

# Project Evaluation

Chapter 1 (cont.) and Chapter 2



School of Economics and Management

TECHNICAL UNIVERSITY OF LISBON

SINCE 1911

# What is an Investment Project?

- a proposal to allocate scarce resources to produce or increase production of certain goods or services

# Investment project includes

- Resources to be allocated (and costs)
- Expected benefits (by periods of time)
- Way to fund the investment and related conditions
- Technical aspects
  - Our perspective will be:
    - Project preparation
    - Project analysis

# Investment Analysis and other knowledge domains

- Accounting
- Finance
- Firm Strategy
- Economics
- Engineering
- Etc.
  - An interactive process

# Project Appraisal: perspectives

- **Financial** (costs and benefits evaluated in monetary units; some difficulties to convert in monetary units)
- **Private**
- **Economic**
- **Social**
- **Environmental**

# Management Decisions

INVESTMENT	How to allocate scarce resources among alternative goals
FUNDING	How to obtain the funding need for the project?
DIVIDEND POLICY	How to distribute profits between reinvesting and paying stockholders?

# Main decision making tools

PRESENT VALUE	Value of the firm/project depends on expected cash flows discounted according a specific rate (risk and capital structure)
Financial Demonstration	Based on financial accounts
Risk-returns	Higher risk → Higher return
Valuation of Alternatives	Delay? Abandon? Expand? (options related with the project)

# Concepts

- Capital Opportunity Cost
- Real ( or Industrial) Investment (concept)
- Real Investment Analysis



# Investment Analysis and Opportunity Cost

Economic Rationality states that an individual will change present benefits for future benefits if she/he considers that the value of the latter is higher than the value of the former

# Real Investment

- Is also named industrial or economic investment
- Is the investment made to create conditions to produce goods and services. Examples:
  - Investment in new equipment
  - Investment in new branches (by a bank)

NOTE: being 'real' investment depends not on the acquired asset but on the purpose for which the asset is acquired

# Real Investment

- Is a change between a present satisfaction (associated with costs) and a future benefit ( associated with expected and uncertain benefits).  
It has as goal the production or distribution of goods or services .

# Financial Investment

- Is associated with financial allocation of savings with the goal of obtaining a return
- In our sessions only real investments will be studied

# Real or financial?

- A firm purchases a building ...
  - Real if the building is to install a firm office
  - Financial if is a way apply the profit to the building with future profit expectations
- A firm purchases stocks in the Stock Market
  - Real if the firm purchases the stocks to obtain services of distribution of the own products
  - Financial if the firm acquire the stocks just to obtain further profits

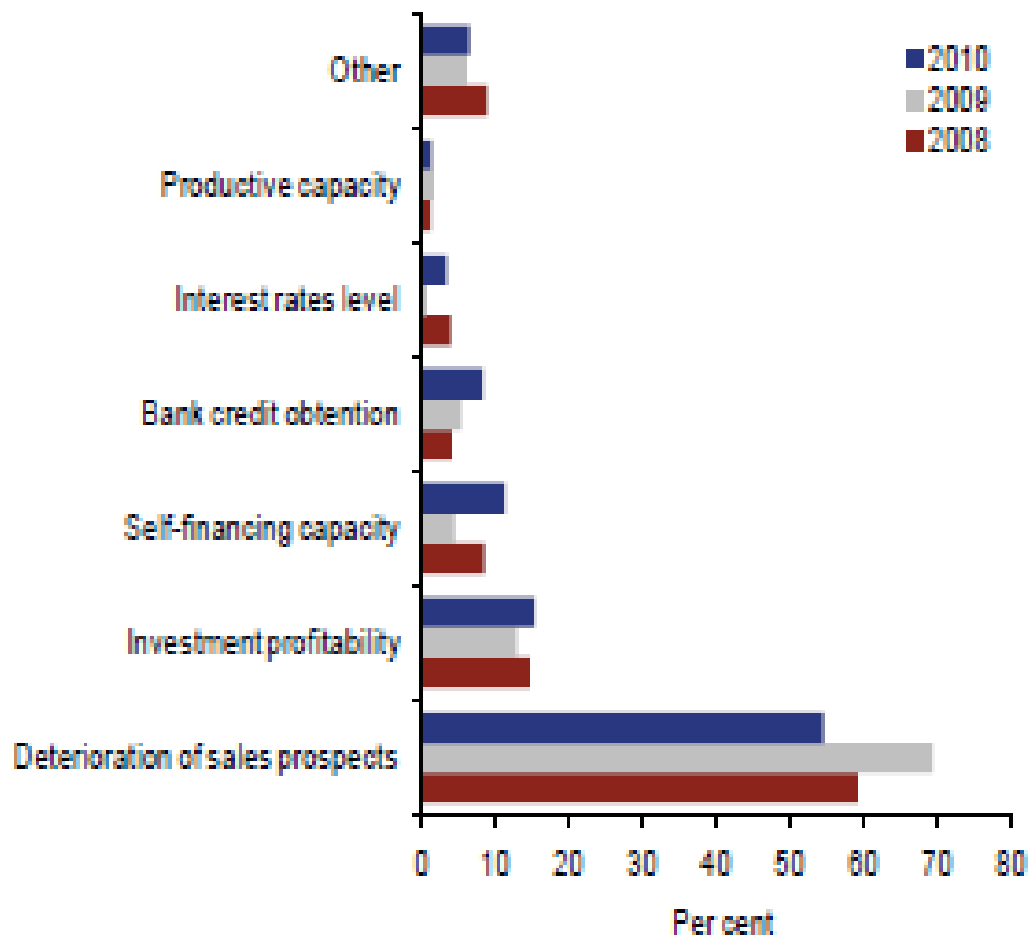
In brief: it depends on the firm motivation

# What is the main limiting factor for investment?

1. Investment profitability
2. Deteriorations of sales prospects
3. Self-financing capacity
4. Bank credit
5. Interest rate level
6. Productive capacity
7. Other

Source: INE Investment survey

**MAIN LIMITING FACTOR FOR INVESTMENT | AS  
PERCENTAGE OF THE TOTAL NUMBER OF COMPANIES WITH  
INVESTMENT LIMITATIONS**



**Source:** *INE* (Investment survey).

**Note:** The results presented for each year are based on the first Investment Survey published in the subsequent year.

# Summary

## **Chapter 2 – Investment and Business Strategy**

1. Introduction
2. Strategic Process
3. Strategic Analysis
4. Case Studies (VF and Reports)



# Strategic Analysis

- ❑ Strategic Analysis studies the internal and external context of investment
- ❑ Helps to forecast future financial flows
- ❑ Helps to estimate the useful life of the project (investment)
- ❑ Contributes to analyzing the risk factors associated with Investment

# Strategic Analysis

## Some Tools

### General Tools

- **SWOT Analysis**
- **Porter's Analysis**

### Specific Tools:

- **Experience Curve**
- **Product/sector lifecycle**
- **BCG (Boston Consulting Group) Matrix**

# ANÁLISE SWOT

(**S**trengths, **W**eaknesses; **O**pportunities; **T**hreats)

- External Environment
  - General
  - Operational (firm/industry-sector)
- Internal Environment
  - Ambiente interno

# SWOT (Portuguese Biomass Sector)

	<b>Strengths</b>	<b>Weaknesses</b>
<b>Internal</b>	<p>Development of rural areas.</p> <p>Creation of direct and indirect jobs.</p> <p>Diversity of energy supply.</p> <p>Reduction of soil erosion during the replacement of energy fields by farmland.</p> <p>Independence from fossil fuel markets.</p> <p>Storage potential and possibility of generation prediction.</p>	<p>Possibility of affecting the quality of soil, air, water and biodiversity.</p> <p>Possibility of using land that could be needed for food production.</p> <p>Dependence on external conditions of climate and pest attacks, during the production of primary source.</p> <p>Reduced experience with dedicated energy crops.</p> <p>Dependence of land availability</p> <p>Economic viability dependent of regulated tariffs.</p> <p>Cost of primary source.</p> <p>High investment costs.</p>
	<b>Opportunities</b>	<b>Threats</b>
<b>External</b>	<p>Biomass is a heterogeneous energy and can be interesting for specific markets.</p> <p>Market growth perspectives.</p> <p>Energy and climate change priority on policy agenda.</p> <p>Revenues still protected by feed -in tariffs and by ensured access to the grid.</p> <p>Growth of RES plants of variable output requiring backup technologies.</p>	<p>Competition with fossil fuels and other renewable sources.</p> <p>Instability of the energy market and liberalization trend of the market and of the tariffs.</p> <p>Possibility of social opposition.</p>

Fonte: Carneiro and Ferreira (2012)  
RES=Renewable Energy Source

# SWOT - Strengths, Weaknesses; Opportunities; Threats

(example shoes production)

<p><b>S</b>trengths</p> <p>Market International experience Technology (Technological Centers) Easy model copy Flexible productive process</p>	<p><b>W</b>eaknesses</p> <p>Distribution Short term management No Portuguese brands</p>
<p><b>O</b>pportunities</p>	<p><b>T</b>hreats</p>

# SWOT - Strengths, Weaknesses; Opportunities; Threats

<p style="text-align: center;"><b>S</b>trengths</p> <p>Market International experience Technology (Technological Centers) Easy model copy Flexible productive process</p>	<p style="text-align: center;"><b>W</b>eaknesses</p> <p>Distribution Short term management No Portuguese brands</p>
<p style="text-align: center;"><b>O</b>pportunities</p> <p>Re-allocation to low cost economies Products with more added value</p>	<p style="text-align: center;"><b>T</b>hreats</p> <p>Competition from other countries (costs) Raw materials dependency Raw materials price variations</p>

# Strategic Analysis Tools

## General Tools

- SWOT Analysis
- Porter Analysis

## Specific Tools

- Experience Curve
- Product/Sector Cycle
- BCG (Boston Consulting Group) Matrix

# Porter's Analysis

## Structural Analysis of Competition

### 5 threats

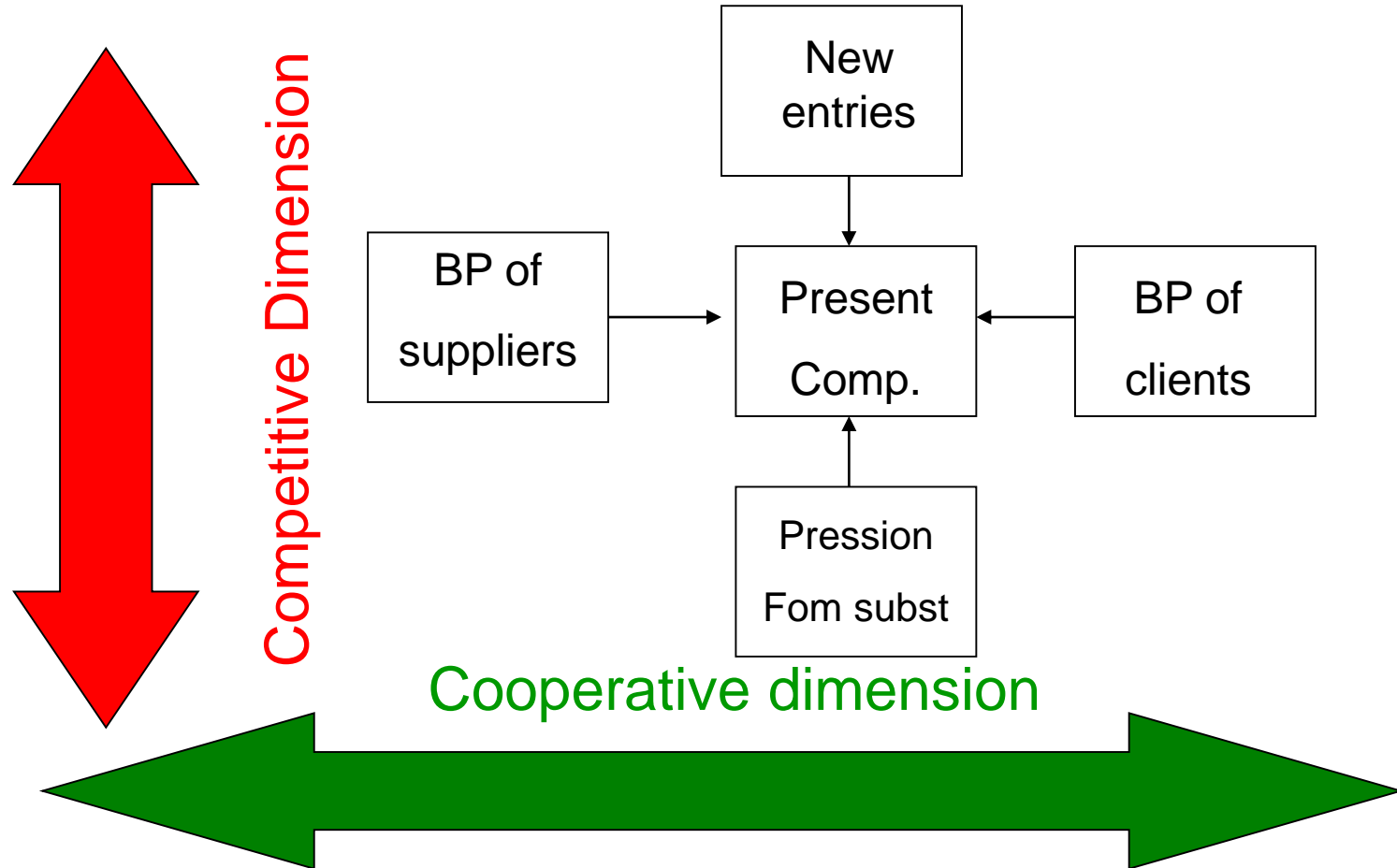
- Entrance of new competitors
- Bargaining power of clients
- Bargaining power of suppliers
- Threat of substitute products
- Competition (firms)

*Michael Porter*

*<http://drfd.hbs.edu/fit/public/facultyInfo.do?facInfo=bio&facEmlId=mporter>*



# Porter's Analysis



# Strategic Analysis Tools

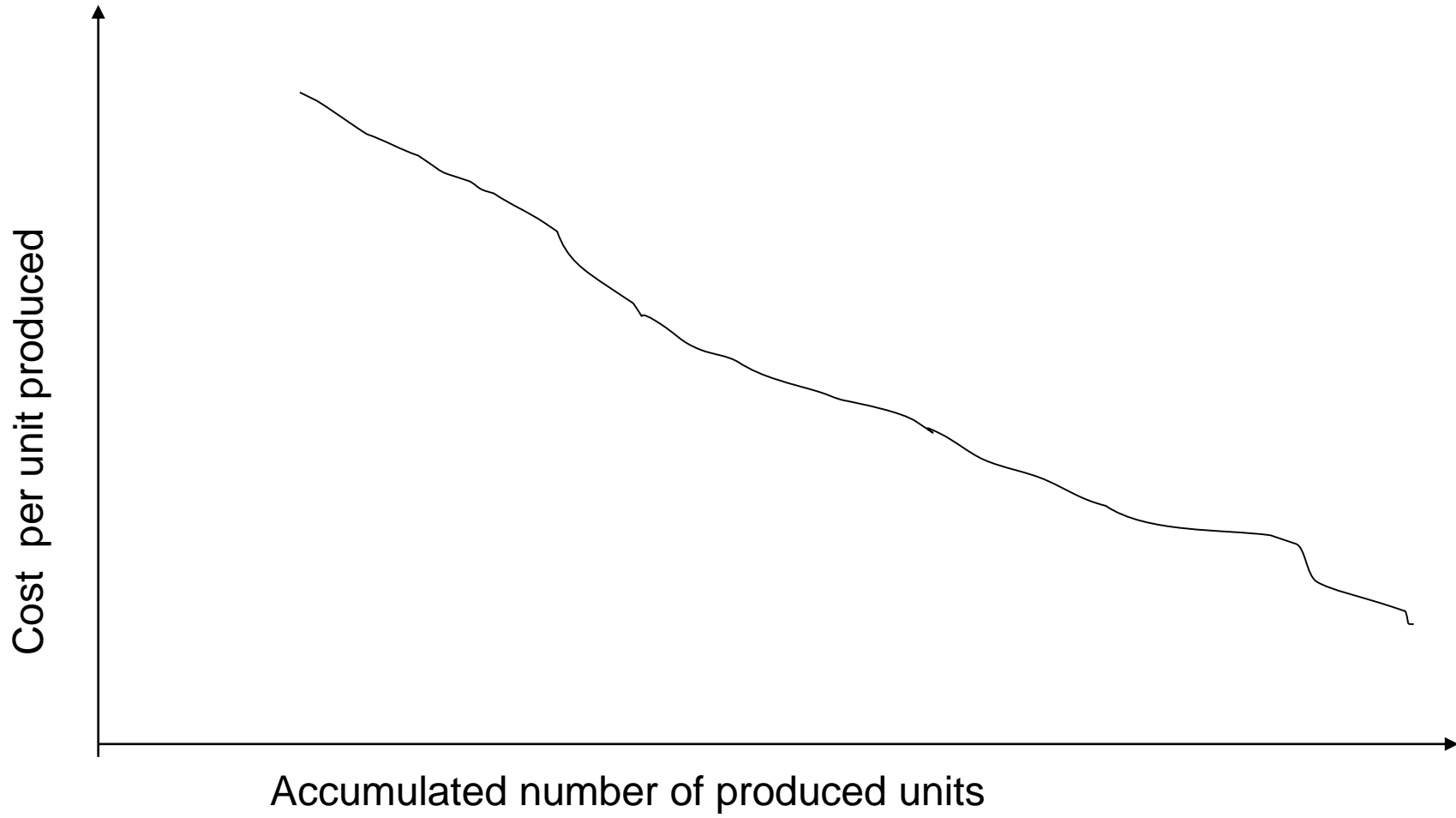
## General Tools

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## Specific Tools

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# Experience Curve



# Strategic Analysis Tools

## General Tools

- SWOT Analysis
- Porter Analysis

## Specific Tools

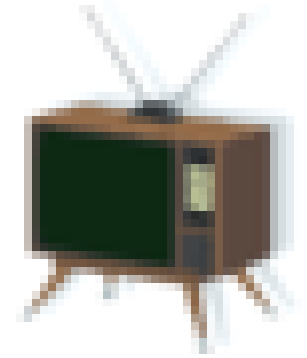
- Experience Curve
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# Product Life Cycle

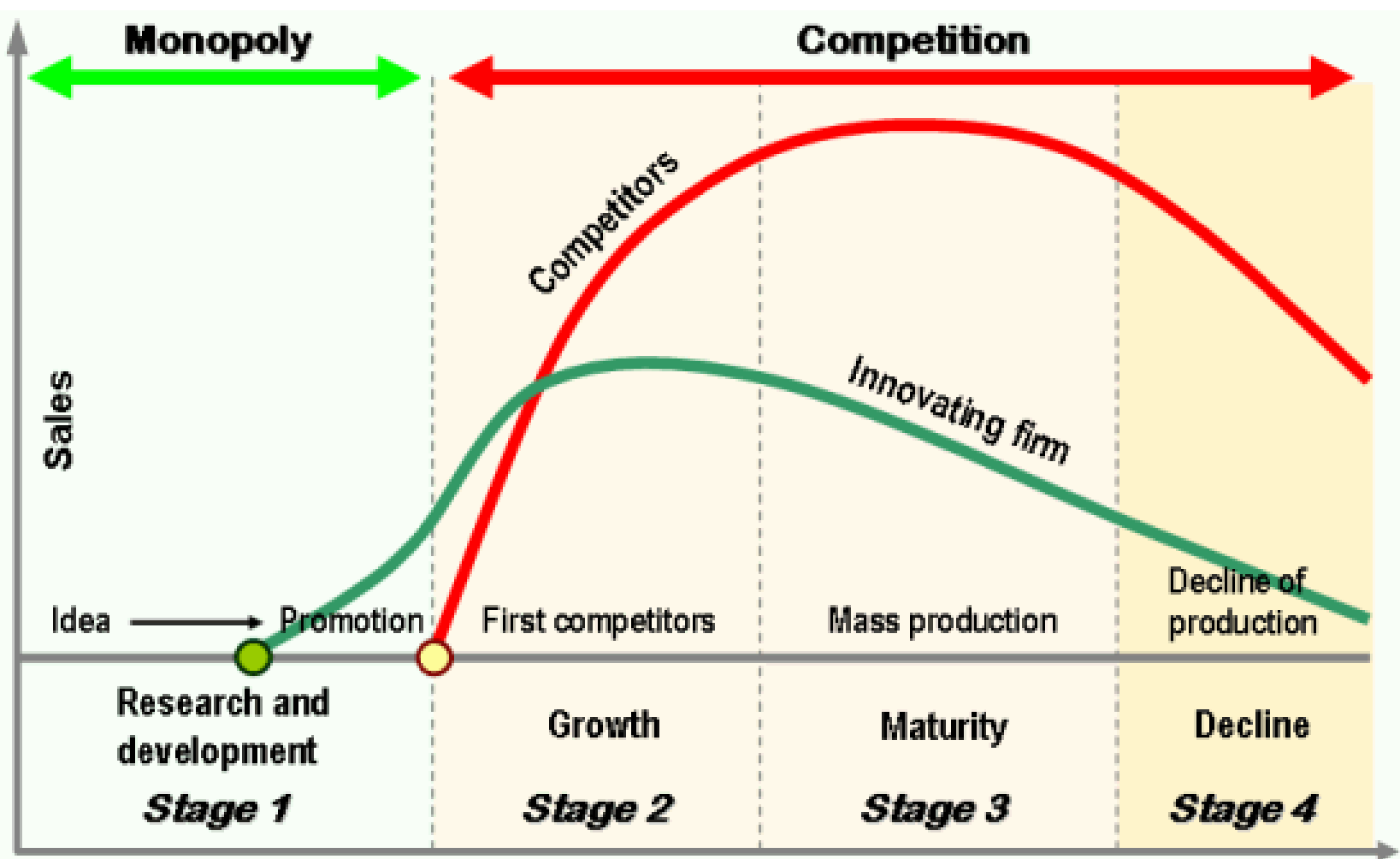
- Introduction
- Growth
- Maturity
- Decrease

# Product Life Cycle

## *B&W TV*



- Introduction (novelty)
- growth (increase of sales and competition)
- Maturity (market saturation)
- Decline (abandoned; color TV)



# Análise estratégica

## alguns instrumentos de análise

### General Tools:

- Análise SWOT
- Análise Porter

### Specific Tools:

- Curva da experiência
- Ciclo de vida do produto/sector
- **Matriz BCG (Boston Consulting Group)**



# Strategic Analysis Tools

## General Tools

- SWOT Analysis
- Porter Analysis

## Specific Tools

- Experience Curve
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# BCG Matrix

## Products Portfolio

2 criteria: market growth & competitive position

- ✓ Stars
- ✓ Question marks
- ✓ Cash cows
- ✓ Dogs

# BCG Matrix

(+)  
Growth rate of sector(-)  
use of funds



(+) Competitive position(-)  
Financial flows

# BCG Matrix

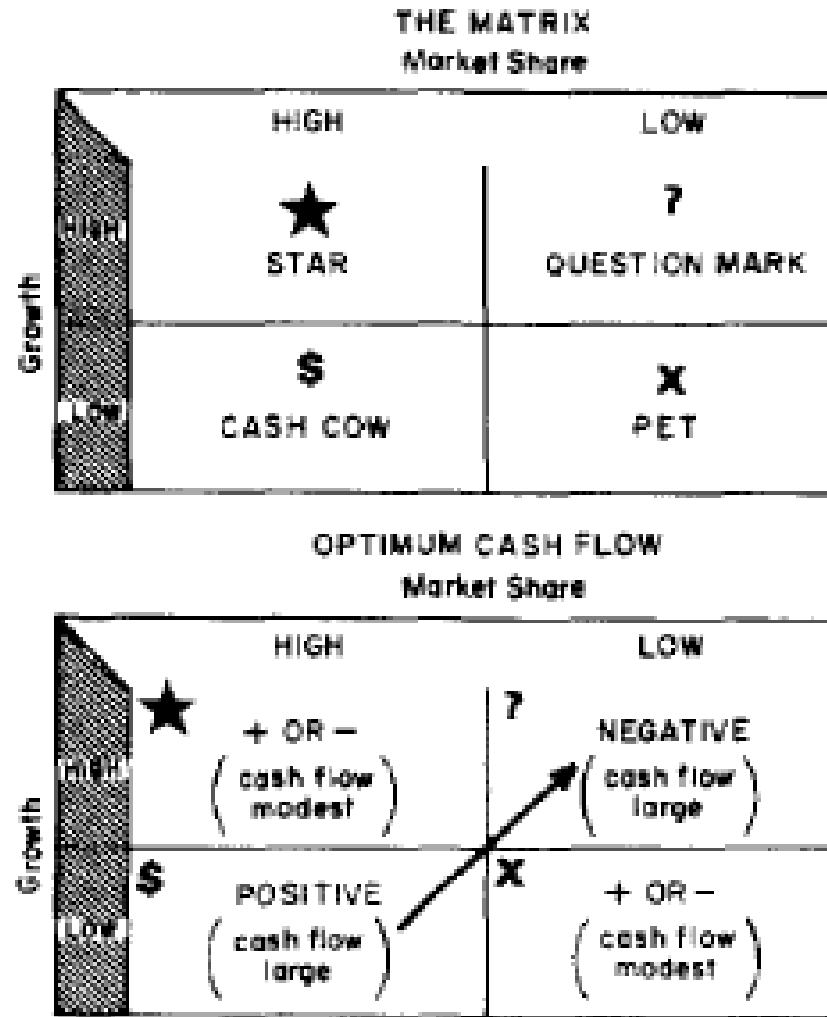


Figure 2. Henderson's Growth/Share Matrix. Source: Henderson, B. (1970) "The Product Portfolio", BCG Perspectives, p. 66.

# BCG Matrix

## Success and Disaster Sequences

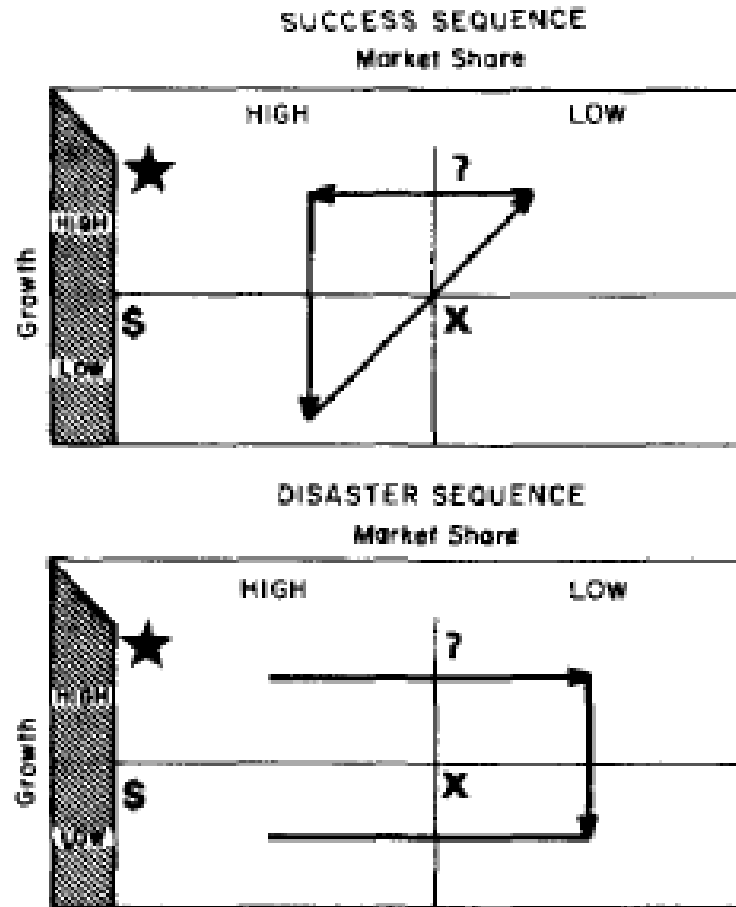
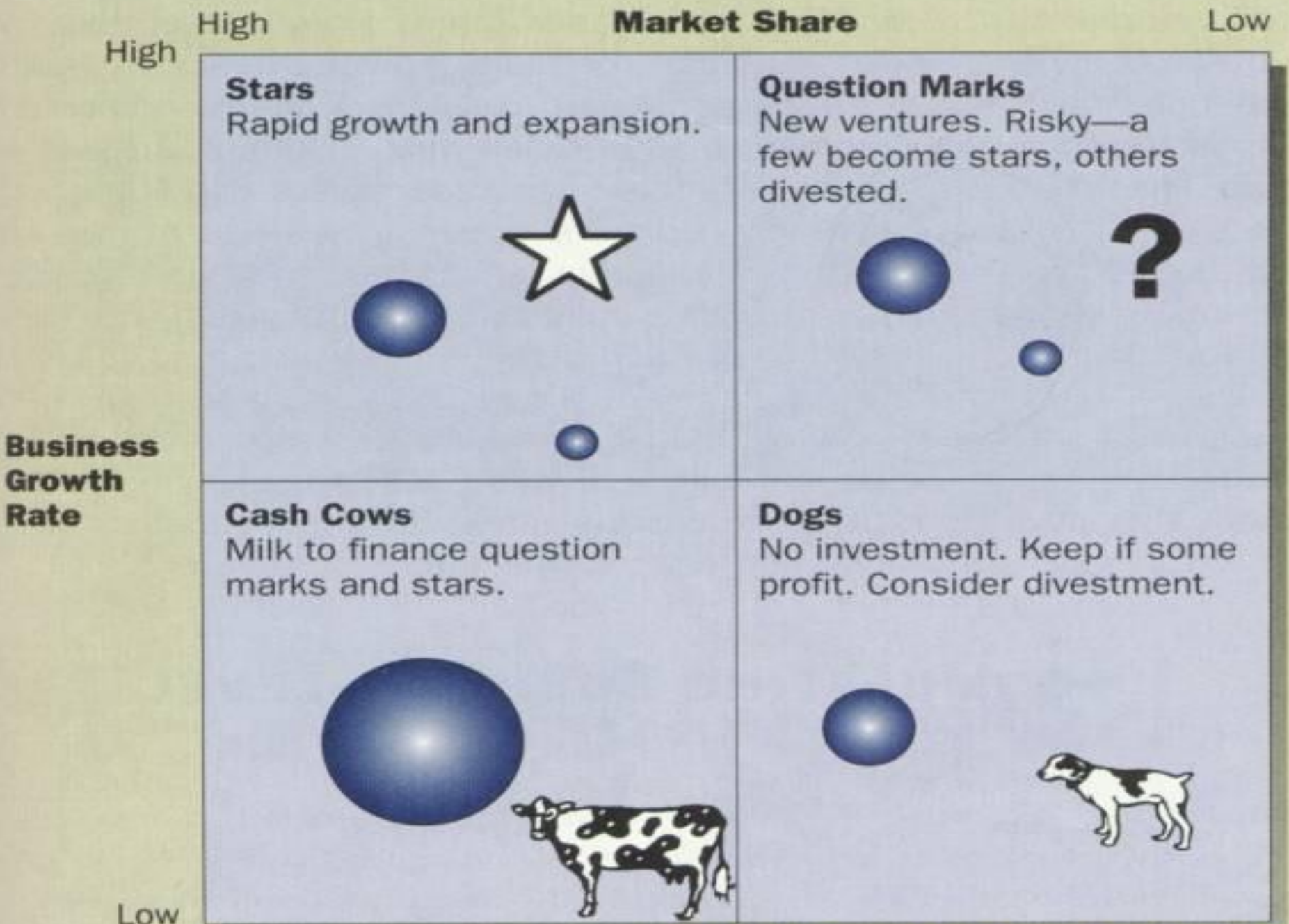


Figure 2. Henderson's Growth/Share Matrix. Source: Henderson, B. (1970) "The Product Portfolio", *BCG Perspectives*, p. 66.



Bubbles represent gross revenues

# Duration of a Project

## How long the project last?

There are different lifetimes

- working life of the equipment in a **physical** perspective (e.g. the steel is strong and the equipment will last 30 years)

# Duration of a Project

## How long the project last?

- ❑ Lifetime of the equipment in an **accounting** perspective (e.g. depreciation rate is 25% per year , after 4 years the equipment is considered to hold zero accounting value (book value). We can not say worthless because it could be still productive.



# Duration of a Project

## How long the project last?

- ❑ Lifetime determined by **market acceptance**  
(e.g. B&W TV is not accepted by the market)

# Duration of a Project

## How long the project last?

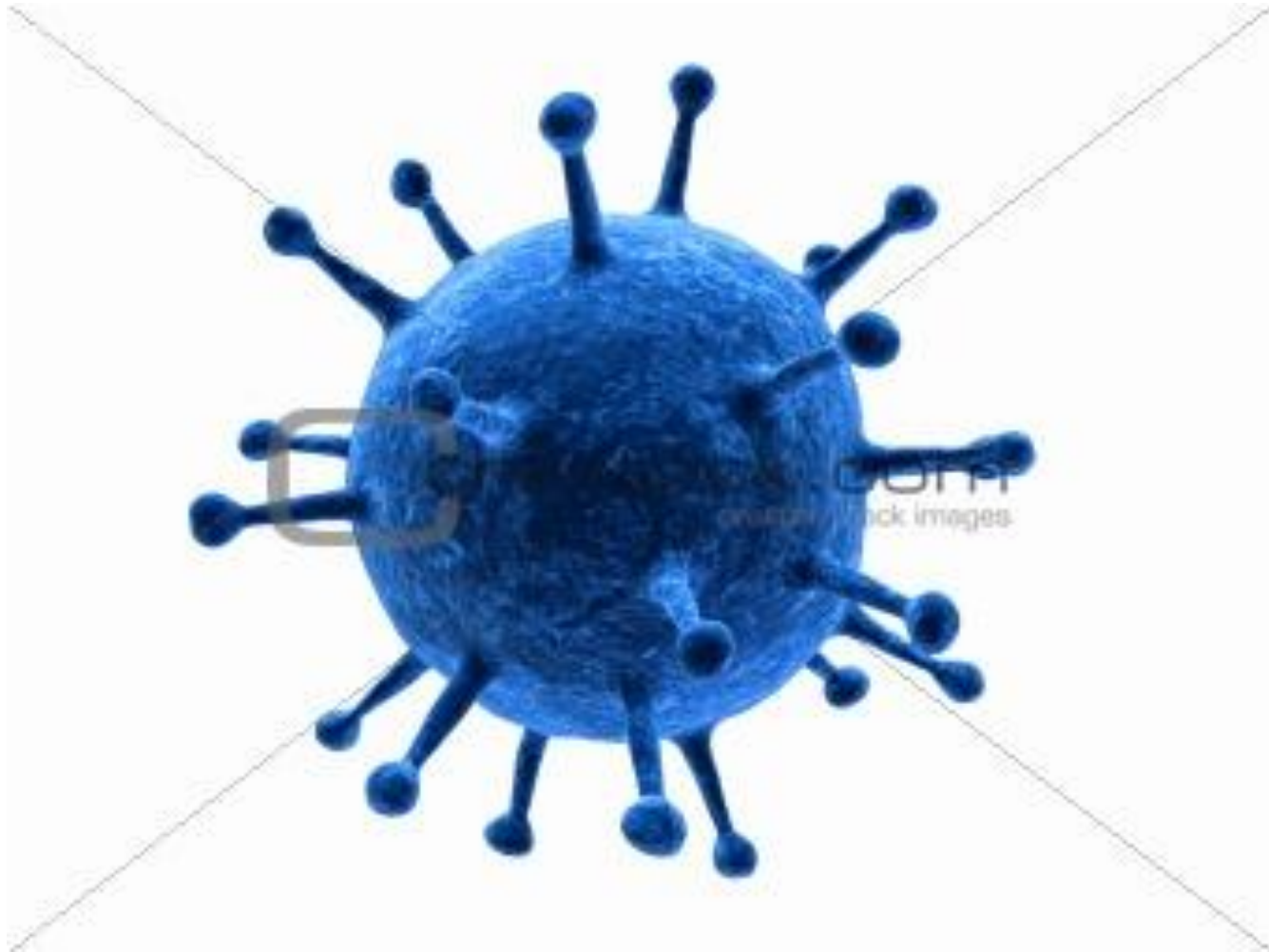
- ❑ Lifetime in an **economic perspective** (technological , productivity and costs). The equipment can became obsolete (in economic or technological terms). i.e. there could be market demand for the product, but the firm is no longer able to produce it in competitive conditions.

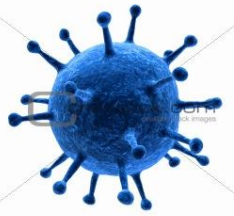
# Duration of a Project

## How long the project last?

What is 'the true lifetime' of a project?  
(project evaluation perspective)

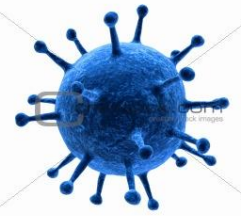
# *Case Study “Virus Free”*





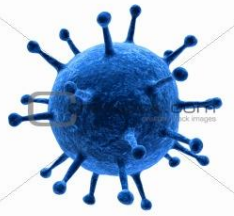
# Case Study Virus Free

- 2 researchers (one in Chemistry and the other in Pharmacy) identify a business opportunity
- They plan to do research themselves and create a new product but in the short run they want to produce an anti-virus already under patent and sell it
- There is a new generation of anti-virus with fewer side effects



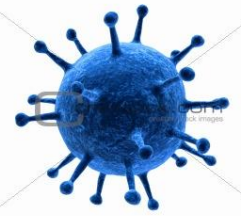
# Case Study Virus Free

- The anti-virus market is growing fast
- They consult specific legislation and they will start production next year
- They hire a consultant to produce an investment project and to evaluate the financial viability of the economic project.



# Case Study Virus Free

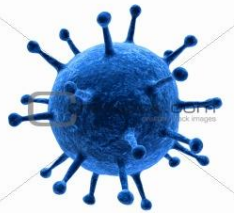
- Life cycle of the product
  - Each medicine has its own life cycle
  - Has a short development period
  - The full cycle is protected by patents for 7 years (+ 7 years as generic brand)
  - After generics brand the sales of the original medicine will decrease



# Case Study Virus Free

- Laboratory equipment costs 200.000 euros, including installation and testing. To be paid year 0.
- Scientific software has an expected cost of 90,000 euros according the supplier's quote.
- Patent cost is 96,000 euros.

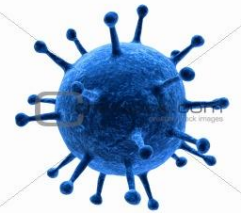




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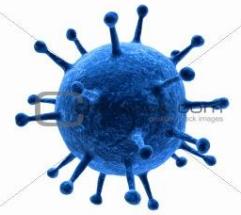
- Depreciation rates per year for the assets are:
  - Building 5%
  - Equipment 10%
  - Intangible assets 33%

[Note that the site (land) is not subject to depreciation (note if it were a quarry the land would depreciate in value)]



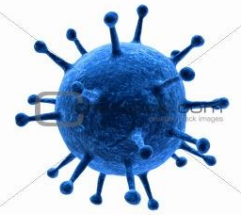
# Case Study Virus Free

- Need for working capital
  - Credit conditions obtained from suppliers: payment deadline is one month (this is the conditions in the sector)
  - Credit conditions for clients: on average 3 months of sales
  - Stock period for raw materials is 2 months of the cost of consumed raw materials
  - Stock period for finished goods is 15 days of sales (the time they stay in the warehouse, after being produced and before being sold).



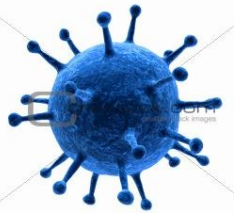
# Case Study Virus Free

- Credit outstanding debts 10% of sales during the period.
- The project-firm borrows money from the bank . It takes out a loan which is 70% of the fixed capital (excluding the site-land) and the interest rate is 5%. The capital payment will be done in the 2 last years of the project (the last 80% and the year before the last 20%). The payment will be at the end of each year.
- Tax rate on profits (IRC) is 25%



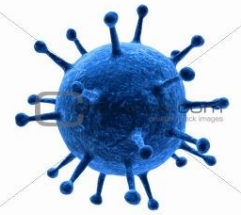
# Case Study Virus Free

- Credit outstanding debts 10% of sales during the period.
- Present generation of anti-virus has a lifetime of 5 years (at the beginning of the project)
- The equipment has an expected economic duration higher than 10 years [what is the lifetime of the project?]



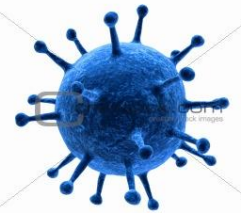
# Case Study Virus Free

- **What is the lifetime of the project?**
  - The lifetime of this project (Virus Free) is 4 years because year zero ( $t=0$ ) is the year of implementation of the project.



# Case Study Virus Free

- During year 0 the unit will not produce
- Cost of creation of the firm 1,000 euros.
- The site (land) where the firm and office will be installed costs  euros
- The builder provides a quote for the building of  euros. The deadline for construction is 6 months to be paid upon completion.



# SWOT Analysis

<b>Strengths</b>	<b><i>Weaknesses</i></b>
<b>Opportunities</b>	<b><i>Threats</i></b>