

2.96 - Management in Engineering, Fall 2004

Massachusetts Institute of Technology

Department of Mechanical Engineering

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# R&D Management

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# Outline

- Risk Factors in R&D
- Strategic Focus
- Stage-Gate Process
- Technology Choice Case

# Attrition Rate of New-Product Ideas

For every 11 serious ideas

- \* 3 enter development
- \* 1.3 are launched
- \* 1 succeeds

# Causes of New Product Failure

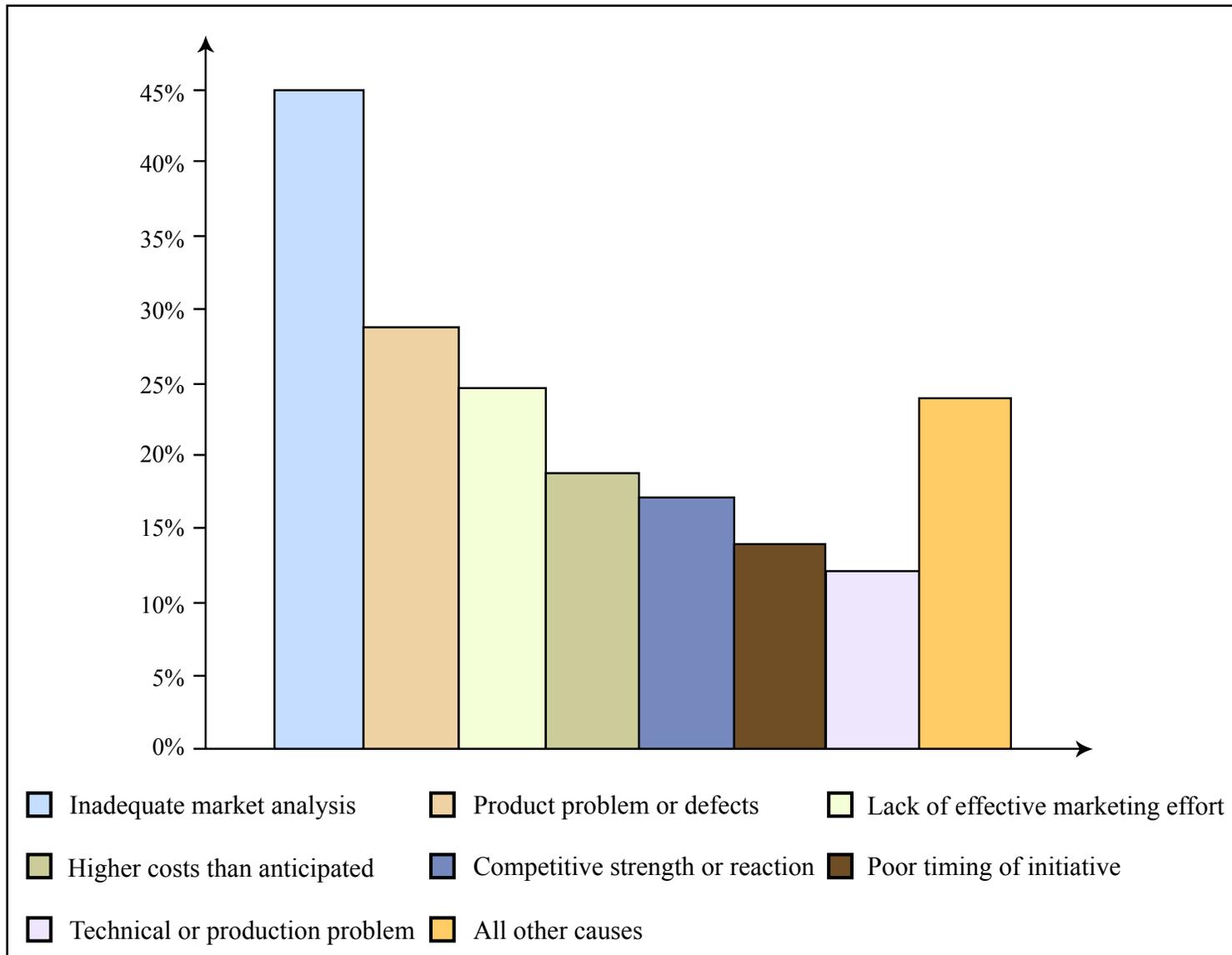


Figure by MIT OCW.

# Attempts to Start New Business

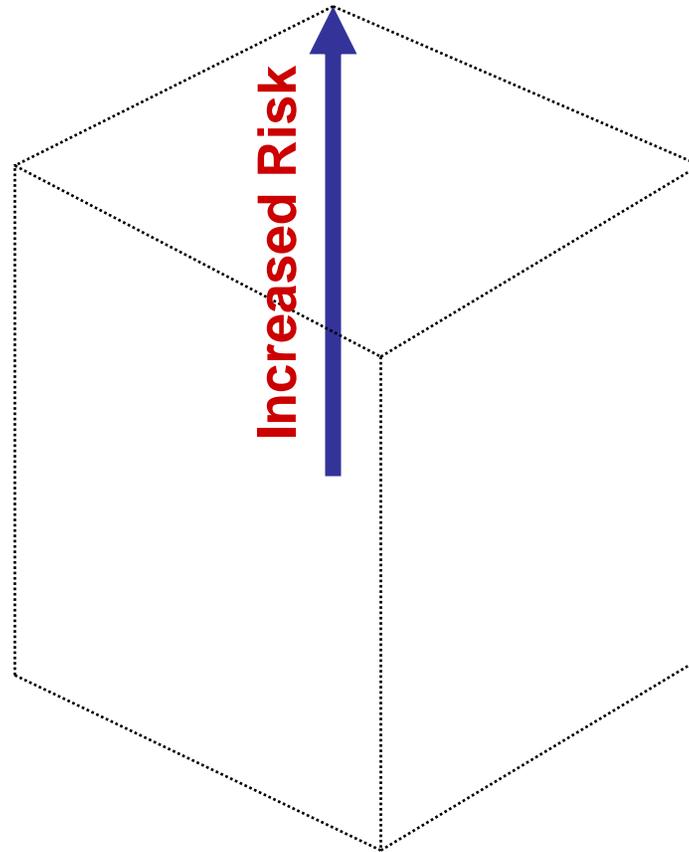
- One success in ten
- The odds are much poorer for new ideas

# Perilous Path to New Business

- Using technology superiority alone
- Lack of understanding in additional capabilities
- Product / service not filling unmet customer need
- Underestimating competition
- Unable to nurture the new business

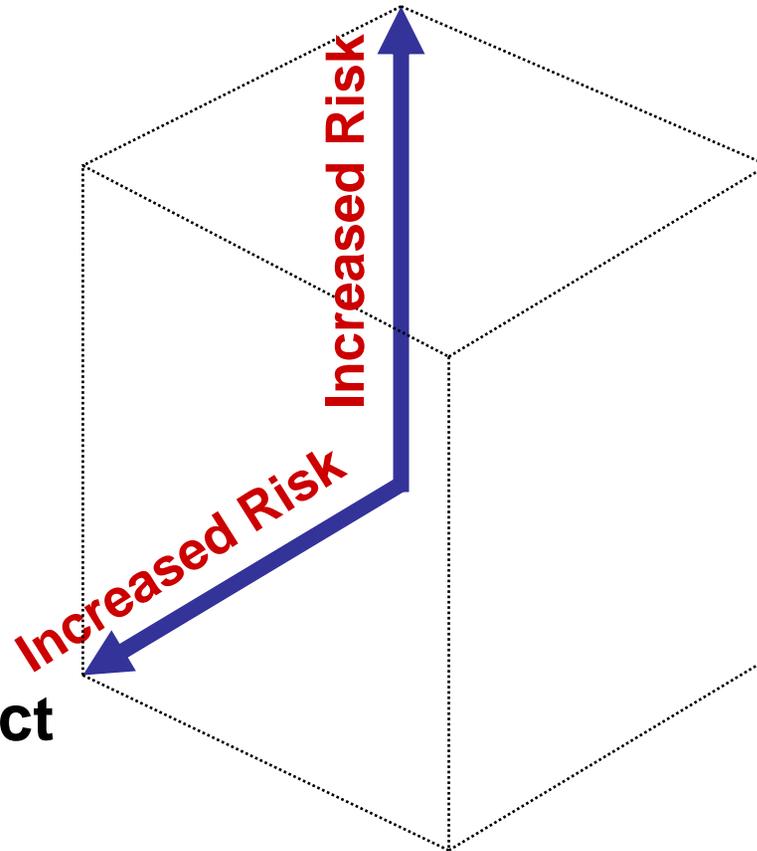
# The Suicide Square

**New Technology**



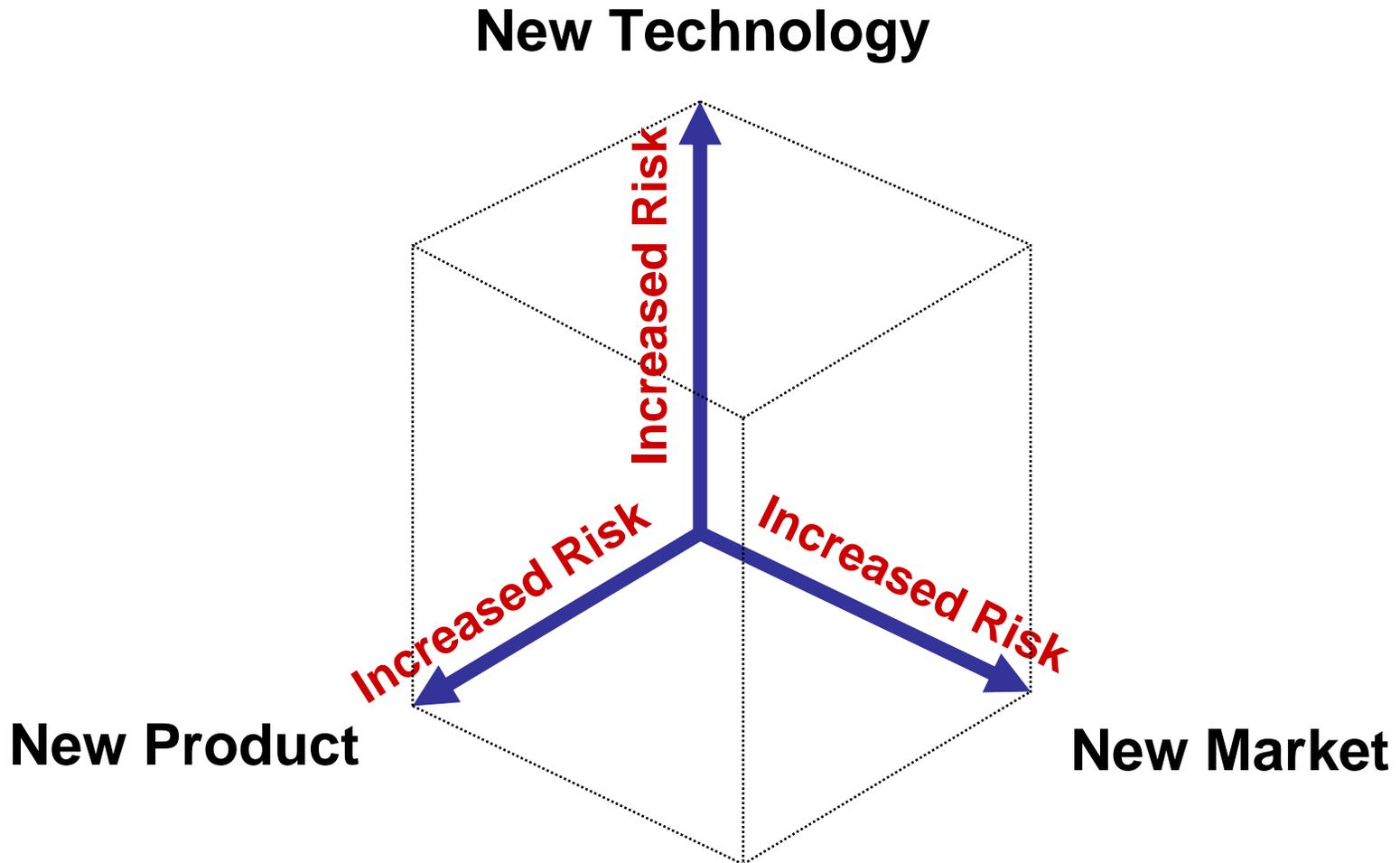
# The Suicide Square

**New Technology**

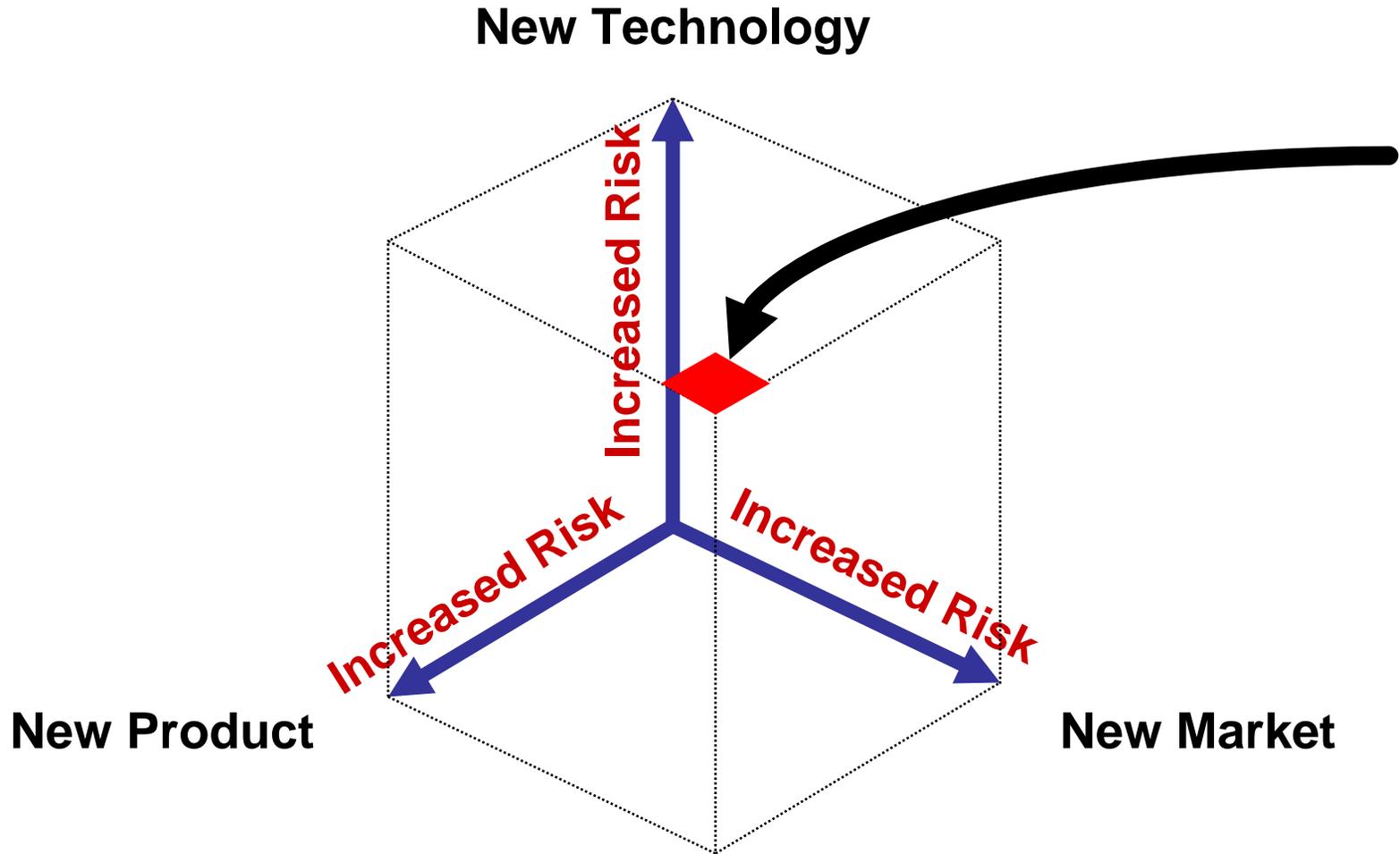


**New Product**

# The Suicide Square



# The Suicide Square



# Failures not merely negligence

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

# Technology Management

- Strategic focus
- Business process

# Technology Strategy vs. Corporate Strategy

- Specify the role technology innovation plays in achieving the firm's overall objectives
- Specify the types of products, markets, applications and technologies for focus
- Identify the company Core Competence

# 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

<b>PRODUCT</b>	<b>MARKET</b>	<b>APPLICATION</b>
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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.

# Business

<b>PRODUCT</b>	<b>MARKET</b>	<b>APPLICATION</b>
	<b>Automotive</b>	

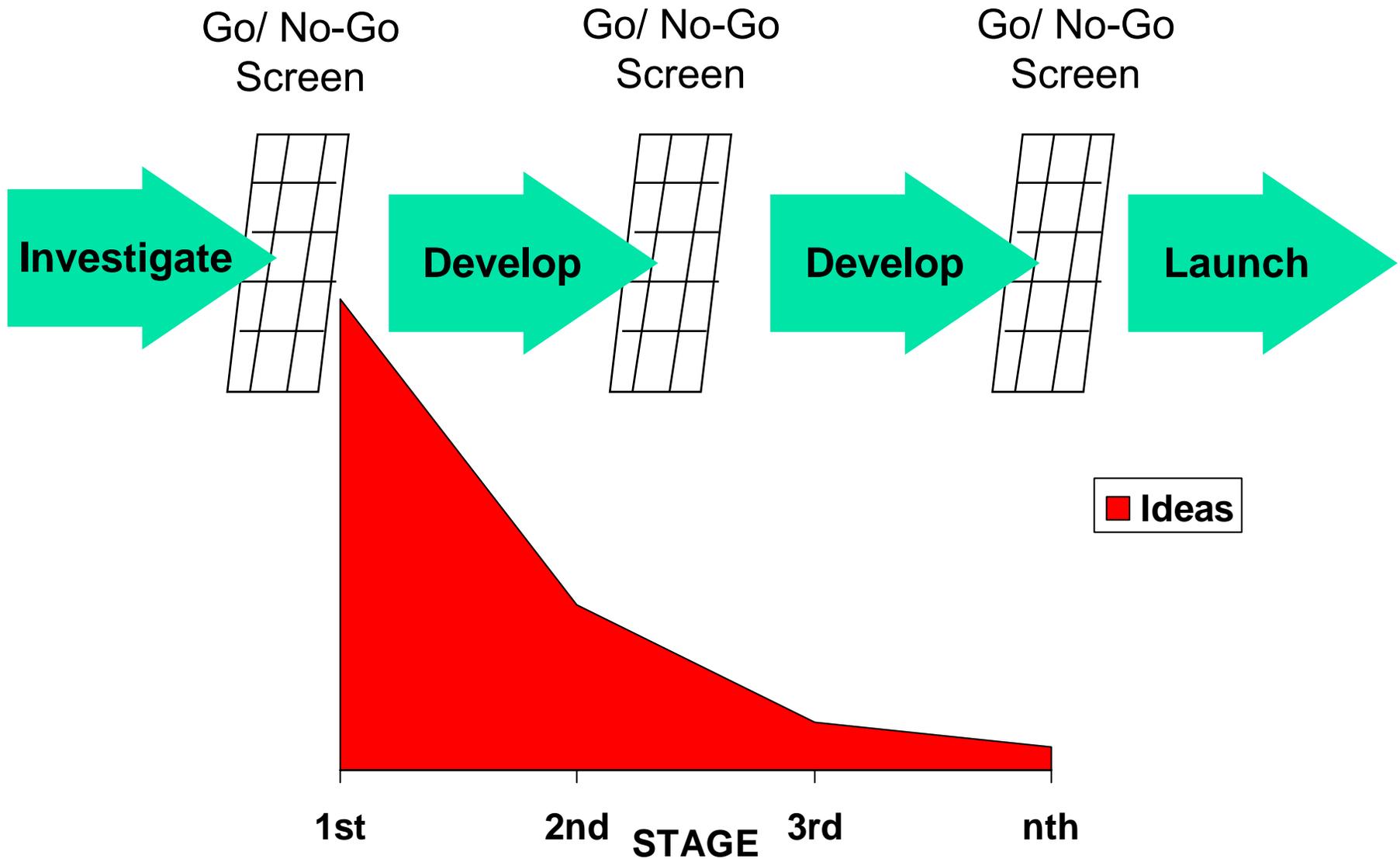
# Business

<b>PRODUCT</b>	<b>MARKET</b>	<b>APPLICATION</b>
<b>Hose &amp; Tubing Assemblies</b>	<b>VW Group GM/ Opel BMW/ Rover Ford</b>	<b>AC Systems</b>

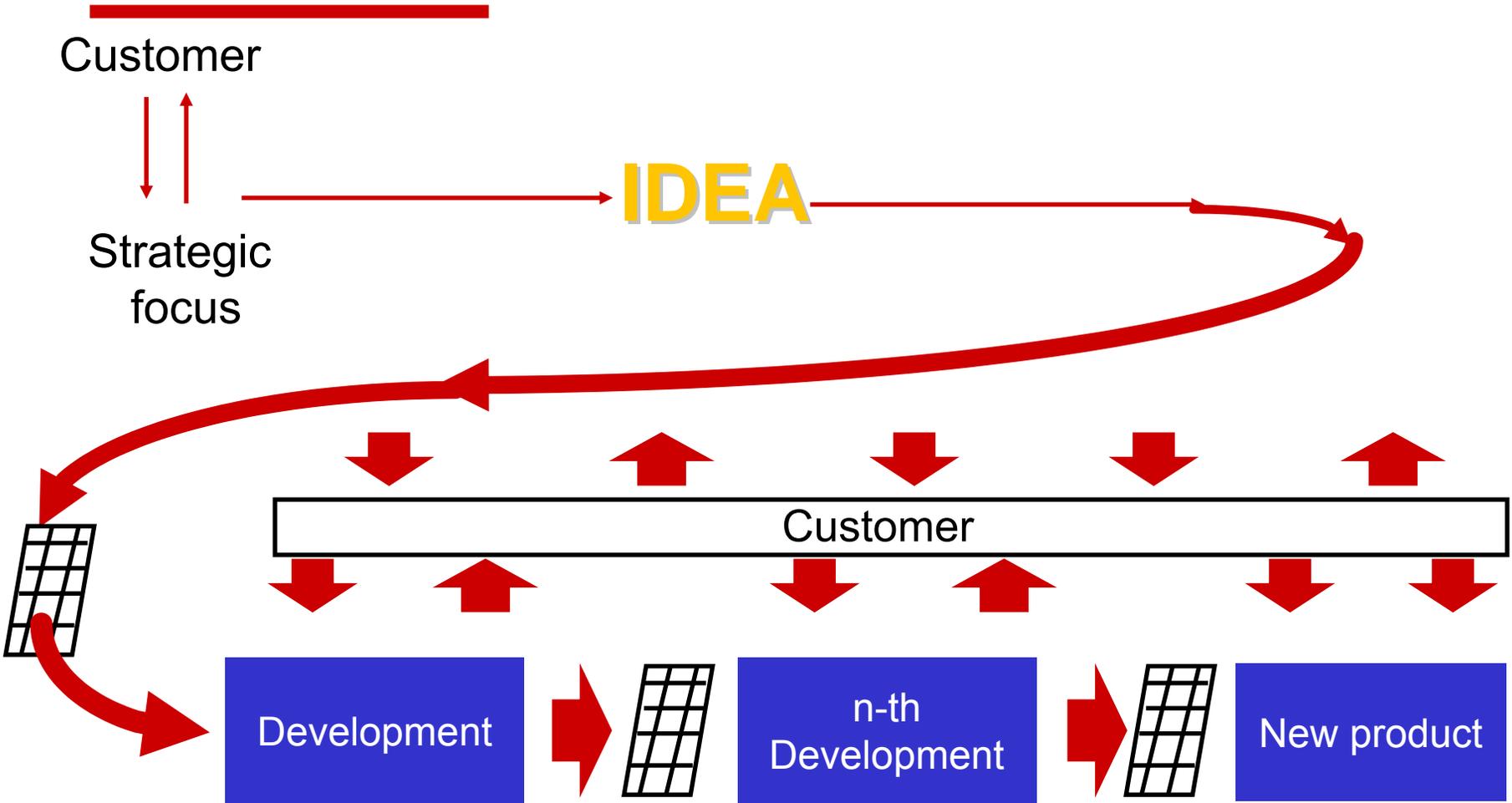
# Strategic Resources: Focus and Risk

- 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



# Modified Stage-Gate with Continuous Customer Interaction



# 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?
  - Is it lower priced or does it reduce costs?
  - Is its market diffusion 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?

# Class Presentation Questions

- What are current Grumman's distinctive technological, marketing or other competency?
- Looking back, what technologies/products/services Grumman should have considered to develop/commercialize?