Supply Chain perspective to services

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Supply Chain Management
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◆ **Introduction to Supply Chain Management**

◆ **Services in Supply Chains and Service Supply Chains**

◆ **Selected Challenges & Solutions from Product world**

◆ **Case: Santa Claus**

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Supply Chain Management, part 1

- ◆ **Introduction**
  - ■ **Definition of supply chains**
  - ■ **Why supply chain management?**
  - ■ **Main flows: material, information, money**
  - ■ **Process model of supply chains**
  - ■ **KPI's**
  - ■ **OPP; examples about supply chain structures (players in supply chains)**
- ◆ **Services in Supply Chains and Service Supply Chains**
- ◆ **Selected Challenges & Solutions from Product world**
- ◆ **Case: Santa Claus**

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Supply chain - definition

A supply chain, logistics network, or supply network is a coordinated system of organizations, people, activities, information and resources involved in moving a product or service in physical or virtual manner from supplier to customer. The entities of a supply chain typically consist of manufacturers, service providers, distributors, sales channels (e.g. retail, ecommerce) and consumers (end customers). Supply chain activities (aka value chains or life cycle processes) transform raw materials and components into a finished product that is delivered to the end customer. Supply chain links value chains.

.

There are a variety of supply chain models, which address both the upstream and downstream sides.

The primary objective of supply chain management is to fulfill customer demands through the most efficient use of resources, including distribution capacity, inventory and labor.

Several companies choose to outsource their supply chain management by partnering with a 3PL, Third-party logistics provider.

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From Wikipedia, the free encyclopedia; http://en.wikipedia.org/wiki/Supply_chain

qdc | **Supply Chain**

SUPPLY CHAIN ENGINEERING

• A supply chain covers all organisations from raw materials to the end consumer: "from supplier's supplier to customer's customer".

• Different variations; the amout and nature of echelons & partners varies.

• Increasing importance of service providers.

▬ Information flow
▬ Material flow
▬ Money flow

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SUPPLY CHAIN ENGINEERING
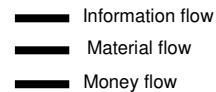
◆ **Objectives**
  ■ to create added value for customers and all partners of the chain
  ■ with optimised total cost
◆ **Management of**
  ■ Processes: plan, source, make, deliver and return
  ■ Information, material and money flows
  ■ Partners & relations
  ■ Definition & development of own role in the supply chain
◆ **Directions:**
  ■ Upstream: to the raw material sources, away from customer
  ■ Downstream: towards the customer
  ■ Horizontal & vertical
◆ **Minimum requirement: supply chain strategy matches the overall business strategy**
◆ **Sometimes supply chain capability is an asset and affects (positively) to the business stragegy**
  ■ example: Zara

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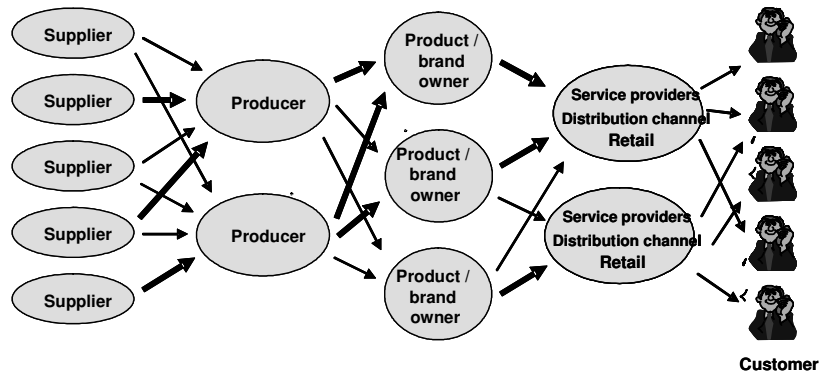## Total optimum is not the sum of suboptima

◆ **In reality**
  - A supply chain can be controlled by one strong player or be a chain with equally powered partners.
  - It is not possible to find a total optimum for a supply chain or a supply network; good target is win-win-thinking where all stakeholders benefit from the cooperation.
  - Supply Chains are evolving constantly: redefinition & innovation of one's own role in the chain

◆ **In companies the trend is from functional silos to process thinking; in a way supply chain thinking is the same phenomenon across companies.**

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It's the customer who pays our wages!

◆ **The success of each supply chain depends on its ability to create added value to the customer**
  - Better products
  - Better service
  - Faster, more accurately, more flexibly, with more variety...
  - With less cost
◆ **Thus, in order to create added value for all partners of the supply chain, the cooperation has to aim to added value for the customer and/or more efficient processes.**
◆ **Added value for the customer should yield to more turnover (more sales and/or higher price) which covers at least the added cost to produce the added value – best solutions create added value with less cost.**

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Supply Chain or a network?

Supplier

Supplier

Supplier

Supplier

Supplier

Producer

Producer

Product / brand owner

Product / brand owner

Product / brand owner

Service providers
Distribution channel
Retail

Service providers
Distribution channel
Retail

Customer

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Supply or demand chain?

Example:

How does a typical supply chain for a university course book delivery look like?

What about the demand chain?

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Current trends in Supply Chains (1/2)

- ◆ **Who adds value?**
  - ■ **Companies move - especially downstream**
  - ■ **Outsourcing of non-core activities; production becomes a service**
  - ■ **Globalisation of production**
  - ■ **Industries converge within and between industries**
- ◆ **Promises and fulfillment of IT**
- ◆ **Fragmentation of product portfolios**
  - ■ **More products**
  - ■ **More variants; product platforms, configurable products**
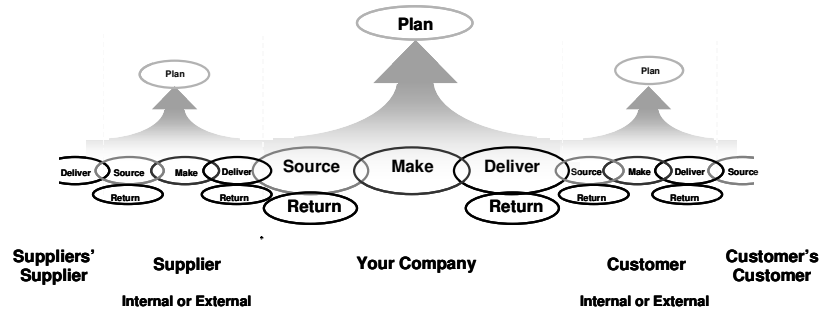 - ■ **Shorter life cycles**
- ◆ **Services**

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Current trends in supply chains (2/2)

- ◆ **Supply Chain management is becoming mature; from slide shows to concrete implemented examples:**
  - ■ **From suboptimisation to big picture**
  - ■ **Demand visibility in supply chains: use of demand data and even point of sales-data (POS)**
  - ■ **Demand management: forecasting, allocation supported by IT**
  - ■ **Availability information is supply chains: sales tools with current availability**
  - ■ **Joint product sortiment planning**
  - ■ **Material management solutions like Vendor-Managed Inventories (VMI)**
  - ■ **Structural changes like direct sales**
  - ■ **Models combining these initiatives (Collaborative Planning, forecasting and replenishment (CPFR), Efficient Customer Response (ECR)**
  - ■ **Differentiated supply chains for different products, customers etc**
  - ■ **Companies, who use supply chain agility to gain competitive advantage and change whole industries.**
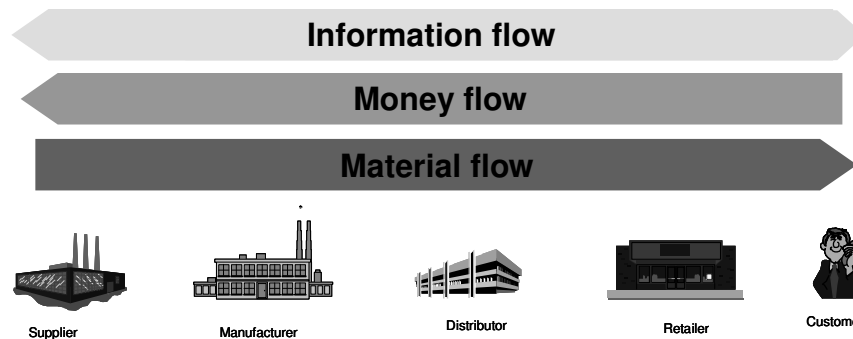
(c) Marja Blomqvist, QDC 2006

Supply Chain processes

Plan

Plan

Plan

Deliver · Source · Make · Deliver · **Source** · **Make** · **Deliver** · Source · Make · Deliver · Source

Return · Return · **Return** · **Return** · Return · Return

Suppliers' Supplier

Supplier

Your Company

Customer

Customer's Customer

Internal or External
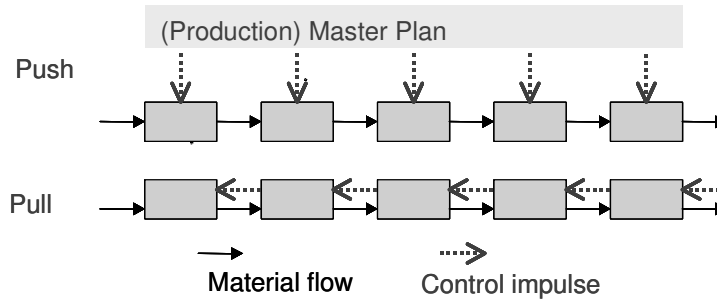
Internal or External

Is there an analogy to services?

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Source: Supply Chain Council, SCOR model version 6.1
www.supply-chain.org

Three main flows in a supply chain

Information flow

Money flow

Material flow

Supplier

Manufacturer

Distributor

Retailer

Customer

What are the flows in a service supply chain?

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qdc **Push vs pull**

(Production) Master Plan

Push

Pull

Material flow   Control impulse

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qdc **Push vs pull**

◆ **Push (system)**
  - **In production, the production of items at times required by a given schedule planned in advance**

◆ **Pull (system)**
  - **In production, the production of items only as demamded for use or to replace those taken for use**
  - **In material control, the withdrawal of inventory as demanded by the using operations. Material is not issued until a signal comes from the user.**

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Order Penetration Point OPP, Demand Visibility Point DVP
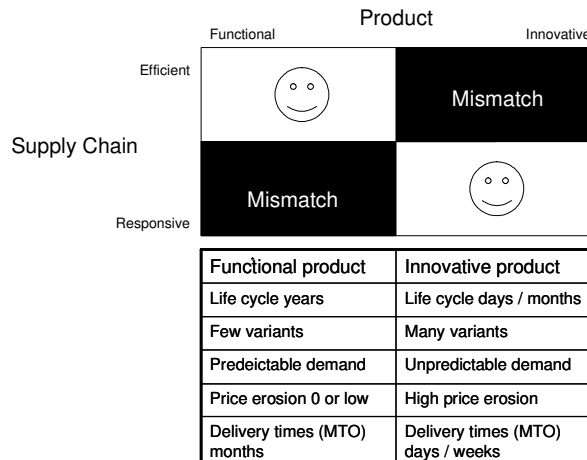

ORDER PENETRATION POINT (OPP)
- point at which a product is assigned to specific, known customer order
  - ship-to-order
  - pack-to-order
  - assembly-to-order
  - make-to-order
  - buy-to-order

DEMAND (order, replenishment, …)

TRADE CUSTOMER   END CUSTOMER

EXECUTION CYCLE
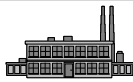
PRODUCER

SUPPLY (bundle of goods and services)

DEMAND VISIBILITY POINT (DVP)
- demand point perceived by the producer
  - customer's arm's length order
  - customer's inventory replenishment
  - customer's production / supply plan
  - customer's production schedule
  - customer's customer's order
  - customer's assortment planning
  - etc. to end customer

Source and (c): Prof. Eero Eloranta, HUT
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Different supply chains for different products

Product

Functional   Innovative

Efficient

Mismatch

Supply Chain

Mismatch

Responsive

Functional product	Innovative product
Life cycle years	Life cycle days / months
Few variants	Many variants
Predeictable demand	Unpredictable demand
Price erosion 0 or low	High price erosion
Delivery times (MTO) months	Delivery times (MTO) days / weeks

Source: Marshall Fisher: What is the right supply chain for your product?
Harvard Business Review March-April 1997

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Supply Chain Metrics (1/2)
(Supply Chain Council)

Measurement target	Primary metrics	Diagnostics metrics
Customer Satisfaction / Quality	**Complete delivery** **Customer satisfaction** **Product quality**	**DOT = Delivery on time** **Warranty costs, reclamations and returns Reaction time to customer question**
Time	**Delivery time**	**Procurement and production lead times** **Reaction time of the supply chain** **Fulfillment of production plan**
Costs	**Total costs of the supply chain**	**Productivity**
Tied capital	**Cash-to-Cash –cycle** **DOS = Days of supply** **ROI = Return on investment**	**Forecast accuracy** **Inventory costs** **Capacity utilization**

(c) Marja Blomqvist, QDC 2006

Source: Supply Chain Council 2005

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Supply Chain Metrics (2/2)

Cost

Quality   **Delivery**
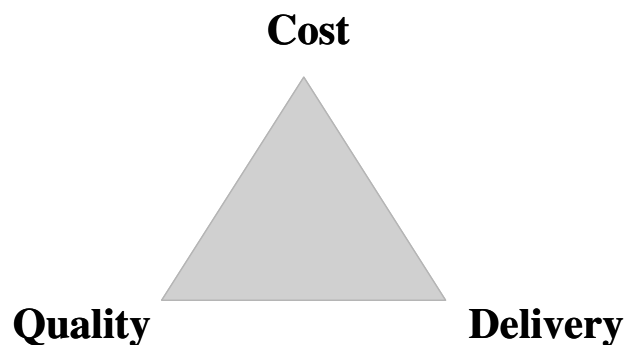
What is the analogy in services?

(c) Marja Blomqvist, QDC 2006

Source: Eero Eloranta, 2004

Supply Chain Management, part 2

- ◆ **Introduction**
- ◆ **Services in Supply Chains and Service Supply Chains**
  - ■ **About nature of services**
  - ■ **Products with embedded services or vice versa?**
  - ■ **Services in goods supply chains – where can we find them? (discussion)**
  - ■ **Goods supply chains behind services – discussion (example: restarant?)**

- ◆ **Selected Challenges & Solutions from Product world**
- ◆ **Case: Santa Claus**

Differences (and similarities) between products and services?

- ◆ **Differences?**
- ◆ **Similarities?**

Distinctive characteristics of Service Operations

◆ **Customer participation in the service process**
◆ **Simultaneity (creation and consumption simultaneously)**
◆ **Perishability (cannot be produced in stock)**
◆ **Intangibility**
◆ **Heterogeneity**

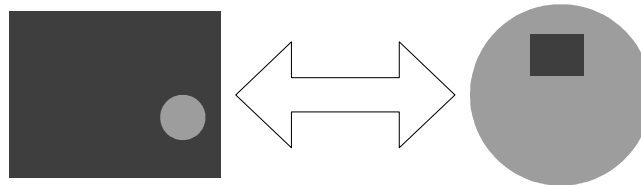Source: Fitzsimmons & Fitzimmons: *Service management.* McGraw-Hill, 2005

Different services

◆ **All services are equal. Except that some services are more equal than others...**

◆ **Discuss the different aspect related to the production / supply chain of services: in what aspects do different service types differ from each other?**

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Taxonomy of service processes

Degree of Customer Contact		Low Divergence (Standardized Service)			High Divergence (Customized Service)		
		Processing of Goods	Processing of Information or Images	Processing of people	Processing of Goods	Processing of Information or Images	Processing of people
No customer contact		Dry cleaning Restocking a vending machine	Check processing Billing for a credit card		Auto repair Tailoring a suit	Computer programming Designing a building	
Indirect customer contact			Ordering groceries from a home computer Phone-based account balance verification			Supervision of a landing by an air controller	
Direct custo-mer contact	No customer-service-worker interaction (self-service)	Operating a vending machine Assembling premade furniture	Withdrawing cash from an automatic bank teller Taking pictures in photo booth	Operating an elevator Riding an escalator	Sampling food at a buffet dinner Bagging of groceries	Documenting medical history at a clinic Searching for invormation in a library	Driving a rental car Using a health club facility
	Customer-service-worker interaction	Food service in a restaurant Car washing	Giving a lecture Handling routine bank transaction	Providing public transportation Providing mass vaccination	Home carpet cleaning Landscaping services	Potrait painting Counceling	Haircutting Performing a surgical operation

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Relation between product & service

Products with embedded services or service with embedded products or something in between?

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Slide 1

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Scale vs. Skill Based Service Advantage

Different services in the same company may fall into different categories and thus have to be treated differently!

Source of competitive advantage

Econ. of scale

Econ. of skill

Apple ITunes Otis remote monitoring & diagn. GM Onstar remote diagnostics Symantec antivirus & firewall services	Cardinal Health hospital inventory mgt. service Convergys billing service IBM data center outsourcing Johnson Control facility mgt service
Cisco network integration & maintenance EMC storage mgt & maintenance SAP Systems integration UTC Utilities field service	Convergys call center mgt GE aircraft engine maintenance GE Healthcare equipment support and diagnostics IBM systems integration

Protect / enhance product   Expand independent service

Strategic intent

(c) Marja Blomqvist, QDC 2006   Source and (c) Eero Eloranta, HUT; Adapted from Auguste et. al. McKinsey Quarterly 1/2006

Slide 2

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Service delivery and organization – skill vs. scale

No "one size fits all": different services in the same company may fall into different categories and thus have to be treated differently!

Source of competitive advantage

Econ. of scale

Econ. of skill

Delivery Embed services into hw/sw if possible, Consolidate service delivery assets **Organization** Single SBU, Specialized service offering and service design force, measure life cycle profits, attach rates, unit delivery costs	**Delivery** Consolidate service delivery assets Standardize platforms, incorporate delivery stds into automated / human work flow **Organization** Independent SBUs Measure sales growth, cost per unit service delivered
Delivery Design for services, Enhance skilled work productivity by knowledge mgt, Standard processes **Organization** Single SBU, measure life cycle profits, revenue and productivity of service delivery	**Delivery** Focus to bring best practice to each service interaction (automation, issue resol. time, knowledge mgt) **Organization** Independent SBUs Measure sales revenue, profit, E2E productivity of service delivery

Protect / enhance product   Expand independent service

Strategic intent

(c) Marja Blomqvist, QDC 2006   Source and (c) Eero Eloranta, HUT; Adapted from Auguste et. al. McKinsey Quarterly 1/2006
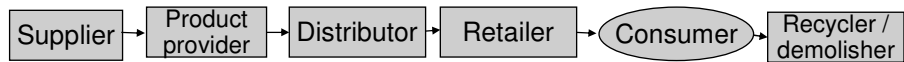
Supply Chain & services

Supplier   Manufacturer   Distributor   Retailer   Customer

Where you can find services along the supply chain of a physical product?

(c) Marja Blomqvist, QDC 2006

Service supply chains

...and how would a service supply chain look like?

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qdc Service Supply Chain vs. Product Supply Chain

Product

Supplier → Product provider → Distributor → Retailer → Consumer → Recycler / demolisher

Service

Goods Supplier
Service Supplier
→ Service provider → Consumer

Source: Samson & Froele, 2006

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qdc **Example: After Market vs. Product Supply Chain**

Parameter	Manufacturing Supply Chain	Afer sales supply chain
Nature of demand	Predictable, can be forecast	Unpredicable, sporadic
Required response	Standard, can be scheduled	ASAP
# SKUs	Limited	15-20 times more
Product portfolio	Homogenious	Heterogenious
Delivery network	Depends on products, multiple	Depends on services, single
Invenory mgt intent	Max velocity of resources	Preposition resources
Reverse logistics	. No	Returns, repair, disposal
Performance metrics	Fill rate	Uptime
DOS	7-60	120-360

Source: Cohen, HBR, 2006

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Supply Chain Management, part 3

◆ **Introduction**
◆ **Services in Supply Chains and Service Supply Chains**
◆ **Selected Challenges & Solutions from Product world**
◆ **Case: Santa Claus**

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Supply Chain Management, part 3

◆ **Selected Challenges & solutions from product world**
  ▪ **Capacity strategies**
  ▪ **Forecasting & demand management**
  ▪ **Process design**
  ▪ **Lean production – lean consumption in service world**
◆ **Possible topics (in backup)**
  ▪ **Forrester / Bullwhip effect (demkand amplifications in supply chains**
  ▪ **Theory of Constraints (capacity bottlenecks)**
  ▪ **Postponement**
  ▪ **Mass Customization**
  ▪ **Layout options**
  ▪ **Toyota 7 sins of waste**
  ▪ **Burbidge's system laws**
  ▪ **Supply Chain orchestration; Facility location; Make or buy; OPP&DVP**

(c) Marja Blomqvist, QDC 2006

Slide 1

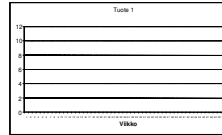# Nature of demand

- ◆ **Different demand profiles:**
  - ▪ **Level demand (does it exist??)**
  - ▪ **Trend (up, down)**
  - ▪ **Cyclic trend (for example technology cycles)**
  - ▪ **Seasonal trends**
  - ▪ **Random**
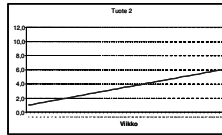- ◆ **Besides the profile, the predictability of the demand is essential.**
  - ▪ **Product life cycle**
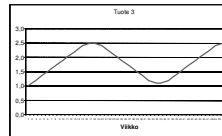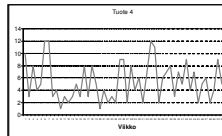- ◆ **Small demand variations multiply in the supply chain (Bullwhip).**
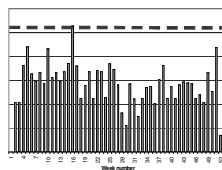

Stable

Trend (rising, falling)
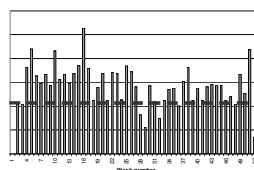
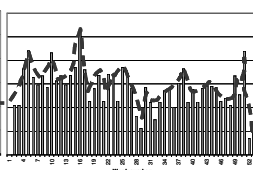Cycle (technology, season, life cycle)

Random (combination)

(c) Marja Blomqvist, QDC 2006
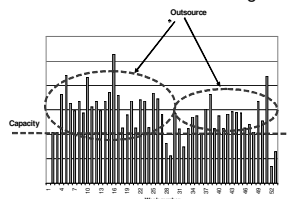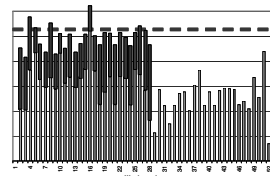
Slide 2

Capacity options

Capacity to match maximum demand

Capacity to match average demand

Capacity is adjusted to demand

Outsourcing of peaks OR Outsourcing the base load

Complimentary products

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qdc — Tactics to deal with demand changes

- ◆ **High capacity (level)**
  - ▪ **Extra capacity**
  - ▪ **Complimentary products**
- ◆ **Medium capacity (level)**
  - ▪ **Inventory**
  - ▪ **Longer lead times**
  - ▪ **Outsourcing peaks**
- ◆ **Adjusting the capacity to demand**
- ◆ **Affecting the demand (i.e. Levelling the demand to capacity)**
  - ▪ **Pricing**
  - ▪ **Limited availability, allocation**

- ◆ **The more we get visibility to end user demand and the better we understand the drivers behind the demand, the better we can prepare & be proactive, not do reactive fire-fighting!**

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qdc — Implications to services

- ◆ **High capacity (level)**
  - ▪ **Extra capacity – expensive but sometimes a must (fire brigade)**
  - ▪ **Complimentary products – Case Gastronautti**
- ◆ **Medium capacity (level)**
  - ▪ **Inventory – not possible – or is it??**
  - ▪ **Longer lead times – Case help desk X**
  - ▪ **Outsourcing peaks – Case Health care**
- ◆ **Adjusting the capacity to demand**
  - ▪ **Common in services**
- ◆ **Affecting the demand (i.e. Levelling the demand to capacity)**
  - ▪ **Pricing – Airlines**
  - ▪ **Limited availability, allocation – Luxury services**

- ◆ **The more we get visibility to end user demand and the better we understand the drivers behind the demand, the better we can prepare & be proactive, not do reactive fire-fighting!**

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Forecasting & demand management

- ◆ **Forecasting is difficult, especially when we are talking about the future...is demand / sales forecast**
  - ■ A fixed plan we aim to carry out as such?
  - ■ Or frames that help us to prepare to the real demand (which is different than the forecast)?
- ◆ **I.e. is the who purpose of forecasting & demand management to guarantee the efficiency of the supply chain or the ability to react agile?**
- ◆ **Forecast is anaccurate by nature (although not everybody agrees)...how do you deal with unexpected demand?**

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Forecasting & demand management

- ◆ **Basically three different types of methods:**
  - ■ Qualitative methods = different expert estimates
  - ■ Causal models = regression
  - ■ Quantitative methods = moving average, exponential smoothing, time series...
- ◆ **Understand the nature of the phenomenon being forecast!**
- ◆ **Aggregation effect: it is more accurate fo forecast large entities than small (product families instead of single models)**
- ◆ **Time scale effect: (at least in theory) the shortest term forecasts are the most accurate ones.**

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Forecasting & demand management

- ◆ **Typically basis consolidated bottom up from those closest to customers**
  - ▪ Sales, marketing
  - ▪ Ideally, collaboration with customers and the channel
- ◆ **Aggregation & combination with other data**
  - ▪ Sanity checks, order backlog, product life cycles
  - ▪ Campaigns, sales initiatives
  - ▪ Historical data
- ◆ **Demand-supply balancing**
  - ▪ Reflect the capacity & materials
- ◆ **Result needs to be agreed & communicated**
  - ▪ Basis for capacity planning & procurement
  - ▪ Action in sales: allocation, marketing action etc
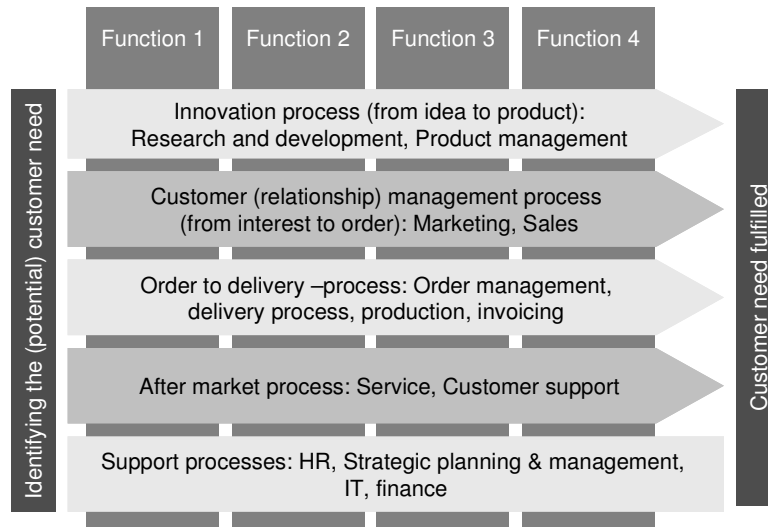- ◆ **Using same numbers all over organisation & supply chain**

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Implication to services

- ◆ **Hypotheses:**
  - ▪ Although ways to manage demand fluctuations are partly different in services, the methods and structures for forecasting & demand methods are applicable.
  - ▪ The most crucial thing is to understand the demand, find the best information available and use this consistently throughout the organisation systematically.

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Process design & improvement:
From functional silos to process thinking

| Function 1 | Function 2 | Function 3 | Function 4 |

Innovation process (from idea to product):
Research and development, Product management

Customer (relationship) management process
(from interest to order): Marketing, Sales

Order to delivery –process: Order management,
delivery process, production, invoicing

After market process: Service, Customer support

Support processes: HR, Strategic planning & management,
IT, finance

Identifying the (potential) customer need
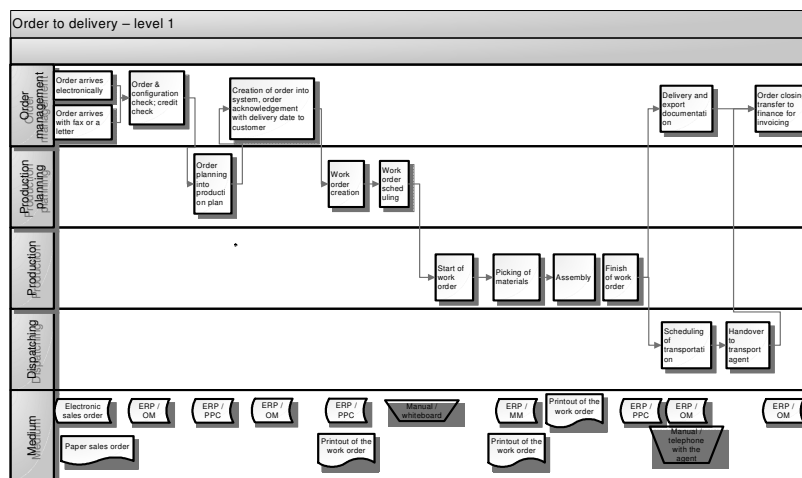
Customer need fulfilled

(c) Marja Blomqvist, QDC 2006

Source: adapted from Fogelholm & Karjalainen: Tuotantotoiminnan mittaaminen, WSOY.

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Process modelling - example

Order to delivery – level 1

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Process improvement

- ◆ **Facts instead of opinions: from "as-is" to "should-be"**

- ◆ **Does the process look like a lean, linear process or are there a lot of loops, jumps etc?**
- ◆ **Is there double work, unnecessary steps, inefficiencies, slack time, unnecessary waiting time...?** .
- ◆ **Where are the bottlenecks in the process? Is the capacity and its flexibility adequate?**
- ◆ **How are the process and its subprocesses controlled? What are key metrics for the process? Are they measured on a regualr basis and results known to everyone?**
- ◆ **What is the lead time for the process and its subprocesses? Is there variance in the lead time?**
- ◆ **Can we do continuous improvement or even radical reengineering to the process?**
- ◆ **Any training needed for people working in the process? Are the people multi-skilled? Are other resources adequate?**

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Implications to services

- ◆ **Hypotheses: For process improvement, same principles and methods apply both for product-related processes and service-related processes – it is the approach and that counts!**

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Lean Production & Lean Management

- ◆ **Lean Production: thin, light production avoiding all forms of waste; better products and customer service with less resources.**
    - **Starting point IMVP-study about world's car industry (International Motor Vehicle Programme, book The Machine that changed the World)**
    - **Based on japanese production principles (JIT, TQM) combined to importance of time (TBM) and global perspective.**
    - **Striving towards perfection and holistic approach: Continuous cost reduction, zero defects, zero inventories, endlessly new product variants.**
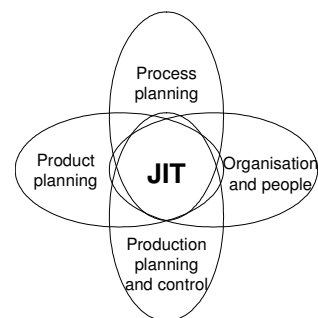
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Basics of a lean organisation

- ◆ **Maximum empowerment of people in operations to do really value adding work**
- ◆ **Recognizion and solving of problems through systematic approach.**
- ◆ **Specifics:**
    - **Multi-skilled workers**
    - **Flexibleautomation, simple machines**
    - **Small lot sizes made to customer order, flow production**
    - **Low-cost producst**
    - **Short product life cycles, customization through modularity**
    - **Zero defects quality**
    - **Tacking problems with continuous improvement.**

Roots in JIT:

Process planning

Product planning — **JIT** — Organisation and people

Production planning and control

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Lean thinking in summary
Womack & Jones

- ◆ **Correctly specify <u>value</u>**

- ◆ **Identify the <u>value stream</u> & remove wasted actions (muda)**

- ◆ **Make the product <u>flow</u>**

- ◆ **So the customer can <u>pull</u>**

- ◆ **By managing towards <u>perfection</u>**

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Steps for implementing "Lean"

- ◆ **Eliminate waste**
  - ▪ **make a map of the process and ask why, why, why...**

- ◆ **Swap inventory buffer to capacity buffer**
  - ▪ **two-shifting techniques**
  - ▪ **extra machines**
  - ▪ **"Andon"**
  - ▪ **Short-term capacity help**

- ◆ **Reduce variability**
  - ▪ **In process capability**
  - ▪ **In WIP -> Pull system**
  - ▪ **Of suppliers**
  - ▪ **by leveling production = freezing mix for short term**

- ◆ **Improve continuosly**
  - ▪ **Repeat from start**

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Lean in Services: Lean Consumption

- ◆ **Lean Services: look at the process from customer side, make it as lean as possible and combine to lean back-end -processes**
- ◆ **Principles of Lean Consumption**
  1. **Solve the customer's problem completely by insuring that all the goods and services work, and work together**
  2. **Don't waste the customer's time**
  3. **Provide exactly what the customer wants**
  4. **Provide what's wanted exactly where it's wanted**
  5. **Provide what's wanted where it's wanted exactly when it's wanted**
  6. **Continually aggregate solutions to reduce the customer's time and hassle.**
- ■ **Examples: Fujitsu Services, Car service**

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Supply Chain Management, part 2

- ◆ **Introduction**
- ◆ **Services in Supply Chains and Service Supply Chains**
- ◆ **Selected Challenges & Solutions from Product world**
- ◆ **Case: Santa Claus**

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Case Santa Claus

◆ **Discussion in groups:**
- **What are the challenges Santa is facing?**
- **Do you face same type of challenges in your organisation?**
- **What would you do if you were Santa?**
- **Discuss the 4 different solutions suggested in article.**

◆ **Briefing together:**
- **Summary of the group discussions**
- **Is this applicable to service worlds?**
- **Is Santa service-oriented?**

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Questions, comments, feedback?
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Interested to know more about supply chains?
Reading list of Marja's favourite supply chain literature

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Recommended reading list

◆ **Supply Chain Management / Books**
  - **Christopher, Martin (2005): Logistics and supply chain management – Strategies for reducing cost and improving service (third edition). Pitman publishing, 1998. *A good introduction on supply chain management.***
  - **Hoover, William E; Eloranta, Eero; Holmström, Jan; Huttunen, Kati (2001): Managing the Demand-Supply Chain. Value Innovations for Customer Satisfaction. Wiley Operations Management Series for Professionals. *A thought-provoking book about innovative supply / demand chain as a competitive advantage.***
  - **Chopra, Sunil; Meindl, Peter (2001): Supply Chain Management. Strategy, Planning and Operation. Prentice Hall, 2001. *Systematic description of tools & methods.***
  - **Crum, Colleen: Demand Management Best Practises: Process, principles and collaboration. J Ross Publishing, 2003. *Good overview on demand management.***

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Recommended reading list

◆ **Supply Chain Management / Articles**

- Feitzinger, Edward & Lee, Hau L.: *Mass Customization at Hewlett-Packard. The Power of Postponement.* Harvard Business Review, January /February 1997, pp. 115 – 121.
- Ferdows, Kasra; Lewis, Michael A. & Machica, Jose A.D.: *Rapid-Fire FUlfillment.* Harvard Business Review, November 2004.
- Fischer, Marc; Frankemölle, Heiner; Pape, Lutz-Peter; Schween, Karsten (1997): *Serving your customer's customer: A strategy for mature industries.* McKinsey Quarterly, number 2, 1997, pp. 81-89.
- Fisher, Marshall L.; Hammond, Janice H.; Obermeyer, Walter R.; Raman, Ananth (1994): *Making supply meet demand in an uncertain world.* Harvard Business Review May/June1994, pp. 83-93.
- Fisher, Marshall L. (1997): *What is the right supply chain for your product?* Harvard Business Review Mar/Apr 1997, pp. 105-116.
- Forrester, Jay W. (1958): *Industrial Dynamics – a major breakthrough for decision makers.* Harvard Business Review July-August 1958., pp. 37-67.
- Holmström, Jan; Hoover, William E. Jr.; Louhiluoto, Perttu; Vasara, Antti (2000): *The other end of the supply chain.* McKinsey Quarterly, 2000, Number 1, pp. 62-71.
- Korhonen, P.; Huttunen, K.; Eloranta, E. (1998): *Demand chain management in a global enterprise – information management view.* Production Planning & Control, 1998, vol 9, no 6, pp. 526-531.

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Recommended reading list

◆ **Supply Chain Management / Articles**

- Lee, Hau L.; Padmanabhan, V.; Whang, Seungjin (1997a): *The Bullwhip effect in supply chains*. Sloan Management Review, Spring 1997, pp. 93-102.
- Lee, Hau L. Padmanabhan, V.; Whang, Seungjin (1997b): *Information distortion in a supply chain*: *The Bullwhip effect*. Management Science, vol 43, no 4, April 1997, pp. 546 – 558.
- Lee, Hau L.; Billington, Corey (1992): *Managing Supply Chain Inventory: Pitfalls and Opportunities.* Sloan Management Review, Vol 33, no 3, Spring 1992, pp. 65-73.
- Lee, Hau L.: *The Triple A Supply Chain.* Harvar Bisness Review, October 2004.
- Liker, Jeffrey K; Choi, Thomas Y.: *Building deeper supplier relationships.* Harvard Business Review, December 2004.
- Olhager, Jan (1994): *On the positioning of the customer order decoupling point.* Proceedings from the 1994 Pacific Conference on Manufacturing, Jakarta, December 1994, pp. 1093-1100.
- Pine II, Joseph (1993): *Mass Customization – The New Forntier in Business Competition.* USA, Harvar Business School Press, 332 p.
- Sharman, Graham (1984): *The rediscovery of logistics.* Harvard Business Review, September-October 1984, pp. 71-79.
- Womack, James P. & Jones, Daniel T: *From Lean Production to the Lean Enterprise.* Harvard Business Review March/April 1994.
- Wise, Ruchard & Baumgartner, Peter (1999): *Go Downstream. The New Profit Imperative in Manufacturing.* Harvard Business Review, September/October 1999.

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- **Services / Articles**
  - Allmendinger, Glen; Lombreglia, Ralph: *Four strategies in the age of smart services.* Harvard Business Review, October 2005.
  - Auguste et al: *The right service strategy for product companies. McKinsey Quarterly*, 1/2006
  - Beaujean, Marc; Davidson, Jonathan; Madge, Stacey: *The 'moment of truth' in customer service.* McKinsey Quarterly, 1/2006.
  - Cohen, Morris A.; Agrawal, Narenda; Agrawal, Vipul: *Winning the aftermarket.* Harvard Business Review, May 2006.
  - Harmon, Eric; Hensel, Scott C; Lukes, Timothy E: *Measuring performance in services.* McKinsey Quarterly, 1/2006.
  - Mathieu, Valerie: *Service Strategies within the manufacturing sector: benefits, costs and partnerships.* International Journal of Servgice Industry Management. 2001, Vol 12, nr. 5.
  - Womack, James P.; Jones, Daniel T.: *Lean Consumption.* Harvard Business Review, March 2005.