# Innovation & Intellectual Property Rights in Europe and Germany

**Robert A. Gehring**
TU Berlin
Computers & Society Research Group

**Presentation given to the**

**National Science Foundation of China**

Berlin, 18 November 2003

# Agenda

- *Some Facts about the Computers & Society Research Group at TUB*
- **Innovation in Europe & Germany**
- **The International IPR Regime**
- **Focus: Software Technology**
- **Conclusion**
- **A Look into the Future**

# Some Facts about the Computers & Society Research Group at TUB

- **Chair Prof. Bernd Lutterbeck, 2 assistant lecturers, 1 secretary + volunteers**
- **Research areas:**
  - Intellectual Property Rights
  - Open Source
  - IT Security
  - Privacy Protection
  - Mobile Computing
- **Consulting to various government & industry institutions**
  - German Federal Ministry of the Interior, German Federal Ministry of Work and Commerce
  - DaimlerChrysler, Schering, Deutsche Post
  - International Contacts: Stanford (USA), Dalian (PRC), Bournemouth (UK)

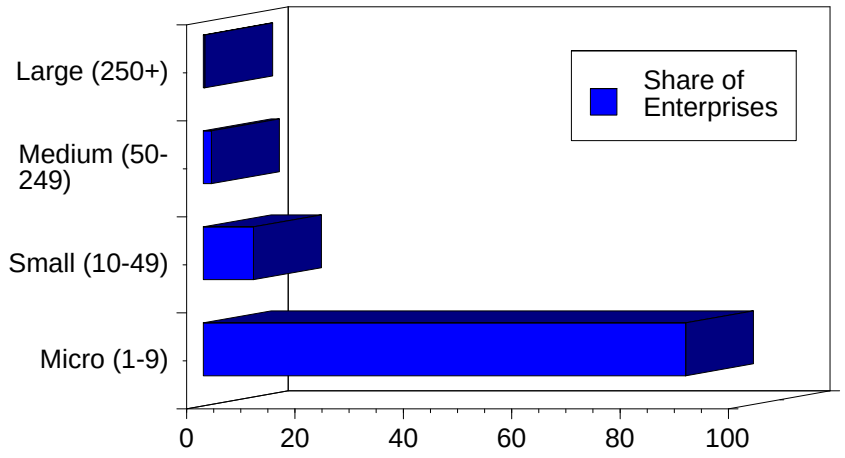
# Research Promotion in Europe (I)

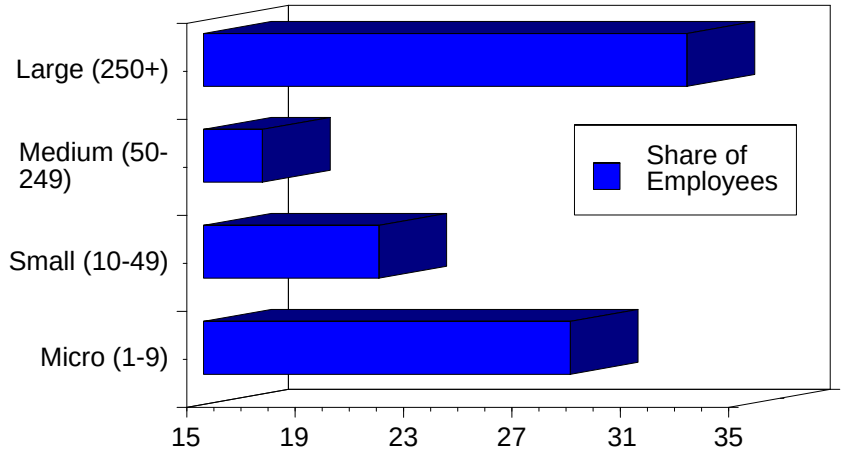
- **Within the European Union**
  - 6th Framework Program launched (FP6, 2002-2006)
    - 17.5 Bill. EUR volume (appr. 4-5% of all R&D expenditures in EU states)
    - Main goal: creation of the European Research Area (ERA) trough research integration
    - 7 thematic priorities
      - Life sciences, Genomics & Biotechnology for Health
      - Information Society Technologies
      - Nano-technologies etc.
      - Aeronautics & Space
      - Food Quality and Safety
      - Sustainable Development, Global Change & Ecosystems
      - Citizens and Governance in a knowledge-based society
    - Integrated projects & Networks of Excellence
    - As of 17 Nov 2003: 100.000 scientists from 50 countries apply for 12.000 projects
  - EURATOM program

# Research Promotion in Europe (II)

- **In Europe at large**
  - EUREKA initiative (EU-15, Esthonia, Island, Israel, Croatia, Latvia, Lithuania, Norway, Poland, Rumania, Russia, Switzerland, Slovakia, Czech, Turkey, Hungary) ➜ "bottom up" approach
    - 702 projects (as of July 2001)
    - 2.2 Bill. EUR volume
    - 2.883 project partners
    - 1.951 enterprises
    - 1.229 SMEs
    - 832 research institutions
    - 100 other institutions

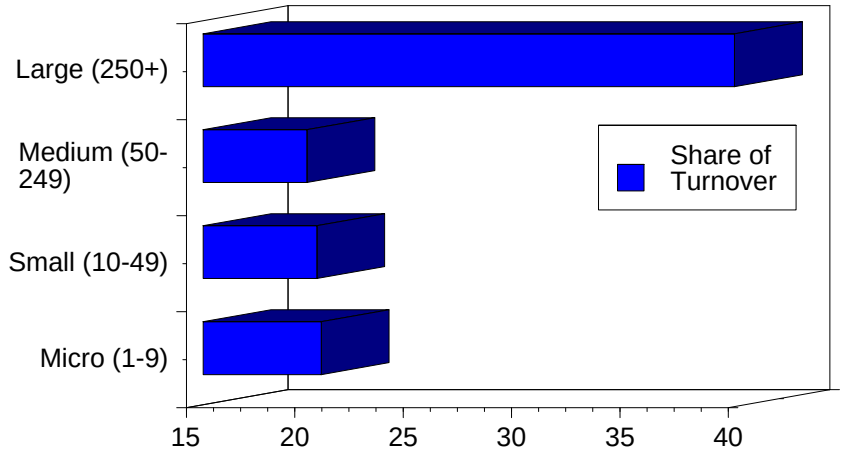
# Industry Structure in EU-15 (I)

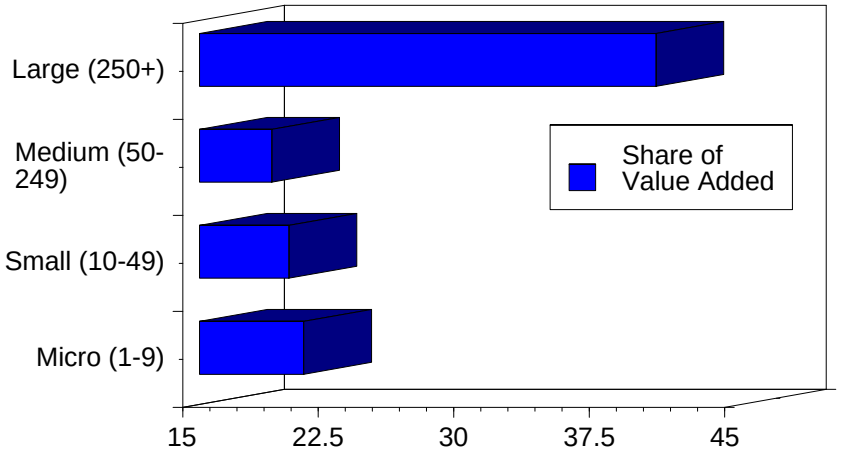



Source: Eurostat Statistics in Focus Theme 4-39/2002

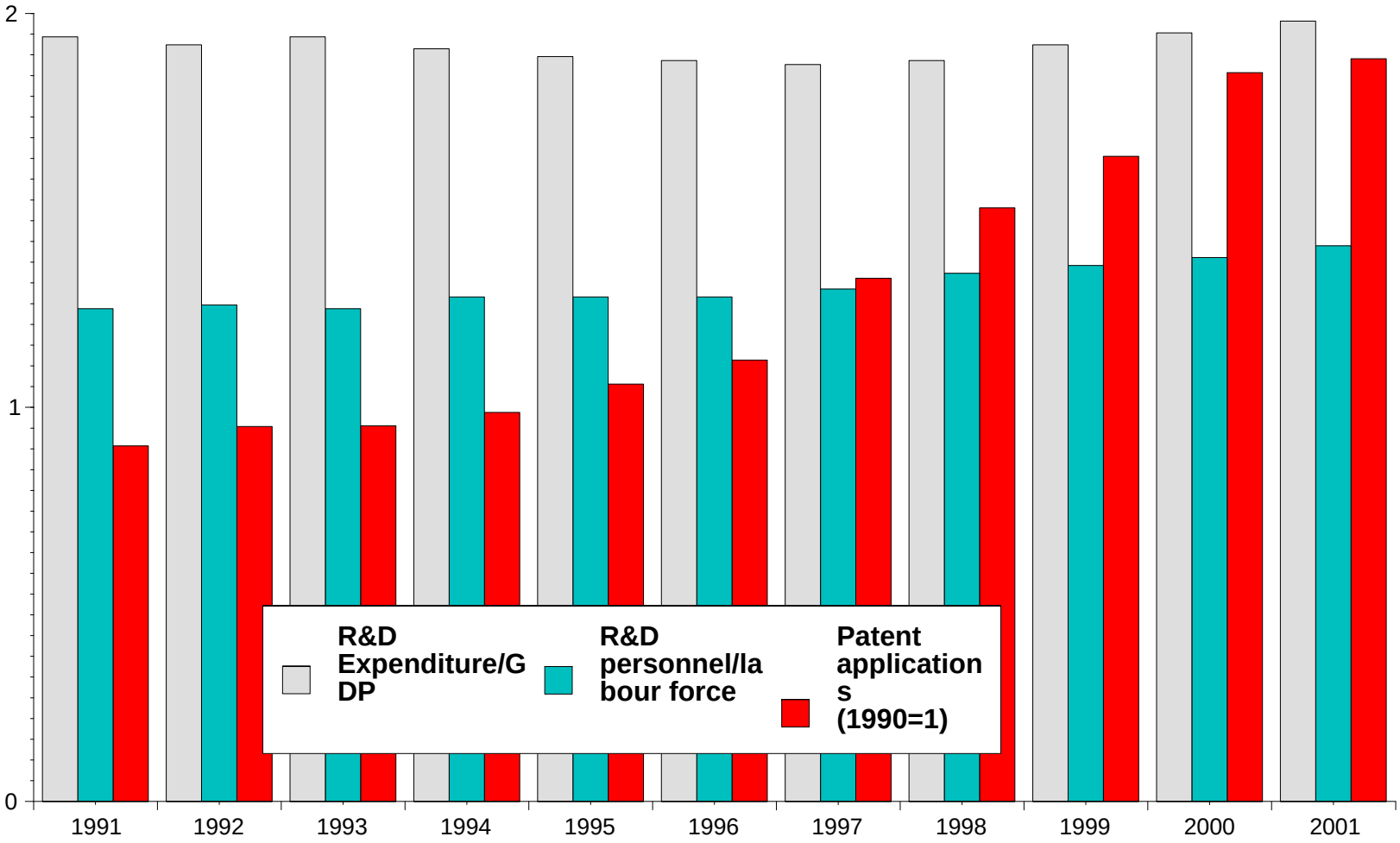
# Industry Structure in EU-15 (II)



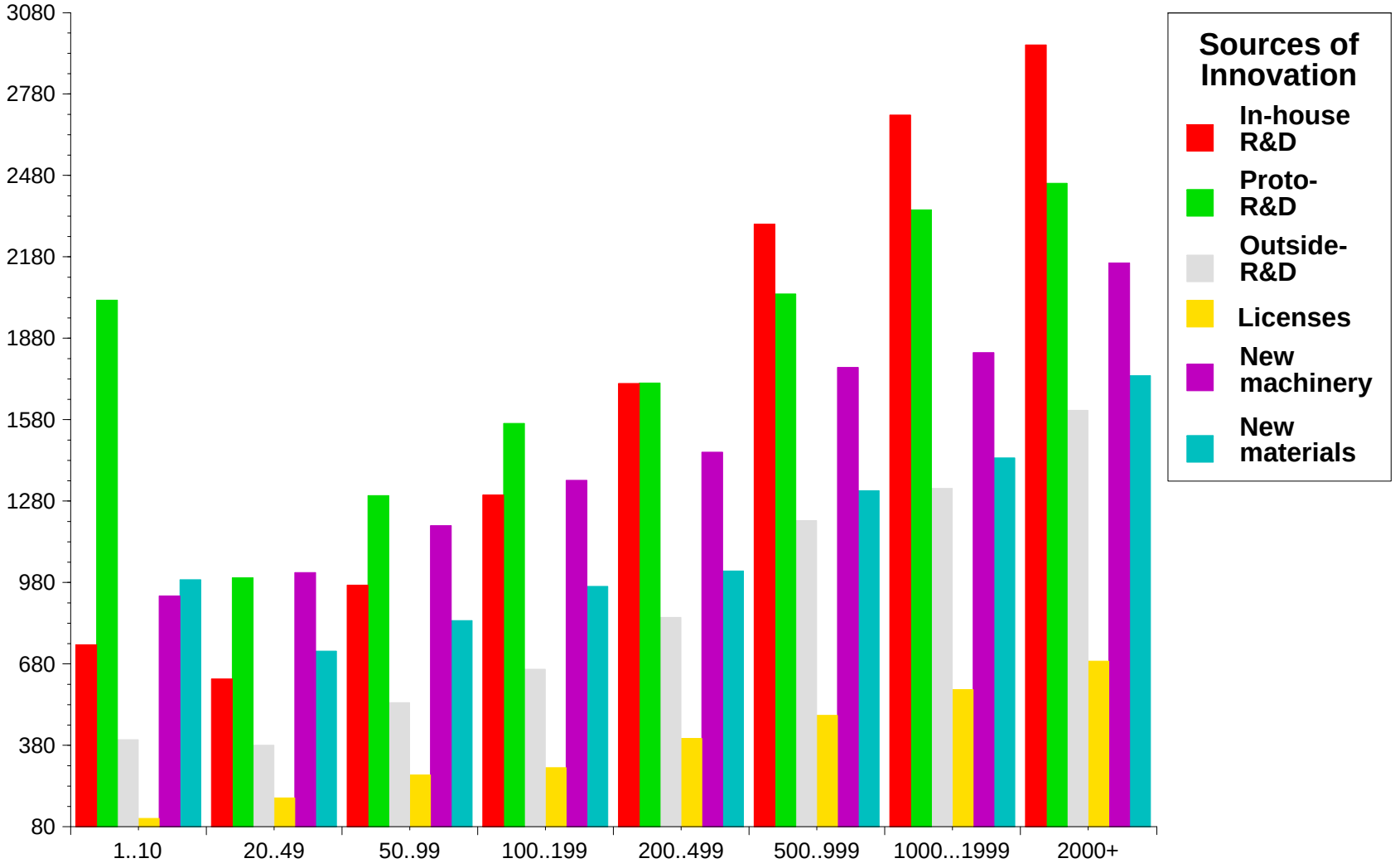

Source: Eurostat Statistics in Focus Theme 4-39/2002

# Research & Development in Europe (EU 15)



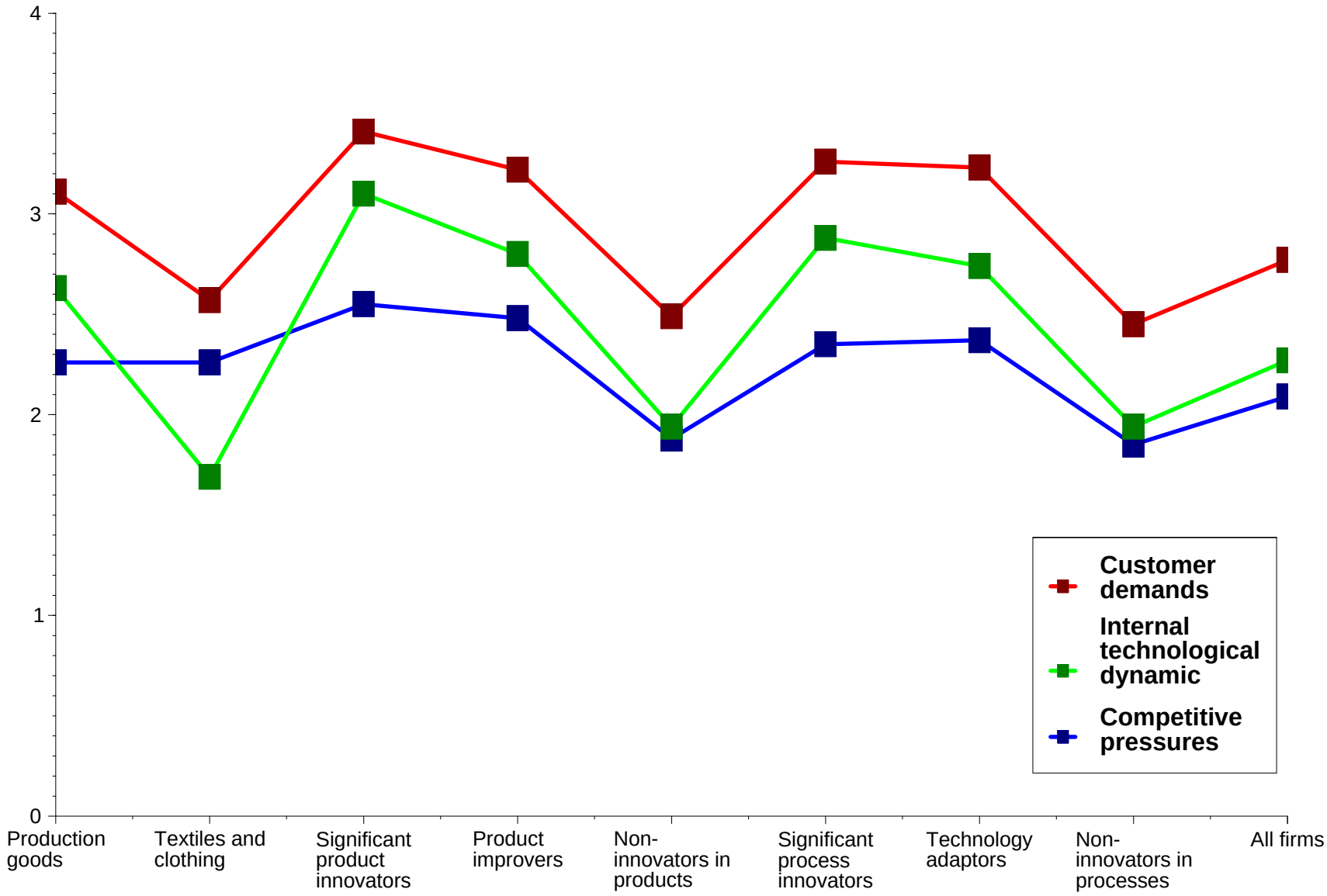

Source: Eurostat Data Collection online

# Sources of Innovation



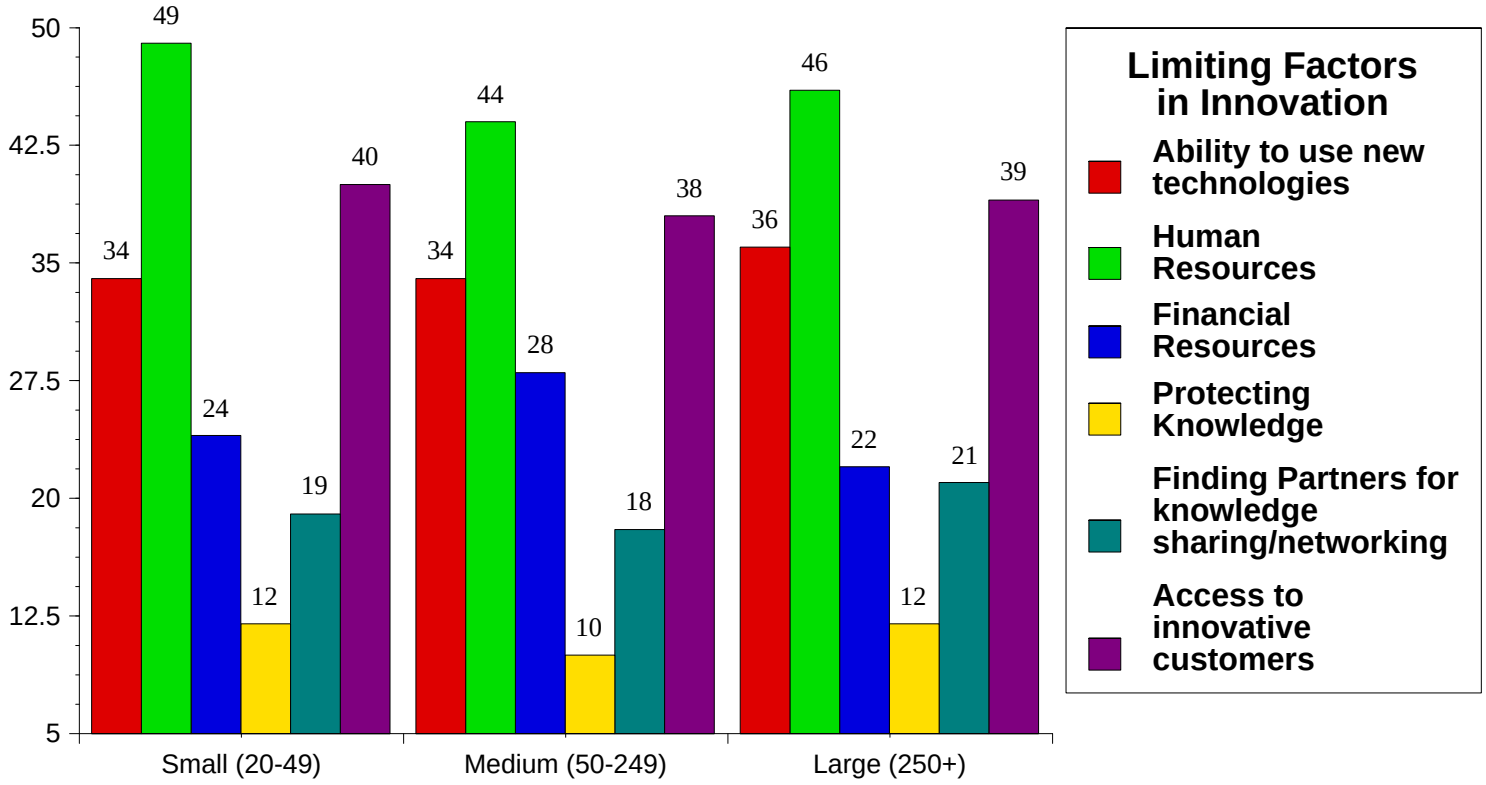

Source: Kaminski, P. (1996): How can very small technology firms be helped? p. 133,
in: OECD (1996): Innovation, Patents and Technological Strategies, Paris, pp. 125-137.

# Indication of Stimulus to Innovate



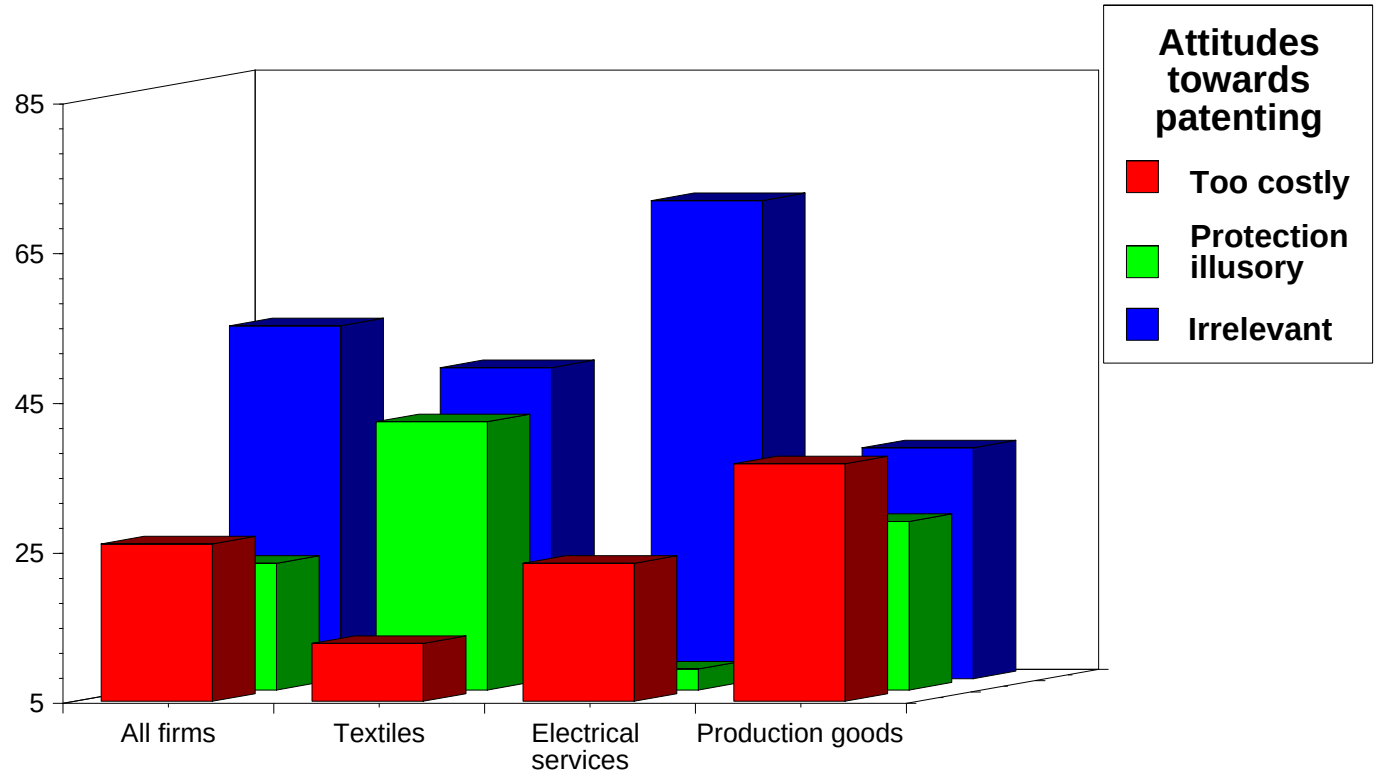

Source: Kaminski, P. (1996): How can very small technology firms be helped? p. 131, in: OECD (1996): Innovation, Patents and Technological Strategies, Paris, pp. 125-137.

# Innovation Activities in Europe: Problems




Source: Eurostat Statistics in Focus Theme 4-39/2002

# Attitudes towards patenting




Source: Kaminski, P. (1996): How can very small technology firms be helped? p. 131, in: OECD (1996): Innovation, Patents and Technological Strategies, Paris, pp. 125-137.

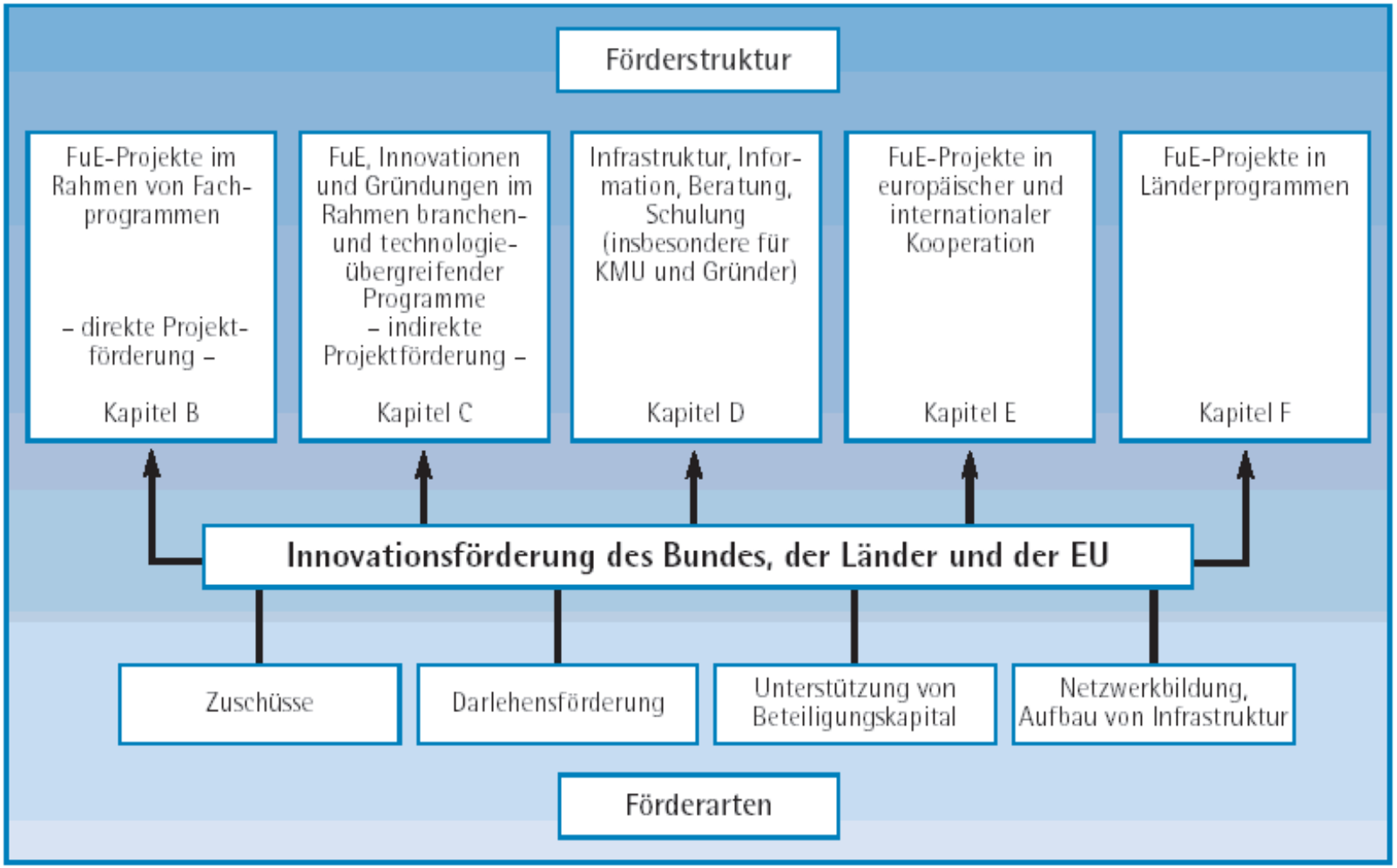
# Research Activities in Germany: Governmental Research Promotion

- Direct support for R&D in research programs
- Indirect support for R&D in SMEs
- Founding support for SMEs
- Infrastructur, information, education, consulting

# Supported Research Institutions

- Federal research institutes
- State- and municipal research institutes
- Helmholtz centers
- Institutes of the Max Planck Society
- Institutes of the Fraunhofer Society
- Institutes of the Leibniz Society
- Academies
- Other non-profit organizations
- Public libraries, archives etc.
- Scientific museums

# Research Activities in Germany: Governmental Research Promotion




Source: BMBF/BMWA - Zukunft gestalten. Innovationsförderung, 2003.

# Research Activities in Germany: Centers of Competence (I)

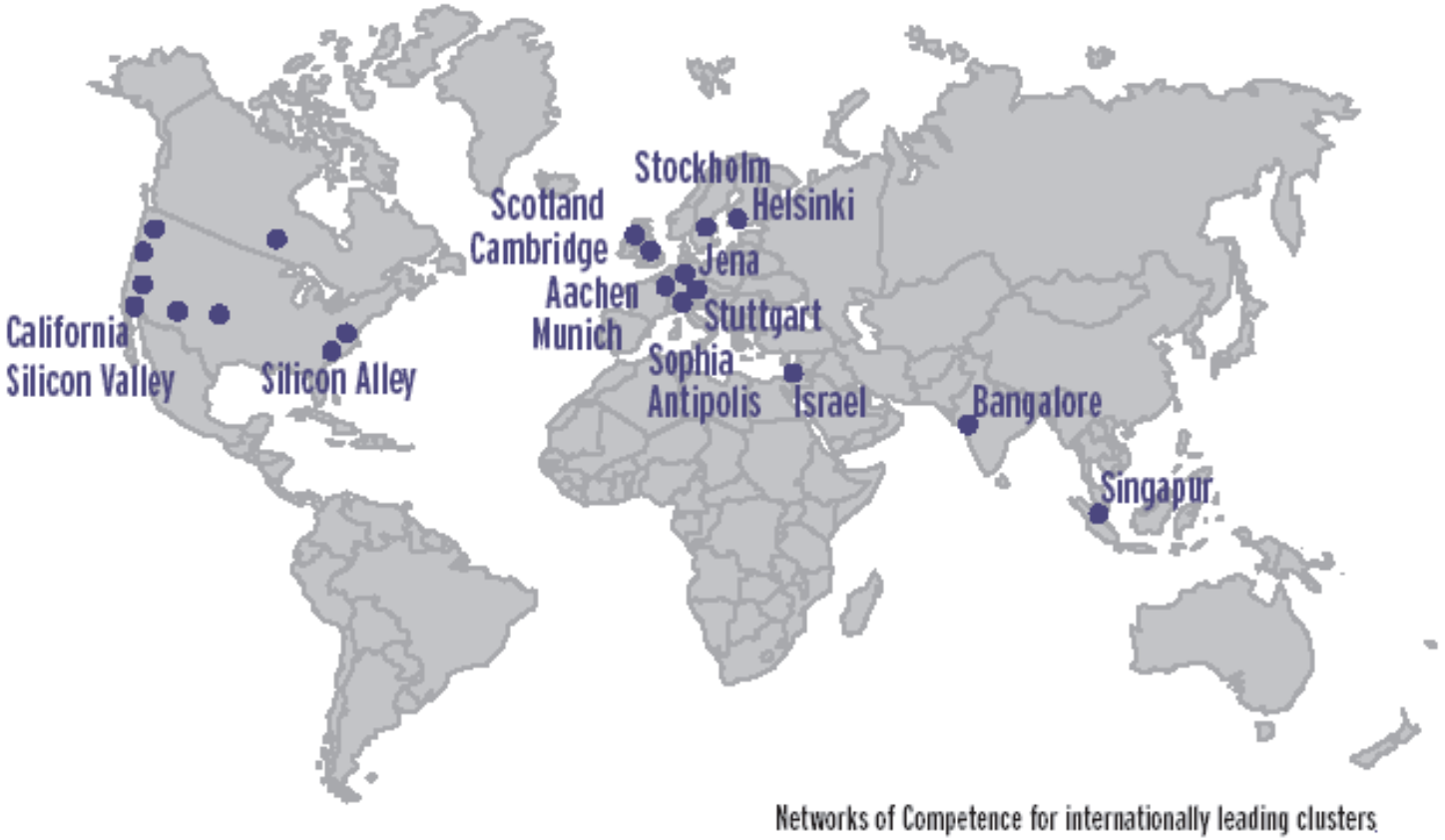
**"The idea behind these networks is based on the observation that accelerating globalization and the transition towards a knowledge-based economy calls for new national and regional strategies. Regions compete directly on many fronts, such as in securing innovative leadership, investment and a highly qualified workforce." (VDI Technology Center 2003)**

# Research Activities in Germany: Networks of Competence (II)

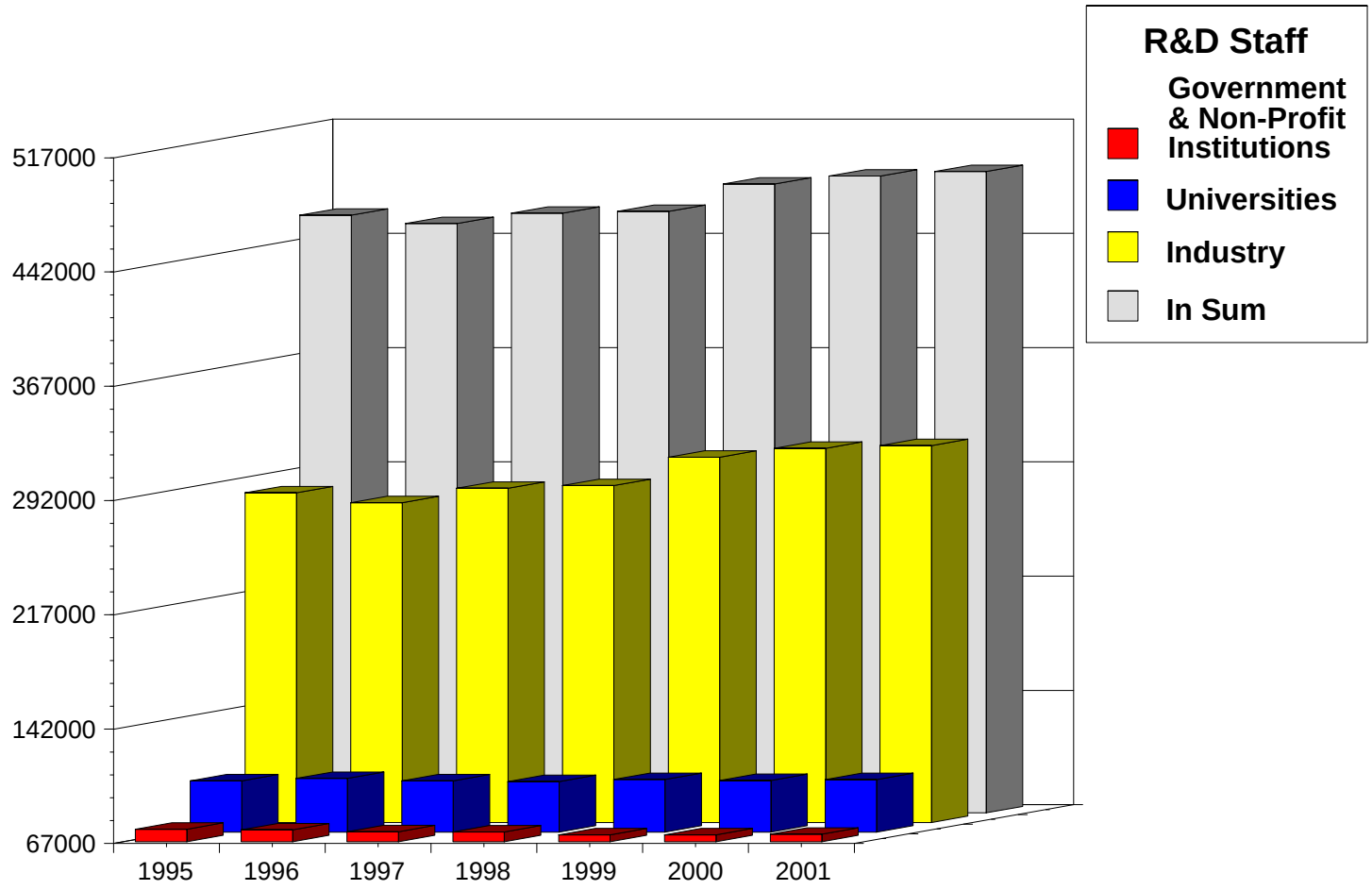
- Aerospace Technology
- Biomaterials
- Biotechnology
- Education & Training
- Environmental Technology
- Genomics
- Information Technology
- Maritime Technologies
- Materials Science
- Mechatronics
- Medical Engineering
- Medicine
- Microsystems Engineering
- Nanotechnology
- Optical Technologies
- OpTecBB
- Power Engineering
- Telecommunications
- Traffics & Transportation

# Research Activities in Germany: Networks of Competence (III)

- **Networks of Competence, international clusters**

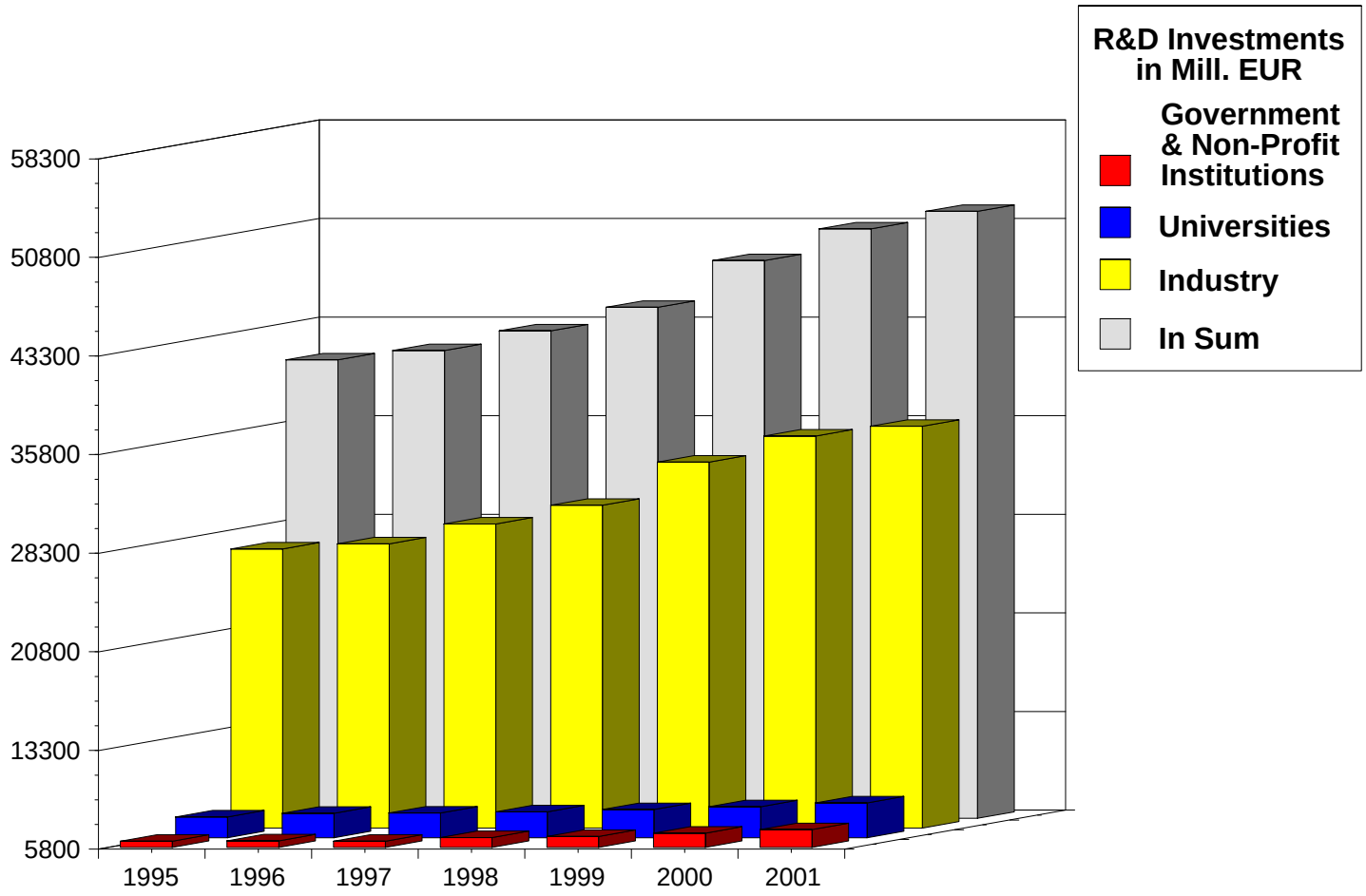


# Research Activities in Germany: Industry Data (I)



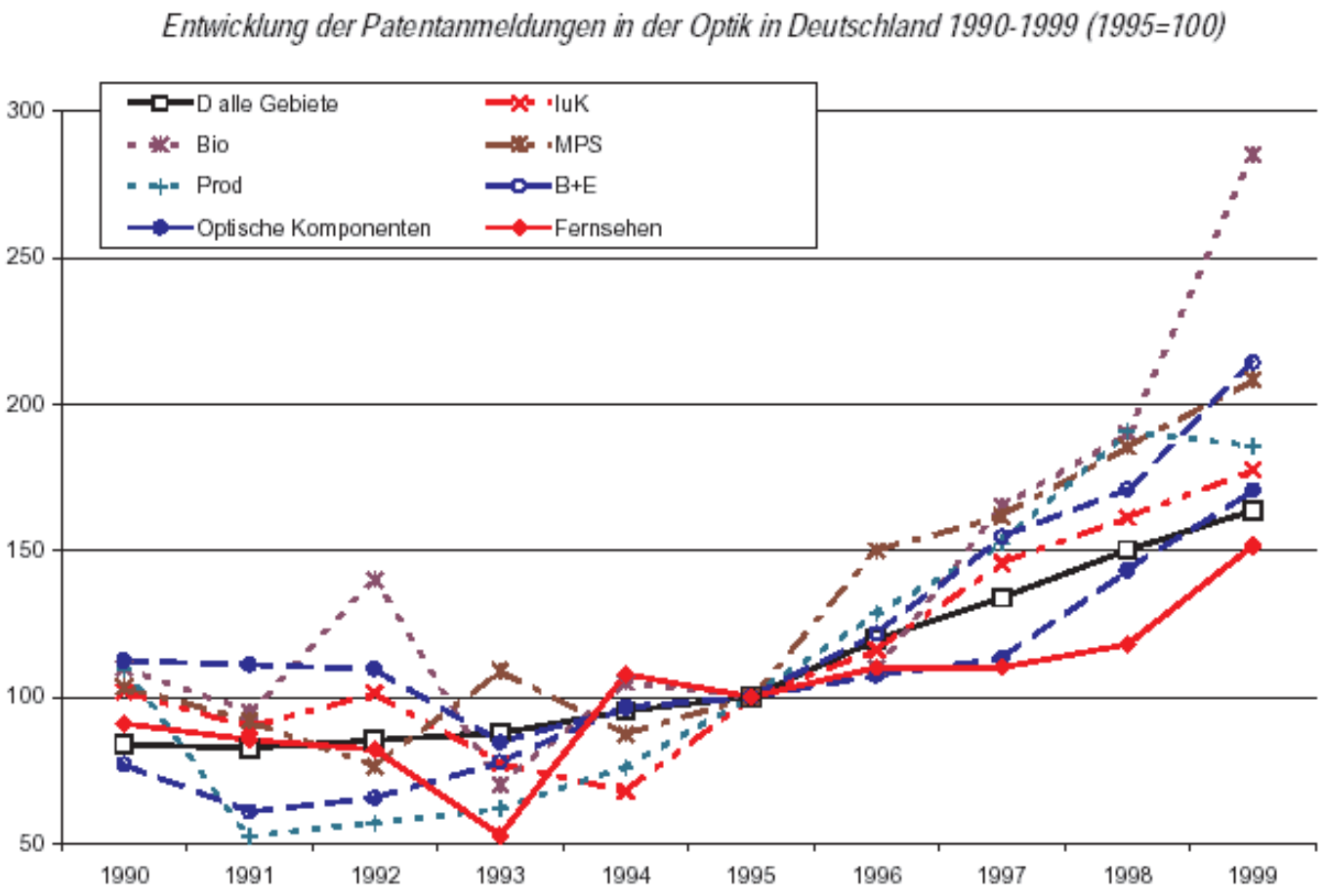

S: Federal Office for Statistics, 2003

# Research Activities in Germany: Industry Data (II)




S: Federal Office for Statistics, 2003

# Research Activities in Germany: Patent Activity




Quelle: EPA. - Berechnungen des Fraunhofer ISI; 1998-1999 teilweise hochgerechnet.

# Research Activieties in Germany: Some Problems

- R&D investments
- Low FDI in Asia
- Differences between former Eastern Germany and Western Germany
- Investments in educational system below avarage (according to OECD studies)

# The International IPR Regime - Some Historical Remarks (I)

- **Statute of Anne (1709): "**An Act for the Encouragement of Learning, by Vesting the Copies of Printed Books in the Authors or Purchasers of such Copies, during the Times therein mentioned."
- **U.S. Constitution (1790): "**The Congress shall have the power...to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries;..."
- **First German Copyright Law (1834): "**Gesetz zum Schutze des Eigenthums an Werken der Wissenschaft und Kunst in Nachdruck und Abbildung"
- **Berne Convention (1886) & Paris (1883) → Globalization of continental droît d'auteur philosophy**
- **Madrid (1891), Nice (1957), Lisbon (1958), WIPO (1967), ...**

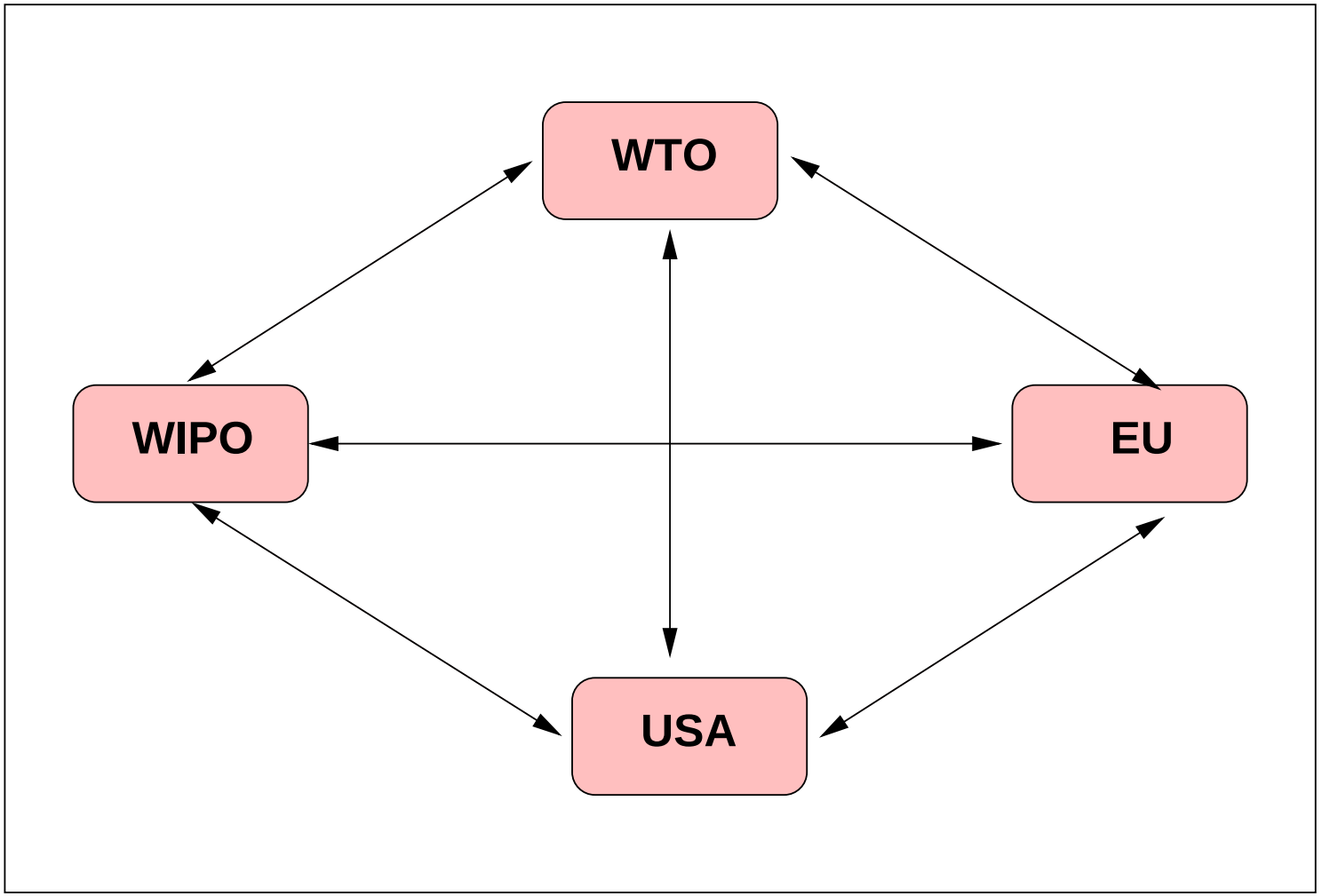
# The International IPR Regime - Some Historical Remarks (II)

- **PCT (1970)**
- **USA (1976): Commission on New Technological Uses of Copyrighted Works (CONTU)**
- **EU (1991): Software Directive**
- **EU (1994): Bangemann Report "Europe and the global information society"**
- **GATT/WTO (1994): Trade Related Intellectual Property Rights (TRIPS) *-- promoted by U.S. industry***
- **EU (1996): Database Directive**
- **WIPO (1996): WIPO Copyright Treaty (WCT), WIPO Performances & Phonograms Treaty (WPPT) *-- promoted by U.S. industry***
- **USA (1998): Digital Millennium Copyright Act**
- **EU (2002): Copyright Directive**

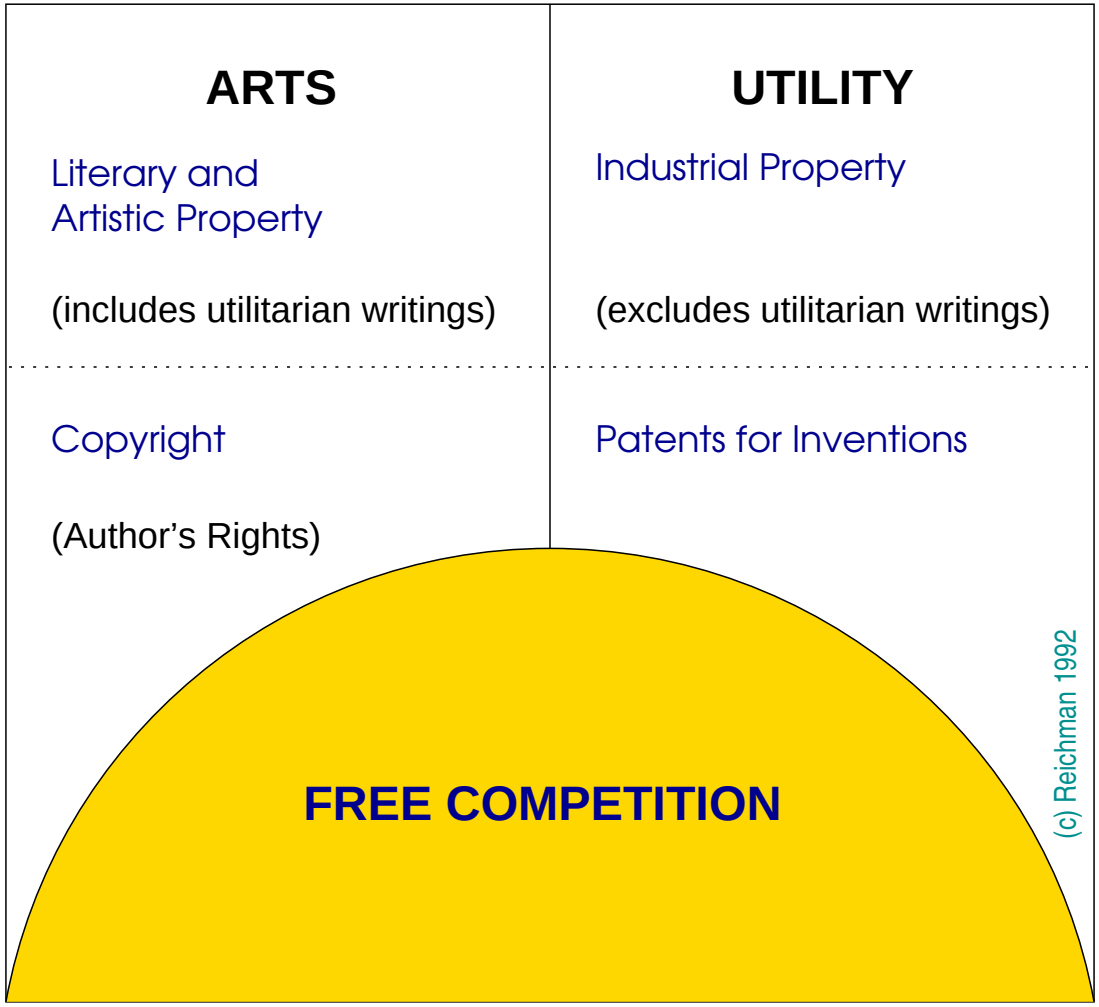
# The International IPR Regime - Some Historical Remarks (III)

- **EU (2003): Copyright Directive implemented in 6 member states including Germany (as of 17 Nov 2003)**
- **EU (2003): Software Patents Directive in preparation -- *strong pressure from U.S. industry***
- **EU (2003): Copyright Enforcement Directive *in preparation***
- **EU (2003): Directive on private use of public data *in preparation***
- **Germany (2003): German-Chinese license contract template**
- **WTO (2003): GATTS *in preparation***
- **...**

# Main Forces Shaping IPR



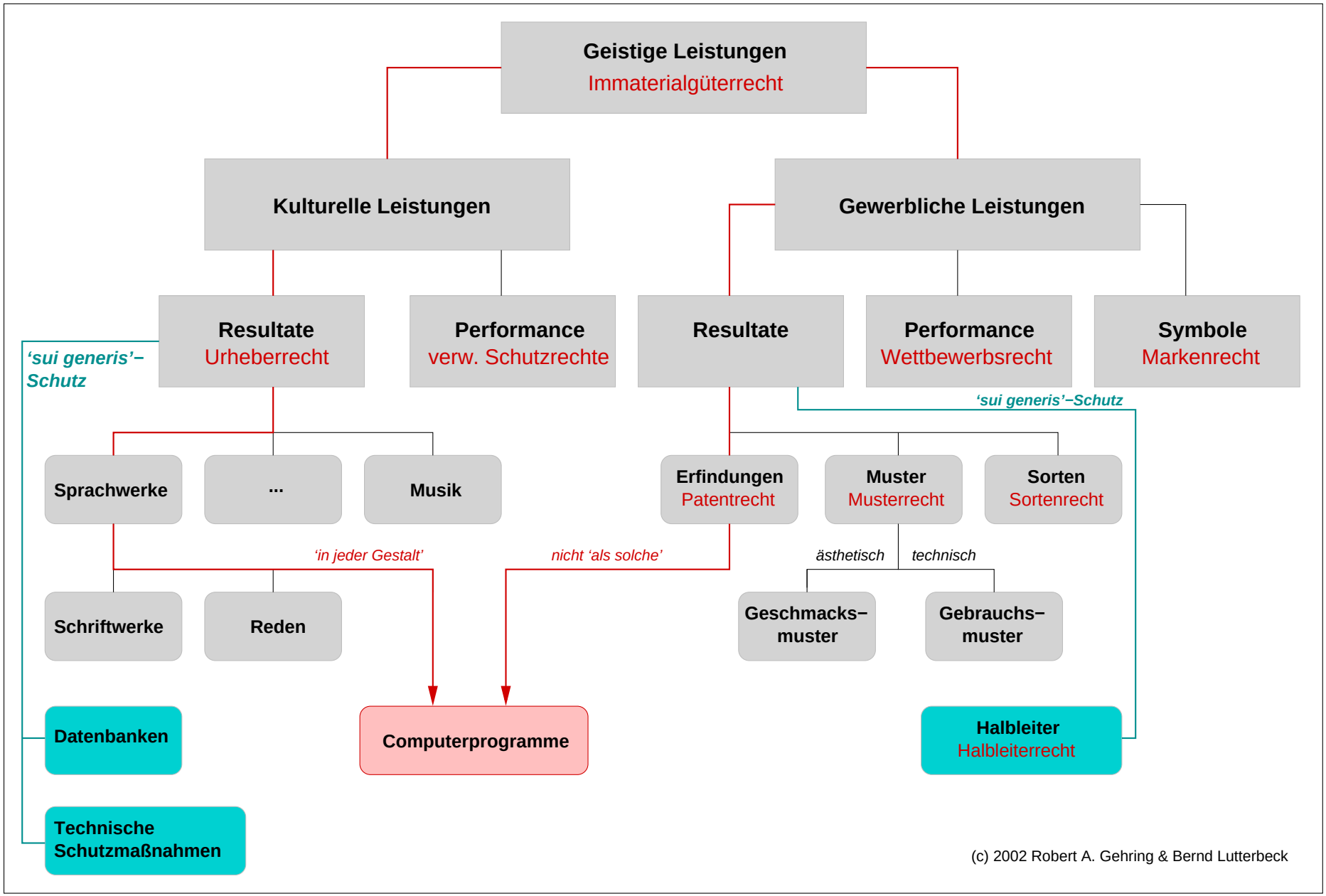
# The Classical IPR Regime



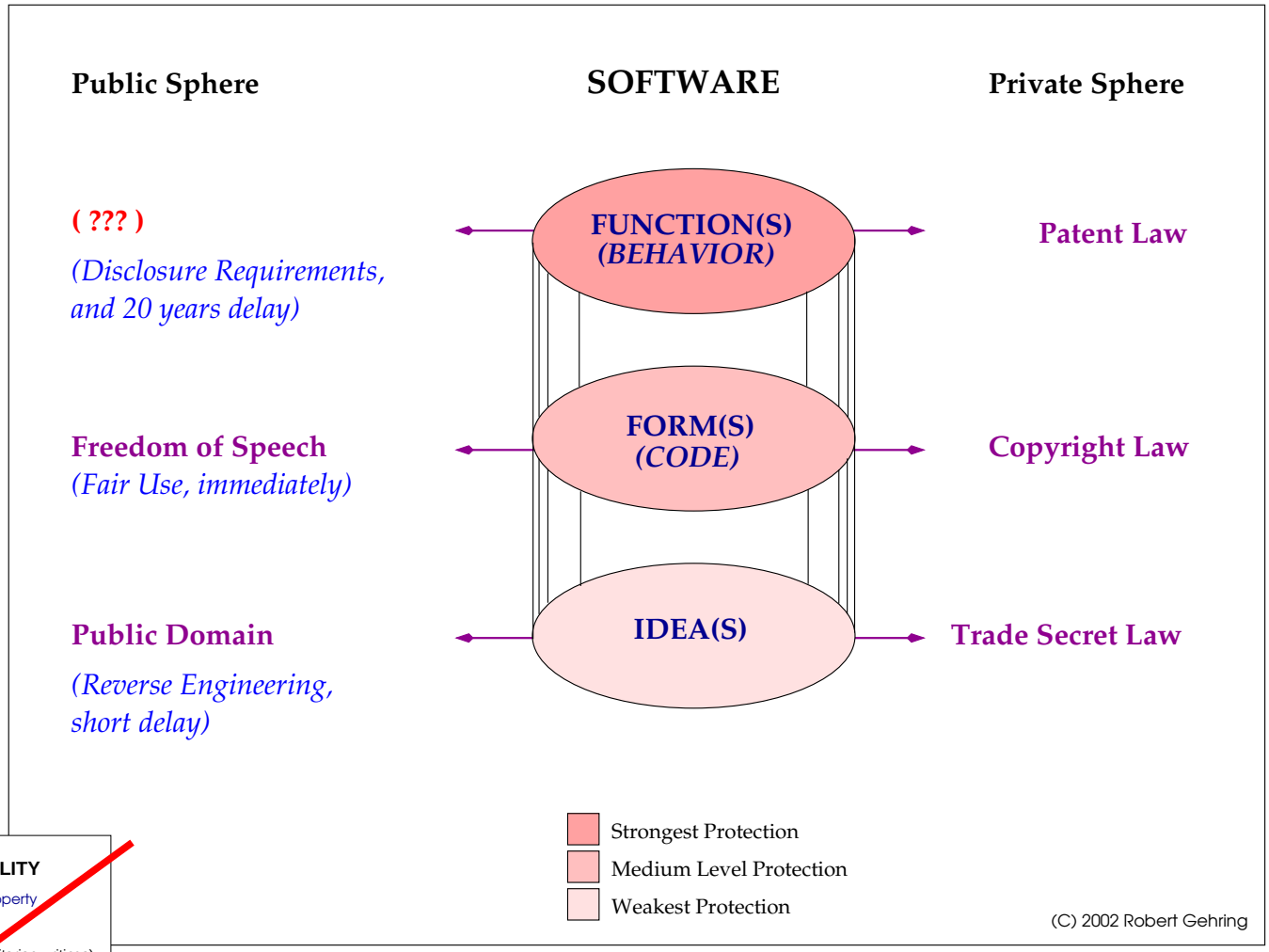
# Focus: Software
# Selected Problems of the New IPR Paradigm

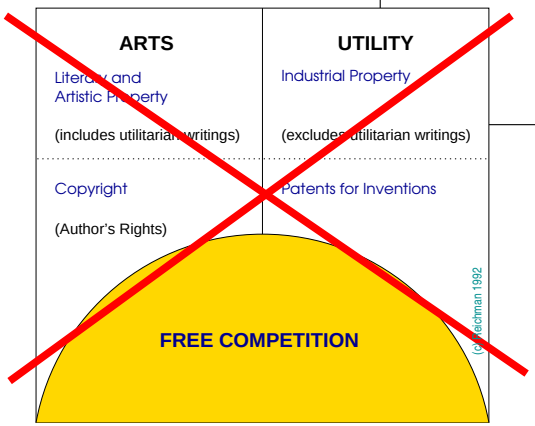
- Software breaks the classical IPR regime
- Access to information in presence of DRM
- Software protection runs against software technology needs (security, standardization, service)
- Tragedy of the anti-commons (Heller 1998)
- Open Source (i.e. technology transfer) inhibited

# Software in German Law

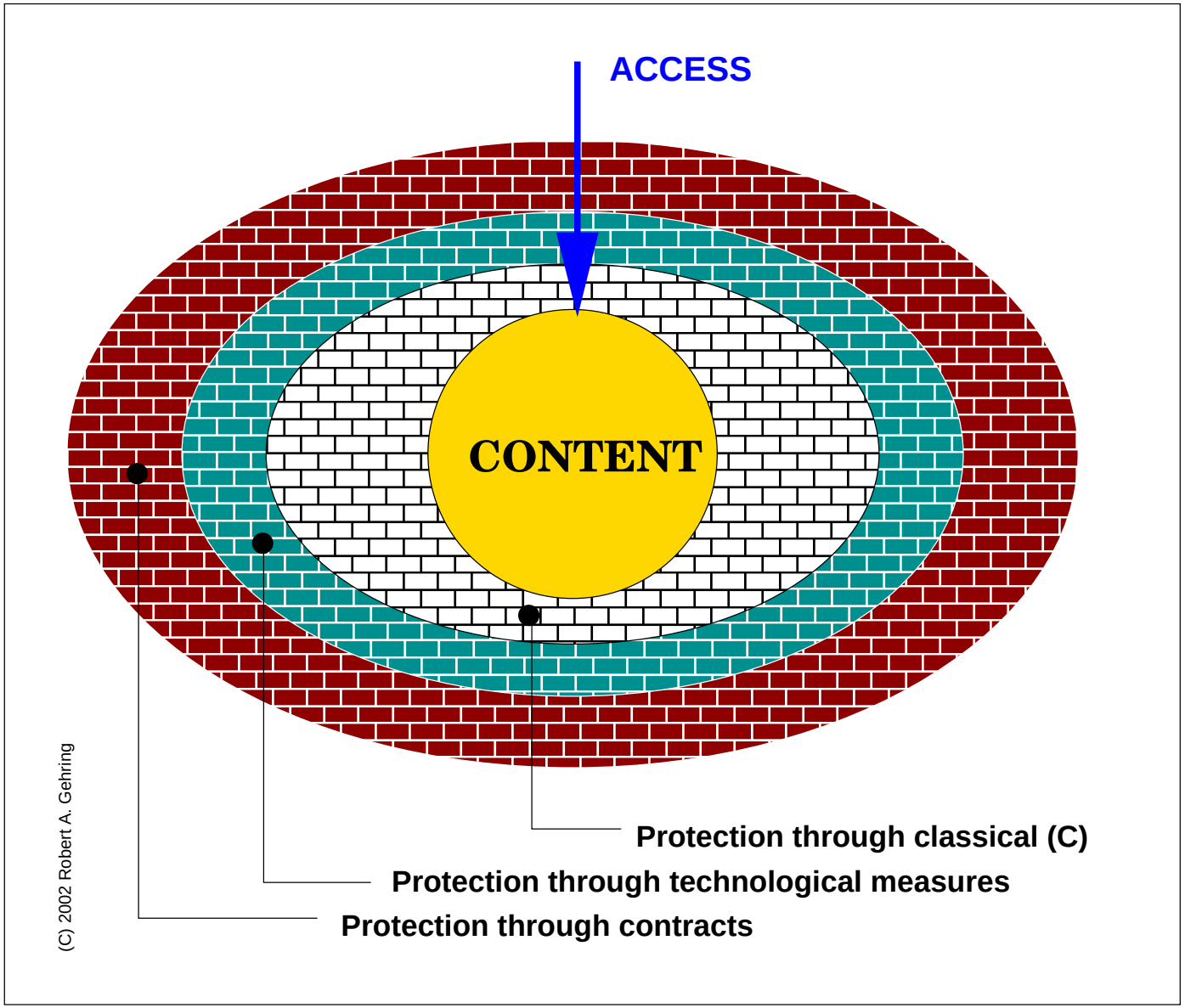


# The Dichotomy in Software IPR

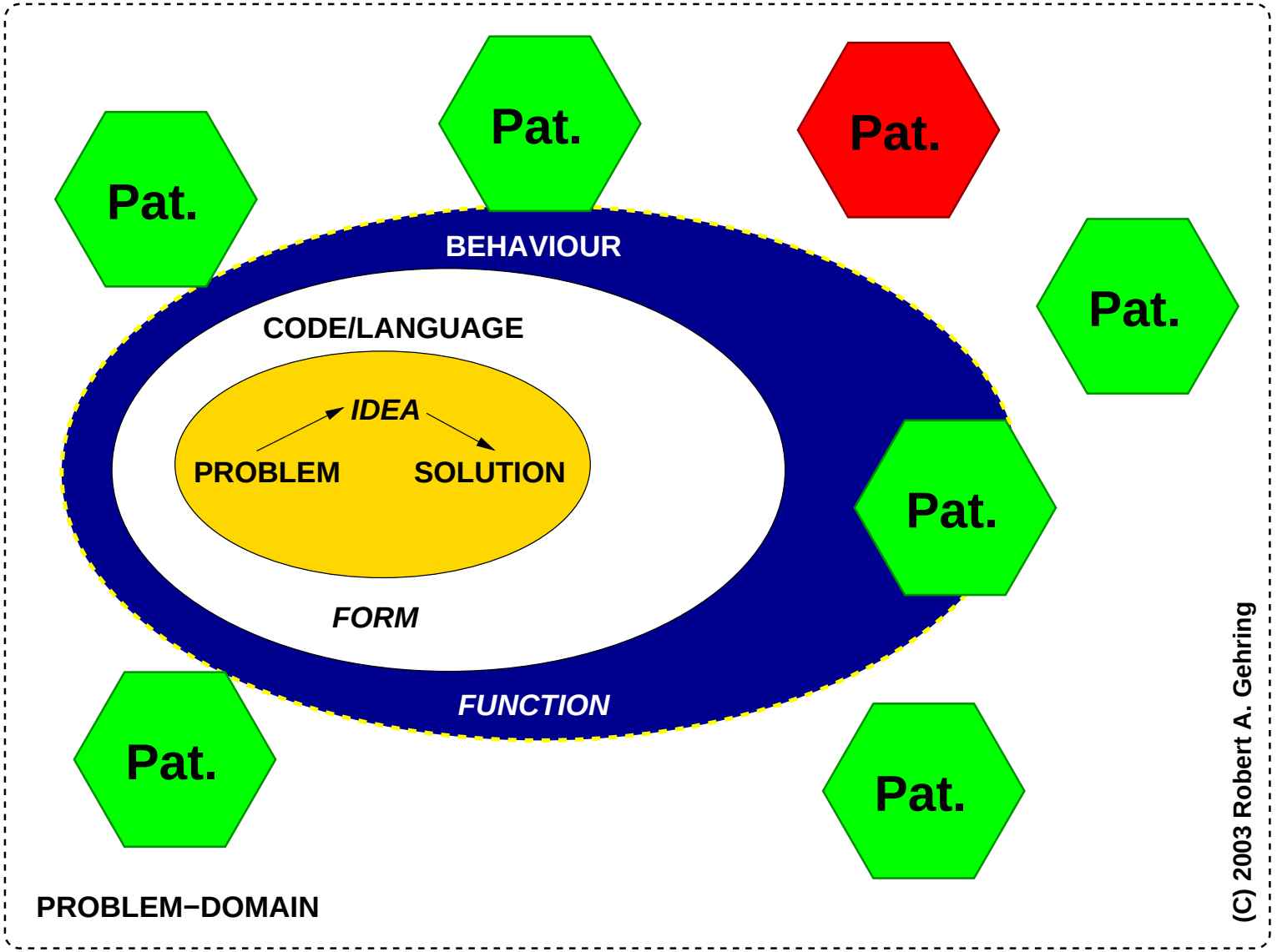


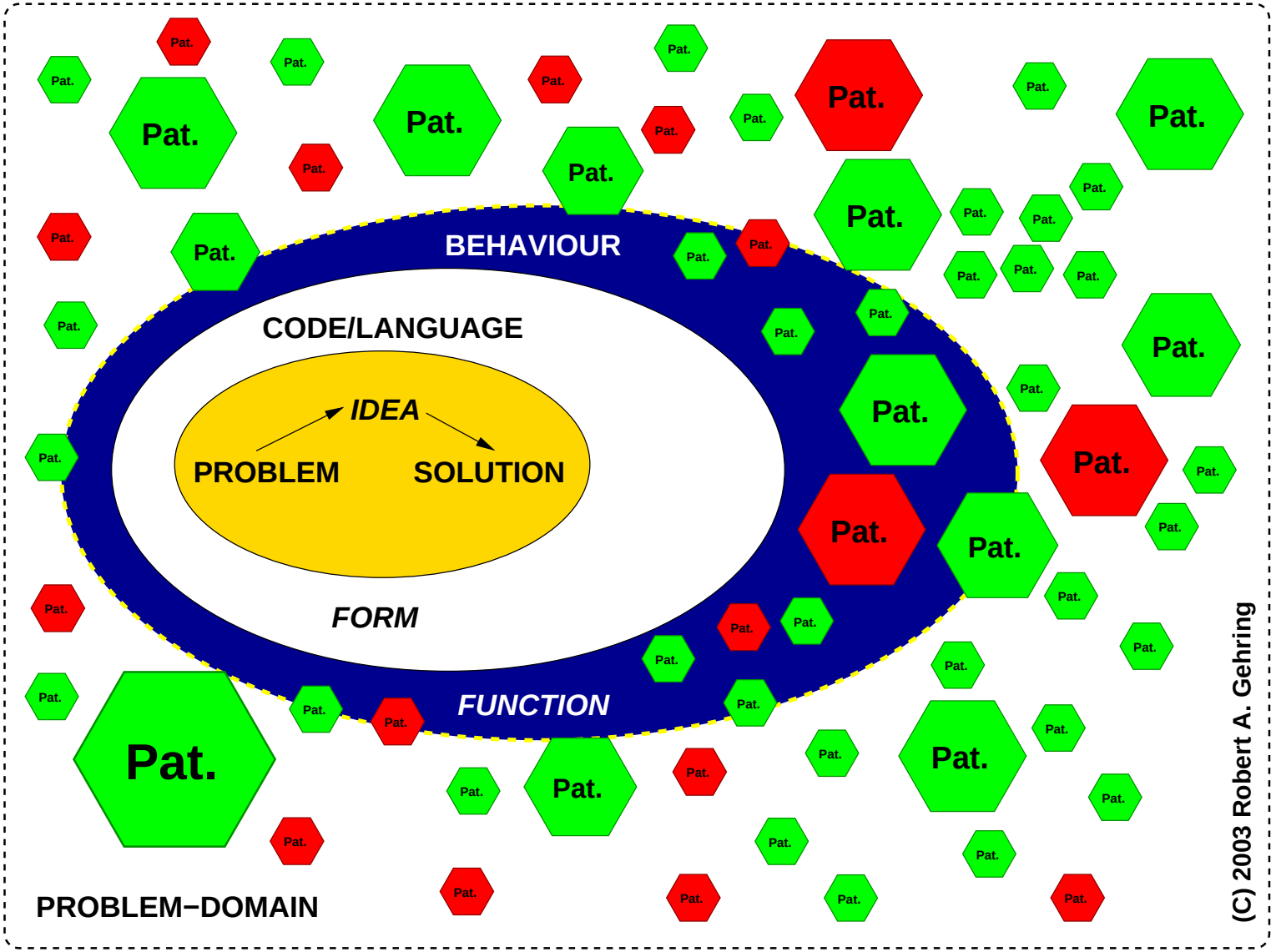
# Access to Information



# Software Patents & Software Technology (I)



# Software Patents & Software Technology (II)

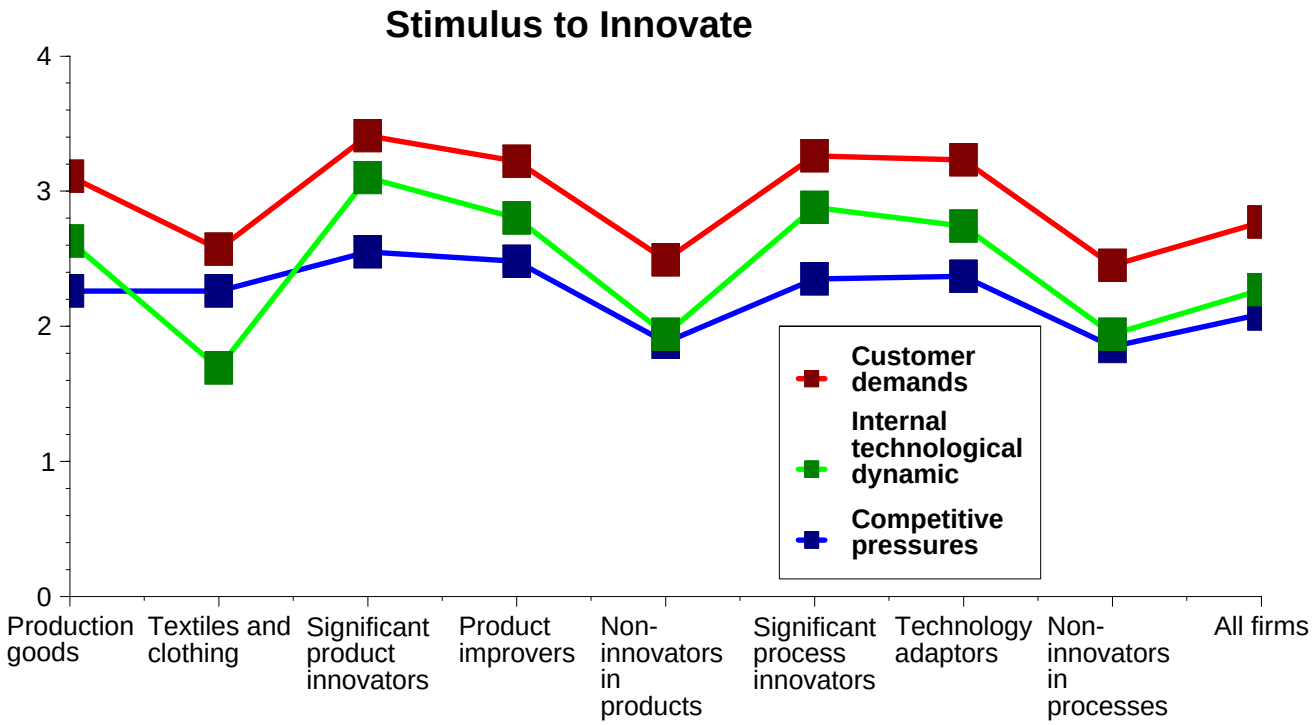


# Tragedy of the anti-commons (Michael Heller 1998)

- **Hardin (1968): "Tragedy of the commons"**
  - Scarce resources in common property will get over-used
  - Example: unrestricted fishing in international waters endangers many fish species
  - Solution: exclusive property rights
- **Heller (1998): "Tragedy of the anti-commons"**
  - resources with complementary exclusive property rights may be underused due to high transaction costs (for contracting) and/or strategic behavior of the right holders
  - Examples: buildings in Russia; patents for genetic resources; online music business
  - Solution: liability rules instead of property rules

# Open Source

- **Open Source promotes technology transfer through non-exclusive rights;**
- **Allows for recombination of existing resources thus promoting user innovation and avoiding unnecessary investments;**
- **Endangered by software patents.**



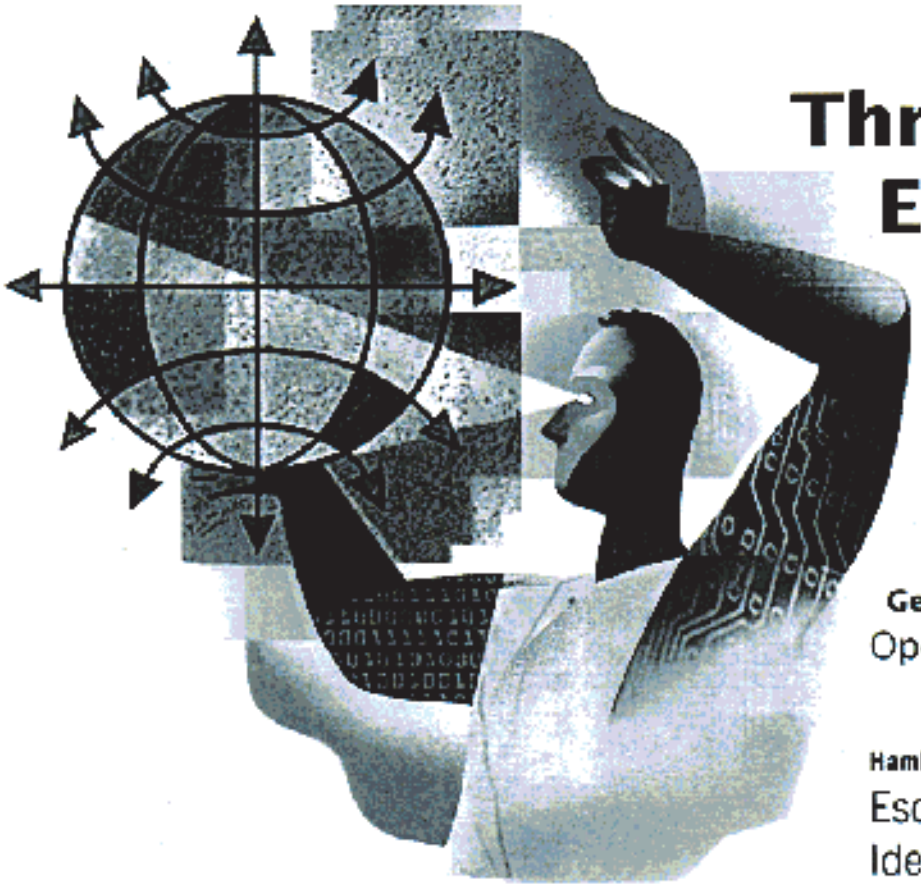
# Conclusion

- **Hard empirical evidence for strong IPRs promoting innovation or knowledge transfer cannot be found.**
  - Other factors are of more importance: Human resources, access to innovative customers, and deployment of new technologies.
- **It is questionable at least wether the new IPR paradigm will promote innovation. In some areas it is already inhibiting innovative processes.**
  - Innovation in many technology areas requires user interaction. Additional transaction costs (for licensing) will disable this interaction.
  - Innovation in many technology areas is incremental and based on recombination. Too many property rights inhibit recombination of resources and leads to anti-commons situations.
- **Software quality assessment and security auditing requires non-exclusive source code access.**

# A Look into the Future ...

SPRING 2003 VOL. 44 NO. 3

**MITSloan**
Management Review



## Thriving in the Era of Open Innovation

**Henry W. Chesbrough on**
The Open-Innovation Model

**David Kline on**
Strategic Licensing

**Georg von Krogh on**
Open-Source Innovation Practices

**Hamid Bouchikhi & John R. Kimberly**
Escaping the Organizational Identity Trap

# For Further References

http://ig.cs.tu-berlin.de/ap/rg/