

Arthur D Little

**BIO-ENTREPRENDRE: DE QUOI
PARLE-T-ON?**

Overview of Biotechnology Sector
and Business Models

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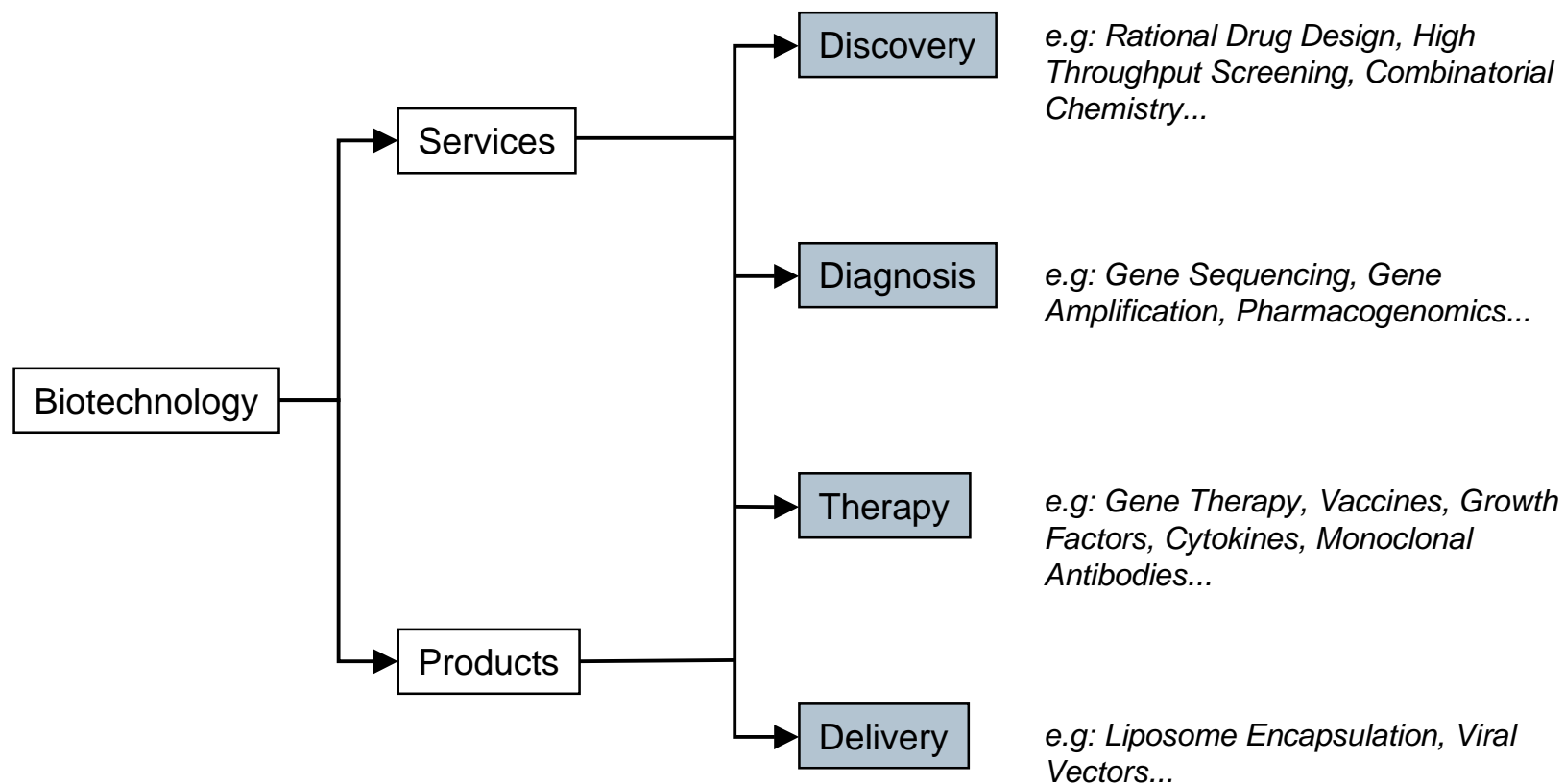
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- 1** **Biotechnology Sector Overview**
- 2 Business Models
- 3 Key Trends
- 4 French Biotech Industry

Biotechnologies have enabled the commercialization of products and services with a wide range of applications



Biotechnology boomed during the 1980s as a result of confluent forces

Technology Breakthroughs in BioSciences

- 1973: First DNA genetic engineering techniques
- 1975: First monoclonal antibody
- 1977: First expression of human gene in bacteria
- 1982: First biotech product in the market (Humulin)

Capital Market Appetite for Biotechnology

- Booming of Venture Capital
- Changes in pension fund regulations allowing more speculative investments

BIOTECHNOLOGY

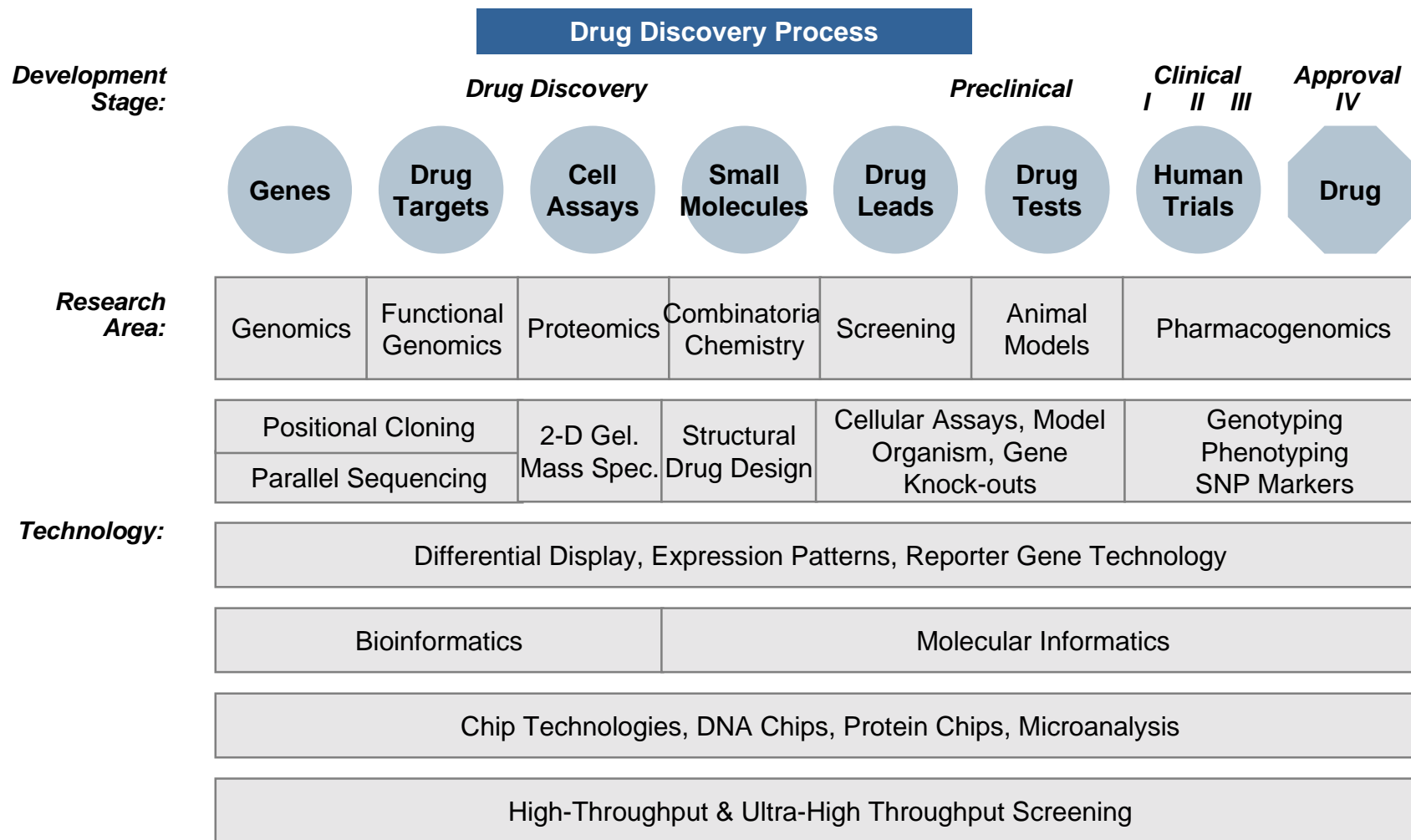
Cultural Shift Towards Entrepreneurial Business Models

- The bureaucratic nature of pharmaceutical R&D
- “Open-door” practice allowing academics to dedicate a portion of their work to outside activities

Favorable Government Policies

- Increased government funding of medical research
- Technology transfer policies under the Reagan administration

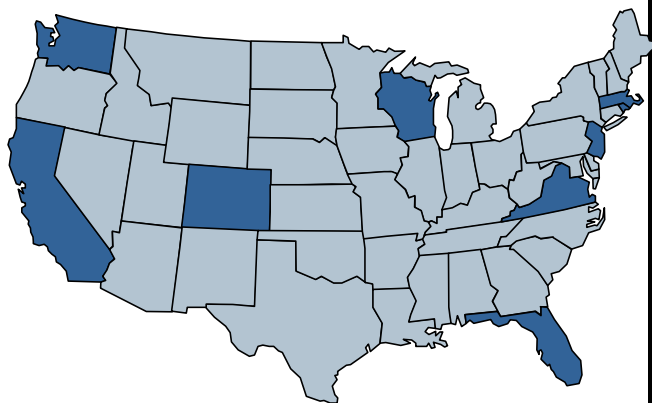
The impact of biotechnologies is evident across the entire drug discovery development and production process



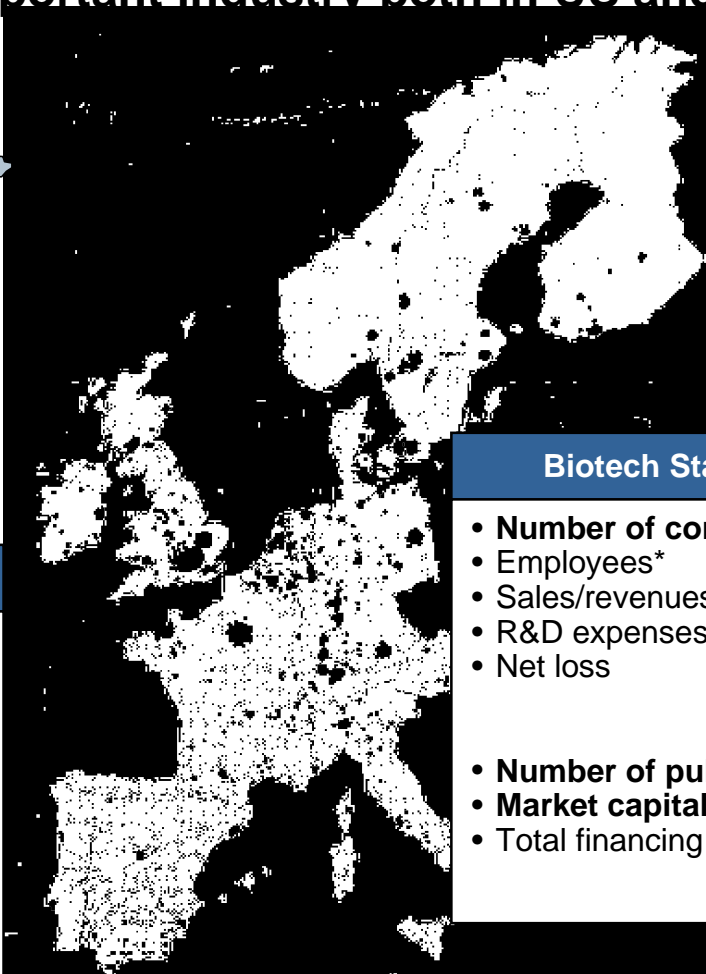
Sources: Arthur D. Little

Bio-Entrepreneur 2003 - E. Halioua

Biotechnology is now an important industry both in US and European markets



Biotech Statistics USA (2000)	
• Number of companies*	1379
• Employees*	174,000
• Sales/revenues*	€ 23.7 bn
• R&D expenses*	€ 11.4 bn
• Net loss	€ 5.9 bn
• Number of public companies	339
• Market capitalization	€ 376 bn
• Total financing	€ 29.9 bn



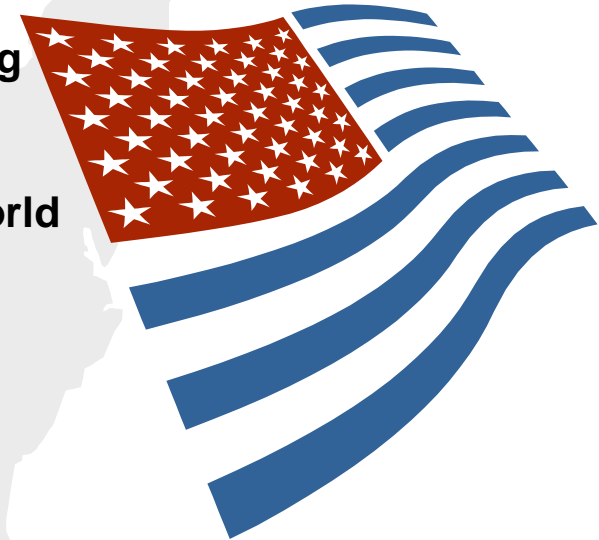
Biotech Statistics Europe (2000)	
• Number of companies*	1570
• Employees*	61,104
• Sales/revenues*	€ 8,7 bn
• R&D expenses*	€ 1.6 bn
• Net loss	€ 0.3 bn
• Number of public companies	114
• Market capitalization	€ 75 bn
• Total financing	€ 5.5 bn

* Only entrepreneurial companies accounted

Several factors have enabled the US to take a strong hold on the industry

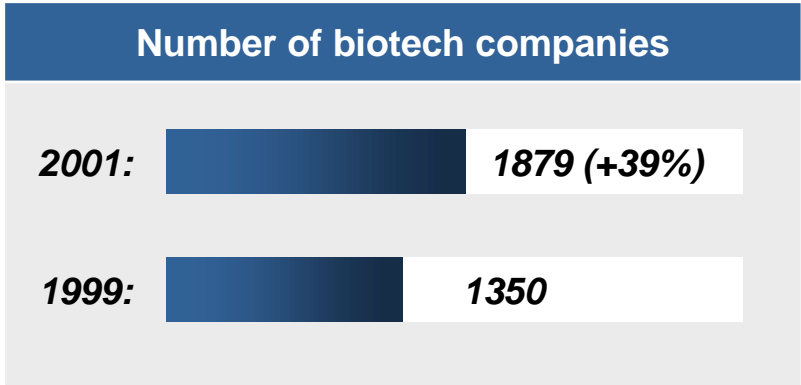
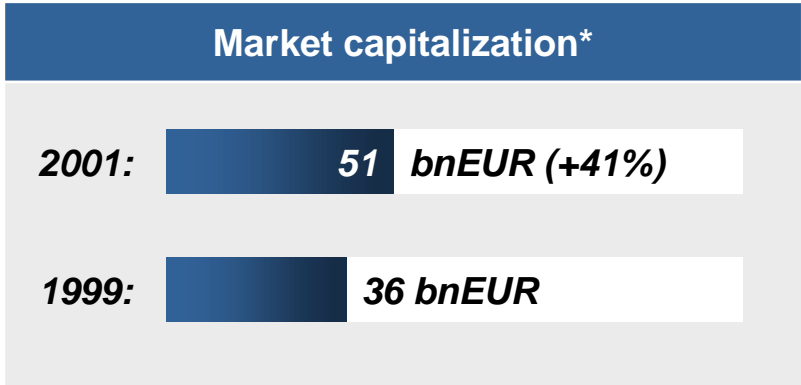
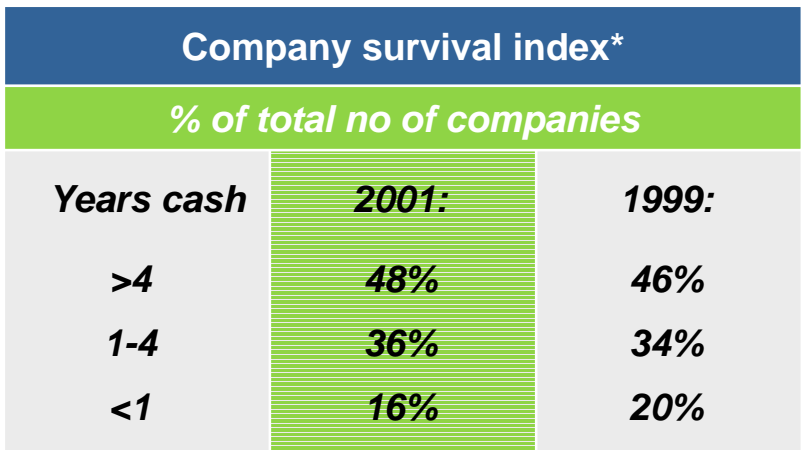
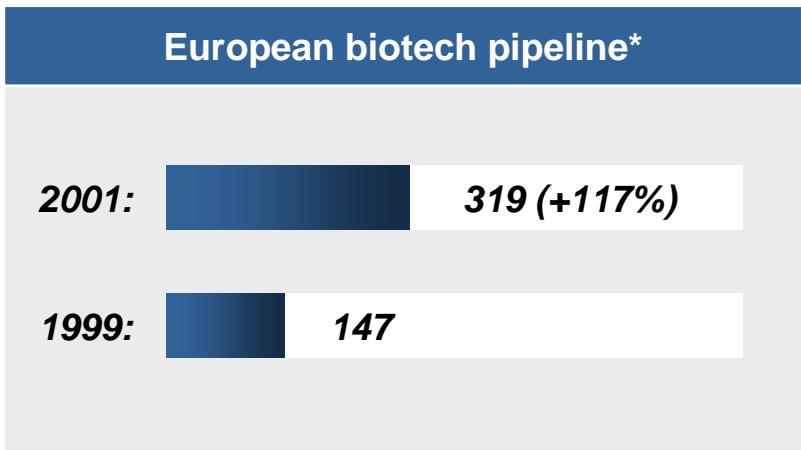
Contributing factors

- It's heads start
- It's more developed financing capability along the life cycle of a biotechnology company
- It's strong pool of management talent and world class scientists
- It's gigantic domestic market
- It's unified regulatory system



Several parameters indicate that European biotech is on the move

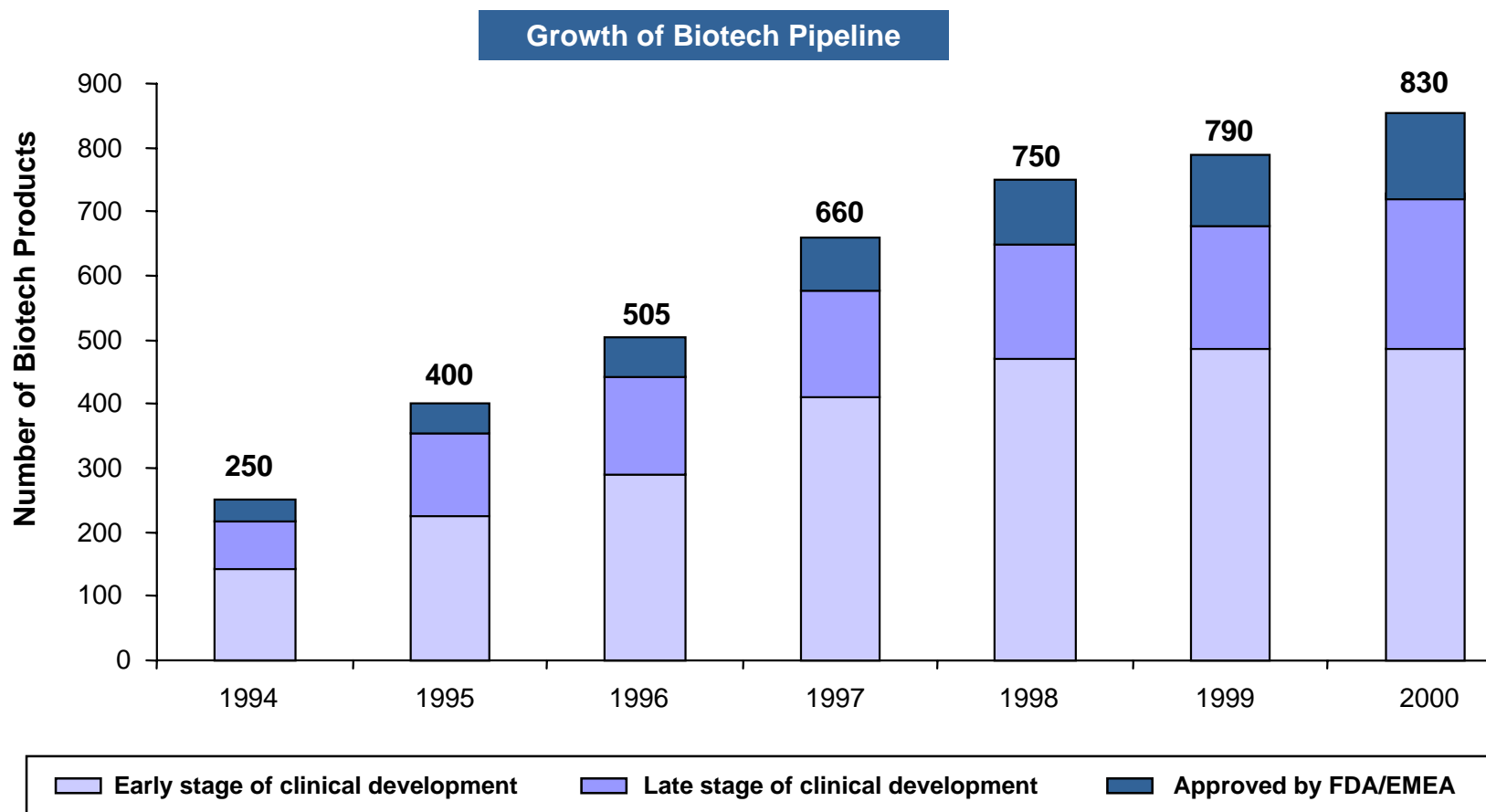
The European biotech industry



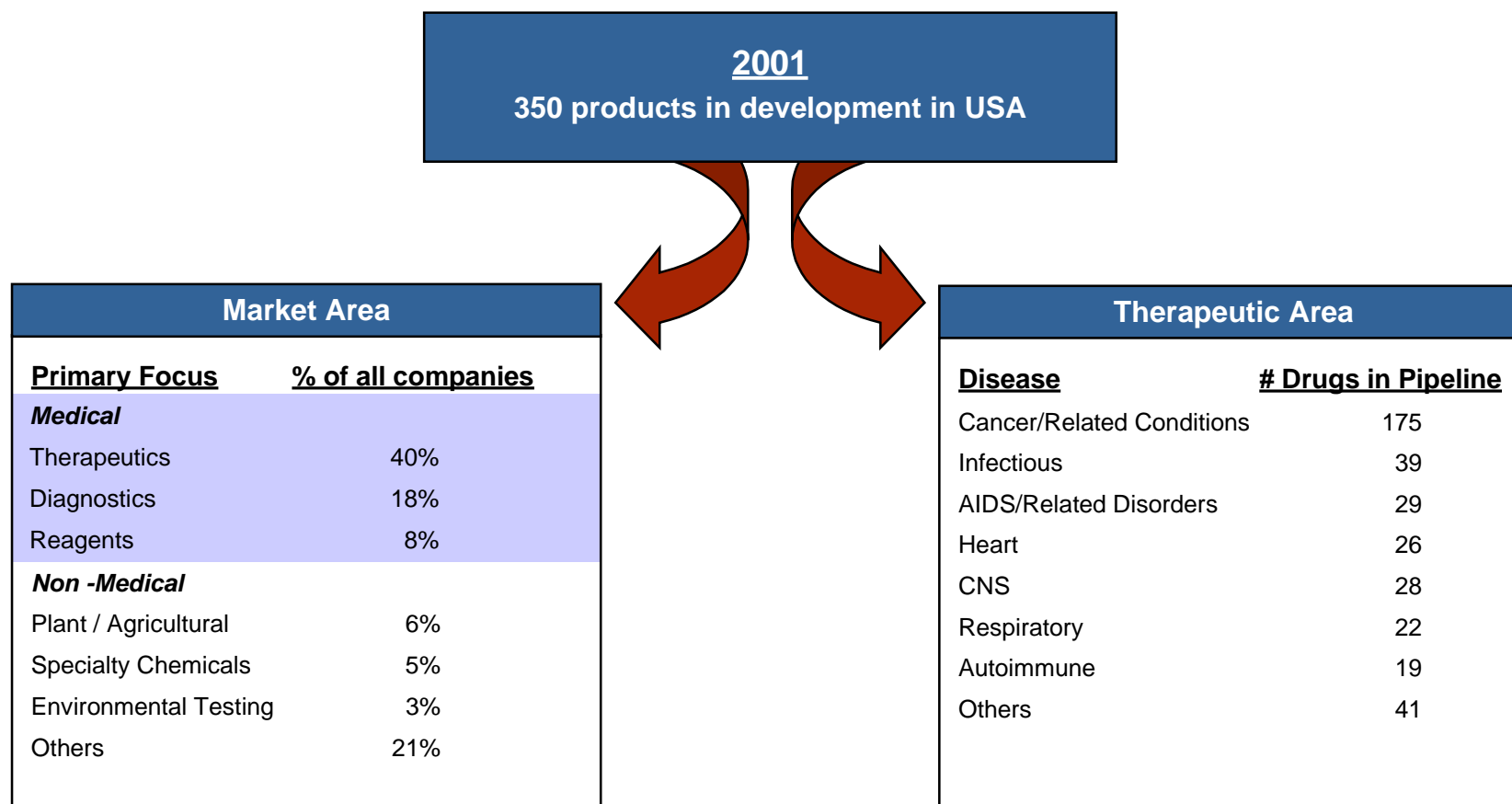
*European public companies

Sources: E&Y, Arthur D. Little estimates

The biotech pipeline continues to grow, with 155 biotech products on the market in 2002



Therapeutics is the most heavily targeted market area, with cancer being the largest therapeutic area being investigated



Sources: PhRMA Annual Report 1999, ADL Estimates, PhRMA "Biotechnology 2000"

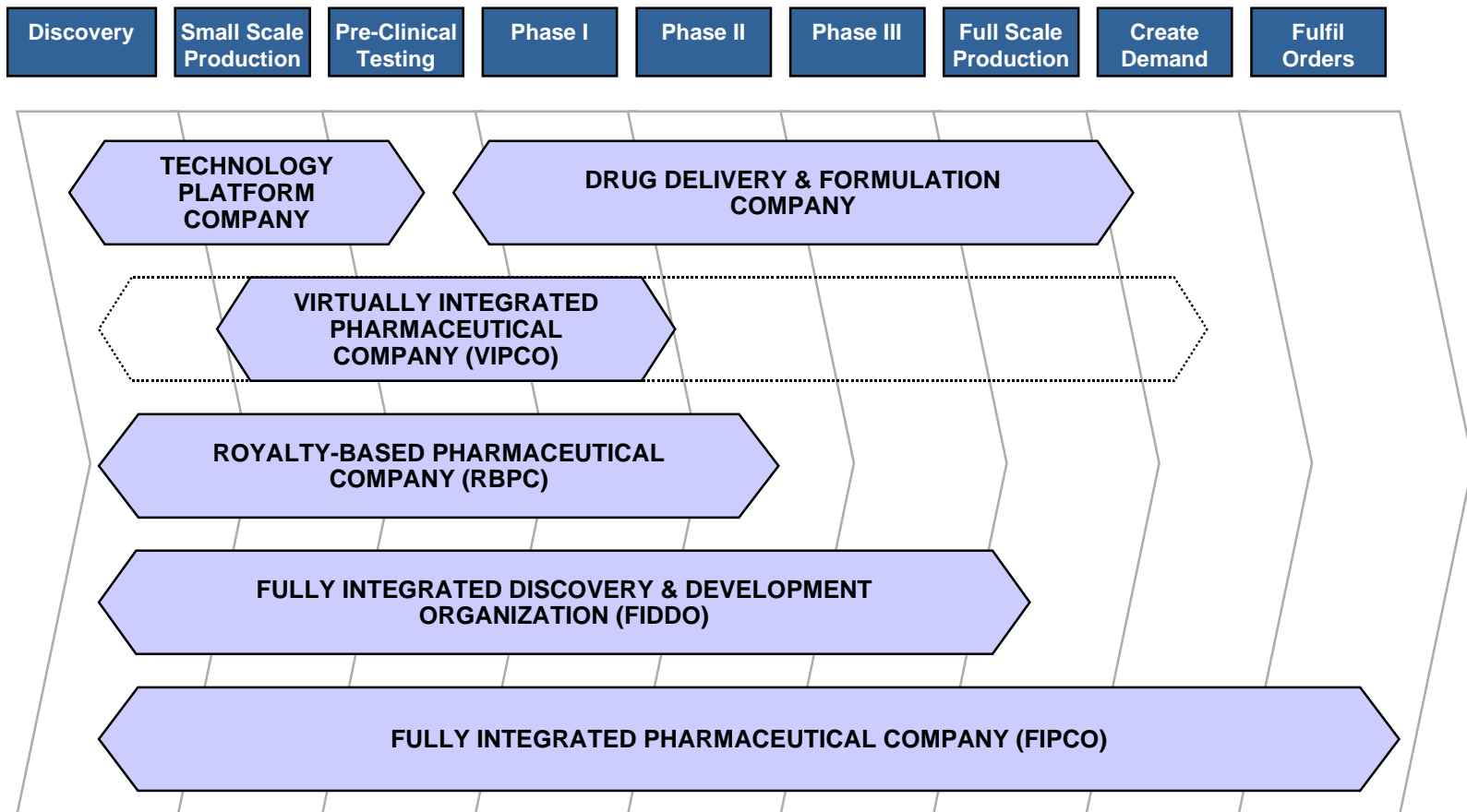
Roadmap

- 1 Biotechnology Sector Overview
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The road to success for an entrepreneur in biotechnology is long and challenging

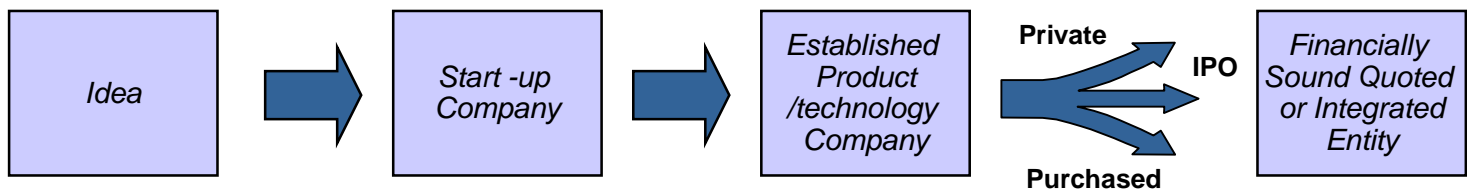
- 1 Risk and complexity of a biotech medical development
- 2 Raising of sufficient capital while keeping control of the enterprise
- 3 Access to adapted technical and managerial resources and needed competencies (clinical trials, regulatory,...)
- 4 Production of biological products (e.g. recombinant proteins)
- 5 Alliance management
- 6 Patent and regulatory constraints and uncertainties (e.g. cell and gene therapy)

To address these challenges, Biotechnology companies pursue different strategies according to the level of risk they wish to assume



As biotech firms grow to become public companies, managing relationships with large pharmaceutical partners and public investors become critical for their sustainable development

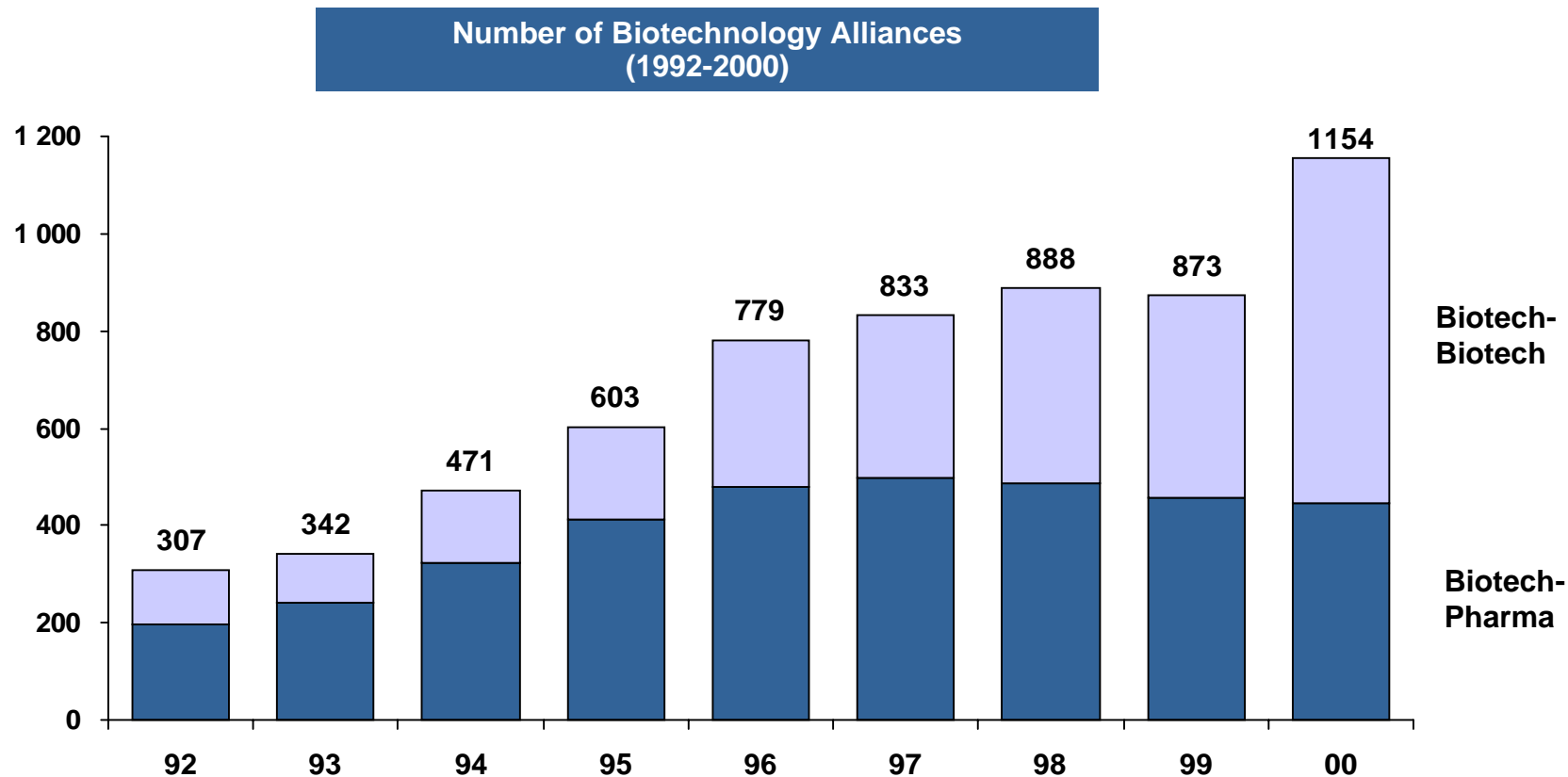
Phases of a biotech firm's development and stakeholder involvement



Academic Centers	✓ Idea Generation	✓ Idea development		
Large Life Science Companies		✓ Alliances	✓ Share purchase	✓ Partnering and/or ownership
Investors	✓ Seed capital	✓ Operational capital	✓ Share purchase	✓ Ownership

✓ = Critical role

Growth in the biotech industry has been supported by a strong collaborative environment



Source : Recombinant Capital, Arthur D. Little Analysis

Today approximately 25% of the Pharma. R&D budget is spent on alliances with Biotech and academic research institutes

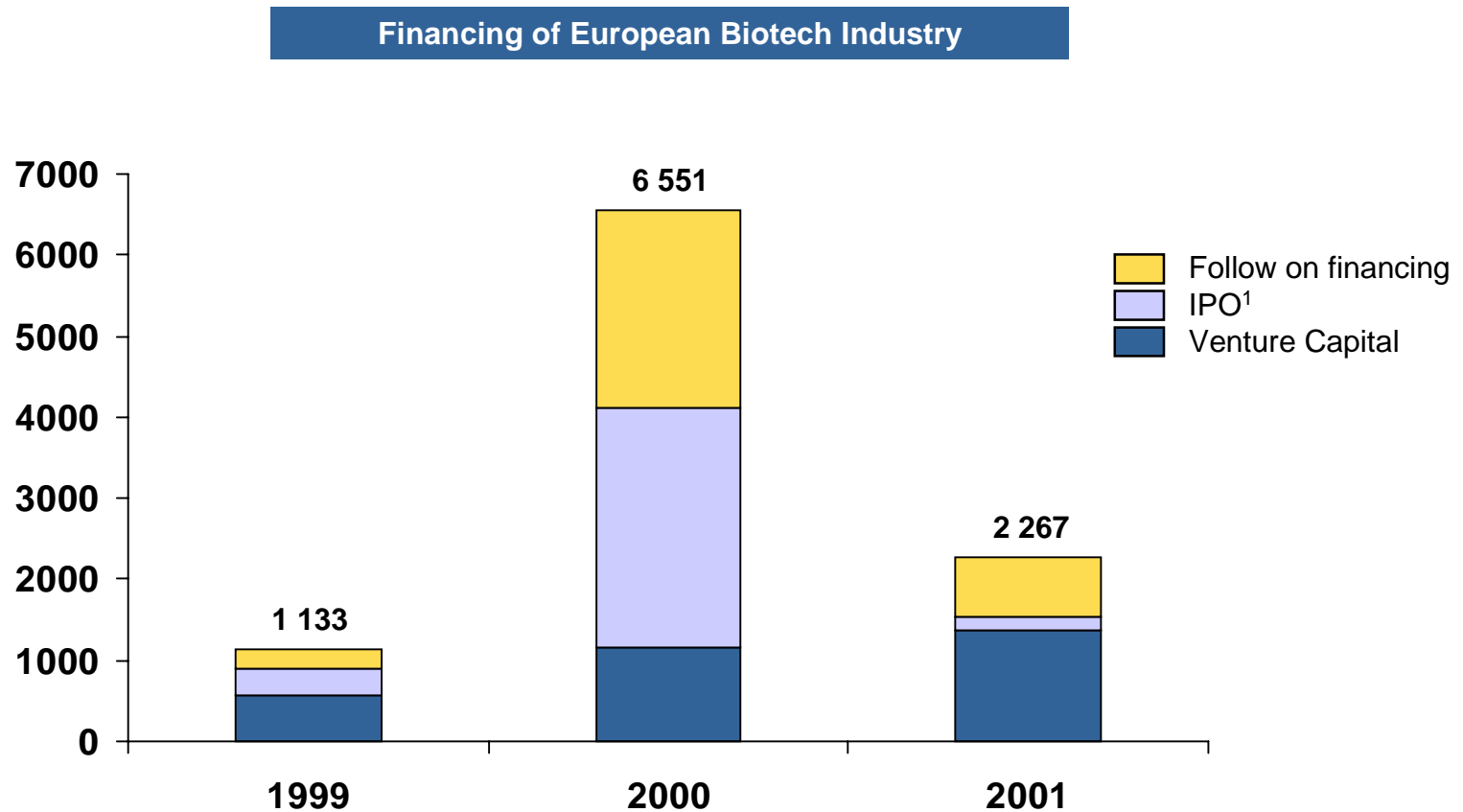
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3. Key Trends

Cash position

After a very good financing year for Biotech industry in 2000, the market conditions were depressed in 2001 and 2002



1: Initial Public Offering

Source : Recombinant Capital, Arthur D. Little Analysis

3. Key Trends

Increasing number of intra-biotech alliances

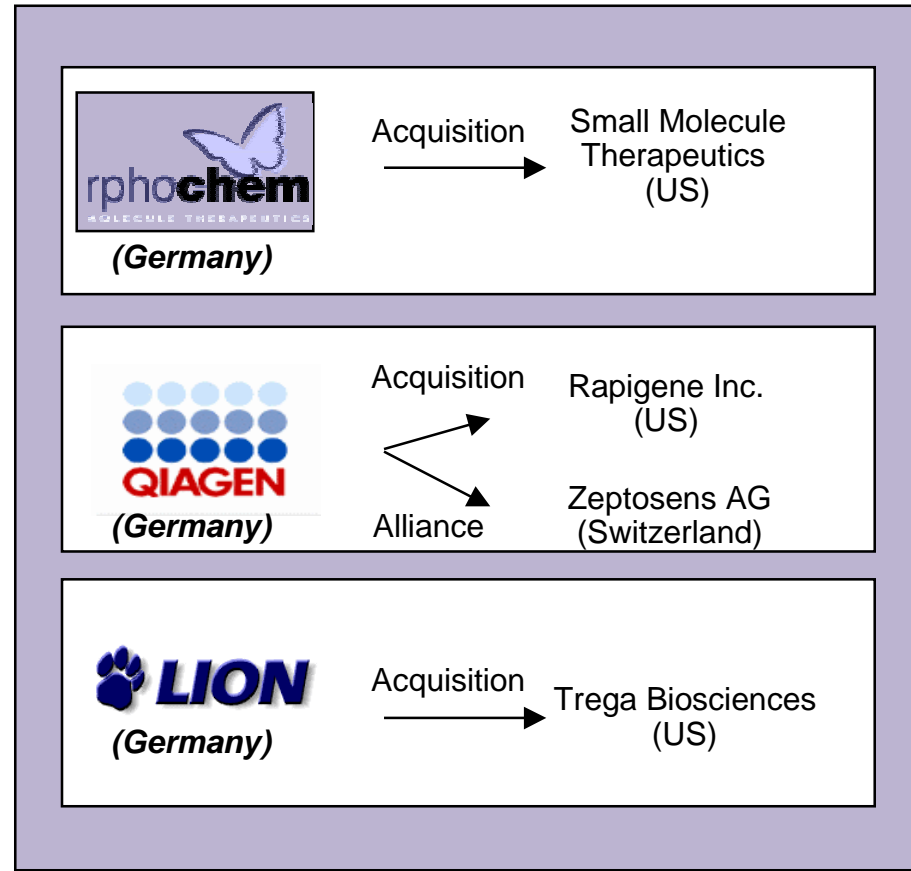
This context should contribute to the Biotech industry consolidation

Drivers

Gain critical mass

Reduce exposure to risk

Integrate vertically or horizontally



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4. French Biotech industry

After a vegetative phase until mid 1990s, France is today in a favorable environment for Biotech development

- The creation of the Nouveau Marché in 1996 was a decisive factor in the development of a Biotech industry in France as it provided an interesting return for financiers who had invested in the initial stage.
 - Several Venture Capital companies have been created in France after the establishment of the Nouveau marché

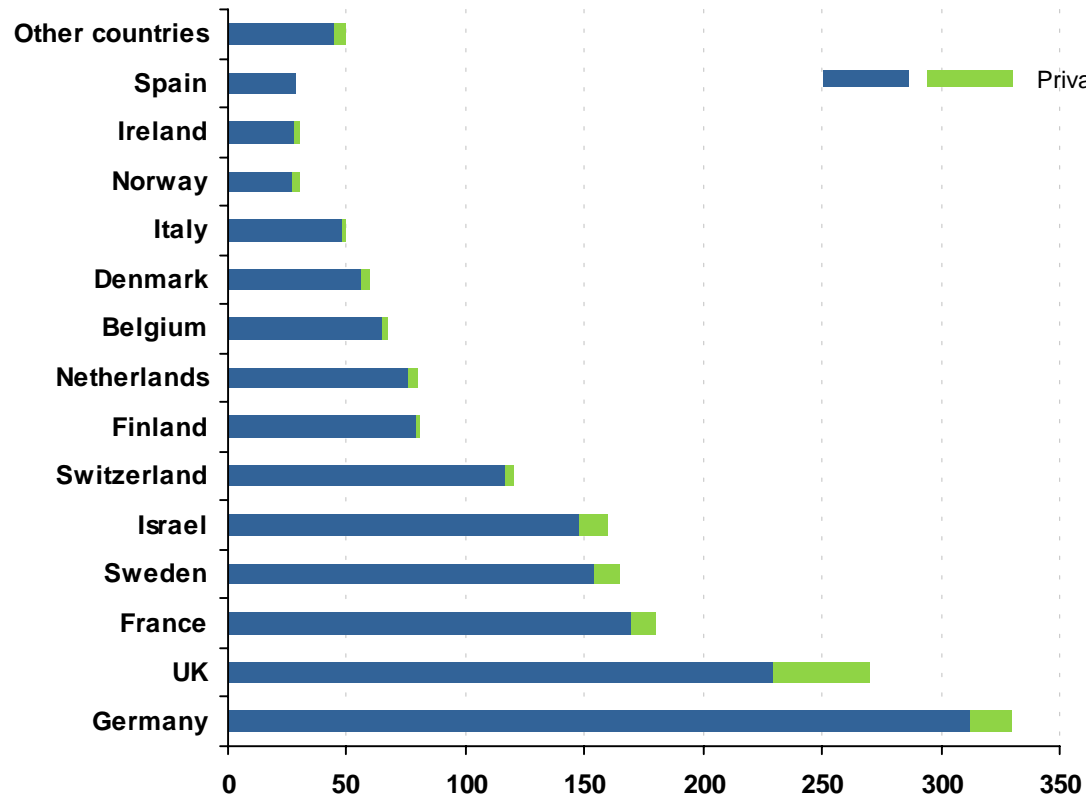
- The different government plans provided as well a favorable field for the development of Biotech company
 - "Loi sur l'innovation" in 1999 clarifying technology transfer rules, encouraging research from universities to create Biotech companies and creating the incubators
 - Plan Innovation 2003 (Statut de la jeune entreprise innovante)

- Today, biotechnologies have a central and strategic role in the different plans of politicians

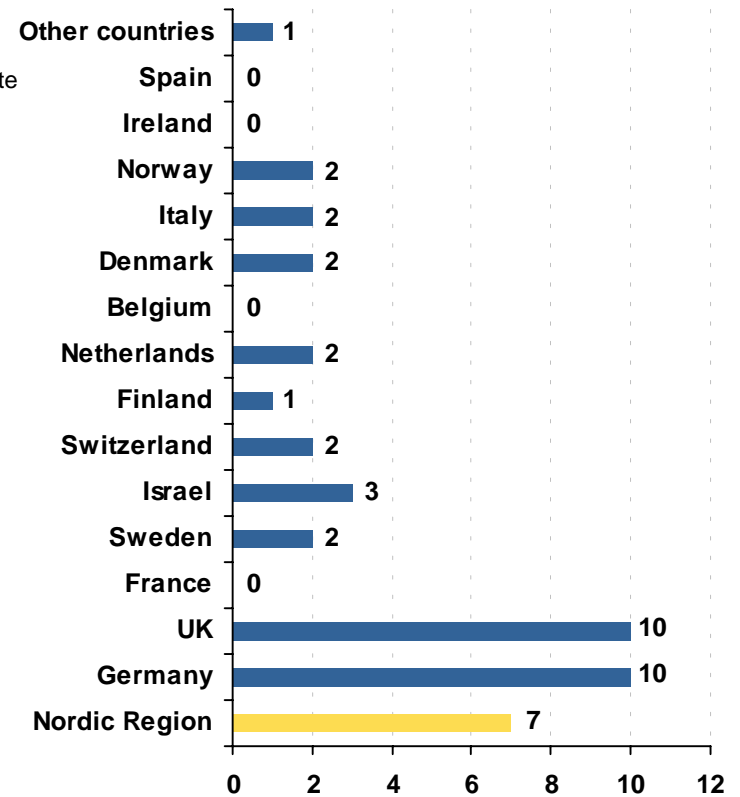
4. French Biotech industry

At the end of 2001, France had 266 biotech companies and was ranked number 3 in Europe...

Total no of European biotech companies per country (2001)



European biotech IPOs (2000)



... with a very high number of new businesses created during the last four years

Biotechnology is an opportunity for entrepreneurs

- Biotechnology will be a key driver of innovation in Healthcare
- Pharmaceutical companies will play a role in the development of biotechnologies in the future but nature of collaborations are not completely stabilized
- French context is favorable thanks
- To create a start-up in Biotechnology is challenging but can contribute to value generation for society (products for unmet medical needs) for founders and for other key contributors (financial investors, universities,...)

About Arthur D. Little

Arthur D. Little is a global management consulting firm

Arthur D Little



- Arthur D. Little is a premier global consulting firm with over 2,000 staff in 29 offices
- Arthur D. Little was founded in 1886 as the world's first consulting firm
- Arthur D. Little has a global commitment to serve the Life Science industry
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