Managing Complexity in the Supply Chain

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The costs of complexity

Much of the cost in today's supply chains is there because of the continuing increase in their complexity …. it can be argued that perhaps the biggest opportunity for cost reduction lies in reducing that complexity.

Complexity – a definition

- "Complex is the opposite of independent whereas complicated is the opposite of simple."

- "Complex systems theory studies how relationships between parts give rise to the collective behaviours of a system and how the system interacts and forms relationships with its environment."

Source: Wikipedia

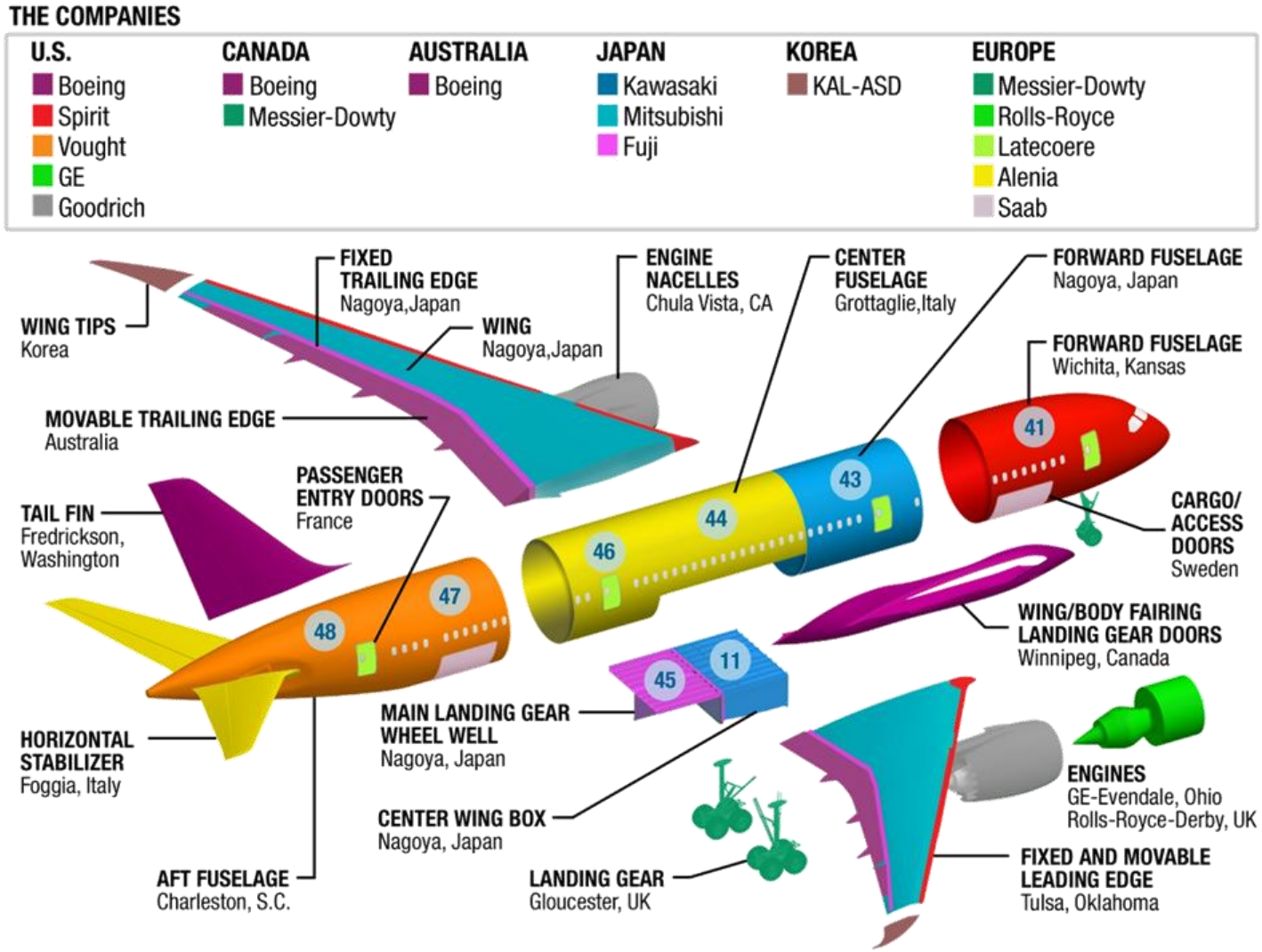
The roots of complexity

- Outsourcing of non-core activities
- The globalisation of supply chains
- Increasing demands of customers
- Shortening life cycles
- Organisational growth through mergers and acquisition

Seven types of supply chain complexity

- Network complexity e.g. too many nodes and links
- Process complexity e.g. too many steps
- Range complexity e.g. too wide a range
- Product complexity e.g. too many unique components
- Customer complexity e.g. too many service options
- Supplier complexity e.g. too many suppliers
- Organisational complexity e.g. too many levels and ‘silos’

Complexity in the global supply chain : the Boeing 787



The challenge of globalisation

Continued trends to off-shore sourcing and focused factories bring reduced costs to purchase/manufacture but ……

…… have the potential to increase total supply chain costs and to reduce agility.

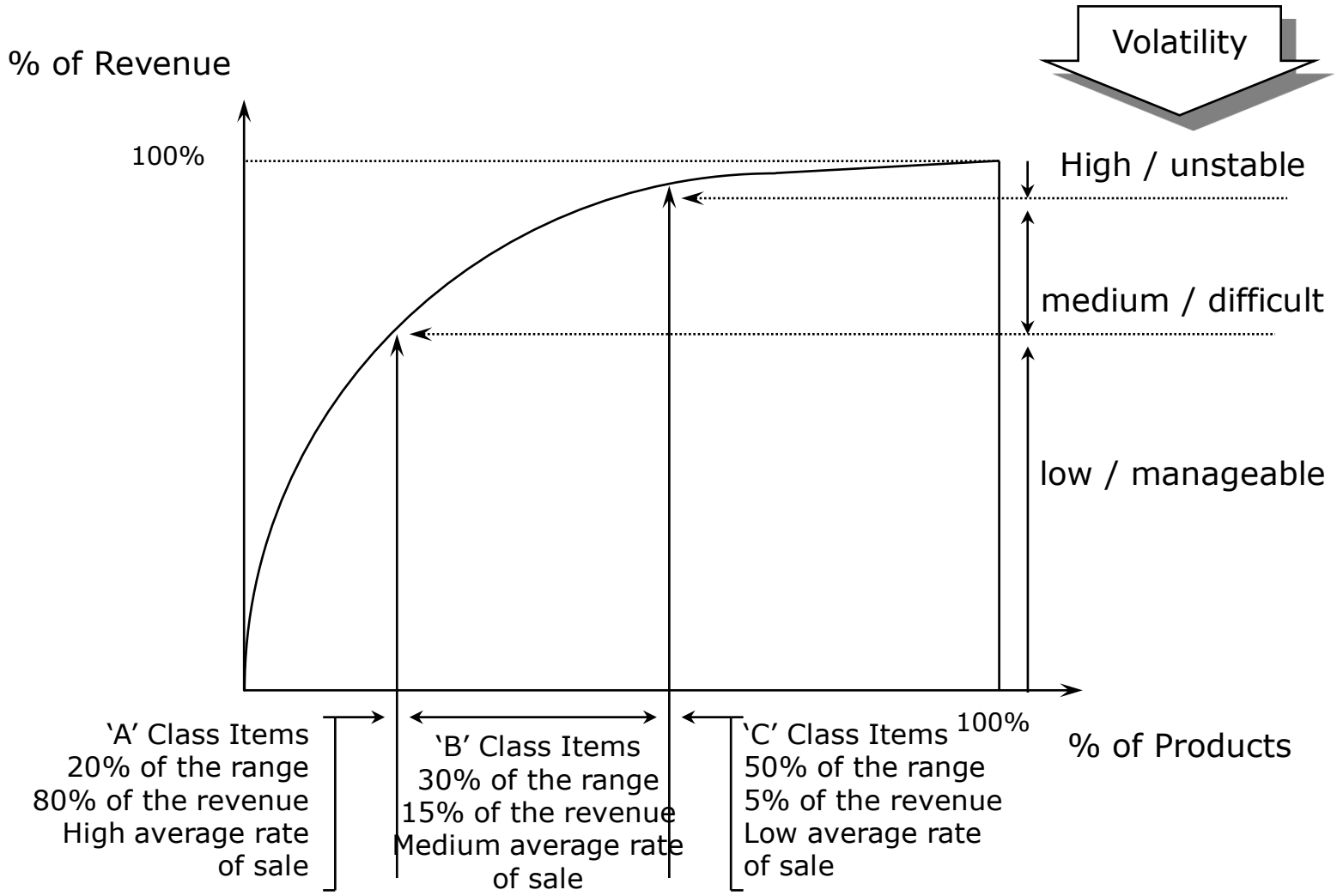
Understanding the total costs of ownership

Not just the purchase price, but …..

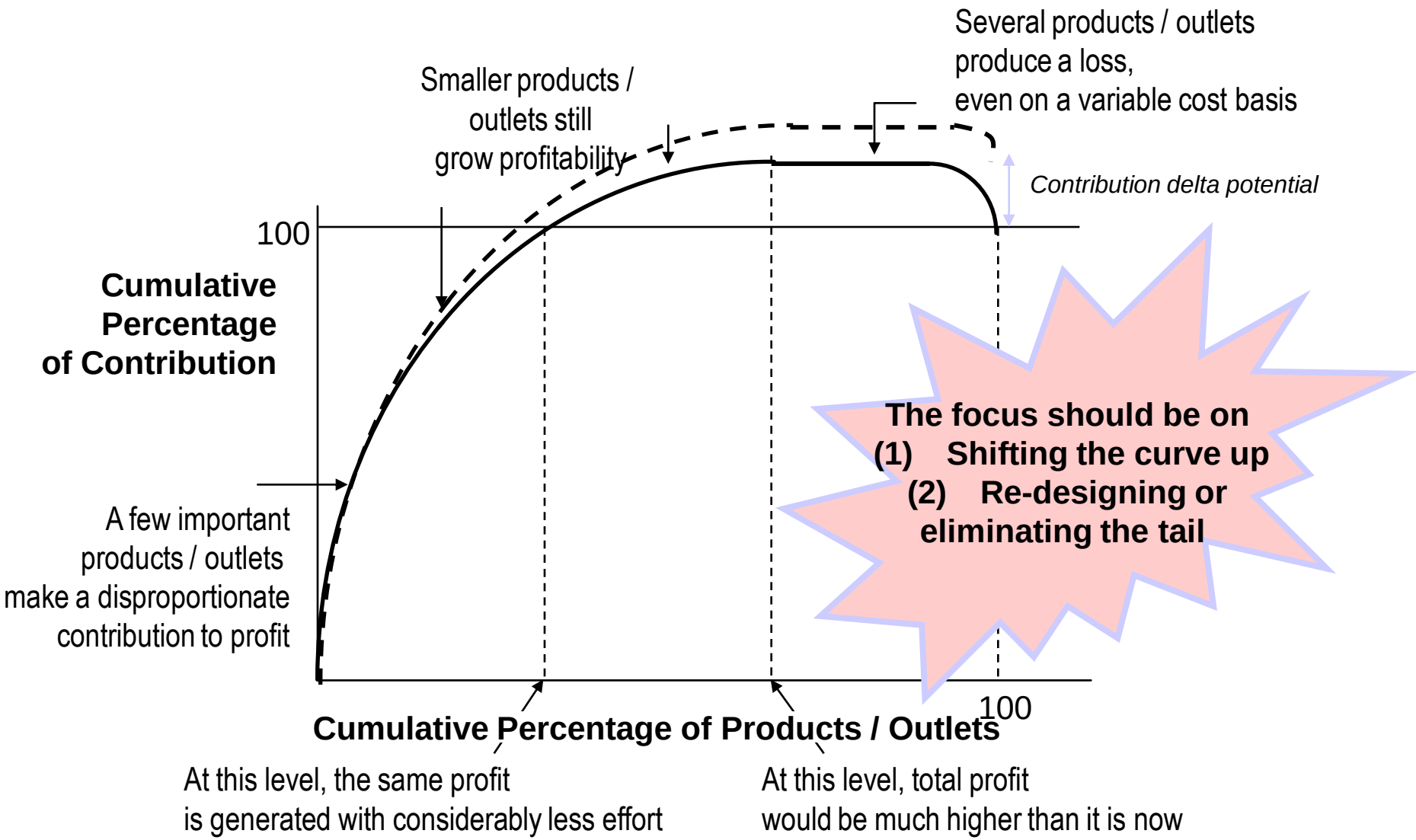
- Increased transport costs
- Increased inventory financing costs
- Increased uncertainty of supply
- Longer lead-times
- Less visibility and increased likelihood of “bullwhip” effect
- Loss of control in quality
- Longer development cycles for new products
- Increased exposure to security risks

…….. etc

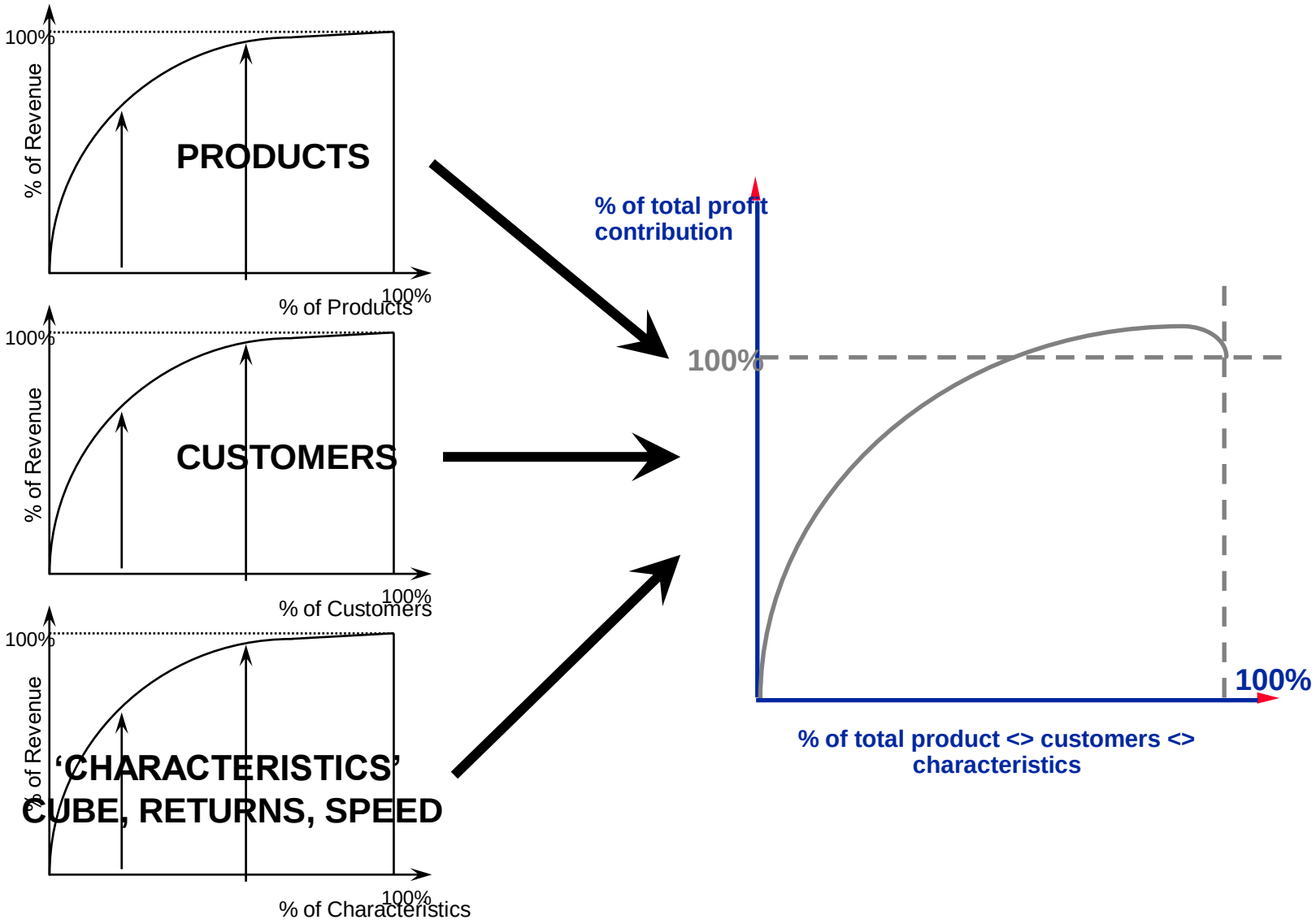
What is the cost of Variety?



Margin contribution / erosion in the supply chain is never uniform – some customers and products erode profit



Products and customers combine to add more complexity



Reducing organisational complexity

- Deep customer insight to identify the things that customers value – the 'order winning criteria'
- Manage processes, not just functions
- Align these processes against the company's value proposition
- Make cross-functional process teams the engine of the business
- Use appropriate KPIs to ensure that complexity reduction is a business priority

The Motorola Complexity Index

At Motorola, competitive pressure caused the company to extend its range of mobile telephones However often there was little commonality of parts across the range. For a single product there could be over 100 possible configurations i.e. four different colours and thirty software choices. Furthermore, these product variations were made ahead of demand to a forecast that was only accurate 3% of the time! To address this problem, Motorola devised a 'Complexity Index' for each product which included the number of components, the degree of commonality, lead-time of supply and so on. New products ideas with high scores on the Complexity Index tend not to be proceeded with. As a result of this focus on complexity reduction Motorola was able to significantly reduce its costs and improve its responsiveness.

Complexity drives cost

Much of the total life cost of a product is pre-determined at the design stage, e.g. :

- Number of components/materials
- Degree of commonality of components/materials across the product portfolio
- Lead-time of replenishment of components/materials
- Physical characteristics of the product

etc …

Farmers in Zentsuji, southwest Japan, preparing to pack square watermelons before shipment in refrigeration units. A farmer came up with the idea of optimising transport space and the melons are formed in square glass containers