A	SUPPLY CHAIN INTEGRATION		SUPPLY CHAIN MANAGEMENT STRATEGIES	
Tuesday, 17/12/2024	A	SUPPLY CHAIN MANAGEMENT STRATEGIES		SUPPLY CHAIN PERFORMANCE MANAGEMENT	
		EXAM: Monday, 20/01/2025, 16h30-18h30			

- **COURSE DEPLOYMENT**

Course is deployed as a set of:

- *Theory sessions (T)*
- *Exercises sessions (E)*
- *Mixed theory + exercises sessions (M)*
- *Wrap-up and dry-run exam preparation session (W)*

- **DATES**

- *First (ordinary) session: Tuesday 05 November 2024*
- *Last (ordinary) session: Tuesday, 17 December 2024*
- ****Recap session and exam preparation: 1/2 day in Jan. 2025****

- **CLASS ATTENDANCE AND PARTICIPATION**

- ✓ *Participation is required, but not formally evaluated.*
- ✓ *Individual in-class quizzes and short take-home assignments are possible and may lead to a 0.5 to 2 points bonus on the final grade.*

EXAMINATION/GRADING

GEST-H-501

(W1) - Written exam Part 1:

Multiple choice and/or open questions

January, duration 30mn

(W2) – Written exam Part 2:

Solving of exercises

January, duration 90mn

FINAL GRADE = (20%W1 + 80%W2) + bonus

DATE:

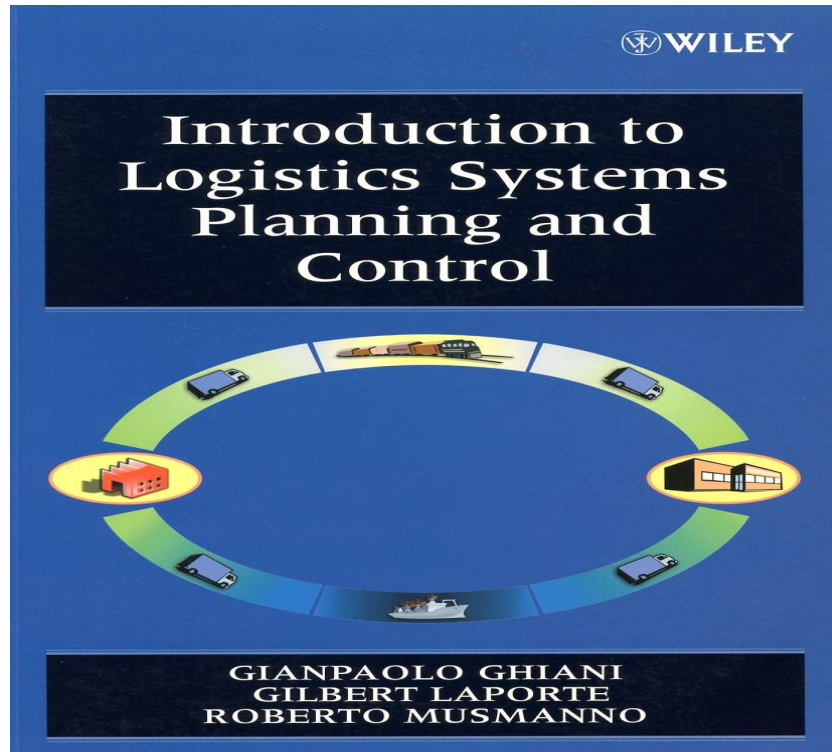
- Monday 20 January 2025, 16h30-18h30

**** It is possible that Part 1, QCM, be replaced by an exercise ****

KEY COURSE OBJECTIVES

- Introduce, to the future manager, **the key concepts of logistics processes optimization and logistics systems management** while insisting on the underlying principles and assumptions as well as the resulting limitations and practical issues of their application.
- Improve significantly the capacity of the future manager as regards the **integrated vision of industrial or business related problems**. The capability of having such a vision **is a critical skill** expected from any future manager who will have to deal with critical challenges of tomorrow.

➤ MAIN REFERENCES



Editions WILEY, ISBN 0-470-84917-7



Editions Economica, ISBN 2-7178-5017-1

*Management Industriel et Logistique:
Conception et pilotage de la Supply Chain.
G. Baglin, O. Bruel, A. Garreau, M. Greif, et al*

CONTACT

Professor Alassane B. NDIAYE
Director, Qalinca-Labs
Universite Libre de Bruxelles, ULB
Avenue F.-D. Roosevelt, 50 – CP 164/7
Brussels 1050
BELGIUM
alassane.ndiaye@ulb.be

