

New Product Development (NPD) & Related tools

اصول اثربخشی برنامه ریزی توسعه  
محصول جدید

1. Corporate-wide strategic emphasis on new product development:

- -Top management's vision and commitment to new product development (as a driving force of development & growth of the firm)
- 3M:Q90s (Quest for Global Excellence in 1990s) Program  
GE:NPI (New Product Introduction) Program

2. A match between business strategy and NPD strategy:

- Integration of Business & Technology Strategic Planning (Partnership between business & technology units)
- NEC, Philips, GE: 70-80% of R&D budgets of corporate research institutes must be funded by business divisions (cf: corporate HQ funding: 20-30% for only fundamental R&D projects)

### 3. Managing strategic NPD projects:

- Special Management of NPD Projects which have strategic importance and/or need urgency in terms of resource allocation and authority of the project leader (i.e., core products)
- Hitachi (Focal Strategic Projects), 3M (Pacing projects), Sharp (Kinkyu Projects), Samsung (World Best Projects)

### 4. Setting a clear goal for NPD from the outset

- Early participation and agreement on the goal of NPD among constituents (R&D, planning, mfg, mktg, suppliers, or buyers)
- GE: Spec-freezing, Japanese companies: early project review for agreement

### 5. Customer-oriented NPD approach:

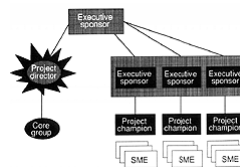
- The ultimate goal of NPD: (speed, quality, cost → customer satisfaction)
- 3M: global survey of customer satisfaction every three years

Sony: Market Trend Forecasting instead of market research

Hitachi: Establishment of Living soft center, encouraging three different experiences of R&D people: selling, using, and living

### 6. Cross-functional team:

- R&D, MFG, MKT, planning, purchasing, & (suppliers or buyers)
- GE: co-location of core team
  - Concurrent engineering



### 7. Multi-generation (Parallel) product planning:

- Utilization of information technology:  
E-mail, VAN, CAD/CAM, database



### 8. Human resource management system:

- Team based performance appraisal, team building training, job rotation and career development plans



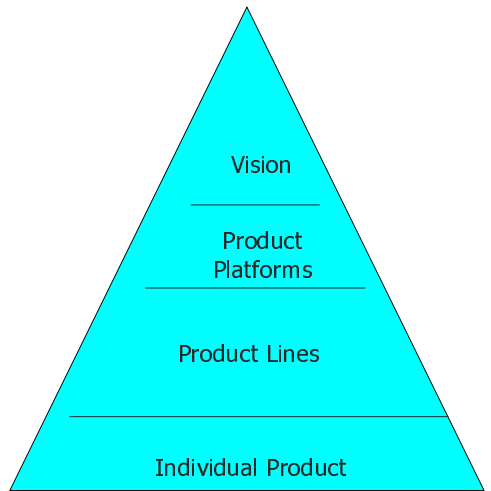
### 9. Institutionalization of innovative culture:

- Autonomy, risk-taking, open communication, & center of excellence

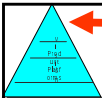


Strategic process for NPD

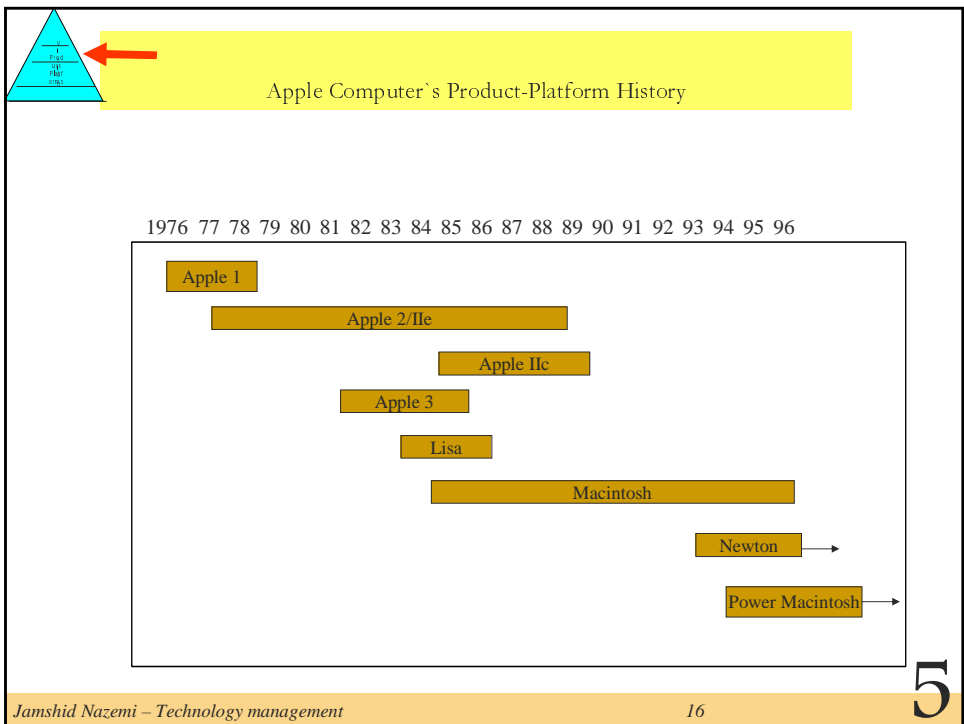
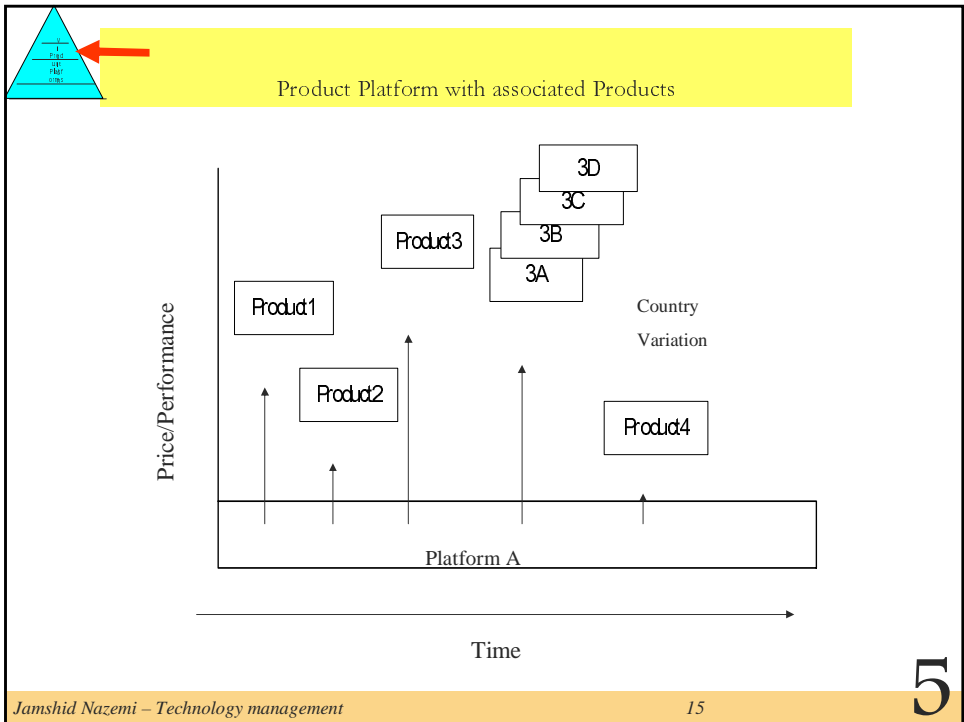
The Four-Level Structure of Product Strategy



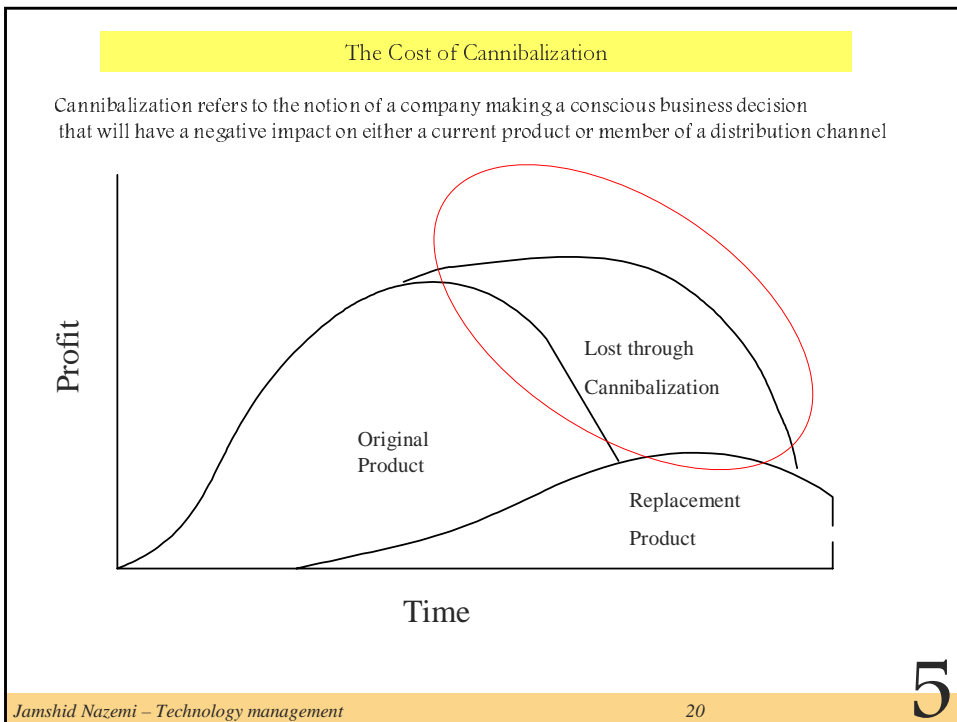
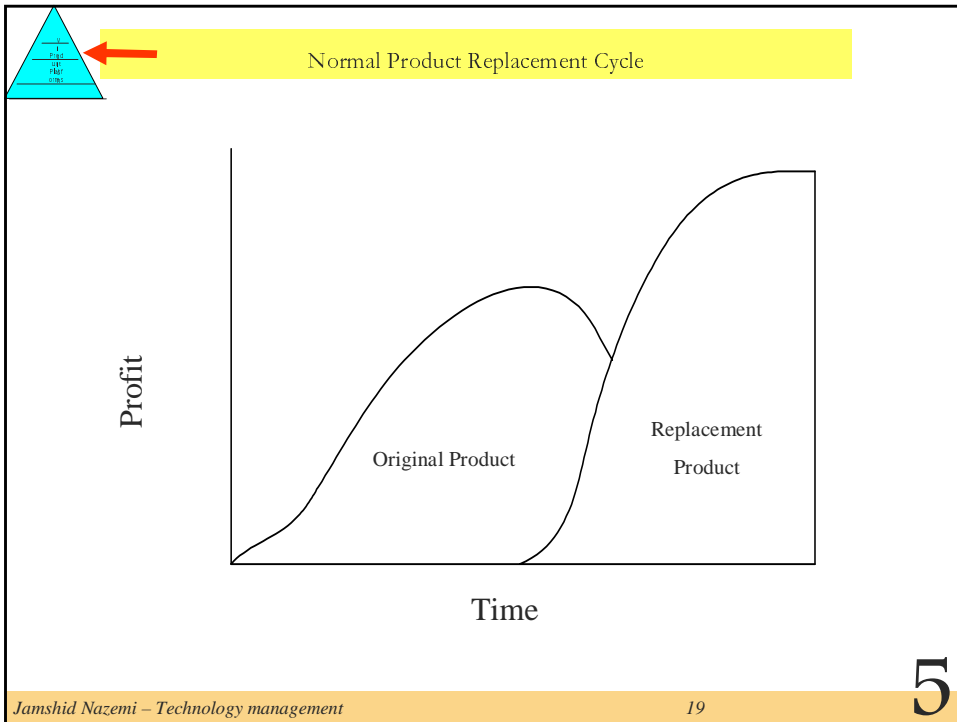
Apple Computer's Strategic Vision of Product Strategy




Phase 1: Marketing-Share Strategy	<ul style="list-style-type: none"> <li>■ Reduce the time it takes to bring new products to market</li> <li>■ Lower prices on Macintosh products to attract more customers</li> <li>■ Broaden the Macintosh family</li> </ul>
Phase 2: Enterprise Computing Strategy	<ul style="list-style-type: none"> <li>■ Establish Apple as a key player in client/server computing</li> <li>■ Expand Apple's product line by creating powerful servers</li> <li>■ Work with key partners to provide better ways to integrate Macintosh</li> <li>■ Work with IBM to develop PowerOpen-a new open systems, UNIX-based platform</li> </ul>
Phase 3: Emerging Technologies Strategy	<ul style="list-style-type: none"> <li>■ Move Macintosh to RISC technology; work with IBM and Motorola to develop PowerPC-a line of RISC-based micro-processors for Macintosh and IBM system</li> <li>■ Take a leadership role in emerging technologies, such as object-based systems, multimedia, and personal-information systems</li> </ul>










## Cannibalization

- Cannibalization is a pretty common theme for fast-growing retail companies. The basic concept of cannibalization in finance terms is similar to something you might hear about on the Discovery Channel. In nature, cannibals are people or animals that feed off of their own kind.
  - Cannibalization occurs when a company's store is stealing traffic away from another one of their stores. A way to explain this is let's say an Abercrombie & Fitch opens up 20 miles away from your house. You really like their clothes so you're happy to drive 20 miles to shop there. But then a new Abercrombie & Fitch opens up right by your house so you don't have to drive as far to shop there. The A&F that was 20 miles away has essentially lost a repeat customer (or customers, since there were probably more like you). Therefore the sales in that store will drop and they will have experienced cannibalization--another one of their stores is feeding off of the original store's traffic.
- The way you can investigate cannibalization is look at trends for the company's comparable-store sales ("comps"). If comps are slowing or declining, it could be a sign that the company is cannibalizing itself

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## Design to cost versus Traditional Design Approaches

### Traditional Design

```

graph TD
    PC[Product Concept] --> PS[Product Specification]
    PS --> PD[Product Design]
    PD --> CE[Cost Estimate]
    CE --> EM[Estimated Margin]
    EM --> PCR[Periodic Cost reduction]
    PC --> PE[Price Estimate]
    PE --> EM
    EM --> PC
    EM --> PS
    EM --> PD
    EM --> CE
    EM --> EM
    EM --> PCR
          
```

Change of Price

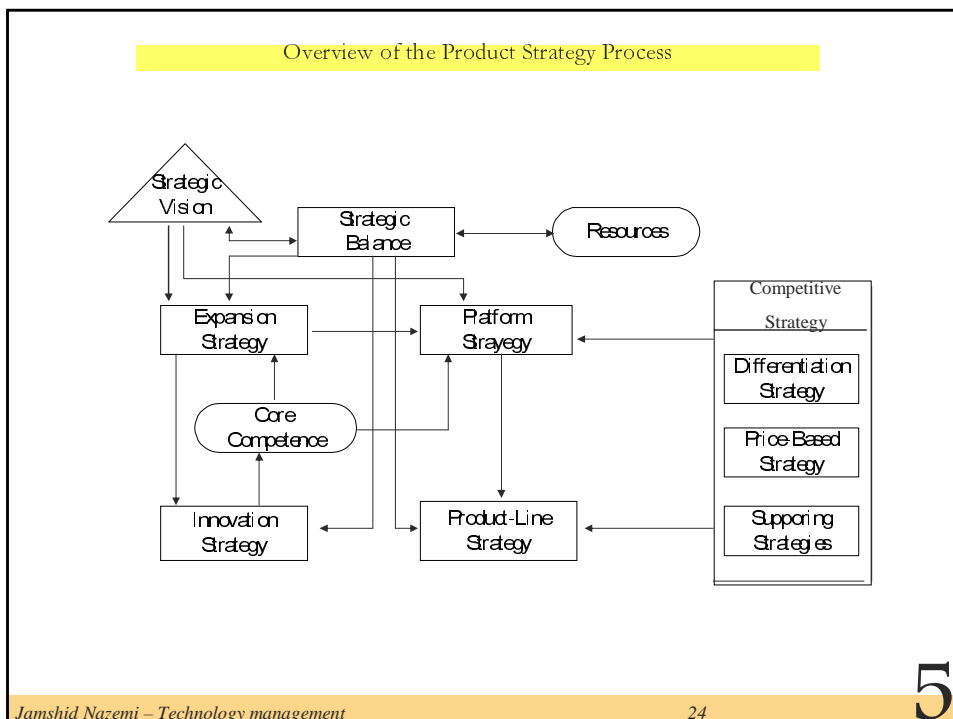
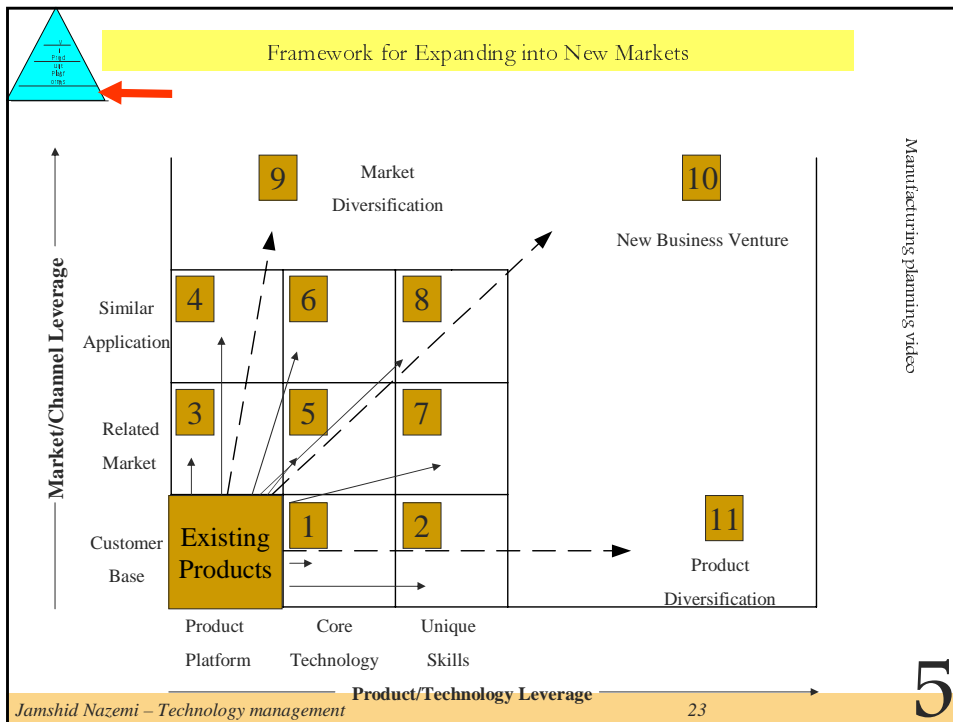
### Design-to-Cost

```

graph TD
    PC[Product Concept] --> PS[Product Specification]
    PC --> TP[Target Price]
    TP --> TC[Target Cost]
    PS --> PD[Product Design]
    PD --> PCR[Planned Cost Reductions]
    PCR --> PS
    PCR --> TP
    PCR --> TC
          
```

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## NPD and R&D Tools

The challenge of R&D management is  
to coordinate the interdependencies in the NPD process

**Interdependencies exist e.g. between:**

- **Technologies and products (conversion)**
- **Modules and components in a product (miniaturization)**
- **The product and the production process**
- **different phases of the new product development process (NPD)**
- **customer preferences (cost, quality, time)**

Two most relevant R&D scenarios with distinct success factors require adopted use of R&D methods

**Type 1:**

- Small sized enterprise
- R&D centered
- R&D focussed on projects
- Very high personal freedom
- Creative working environment
- Own R&D lifestyles

**Critical success factors:**

- Creativity and motivation of employees
- Conversion of project results into marketable products

**Type 2:**

- Large scale enterprises
- Distributed R&D activities
- Customer-orientation throughout the whole R&D process
- New research areas accessed by new employees

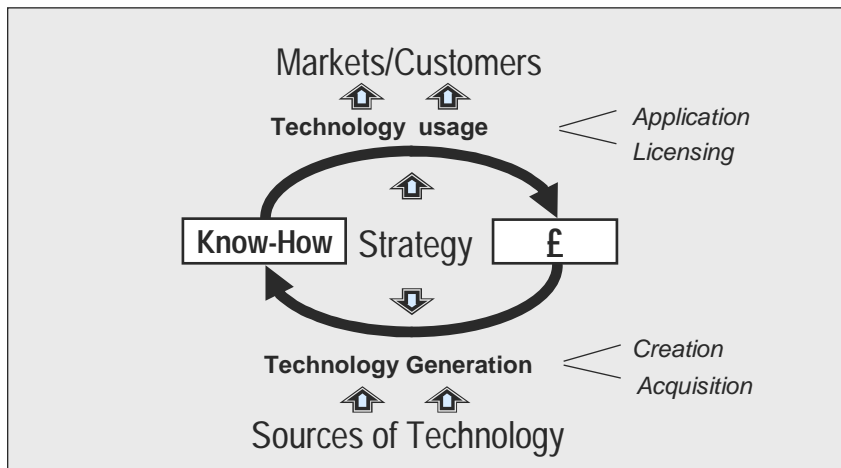
**Critical success factors:**

- Management of multicultural interfaces
- Efficient start to development projects ("warm start")

Basis: Questionnaire, 400 responses

[Reward Consortium, 1996]

Technology Management  
Generation & application processes



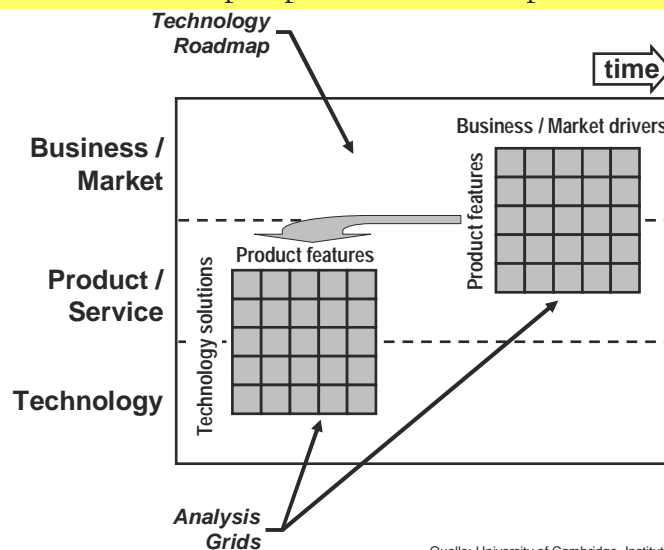
Quelle: University of Cambridge, Institute for Manufacturing, 2001)

## Fast-Start Technology Roadmapping: Aims

- To support the start-up of company-specific TRM processes
- To establish key linkages between technology resources and business drivers
- To identify important gaps in market, product and technology intelligence
- To develop a 'first-cut' technology route map
- To support technology strategy and planning initiatives in the firm
- To support communication between technical and commercial functions

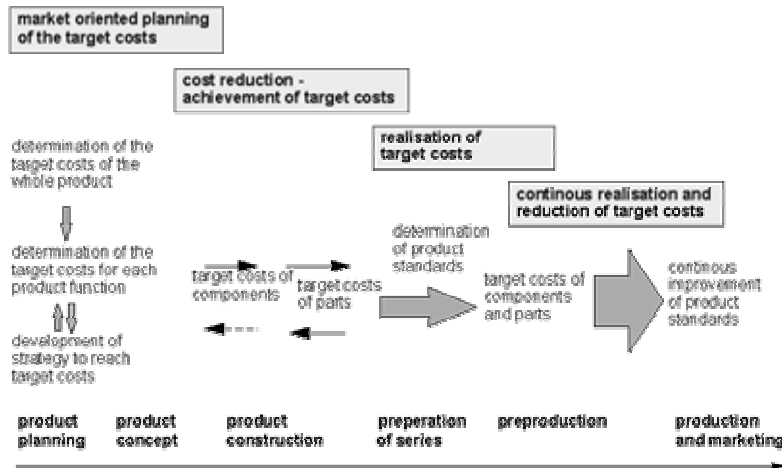
Quelle: University of Cambridge, Institute for Manufacturing, 2001)

## Roadmap Input Data Development



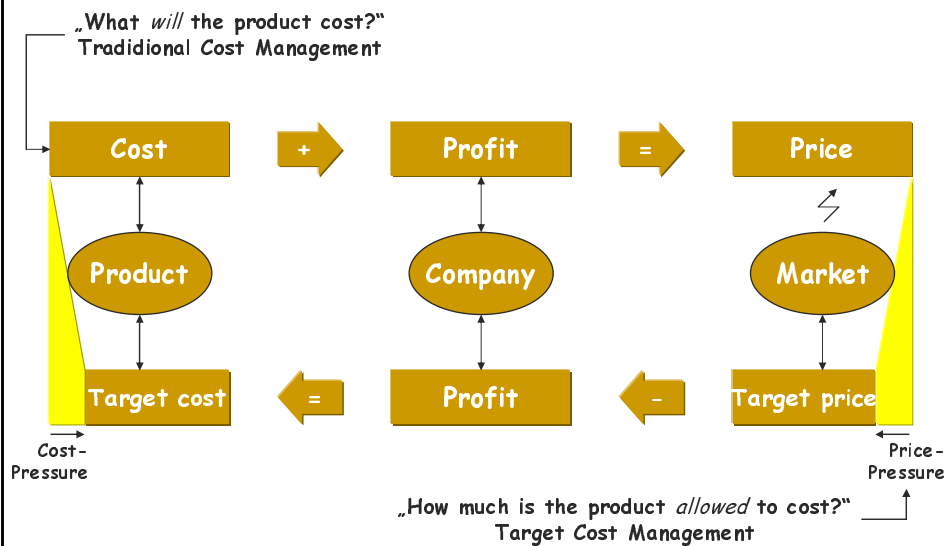
Quelle: University of Cambridge, Institute for Manufacturing, 2001)

## Target costing is a tool for market driven controlling of product development

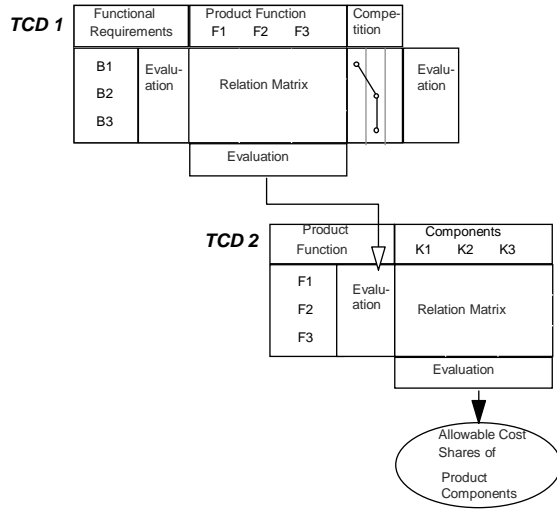


[Reword Consortium, 1996]

## Traditional Cost Management vs. Target Cost Management



## Target Cost Deployment (TCD) in Deriving Target Costs



[Source: Groos]

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## TCD Matrix Case Study

Customer requirements	%	Customer evaluation	Evaluation of competition from customer's viewpoint	Final evaluation	Product Function and Services						
					Corrosion resistance	Smooth running	Stability under impact	Unbreakability	Easy assembly	Replacement parts in 48 hours	
1 High-quality equipment	20%	2	1.4	2.8	5	1	5	5	1	3	
2 Design (sporty, dynamic)	10%	1	1.2	1.2	5	0	0	1	1	0	
3 Durability (functional)	30%	3	1.2	3.6	5	1	3	5	0	0	
4 Durability (visual)	10%	1	1.0	1	5	0	1	1	1	0	
5 Versatility (to the baker or on bike tours)	10%	1	1.4	1.4	0	3	3	3	3	0	
6 Security	10%	1	1.2	1.2	5	1	5	3	3	0	
7 Quick replacement part delivery	10%	1	1.6	1.6	0	0	0	0	0	5	
8											
9											
10											
=Automatically calculated		100%	absolute		49	11.8	36	42	20.8	16.4	
			relative		28%	7%	20%	24%	12%	9%	
										176	
										100%	

[Source: ITEM-HS6]

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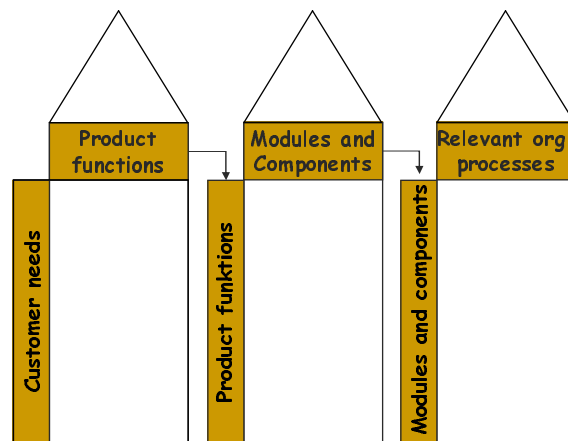
## Main Problems with Implementation

“Target Costing methods are relatively easy and established. The main problem lies in their implementation:

- ⇒ Market-oriented goals are hard to define and therefore hard to achieve,
- ⇒ An interdisciplinary team is essential,
- ⇒ Target Costing means Cost Management in the life-cycle of the product,
- ⇒ New costs must be competitive,
- ⇒ Target Costing is a management task.”

[W. Seidenschwarz, Stuttgart 30.06.94]

Quality function deployment is a tool to transfer the ‘voice of the customer to all departments’



[Hauser, Clausing, 1988]

Rapid prototyping is a tool to speed up feedback cycles in the NPD process

Rapid prototyping: Match with type of project

Type of project	New development	Product of following generations	Product cultivation
	Instant feedback for construction	Integrated system solution	Early production prototyping
Model for prototype construction	<ul style="list-style-type: none"> <li>• rapid production flow</li> <li>• flexible specifications</li> <li>• control of construction</li> <li>• technical emphasis</li> </ul>	<ul style="list-style-type: none"> <li>• gaining knowledge and know how</li> <li>• early fixed requirements/specifications</li> <li>• control of teams</li> <li>• system integration</li> </ul>	<ul style="list-style-type: none"> <li>• prototype quality</li> <li>• fixed specification</li> <li>• control of production</li> <li>• easy manufacturing</li> </ul>

Source: Wheelwright, Clark