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## Biotechnology Clusters

*30th June, Brasília*  
*SEMINÁRIO INTERNACIONAL BRASIL – UNIÃO EUROPEIA*  
*“Inovação em Arranjos Produtivos Locais”*

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## Content of the presentation

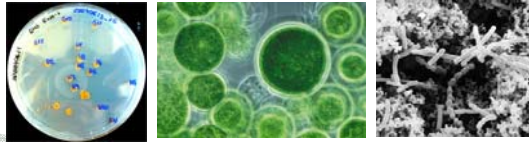
- About biotechnology
- From science to marketplace
- Teachings from European cases
- Conclusions

# 1. About Biotechnology

What is biotechnology?

– OECD definition:

“the application of science and technology to living organisms, as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services”.



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# 1. About Biotechnology

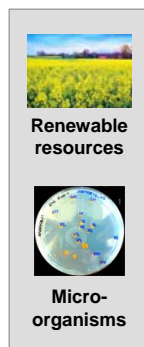
Application fields:

- Health (both human and animal)  
ex. vaccines, biopharmaceuticals, cell therapies
- Agriculture and related primary resources  
based on living organisms
- Industrial processes and environmental  
applications

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# 1. About Biotechnology

Industrial processes:



A plethora of products:

Food additives



Biopolymers



Fuels & Chemicals



And more, much more...



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# 2. From Science to Marketplace

Ingredients:

- Trained human resources  
(both scientists and non-scientists)
- Strong R&D base  
(people, infrastructure)
- Market-driven research  
(interaction with adopters of inventions and technologies)

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## 2. From Science to Marketplace

Ingredients:

- Infrastructure for companies  
(spin-offs, start-ups and attraction of mature companies)
- Social acceptance of biotechnology  
(awareness and informed public and stakeholders)
- Financing  
(grants; investment community for financing new ventures)

...is this enough?

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## 3. European Cases

Examples in the next slides

- Biovalley
- The German experience
- Fragmentation and maturity
- Starting from scratch: Biocant

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## 3.1. Biovalley



### Historical perspective

- Fusion of Ciba-Geigy and Sandoz to become Novartis [1996]
- Release of numerous highly qualified skilled personnel
- Establishment of Novartis Venture Fund
- The trinational "Life Sciences Network BioValley" was built  
Alsace (FR), Basle (CH), Freiburg (DE)
- Support from EU community initiative INTERREG for  
cross-border cooperation with co-financing of local authorities
- Long term goals: 15 to 20 years

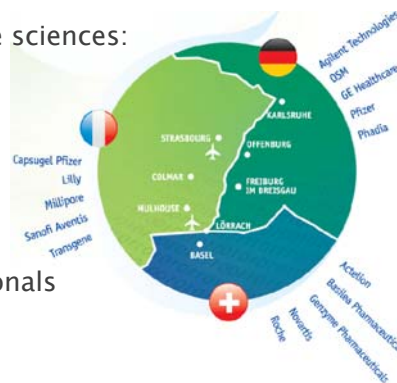


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## 3.1. Biovalley

### Ingredients in place in the field of life sciences:

- Outstanding scientific facilities
- Highly qualified workforce
- Headquarters of global players and  
branches of biopharma multinationals
- Public acceptance of biotechnology
- Strong political commitment to biotechnology



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## 3.1. Biovalley

Today:

- Even stronger scientific base
  - 5 Nobel prizes in chemistry and medicine in the last 15 years
  - new R&D centers were set up
- Broad business base
  - 100 start-ups created some of which now on Swiss Exchange
  - 75 products in clinical and pre-clinical stage
- Technology and innovation infrastructure
  - 12 biotech parks and incubators, shared services
- Funding opportunities
  - Strong and knowledgeable investment community (VCs, foundations, etc).

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## 3.2. Germany

A federal state, such as Brazil

Early 90's:

- Negative public attitude towards biotechnology (genetic engineering)
- Strict regulations for biotech-based R&D
- Large companies established R&D sites abroad
- Excellent basic research at universities but no link to applied research
- Spin-offs from large companies nearly absent

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## 3.2. Germany

Government action in mid-90's

- National standards on genetic engineering readjusted
- BioRegio contest for regions (17).  
Strategies of commercialization of biotech  
R&D from universities and other research institutes
- 3 winners selected by an international jury.  
Main criteria:
  - potential of biotech academic R&D in the region;
  - existing industrial companies
  - investors commitment to finance regional biotechs.

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## 3.2. Germany

Government action in mid-90's

- Each region:  
25 million Euro funding/5 years  
loan and R&D grants up to 50% of the project cost
- The other regions implemented their own plans using  
funds from state governments
- Main areas:
  - business services & consulting
  - support technology transfer through patent attorneys
  - providing cheap laboratory and office space in incubators and technology parks.

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## 3.2. Germany

Lasting BioRegio effect:

Networking and interaction among people from:

- universities
- industry
- public administration

“bio-boom” in the regions

Financing:

- Increase of venture capital (generous co-financing from government-owned banks)
- Pharma and chemical companies set-up corporate venture funds
- Exchange market for high-tech companies

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## 3.2. Germany

And what about entrepreneurs?

- Less jobs in academia
- Industry downsizing due to mergers and cost reduction programs
- Business plan workshops and competitions
- Coming back of scientists exposed to US entrepreneurial ecosystem

Biotech companies mushroomed throughout Germany

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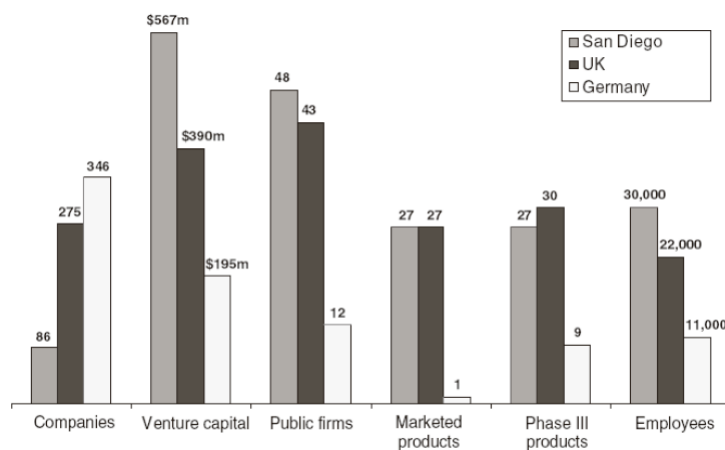
## 3.4. Fragmentation

Council of European BioRegions  
Founded in 2006 by 100 European  
biocommunities

Main goal: reduce fragmentation

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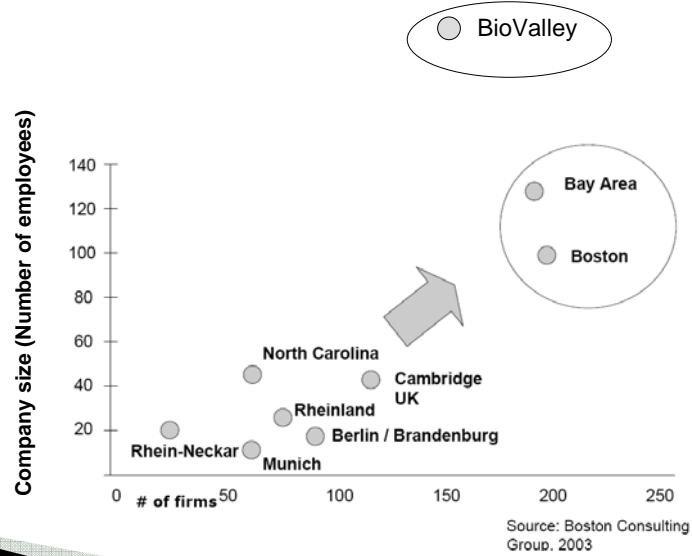
## 3.4. Fragmentation



Source: Casper, *Creating Silicon Valley in Europe*, OUP, 2007

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### 3.5. Maturity of Biocommunities



### 3.5. Maturity of Biocommunities

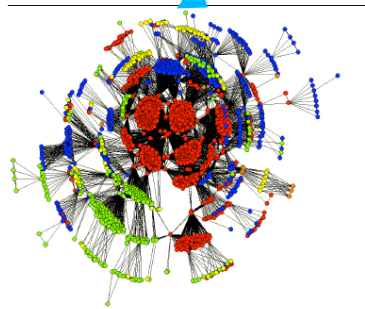
	German biotech (2002)		San Diego biotech (2004)	
Founder Lab	40	48%	n/a	
Local Academic	2	2%	17	7%
Non-Local Academic	24	40%	27	10%
Biotech	6	8%	168	65%
Pharma/Industry	12	14%	47	18%
Total Sample	84		259	

Most previous job of senior scientists working within German and San Diego biotech companies

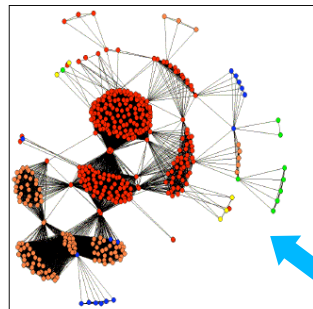
Source: Casper, 2007; German data from 44 companies located in Munich Heidelberg, Cologne, and Berlin.

### 3.5. A maturing sector

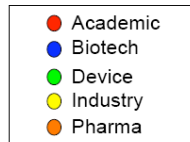
Similar to Biovalley



Boston



North Carolina



Similar to typical EU clusters

Composition of biotech inventor networks, 1995  
Source: NBER patent database

### 3.6. Clustering keys to success

Network effect:

develop social networks linking scientists, managers, investors

Heterogeneity:

populated by individuals and organizations with diverse skills and experiences

Marketplace orientation:

dynamic “hubs” of activity with rapid entry and exit of organizations and individuals

## 3.7. Starting from scratch



Founders (2005):

- University of Aveiro
- University of Coimbra
- Municipality of Cantanhede



Other funding sources:

PT Government and EC subsidies  
and projects

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## 3.7. Starting from scratch

Education:



Research:



microbiology, cell biology, molecular biotechnology,  
genomics and sequencing, bioinformatics, systems biology,  
tissue engineering

Investment:



early stage investment, venture catalyst

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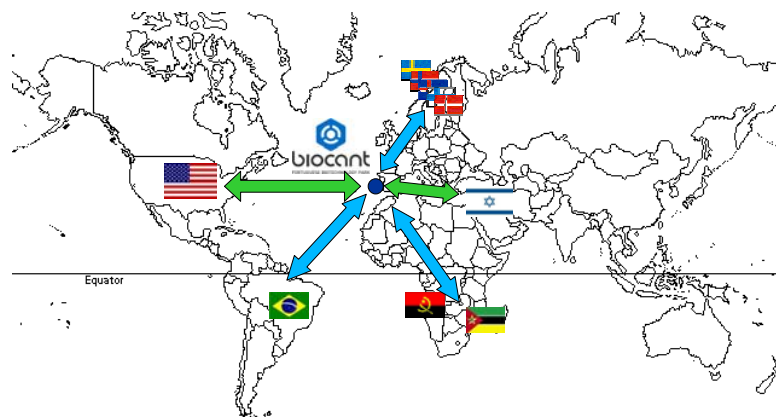
### 3.7. Starting from scratch

Biotech Park – Office and lab space for startups



### 3.7. Starting from scratch

International positioning & strategy



## Conclusions and Recommendations

1. The key ingredients must be (made) available
2. Top-down initiatives can be a catalyst but are not enough
3. Interaction between different communities within the cluster is mandatory
4. Be prepared not to get short-term results
5. Create a dynamic market
  - for company startup
  - for company growth
  - for company closure
  - ...do not waste time nor human, material or financial resources

## Further Information

- Biovalley
  - Alsace (FR), Freiburg (DE), Basel (CH)
- Medicon Valley:
  - Denmark + Sweden
- ScanBalt Bioregion
  - Scandinavian + Baltic regions
- Germany Bioregions

## Further Information

- Cambridge Biotechnology Cluster (UK)
- UK National Industrial Biotechnology Facility
- Stockholm BioScience (Sweden)
- Turku Bio Valley (Finland)
- VIB – Flanders Interuniversity Institute for Biotechnology (Belgium)

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## Further Information

- BioCat – BioRegion of Catalonia (Spain)
- CLIB2021 [Industry-led, Germany]
- Bio-Hub [Industry-led, France]

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# Obrigado!

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Este projeto é co-financiado  
pela União Europeia



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