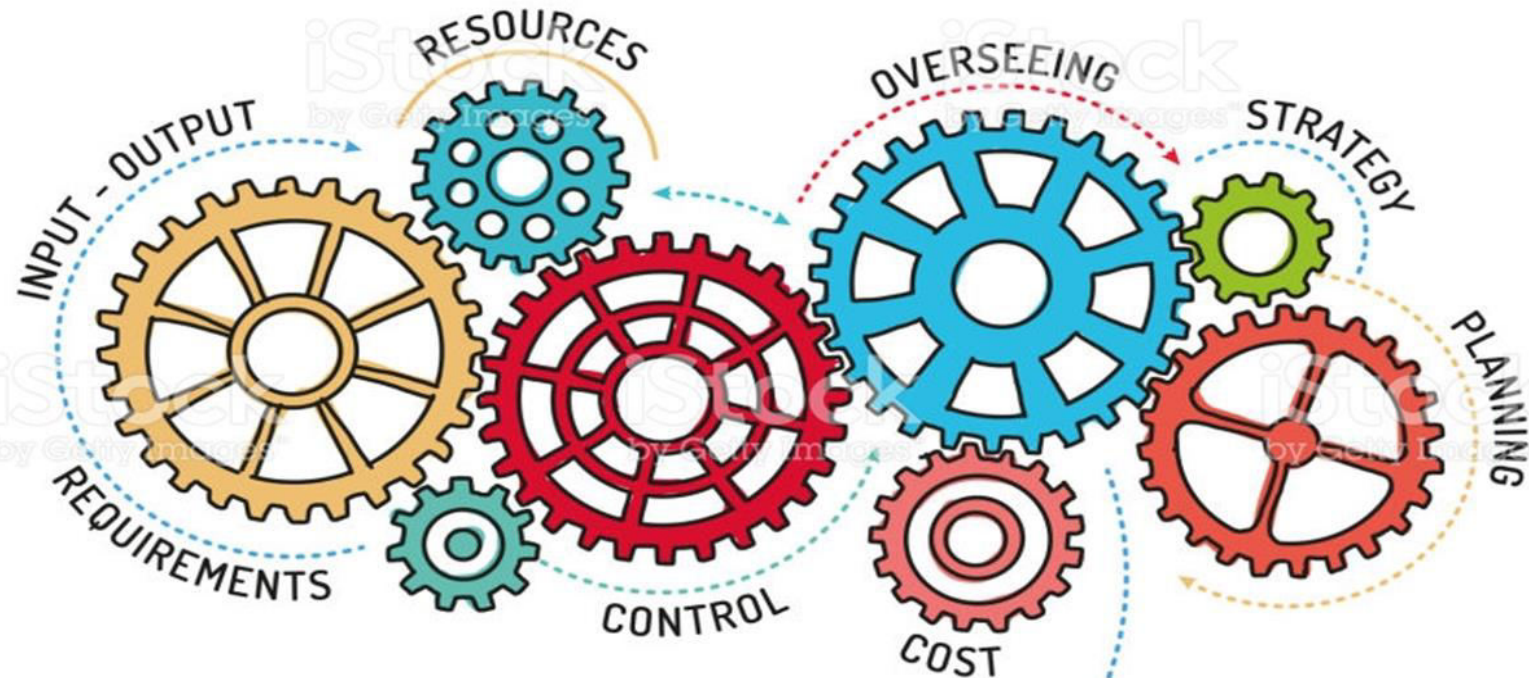




OPERATIONS MANAGEMENT



Operations
Management



8

BUSINESS PROCESS REDESIGN



BUSINESS PROCESS REDESIGN

Introduction



- Why is the importance of redesigning processes
- How would you approach a redesign



BUSINESS PROCESS REDESIGN

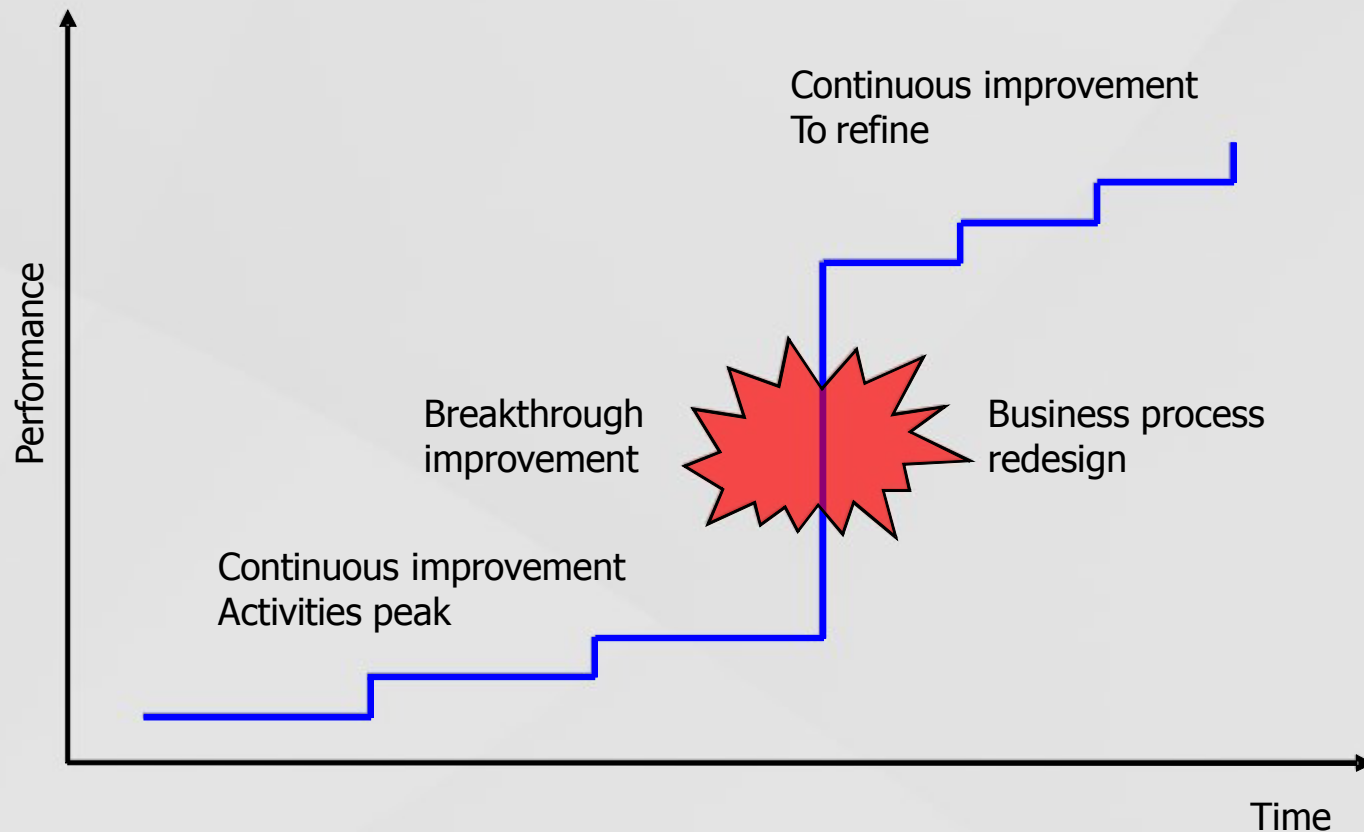
Process innovation

- **Process innovation** is important to:
 - Increase productivity
 - Increase competitiveness
- Methods of process innovation:
 - Continuous improvements: small improvements
 - Breakthrough improvement: 50-100% improvement



BUSINESS PROCESS REDESIGN

Breakthrough/Process Redesign



Source: Russell & Taylor, 2003, p. 138



BUSINESS PROCESS REDESIGN

The reengineering process



Source: Russell & Taylor, 2003, p. 138



BUSINESS PROCESS REDESIGN

Business Process Redesign (BPR)

- Remove waste, simplify, and consolidate activities;
- Link processes to create value;
- Let swiftest/most capable enterprise execute process;
- Flex the process for any time, any place, any way;
- Capture information digitally at the source
- Provide visibility through fresher/richer information;
- Fit the process with sensors and feedback loops
- Add analytic capabilities to the process;
- Connect, collect, create knowledge around process;
- Personalize the process with preferences of participants.



BUSINESS PROCESS REDESIGN

Theory of constraints

- The **theory of constraints** (Eliyahu Goldratt) describes how complex organisations simply can achieve big breakthrough's. The five main rules are:
 - Identify the bottleneck in the system;
 - Determine how the bottleneck can be exploited maximum;
 - Make all other process steps subordinated to the bottleneck;
 - Increase the throughput of the bottleneck;
 - If this works successful a new bottleneck will show up. Without hesitation go back to step 1.



Theory of constraints

WHAT IS THE THEORY OF CONSTRAINTS?

The Theory of Constraints is a methodology for identifying the most important limiting factor (i.e. constraint) that stands in the way of achieving a goal and then systematically improving that constraint until it is no longer the limiting factor. In manufacturing, the constraint is often referred to as a bottleneck.

The Theory of Constraints takes a scientific approach to improvement. It hypothesizes that every complex system, including manufacturing processes, consists of multiple linked activities, one of which acts as a constraint upon the entire system (i.e. the constraint activity is the “weakest link in the chain”).

So what is the ultimate goal of most manufacturing companies? To make a profit – both in the short term and in the long term. The Theory of Constraints provides a powerful set of tools for helping to achieve that goal, including:

- The Five Focusing Steps (a methodology for identifying and eliminating constraints)
- The Thinking Processes (tools for analyzing and resolving problems)
- Throughput Accounting (a method for measuring performance and guiding management decisions)



Theory of constraints

A successful Theory of Constraints implementation will have the following benefits:

- Increased profit (the primary goal of TOC for most companies)
- Fast improvement (a result of focusing all attention on one critical area – the system constraint)
- Improved capacity (optimizing the constraint enables more product to be manufactured)
- Reduced lead times (optimizing the constraint results in smoother and faster product flow)
- Reduced inventory (eliminating bottlenecks means there will be less work-in-process)



Theory of constraints

Core Concept

The core concept of the Theory of Constraints is that every process has a single constraint and that total process throughput can only be improved when the constraint is improved. A very important corollary to this is that spending time optimizing non-constraints will not provide significant benefits; only improvements to the constraint will further the goal (achieving more profit).

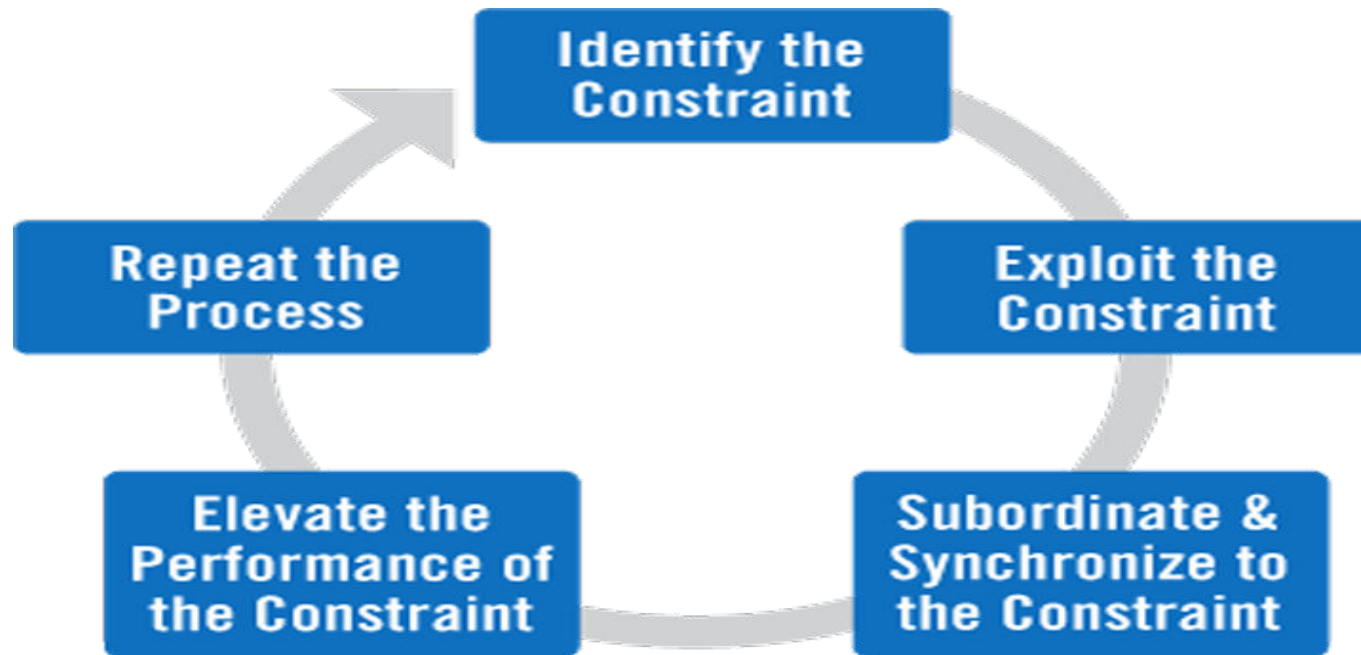
Thus, TOC seeks to provide precise and sustained focus on improving the current constraint until it no longer limits throughput, at which point the focus moves to the next constraint. The underlying power of TOC flows from its ability to generate a tremendously strong focus towards a single goal (profit) and to removing the principal impediment (the constraint) to achieving more of that goal. In fact, Goldratt considers focus to be the essence of TOC.



Theory of constraints

The Five Focusing Steps

The Theory of Constraints provides a specific methodology for identifying and eliminating constraints, referred to as the Five Focusing Steps. As shown in the following diagram, it is a cyclical process.



The Theory of Constraints uses a process known as the Five Focusing Steps to identify and eliminate constraints (i.e. bottlenecks).



Theory of constraints

Step	Objective
Identify	Identify the current constraint (the single part of the process that limits the rate at which the goal is achieved).
Exploit	Make quick improvements to the throughput of the constraint using existing resources (i.e. make the most of what you have).
Subordinate	Review all other activities in the process to ensure that they are aligned with and truly support the needs of the constraint.
Elevate	If the constraint still exists (i.e. it has not moved), consider what further actions can be taken to eliminate it from being the constraint. Normally, actions are continued at this step until the constraint has been “broken” (until it has moved somewhere else). In some cases, capital investment may be required.
Repeat	The Five Focusing Steps are a continuous improvement cycle. Therefore, once a constraint is resolved the next constraint should immediately be addressed. This step is a reminder to never become complacent – aggressively improve the current constraint...and then immediately move on to the next constraint.



PART 3

SUPPLY CHAIN MANAGEMENT



SUPPLY CHAIN MANAGEMENT

Sub blocks:

- 9. Supply Chain Management
- 10. Supply Chain Globalisation
- 11. Inventory Management



9

SUPPLY CHAIN MANAGEMENT



SUPPLY CHAIN MANAGEMENT

Introduction



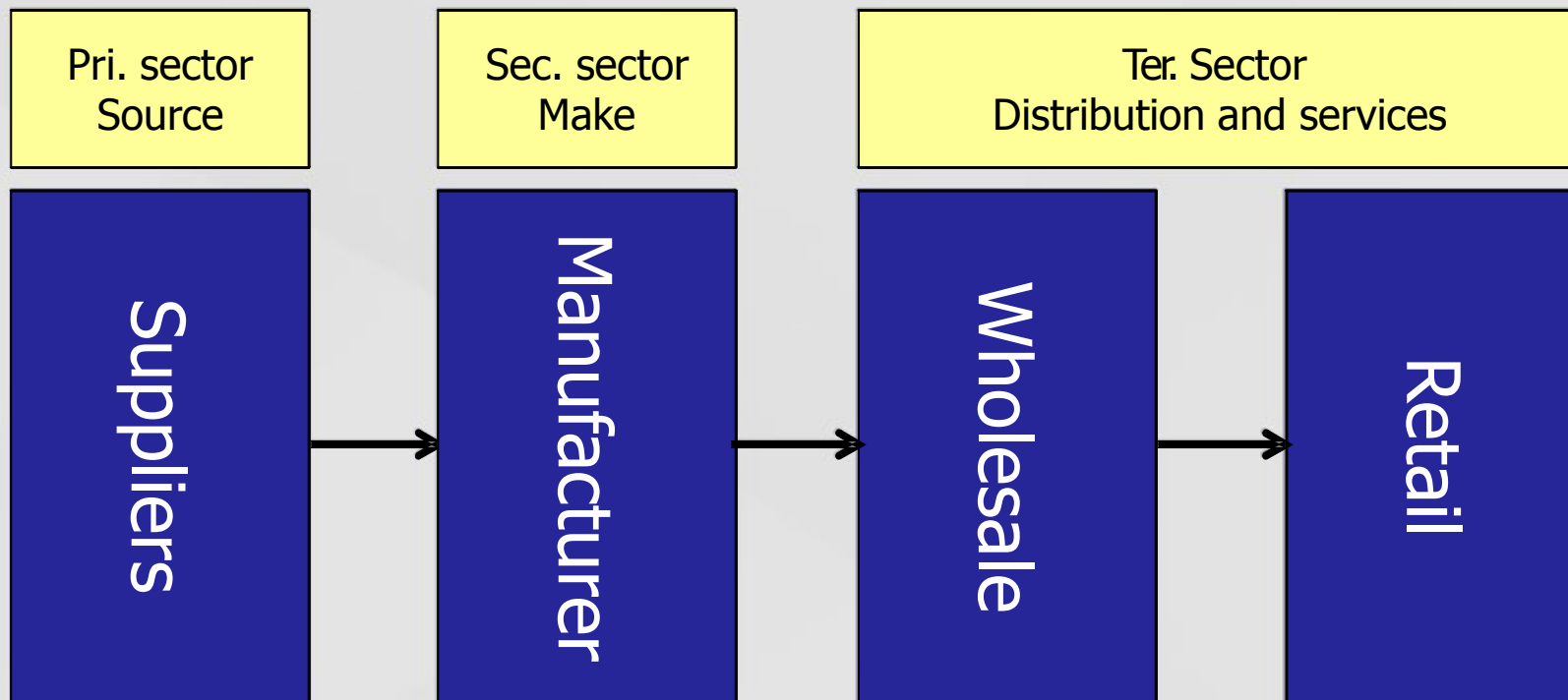
- What is supply chain? What are all elements of the supply chain?
- What are drivers for supply chain management?
- How does the internet and e-Business affects Supply Chain Management?



SUPPLY CHAIN MANAGEMENT

Supply chain functions

- Functions of the supply chain are:



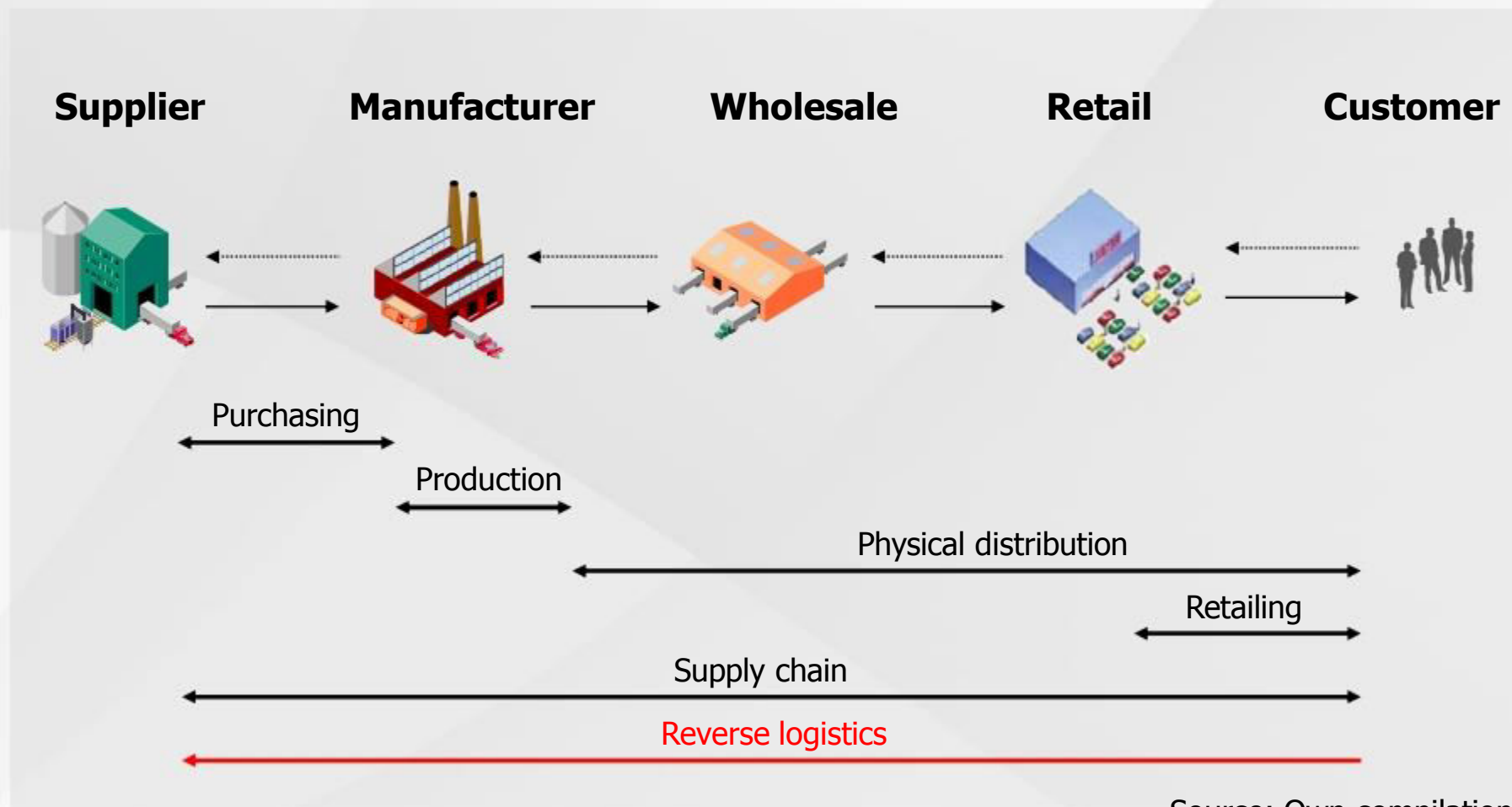
Source: own compilation



SUPPLY CHAIN MANAGEMENT

The supply chain

OPM
basics

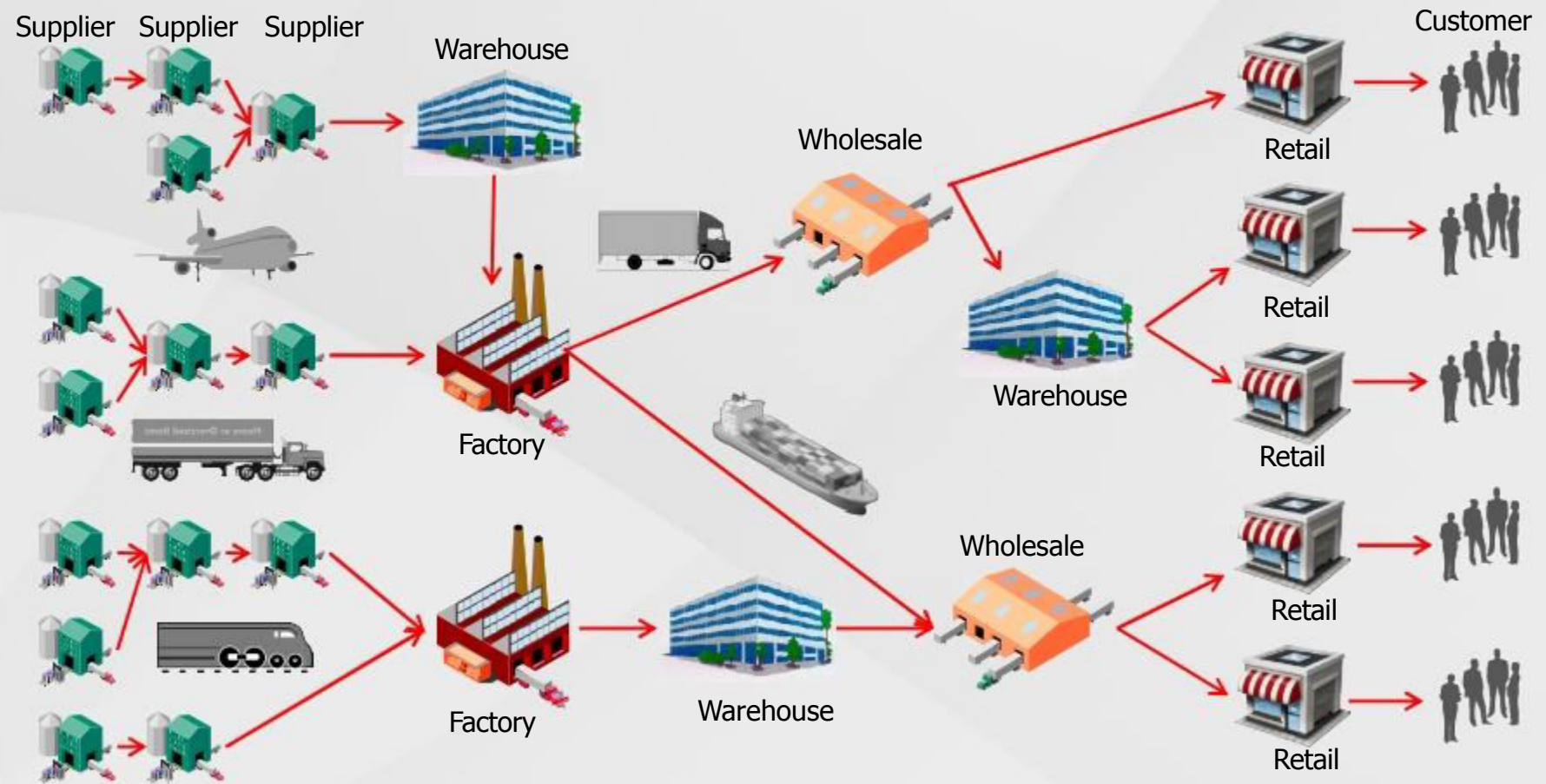


Source: Own compilation



SUPPLY CHAIN MANAGEMENT

Source, make and deliver



Source: Own compilation



SUPPLY CHAIN MANAGEMENT

Players in the supply chain

Customers	Become more critical, less bounded to products, services and shops and are open for testing from increasing alternatives.
Retail	Confronted with increasing competition, forces to improving retail forms and more professionalism with an increasing buying power to producers.
Producers	Confronted with increasing competition because of globalisation, and increasing pressure on margins and looking for optimising production and logistics.
Logistic service providers	Transportation, warehousing, assembling activities are more and more outsourced , increasing pressure on speed of delivery, large logistic service providers take the total-package and subcontract the transportation.



SUPPLY CHAIN MANAGEMENT

Strategic need

- Costs: total supply chain costs can be 50% or more of total operating costs.
 - Costs of storage, movement, personal, goods
 - Costs of responsive distribution and procuring
 - Costs of discontinuities between supply chain elements
- Others:
 - Increased global competition
 - Outsourcing
 - E-commerce
 - Increasing supply chain complexity.



SUPPLY CHAIN MANAGEMENT

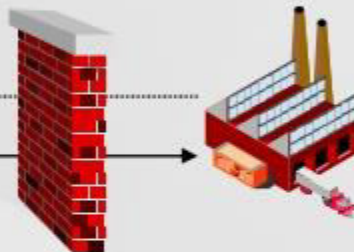
Uncertainty and bullwhip

OPM
basics

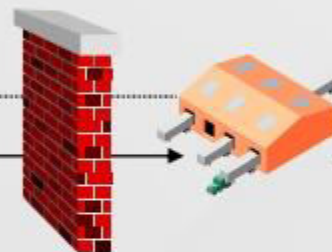
Supplier



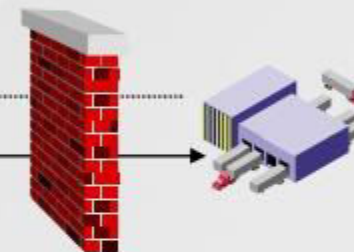
Manufacturer



Retail



Customer

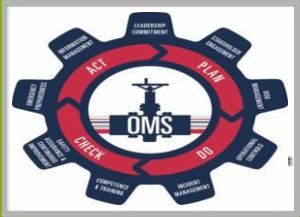


- Lack of global visibility for the entire supply chain
- Local optimal, not global optimal

- Difficult to Promise the Delivery Date
- Low On-Time-Delivery Ratio



Source: Own compilation



SUPPLY CHAIN MANAGEMENT

Information in the supply chain

- In the supply chain following information technologies are used:
 - Bar coding
 - Electronic Data Interchange (EDI)
 - XML
 - Handheld devices
 - RF technology
 - Computers, satellite tracking
 - Imaging
 - Artificial intelligence
 - Point-of-sale

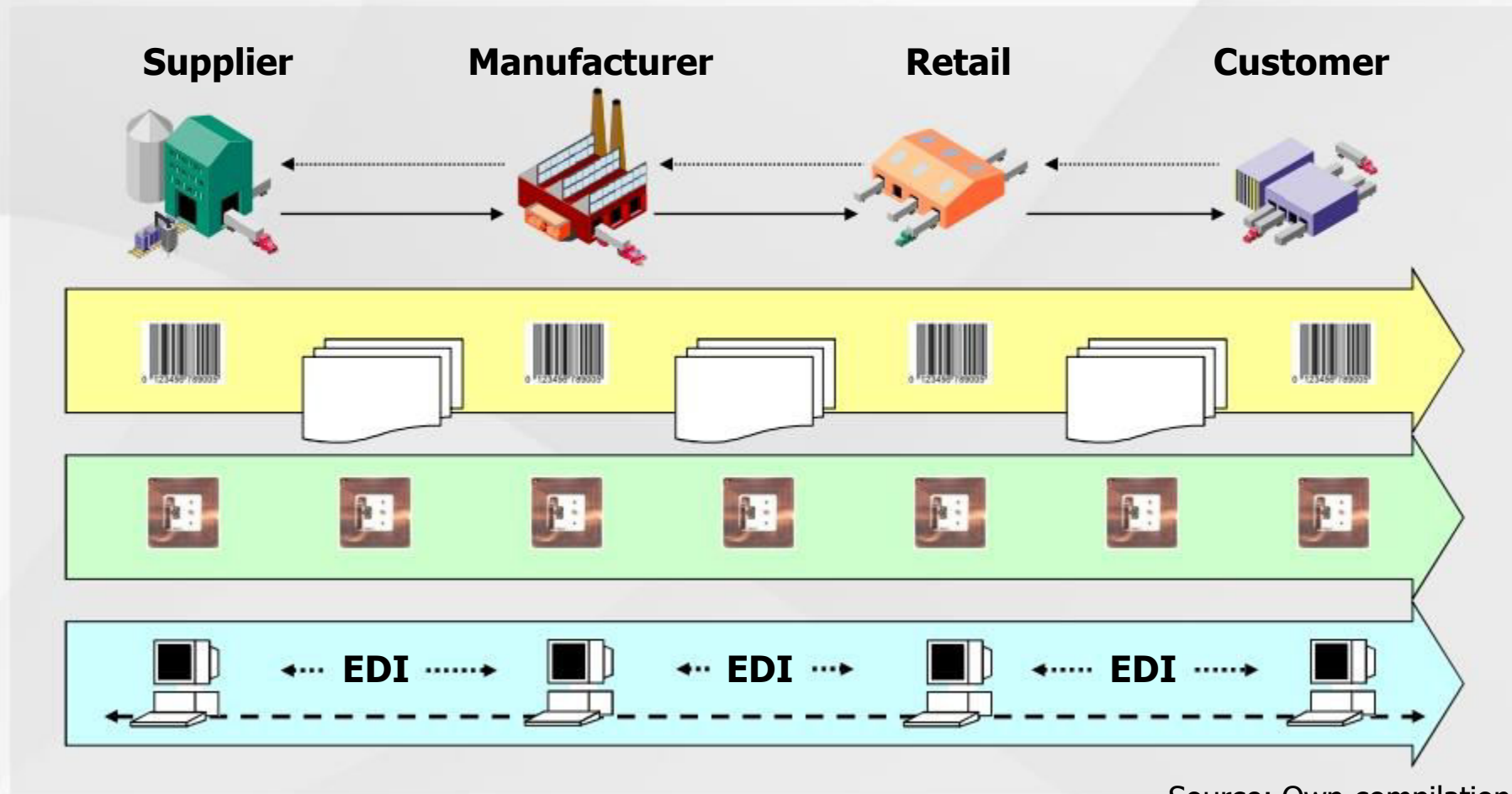




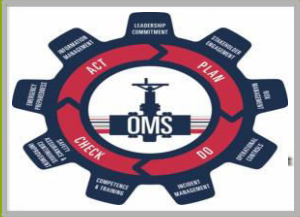
SUPPLY CHAIN MANAGEMENT

Information in the supply chain

OPM
basics



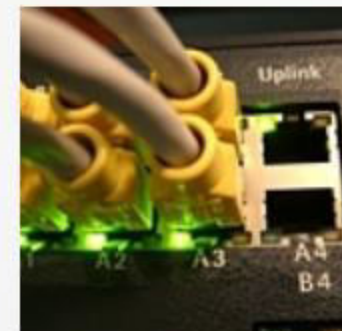
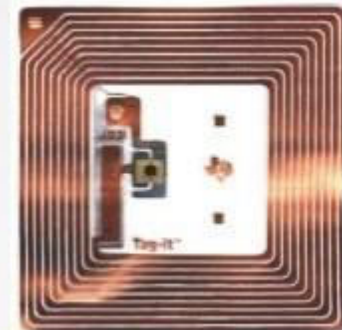
Source: Own compilation



SUPPLY CHAIN MANAGEMENT

Information in the supply chain

- General benefits of information exchange provides:
 - Improved customer service
 - Decreased cost-of-sales
 - Improved vendor/supplier relationships
 - Increased ROA
 - Improved cash-to-cash
 - Ability to proactively respond
 - Improved performance metrics





SUPPLY CHAIN MANAGEMENT

Performance metrics

	Performance attribute	Metric performance
Customer oriented	Supply chain deliver	Delivery performance
		Fill rate
		Perfect order fulfilment
	Supply chain responsiveness	Order fulfilment lead-time
	Supply chain flexibility	Supply chain response time
		Production flexibility
Internal facing	Supply chain costs	Supply chain management costs
		Cost of goods sold
		Value added productivity
		Warranty/return costs
	Supply chain asset management efficiency	Cash-to-cash cycle time
		Inventory days of supply
		Asset turns



10

SUPPLY CHAIN GLOBALISATION



SUPPLY CHAIN GLOBALISATION

Introduction



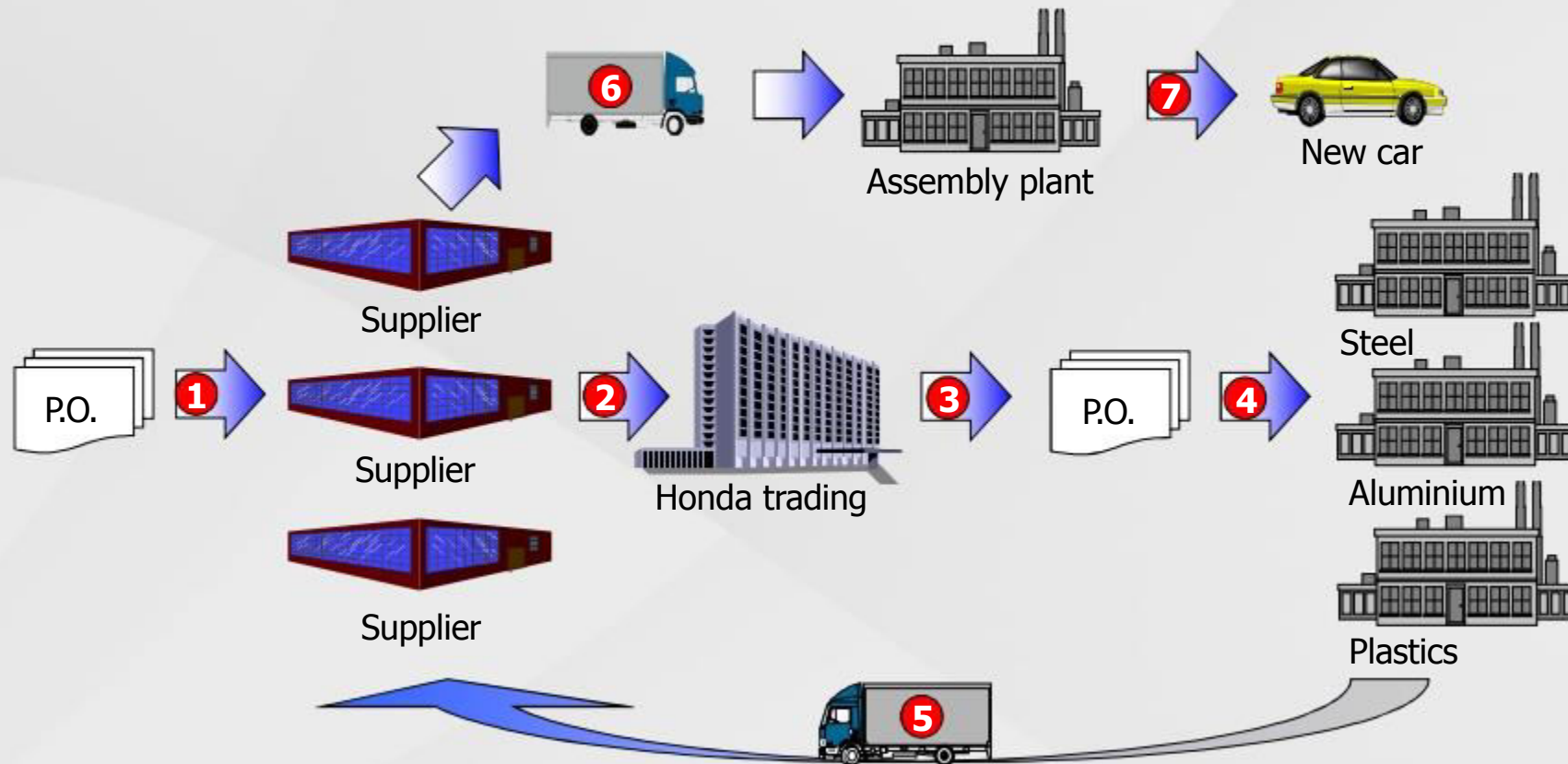
- What is the effect of globalisation on the supply chain?



SUPPLY CHAIN GLOBALISATION

E-procurement

Supply chain management at Honda



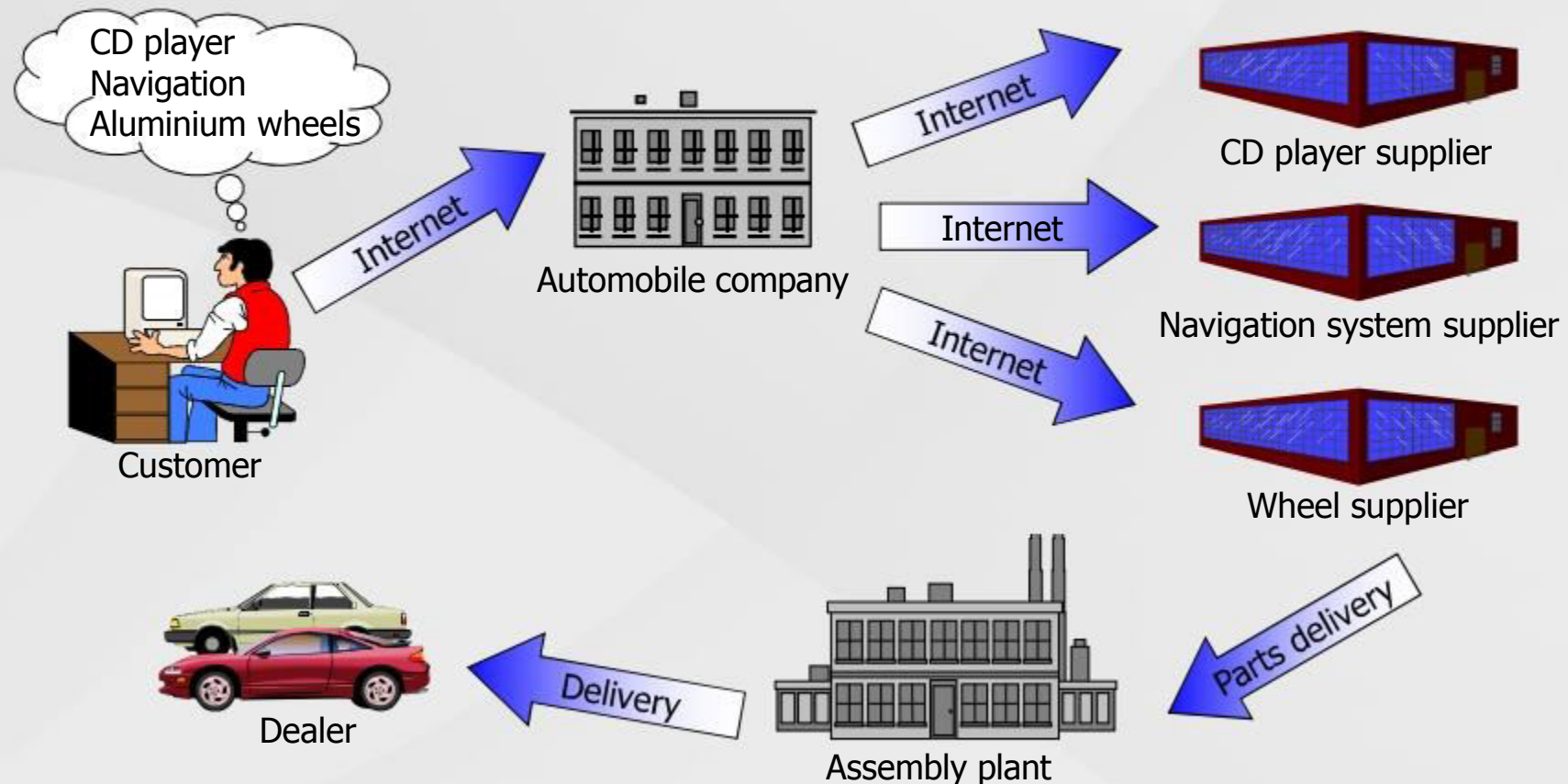
Source: Russell & Taylor, 2003, p. 285



SUPPLY CHAIN GLOBALISATION

Order fulfilment

Build-to-order cars over the Internet





SUPPLY CHAIN GLOBALISATION

Warehouse management

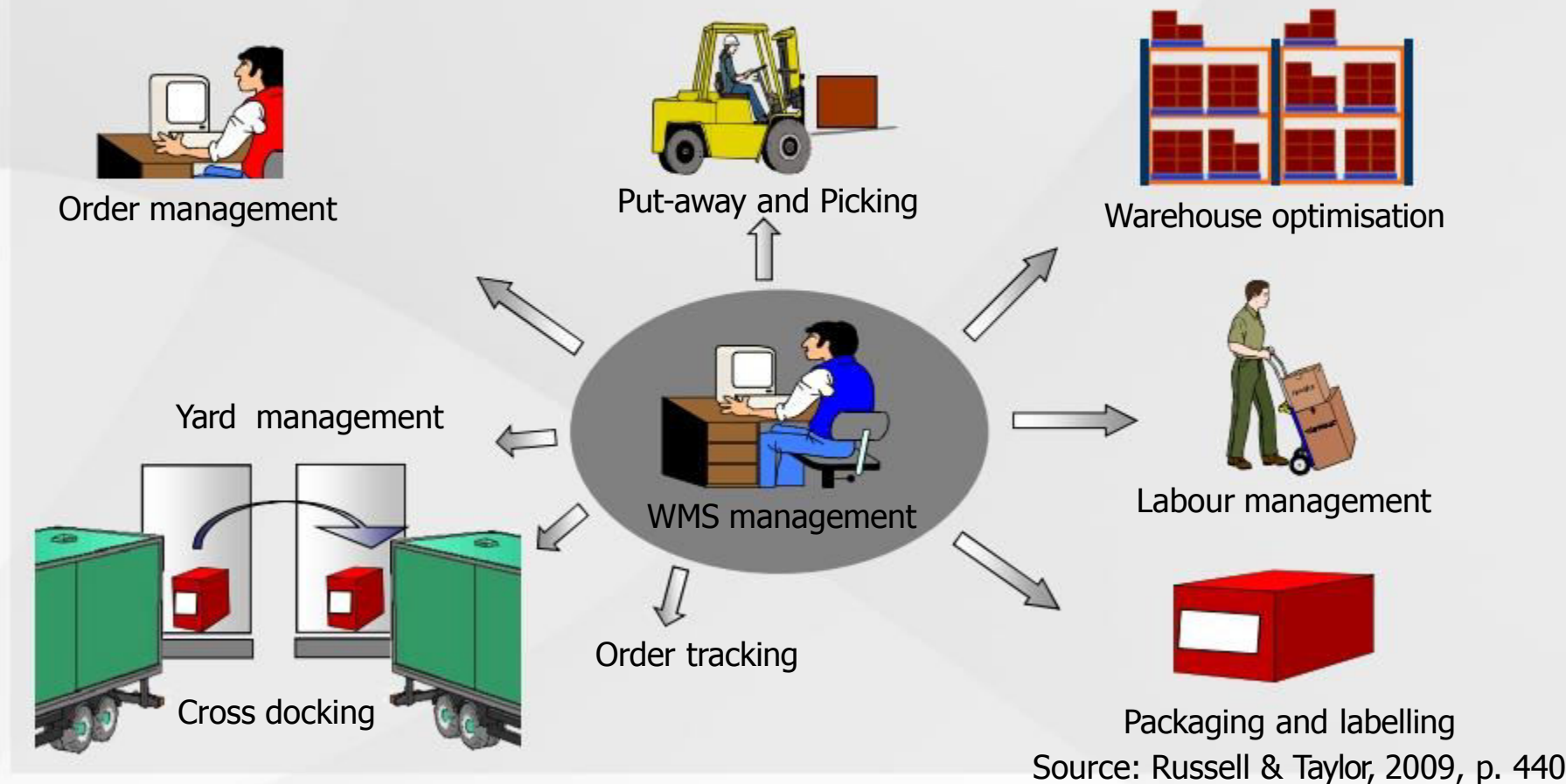
- **Warehouse Management systems (WMS)** runs the DC's daily operations and keeps track of inventories.
- WMS may include: transportation management, labour management, and warehouse optimisation.
- Typical WMS steps:
 - Put-away: receive and storage at specific location;
 - Picking: take an item from a location;
 - Packing: preparing item(s) for transportation;
 - Shipping: ship the goods via a carrier.



SUPPLY CHAIN GLOBALISATION

Warehouse management

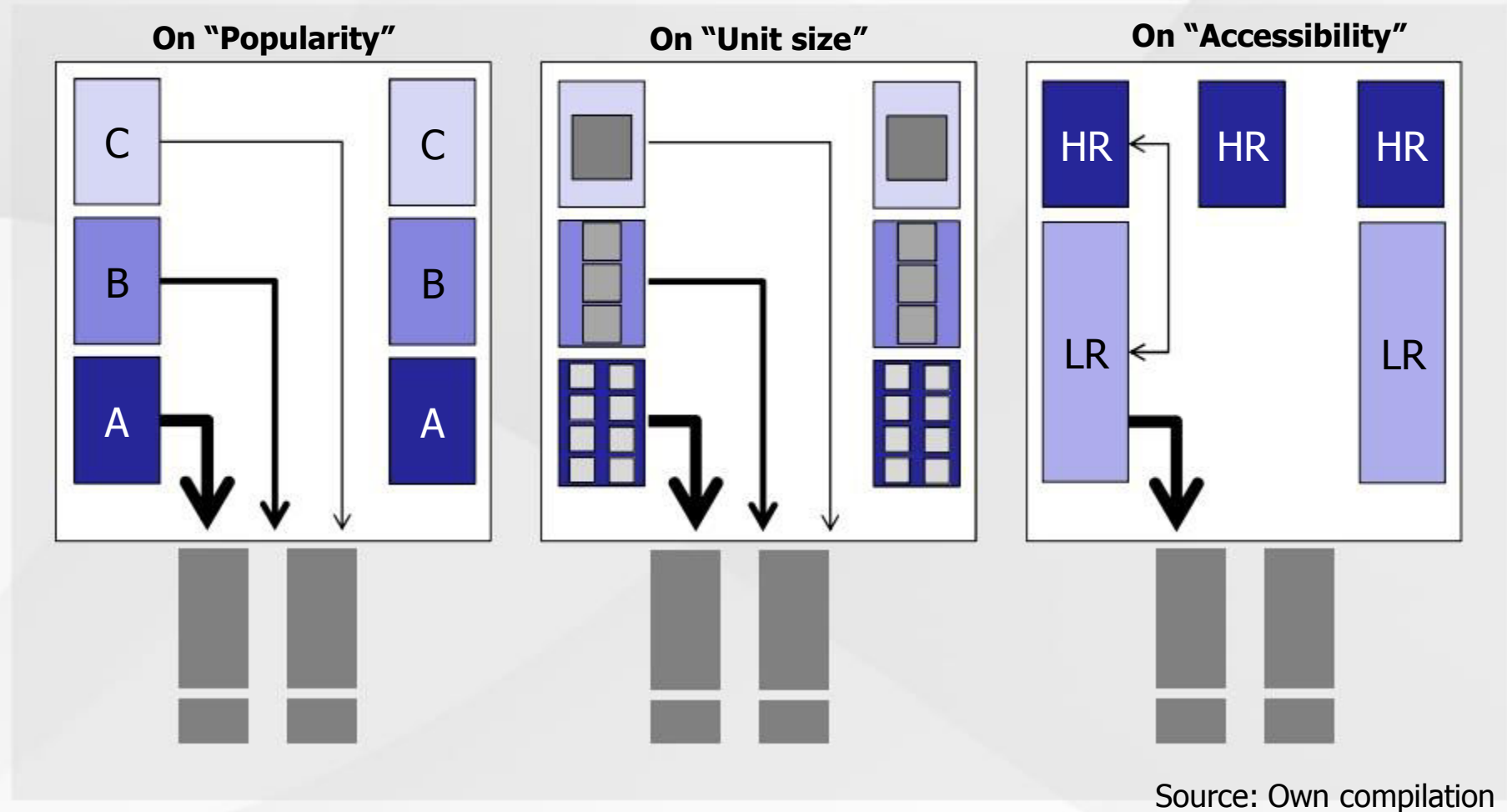
Warehouse Management System (WMS)





SUPPLY CHAIN GLOBALISATION

Warehouse management



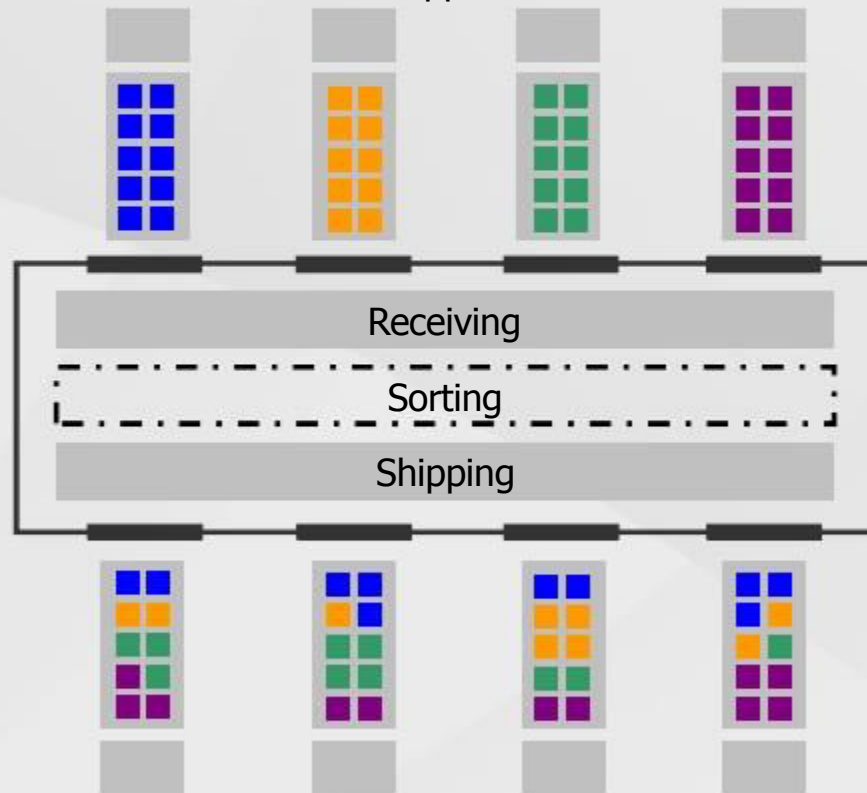


SUPPLY CHAIN GLOBALISATION

Cross-docking

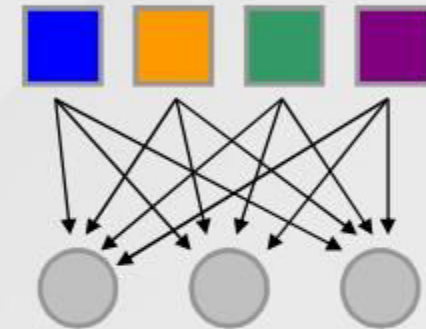
Distribution Center

Suppliers

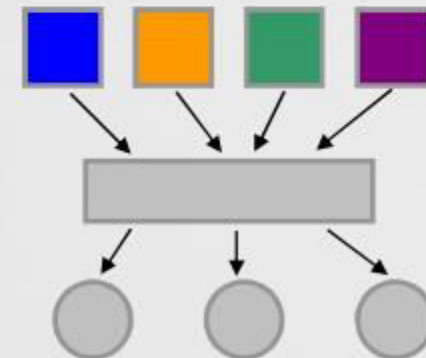


Customers

Before cross docking



After cross docking



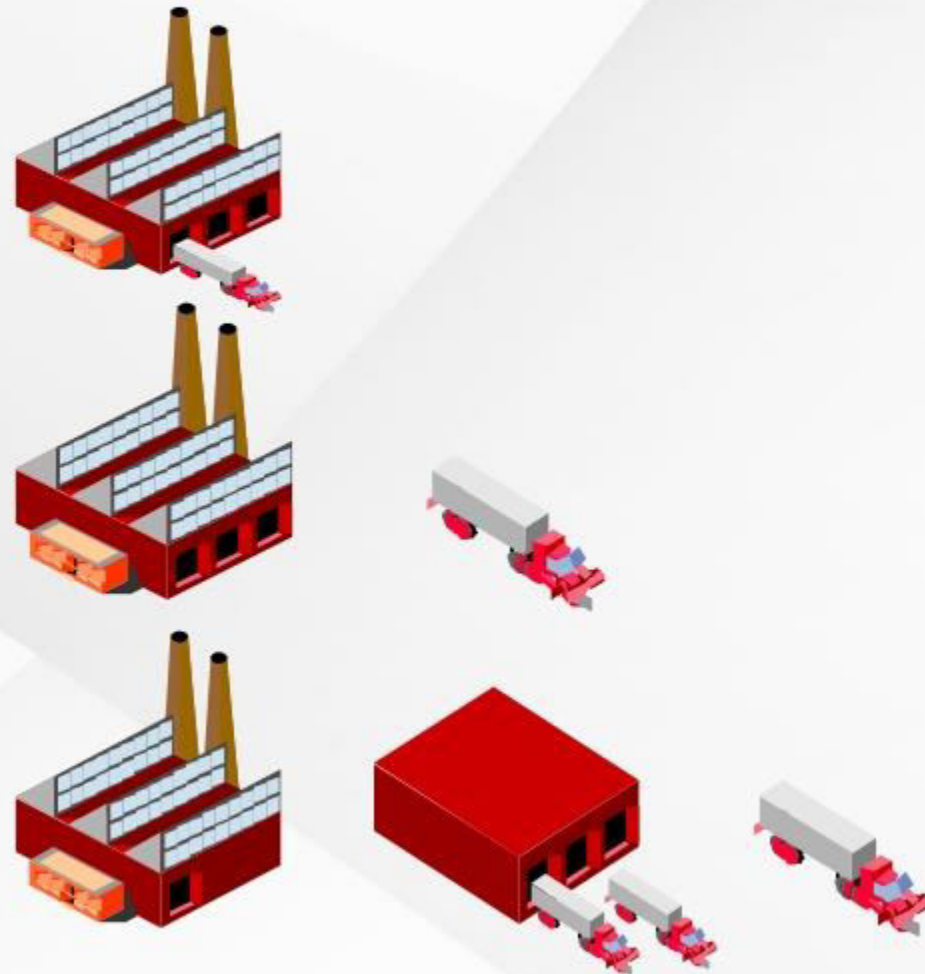
Source: Own compilation



SUPPLY CHAIN GLOBALISATION

Outsourcing logistics

- Manufacturers organises own distribution
- Manufacturer outsource transportation
- Manufacturer outsource all logistic functions





SUPPLY CHAIN GLOBALISATION

Basic modes of transportation



Railroad

Offer low-cost, large volume, great distance transport with accessibility limitations and long transit time.



Motor carriers

Accessible, flexible point-to-point service of small loads over short and long distances with consistent transit times, but more costly



Water carriers

Low cost, large volume great distance transportation with long transit times and service disruptions because of weather



Air carriers

Short transit time, high rate transportation, (service above price). Transportation option for high value-to-weight commodities.



Pipelines

Can only be used for liquids, low rate, but no option for manufactured goods.



SUPPLY CHAIN GLOBALISATION

Globalisation

- Globalisation creates new obstacles:
 - Increased documentation for invoices, insurance, letter of credit, ocean bills, airway bills
 - Changing regulations varying per country
 - Trade groups, tariffs, duties, landing costs
 - Limited shipping modes
 - Differences in communication
 - Difference in business practises
 - Government codes and reporting requirements
 - Numerous players, agents, custom house brokers, financial institutions, insurance providers, carriers



SUPPLY CHAIN GLOBALISATION

International trade expertise



Duty specialist
advising companies
how to optimise for
duties



**Export trading
companies**
combining all services
of international trade



**International freight
forwarders** handling all
the details and obtain
documents for crossing
borders.



**Purchasing
agents** in foreign
countries identify
reliable suppliers



Supplier(s)



**Custom house
broker** manage the
movements of imported
goods through a
country's custom
procedure



Export packers
perform customized
labelling and
packaging



Export management
companies handle
overseas sales for
companies and identify
foreign companies
licensed to manufacture
their products

Source: Own compilation



11

INVENTORY MANAGEMENT



INVENTORY MANAGEMENT

Introduction



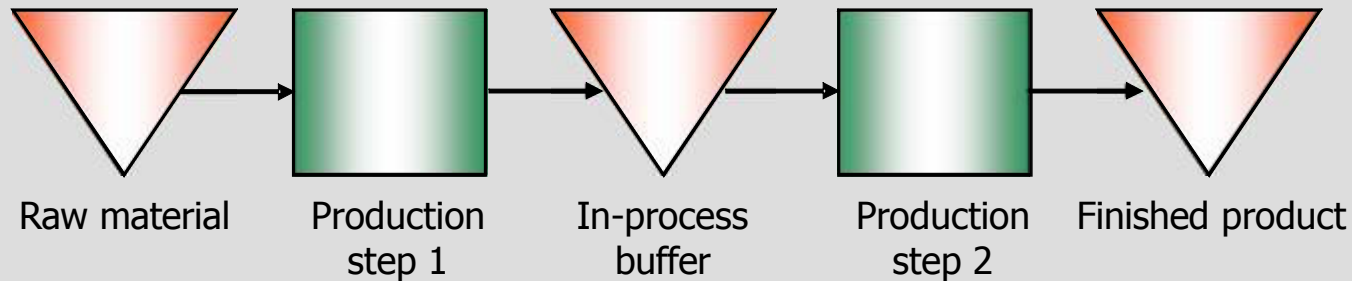
- What types of inventory do you know?
- Why do organisations keep inventory?



INVENTORY MANAGEMENT

Inventory management elements

OPM
basics



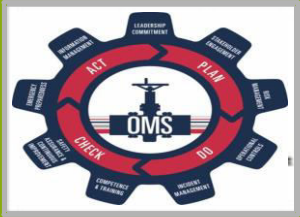
- **Raw material buffers:** to cover for variations in suppliers deliveries;
- **buffer inventories:** so that production can run smoothly in case of temporary machine breakdowns, or other work stoppages.
- **Finished goods inventories:** to cover for fluctuations in demand and work stoppage.



INVENTORY MANAGEMENT

Inventory management elements

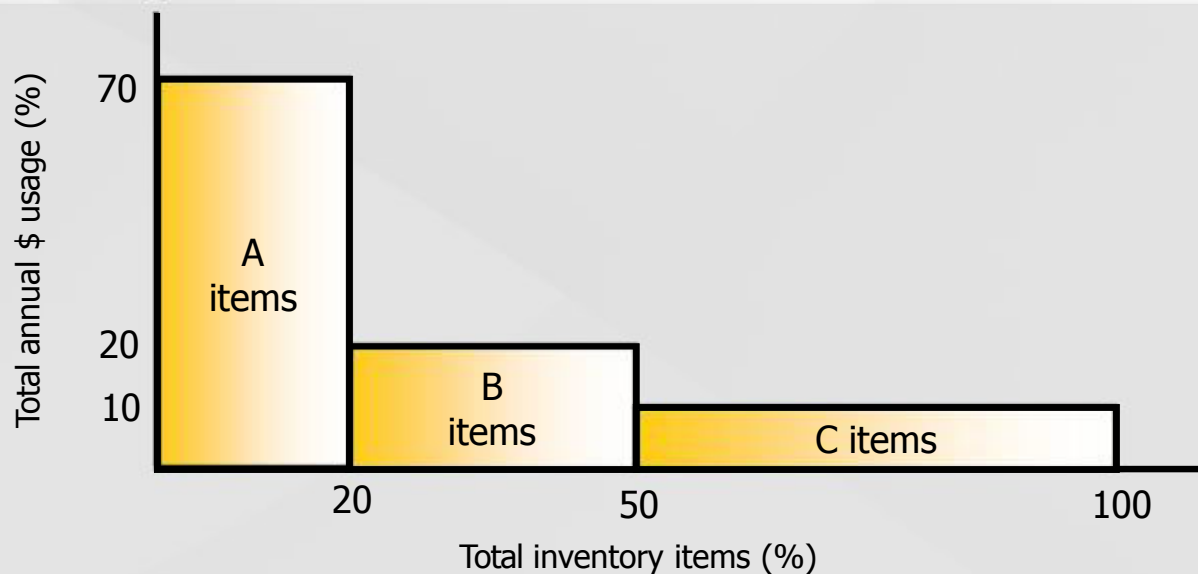
- **Inventory management** is to determine the amount of inventory to keep in stock.
- **Inventory costs** is the total of *carrying*, *ordering*, and *shortage costs*:
 - **Carrying costs** are the costs of holding an item in inventory.
 - **Ordering costs** are the costs of replenishing inventory.
 - **Shortage costs** are temporary or permanent loss of sales when demand cannot be met.



INVENTORY MANAGEMENT

Inventory control approach

- ABC classification system:
 - A parts: 70% of sales revenue, 20% of inventory items
 - B parts: 20% of sales revenue, 30% of inventory items
 - C parts: 10% of sales revenue, 50% of inventory items



Source: Russell & Taylor, 2009, p. 534



INVENTORY MANAGEMENT

Inventory control approach

- Inventory control using ABC classification:
 - A parts: control each item with high frequency
 - B parts: control each item with lower frequency
 - C parts: control on minimum-maximum rules

A parts			OK				
B parts	Out-of-Stock	risk		OK		To stock	risk
C parts					OK		

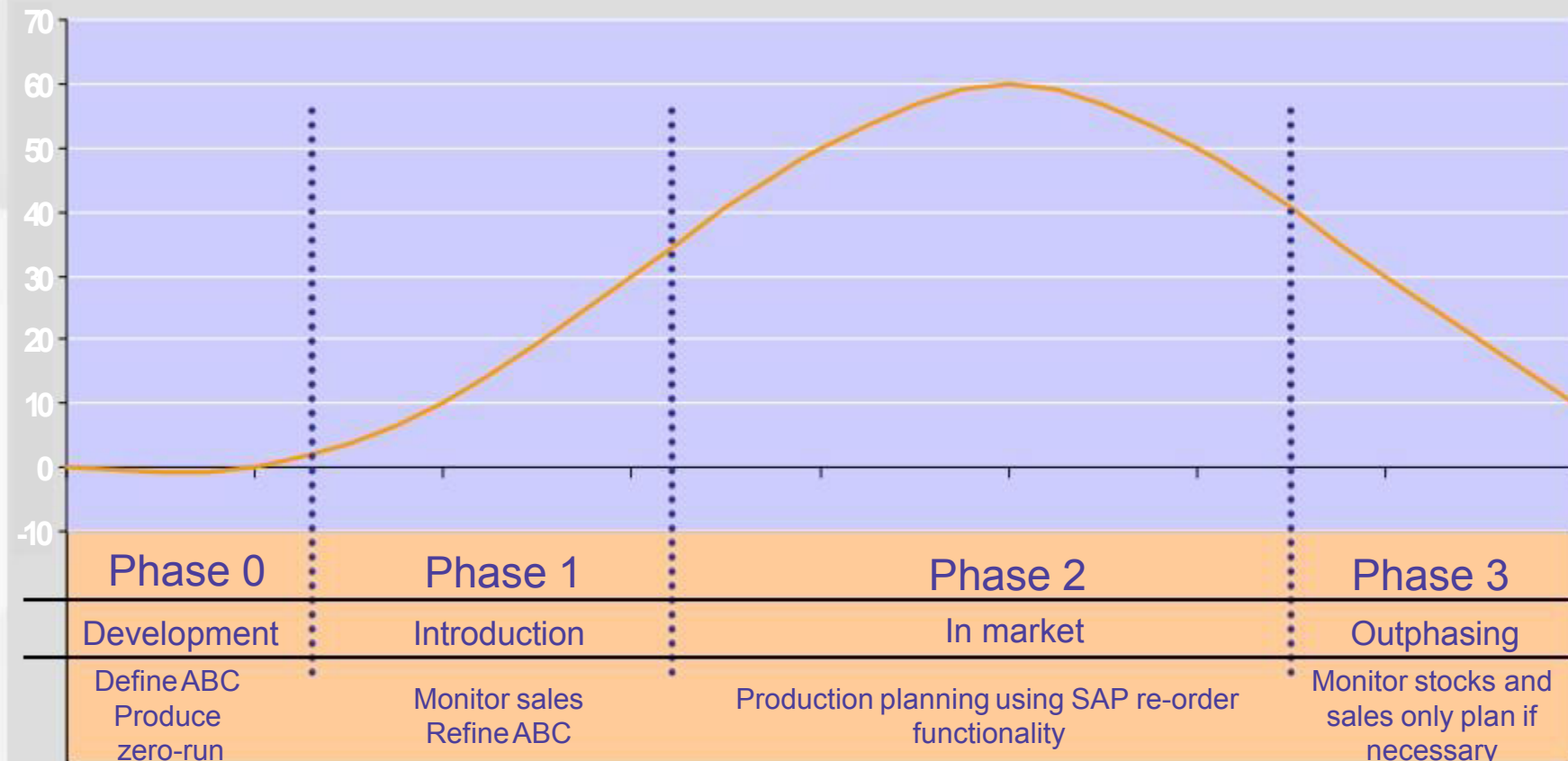
Stock level in weeks →

Source: Own compilation



INVENTORY MANAGEMENT

Inventory control approach

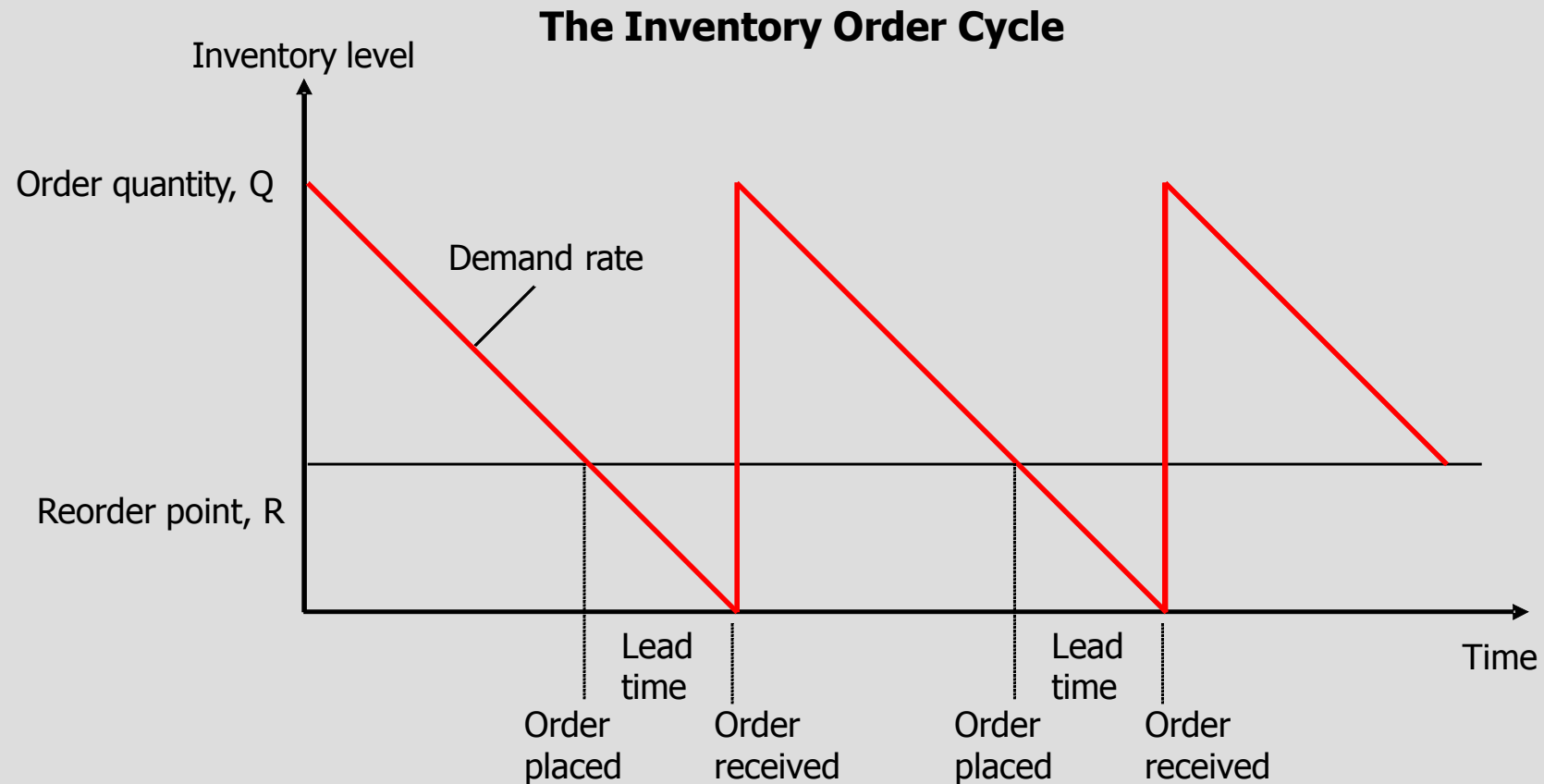


Source: Own compilation



INVENTORY MANAGEMENT

Economic order quantity models



Source: Russell & Taylor, 2009, p. 537



INVENTORY MANAGEMENT

Economic order quantity models

- **EOQ** is the optimal order quantity that will minimize total inventory costs.

$$Q_{\text{opt}} = \sqrt{\frac{2 \times C_o \times D}{C_c}}$$

Q_{opt} = Optimal order quantity

D = Demand

C_o = Order costs / set-up costs

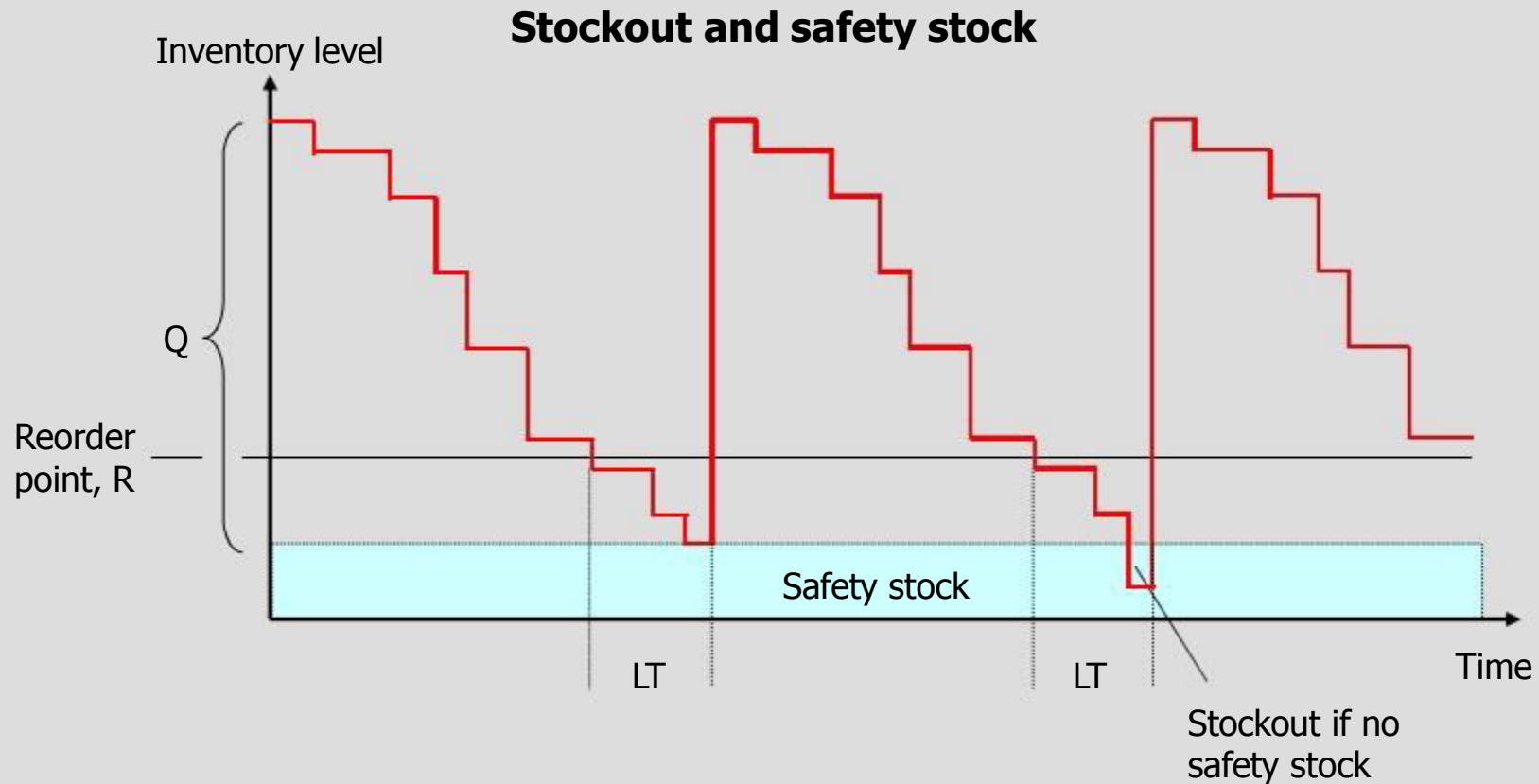
C_c = Unit carrying costs / stock costs

- Assumptions to EOQ model:
 - Demand is known with certainty, is constant in time;
 - No shortages are allowed;
 - Lead-time for receipt of orders is constant
 - The order quantity is received all at once



INVENTORY MANAGEMENT

Reorder point



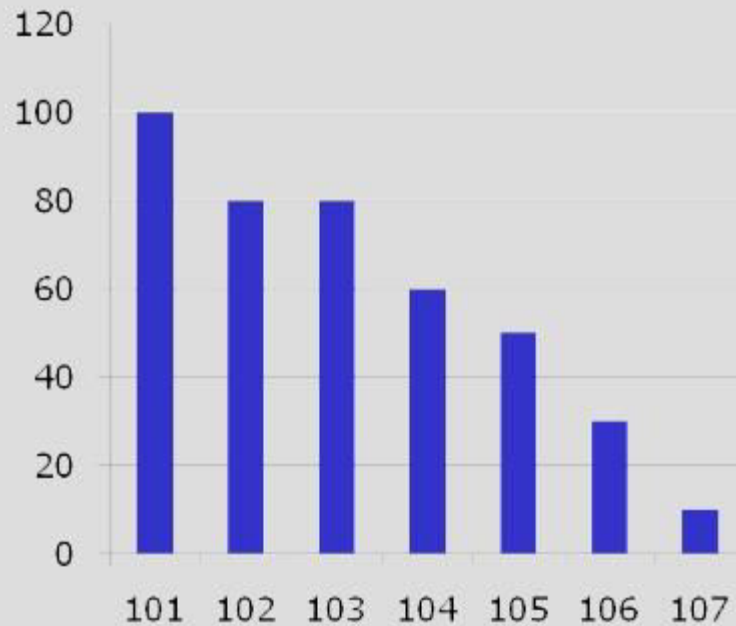
Source: Russell & Taylor, 2009, p. 547



INVENTORY MANAGEMENT

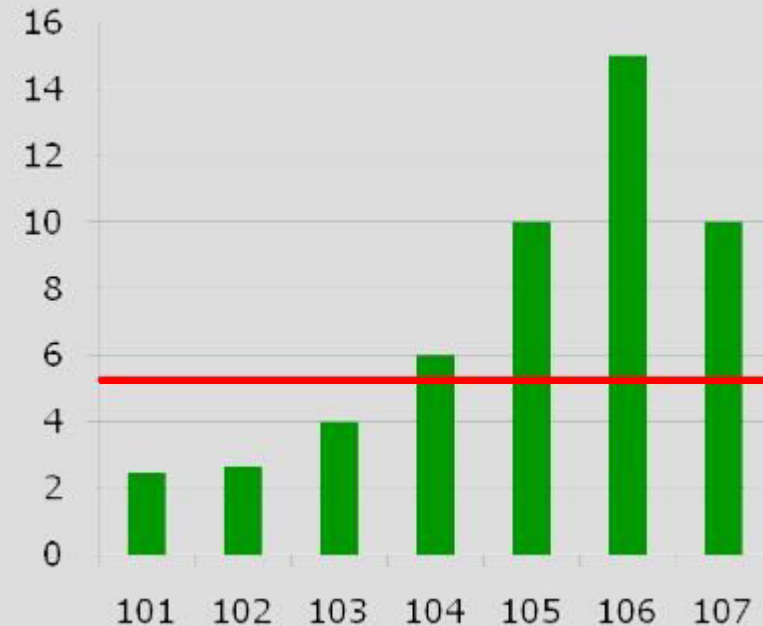
Stock control

Stock (in number of products)



Stock	100	80	80	60	50	25	10
Sales	40	30	20	10	5	2	1

Stock (in weeks sales)



Stock	100	80	80	60	50	25	10
Sales	40	30	20	10	5	2	1

Source: own compilation



PART 4

LEAN SYSTEMS METHOD



LEAN SYSTEMS METHOD

Sub blocks:

12. Lean Manufacturing

13. Quality Management



12

LEAN MANUFACTURING



LEAN MANUFACTURING

Introduction



- What is Lean Manufacturing?
- Who invented Lean Manufacturing?
- Name some elements of Lean Manufacturing?



LEAN MANUFACTURING

Introduction



- Colosseum (Rome) – Standardisation
 - Capacity: 50.000 people
 - Build in 8 years



- Henry Ford – Assembly line
 - Price from \$825 (1908) to \$360 (1916)
 - Build in 81 hours



- Taiichi Ohno – Just-In-Time
 - Small lots mixed model assembly
 - Producing only what is needed



LEAN MANUFACTURING

Toyota Production System

- Toyota Production System (TPS):
 - Mass production not suitable for Japan
 - Scarcity of resources
- TPS basic principle: Sell one, make one
 - Efficient process: eliminating waste
 - Effective process: no intermediate storage
 - Flexibility: one piece flow mixed model
- Lean Manufacturing is the American version of TPS



LEAN MANUFACTURING

Basic elements of Lean

- Basic elements of Lean
 - Flexible resources;
 - Cellular layouts;
 - Pull production system;
 - Kanban production control;
 - Small-lot production;
 - Quick set-ups;
 - Uniform production levels;
 - Quality at the source;
 - Total productive maintenance;
 - Supplier networks.



LEAN MANUFACTURING

Flexible resources

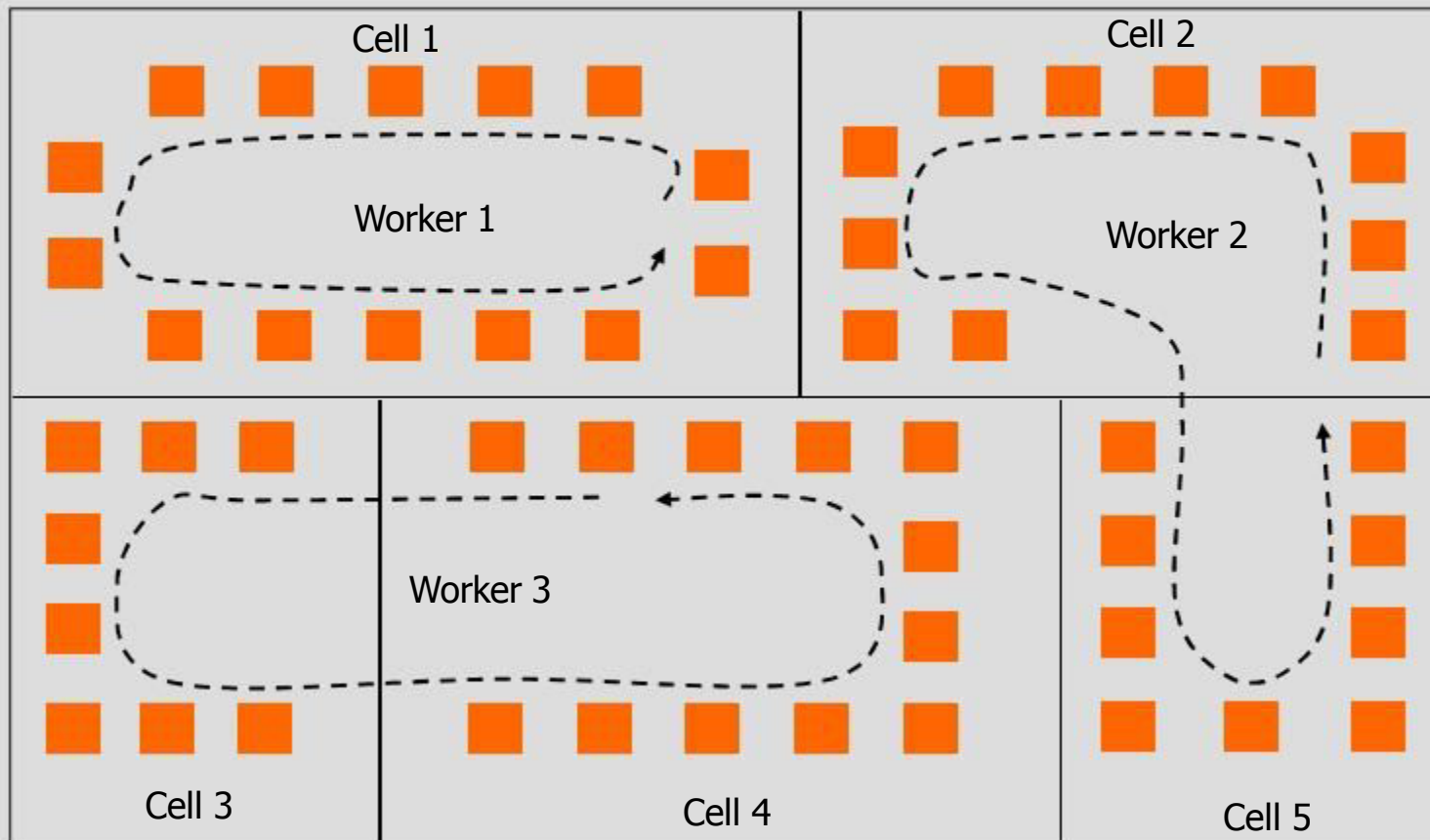
- **Flexible resources** means multifunctional workers as general purpose machines
- **Multifunctional workers** perform more than one job.
- **General-purpose** machines perform several basic functions
 - Adopt machines to improve so that less operator presence is required.

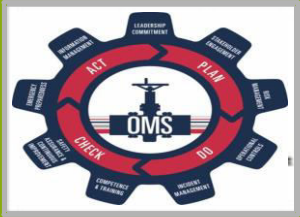


LEAN MANUFACTURING

Cellular layout

Worker routes operating one or more cells

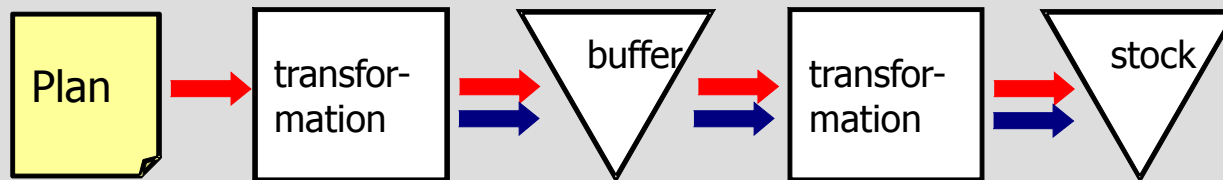




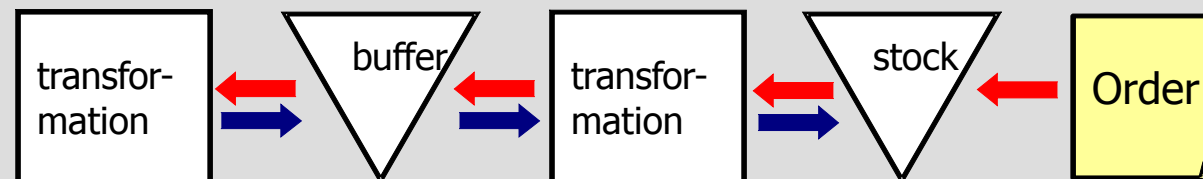
LEAN MANUFACTURING

Pull versus push

- **Push systems** rely on a predetermined schedule.



- **Pull systems** rely on customer requests.





LEAN MANUFACTURING

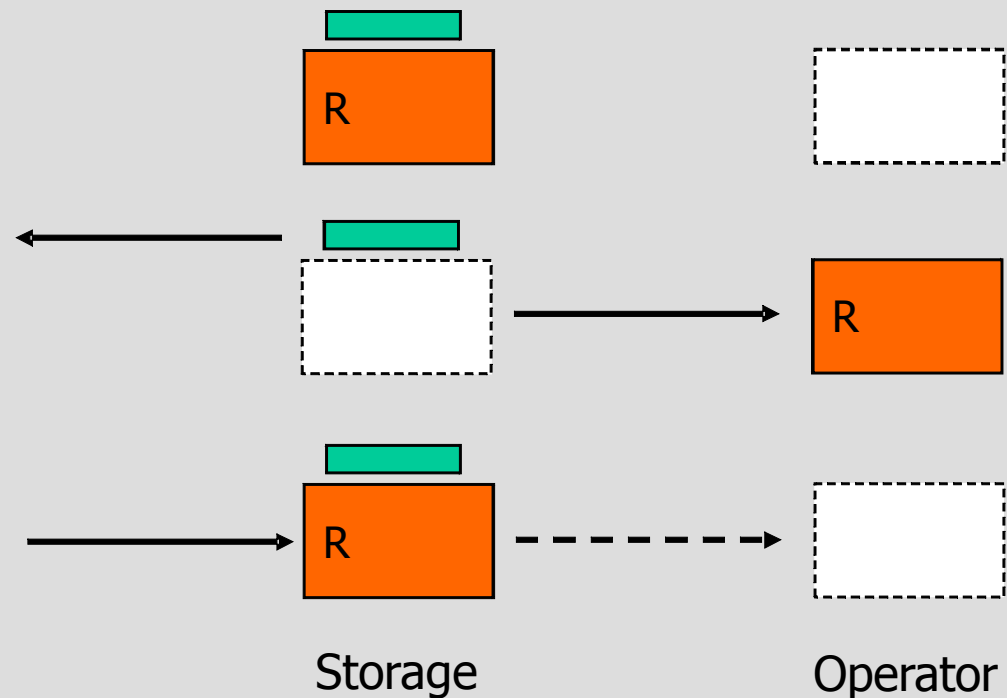
Kanban production control

- A **kanban** is a signal card that corresponds to a standard quantity of production.

Materials ready for use by operator

Materials in use, kanban issued for replenishment

New materials arrive about quantity R is used

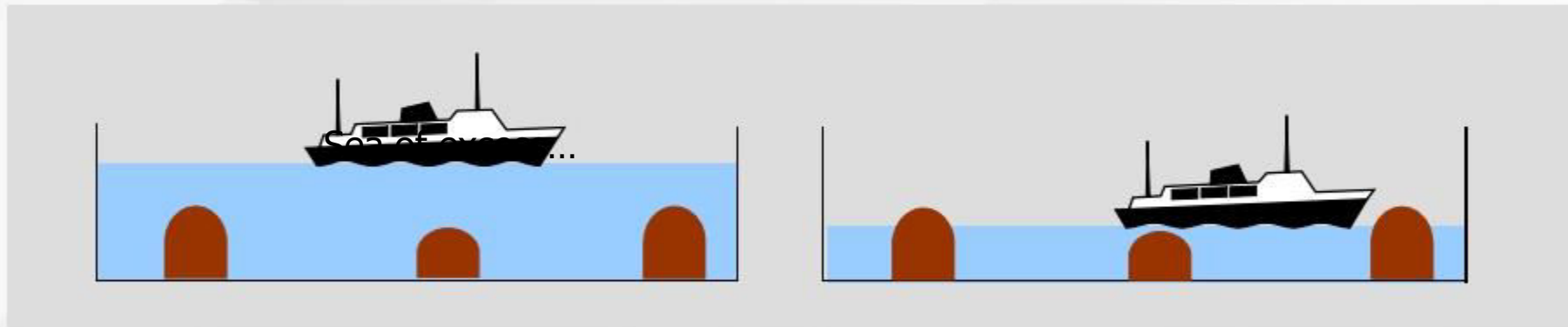




LEAN MANUFACTURING

Small lot productions

- **Small lot productions** requires less space, less capital investment, more flexibility, closer together, more simple transportation and ...
... quality problems are more easy to detect.



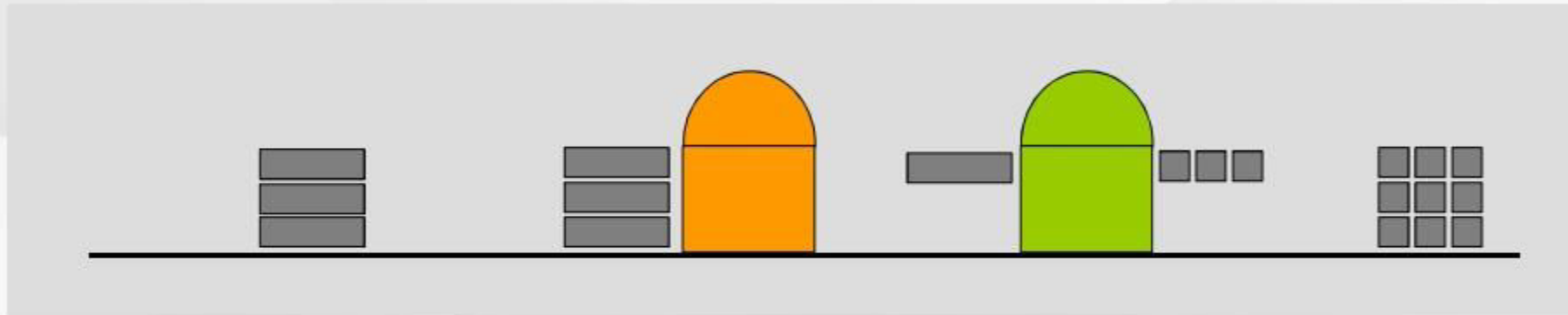
- Lower inventory levels expose problems as: lengthy set-ups, machine breakdowns, poor quality, bad design, unreliable suppliers.



LEAN MANUFACTURING

Reduction of lead time

- Lead time is typically made up of four components:



- *Waiting time*, reduce or eliminate
- *Moving time*, reduce by shorter distances
- *Set-up time*, reduce by smart set-up
- *Processing time*, reduce by increasing speed



LEAN MANUFACTURING SMED

- **Single-Minute Exchange of Dies**
 - Separate internal set-up from external set-up;
 - Convert internal set-up to external set-up;
 - Streamline all aspects of set-up;
 - Perform set-up activities parallel or eliminate them entirely.
- Common techniques: preset settings, quick fasteners, locator pins, eliminate tools and make movements easier.

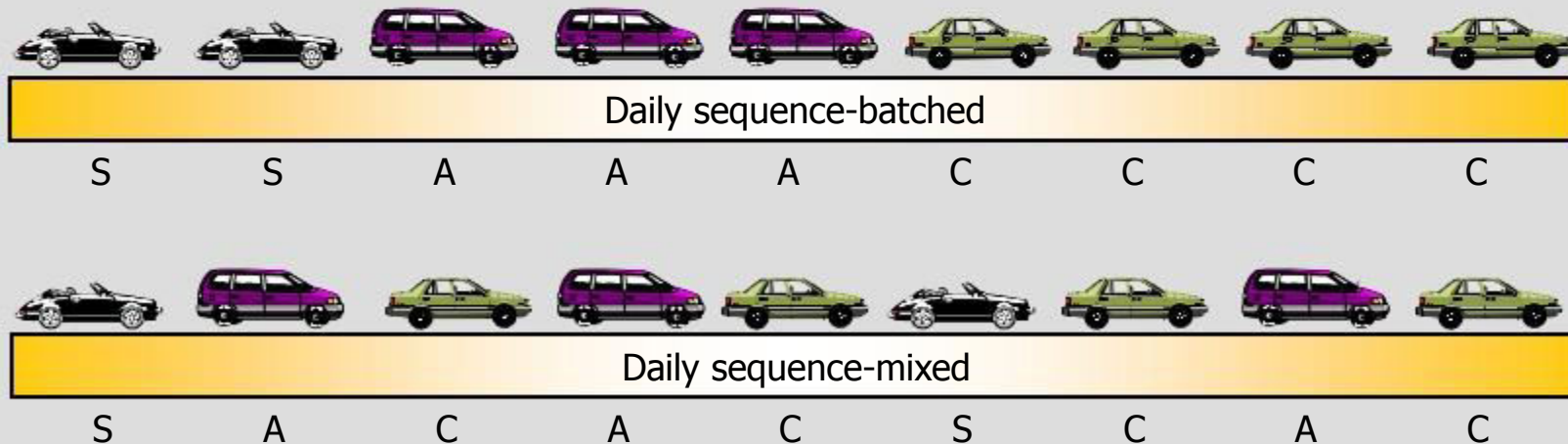




LEAN MANUFACTURING

Uniform production levels

- Uniform production levels result from smoothing production requirements by:
 - More accurate forecasts.
 - Smoothing demand.
 - Mixed model assembly steadies component production.

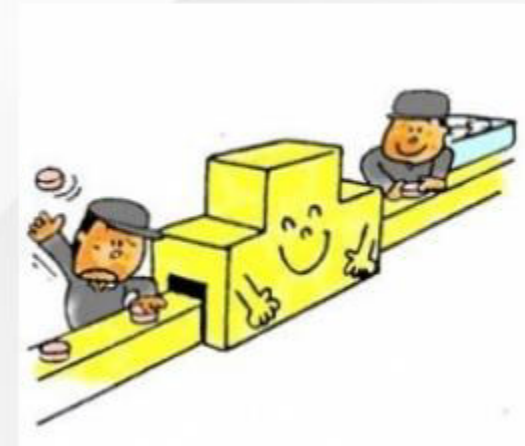


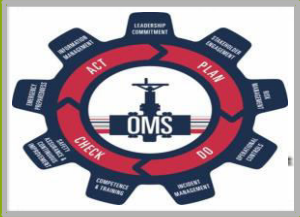


LEAN MANUFACTURING

Quality at the source

- No buffers leave no room for errors and so focus on high quality.
- **Visual control:** kanban, standard operation sheets, process control charts and tool boards.
- **Jidoka:** Never pass on a defect by authorising workers to stop production to solve problem.

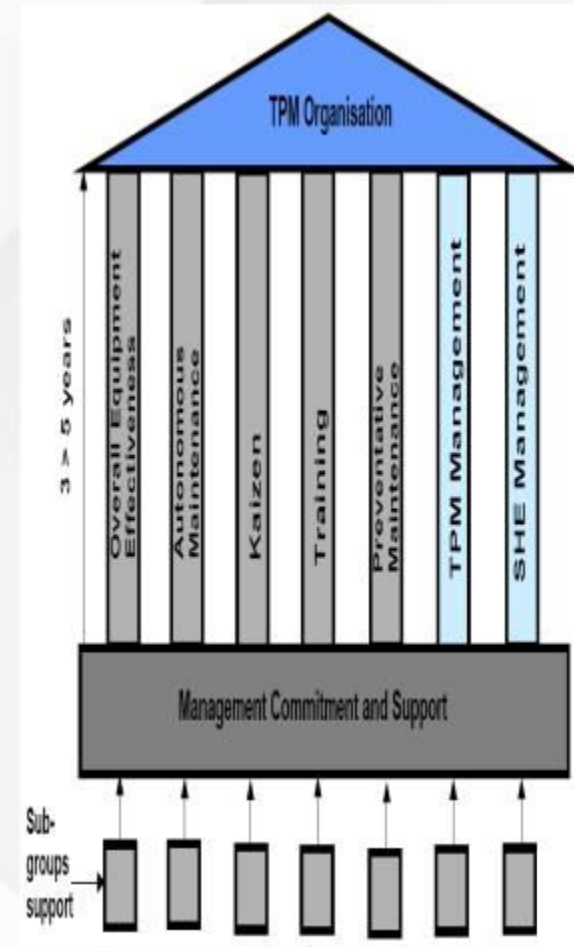




LEAN MANUFACTURING

Total Productive Maintenance

- Total productive maintenance (TPM) combines preventive maintenance with total quality with the objective of zero breakdowns.
- Breakdown maintenance = repair to make a machine operational.
- Preventive maintenance = maintenance to keep the machine operational.





LEAN MANUFACTURING

5S

5S: Seiri, Seiton, Seison, Seiketsu, Shitsuke





LEAN MANUFACTURING

Supplier networks

- **Supplier networks** includes:
 - Located near to customer;
 - Use small, side-loaded trucks and ship mixed loads;
 - Consider establishing small warehouses near to customer or consolidating warehouses with other suppliers;
 - Use standard containers and make deliveries according to a precise delivery schedule;
 - Become a certified supplier and accept payment at regular intervals rather than on delivery.



LEAN MANUFACTURING

Benefits of Lean manufacturing

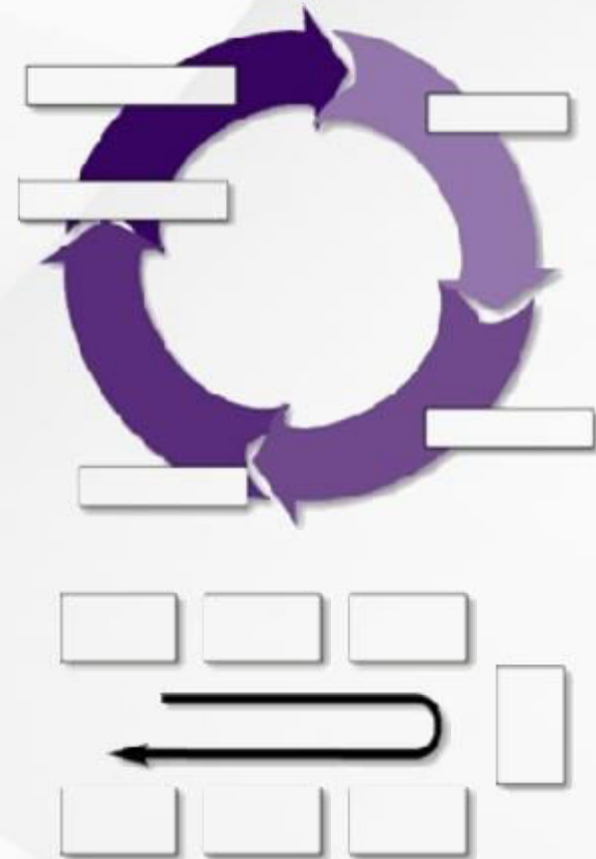
- JIT provides a wide range of benefits, including:
 - Reduced inventory, and space requirements
 - Improved quality
 - Lower costs
 - Shorter lead time
 - Increased productivity
 - Greater flexibility
 - Better relationship with suppliers
 - Simplified scheduling and control systems
 - Increased capacity
 - Better use of human resources and more product variety.



LEAN MANUFACTURING

Drawbacks of Lean manufacturing

- Lean is difficult to apply in organisations:
 - With a variability in demand
 - Low volume products
 - High volume mass production
 - Big changes in supply
 - strikes
 - fire
 - natural disasters
 - terrorism
 - epidemics like SARS





LEAN MANUFACTURING

Lean in services

- The Lean concept can also be applied to services:
 - MacDonald's, Domino's and FedEx, who compete on speed and still provide their products at low cost and increasing variety;
 - Construction firms that coordinate the arrival of materials "just as needed" instead of stockpiling them at site;
 - Multifunctional workers in department stores that work the cash register, stock goods, arrange displays, and make sales;
 - Level selling with "everyday low prices" at Wal-Mart and Food Lion;



LEAN MANUFACTURING

More lean

- Lean retailing:
 - Smaller orders, frequent replenishment
 - Shorter time-to-market
- Lean banking:
 - Standardisation of processes
 - Simplifying services
- Lean health care:
 - Reducing hospital visits
 - Simplifying forms and procedures

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13 QUALITY MANAGEMENT



QUALITY MANAGEMENT

Introduction



- How would you define quality?
- What has more quality a Ferrari or a Pick up truck?
- How can an organisation ensure quality?
- What quality systems do you know?



QUALITY MANAGEMENT

The meaning of quality

- **Quality or fitness for use** is how well the product or service does what it is supposed to do.



A sports car and a pick-up are equally "fit for use". But with different design dimensions for different customer markets that result in different purchase prices.

- **Quality of design** involves designing quality characteristics into a product or service.



QUALITY MANAGEMENT

The meaning of quality

- **Dimensions of quality** for which a consumer looks:
 - *Performance*: basic operating characteristic;
 - *Features*: extra items added to the basic features;
 - *Reliability*: probability that a product will operate;
 - *Conformance*: degree to which standards are met;
 - *Durability*: how long the products lasts;
 - *Serviceability*: the ease, speed, of getting repairs,
 - *Aesthetics*: how a product looks, feels, smells, tastes;
 - *Safety*: assurance that the user will not be injured;
 - *Other perceptions*: subjective perceptions based on brand name, advertising, and the like.



QUALITY MANAGEMENT

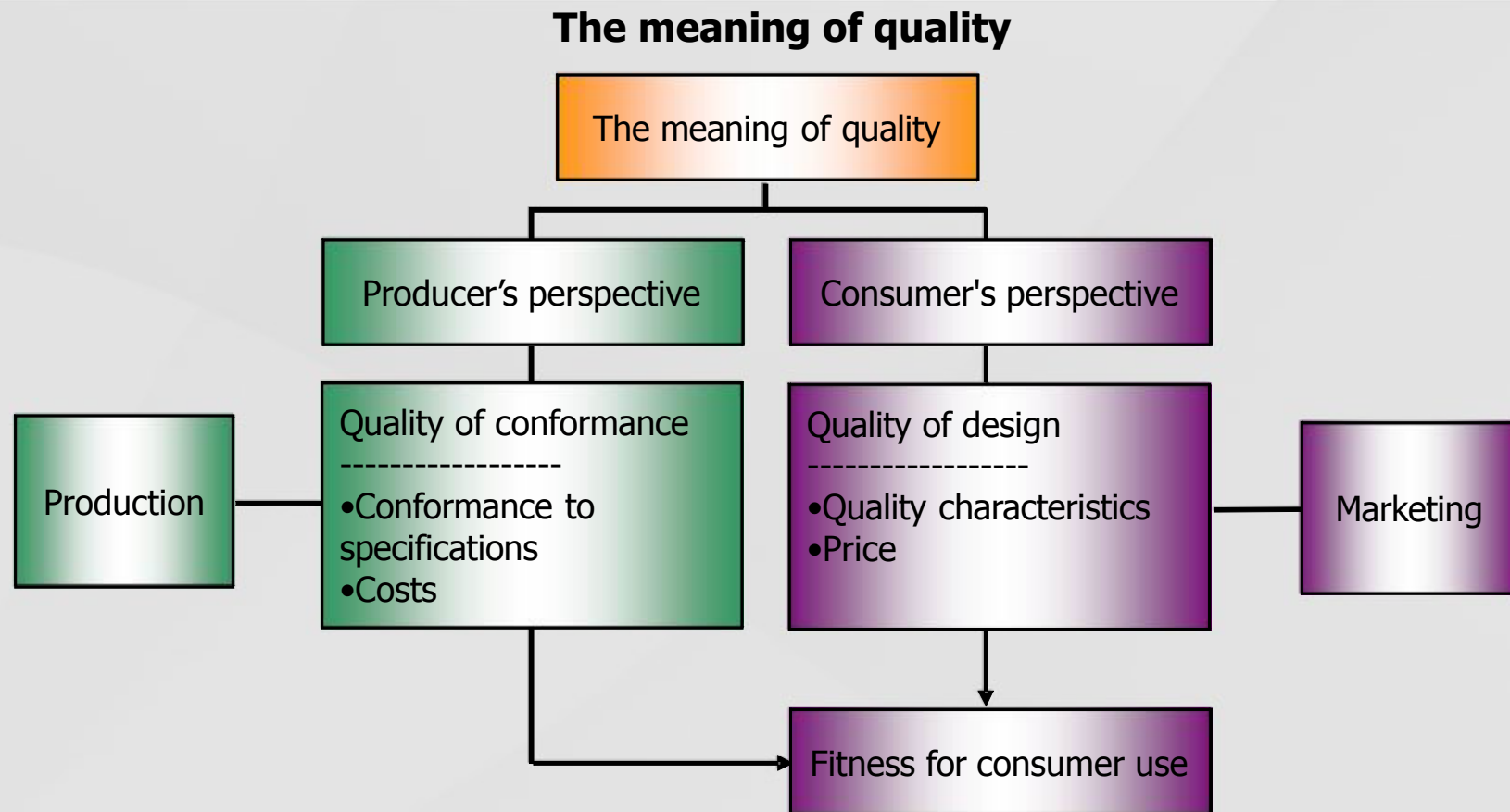
The meaning of quality

- **Dimensions of service quality** for which a consumer looks:
 - *Time and timelines*: how long a customer must wait;
 - *Completeness*: is everything expected also provided;
 - *Courtesy*: how customers are treated by employees;
 - *Consistency*: is the same level provided each time;
 - *Accessibility and convenience*: how easy to obtain;
 - *Accuracy*: service performance right every time;
 - *Responsiveness*: how well the company reacts to unusual situations.



QUALITY MANAGEMENT

The meaning of quality



Source: Russell & Taylor, 2009, p. 56



QUALITY MANAGEMENT

The cost of quality

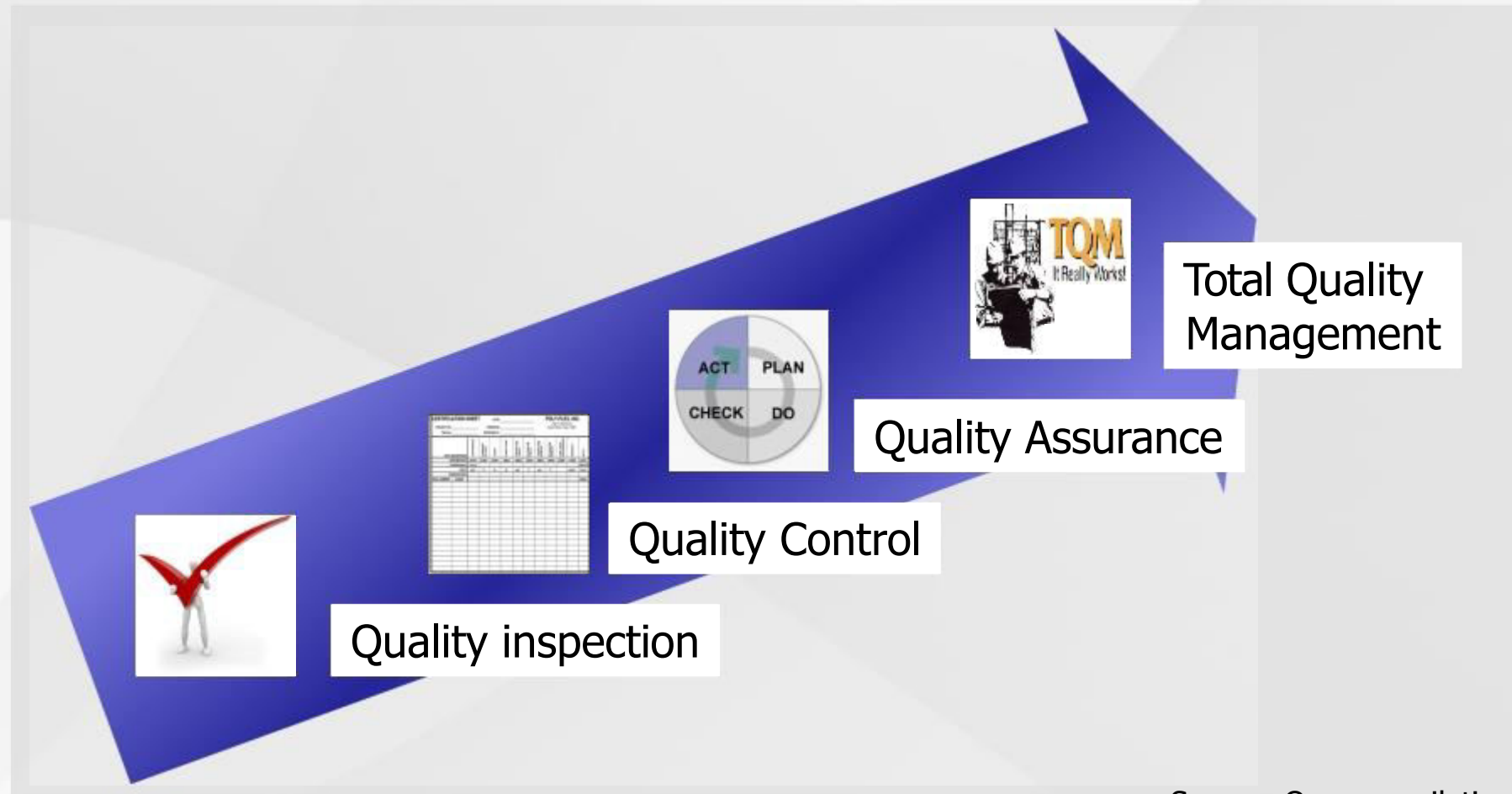
- **Prevention costs** are costs incurred during product design, but also include training cost etc.
- **Appraisal costs** are costs of measuring, testing and analysing.
- **Internal failure costs** include scrap, rework, process failure, downtime, and price reductions.
- **External failure costs** include complaints, returns, warranty claims, liability, and lost sales.



QUALITY MANAGEMENT

Evolution of quality management

OPM
basics



Source: Own compilation

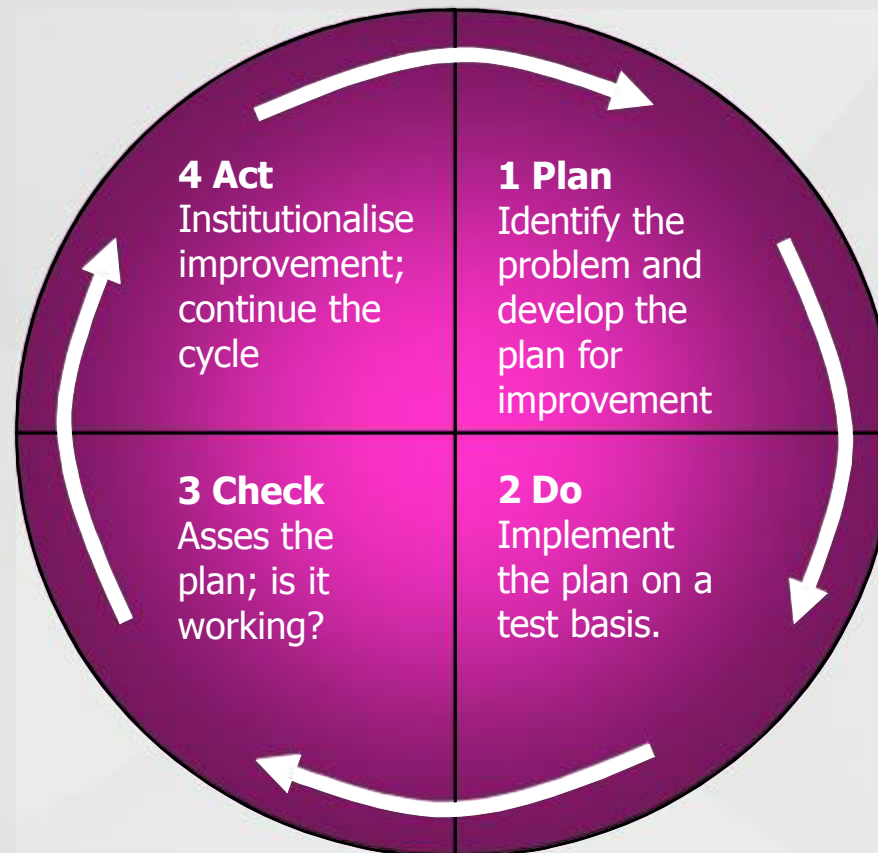


QUALITY MANAGEMENT

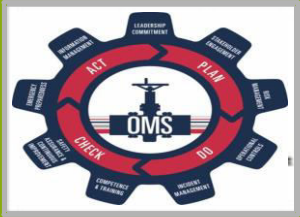
A basic quality model

OPM
basics

Deming wheel

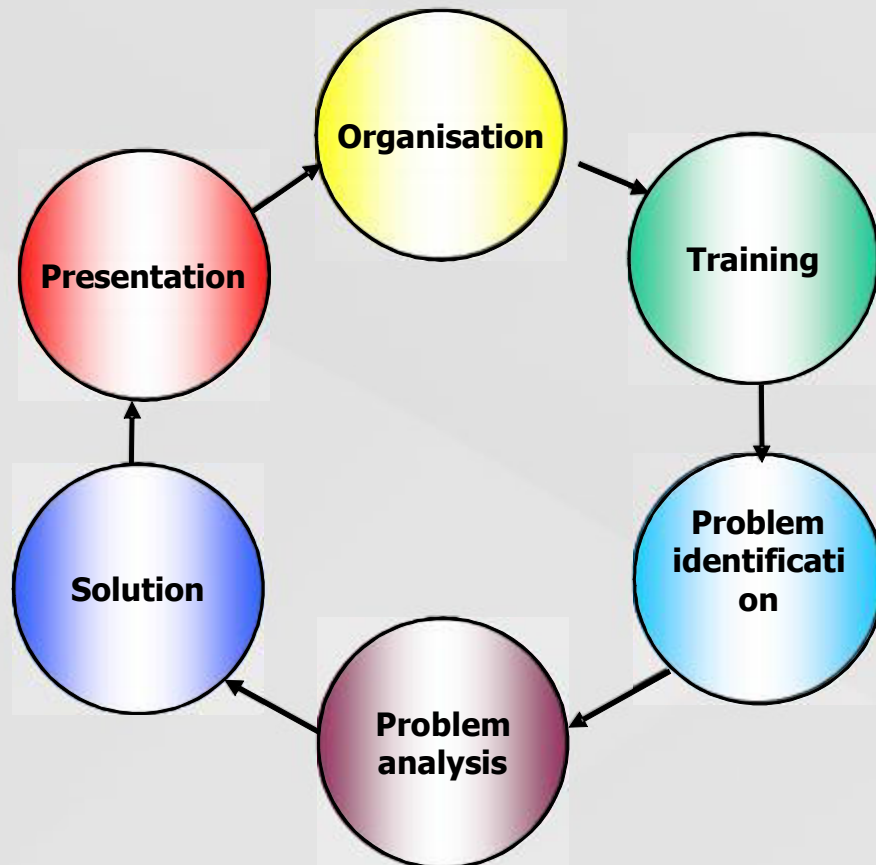


Source: Russell & Taylor, 2009, p. 59



QUALITY MANAGEMENT

Quality circle



- **Quality circle** is a group of workers who address (production) problems.
- Quality circles were developed by Kaoru Ishikawa in Japan in the 1960's.

Source: Russell & Taylor, 2009, p. 68



QUALITY MANAGEMENT

Total quality management

- **Total quality management** (TQM) assures that products and services have the quality they have been designed for.
- **Quality assurance** is a commitment to quality throughout the organisation.
- **Total quality control** is a company-wide, systems approach to quality.



QUALITY MANAGEMENT

Total quality management

- **Total quality management** principles:
 - The *customer* defines quality;
 - Top management must provide the *leadership* for quality;
 - Quality is a *strategic* issue, requires a strategic plan;
 - Quality is the responsibility of *all employees*;
 - Focus on *continuous quality improvement*;
 - Quality problems are solved through *cooperation*;
 - Make use of *statistical quality control* methods;
 - *Training* and *education* of all employees are the basis for continuous quality improvement.



QUALITY MANAGEMENT

Total quality management

TQM throughout the organisation



Source: Own compilation



QUALITY MANAGEMENT

ISO 9000

- **ISO 9001 (9002)** is a world wide procedure for the international quality certification of suppliers.
- The **International Organisation for Standardisation** (ISO), headquartered in Geneva, Switzerland, has as its members the national standards organisation for more than 130 countries.
- Many (overseas) companies will not do business with a supplier unless it has ISO 9000 certification.



QUALITY MANAGEMENT

ISO 14000

- **ISO 14001** is a world wide procedure for the certification of environment management systems.
- Seven steps to implement ISO 14001:
 - Step 1: Where are we now? Zero measurement
 - Step 2: What are the important environment topics?
 - Step 3: How can we control it day-by-day?
 - Step 4: What goals do we have?
 - Step 5: How can we set up the system?
 - Step 6: Get the system live
 - Step 7: Do what we promise



QUALITY MANAGEMENT

Six Sigma

- **Six sigma** means 3.4 defects per million!
- The goal is to improve process by reducing variations, waste of time & materials, costs of repair
- The four basic steps of six sigma:
 - **Align:** Define metrics and high impact projects
 - **Mobilize:** Develop empowered teams using *DMAIC*
 - **Accelerate:** Execute project with aggressive time line
 - **Govern:** Review status and share knowledge



QUALITY MANAGEMENT

Six Sigma DMAIC

- Break through problem solving: DMAIC
 - **Define:** What is the problem, who is the customer and what are needs
 - **Measure:** Process is measured, data collected and compare to desired
 - **Analyze:** Analyse to find the root cause of the problem
 - **Improve:** Develop solutions and implement them, measure to check, change if necessary
 - **Control:** Monitor the process to ensure right level of performance



PART 5

CURRENT TRENDS IN OPERATIONS MANAGEMENT



OPERATIONS MANAGEMENT

Current Trends

- **Moving beyond the factory:** Operations is strong affected by what goes on outside
- **The growing importance of services:** The service sector continue to grow
- **The increased importance of the supply network:** The next step is working/sharing together.
- The increased importance of ICT: Internationalisation of services, mass customization, supporting product differentiation
- **Low cost labour:** Off-shoring production/services to reduce costs, organising transferring operations



OPERATIONS MANAGEMENT

Current Trends

- **Population changes:** In Europe, Japan and Russia aging populations, internationalisation of work force.
- **Discontinuities:** Increased risk of operations, bankruptcy of supplier/customer to death of key employee, more focus on business continuity planning.
- **Environmentalism:** Wide range of concerns that centre of environmental degradation.
- **Social responsibility:** Renewal of interest in concept that organizations should behave ethical.
- **Learning to change:** Organizations should be able to respond and adapt to changes in environment.



OPERATIONS MANAGEMENT

- Topics not included today:
 - Work Organisation
 - New Product Development
 - Project Management
 - Performance Measurement
 - Company visit
 - Company analysis



OPERATIONS MANAGEMENT

That's it all



Thank you