INFS1602 Digital Transformation in Business – Comprehensive DISTINCTION Notes

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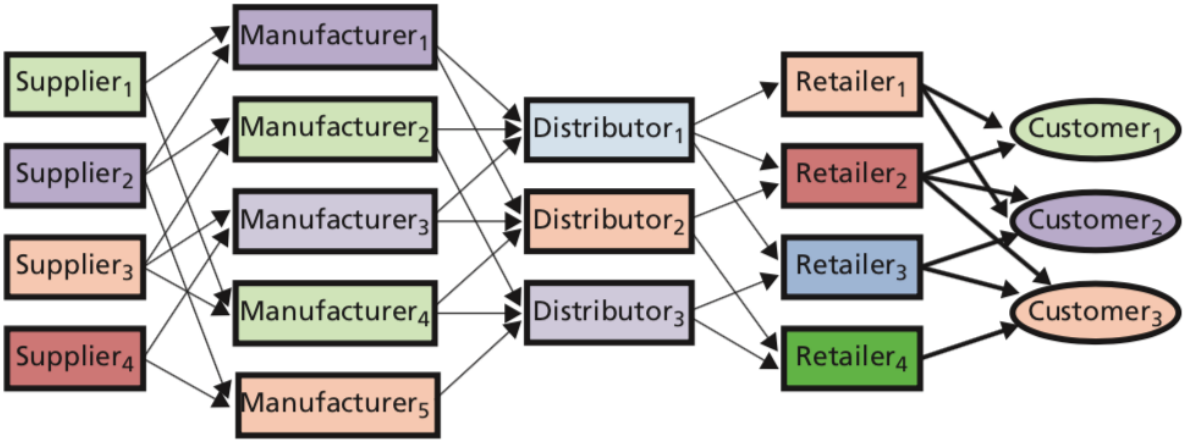
Chapter Extension 10 – Supply Chain Management

CE10.1 What are typical inter-enterprise processes?

An inter-enterprise system is an IS that is shared by two or more independent organisations. Inter-enterprise cooperation is governed by negotiation and contract, and conflict resolution is done by negotiation, arbitration and litigation.

CE10.2 What is a supply chain?

A **supply chain** is a network of organisations and facilities that transforms raw materials into products for customers.



The supply chain also includes transportation companies, warehouses, inventories and means for transmitting messages between the involved organisations.

Because of **disintermediation**, not every supply chain has all of these organisations.

- Eg Dell sells directly to the customer, thereby omitting both the distributor and retailer organisations from its supply chain

At each level an organisation can work with many organisations both up and down the supply chain. Thus, the supply chain and the processes that support it are networks.

- The only source of revenue in a supply chain is the customer.

CE10.3 What factors affect supply chain performance?

Four major factors (drivers) affect supply chain performance:

1. **Facilities -** location, size and operation of the places where products are fabricated, assembled or stored
2. **Inventory** - all of the materials in the supply chain, including raw materials, in-process work and finished goods
    - Managing an inventory requires balancing between availability and cost
3. **Transportation** - Concerns the movements of materials in the supply chain (decisions impact speed and cost)
4. **Information** - influences supply chain performance by affecting the ways that organisations communicate
    - There are three factors of information:
        1. **Purpose -** transactional (orders and returns), or informational (sharing inventory and order data)
        2. **Availability** - which organisations have access to which information and when

3. **Means** - Methods by which the information is transmitted (typically SOA and web services)

Two ways that information can affect supply chain performance are supply chain profitability and the bullwhip effect.

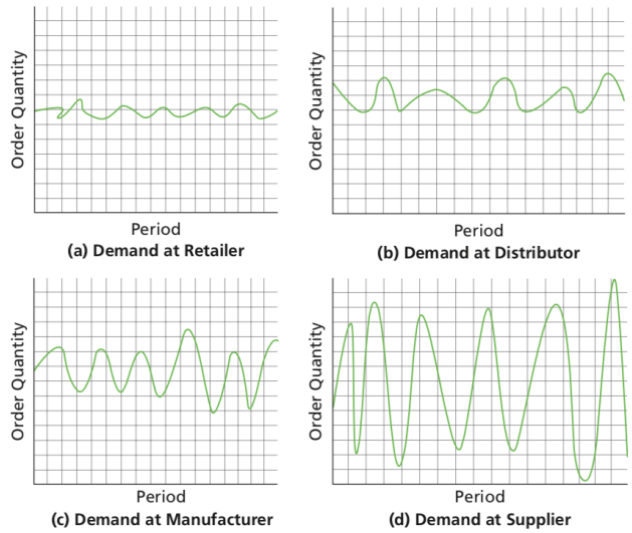
CE10.4 How does supply chain profitability differ from organisational profitability?

Each of the organisations in the supply chain is an independent company with its own goals and objectives. Each has a competitive strategy that may differ from the competitive strategies of the other organisations in the supply chain.

- **Supply chain profitability** is the difference between the sum of the revenue generated by the supply chain and the sum of the costs that all organisations in the supply chain incur to obtain that revenue
    - In general, the maximum profit to the supply chain *will not* occur if each organisation in the supply chain maximises its own profits in isolation
- Theoretically the way to solve lack of goal congruence is to use some form of transfer payment which would be recovered up the supply chain by adding a margin
    - However, this solution is difficult to implement and may only be of benefit for higher-priced items or high-volume orders

CE10.5 What is the bullwhip effect?

The **bullwhip effect** is a phenomenon in which the variability in the size and timing or orders increases at each stage up the supply chain from customer to supplier.



- Retailers do not order from the distributer with the sale of every item. Instead they wait until inventory falls below a certain level (*reorder quantity)* and then orders a supply of the item which is perhaps slightly higher than it expects to sell to ensure they do not have an outage.
- The distributor receives the retailer's order and follows the same process
    - It waits until its supply falls below the reorder quantity and then reorders from the manufacturer with perhaps an increased amount to prevent outages
- The manufacturer, in turn, uses a similar process with the raw-materials suppliers

Because of the nature of this process, small changes in demand at the retailer are amplified at each stage of the supply chain.

The large fluctuations of the bullwhip effect force distributors, manufacturers and suppliers to carry larger inventories than should be necessary to meet the real consumer demand. Thus, the bullwhip effect reduces the overall profitability of the supply chain.

- One way to eliminate the bullwhip effect is to give all participants in the supply chain access to consumer-demand information from the retailer
- Each organisation can plan its inventory or manufacturing based on the true demand from customers and not on the observed demand from the next organisation up the supply chain
    - Of course, an *inter-enterprise information system* is necessary to share such data

CE10.6 How do information systems affect supply chain performance?

Information systems have had an exceedingly positive impact on supply chain performance in the following areas:

- **Reduce costs of buying and selling**
  - Sourcing, buying and selling have all become faster, easier, more effective and less costly
  - Distributed systems in the cloud have enabled businesses to integrate their information systems with less cost and greater speed and agility than ever before
- **Increase supply chain speed**
  - **Supply chain speed** is the dollar value of goods exchanged in a given period of time
- **Reduce size and cost of inventories**
  - This reduction is possible because the speed and efficiency provided by information systems enable the processing of small orders quickly
- **Improve delivery scheduling - enable JIT**
  - Using IS, suppliers can deliver materials and components at the same time and in the sequence needed
  - JIT allows manufacturers to reduce raw materials inventory size as well as the handling of raw materials
- **Fix bullwhip effect**
  - IS has the capability to eliminate the bullwhip effect but doing so requires retailers to be willing to share sales data with the entire supply chain
  - Such sharing entails some risk and many retailers refused to release such data due to the belief that the benefits of sharing will only accrue to the supply chain
    - Whilst there is a likelihood that increased flow of information would improve supply chain accuracy and thus lower costs, retailers are not convinced that these cost savings would flow to the very bottom of the supply chain (where they operate)
- **Do not optimise supply chain profitability**
  - IS do not optimise supply chain profitability
  - Rather, they benefit the companies that actively participate in a particular IS
  - As previously noted, maximising individual company profitability does not necessarily maximise supply chain profitability
  - To solve these problems, it is necessary to establish some system of transfer payments as an incentive