Lecture 18: Suppliers

Terminology

- Supply chain management
  - the systematic methods of managing the first/second/etc. tiers in the supply chain
- Supplier management
  - how to select and qualify suppliers
  - how to pick what what level of control the supplier has
- Supply management
  - Management of the goods and services
  - enabled using ERP software
- Purchasing
  - contract methods

Background

Why outsource

- Schedule
- Volume savings are higher outside (sharing costs of equipment with other companies)
- Expertise is greater in another company
- Proprietary technology
- Remove risk of volume changes
- Strategic (offsets)

Why keep in house

- Proprietary technology
- Integral part of a system / high interactions with other parts
  - need to have the ability to rapidly make changes
  - need an close knowledge of the interactions
- Companies' trademark/perceived core-competency

5

What are the variables in determining make buy/ supplier relationship?

- Cost of part
- Fixed costs
- Expertise
- Ability to deliver
- ….

6

Supplier Types

- *Supplier proprietary parts* - components that are bought off the shelf
- *Black Box* - end specifications and interface requirements given to supplier. Design, tooling and manufacturing done by supplier
- *Grey Box* - co-design between supplier and customer. Iterative process
- *White box (detail controlled parts).* All detail design done in house by integrator. Drawings are sent out for low bid.

7

Link to product architecture

- Modular systems
  - Arm's length supplier relations easier
  - Assume that
    - interfaces are set
    - if they change, they don't impact the design
- Integral systems
  - Need close links

8

Vectors for make/buy decision

	Competency	No competency
Integral	Keep in house (film design)	Learn it Or Close iteration with supplier (paper handling)
Modular	Outsource if cheaper Or Keep internal (thermal control board)	Outsource - black box design (motors/bearings)

9

Differences between supply management approaches

10

Supply chain history

- Ford - Do it all your self
  - how to organize?
  - what happens when there is a downturn
- Sloan (1920) - Do it all but set up decentralized parts-making as independent profit centers
  - coordinated but unified
- Ford (1950) - Outsource to other companies
  - arms-length market based, short-term interactions
- Japan (1980) - show that there is a way to work in a tightly coupled manner with suppliers

Arms-length supplier interaction

- Parts are designed
- Sent out for quote: how much for 400,000 per year at a 1,000 parts per million defect
- Short term contract but
  - may be long term
  - replacement parts are good source of revenue
- Under-bid and then raise costs over time ("buy the business")
  - running changes
- No trust on cost data
- No interactions on design
- Hidden costs to pay for low bids
- Guarding knowledge to link assembler to the supplier

Suppliers as part of the design team

- Suppliers are chosen early in the design process
- Selected based on past experience
- Use of first-tier suppliers to reduce the number of suppliers (300 rather than 2,500)
- In-house designers
- Suppliers have design responsibility for those areas that are not proprietary
- Long term relationships
- Target costing
- Mutual sharing between supplier and assembler to reach target cost
- System is optimized globally
- Continual improvement during production
  - targets set for cost reductions
  - cost savings are shared between supplier and

Benefits of partnerships

- Volume changes are smoothed
- Contracts are not yanked quickly
- Training and education of suppliers
- Tooling risk is reduced -- customer will pay for the tooling if the volumes are lower than expected
- Suppliers pay a penalty for defective parts
- Parts are designed for suppliers manufacturing
- Integration done by supplier -- fewer interfaces to manage
- Long term cost reductions that are

Honeywell Industrial Automotive and Control supplier changes

- 70% of material costs are supplied
- 5% - 1/2% defect reduction
- 100 - 55 suppliers
- 17 supplier partners have offices inside Honeywell
- Head of supply management reports directly to CEO
- Supply management co-located with engineering and manufacturing

15

Honda of America

- 80% of the value of the car is purchased
- 25 - 50 year long relationships with suppliers
- 1998 Accord, supplier involvement reduced the cost of the car by 21.3%
- 60% of suppliers use EDI

16

Target costing - Honda

- Honda maintains internal cost tables to set target prices for all parts
- Work with suppliers to
  - achieve that cost target
  - find other places to save
  - correct errors in tables
  - identify where suppliers are inefficient and help them.
- Requires
  - internal experts on the cost and function of parts

Strategic Supplier Segmentation

- No one-size-fits-all model
- Strategic
  - where different from competition
  - use a close relationships
  - where parts are integral
- Non-strategic
  - arm's length
  - cost-based
  - modular/standard parts

Durable arms-length

- Small set of suppliers
- Picked based on competitiveness
- Invest in communications
- Always have some business
- Will open up bidding every 5 years

Reporting structures

Limitation in current Supply Management systems

- 50% of companies have supplier groups have a direct reporting line to top management
- 20% of companies do not track delivery performance
- 40% do not measure savings against targets (they don't close the target cost reduction loop)

Transition in importance of supplier management

- Used to be purchasing
  - transactional
  - get the cheapest parts there on time
  - could be de-coupled from design process
- Move to supply management
  - need to integrate suppliers more upstream
  - get the best quality part there on time
  - leverage knowledge in the supply chain into design groups

Active supply chain interactions

- Supplier management groups do more than just procure materials
- Work to train their suppliers in
  - Kanban
  - JIT
  - Continual improvement
  - SPC/variation control

Centralized vs. local supply management

Centralized

- Central approval
- Reduced overhead
- Consolidated purchasing
- Common approval/ supplier qualification practices

Local

- Special needs
- Rapid response
- Closer supplier relations
- Lower bureaucracy

Enablers for better supply management

- Shared scheduling
  - volume predictions
- Just-in-time inventory
  - pull inventory
- Information systems
  - EDI, ERP, Supply chain software, etc.
- Co-location of suppliers
- Value engineering
  - communication of additional information other than drawings
  - involve suppliers in target costing

Supply chain qualification

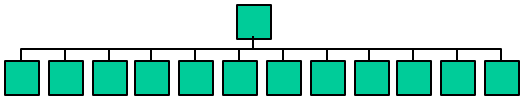
- Most companies have a supplier qualification system (ISO-9000)
- Used to down-select suppliers
- Aspects
  - quality of parts
  - integration with design process
  - existence of EDI

Supplier consolidation

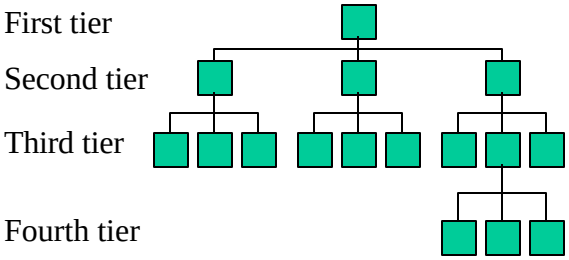
Supplier Consolidation

- Move in industry to reduce the number of suppliers
- One company went from 5,000 to 550.
- Three ways to reduce base
  - Suppliers as Integrators
  - Part count reduction (DFA)
  - Single sourcing

Supply chain height



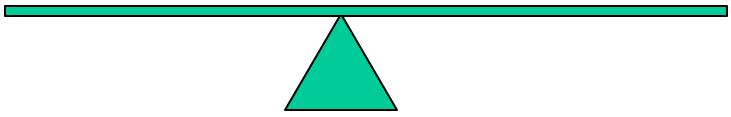
Traditional Large supplier base



Consolidated supplier base with tiered suppliers

Large number of suppliers
Less time per supplier
Lower risk

Small number of suppliers
More time per supplier
Higher risk



Single source vs. multiple source

- Multiple source
  - Procure the same part from more than one supplier
  - Sets up competition
  - High overhead
  - Low risk of delivery failure
- Single source
  - Procure a part from one supplier only
  - Encourages long term contracts
  - Encourages communication and sharing
  - Less overhead

31

Models of dialogue

- Most models assume that information exchange is free -- it is not.
- Iterative model
  - needs are expressed
  - options are proposed
  - further trimming of set through additional vectors of differentiation etc.
- Reciprocal asymmetry of information
  - Customer preferences are not known by the supplier
  - Suppliers technology and cost/performance tradeoffs are not known

32

Cost of communication

- Hypothesis: the higher the communication costs, the less information will be shared
- Most enablers are used to reduce the cost of communication
  - smaller sets of supplier
  - bigger “chunks” being delivered (i.e., fewer interactions)
  - EDI
  - co-location of suppliers
  - suppliers as a member of the IPT

33

Data exchange

- Single transfers
  - “Through purchasing” drawing hand-off
- Discrete transfer
  - Team to team paper/fax based exchange of drawings, models, etc. includes email
  - Electronic exchange of information -- sending drawings over the wire
- Continual transfer
  - Integrated internet
  - continual visibility of information

34

ERP vs. Supply chain software

ERP

- Logistics
- Transaction based systems
- SAP, Baan, Oracle, etc.
- Used to link financial, resource and material transactions

Supply Chain

- Decision support
- Used to model the supply chain delivery to determine the best system
- I2, Manugistics
- Uses the ERP as the information source

35

Whitney and Fine "Is the make-buy decision process a core competence?"

- Observation that Japanese companies made much of their manufacturing equipment
  - DFM is much easier
  - processes can be tailored
  - understand maintenance therefore have higher up-time
  - "learn by making not buying"

36

Lecture 19: Appropriability