Strategic Planning of R&D
Outline

- Risk Factors in R&D
- Strategic Focus
- Stage-Gate Process
- Technology Choice Case
Company Births and Deaths*

- 1995: 594,000 births & 497,000 deaths
- 2002: 580,900 births & 576,200 deaths
- 2005: 670,058 births & 599,333 deaths

* SBA Office of Advocacy
Attrition Rate of New-Product Ideas

For every 11 serious ideas
* 3 enter development
* 1.3 are launched
* 1 succeeds
Attempts to Start New Business

- One success in ten
- The odds are much poorer for new ideas
The Business Plan Funnel*

Business Plan Received (600)
Listen to presentation (60)
Visit (20)
Due Diligence / Negotiation (12)
Investment (3)

* Brookwood Partners
Causes of New Product Failure

- Inadequate Market Analysis: 45%
- Product Problems or Defects: 30%
- Lack of Effective Marketing Effort: 25%
- Higher Costs than Anticipated: 20%
- Competitive Strength or Reaction: 15%
- Poor Timing of Initiative: 10%
- Technical or Production Problems: 5%
- All Other Causes: 0%
Failures not merely negligence

- Attributable to lack of
  - understanding customer requirements
  - creating dramatic differences in current capabilities
  - understanding additional capabilities
The Suicide Square

New Technology

Increased Risk
The Suicide Square

New Technology

Increased Risk

New Product

Increased Risk
The Suicide Square

- Increased Risk
- New Product
- New Technology
- New Market
The Suicide Square

New Technology

Increased Risk

New Product

Increased Risk

New Market

Increased Risk
Risk Matrices

- **Existing**
  - **Low Risk**
  - **Low Returns**

- **New**
  - **Market and Tech Risk**
  - **“The Death Zone”**

- **Existing Markets**
  - **Market Risk**
  - **Ordinary Returns**

- **New Technology**
  - **Technology Risk**
  - **High Returns**
CD Risk Matrix 1981
Sony, Philips, Matsushita

<table>
<thead>
<tr>
<th>Existing Markets</th>
<th>New Markets</th>
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</thead>
<tbody>
<tr>
<td>Vinyl records to audio market</td>
<td>Sell CD’s to the Audio market</td>
</tr>
<tr>
<td>Sell floppy disks to the PC market</td>
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CD Risk Matrix 1985-1996
Sony, Philips, Matsushita

Technology

Existing

Existing

New

New

Sell CD’s to the PC market
Sell DVD’s to the Video Game market

Sell CD’s to the Audio market
Sell DVD’s to the Video market
Technology Management

- Strategic focus
- Business process
Strategic Focus

- Choose attractive strategic markets or market segments to participate in.
- Find “Beacons” in selected markets and market segments.
- Identify core competencies needed to address products, markets and applications.
- Plan a product, market, application / competency succession strategy.
## Business

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**Product:** What we supply to add value.

**Market:** Who we supply the value to.

**Application:** How customers use the product to realize value.
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## Business

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<td>GM/ Opel</td>
<td></td>
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<td>BMW/ Rover</td>
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<td>Ford</td>
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# Business

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Technology Strategy vs. Corporate Strategy

- Identify the firm’s “Core Competency”
- Specify the types of products, markets, applications and technologies for focus
- Specify the role technology innovation plays in achieving the firm's overall objectives
Strategic Resources: Focus and Risk

- Assign resources to reflect strategic focus.
- Assign resources according to the acceptable level of risk.
- Reconcile differences between the stated strategy and specified resources.
Stage – Gate Process

1st Stage

Go/ No-Go Screen

Investigate

2nd Stage

Go/ No-Go Screen

Develop

3rd Stage

Go/ No-Go Screen

Develop

nth Stage

Launch

Idea
Modified Stage-Gate with Continuous Customer Interaction

Customer

Strategic focus

IDEA

Development

n-th Development

New product
Concurrent Business Development

- Cross-disciplinary teams
- Knowledge must broaden
  - Engineers are “technical” experts; but must understand the business
  - Managers are “business” experts; but must understand the technology
Case Study: Technology Choice

Grumman Corporation
Basic Factors in Evaluating a Technology

- Will the technology satisfy a market sometime in the future (Market Need)?
  - Does it provide improved performance?
  - Does it reduce costs?
  - Is its market penetration rate acceptable?

- When will the product become significant (Timing)?
Basic Factors in Evaluating a Technology (cont.)

- Will the technology be commercially viable (Economics)?
  - Does the market exist or will it be created?
  - Does the potential market size justify the investment?
  - Is the production process feasible and practical?
  - Is the product profitable to manufacture?
Solar grid parity is close
Declining Prices Build Markets

Price NOT adjusted for inflation

Shipments CAGR 2000-2005 > 35%
Solar’s Challenge: Scale

Global Cell Production

- Despite record growth, generation from PV still is only 0.2% of total global electricity
Our energy supply will change and PV will play a big role

Renewables:
- Hydro
- Solar Electric
- Wind
- Bio-fuels
- Geothermal

Source: Energy Information Agency