# Development of the German Research and Innovation Policy towards networks and clusters

K. Matthes

German Embassy

Science and Technology Division

Email: Wiss1@toky.auswaertiges-amt.de

#### Structure of the presentation

- Japan and Germany, comparing data
- Development of the Research Policy in Germany
- kompetenznetze.de
- InnoRegio: special program for East Germany
- Examples/ best practice
- Lessons learned

#### Japan-Germany: Comparing Data (1)

	Germany	Japan
Population (Mio)	82	127
GDP (Bio US \$, PPP)	2195	3440
R&D-Budget of Gov. (Bio Euro)	16	27
Researchers (total)	240.000	740.000
Researchers in public Institutes	39.000	31.000
PhD-graduations per year	12.000	6.500
Patents (registered worldwide)	92.000	218.000
Triade Patents	5700	10.200
Scientific Publications (% OECD)	9,2 %	10,3%
Scientific Citation Rate (% OECD)	9,2 %	7,2 %

#### Japan-Germany: Comparing Data (2)

	Germany	Japan
know-how-intensive goods:		
- Techn. Paym Income (Bio USD)	13,9	9,8
- Techn. Payment (Bio USD)	20,6	4,1
- Trade-balance (Bio Euro)	+ 90	+ 200
- World market share	14%	12%
Economic competitiveness:		
- World Compet. Report (IMD)	10	11

## Structure of the presentation

2 Japan and Germany: comparing data

- Development of the Research Policy in Germany
- kompetenznetze.de
- Inno Regio: special program for East Germany
  - Examples/best practice
- Lessons learned

# Change of R&D-policy

old



- + Focus on scientific-technological goals
- + support of single institutions (institutional orientation)



- + Focus on innovation goals
- + support of network structures (structure orientation)

Evaluation by scientific-technological criteria Promotion of good, but isolated projects



Evaluation of strategic and structural success criteria
Promotion of networks, selected by competition

Presentation of single R&D results



Active marketing of competence

# Research Promotion Policy in Germany

Networks/Clusters

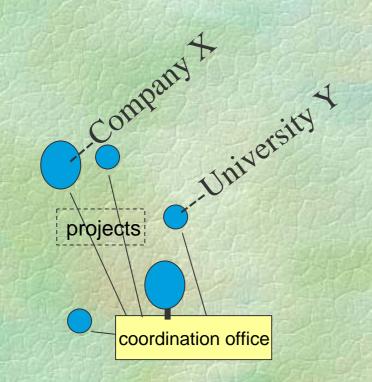
Leading Projects ----

Co-operation Projects -----

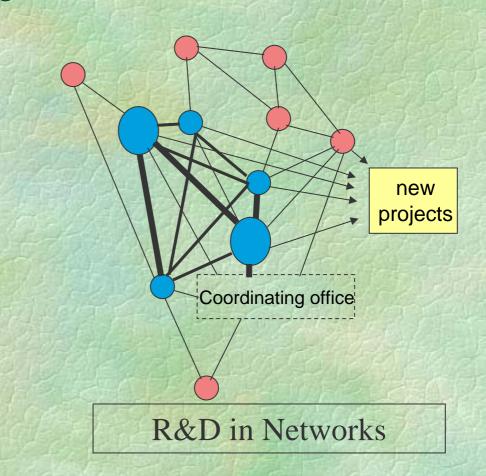
Single Projects

60th 70th 80th 90th 2000

# From single projects to networks



Cooperation Project



**Important**:: network structure and R&D projects should be funded separately!

# Results of a 10-country comparative study

#### Networks overcome the weakness of traditional innovation systems

- a lack of co-operation between university/research sector and industry
- scattered and uncoordinated support activities
- science-industry-interface not clearly defined
- concentration of innovative activities in metropolitan areas
- brain drain due to scientific hot spots of other countries
- low mobility rate and little transfer of knowledge

prevalence of a systemic imperfection outstanding rationale for initiating networking policies.

#### **Value chain: closing gaps**

- **Supporting cooperation** 
  - working groups
  - exchange of experience
  - increasing flexibility
  - support of spill-over effects from science to industry and vice versa
- Sharpening the regional profile
  - marketing
  - reputation management
  - public consultancy

**Location Orientation** 

## Definition of competence-networks

Criterion 1: Thematic, strategic, and regional focus

common guidelines, targets

Criterion 2: Integrative approach

scientific and technological know-how

educational offers

innovation-friendly general framework

Criterion 3: Interdisciplinarity and cooperation

close communication and interaction within the

network

cooperation with external partners

Criterion 4: International attractiveness

products leading to international markets

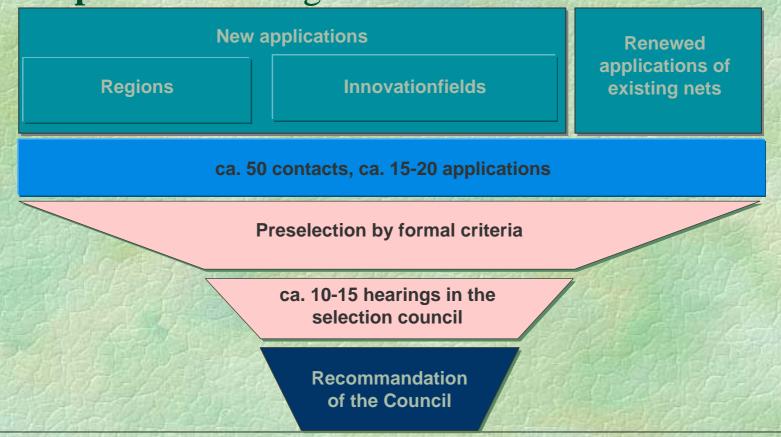
international contacts

## Structure of the presentation

- Japan and Germany: comparing data
- · Development of the Research Policy in Germany
- kompetenznetze.de
- ImnoRegio: special program for East Germany
  - Examples/best practice
- Lessons learned

# Selection of Networks of Competence

The principle: Bottom-up through a competition process
The goal: top networks with permanent quality control
The process: leading to the "club of the best"



# Kompetenznetze.de

The best networks of competence are presented at kompetenznetze.de kompetenznetze de - Microsoft Internet Explorer Datei Beachelten Ansicht Favoriten Estats 2 Zinick Abbrechen Aktualisieren Favoriten Drucken Beabeien Wechseln zu Links diesse 2 http://www.k.corpetenznetze.de/er/index.php?auth:25.sprache=2 Networks of Competence AS INTERNATION AND Federal Ministry of Education and Research kompetenznetze.de 4 Networks of Competence Guide to Innovation, Investment and Education Fields of Innovation - Regions - All Networks You are looking for excellence in education, research, development and business. We offer information on autstanding Networks of Competence in Germany. kompetenznetze.de - current issue nnovations at a glance Fuel Cell co-generation plant HANOVER FAIR 2003 PEM fuel cell with a rated electrical output risit us at the booth of the of 250 KW for electricity and heat co-Federal Ministry for Education generation. and Research (BMBF), Forum tech transfer, and the VDIexposition "Technologies for New Network of Competence: Fuel Call Miobrility". Network Nordrhein-Westfalen all Highlights! Calendar of events Gateway to Germany CONGRESS OF MINIMAL INVASIVE TUMOR THERAPY, This compilation provides information about 9 to 12 Apr 2003, Munich Germany in English language across a New materials technology event, 10 to 11 Apr 2003, variety of topics such as Education, Hanpver -Research, Exchange Programmes and Knowledge transfer from university to industry workshop, Business. 10 to 11 Apr 2003, Mallorca / Spain [full Calendar] We are continuously reviewing and enlarging this virtual guide to Germany for our Coordinating office: foreign visitors. Berlin Universities Create Online Job Portal VDI-Technologiezenfrum EU is bringing Energy Efficiency to the Liberalised Markets 🗖

Ø 3 16:44

## kompetenznetze.de

#### aims:

- identify strategic fields of innovation
- offer leading know how and techn.
- Techn.-Transfer and marketing
- promote internationalization

#### \* through

- information
- communication
- cooperation



## Innovation fields and regional clusters in Germany selected by kompetenznetze.de

Innovationsfelder	Anzahl Netze	Regionen	Anzahl Netze
Medizin	14	Aachen	8
Biotechnologie	12	BerlinBrandenburg	8
Optische Technologien / Lasertechnik	11	Stuttgart	7
Medizintechnik	10	Ruhrgebiet	6
Materialforschung	7	Braunschweig	5
Nanotechnologie	7	Hannover	5
Industrielle Produktion	6	Erfurt - Jena	4
Transport und Verkehr	5	Nürnberg-Erlangen	4
Energietechnik	4	Karlsruhe	3
Genomforschung	4	München	3
Biomaterialien	3	Tübingen / Reutlingen / Neckar-A	3
Informationstechnologie	4	Bodensee-Oberschwaben-Ulm	2
Mikrosystemtechnik	2	Dresden-Chemnitz	2
Telekommunikation	2	Frankfurt / Rhein-Main	2
Mechatronik	2	Rheinland	2
Maritime Technologien	1	Kaiserslautern	2
Umwelttechnik	1	Hamburg	2
Luft- und Raumfahrttechnologie	1	Freiburg	1
Bildung	1	Halle-Merseburg	1
Bionik	1	K.E.R.N.	1
	-44 34 18	OstWestfalenLippe	1
		Rhein-Neckar	1
	124 CON	Weser-Ems	1
		Würzburg	1
		Darmstadt / Starkenburg	1.05
		Saarbrücken / Saarpfalz	1

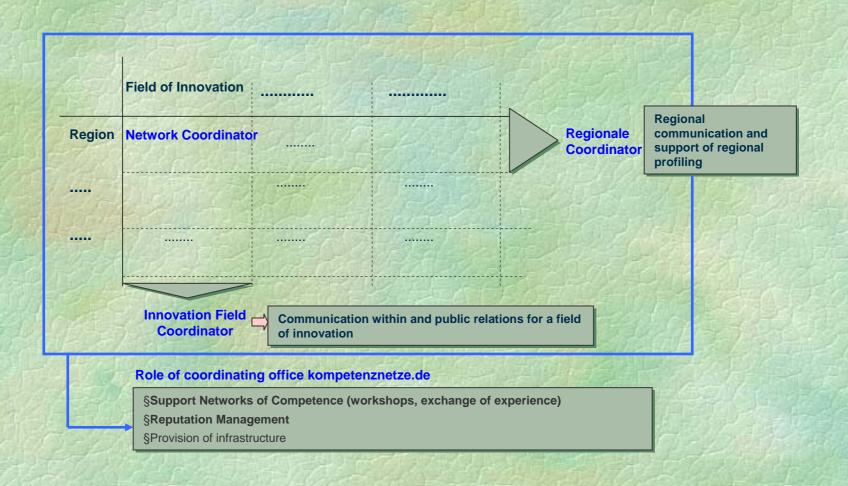
#### Kompetenznetze - innovative hot spots in Germany



informs about the best networks of competence in Germany:

- » 97 networks
- » 20 innovation fields
- 27 regions as local basis for networkcooperation

# Organization structure tasks and responsibilities



## Output of regional competence clusters

#### German regions with the highest patent intensity (patents/100000 employees)

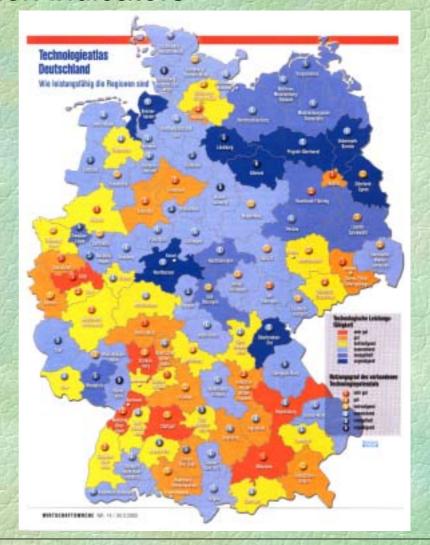
Business		Scienc	e
Region	Patent intensity	Region	Patent intensity
Stuttgart	279.9	Aachen	27.9
Rheinpfalz	272.5	Oberes Elbtal	24.3
Ostwürttemberg	250.3	Ostthüringen	22.0
München	236.5	München	18.0
Bodensee-Oberschwaben	220.6	Mittl. Obererrhein	16.0
Main-Rhön	212.1	Mittelthüringen	12.5
Starkenburg	209.5	Braunschweig	12.2
Oberland	203.7	Oderland-Spree	11.9
Mittelfranken	199.1	Südlicher Oberrhein	11.3
Braunschweig	192.1	Unterer Neckar	10.9

Source: Deutsches Patent- und Markenamt, S.Greif, Statistik der sozialversicherungspflichtig Beschäftigten, DIW

#### Ranking of regional clusters

based on 12 innovation indicators

Region	Index
1 München	59,10
2 Starkenburg	46,00
3 Regensburg	44,20
4 Mittlerer Oberrhein	42,90
5 Stuttgart	41,70
6 <mark>Köln</mark>	41,20
7 Mittelfranken	39,40
8 <mark>Düsseldorf</mark>	38,30
9 <mark>Südostoberbayern</mark>	38,10
10 Augsburg	37,10
11 Hamburg	36,80
12 Bodensee/Obersch	36,40
13 Donau/Iller	35,70
13 Hannover	35,70
15 Rhein/Main	35,50



## Structure of the presentation

- Japan and Germany: comparing data
- · Development of the Research Policy in Germany
- kompetenznetze de
- InnoRegio: special program for East Germany
- Examples/best practice
- Lessons learned

#### Reunification: new start for East Germany

#### First measures after reunification:

- Saving the few competitive industrial capacities
- Integrating the best research institutions

#### **Current Program:**

• build up regional innovation capacities through core areas of competence



InnoRegio Program

# InnoRegio

Innovation program for the new federal states

23 topic driven networks

8 innovative regional core growth areas

**40 Research Labs** 

24 interregional alliances

12 excellence centers

**540 running Research Projects** 

Program cost: 440 Mio Euro

1999

2002

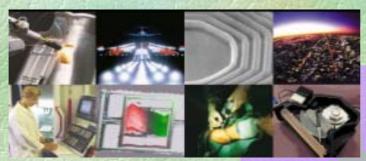
2004

2006

## Structure of the presentation

- . Japan and Germany: comparing data
- Development of the Research Policy in Germany
  - kompetenznetze de
  - ImpoRegio: special program for East Germany
- Examples/ best practice
- Lessons learned

# Optical technology networks



- **■** funding period: 2001 2006
- 50 % funding by BMBF
- > 400 partners
- **■** industry-led process
- ■11 regional networks
- 1 national network of networks
- accompanying evaluation

Photonic Net









**optonet** 



# **OptechNet**

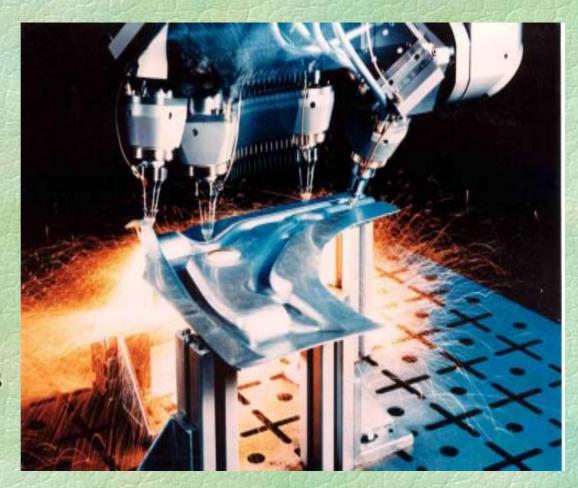
#### A regional cluster in the Ruhr area

#### Specialized in:

- displays and sensors
- optical measurement
- connection components
- optical materials

#### Partners:

- 25 industrial companies
- 7 research institutions
- 5 service companies

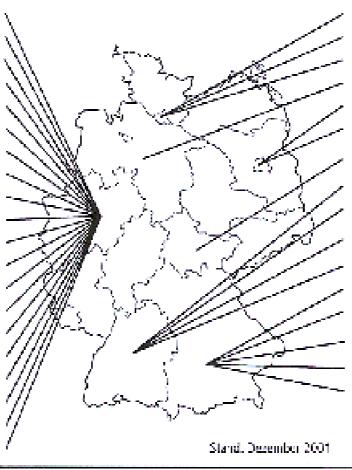


# Network: Innovative Recycle Technologies



#### Characteristic: 1 main regional concentration and 3 subclusters

ABX LOGISTICS GmbH ARRA TERRA Verbundsteff GmbH C.C. Umwer AG. Dewey Consult DC Efficienzagentur NBW Entrorgung Dortmune GmbH. Fraunhofer ML Fraunhoter UMSICHT H. Brühne Entsorgung GmbH & Co. KG. ICN mbH & Co. KG. INTERSEROH Entsorgungsdienstleistungs GmbH. Kohtes, Klewes & Partner SmbH. Kreislaufsystem Blochveraackungen Stahl SmbH. RAG Aktionijosel schaft. Buhr-Universität Bochum. Singula Gesellschaft für Systemtechnik mbH. SITA Eco Service CmbH Universität Cortmund, Fachgebiet Locistik. Universität Dortmund, INFU-WILD Globb



BDC Unterhelimesberatung GerbH. GRS-Batterion Starffrein gund Hamburg TU Braunschweig. Kreislauf- und Verwertungs- Agentur KVA eG. Tu Berlin VTI Thüringer Verlahrenstechnisches. Institut für Umwelt und Energie g.V., Fraunhofer, AOL Fraunhofer St. GGA Ceseslischaft für Glasrocyding und Apfallvermeidung mbH. Universität Stuttgart. CCR Logistics Bystems AG BJBOHOG CmbIII. Landeshaudtstack München. Amt für Abfallwirtschaft. TOGEX System GmbH & Co. KG. P.D.B.-Leoistik Fachhoorschule Studiengänge. Noralberg, Osterreich

# **Network: Innovative Recycle Technologies**



Goal: prepare the future cycle-economy with new concepts to avoid, reuse and remove garbage

#### **Common tasks:**

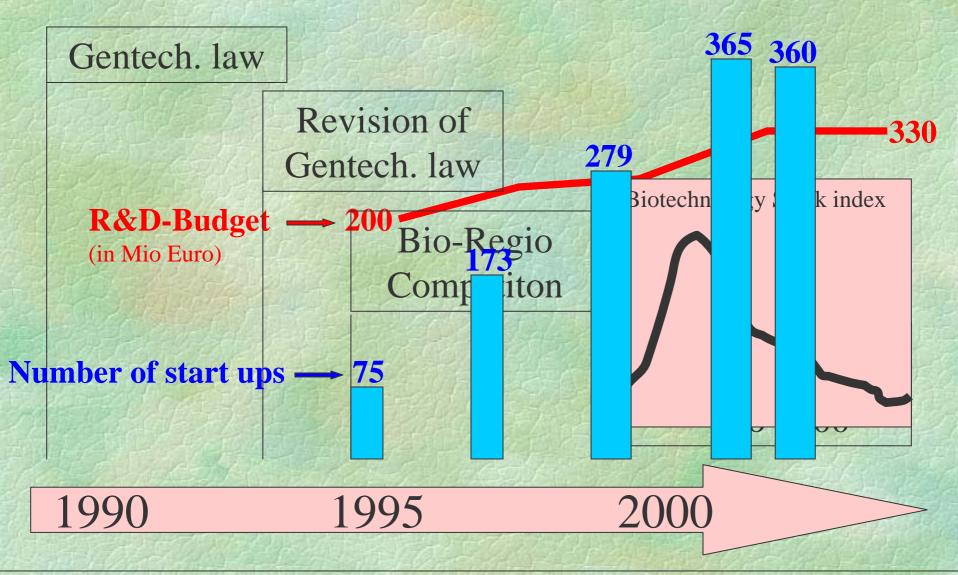
- 25 Research and Development Projects
- new education and professional training concepts
- common marketing and quality insurance concepts

Organization: 3 Meetings per year between 21 companies, 5 consultants, 7 universities and 5 public research institutions

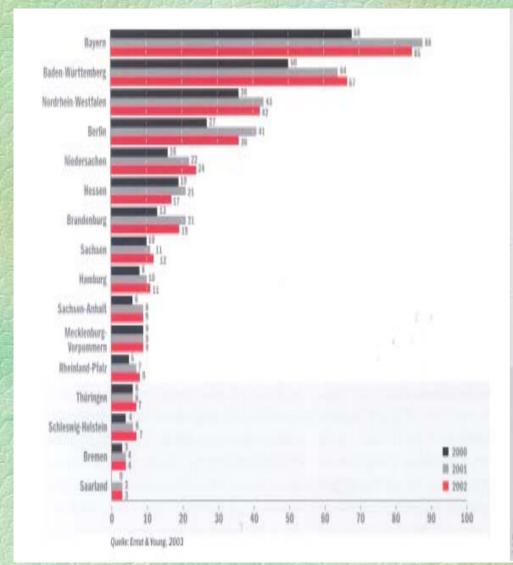
## Effects of clustering policy to regional economy

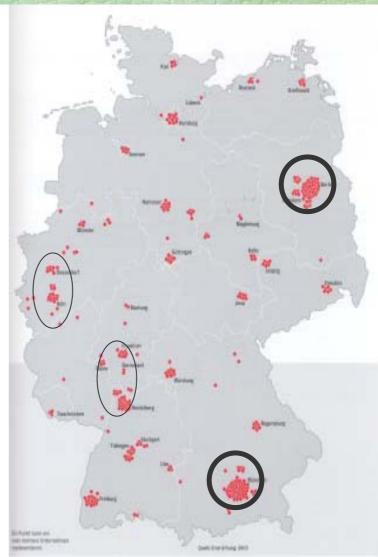
67.74	Wolfsburg	Dortmund
Starting conditions 1998:	18% jobless rate	Jobless rate over 16%
1770.	low qualification	restructuring of coal and
		steel industry
goals:	Reduce jobless rate	Reduce jobless rate
	build up an automobile cluster	build up clusters in IT-
		E-Commerce, Micro-
		systems, logistic
situation today:	* * * * * * * * * * * * * * * * * * *	* 57 new start ups
* 120 new start ups settlement of 100	* 120 new start ups	* 8 internat. companies
	settlement of 100	* new private university
	companies	* jobless rate: 15%

# Effects of clustering to industrial competitiveness Milestones of Biotechnology Development in Germany



## Core biotech companies in Germany





## Structure of the presentation

- 2 Japan and Germany: comparing data
- Development of the Research Policy in Germany
  - kompetenznetze de
- Inne Regio: special program for East Germany
- Examples/best practice
- Lessons learned

#### Lessons learned

#### Success criteria for innovation clusters

- 1. Conditions for high competitiveness
- 2. Sector-specific conditions
- 3. Market conditions
- 4. Existence of actors and networks
- 5. Regional frame conditions

# 1. Conditions for high competitiveness

- Focussing on core competences
- a common business plan/innovation concept
- establishment of alliances
- international orientation
- strategic forecasting
- effective structures and responsibilities
- controlling and evaluation of efficiency

# 2. Sector specific conditions

- complementation of companies (e.g. value chain)
- accumulation of appropriate human ressources
- availability of innovations
- existence of synergies
- availability of risk capital

#### 3. Market conditions

#### New clusters appear generally

- in growing markets
- in opening markets
- in connection of restructuring and fusion process

#### 4. Actors and networks

#### Important for the cluster building are:

- a respected personality as coordinator/spokesman
- an efficient network/cluster management
- broad promotion activities
- active support of new companies/start-ups

# 5. Regional frame conditions

#### Favorable conditions for cluster building are:

- good education and vocational facilities
- an innovation friendly environment, especially for starting new companies
- appropriate physical infrastructure
- appropriate political framework (e.g. tax, regulations, subsidies, gov. purchase .....)

# What politics should observe!

- Political support is only efficient, if the additional cost for reaching the "critical mass" of a self sustaining cluster is low (cost benefit analysis!): the risk of investment loss is high, if the critical mass cannot be reached
- The concentration on one economic branch leads to high risks in case of structural economic changes
- Cluster policy contradicts equal distribution of economic activities. Therefore: keep equal chances through a fair competition for every region