

Making Technology Happen™

FINDING, EXPLOITING AND MANAGING TECHNOLOGY

Denzil Doyle, Chairman
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www.doyletechcorp.com

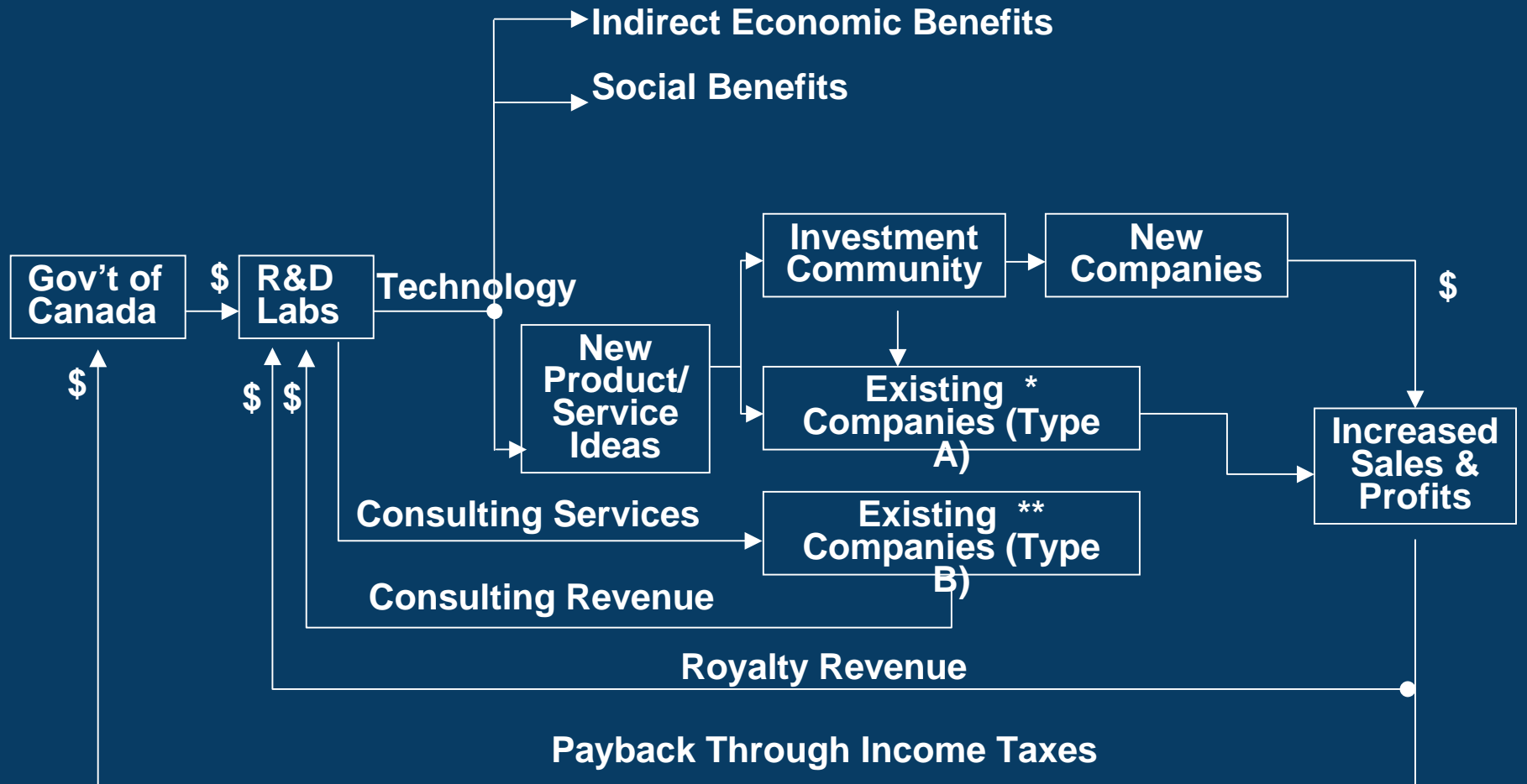
Agenda

- 1. Finding Technology**
- 2. Exploiting Technology**
- 3. Building a Sound Management System**
- 4. The Role of Technology in Canadian Competitiveness**
- 5. Problem Solving Sessions**
- 6. Raising Investment Capital**

“Measuring how well Canada becomes more and more productive at making things that no one wants to buy anymore is like watching a nation of hamsters run faster and faster on little treadmills: in the end they’re exhausted, but exactly where they began”

Excelerate: Growing in the New Economy
- Nuala Beck

Model for Measuring Economic Payback From Publicly Funded R&D Labs



* Type A Companies tend to be SMEs that supply technology-based products and services

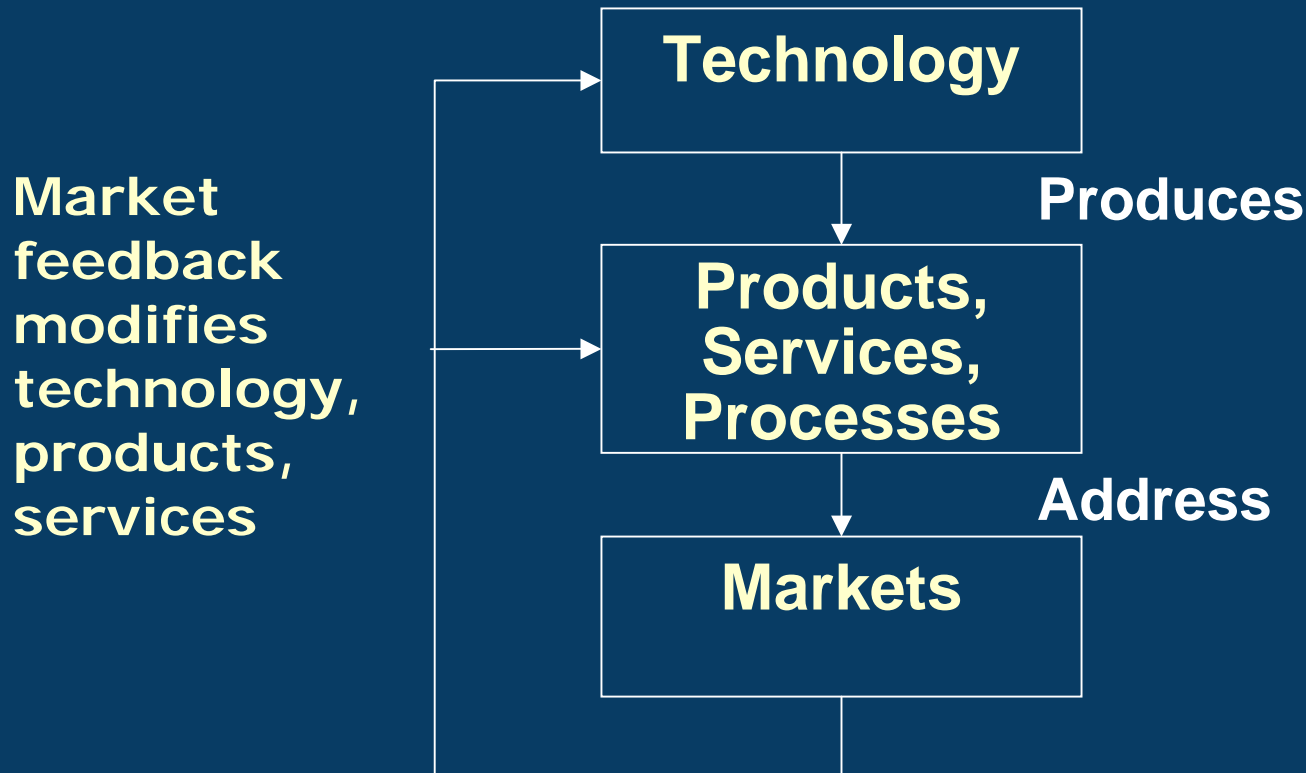
** Type B Companies tend to be MNEs that use technology-based products and services



Identifying Exploitable Technology

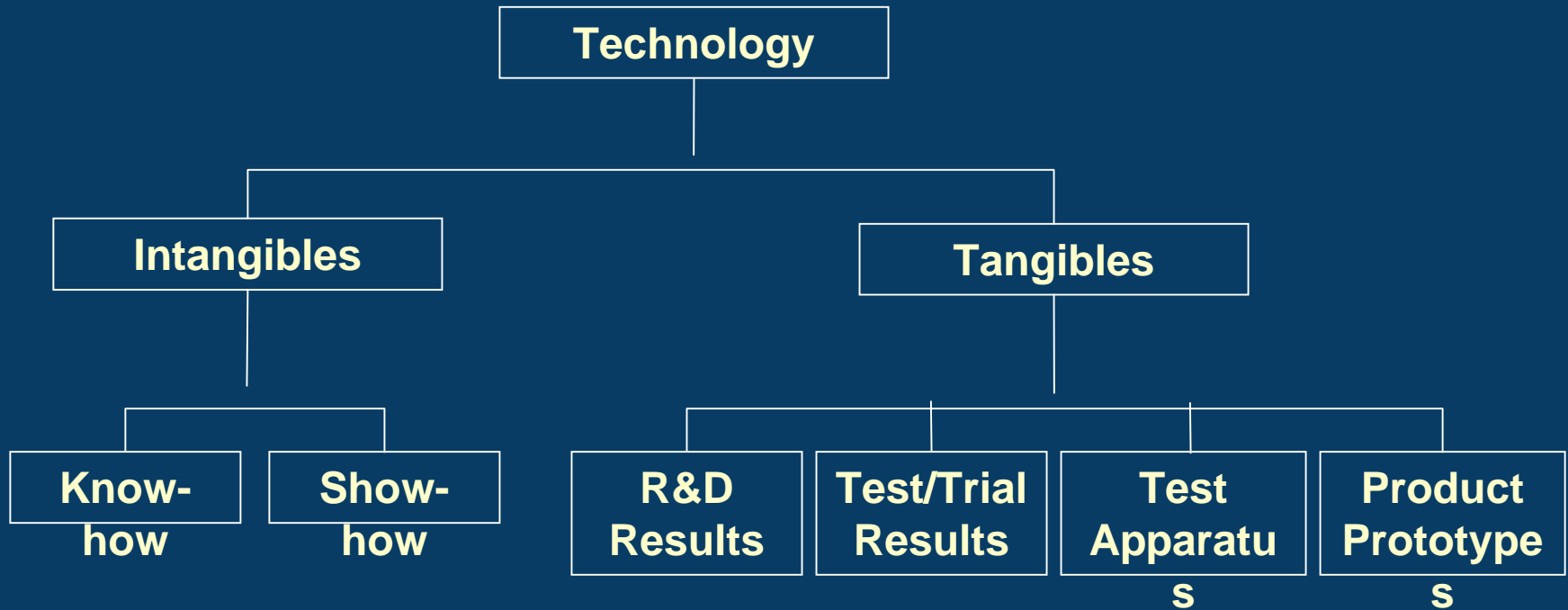
- **Technology → Products → Markets**
- **Only products or services create wealth**
- **Keep asking the question “What is the Product?”**
- **Don’t overlook pure research**

Fundamental Law of Technology Transfer



- Only the sale of products / services creates wealth
- A process can improve products / services

What is Technology?



- Notes:**
- 1) All of the boxes can refer to products, services or processes.
 - 2) Know-how, show-how and R&D results can refer to market as well as products, services and processes.
 - 3) All of the technologies can be protected by: confidentiality agreements, copyrights, trademarks, registered industrial designs, patents.

Some Definitions

- **Product:** A physical deliverable which is defined by fixed specifications and can be sold to several markets.
- **Service:** A non-physical deliverable (e.g. time) which may or may not be defined by fixed specifications and which may or may not be sold to several markets.
- **Process:** A non-physical deliverable which is typically used by a company to deliver (or improve) an existing product or service.
- **Market:** A group of people with a common need, the ability to pay for the satisfaction of that need, and the willingness to do so.

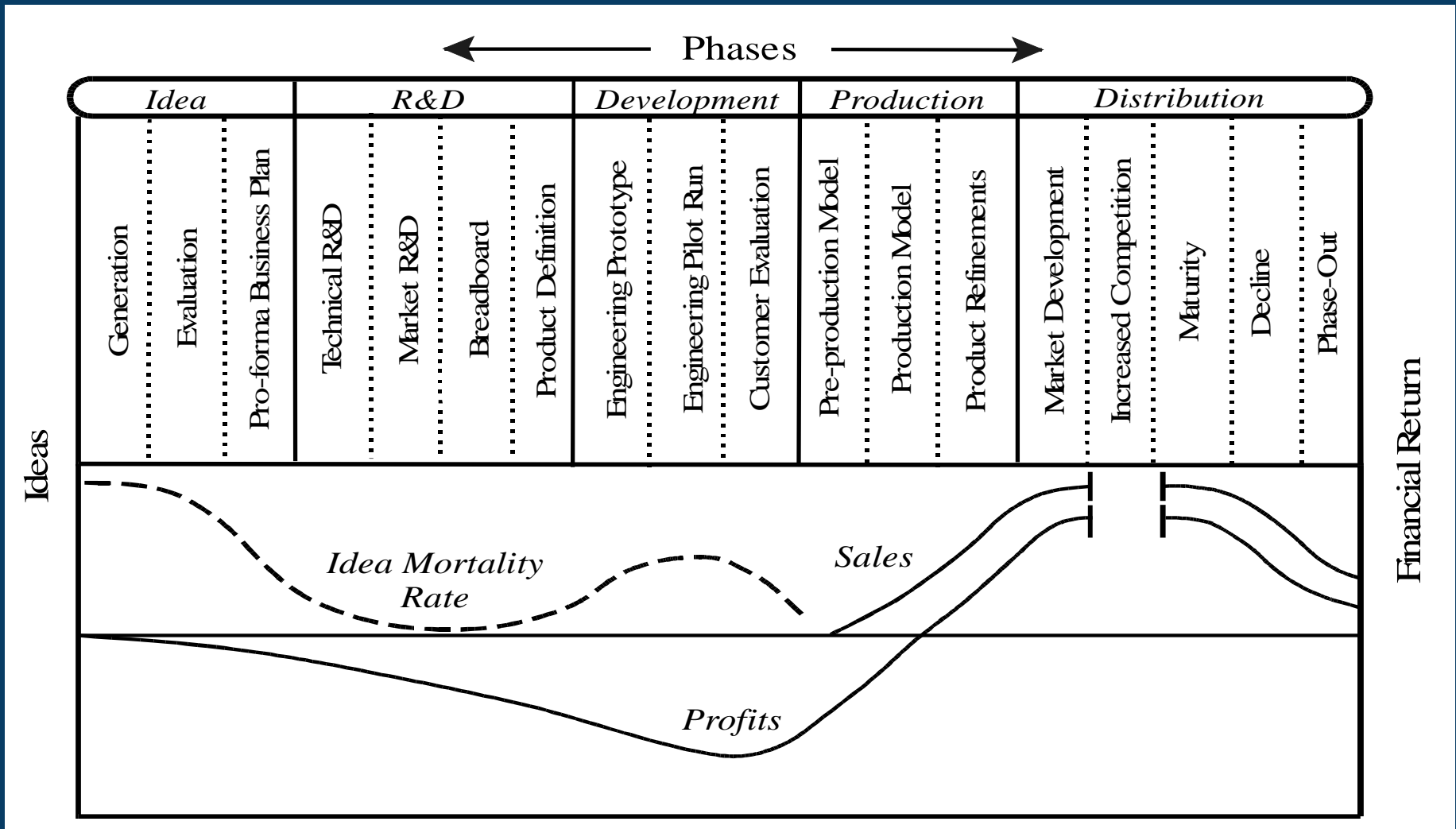
Dialogue with the Scientists

$$= \frac{\partial G}{\partial n} \Big|_{P, T, \dots}$$

$n = \dots$ $kT \ln \left\{ \frac{n}{gV} \right\}$
chemical part of ... heat gas

Dialogue with the Scientists

The Innovation Chain



Dialogue with the Scientists (con't)

- Can your research lead to commercial products or services?
- In what time frame?
- Where does your product fit into the innovation chain?
- If an investor were standing in front of you with \$1M to invest in a new business based on your research, how would you describe the business opportunity to him or her?

Dialogue with the Scientists (con't)

- **What trends do you see in this technology that might influence the kinds of products that might flow from it?**
- **What trends do you see in related technologies that might influence this technology and/or the products that might flow from it?**

Dialogue with the Scientists (con't)

- **What parallels can you draw between your technology and products and others that you have been familiar with in the past?**
- **What types of research do you think you will be doing five years from now if you continue to work in your present field?**

Business Opportunity Documents

- **Business Opportunity:** A simple statement of how an investor will make money from a product, service or process generated by the technology.
- **The Technology:** A brief description of the technology so that potential investors can determine quickly if it fits with their own mission.
- **The Products, Services and Processes:** A brief description of each, along with possible migration strategies.

Business Opportunity Documents (con't)

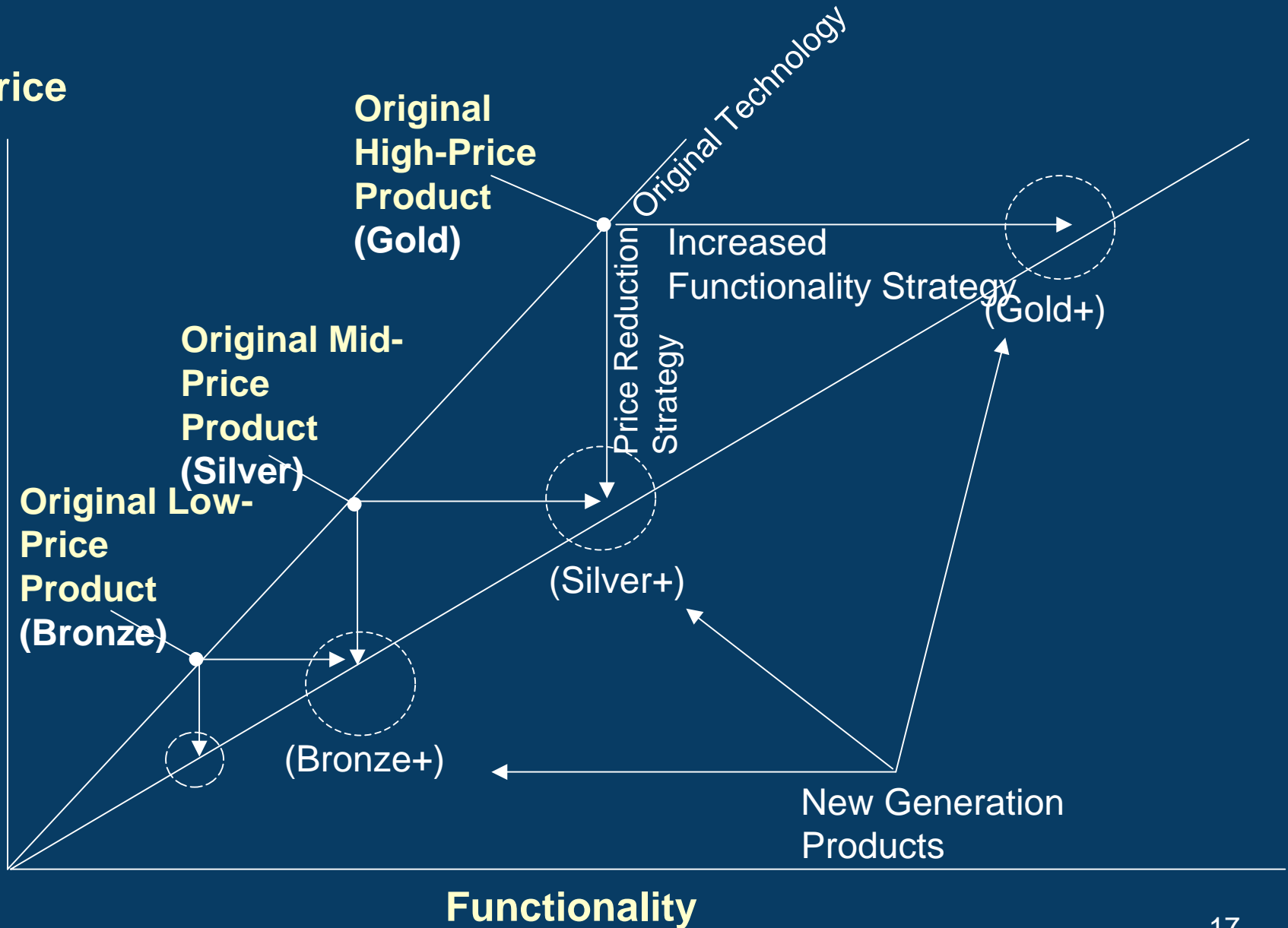
- **The Markets:** Who will purchase the products, services and processes and in what (approximate) quantities.
- **The Investment / Payback:** An indication of how capital intensive the exploitation process is likely to be, the timing and magnitude of the payback.
- **Technology Transfer Possibilities:** How investors might work with the owner of the technology (licensing, sale of technology, consulting arrangements etc.)

Some Fundamentals

- **Be sure you have a product or service**
- **Or a process that can improve existing products**
- **Don't confuse technology with products or services**

Product Migration Strategy

Price



New Venture Business Plan



- **The Opportunity**
- **The Products and/or Services**
- **The Market**
- **Financial Projections**
- **Investment Requirements**

Four Types of Business Plans



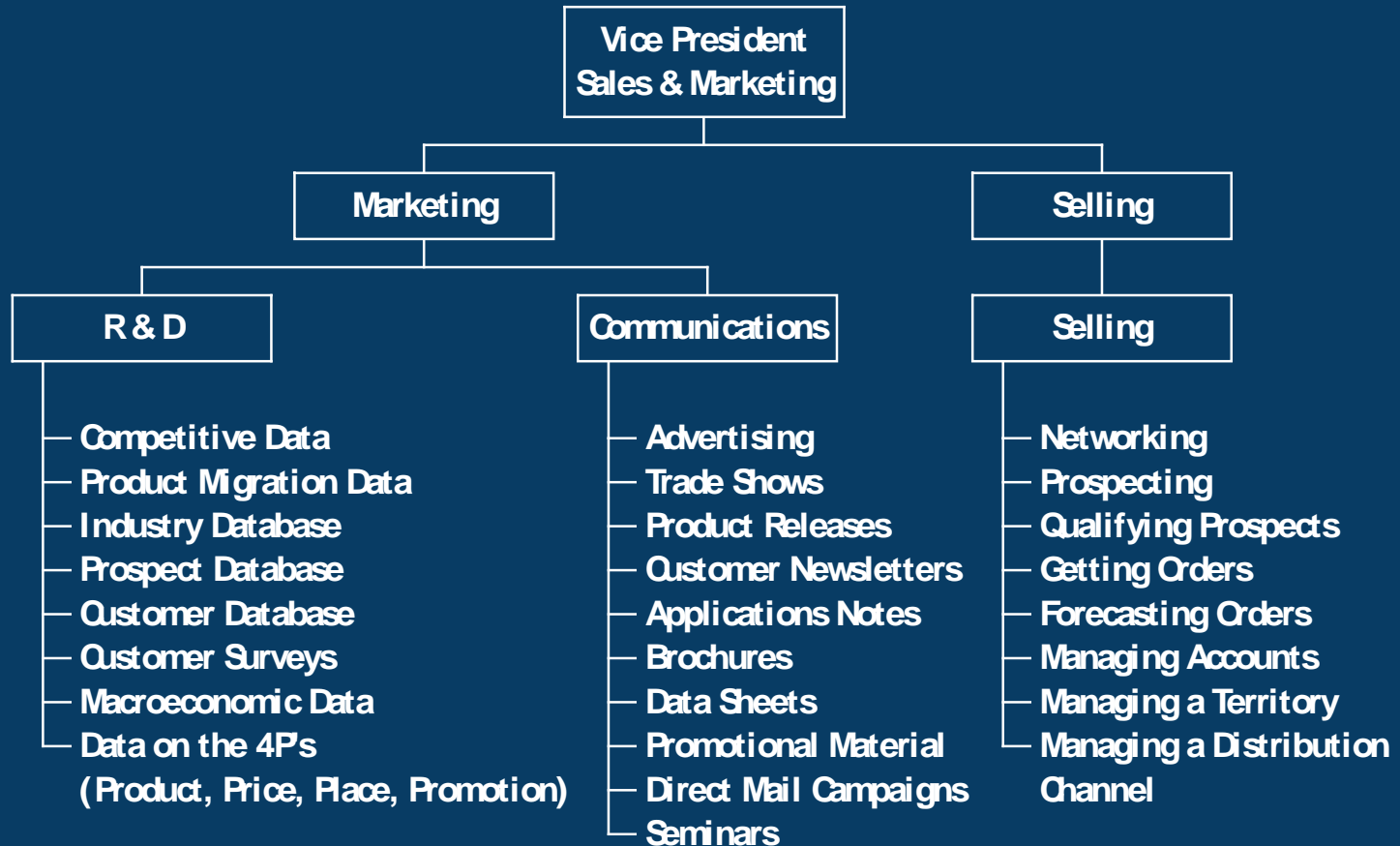
- **New Venture Business Plan**
- **Annually Updated Strategic Plan**
- **Annually Updated Operational Plan**
- **Financing Plan**

Typical Profit & Loss Models

(all figures in %)

	<u>Hardware</u>	<u>Service</u>	<u>Software</u>
Sales Revenue	100	100	100
Cost of Sales (labour, material, overhead)	<u>45</u>	<u>60</u>	<u>20</u>
Gross Profit	55	40	80
<u>Operating Expenses</u>			
Selling (in-house sales force)	5	2	10
Marketing	10	10	20
Engineering	10	5	15
Warranty	5	2	10
General & Administration	<u>8</u>	<u>8</u>	<u>6</u>
Total Operating Expenses	<u>38</u>	<u>27</u>	<u>61</u>
Operating Profit	<u>17</u>	<u>13</u>	<u>19</u>

Functions of Selling & Marketing



Buying Influences

- **Economic Buyer**
 - The person who signs the P.O.
- **User Buyer**
 - The person with the need
- **Technical Buyer**
 - The person who keeps the process honest (e.g. Purchasing Agent)
- **Coach**
 - A person who keeps the communications going

The Language of Marketing

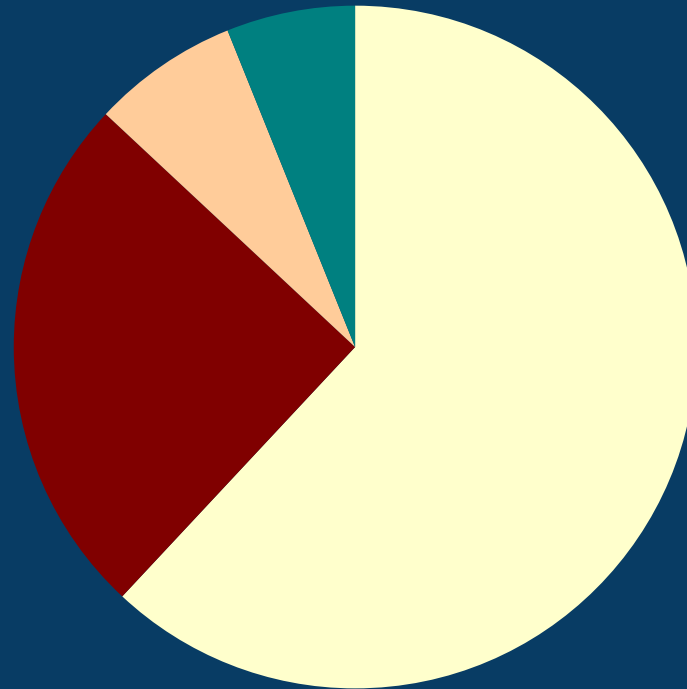
- **Target Markets**
- **Market Segments**
- **Potential**
- **Penetration**
- **Share**
- **Incremental Market**
- **Replacement Market**

Estimating Sales Revenue

- **Identify the target markets**
- **Determine the size of the potential market**
- **Estimate the likely penetration of the potential market**
- **Estimate market share**

Fundamentals of Marketing

Market Potential = Area of Circle



- Untapped Market Potential
- Original Market Penetration
- Replacement Market
- Incremental Market

Revenue Projections

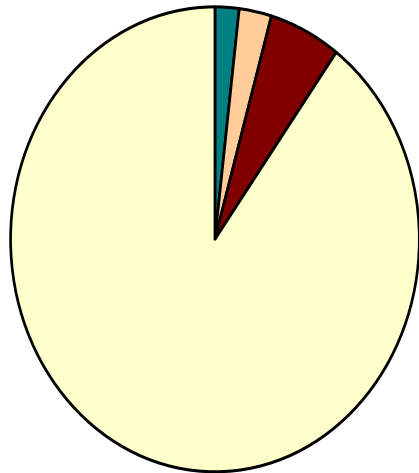
	Year 1		Year 5	
	Percent %	Value \$M	Percent %	Value \$M
Market Size (area of circle)	100	6.60	100	9.20
Incremental Market	2.0	0.13	14.0	1.29
Replacement Market	2.5	0.17	36.0	3.31
Company Share	4.5	0.30	50.0	4.60
Competitor's Share	5.5	0.36	30.0	2.76
Market Penetration	10.0	0.66	80.0	7.36
Untapped Market Potential	90.0	5.94	20.0	1.84

Technology and Market Maturity Matrix

MARKET	New	<p>Fad Markets</p> <p><u>No market stability</u></p>	<p>No Market History and High Technology Risks</p> <p><u>Good profit margins</u></p>
	Old	<p>Proven Markets and Technology</p> <p><u>Low profit margins</u></p>	<p>Some Market History Available</p> <p><u>Good profit margins</u></p>
		Old	New
		TECHNOLOGY	

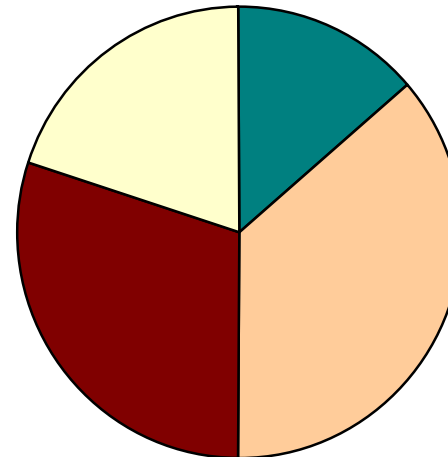
Revenue Projections (con't)

Year 1



- Incremental Market
- Replacement Market
- Competitors' Share
- Untapped Market Potential

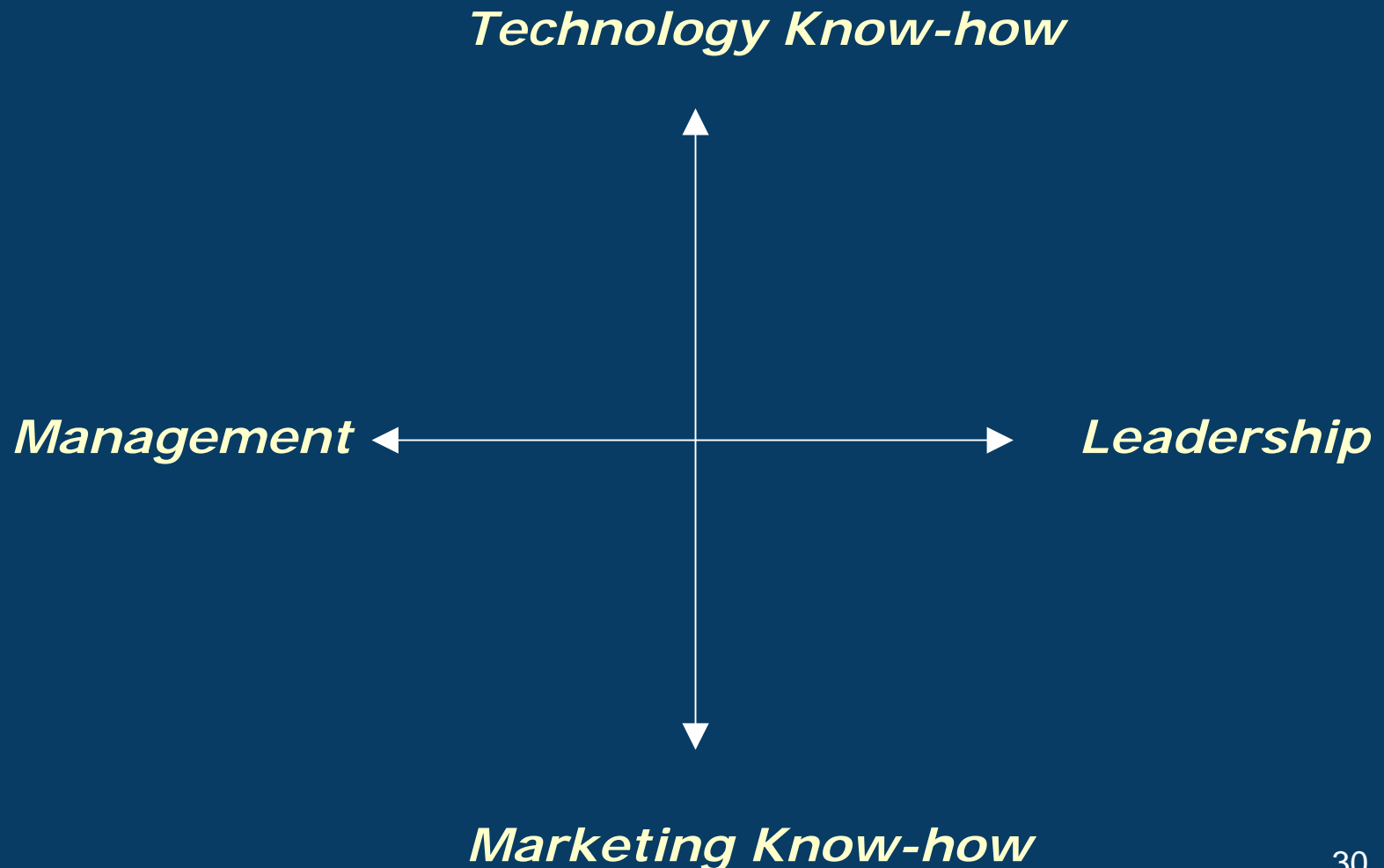
Year 5



- Incremental Market
- Replacement Market
- Competitors' Share
- Untapped Market Potential

You are better off with a good management and a bad product than with bad management and a good product.

The 4 Key Attributes of a CEO



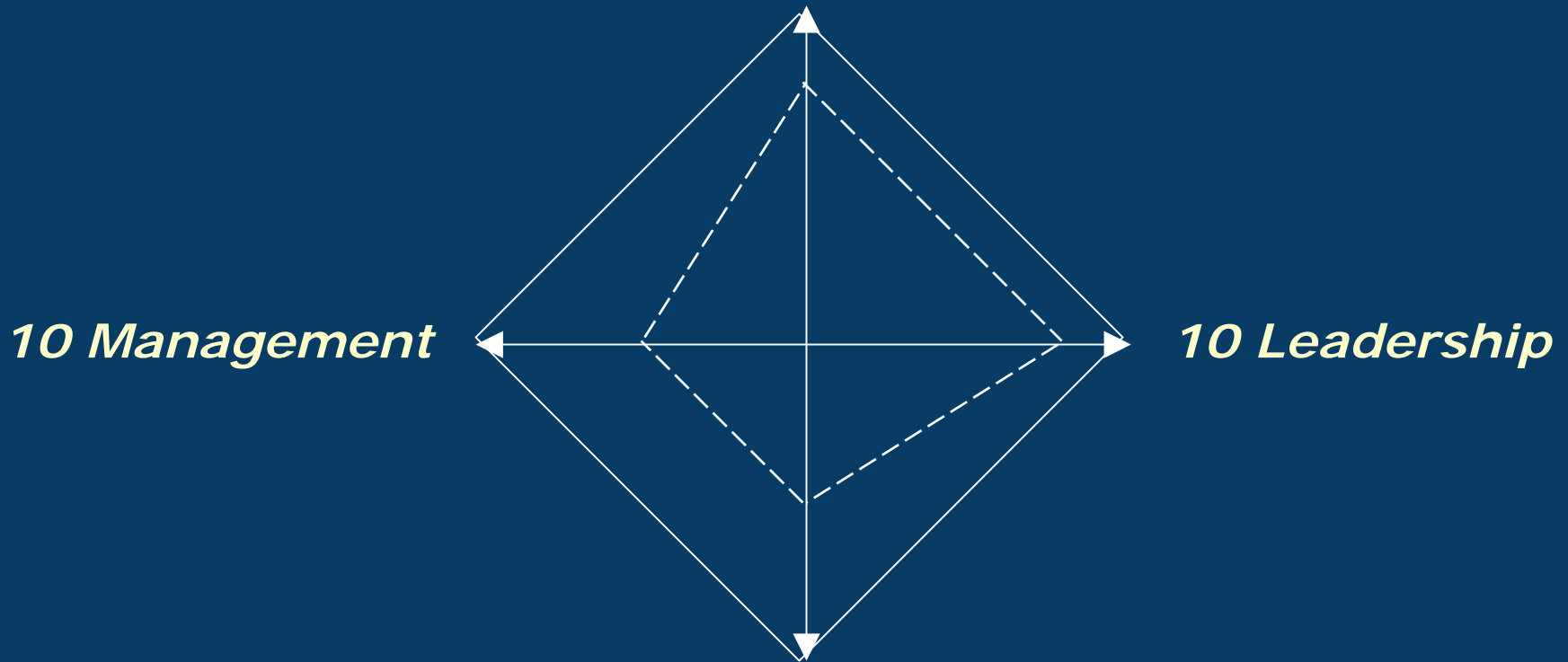
A Rating System

10 Technology Know-how



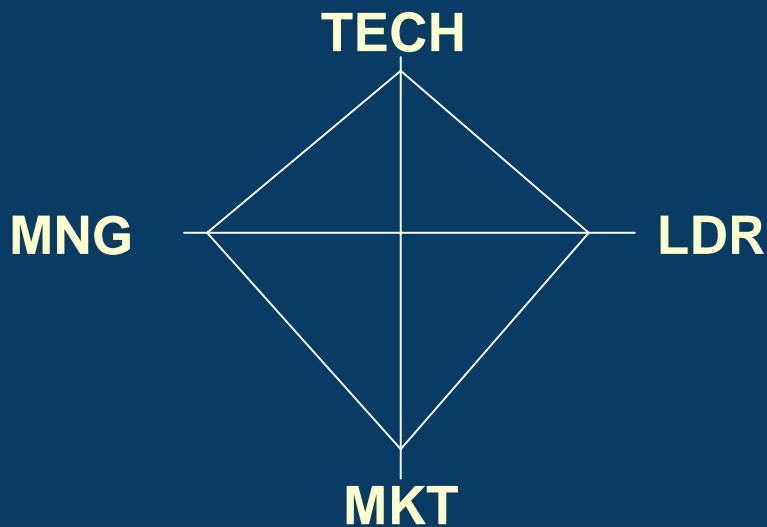
A Typical CEO

10 Technology Know-how



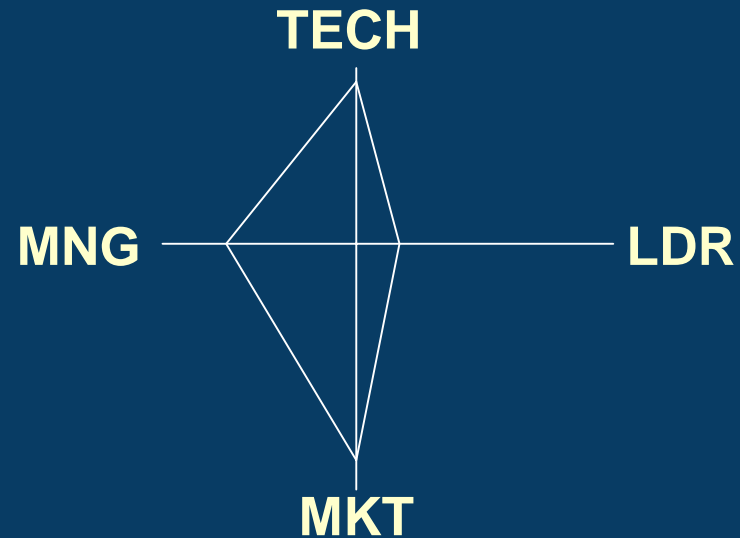
10 Marketing Know-how

Quality Ratings for 12 CEOs



Management	5.3
Leadership	6.8
Technology	7.0
Marketing	7.6

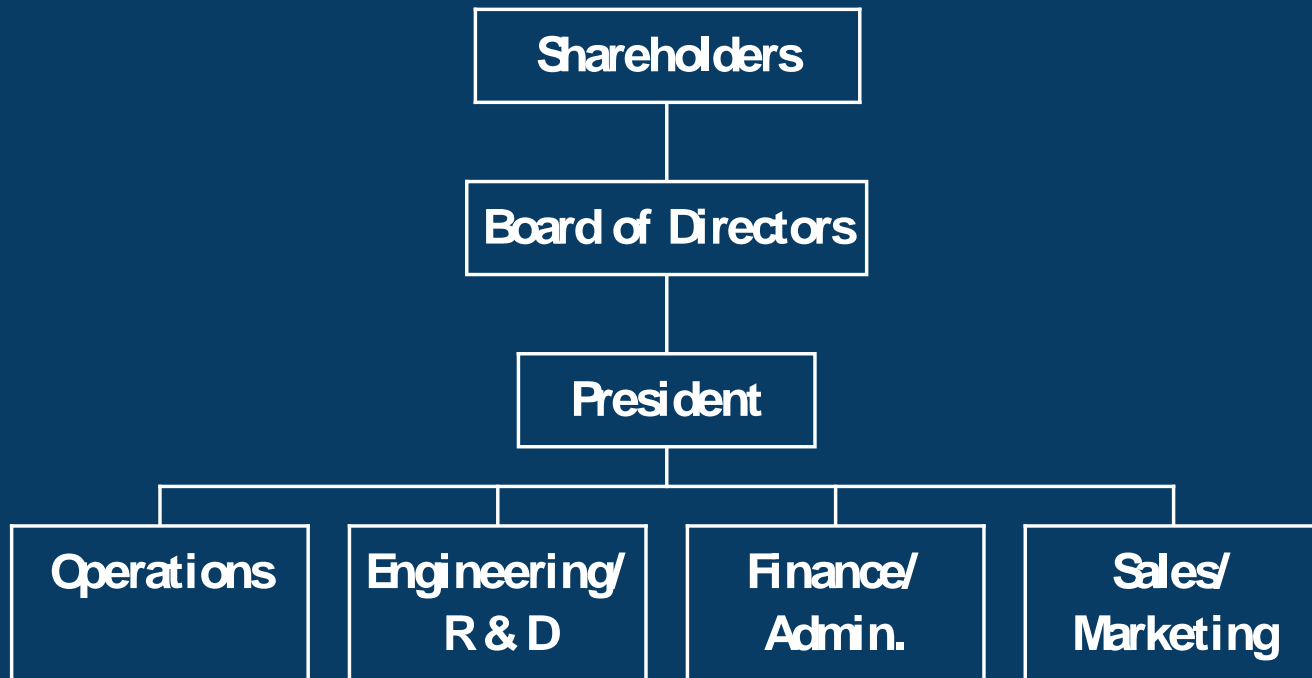
THE SURVIVORS



Management	4.6
Leadership	3.3
Technology	7.2
Marketing	6.5

THE NON-SURVIVORS

The Management Hierarchy



**Discipline can be best administered
by a strong Board of Directors
(or Board of Advisors).**

So...

What does a Board of Directors Do?

Do's and Don'ts for Directors

- **Never operate without a business plan, a budget and a forecasting system**
- **Don't get too far into the kitchen**
- **Don't get too far out of the kitchen**
- **Meet on a regular schedule which is drawn up well in advance**
- **Follow a standardized agenda**
- **Provide mentorship to the President**
- **Board members must do their homework**

Do's and Don'ts for Presidents

- **Never start a fiscal year without a budget**
- **Establish the right span of control for the task at hand**
- **Establish and maintain open communication with the Board**
- **Don't delegate the job upward**
- **Do delegate the job downward**

Do's and Don'ts for Presidents (con't)

- **Have clearly defined corporate policies and a visible corporate culture**
- **Learn to be tough-minded**
- **Learn to communicate in simple language**
- **Learn to fly a desk**

The President's Report

- **Report by Function**
 - **Engineering**
 - **Finance**
 - **Marketing**
 - **Operations / Manufacturing**
- **Report by Profit Centres**
- **Report against Key Objectives**
- **Updated Forecasts**

The Role of the Long Range Plan, the Budget and the Forecast

- **Three different documents**
- **Different functions**
- **Different time horizons**
- **The Budget is the contract**
 - be sure there is a formal sign off
- **Budget should be in line with the most recent forecast**

A Typical Long Range Plan

- Report Against Previous Plan
- Situational Analysis
- Mission Statement
- Product Strategy
- Market Strategy
- Objectives
- Implementation
- Financial Objectives
- Financial Projections
- Problems & Opportunities

Some Pitfalls of Business Planning

- Risk Assessment
- Market Potential
- Market Penetration Capability
- Quality of Inventory
- Quality of Accounts Receivable
- The Relationship between Revenue and Order Intake
- Capitalized R & D and Startup Costs

A Typical Budget

- **Profit & Loss Statements**
- **Cash Flow** (monthly)
- **Balance Sheet** (quarterly)
- **Capital Expenditures** (monthly)
- **Cost Centre Breakdowns** (quarterly)
- **Profit Centre Contributions**

Forecasting

- Forecast at least order intake
- Quantify forecast performance
- Make it part of the measurement system

The 12-Month Rolling Forecast

- **Update Monthly**
- **Forecasts can be for months or quarters**
- **Basic measurement criteria: average deviation of actual forecasts**
- **Can be done for any desired interval - monthly, quarterly, etc.**

Forecast Analysis Sheet

	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3
Bookings Budget	380	515	650	810	2355			
Forecast at the beginning of:								
Month 1	380	515	650	810	2355			
Month 2	300	600	650	810	2360			
Month 3	400	600	600	900	2500			
Q1 Actual	400							
Month 4		600	600	810	2410	900		
Month 5		500	650	810	2360	900		
Month 6		500	700	900	2500	950		
Q2 Actual		500						
Month 7			650	810	2360	900	1200	
Month 8			525	900	2325	900	1200	
Month 9			625	950	2475	950	1100	
Q3 Actual			600					
Month 10				950	2450	920	1000	1400
Month 11				900	2400	900	1200	1500
Month 12				850	2350	850	1100	1400
Q4 Actual				850				
Budget Performance (%) (Actual/Budget) x 100	105%	97%	92%	105%				
Forecast Performance (%) (Actual-Deviation)/Actual x100	90%	93%	92%	94%				

- (1) The "total" figure is the sum of the forecasts during Q1, and the sum of the year-to-date actual & forecasts thereafter.
- (2) "Deviation" is defined as the average of the absolute values of the three forecasts from the actual. Note that forecast performance factor is keyed to "actual" as opposed to "budget" because it is intended to encourage a consistent number in each forecast that turns out to be equal to the "actual" even if it is not the same as the "budget"
- (3) The four-quarter rolling forecast provides increasing visibility of next years performance.
- (4) Variations in a given row or column provide information about future trends in the market and/or the company's competitiveness in the market.
















The Human Resources Factor

- The Hiring Criteria
- Goal Setting
- Performance Review
- Selective Compensation Scheme

How Do You Identify (Recruit) Good Management

- **A track record helps**
- **If no track record, a readiness to accept discipline**

Hiring, Motivating and Developing Good People

Responsibility	Common Sense	Energy Level	Mental Capacity
Achieve Booking Quota			
Manage Existing Accounts			
Develop New Accounts			
Manage Order Processing			
Forecast Bookings			
Submit Monthly Reports			
Maintain Customer Records			
etc.			

Hiring, Motivating and Developing Good People (con't)

- **Design an equity plan**
 - use the LRP as a guide
 - the staircase approach

- **Share purchase plans**

Equity Participation

- Stock Option Plan
for key employees (golden handcuffs)
- Stock Purchases Plan for all employees (instruments of participation)

How to Fly a Desk

- **The tools of self-management**
- **Some basic rules**
- **Handling of paper flow**

The President's Tool Kit

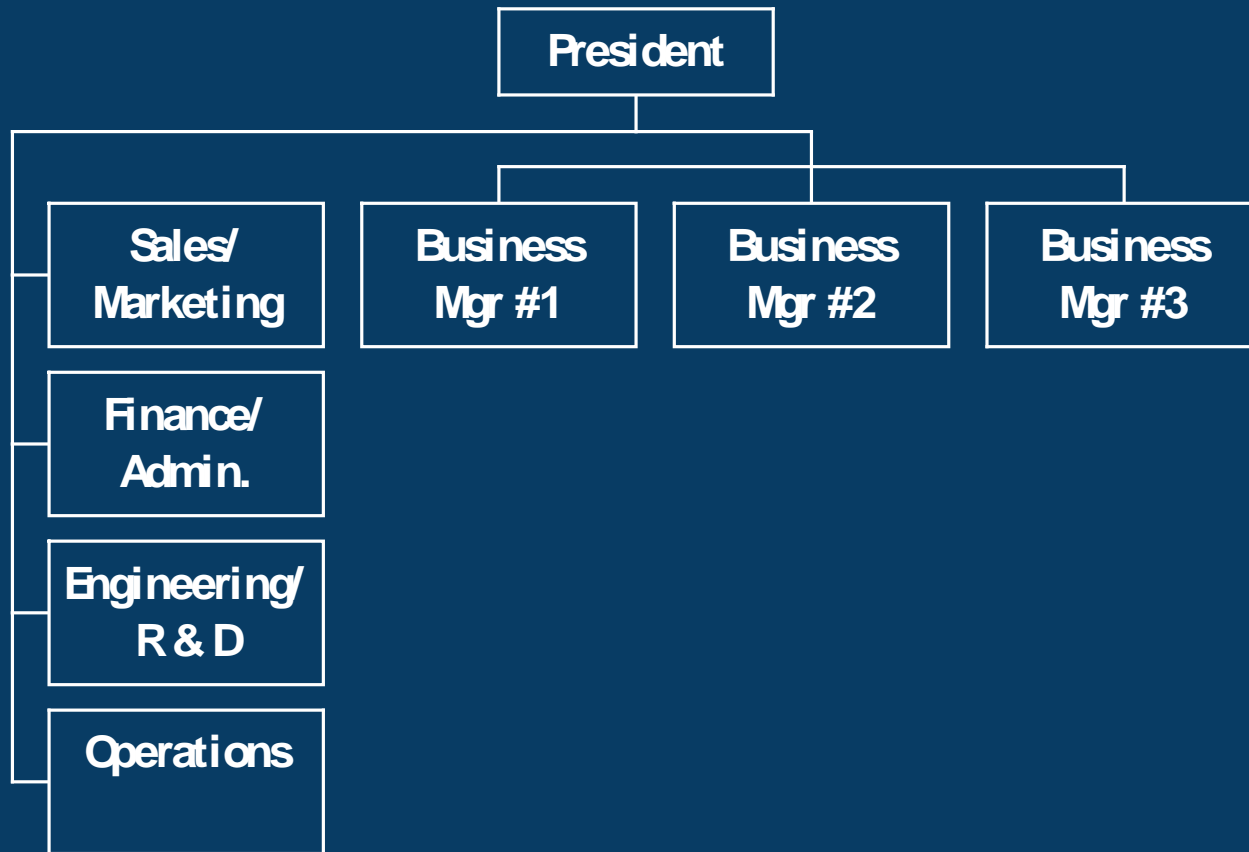
- The fiscal calendar
- The budget package
- The most recent forecast package
- The most recent financial statements
- The company's organization chart
- A section of notes entitled "Items for Board Discussion"
- A section of notes entitled "Management Meeting Topics"

The Director's Tool Kit

- **Background Files**
- **Meeting Files**
- **Notebook**
- **Liability List**

The Management Hierarchy

Corporate Evolution



Technology / Product / Market Pyramids

Technology

Products

Markets

**Narrow Technology / Broad
Markets (preferred business
scenario)**

Technology

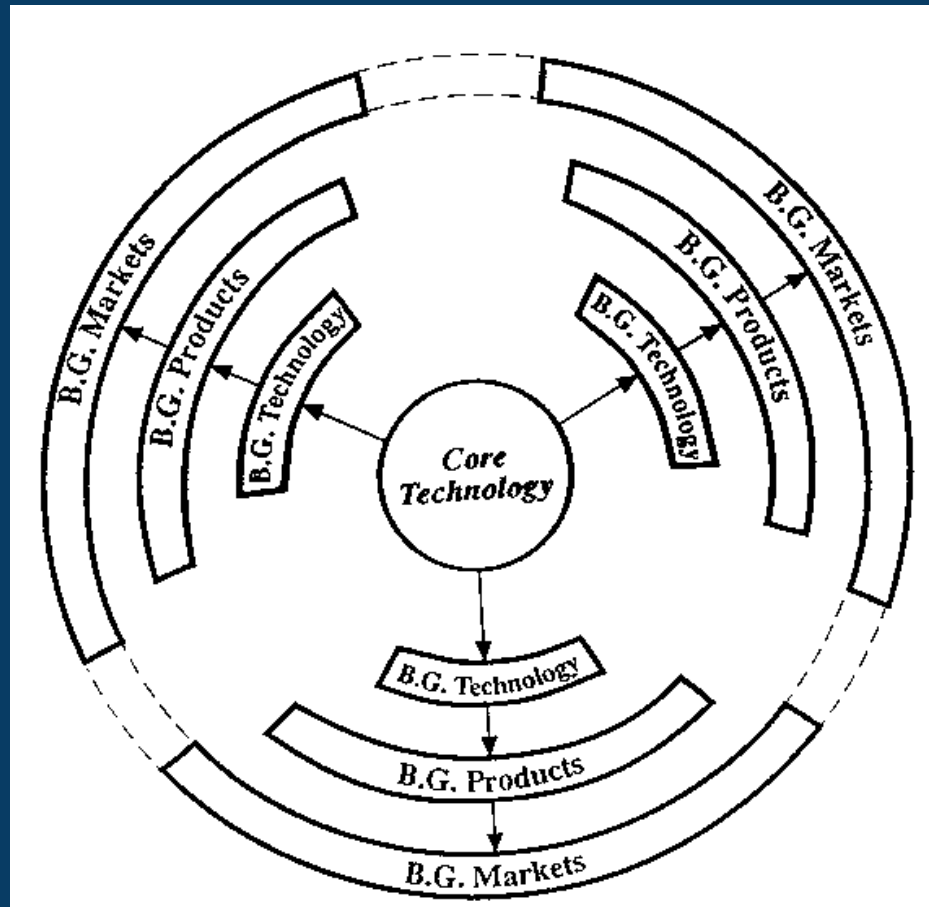
Products

Markets

**Broad Technology / Narrow
Markets (more risky business
scenario)**

The Technology Wheel

Technology / Product / Market Pyramids in a Shared Resource Organization



Some Stimulants to Innovation

- Lateral thinking
- A sense of history
- Informality in the communication channels
- Visible awards for success in innovation
- Forgiveness for failure
- Penalties for not trying
- Equate problems with opportunities

Some Impediments to Innovation

- Failure of nerve (e.g. peer pressure)
- Committee syndrome
- Failure of imagination (e.g. President Roosevelt's Committee 1937)
- Bureaucratic management style

Ensure That There Is A Forum

- **Use the senior executives committee**
- **Ensure that everyone understands the process**

Don't Blame It On Lack Of Resources

- **Good ideas will attract the required financing**
- **The only reason why a new company is formed is because an existing company did not have a product migration strategy**

How To Maintain An Innovative Environment

- Encourage Strategic Thinking
- Insist upon clearly defined product migration strategies
- Don't blame it on a "lack of resources"
- Ensure that there is a forum for proposals
- Encourage serious proposals
- Discourage frivolous proposals

Encourage Strategic Thinking

- Long Range Plan
- Budget
- Forecast
- Business Cases

1865 Editorial in the Boston Globe

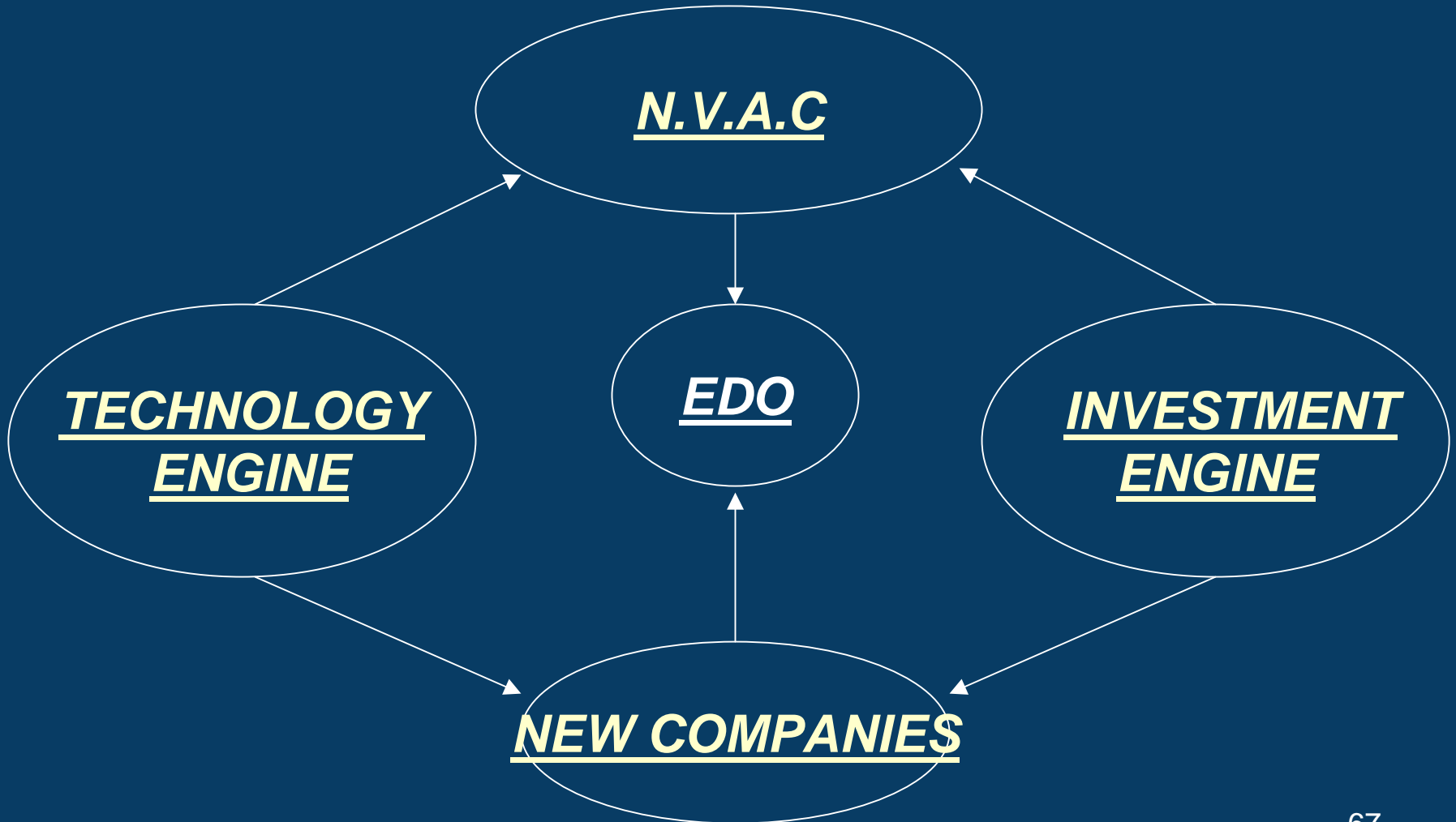
Applauding the arrest of Joshua Coopersmith who had been trying to raise funds to develop and manufacture telephones...

“Everyone knows that it is impossible to transmit the human voice over wires, and were it possible to do so, the device would be of no practical value.”

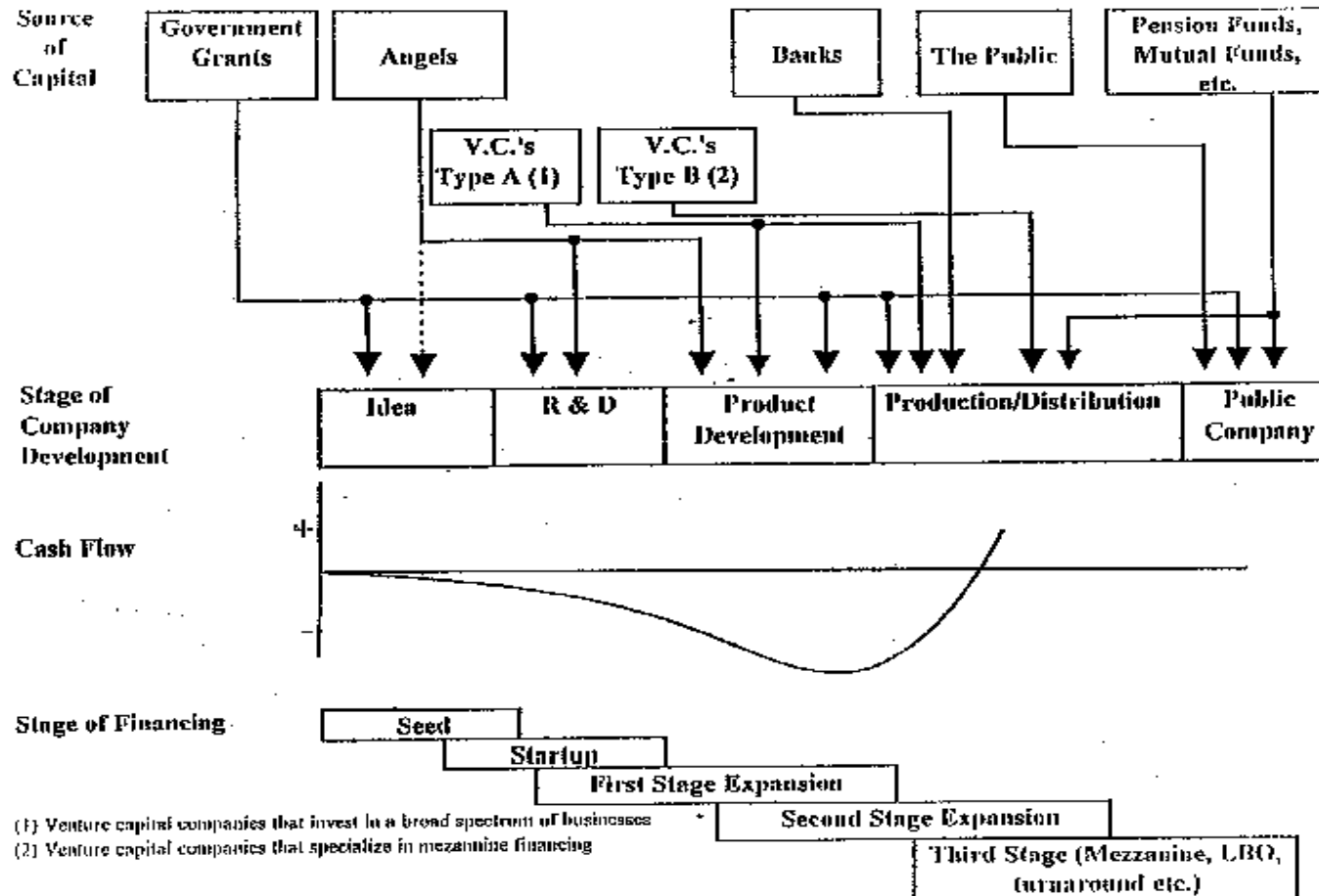
Investment Proposal Format

- Executive Summary
- Industry
- Business of the Company
- Products
- Sales and Distribution
- Competition
- Production
- Management
- R & D
- Financial Information
- Ownership
- Term Sheet
- Due Diligence Process
- Summary

A Role for the EDO



High Technology Investment Spectrum



The Reality of Making Technology Happen

