LOGISTICS
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LOGISTICS METHODS AND TECHNIQUES - JIT

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The aim of the lecture is to discuss JIT technology

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Logistics
-
Logistics methods and techniques - JIT

Structure of the lecture

JIT
JIS
Kanban
Hub and spoke
CROSS Docking
QR
ECR

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JUST-IN-TIME (JIT)

- business philosophy, not technical guidance on how to manage production
- after the WWII Taichii Ohno was studying supermarkets - the system to buy as many goods as I need - can this be used directly at the production site?
- Ohno's solution: total elimination of prodigality
- JIT term was first used by Kiichiro Toyoda
- the greatest boom of JIT in the 1980s in Japan and the US

- with the implementation of JIT, storage becomes unnecessary
- ideal economic order quantity equals to one unit, safety stock is considered unnecessary and any stock in a store should be excluded
- JIT based on reversing existing practices (overproduction problem)

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Definition JIT:

JIT is a philosophy based on the principle of getting the right materials to the right place, at the right time, in the right quantity, in the required quality and at the required price based on the customer´s request.

Characteristics of the JIT system

- philosophy of total elimination of all losses
- no losses for machines, equipment and workers
- trouble-free and smooth flow of materials
- automation with human factor
- production plan must be uniform
- let us produce even the smallest items in the smallest number
- let us make only what is needed
- autonomy of workplaces
- optimization of production process = problem solving

Reducing the share of human labour

- human factor is the most common source of errors
- task wage is more motivational than the time wage
- idle worker brings a loss
- unused machinery capacity does not represent a loss
- use of machines to adapt to people
- trap of automation
- labour saving vs. saving people

Stock status

- zero stock - ideal condition
- having no stock is impossible for industrial production
- effort to reduce stock should never be stopped

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Response to changes

- introduction of JIT is associated with dramatic changes in the existing structure of production processes
- unlocking of the capacities is not a positive benefit of the improvement process and cannot be accepted as a result
- importance of feedback
- ability and willingness to be flexible

Characteristics of production management	**Traditional approach**	**JIT**
Manufacturing program	Wide	Limited
Product design	Effort to satisfy the customer as much as possible	Application of standardization, construction adapted to production
Production process and inter-operational transport	Operational arrangement	Process arrangement
Workforce and workstyle	Narrowly specialized workforce, individualized work, changes in the work process enforced rather by command	Wide qualified flexible workforce, teamwork and cooperation, changes in the work process promoted by consensus

Production planning	Complicated production flows, long setup times, large production batches, long running times, very little computer planning support	Short set-up times, small batches, shorter lead times, computer support focused on production progress
Stock management	Large in-process stock, in-process stores	Small in-process stock, storage of work in progress at the workshops
Subcontractors	A large number with competitive relationships	Limited number with cooperative relationships
Production quality control	In critical areas, focused on products	Continuous, focused on critical points of the production process
Production facility maintenance	After failure, performed by specialists	Preventive to proactive, performed by operators

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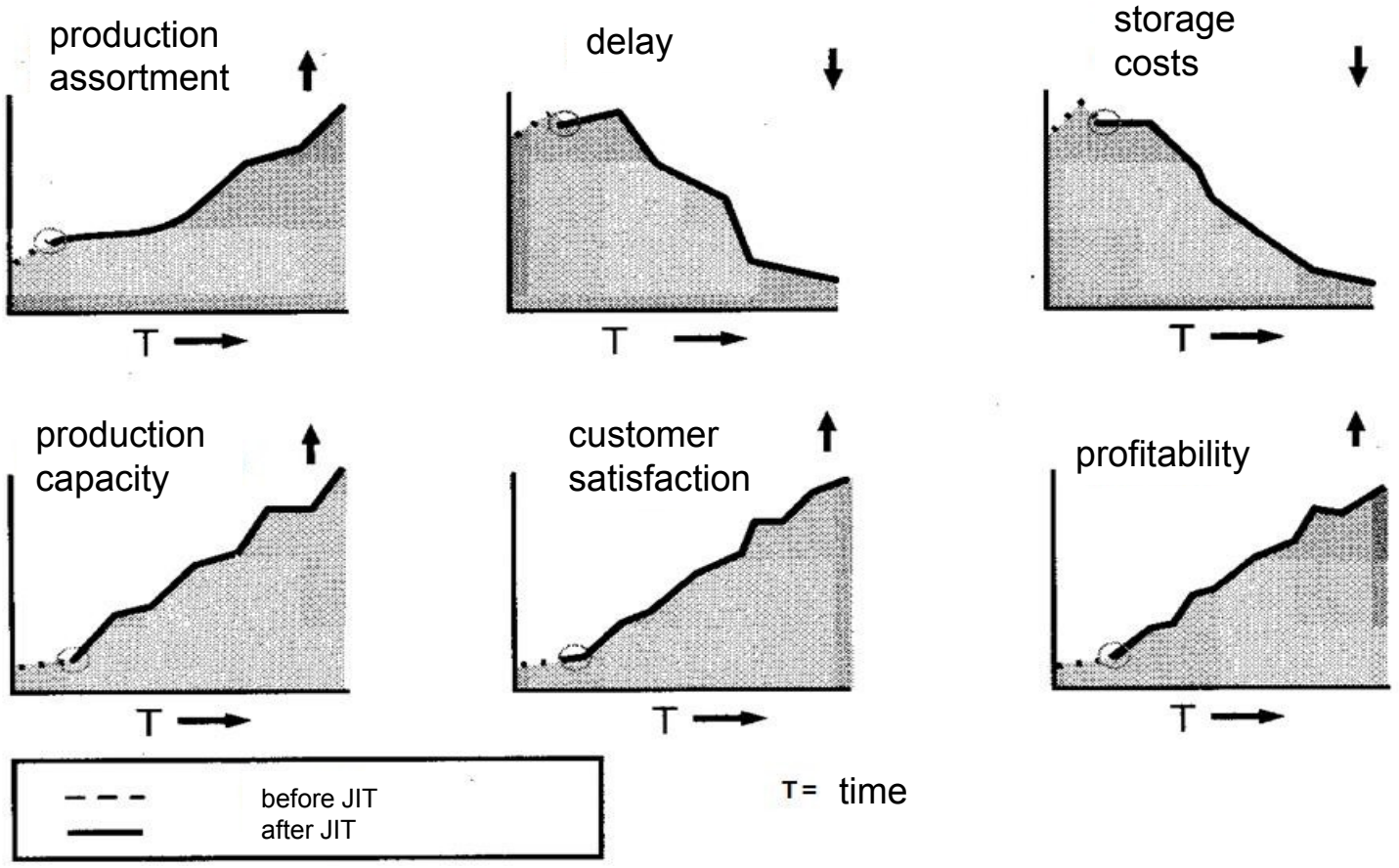
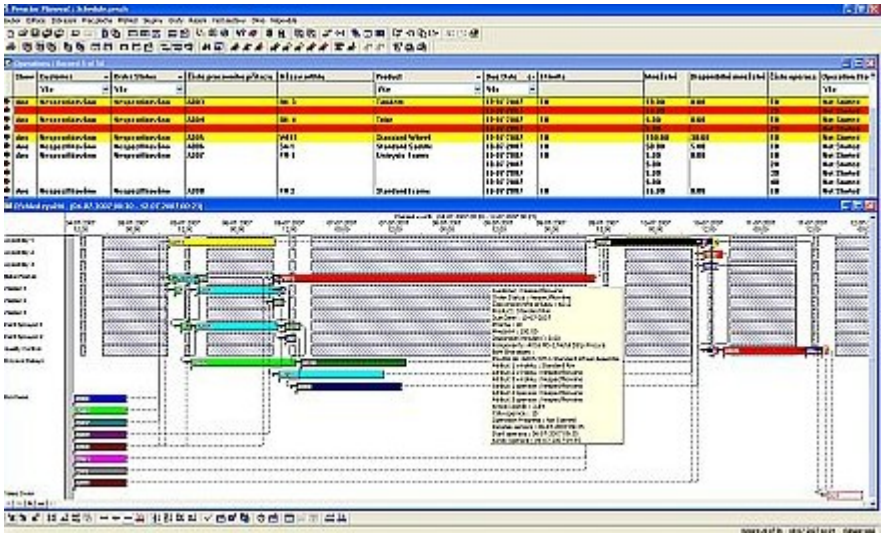


Negative consequences of the introduction of JIT

- the minimum stock requirement is offset by an increase in traffic:
  - increasing traffic on the roads
  - emissions, noise, traffic accidents
  - problems with keeping timetables

- complications in production management:
  - production planning of the plant
  - supplier production plans
  - deployment of suppliers



- resistance from employees
- insufficient support of business systems
- inability to define service level
- insufficient planning and transfer of stock to suppliers

JUST-IN-SEQUENCE (JIS)

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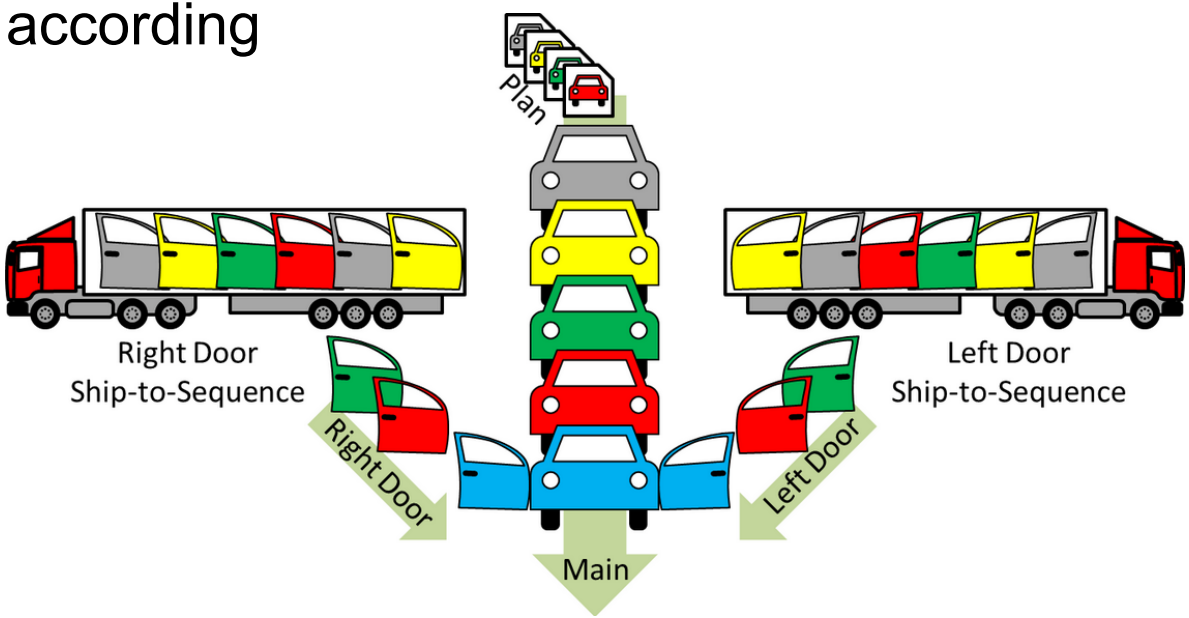
- entire product assortment produced on a single line
- parts are delivered in sequences, i.e. in order in which they travel to the line according to product assembly



- high demands on delivery accuracy:
  - time aspect
  - right order
- supplier's range usually does not exceed 50 km
- sometimes the supplier has his warehouse located directly at the manufacturer's plant - here he sequences the components directly to the assembly lines
- importance of ICT

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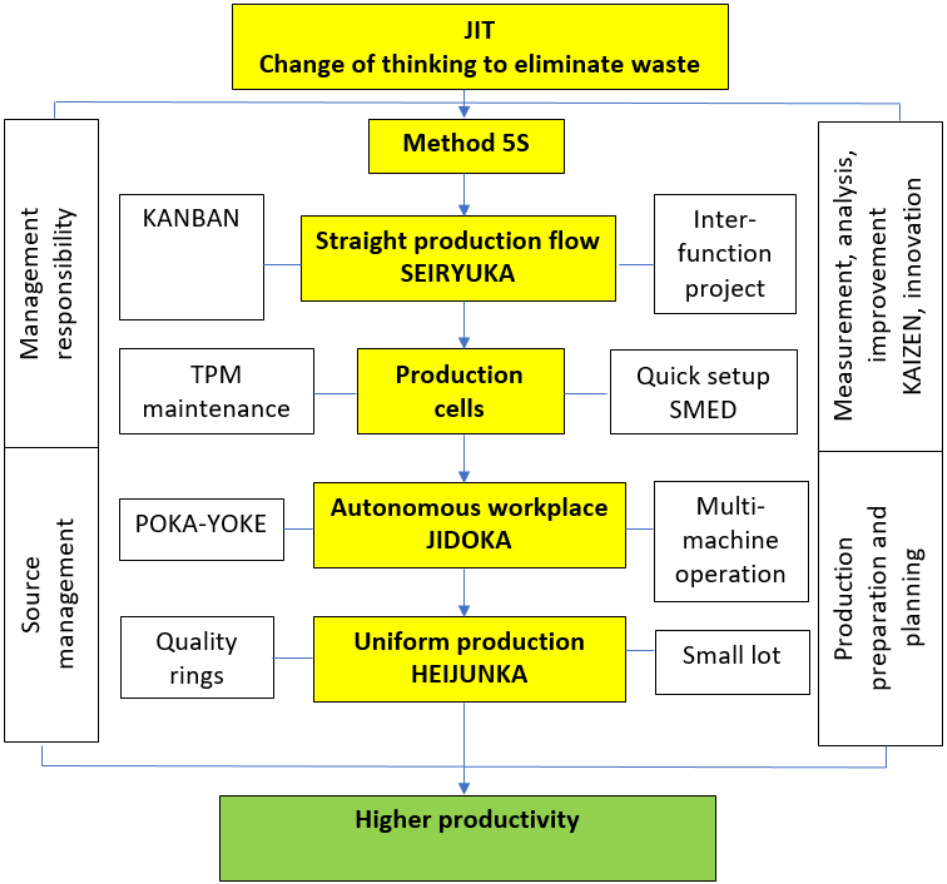

KANBAN

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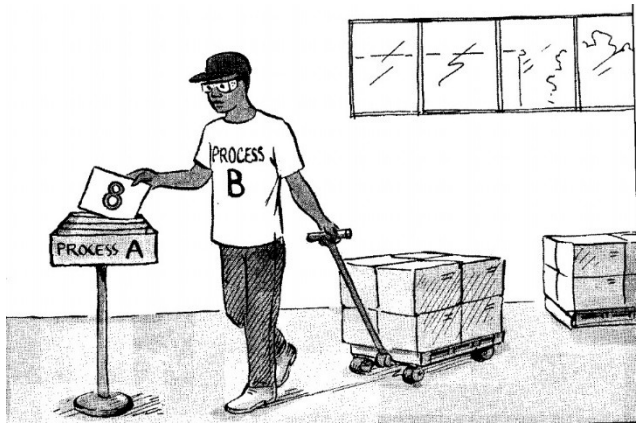
- for production and material flows between processes coordination
- kanban = card (direction indicator)
- kanban cards are used to visualize material flows
- allows controlled pull



Types of kanban

- **transfer**: authorizes the process to get parts from the previous process
- **manufacturing**: authorizes the previous process to manufacture other parts
- **supplier** (external): authorizes the external supplier to deliver additional parts

Kanban circles

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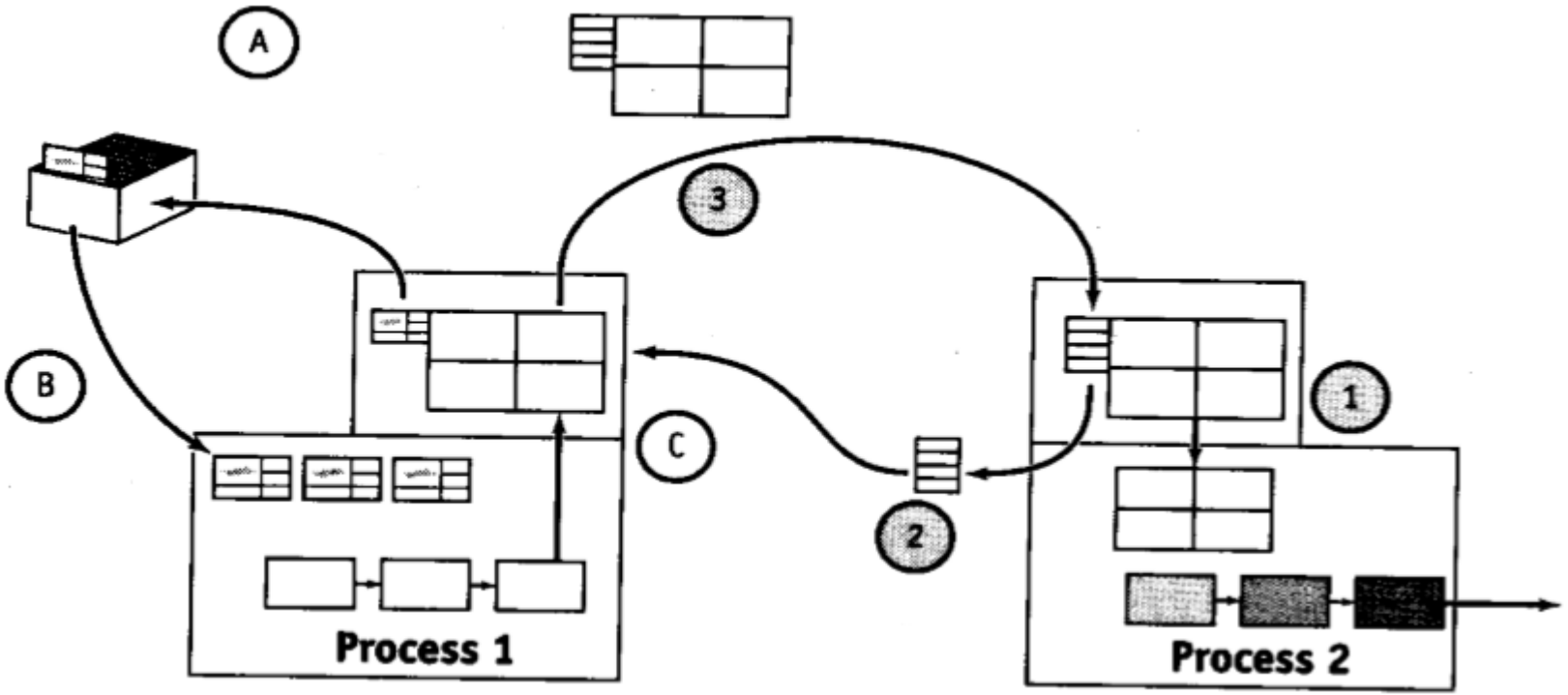

Kanban rules

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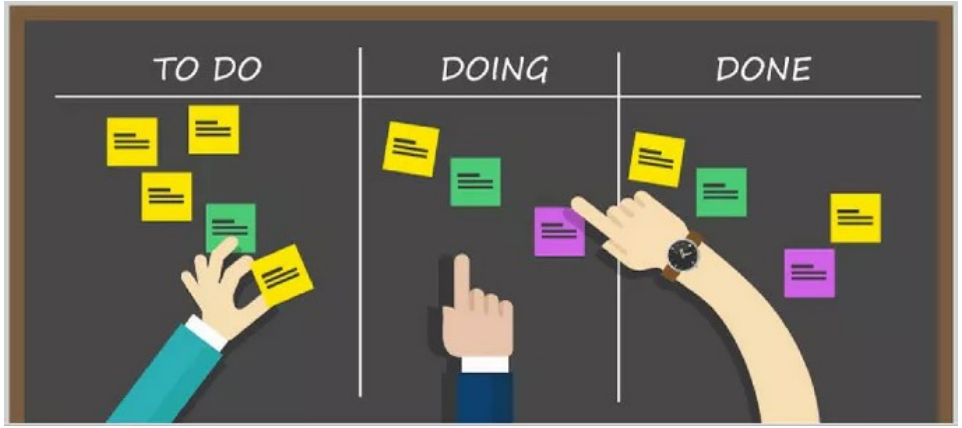
1. The subsequent process turns to the previous one for taking only when it needs it
2. The previous process only produces the amount needed to replace what has been taken



3. Scrap will never be sent to the following process
4. Kanban must always be accompanied by series production
5. Production must be staggered into levels
6. Using kanban to tune production schedule
7. Stabilization, rationalization, process simplification

Benefits of Kanban

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- decrease in stock
- ensuring a systemic flow of information throughout the production process
- support of production continuity while increasing assortment and reducing planning effort
- openness of the management system
- significant reduction of the effort spent on processes with minimal added value
- overall reduction in the cost of transporting information
- possibility to delegate responsibilities directly to the staff on lines

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QUICK RESPONSE – QR

- from1986 at Milliken & Company
- core customer-oriented supply chain technology
- identifying demand as quickly and accurately as possible, including ensuring the satisfaction of each link in the supply chain
- deployment of the computerization tools

EFFECTIVE CONSUMER RESPONSE – ECR

- referred to as the successor of QR
- first time in the US food industry in the early 90s
- main focus on the customer as a link in the supply chain
- demand and supply synchronization using joint planning, forecasting and replenishment techniques

- **cooperation instead of competition**
- 4 core processes that create added value in the supply chain:
  - efficient replenishment of stocks
  - effective shop assortment management
  - effective promotion
  - effective introduction of new products on the market

- Professional ECR technology alternatives:
  - EHCR (*Efficient Healthcare Consumer Response*) in the pharmaceutical market
  - EFCR (*Efficient Food Service Consumer Response*) in gastronomy
  - EPCR (*Efficient Packaging Consumer Response*) in the packaging industry

Potential benefits of using ECR technology

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supplier / manufacturer	distributor / wholesale	customer / retail
• reducing demand uncertainty • growth of continuity and elasticity of production processes • growth of long-term relationships and offered brands	• stabilization of relations between suppliers and customers • information on current levels of supply and demand • reduction of stocks and their maintenance costs	• improving the quality of delivery service at a lower price of products • wide range of fresh products • risk reduction • reducing transaction costs • improving the continuity of funding

HUB-AND-SPOKE

- system of consolidation of smaller consignments into larger units, which are transported to central warehouses and subsequently sorted into individual consignments according to customer requirements
- associated with the deregulation of air transport in the USA (1978)

HUB-AND-SPOKE principle

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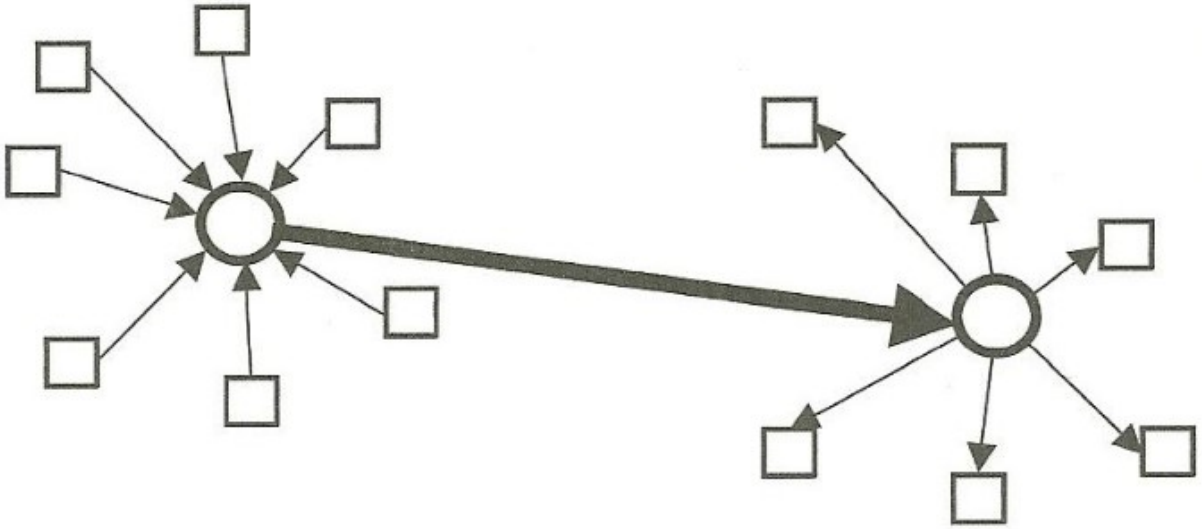

Consignor
Consignee
Place of consignment consolidation and deconsolidation
Transport distance of consolidated consignment

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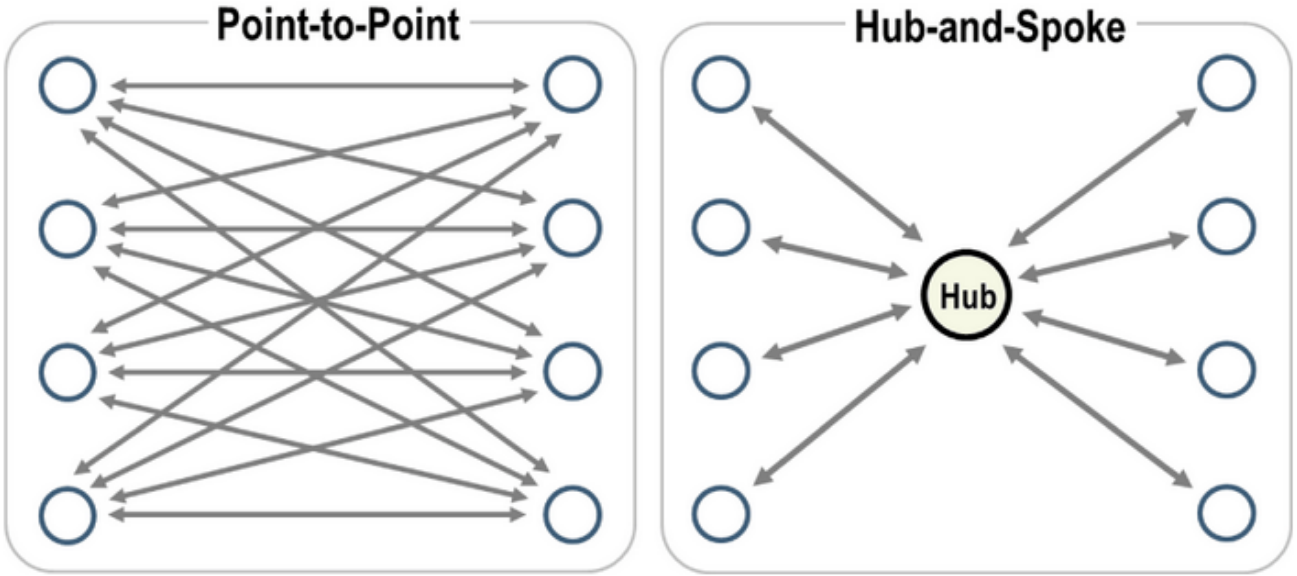
Point-to-Point versus Hub-and-Spoke Networks



Source: https://transportgeography.org/?page_id=653

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OUTSOURCING

- long-term transfer of an activity that the company has carried out itself to an external provider
- initially understood as "handing care" to another entity, on a commercial basis, a "thing" owned by the customer
- currently moving in two directions:
  - outsourcing of services instead of „care“
  - softening of outsourcing

Reasons for outsourcing

- responding flexibly to customers' wishes
- trying to get to the world level quickly or stay there
- focusing on the main activities of the company
- increasing or maintaining competitiveness
- permanent recruitment and involvement of experts
- reduction of operational and investment costs
- predictability of costs in the area
- simplifying work organization
- risk reduction
- synergic effect

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Outsourcing in logistics

- Logistics services providers are specialized enterprises involved in to logistics chains as a organisational legal and economic independent external partners
- Services used in logistics outsourcing:
  - storage (in the form of distribution centre, public and customs store)
  - Store management (+ store information management software)

- palletizing of goods, packaging, labelling
- completing of promotional items
- customs services, security of customs debt
- goods insurance in the warehouse and in transport
- distribution of goods
- return information about delivered shipments
- transhipment of goods
- creating directional sets
- material handling
- transportation
- supply chain planning, management and control

- logistics chain providers by role sizes in the logistics chain:
  - carriers and operators
  - shippers and courier providers
  - Third Party Logistics Providers (3PL)
  - logistics companies (4PL)

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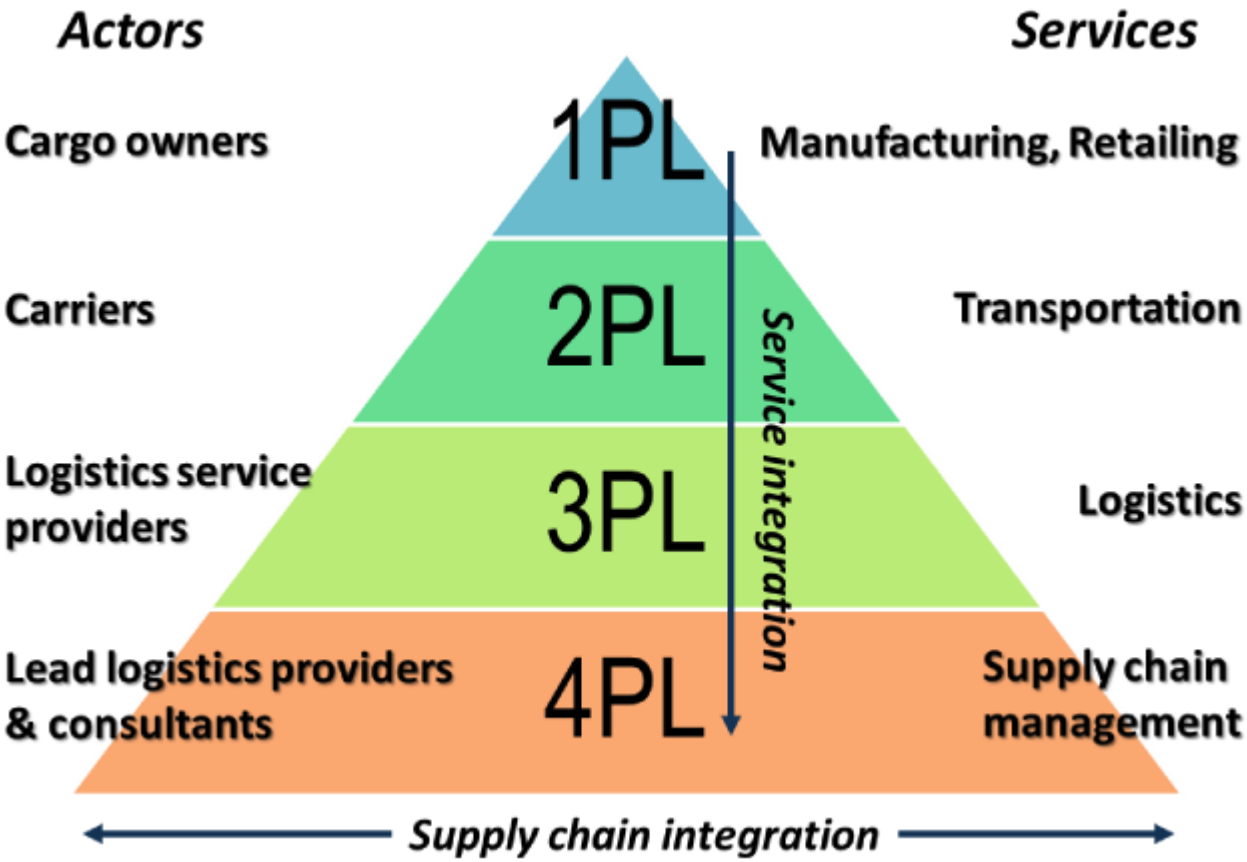

THIRD PARTY LOGISTICS – 3PL

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- entrusting transport, storage and related activities to a third company - transport, storage and handling of goods
- the biggest differences between providers are not in the area of logistics services, but in the level of their IT equipment - the choice of a provider who, with the help of control computer systems, can guarantee their processes without human error

FOURTH PARTY LOGISTICS – 4PL

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- providers of logistics services that have crossed the imaginary boundaries of transport and storage
- also marked as 3PL new generation, 3PL plus
- integration of supply chain management to connect and manage the resources, capabilities and technology of other logistics, information and consulting services to deliver a comprehensive and a parameterized customer solution

- integrated 4PL solution effects:
  - improving the quality of supply services
  - economies of scale in the supply chain up to 15% of production costs
  - decrease in stock held
  - reduction in the volume of fixed assets
  - ability to create value for the client at every point in the supply chain

LOGISTICS CENTRES

- incorporates into one space transport and forwarding companies, logistics providers, customs, veterinary, phyto technical and sanitary administration, industrial and commercial enterprises, leasing, insurance and banking companies
- point at which different means of transport meet - optimal conditions for the creation of combined transport chains

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CTPark Ostrava

Source: https://www.ctp.eu

Summary of the lecture

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You can:

- Explain the essence of JIT philosophy
- Describe the positives and negatives of JIT
- Clarify JIS
- Describe the nature of Kanban
- List the benefits of kanban