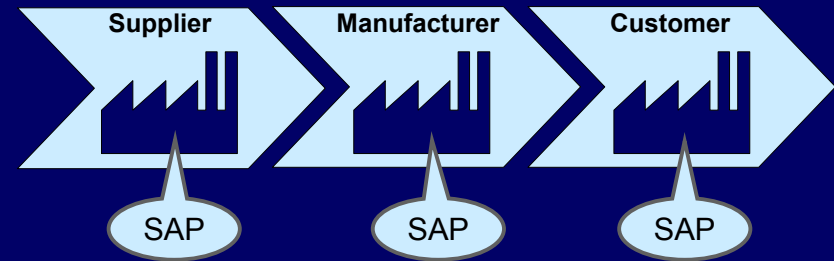


## Supply Chain Integration

- Contradictions and Trust
- Segmentation
- Supply Chain Integration
  - Supplier hubs
  - Integrated (Planning) Systems
  - Vendor Managed Inventory
  - Initiatives versus supplier segments
  - Current and future state
  - Experiences from industry

## Contradictions and trust

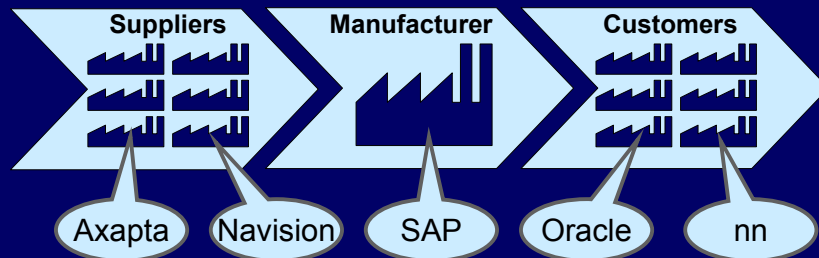
Supply Chain View according to Consultant's & Magazine's



and high rates of saving by entering @ solutions

## Contradictions and trust

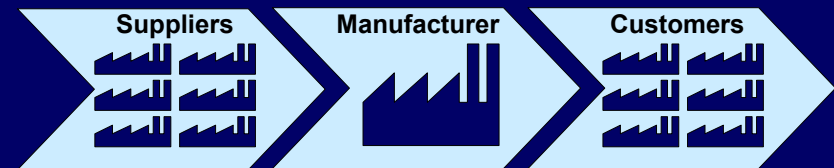
Supply Chain View according to Industry



and few examples of savings (e.g. computer and automobile industry)

## Contradictions and trust

Technology squeeze

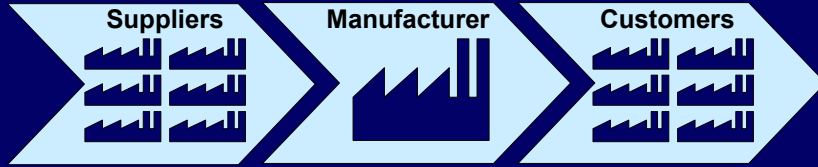


- Suppliers are asked to participate in different exchanges with multiple technology solutions
- Each exchange uses a different flavour of XML and has different business rules
- Without back office integration this will lead to increased time consumption and costs for the supplier

Adapted from [Gullledge]

## Contradictions and trust

### Supplier squeeze



- Large customers create an exchange to reduce their procurement costs
- The exchange will lead to reduced supplier profit margins by introducing new technologies such as auctions

Adapted from [Gulledge]

## Contradictions and trust

### Problems and challenges

- Conflicting objectives
- Lack of trust and unwillingness to share data, especially if the supplier also supplies a competitor
- Measuring and sharing supply chain returns
- High costs of integrating partner back-office systems with the exchange technology
- Lack of consensus among partners about where functionality should reside (electronic supplier hub)
- The majority of companies have purchased state-of-the-art software before making the process improvements needed to effectively use that technology (thus are disappointed with the results of their technology investment).

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## Segmentation

Keywords - *simplification & standardisation*

### Segmentation of customers, e.g.

- Key customers (e.g. order volume or contribution margin)
  - Standard customers
  - One-off customers
- with different privileges (e.g. price, leadtime or order changes)

### Segmentation of suppliers, e.g.

- Standard products
  - Customised products
  - Complex products
- with different needs of control systems and integration
- } Reduce supplier base and select suppliers for closer collaboration

# Segmentation

<b>Customisation</b>	<p><b>Capacity suppliers</b></p> <ul style="list-style-type: none"> <li>Customised products</li> <li>High costs related to switch of supplier</li> <li>High need of information sharing</li> <li>Supply chain type relationship</li> </ul>	<p><b>System suppliers</b></p> <ul style="list-style-type: none"> <li>Highly customised products</li> <li>Joint technology/product development</li> <li>High need of information sharing</li> <li>Extended or virtual enterprise type relationships</li> </ul>	
	<p><b>Standard suppliers</b></p> <ul style="list-style-type: none"> <li>Standard products</li> <li>Low costs related to switch of supplier</li> <li>Low need of information sharing</li> <li>(Loose) supply chain type relationship</li> </ul>	<p><b>Key suppliers</b></p> <ul style="list-style-type: none"> <li>Complex products</li> <li>Manufacturers dependant of suppliers</li> <li>Frequent need of information sharing</li> <li>Extended enterprise type relationship</li> </ul>	

**Complexity**

[Hvolby & Trienekens; adapted from Bensaou]

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# Supply Chain Integration

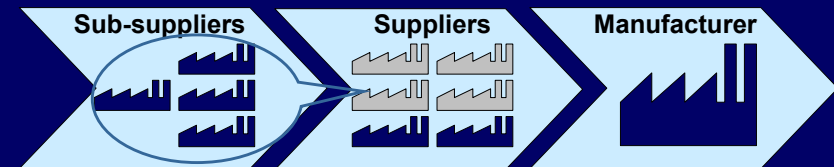
## Introduction - purpose of supply chain integration

Improve the flow of materials and information in the supply chain with possible gains for all parties

- shorter leadtime
- improved flexibility
- reduced costs
  - reduced stock
  - reduced resource consumption
- improved delivery precision

# Supply Chain Integration

## Supplier hubs



Supplier hubs is a way to reduce the number of actors in the supply chain planning procedure by using one supplier as a link to a number of sub-suppliers.

The hub can either act as

- information exchange (e.g. webservice or EAI) and/or
- logistic service provider by storing components delivered by the sub-suppliers and forward these to the manufacturer

## Supply Chain Integration

### Integrated (Planning) Systems

- Integrated Customer-Supplier systems (specific)
- Advanced Planning and Scheduling (APS)

An example of a Customer-Supplier specific system was developed in a case company to share information on specifications for control units.

Examples of well operating APS implementations are found in associated companies (e.g. in the car industry among "internal" factories).

## Supply Chain Integration

### Integrated (Planning) Systems

APS systems support collaborative planning among several (closely connected) partners in a network, e.g.

- joint allocation of production capacity and materials
- joint planning and optimisation of stock and goods flows

An APS plan can either be

- unconstrained (infinite like MRP)
- constrained
- optimised

## Supply Chain Integration

### Integrated (Planning) Systems

Constrained planning

- a feasible but not necessarily optimal APS plan
- respects the specified (hard) constraints
- no optimisation objectives or criterion considered

Optimised

- an optimised and executable APS plan
- based on decision variables, penalty factors and objectives (weight on-time delivery, inventory turns and plan profit)
- optimisation entirely based on cost and profit
- constraints is overruled if this reduces the total costs

## Supply Chain Integration

### Vendor Managed Inventory

To entrust suppliers with the responsibility to handle inventory holding at the buyer

- within certain agreements, e.g.
  - min/max stock
  - consignment

- giving supplier access to buyers plans & forecasts of the
- maybe combined with consigned inventory

Benefits of VMI might include

- reduced inventory cost at buyer and supplier by reducing inventory, transport, obsolescence, stocktaking, space etc.
- improved resource utilisation (levelling) at supplier by flexible delivery and insight into buyers future needs
- reduced acquisition tasks and order entry tasks

# Supply Chain Integration

## Vendor Managed Inventory

- Reduced acquisition tasks and order entry tasks might include
- submitting and receiving orders and order changes (fax, phone, mail)
  - exchanging information with suppliers (e.g. forecast updates)
  - printing orders and/or order confirmations
  - entering customer orders and order changes in the ERP-system
  - replying lead time to customers (fax, phone, mail)
  - monitoring stock levels and order status

# Supply Chain Integration

## VMI systems

- No standard interfaces for information sharing among ERP vendors leads to technical problems and high investment costs. Therefore there is a marked for VMI systems (e.g. Vidity and Pipechain) enabling information exchange and monitoring
- actual and needed stock levels
  - planned and initiated production quantity (at supplier)
  - initiate actions and notifications in case of exceptions, e.g. potential material shortages
- During the implementation phase a large number of notifications are typically used until confidence is established.

# Supply Chain Integration

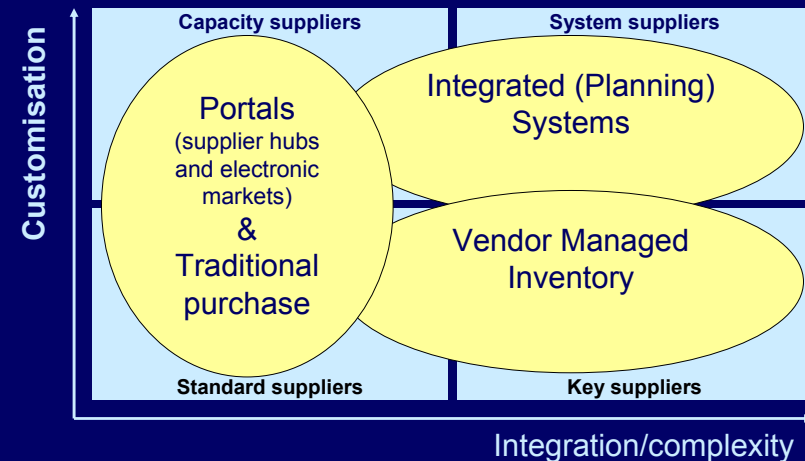
## Consigned inventory

A special problem exists regarding consigned inventory, as the IT-system should be able to handle inventory holdings without a financial registration in the accounting system (as the inventory belongs to the supplier until the buyer pulls the item from the inventory). Otherwise more sub-systems (e.g. spreadsheets) are introduced

Only a few ERP systems are able to handle consigned inventory at present (e.g. Oracle & SAP)

# Supply Chain Integration

Supply Chain Integration



[Hvolby & Trienekens, 2005]

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## Experiences from industry

Case example, supplier segmentation

Segments	Suppliers		Purchased value (%)
	(#)	(%)	
Standard suppliers	10	4	83
Capacity suppliers	13	5	
Key suppliers	15	6	
System suppliers	3	1	
Ungrouped suppliers	210	84	17
<b>Total</b>	<b>251</b>	<b>100</b>	<b>100</b>

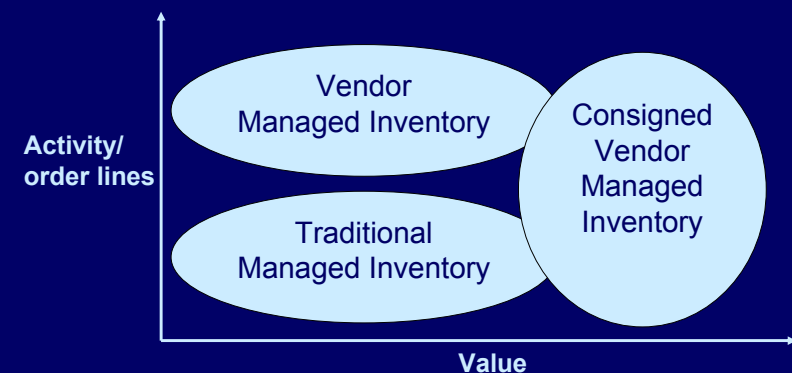
## Experiences from industry

Case example, supplier segmentation

- ungrouped suppliers (will always exist to some extent)
  - workmen/craftsman (painter, gardener)
  - transport, it-support, chartered accountant
  - various products (carpets, desks, cars)
- many overlapping suppliers
  - reduction of supplier base
  - procedure for entering new supplier agreements
- supplier hub selected for durable manufacturing products (oil, twist, gloves, simple tools, etc)
- classified suppliers (41) for extended collaboration
  - some not interested (e.g. large international companies)
  - some not motivated (e.g. find little value of collaboration)
  - some not qualified (e.g. quality problems or late deliveries)

## Experiences from industry

Case example, buyer's supplier collaboration matrix



## Experiences from industry

### Case example, buyer's expectations (2004)

- Introduce VMI agreements with top 25 vendors (more than 50% of total buy) within one year
- Reduce total admin. acquisition costs by more than 50%
- Reduce stock cover from over 8 to 2 weeks
  - Reduce inventory of obsolete materials
  - Reduce number of slow moving items
- Improve supplier delivery performance, agility and logistic attention

## Experiences from industry

### Case example, buyer's realised results (2005)

- VMI agreements with 13 vendors
  - will be reduced to 11 due to missing contract fulfillment
  - expected to increase to 15-20 during 2005
- Inventory is reduced by 50% for VMI parts (stock cover reduction is not a suitable measure)
- The acquisition workload is reduced, but the number of employees is unchanged
- Number of slow moving items is somewhat reduced
- The suppliers flexibility and delivery precision is improved
- Consignment has not been introduced so far due to missing functionality in the buyer's ERP-system

## Experiences from industry

### Case example, suppliers results

- Satisfied with solution
- Resource levelling improved
- Transport costs reduced
- Collaboration improved
- Uses their experience in handling VMI-supplies to acquire new customers