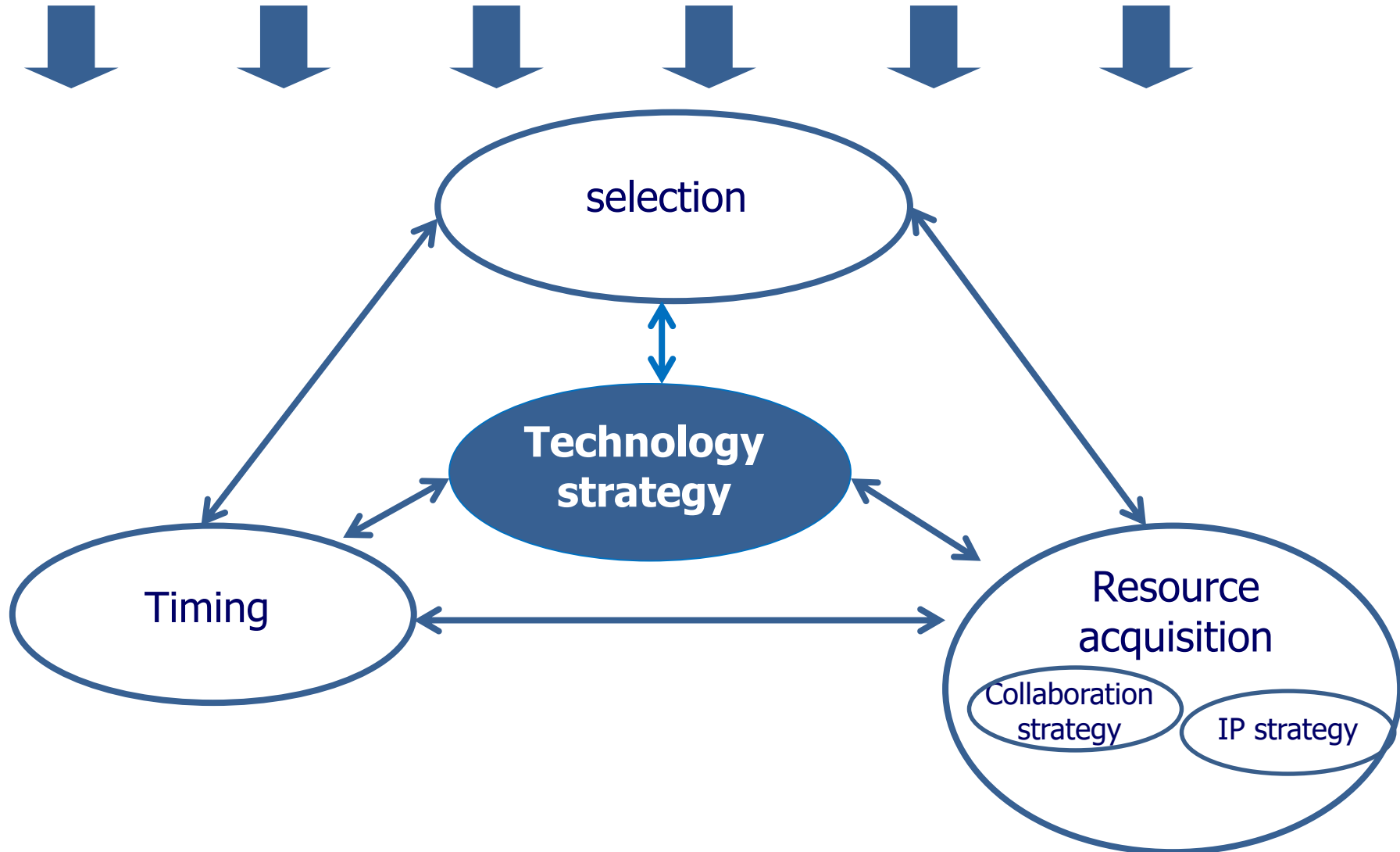


# Innovazione e sviluppo prodotto

## Technology strategy

# Technology strategy

## Technology and business intelligence



# Technology selection

- Objective: selecting the competencies / technologies that will be the focus of the company's innovation and technological effort
- Selection decisions are based upon the results of the intelligence process
- Concerns the **selection of competencies and technologies, not projects**

# Relevant Variables in selection decisions

- (1) **relevance** of the technology, in terms of
  - Potential market (% and timing)
  - Range of applications
  - Value generation (ability of the technology to create value for the customer)
- (2) **Risk**
  - Technical
  - Commercial
  - financial
- **Others :**
  - Appropriability
  - Interdependences with other technologies
  - Future option generation

# appropriability

- Appropriability is the possibility to internalize the benefits deriving from an innovation
- High appropriability is related to:
  - Protection by means of Intellectual Property rights
  - Secrecy
  - Tacit knowledge
  - Level of innovativeness
  - Access to complementary assets
  - Product complexity
  - Lead time
  - Learning curves

# Tools supporting technology selection

- AD Little matrix
- Technology relevance - positioning
- Skill-application matrix

# A. D. Little Methodology

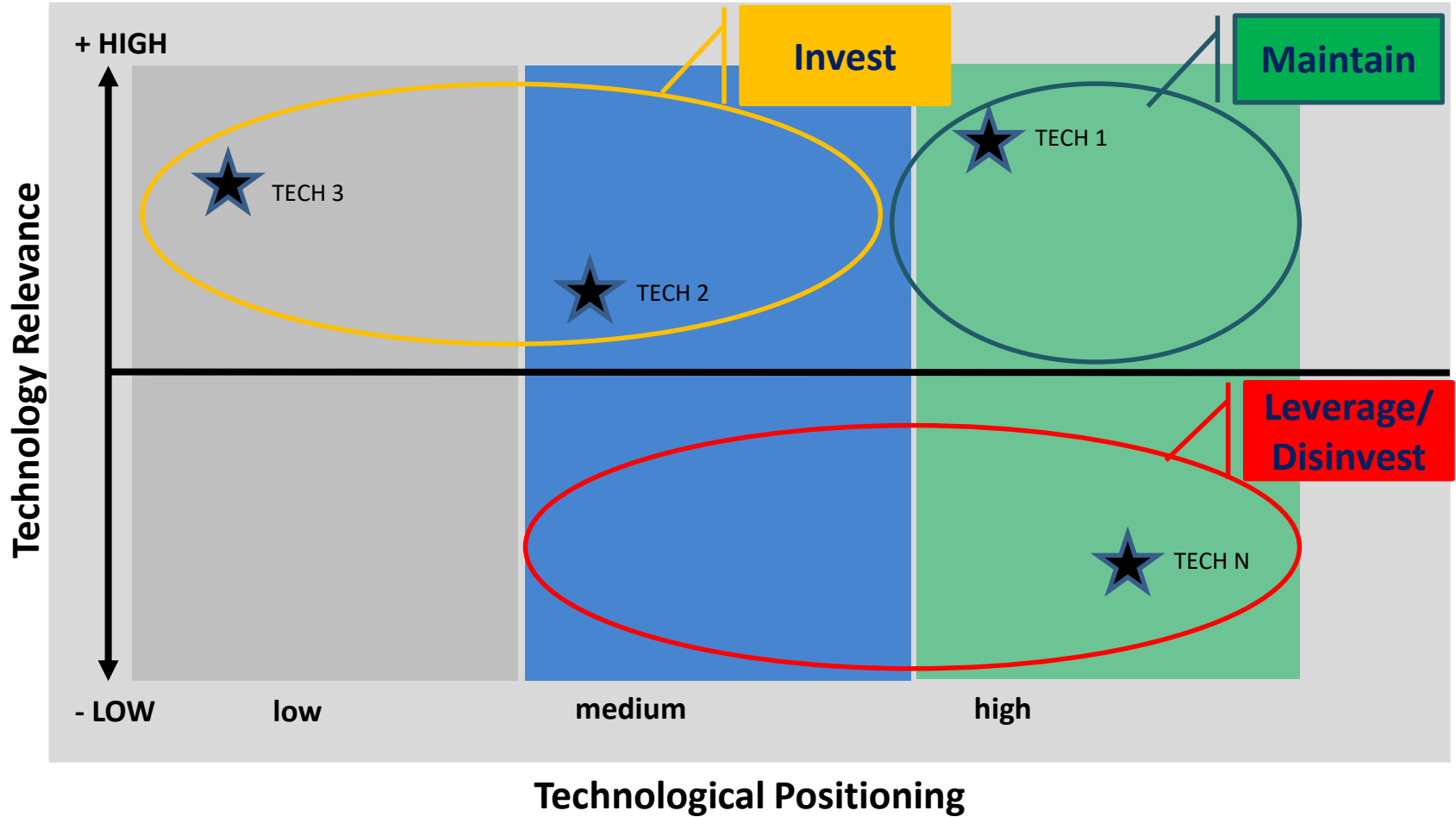
Technology relevance	Technological competence				
	Clear leader	Strong	Favourable	Tenable	Weak
Base	Alarm signal for waste of resources		Industry average	Alarm signal for survival	
Key	Opportunities for present competitive advantage			Alarm signal for present	
Pacing	Opportunities for future competitive advantage			Alarm signal for future	
Emerging					

# A. D. Little Methodology

Technology relevance	Technological competence				
	Clear leader	Strong	Favourable	Tenable	Weak
Base	<b>Maintain</b>		Industry average	<b>Repair</b>	
Key					
Pacing	<b>Build</b>			<b>Invest selectively</b>	
Emerging					

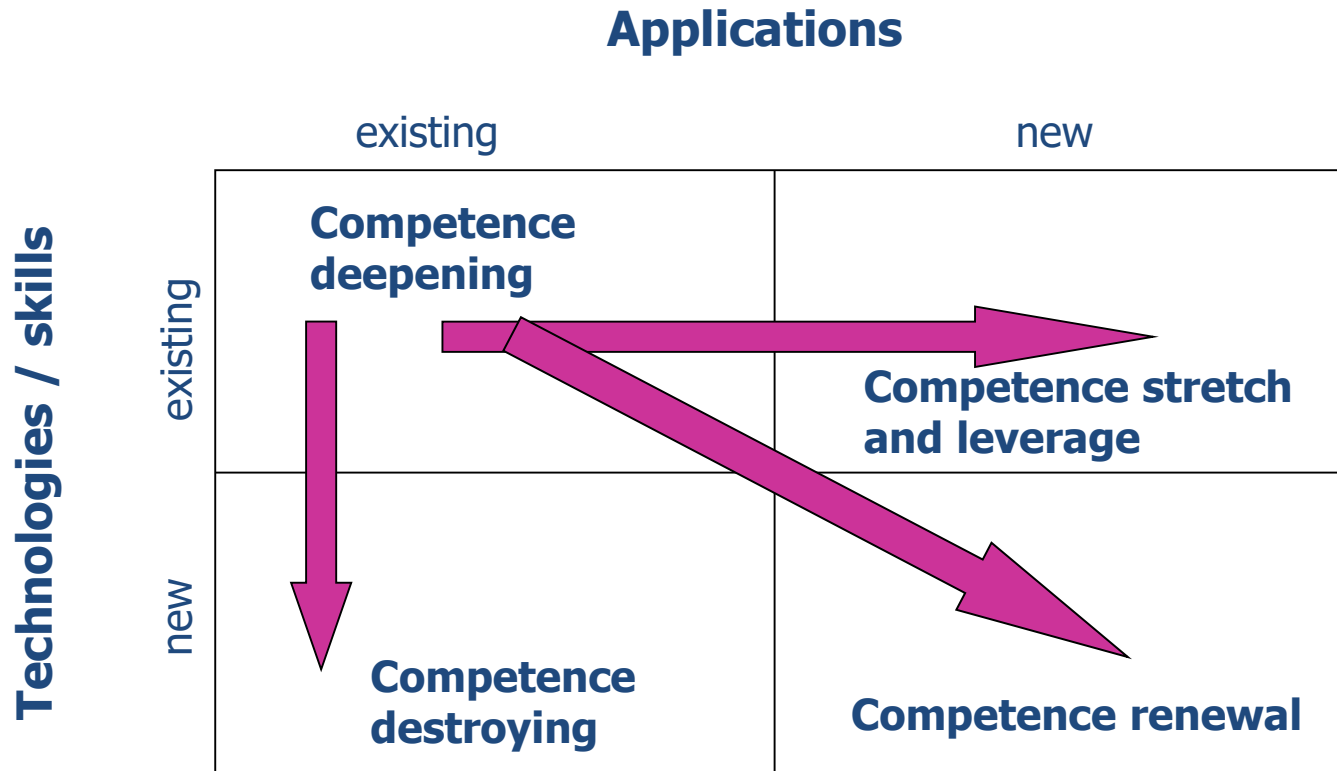


# Technology relevance / positioning



# Skill Application matrix

Types of technology strategy decisions could be mapped within the skill / application matrix



# Timing: technology Leaders and followers

- **First mover advantages:**

- Reputation and Brand loyalty
- Temporary monopoly
- Switching costs
- Access to distribution channel
- learning
- Access to limited resources
- Definition of standards
- Institutional barriers

- **Follower advantages:**

- Lower costs and risks
- Lower uncertainty
- Better understanding of customers' needs and evolution
- Lower specific investments
- Lower risk against technological discontinuities
- imitation
- Development of distribution channels

# Timing

- Other elements to be considered in timing decisions are:
  - Relevance of TTM in competition – exploitation of windows of opportunities
  - Time compression diseconomies
  - Profits profile
  - “acceleration trap”
  - Availability of complementary assets and enabling technologies
  - Standard definition
  - Threat of new entrants
  - Technological positioning and evolution of competitors

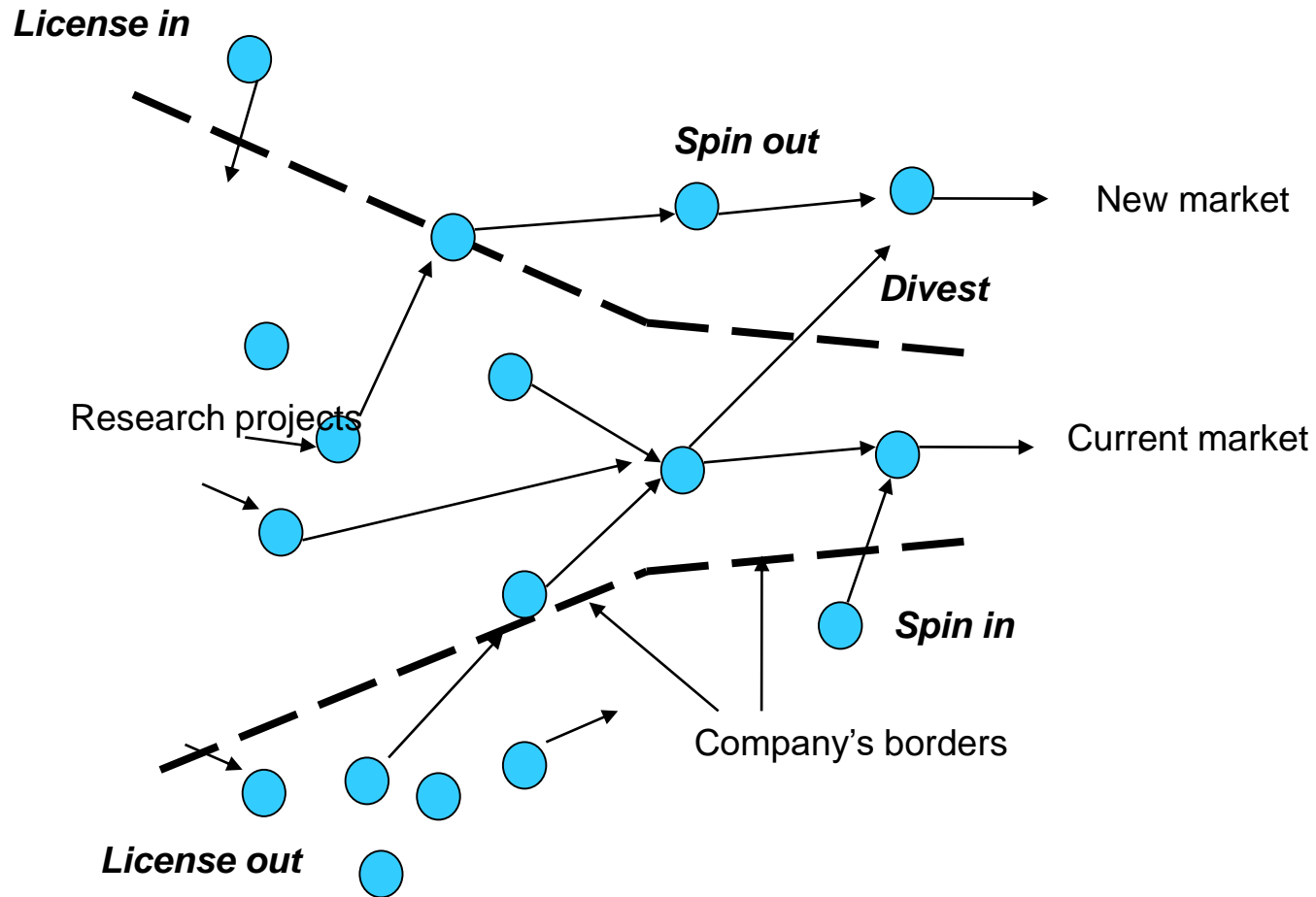
# Resource acquisition in the Open Innovation era

- “Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. [This paradigm] assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology.”

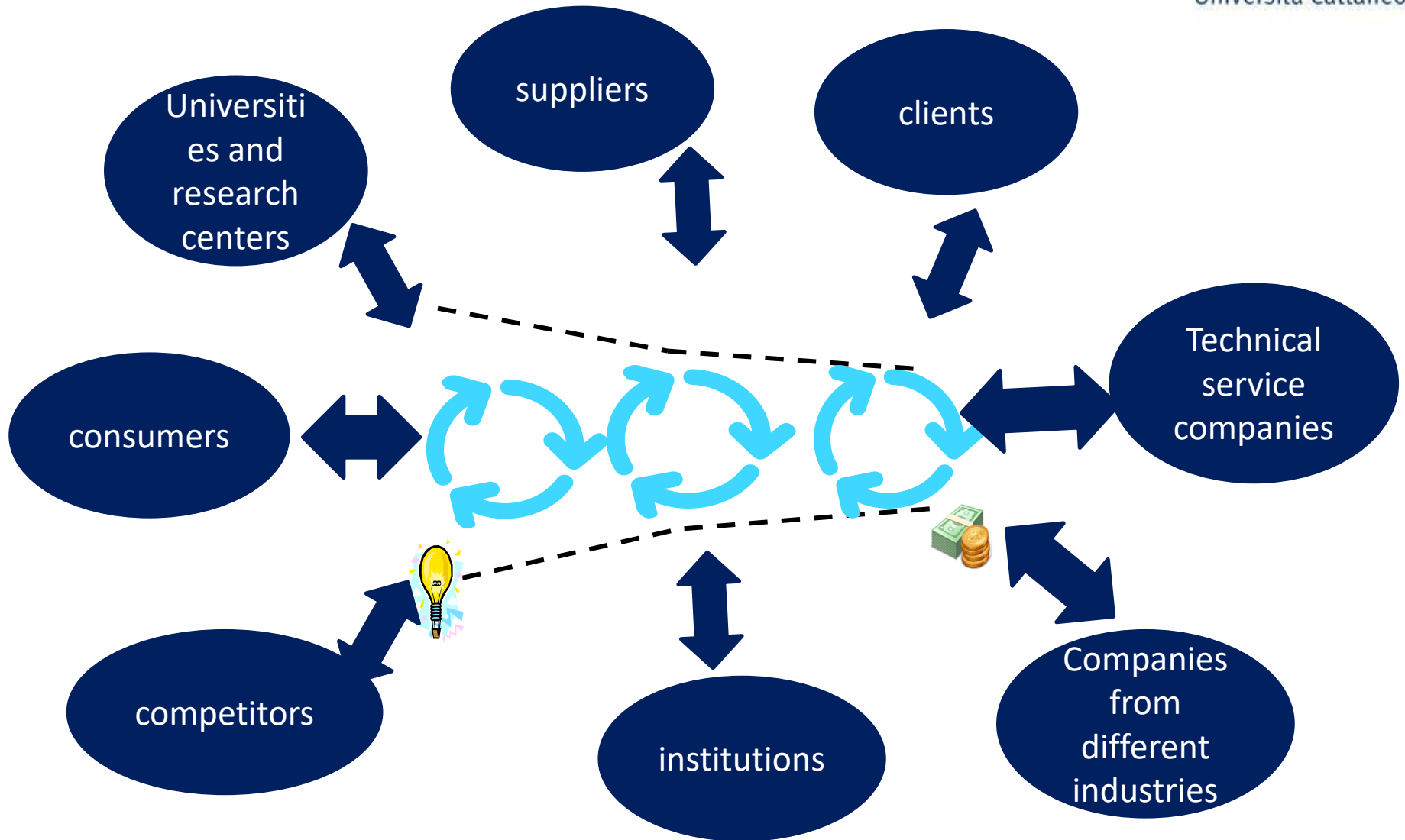
Henry Chesbrough, 2003

[Open Innovation: Researching a New Paradigm](#)

# The "open innovation" funnel



# Open innovation



# Open innovation: advantages

- integrate different scientific and technological disciplines
- reduce, share and minimise uncertainty
- reduce, share and minimise costs
- increase the innovative potential and the creativity
- improve time to market
- foster knowledge and technology transfer
- increase flexibility and technological change speed monitoring (and responding to) customers needs
- monitoring (and responding to) suppliers needs
- catch market opportunities
- monitoring (and responding to) environmental and technological changes
- broaden the product range
- monitoring (and responding to) competitors' behaviour
- achieve continuity with current products/technologies
- respond to the needs of internationalisation / globalisation and new markets entry
- define and establish market standards
- access distribution channels
- .....



# Open innovation: risks

- Loss of control over critical know how;
- spill over;
- Loss of competences;
- Organizational and managerial complexity;
- Increasing (organizational) time and costs;
- NIH syndrome;
- Opportunistic behaviour;
- .....

# open innovation models

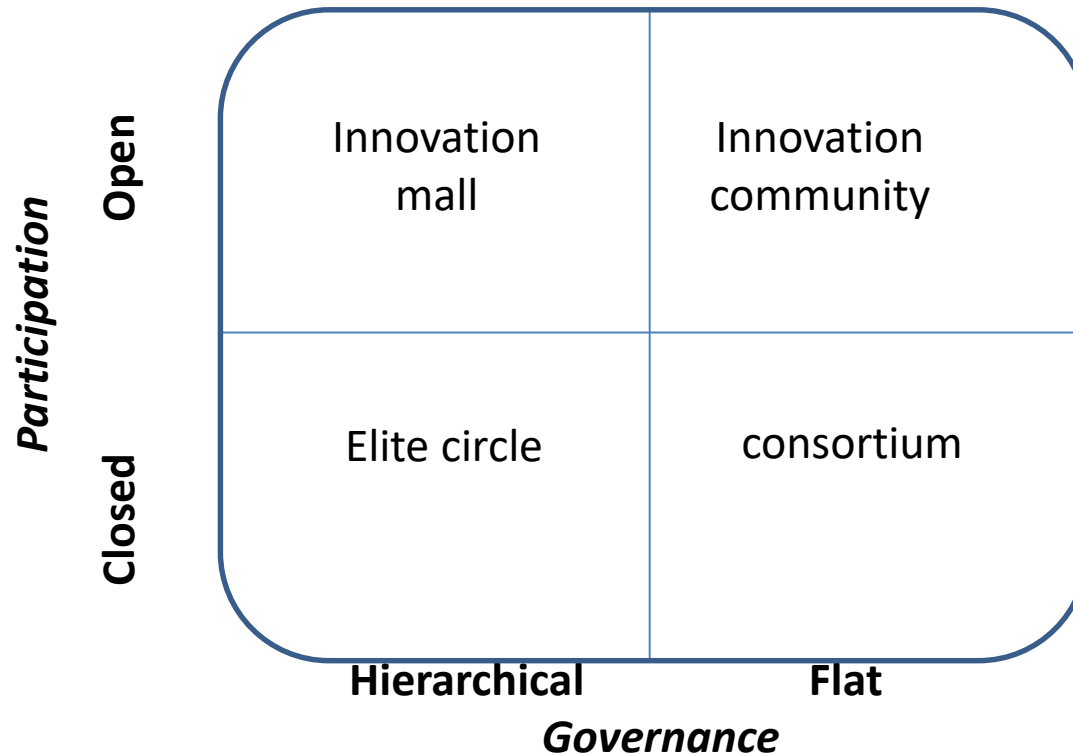
- Different degrees of openness correspond to different open innovation models
- Examples of Open Innovation models corresponding to different degrees of openness are described in literature

# Open innovation models

- The literature identifies the most relevant variables that distinguish different ways to open the innovation process:
  - Governance
  - Organisational forms
  - Openness direction (inbound/outbound)
  - Partners variety
  - Innovation funnel openness

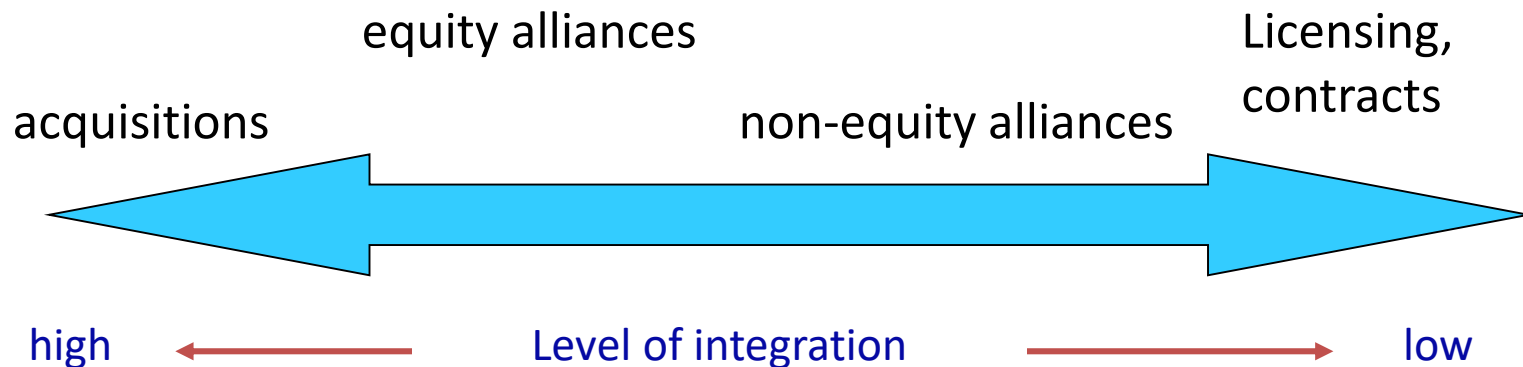
# 1. Governance

- Innovation networks may have a governance from **flat** to **hierarchical**
  - Flat: each partner participates in decision making, discussion of problems and solutions, design and planning of activities
  - Hierarchical: there is a clear leader in the network who decides



## 2. Organisational forms for open innovations

- Different organisational forms can be chosen for opening (in and/or out) the innovation process, that can be classified according to the level of integration:



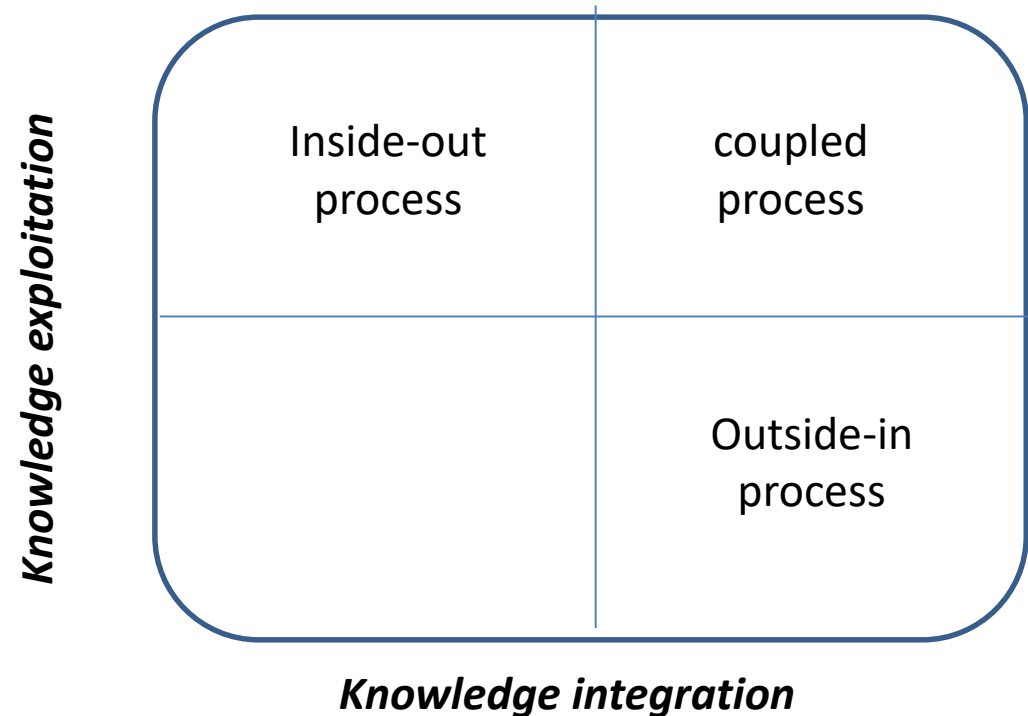
- A measure can thus be given to the governance companies choose to open their innovation processes (in and/or out) in terms of level of integration

# Organizational and managerial implications of different forms of collaboration

	Speed	Cost	Control	Potential for leveraging existing competencies	Potential for developing new competencies	Potential for accessing other firms' competencies
Solo internal development	Low	High	High	Yes	Yes	No
Strategic alliances	Varies	Varies	Low	Yes	Yes	Sometimes
Joint ventures	Low	Shared	Shared	Yes	Yes	Yes
Licensing-in	High	Medium	Low	Sometimes	Sometimes	Sometimes
Licensing-out	High	Low	Medium	Yes	No	Sometimes
Outsourcing	Medium/high	Medium	Medium	Sometimes	No	Yes
Collective research organizations	Low	Varies	Varies	Yes	Yes	yes

### 3. Openness direction

- Companies may choose to open their innovation process:
  - to access technology and know how from external sources;
  - to sell technology and know how to (or to share with) external actors;
  - to access technology and know how from external sources AND to sell technology and know how to external actors.
- Openness direction can thus be distinguished in three typologies:
  - Inbound
  - Outbound
  - Inbound and outbound

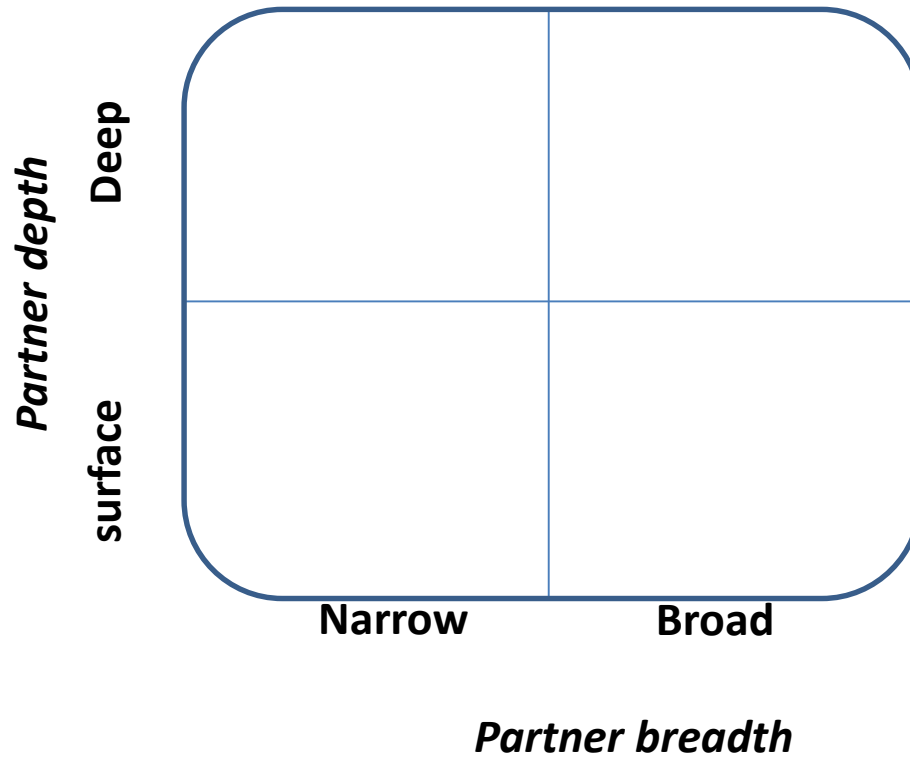


## 4. Partners variety

- Companies may open their innovation process to contributions from/towards many different categories of actors:
  - University and research centres
  - Technical and scientific service companies
  - Governmental institutions
  - Customers
  - Suppliers
  - Competitors
  - Firms operating in different sectors of activity
- Partners variety can thus be measured by the number of different categories of actors that access to the company's innovation process (for acquiring and/or selling technology)

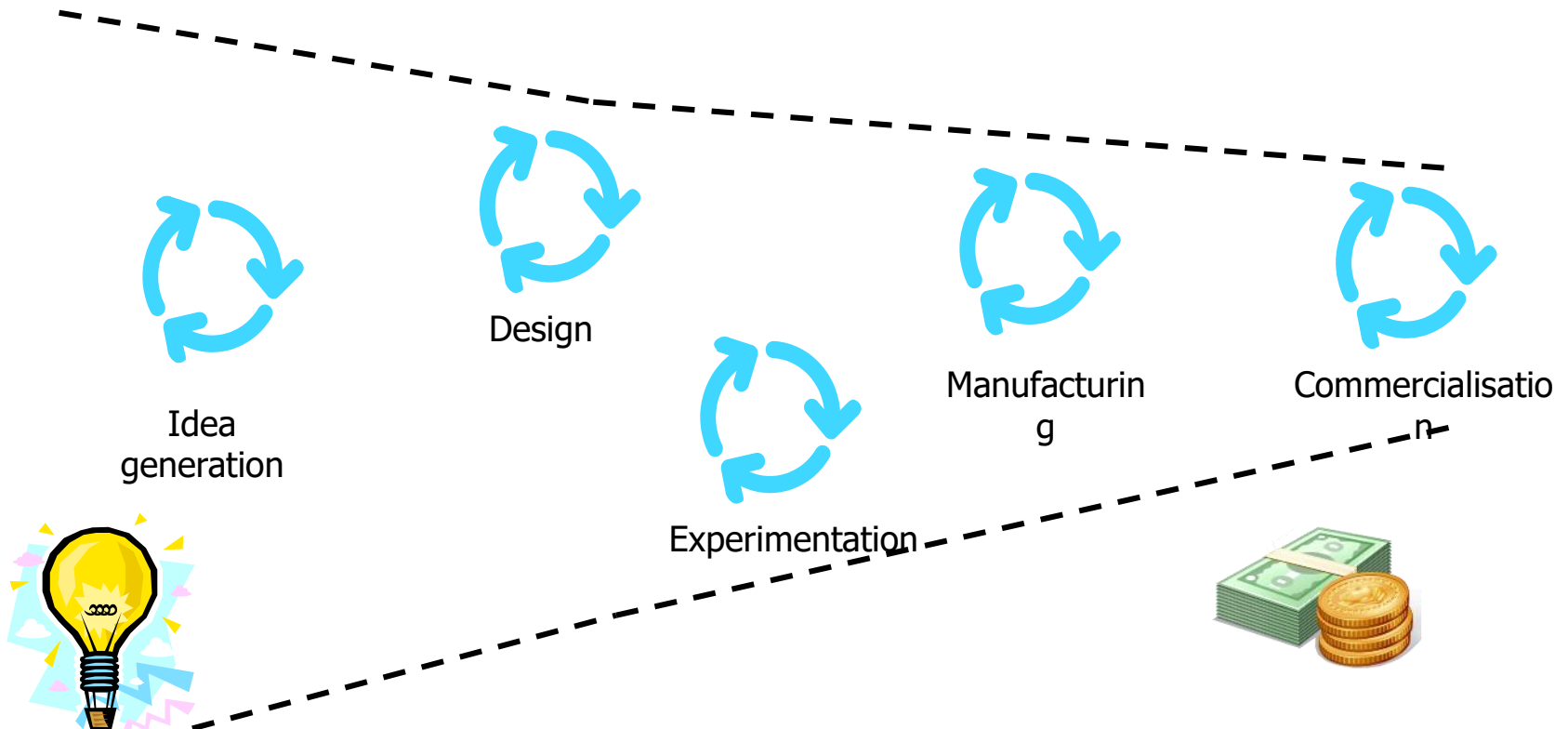


# 4. Partners variety



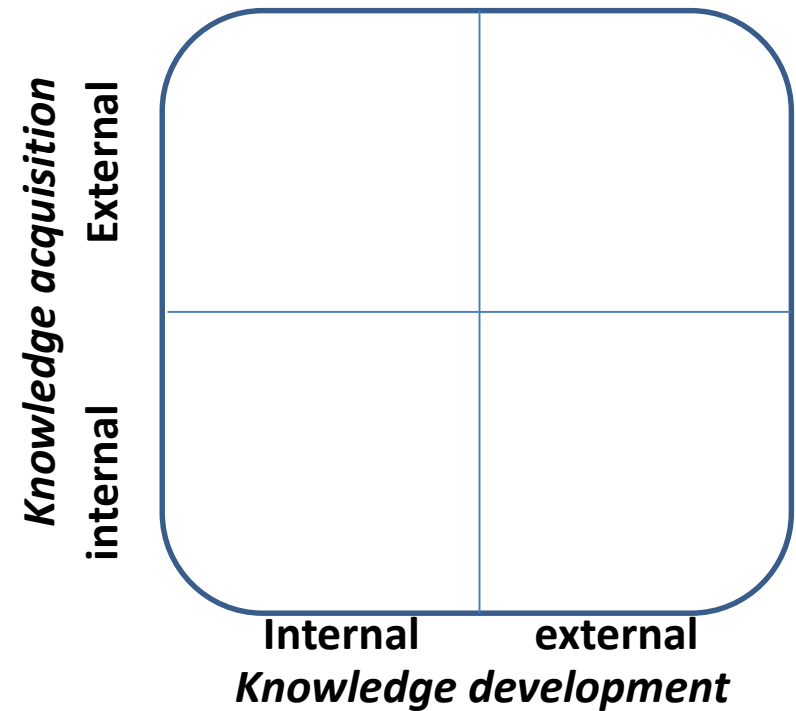
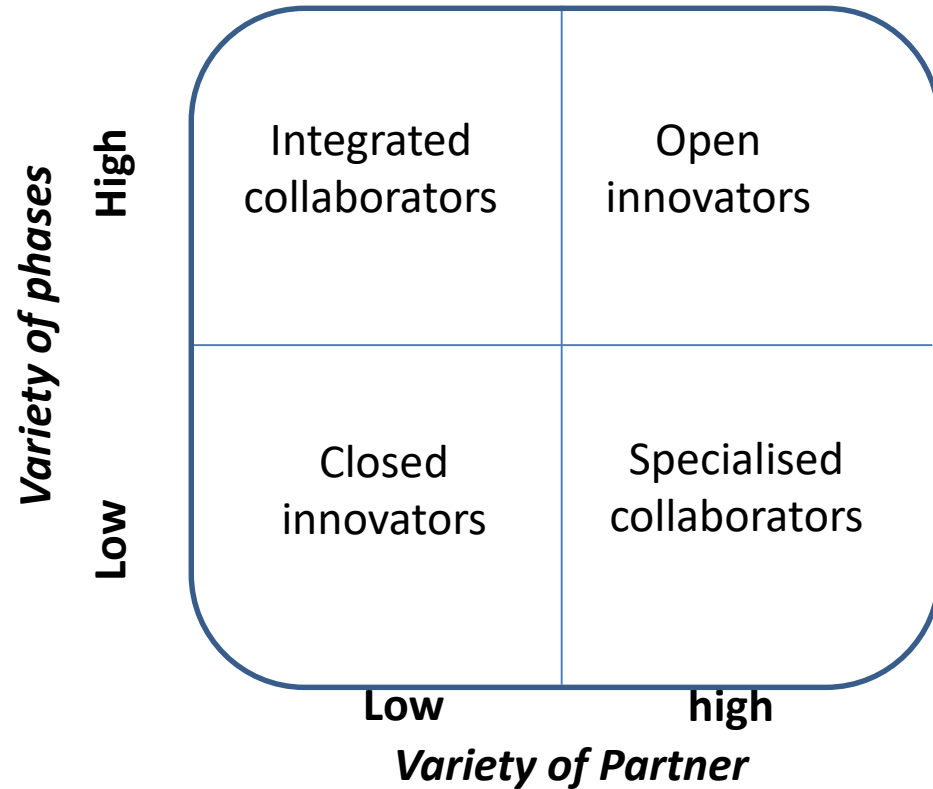
# 5. Innovation funnel openness

- The innovation funnel can be generally represented by 5 cycles of activities:

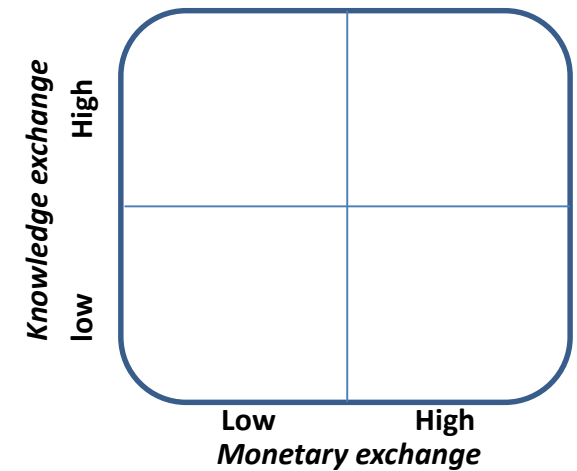
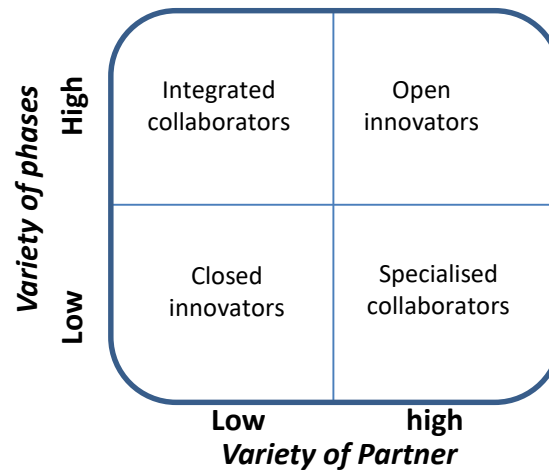
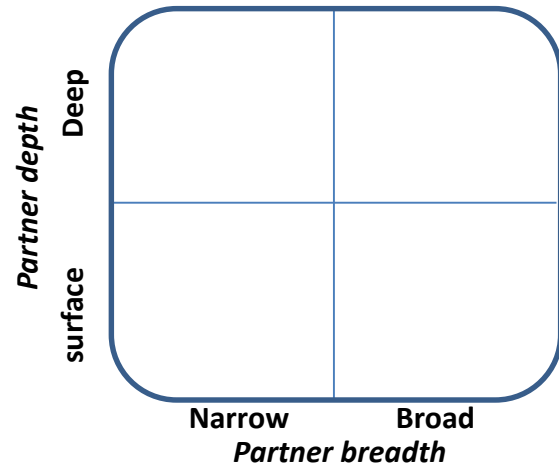
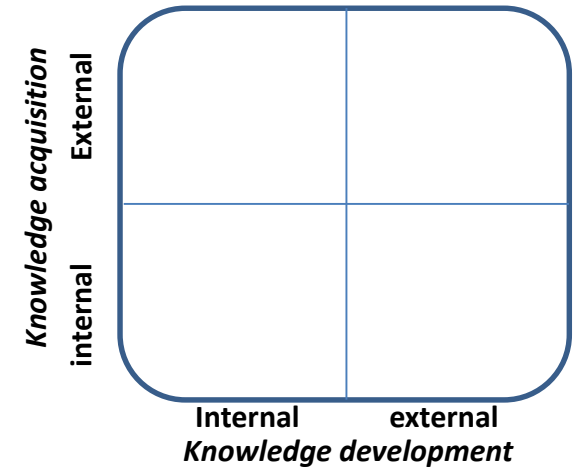
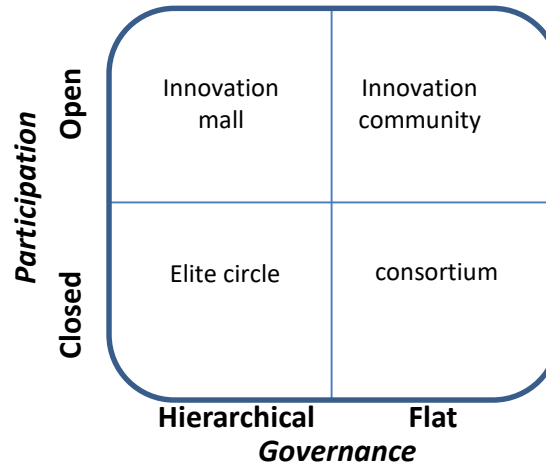
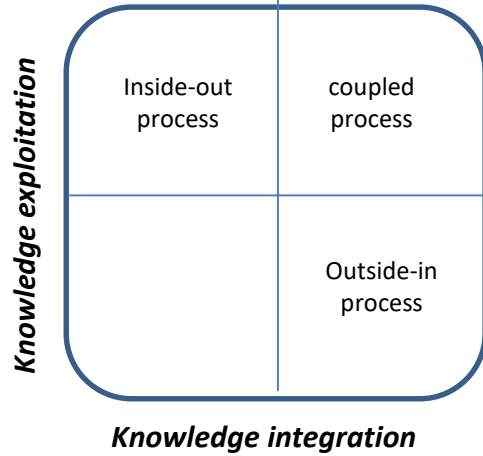


- The innovation funnel openness can thus be measured by the number of different phases in which the company access to external sources to acquire and/or sell technology

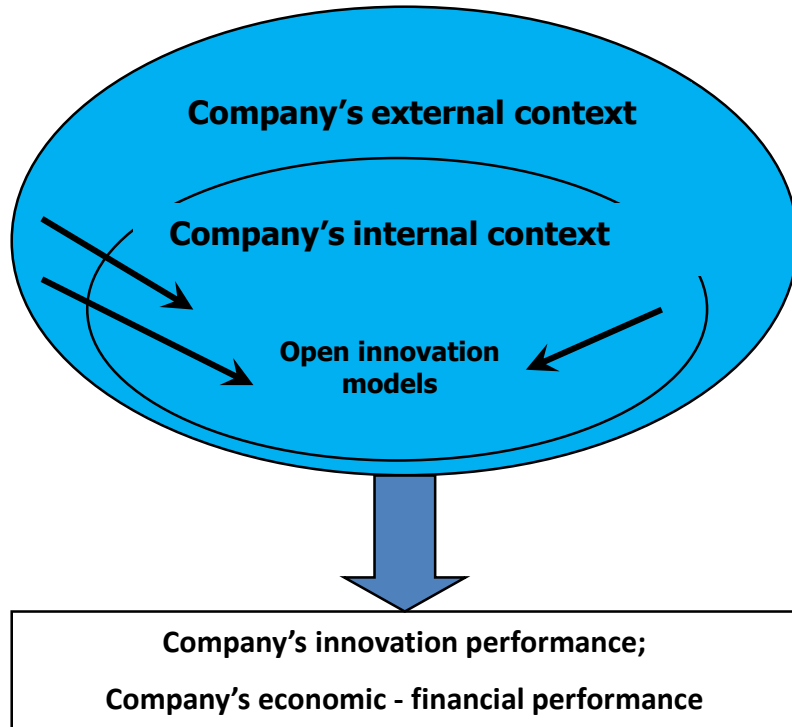
# 5. Innovation funnel openness



# open innovation models



# La scelta del modello di Open Innovation



- Open innovation models = different ways chosen by companies for opening up their innovation process
- Company's internal context =
  - size;
  - strategy;
  - organisation;
  - management style;
  - culture.
- Company's external context =
  - competitive arena (industry, geo-political area, target clients, type of products and services)
  - Socio – cultural – political context.

# IP strategy: tools

- Formal tools: patent, trademark, design, utility model, copyright ..
- Contractual tools: non disclosure agreement (NDA), employee agreement
- Informal / strategic tools: secrecy, product complexity, lead time advantage

# Advantages and disadvantages of getting a patent

## Advantages

- Exclusivity enables investment and higher returns on investment
- Strong, enforceable legal right
- Makes invention tradable (licence, sale)

## Disadvantages

- Reveals invention to competitors (after 18 months)
- **Can be expensive**
- Grant may take 3-5 years
- Patent enforceable only after grant; proceedings can be costly

Adapted from EPO – Intellectual property Teaching Kit – Advanced Part I

# Alternatives to patenting: disclosure and secrecy

## Disclose (publish) the information

- Cheap
- Prevents others from patenting the same invention

- Does not offer exclusivity
- Reveals the invention to competitors

## Keep it a secret

- Cheap (but there is the cost of maintaining secrecy)
- Does not reveal the invention

- No protection against reverse-engineering/duplication of invention
- Difficult to enforce
- Secrets often leak quite fast

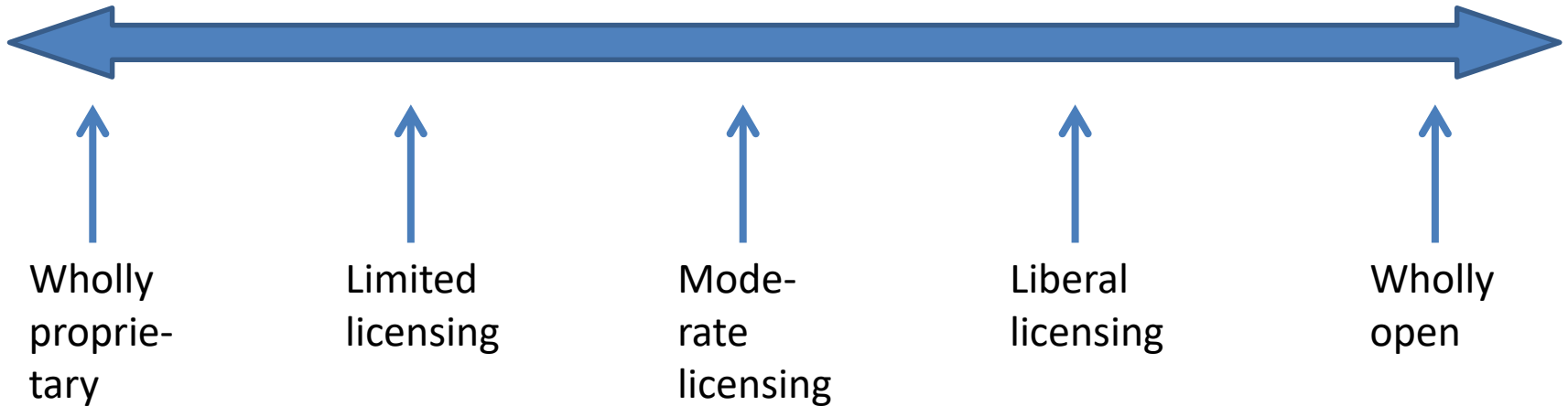
Adapted from EPO – Intellectual property Teaching Kit – Advanced Part I



# How patents are actually used

- [http://www.wipo.int/export/sites/www/ipstats/en/docs/infographics\\_systems\\_2015.pdf](http://www.wipo.int/export/sites/www/ipstats/en/docs/infographics_systems_2015.pdf)

# IP strategy: from proprietary to open



# Advantages and disadvantages of proprietary vs. open IP strategies

## Proprietary strategy - Advantages

- Rent appropriability
- Incentives to invest in further development
- Returns allow investment in marketing and production capacity
- Allows architectural control

## Open strategy - Advantages

- Rapid diffusion
- Increased installed base
- Attracting customers and producers of complementary goods
- Exploit collective development efforts