

# Vitalization of Industry Through the Promotion of Knowledge Intensive New Firms – The Case of German Biotechnology

The Japan Institute for Labour Policy and Training, Tokyo, 26.03.2004



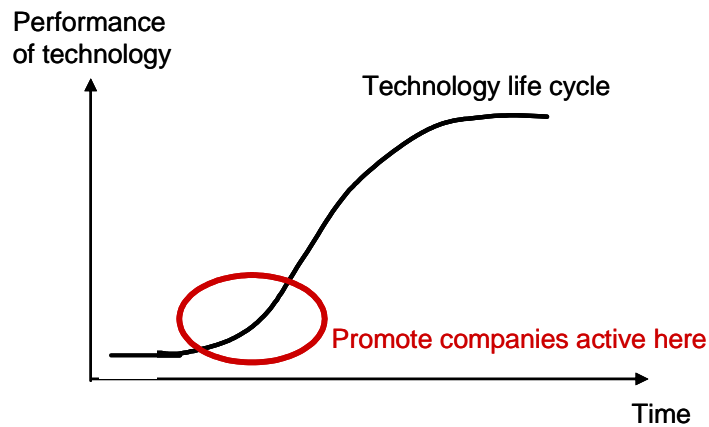
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## Structure of the Presentation

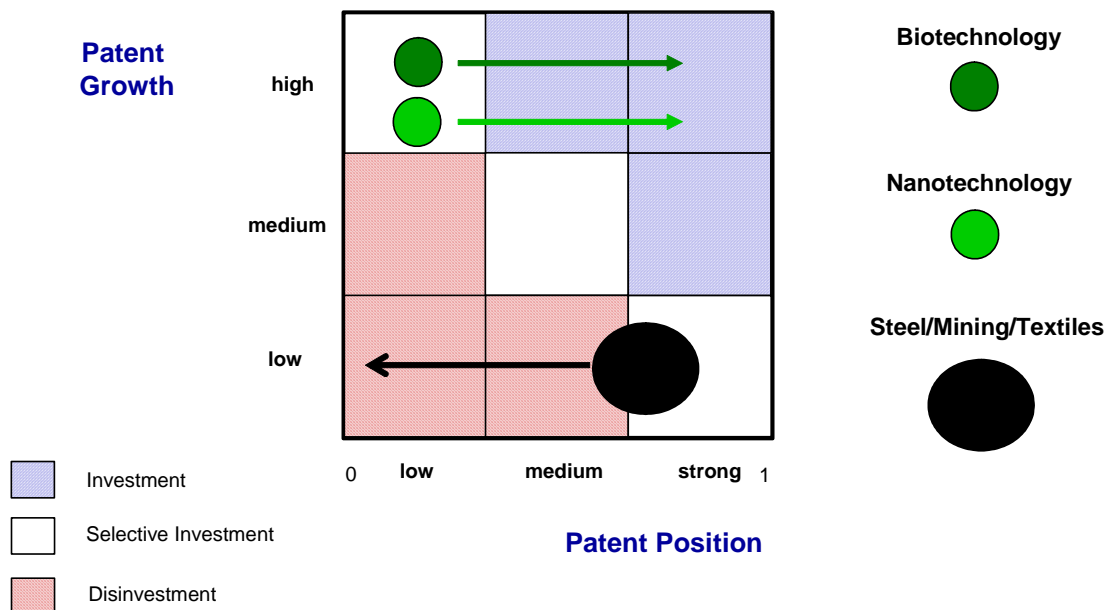
- **Importance of promoting knowledge-intensive industries**
- **Regional factors and knowledge-intensive industries**
- **The BioRegio contest: Implementation of a new policy**
- **Characteristics of the BioRegio winner regions**
- **Results of the BioRegio contest**
- **Conclusions**

## Promotion of Knowledge-Intensive Industries

- Attract new firms operating in new technologies
- Alternative to retaining old-industry firms with subsidies (portfolio management: national R&D portfolio)
- At an early stage in technological development (high uncertainties; (basic) research (far) away from commercialization), public promotion programs have the highest impact on successful knowledge creation.



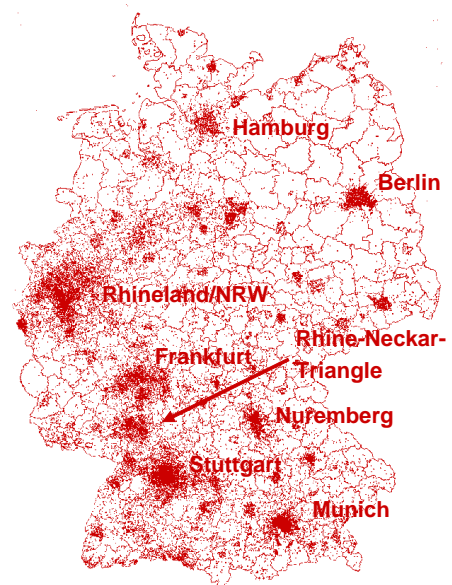
## Strategic R&D Portfolio Management at the National Level



## Regional Factors and Knowledge-Intensive Industries

- Knowledge-creating companies tend to cluster in regions.
- Regions have specialized factor markets.
  - Skilled labor
  - Services
- Regions facilitate knowledge-transfer.
  - Reduced transaction costs and risk
  - Transfer of tacit knowledge needs direct interaction
  - Most knowledge spillovers happen at the regional level
- Universities and research institutions enhance the regional business environment:
  - Labor market
  - Technology transfer
  - Entrepreneurial activity

Knowledge clusters in Germany



Source: Greif and Schmiedl, 2002

## BioRegio: A New, Regional Promotion Policy for Biotechnology

- Regions as centers of growth
- Interregional competition
- Promotion of the strongest regions
- Initiated by the federal government, first implementation in Biotechnology
- BioRegio contest, initiated in 1995 and realized 1996-2003:
  - 17 regions developed biotech promotion concepts (financed by the federal government)
  - Interdisciplinary expert (also from industry) jury chose best regions.
  - Winner regions got special funding to realize the regional concept (Euro 95 million total)
  - Winners also got preferential access to general federal biotech funding (Euro 750 million)
  - **Availability of public funding for biotechnology projects depended on private investors:**
    - At least 50% of the investment volume of each project had to be covered by private funding
    - In evaluating projects, government largely relied on the private investors' commitments.
  - During the first 23 months of the distribution of public funds, the winner regions received 66% of the total private and public biotechnology investments in Germany.

## Why the Focus on Biotechnology?

- Biotechnology is a strategic technology
  - High importance for the multi-billion-Euro life science industry
  - Enables many other advanced technologies
- Biotechnology companies...
  - Are extremely knowledge intensive
    - Strong orientation towards basic research
  - Need strong funding
    - Significant research efforts necessary before generating enough cash-flows
  - Are relatively new and their location reflects contemporary regional differences.
- Situation in Germany in 1995:
  - Strong research institutions
  - Important research results came from Germany, but were commercialized elsewhere
  - Very small German biotech industry, compared to the U.S.A. and U.K.
- **Objectives:**
  - Encourage the formation of biotech companies
  - Stimulate the growth of existing biotech companies
  - Make Germany the No. 1 European Biotech country
  - Revitalize the German economy through the promotion of biotechnology (knowledge-intensive industry with high added value)

## Evaluation Criteria of the BioRegio Contest

- Number and scale of existing biotechnology companies in the region
- Number, profile and productivity of biotech research facilities and universities in the region
- Interaction of different branches of biotechnology in the region
- Supporting service facilities (patent attorneys, information networks, consulting)
- Strategies to convert biotechnology know-how into new products, processes or services
- Regional concept to help start-up biotech companies
- Provision of resources (private and public) to finance biotech companies
- Cooperation among regional biotech research institutes and clinical hospitals in the region
- Local authorities approval practice concerning new biotech facilities and field experiments

Regions that won the BioRegio contest:

Rhineland, Munich, Rhine-Neckar-Triangle

Special vote for the small city of Jena (Eastern Germany)

## Characteristics of the BioRegio Winner Regions

Name of Region	Scientific Base	Company Base	Other Aspects
Munich	Two universities, several large biotechnology research institutes.	Large biotechnology production site nearby. Roche Diagnostics. About 34 biotech companies in 1996.	Regional promotion already from 1992 on. International Venture Capital Firms located in Munich.
Rhineland	Four relevant universities, highest density of academic institutions in Europe. Several biotechnology research institutes.	Large and several medium-sized pharmaceutical companies (Bayer). About 20 biotech companies in 1994.	Research centers distributed across the region. Some biotech promotion since 1991.
Rhine-Neckar-Triangle	One university and several important biotechnology research institutes.	Large pharmaceutical companies (Roche, BASF). Several biotech companies.	Additional large pharmaceutical companies nearby.
Jena	One university and three research institutes related to biotechnology.	One medium-sized pharmaceutical company. Five biotechnology companies in 1995	Only 100,000 inhabitants. History in optical instruments (Carl Zeiss).

Source: Bio-M AG, Life Science Agency GmbH, BioRegion Rhein-Neckar-Dreieck e.V., BioRegio Jena e.V.

## Regional Promotion Concept

- Financing
  - Advice on financing options
  - Help with obtaining public and private funds
  - Creation of a dedicated regional seed capital fund
  - Close cooperation with venture capital firms
- Contacts
  - Coordination of all stakeholders
    - Founders, Scientists, Investors, Policy Makers, ...
  - Networking events
- Consulting and Training
  - Advice on business plan, market research, ...
  - Services concerning intellectual property
  - Seminars and conferences for founders and employees
    - Biotechnology-related, Business-related
- Stimulation of knowledge transfer
  - Coordination of public research and local companies
  - Promotion of spin-offs
- Support: Technology parks with offices and certified laboratory space.
- General public relations work
  - Promotion of the region at trade fairs, conferences, ...

Jena:

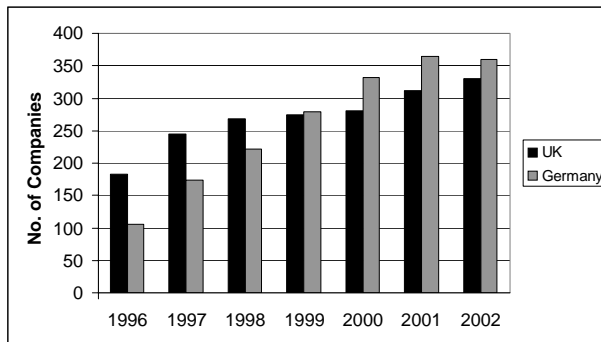
Focus on Bioinstruments

Rhineland:

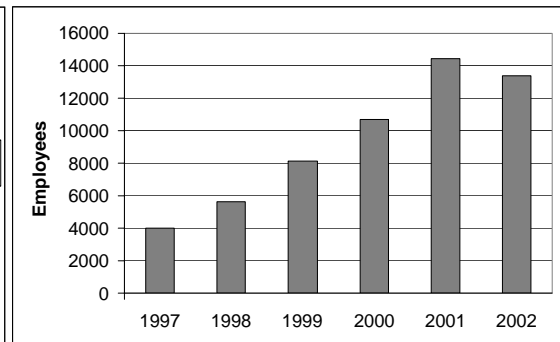
Several sub-clusters near research centres.

## BioRegio Results at the National Level

- Number of dedicated biotech companies increased more than 300%
- Created more than 9000 jobs in new biotech companies
- Germany overtook the UK; No. 1 Biotech country in Europe (in terms of no. of companies)
- Mobilized large sums of private investment (more than Euro 750 million)
- Inspired many new promotion programs in different technology fields.
- Many of the 13 non-winner regions implemented their concept (without receiving priority funding) and succeeded in improving their biotechnology industry.



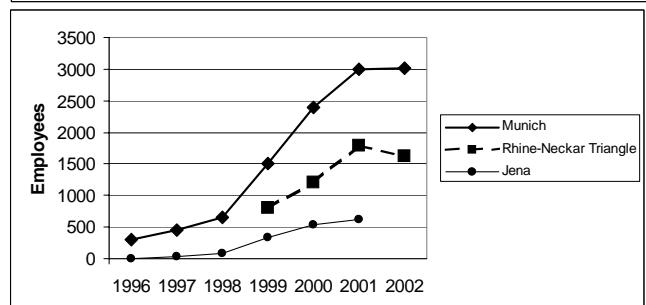
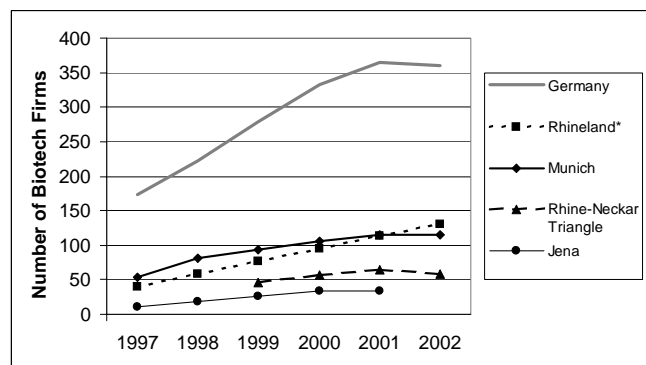
Data Source: Ernst&Young (2003)



Data Source: Ernst&Young (2003)

## BioRegio Results at the Regional Level – Firm and Job Creation

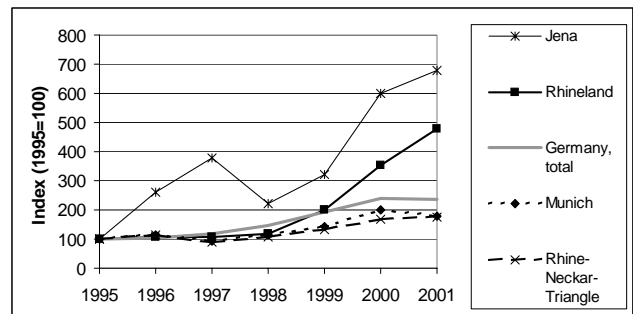
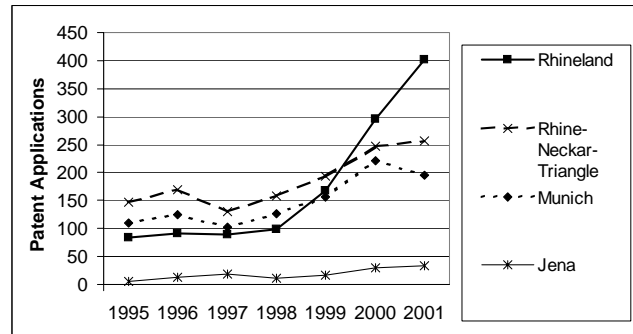
- All winner regions attracted new companies and created a significant amount of new jobs
- Rhineland attracted more firms than the other regions
- Jena managed to increase its local biotech industry from 5 to 34 companies
- Both Rhineland and Jena increased their share of German biotech firms
- The relative increase in biotech jobs was significantly higher in the BioRegio winner regions than in Germany as a whole
- Munich has more employees in biotech companies than any other German region (Stat. Bundesamt)



Data Source: Regional Promotion Agencies, Ernst&Young (2003)

## BioRegio Results at the Regional Level – Knowledge Creation (Patents)

- The rate of knowledge-creation (patent applications) accelerated after the implementation of BioRegio (1997) in all regions.
- From 1998, Rhineland has tremendously increased its rate of knowledge-creation in biotechnology.
- Biotech patent applications in Rhineland and Jena grew faster than in Germany on average.
- On average, half of the patent applications come from academic research institutions (changes in exploitation policies for patents generated at universities).



Data Source: Own Research

## Conclusions

- The regional promotion policy implemented in BioRegio was a success
  - In terms of firm, job and knowledge creation (vitalization objectives achieved)
  - Even the region of Jena, which entered biotech only in 1997, had created more than 600 jobs in multiple new companies by the year 2001.
- A strong science base (universities, research institutions, firms) is a prerequisite for knowledge-intensive industries
  - But even competences in related areas can serve as a starting point, as shown by Jena (focused on its existing competences in medical instruments).
- The key success factors of the BioRegio contest were:
  - Orientation towards private investment in public funding decisions
    - Public funds were directed towards projects with high expected economic payoffs
    - The total funds available to biotech were much higher than the public funds (no crowding-out effects)
  - Promotion of regional interaction and entrepreneurial activity
  - Support and advice for entrepreneurs and young firms
  - Interregional competition (not only the 4 mentioned regions were successful in biotechnology)

## The Improvement of Germany's Position in Biotechnology and its Overall R&D Portfolio

