Eidgenössische Technische Hochschule
Swiss Federal Institute of Technology

Departement Management, Technology, and Economics
MTEC

Logistics, Operations, and Supply Chain Management

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BWI

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Definition: Good, Resp. Goods

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- A good is something that has an economic utility or satisfies an economic want
- The noun form of an adjective with the meaning
  - formerly: ‘fitting in a building or human society’
  - today: ‘suitable, serviceable, convenient or effective’

Consumer Products

Cards and Gifts

Cars

Dry Goods

Books

Grocery

Definition: Good, Resp. Goods

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Logistics and Trans-portation

Banking, Insurance

Health Care

Enter-tainment

Government Service

Travel

Definition of Three Synonymous, Logistics Related Terms (1)

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- A *produce*
  - is something produced as commodity or similar.

Definition of Three Synonymous, Logistics Related Terms (2)

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- A *product*
  - is something brought about by intellectual or physical effort.

Definition of Three Synonymous, Logistics Related Terms (3)

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- An *artifact*
  - is something created by humans, usually for a practical purpose.

Definition of Input Goods for Product Development (not synonymously used) (1)

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- *Materials*
  - are the elements, constituents or substances of which something is composed or can be made. Beside raw materials, also documents, evidence, certificates or similar things may serve as materials.

Definition of Input Goods for Product Development (not synonymously used) (2)

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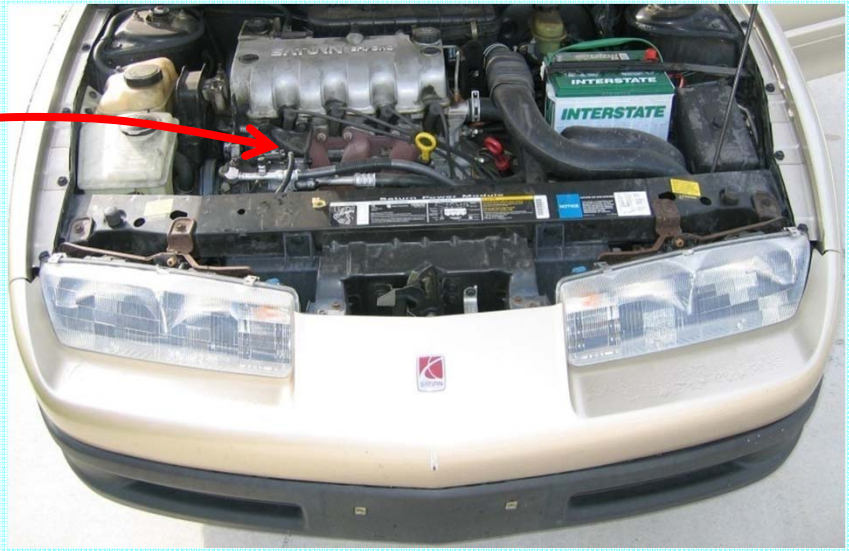
- A co*mponent*
  - One of several parts that together make up a whole machine.
  - With regard to a product, components are goods that become part of a product during manufacturing (e.g. through installation) or arise from a product during disposal.



Input and Output in Value-Adding Processes

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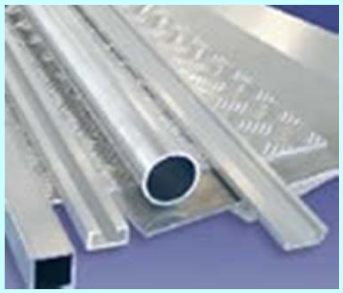

Materials
Component

Transformation

Produce
Product
Artifact

Dimensions of a Good (1)

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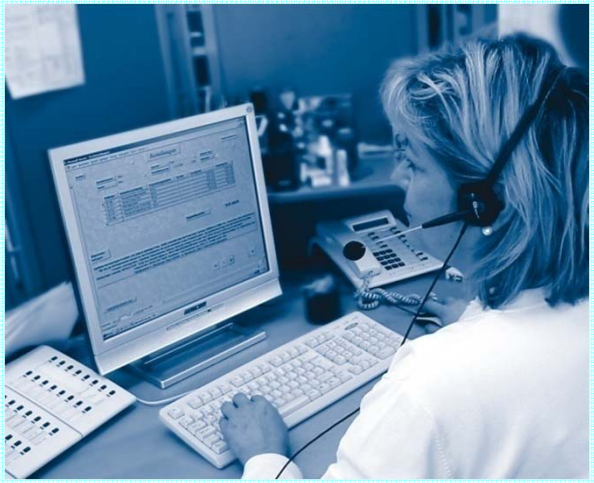
- *The nature of goods*
  - *Material goods* are produced or traded mainly by companies in the industrial sector.
  - *Goods of a non-material nature*, such as information, tend to be produced, compiled or traded by companies in the *service industry* sector.



Dimensions of a Good (2)

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- *The use of goods*
  - *Investment goods* are utilized by the consumer mainly to develop and manufacture other goods.
  - *Consumer goods* are mainly intended for direct consumption.

Dimensions of a Good (3): the Degree of Comprehensiveness of a Product

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Product in the most comprehensive sense (incl. the company)

Product in a broad sense

(includes the service provided)

„Simple“ Product

Airline:
„We buy Airbus only!“

AIRBUS

Training of Pilots and Mechanics by Airbus

The Product Life Cycle

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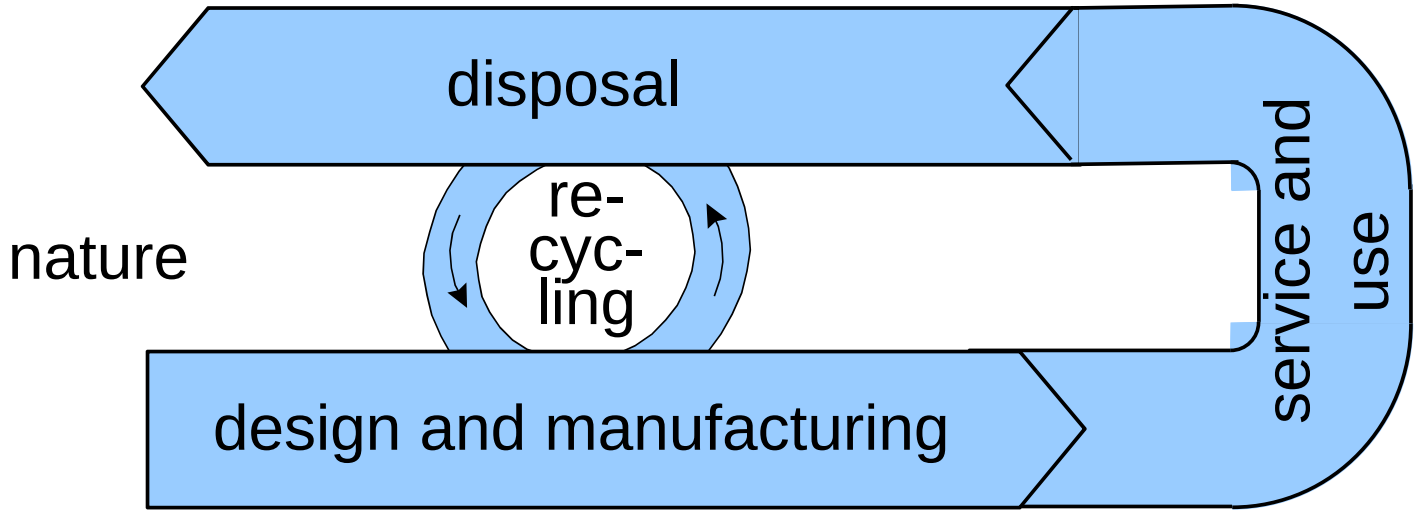

Consumer
‚uses (up)
the product‘

Assignment of Terms to Value-added Management (1)

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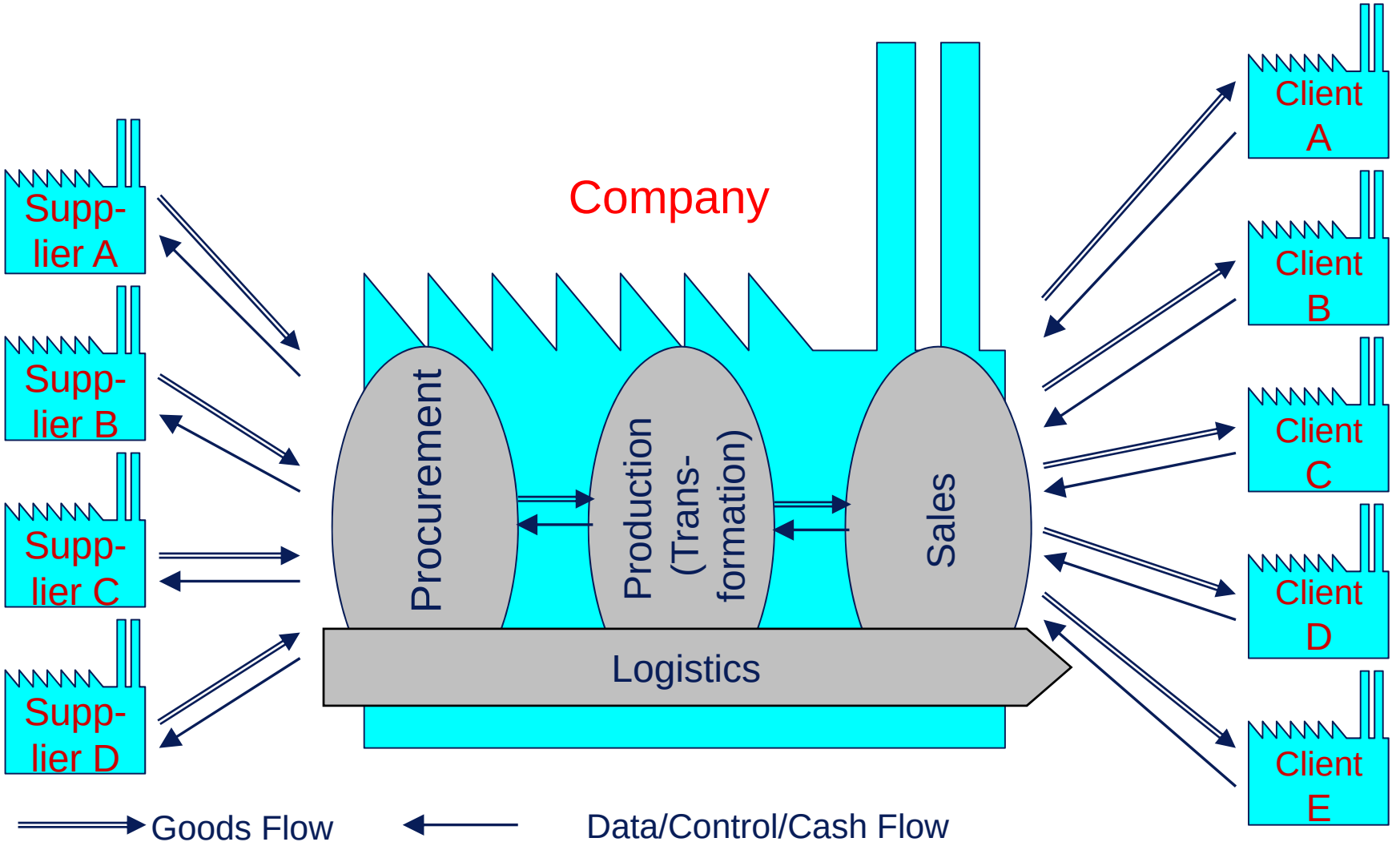

Assignment of Terms to Value-added Management (2)

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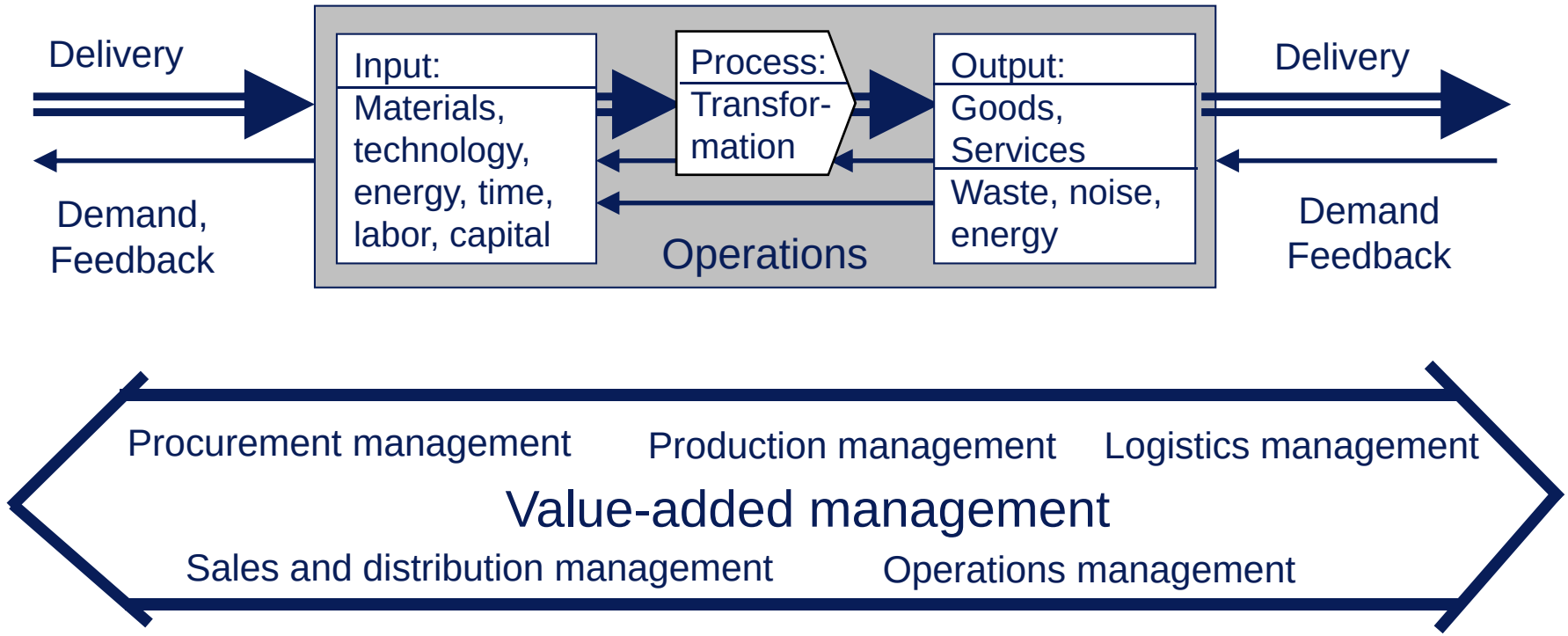

Basic Problem: The Temporal Synchronisation between Supply and Demand

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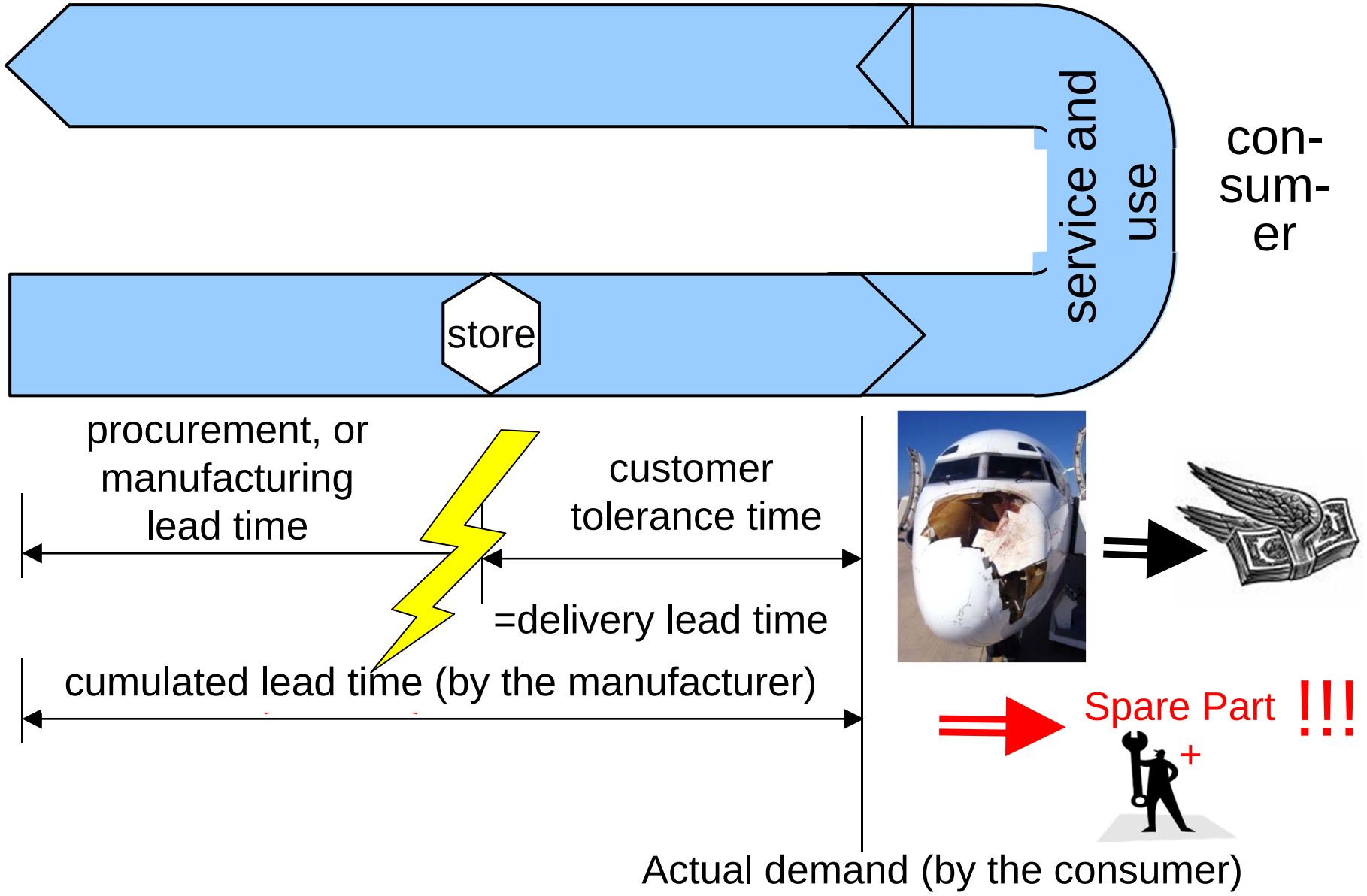

Storage of Goods within Logistics and the Problem of Demand Forecast

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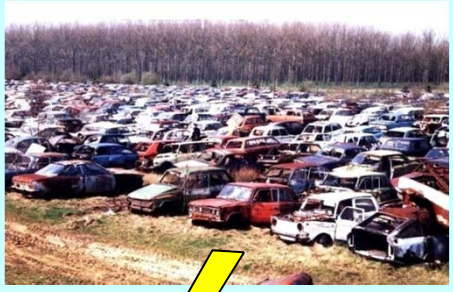

store of goods, warehouses (= decoupling points)

service and use

con-sumer

Demand (by the consumer)

Three Organizational Units in a Logistics Chain

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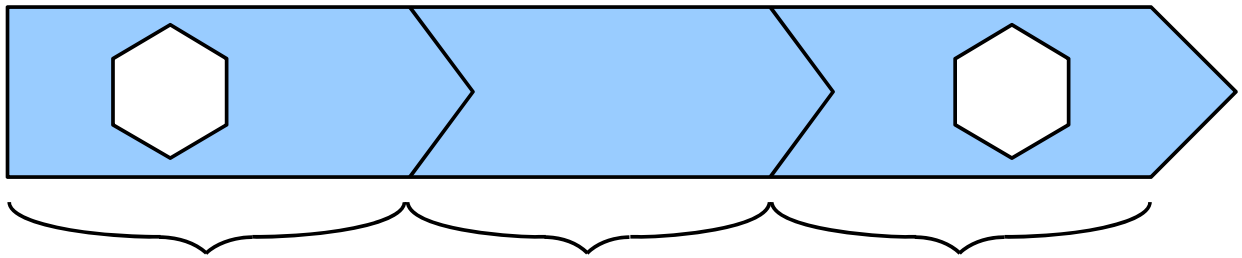

A *Supply Chain* is the global network to deliver products and services from raw materials to end customers through an engineered flow of information, physical goods, and cash [APICS]

An Example of Cooperation in a Logistics Chain: the Supply Chain of the B777

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- Partners in the Pacific arena, in particular in Japan, manufacture the greater part of the airplane bodies.
- The cooperation was undertaken with the explicit view to the Asian market.

Multidimensional Supply Chains for the Design and Manufacturing of Investment Goods

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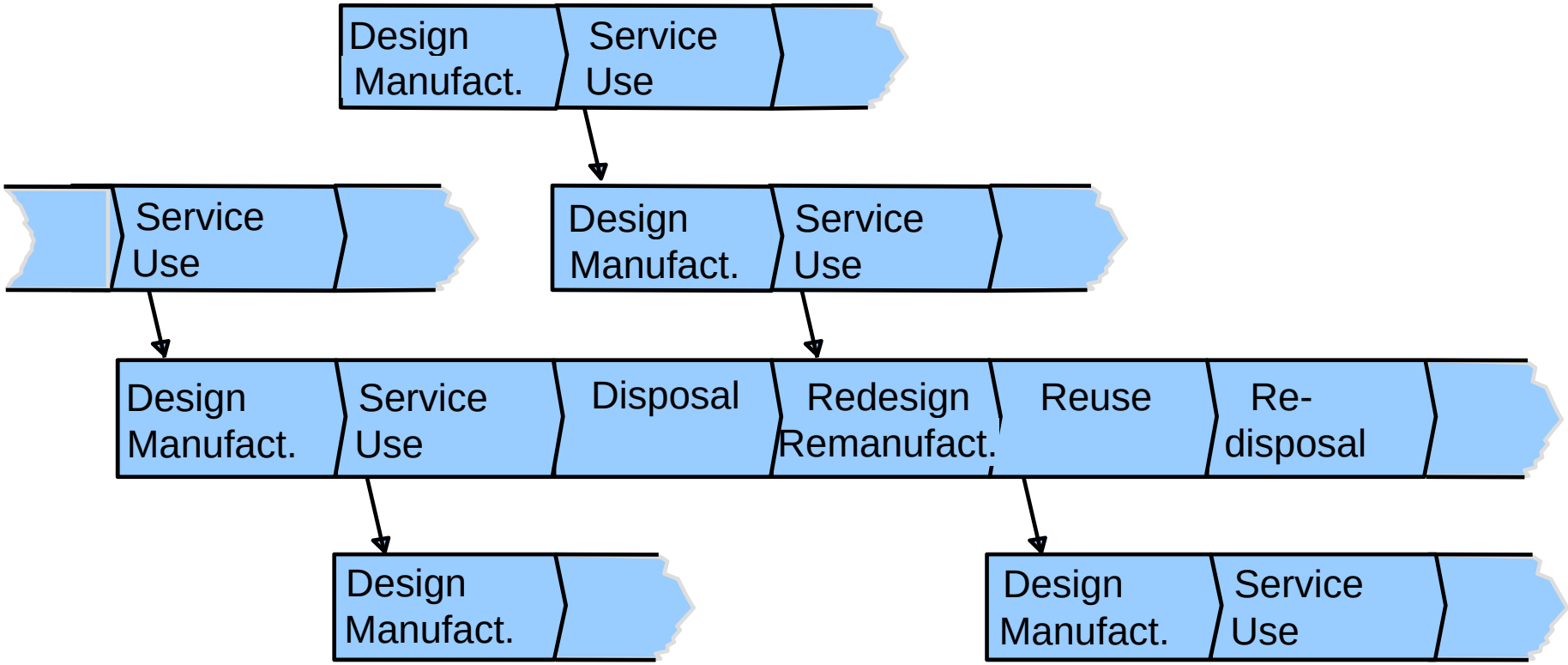

Supply chain management (SCM) is the design, planning, execution, control, and monitoring of supply chain activities.

SCM is applied to the comprehensive supply chain, that is, along the entire product life cycle, within and across companies.

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Entrepreneurial Objectives Affected by Logistics, Operations and Supply Chain Management

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- Target Area Quality:
  - Main objective: to meet high demands for product quality
  - Main objective: to meet high demands for process quality
  - Main objective: to meet high demands for organizational quality
  - Partial objective: high transparency of product, process and organization

- Target Area Costs:
  - Main objective: low on-hand balance, low in-process or in-transit inventory
  - Main objective: high capacity utilization
  - Main objective: low cost rates for administration
  - Partial objective: complete and detailed bases for calculation and accounting

- Target Area Delivery:
  - Main objective: high fill rate (high customer service ratio, or short delivery lead time)
  - Main objective: high delivery reliability rate
  - Main objective: short lead times in the flow of goods
  - Partial objective: short lead times in the data and control flow

- Target Area Flexibility:
  - Main objective: high degree of flexibility to enter as a partner in supply chains
  - Main objective: high degree of flexibility in achieving customer benefit, e.g. by product and process innovation (that is by innovative power)
  - Main objective: high degree of flexibility in the use of resources

Opportuneness and Opportunity Costs

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- *Opportuneness*
  - is the suitability of an action in a particular situation.

- *Opportunity costs*
  - is defined as the return on capital that could have resulted, had the capital been used for some purpose other than its present use.

Opportunity Cost of the Objective “Fill Rate”

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- What does a reduction of the fill rate cost?
- You may think on a loss of…
  - ….
  - ….
  - ….

Potential for Conflicting Entrepreneurial Objectives

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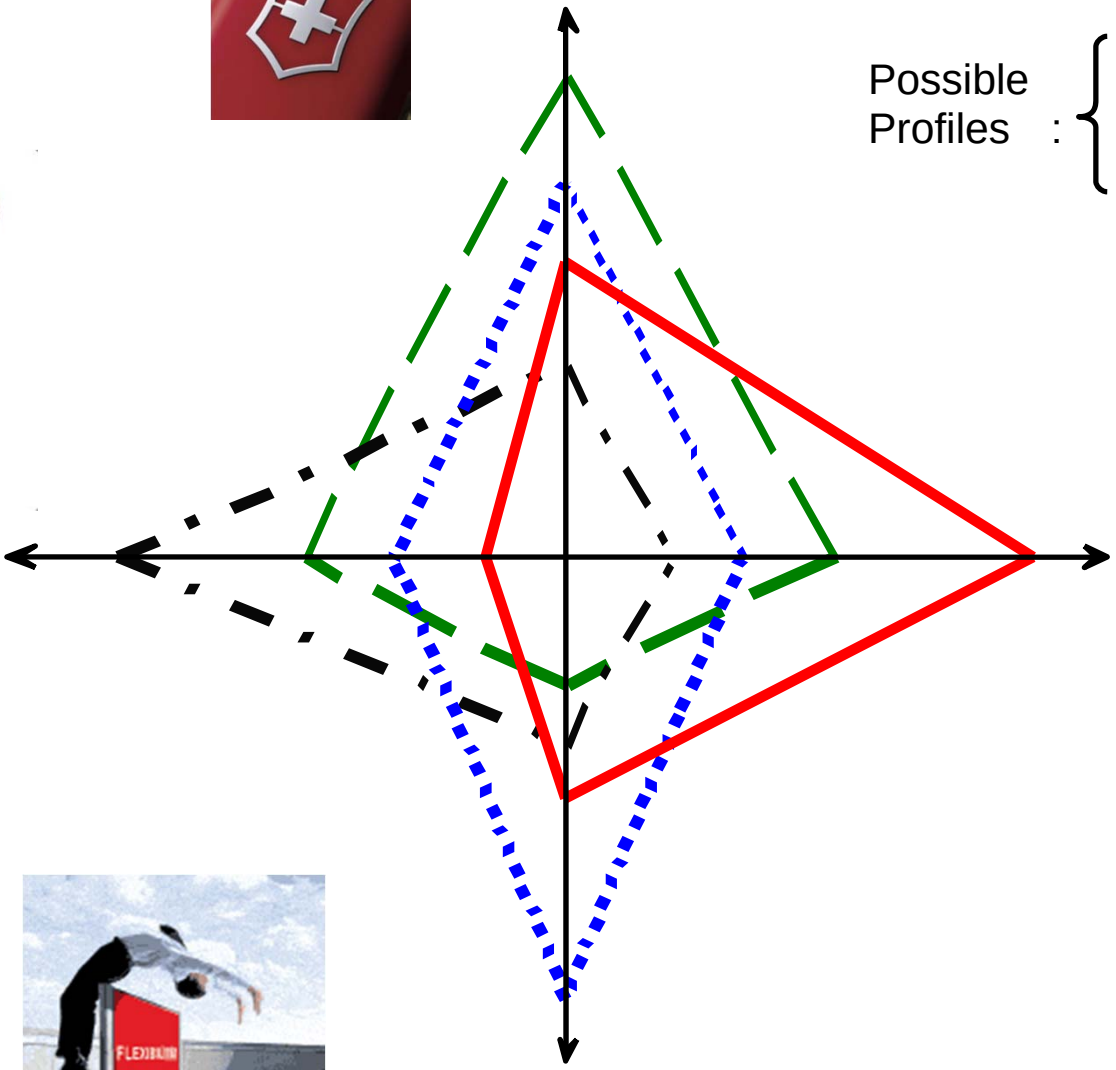

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Logistics Performance Indicators

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- … analyze the effect of logistics on company objectives in the four target areas of quality, cost, delivery, and flexibility.

- In the following, we introduce a balanced set of global measures from a logistics perspective.

  → also requirement of balanced scorecard.

Practical Applicability of Performance Indicators in the Form of Practical Methods (1)

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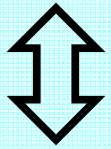
- *Too general performance indicators*:
  - Easily measurable, but:
  - Often general and qualitative in meaning
  - No practical steps can be derived from them without making additional, non-quantitative, and implicit assumptions.
- *Lack of comprehensive measurement methods*:
  - Simple, applicable performance indicators often cannot be measured directly.
- *Distortion of the processes*:
  - Each measurement affects the process being measured.

‚Customer Satisfaction‘



Practical Applicability of Performance Indicators in the Form of Practical Methods (2)

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- *Meaning of the performance indicators*:
  - The absolute value of a performance indicator has little meaning as such.

- *Comparability of performance indicators*:
  - Benchmarking against competitors has meaning only if the competitor has used the same measurement.

- *Practical applicability in supply chains*:
  - All of the important performance indicators can be applied in the total logistics network as well as in the individual company.

Performance Indicators in Operations and Logistics Management

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- Target area quality
  - Scrap factor yield factor)
  - Complaint rate

- Target area delivery
  - Fill rate or customer serv ratio
  - Delivery reliability rate
  - Lot size (batch size)
  - Capacity utilization
  - Value-added rate of lead time
  - Variance in work content
  - Response time
  - Order confirmation time

- Target area costs
  - Stock-inventory turnover
  - Work-in-process-inventory turnover
  - Work center efficiency
  - Capacity utilization
  - Administration cost rate (such as inventory control, purchasing)

- Target area flexibility
  - Bid proposal success rate
  - Order success rate
  - Breadth of qualifications
  - Temporal flexibility

Performance Indicators in the Target Area of Delivery: *Fill Rate* and *Delivery Reliability Rate* (1)

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Indicator	Fill rate or customer service ratio
Definition	Number of products delivered on desired delivery date divided by number of products ordered
Reason for measuring	Poor fill rate results in opportunity cost and, depending on contract, penalty costs.
Reference obj.	a) item, b) business partner, c) part logistics (e.g. sales)
Fact to measure	For a): item demand, or order position For b) and c): order position or order

Indicator	Delivery reliability rate
Definition	Number of products delivered on confirmed delivery date divided by number of confirmed products
Reason for measuring	Poor delivery reliability rate results in opportunity cost and, depending on the contract, penalty costs.
Reference obj.	a) item, b) business partner, c) part logistics (e.g. sales)
Fact to measure	For a): item demand, or order position For b) and c): order position or order

Example: determine the fill rate

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- Order A:
  - Item 4711: 10 ordered, 10 delivered
  - Item 4722: 20 ordered, 20 delivered
- Order B:
  - Item 4712: 5 ordered, 3 delivered
  - Item 4711: 2 ordered, 0 delivered
- Order C:
  - Item 4715: 4 ordered, 3 delivered
  - Item 4711: 3 ordered, 3 delivered

- Determine the fill rate!

Performance Indicators in Operations und Logistics Management – Possible Measures

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- *Target area quality*
  - Educate employees for specific tasks
- *Target area costs*
  - Dismiss employees
  - Reduction of inventories (Lot size “1”)
- *Target area flexibility*
  - Educate employees for different tasks
  - Motivate employees for a more flexible work schedule
  - Communication in the company
  - Group work
- *Target area delivery*
  - Layout change
  - Harmonize content of work and processes
  - Customer order forecasting system
  - Decentralized storage
  - Lot size “1”
  - Transportation within company and trans-corporate
    - automate
    - by those employees producing the products