IP In Sponsored Research Agreements:

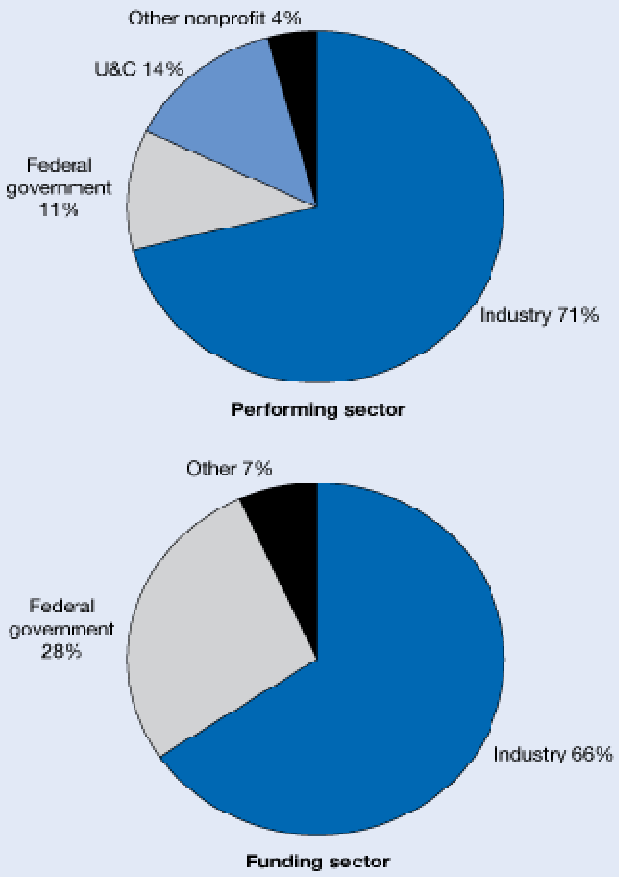
A Perspective From the Chemical Industry

Dr. Susan Butts
Sr. Director, External Science & Technology Programs
The Dow Chemical Company
President, University Industry Demonstration Partnership

Outline

- Quick facts & figures on research in the US
- Issues around sponsored research agreements and IP terms
- Differences between industry sectors
- Characteristics of the chemical industry
- Implications for IP terms in research agreements
- UIDP and new approaches

Figure 4-2
Shares of national R&D expenditures, by performing and funding sectors: 2006



U&C = universities and colleges

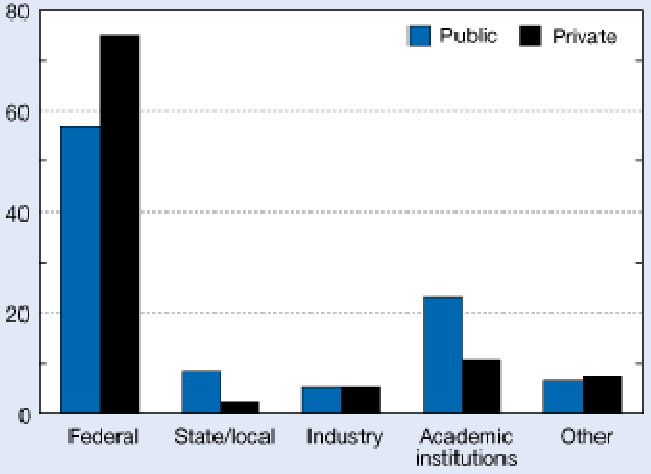
NOTES: National R&D expenditures projected at $340 billion in 2006. Federal performing sector includes federal agencies and federally funded research and development centers. Values rounded to nearest whole number.

SOURCE: National Science Foundation, Division of Science Resources Statistics, National Patterns of R&D Resources (annual series). See appendix tables 4-3 and 4-5.

Science and Engineering Indicators 2008

Although industry is the major performer and funder of R&D it contributes only about 6% of funding for university research

Figure 5-10
Sources of academic R&D funding for public and private institutions: 2006

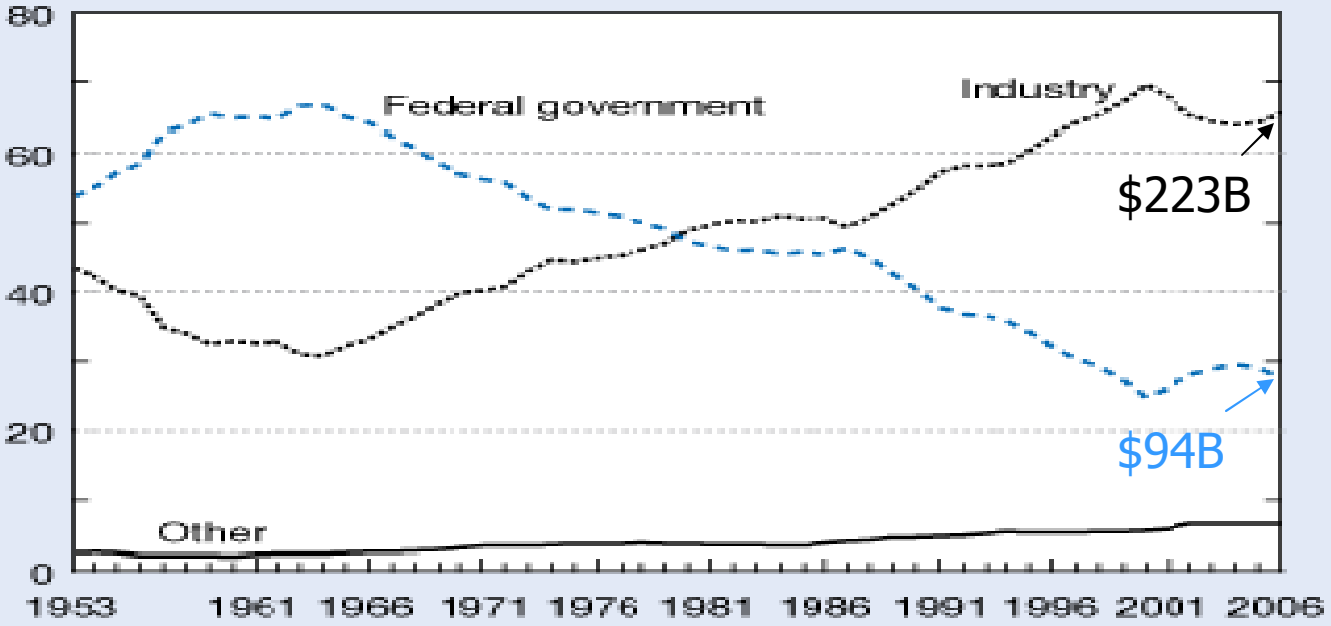


SOURCES: National Science Foundation, Division of Science Resources Statistics, Academic Research and Development Expenditures: Fiscal Year 2006; and WebCASPAR database, http://webcaspar.nsf.gov. See appendix table 5-10.

Science and Engineering Indicators 2008

U.S. R&D, Source of Funds: 1953–2006

Figure 4-3
National R&D expenditures, by funding sector: 1953–2006

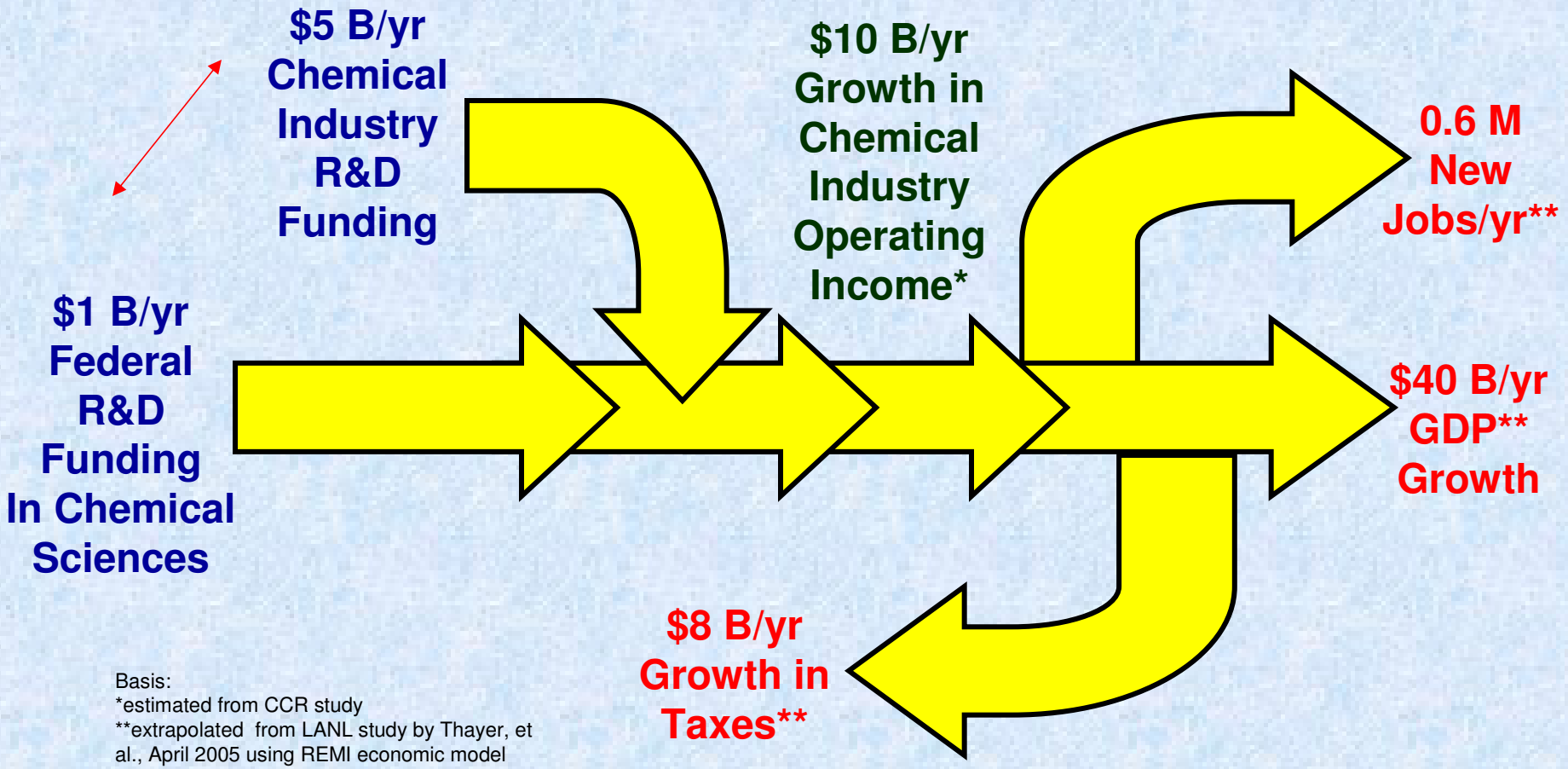


SOURCE: National Science Foundation, Division of Science Resources Statistics, National Patterns of R&D Resources (annual series). See appendix table 4-5.

Science and Engineering Indicators 2008

Growth from Chemical Sciences R&D

CCR



Basis:
*estimated from CCR study
**extrapolated from LANL study by Thayer, et al., April 2005 using REMI economic model

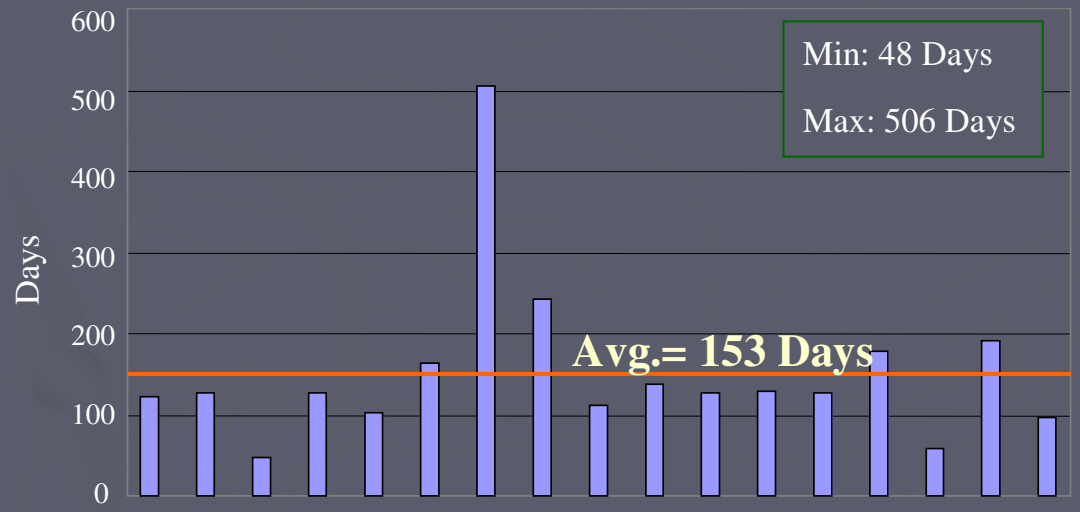
What is the Problem?

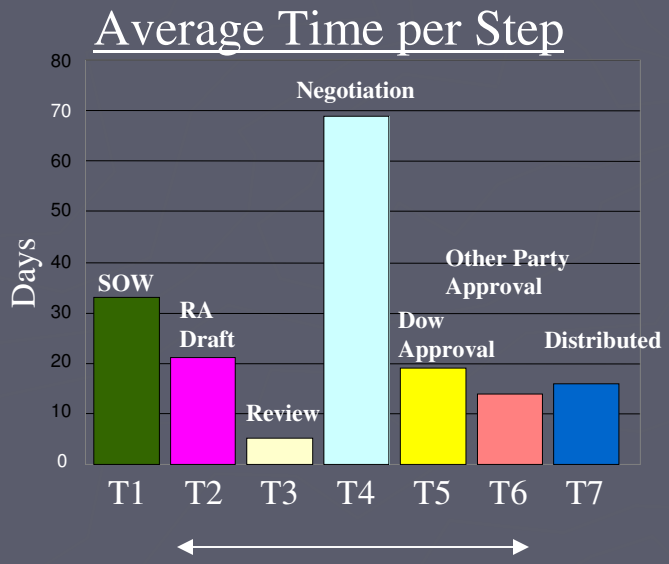
- Negotiation of intellectual property rights in sponsored research agreements has become a barrier to industry-university research collaboration in the United States.
  - more contentious
  - takes longer
  - increases transactional costs
  - little or no benefit results

- Companies will collaborate more with foreign universities/less with US universities

Dow Six Sigma Study of Cycle Time for Sponsored Research Agreements in US

Cycle Time (T6 out -T2 in) = Over 5 Months!

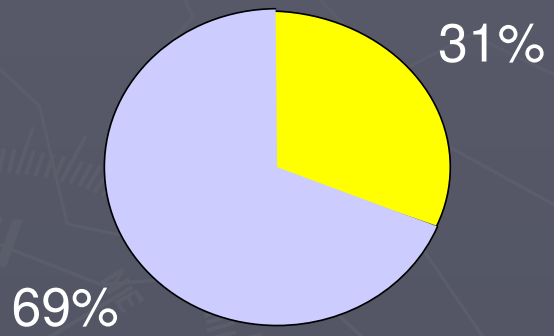




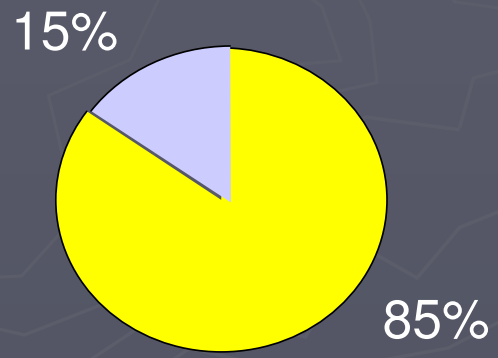
Dow Study of Quality of IP Terms in Sponsored Research Agreements

Foreign Universities Provide
More Favorable IP Terms to Sponsor

US Universities



Foreign Universities



Sole university inventions assigned to Dow or owned jointly

Sole university inventions solely owned by University

2003 Industry Survey

Polled members of the External Technology Directors Network of the Industrial Research Institute

Question: Do you/your company agree with the following statements:

A) IP issues are an impediment to working with US universities

B) We sometimes choose to work with a foreign university (rather than a US university), **and** getting better IP terms is one of the reasons for doing this

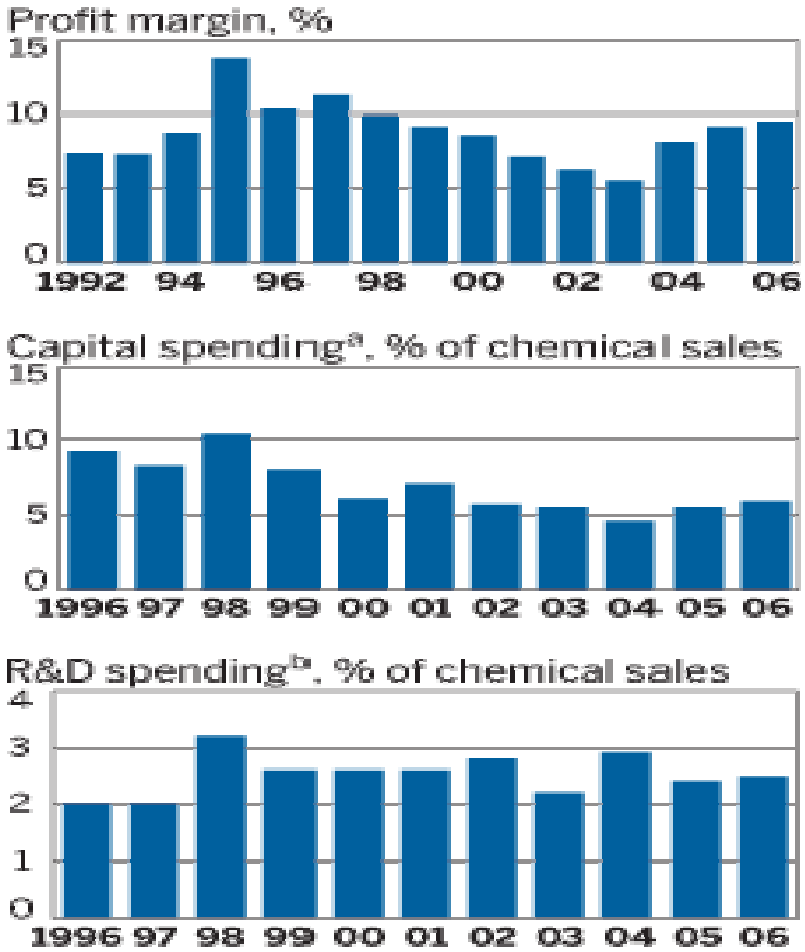
Responses:

- **100% agreed with statement A**
- **50% agreed with statement B**

Characteristics of Chemical Industry

- Global (R&D, manufacturing, sales)
- Large Scale (companies are large due to high capital investment required for cost competitive manufacturing)
- Research Intensive (industry spending high relative to government spending)
- Long Development Timeline (for new products & processes)
- High Development Costs (for new products & processes)
- Low Profit Margins (profits due to sales volume)
- Direct Correspondence (between academic disciplines of chemistry & chemical engineering and the research performed in industry)

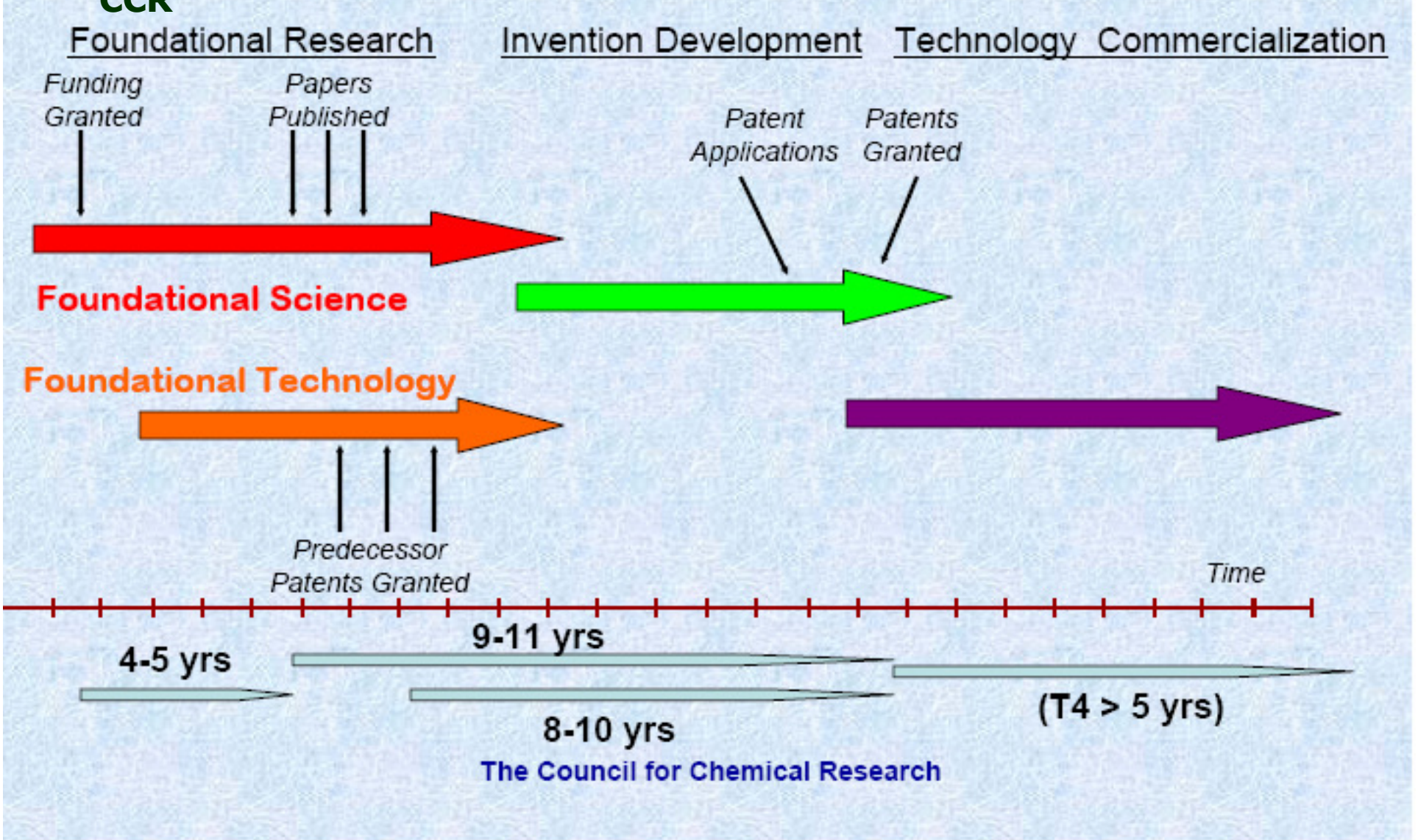
Global Chemical Industry Facts



Source: C&E News, July 2, 2007

Timeline from Conception to Market

CCR



The Council for Chemical Research

Industry Sectors Differ in Business Models: Pharma & IT At Opposite Ends of Spectrum

- **Pharmaceutical Industry**
  - drug discoveries are rare/a single invention is basis for a new product
  - commercialization is expensive and slow
  - product lifetime is long
  - profit margins are high
- exclusive license is highly preferred
- royalty rates can be fairly high

- **Information Technology**
  - each product uses many inventions
  - commercialization is rapid
  - product lifetime is short
  - competitors engineer around IP to make look-alikes
  - profit margins are low
- non-excusive license with right to sub-license is preferred
- royalty-free or nominal royalty

The Chemical Industry is Closer to Pharma but…

- **Pharmaceutical Industry**
  - drug discoveries are rare/a single invention is basis for a new product
  - commercialization is expensive and slow
    - clinical trials and registration
  - product lifetime is long
  - profit margins are high (12-31%)
- exclusive license is highly preferred
- royalty rates can be fairly high

- **Chemical Industry**
  - new products are rare/ inventions usually related to product or process improvements
  - commercialization is expensive and slow
    - development, testing & capital costs
  - product lifetime is long
  - profit margins are low (6-11%)
- exclusive license is highly preferred
- royalty rates need to be fairly low

Low Probability of Commercializing University Inventions

Innovation Steps	Success Probability
Proposal to Grant	1 in 10
Research to Publication	1 in 2
Publication to Patent	1 in 100
Patent to Profit	1 in 250
Overall Probability	**1 in 500,000**

Source: "Understanding Innovation" T.A. Ring (Univ. of Utah), S.B.Butts (Dow Chemical), manuscript in preparation

Industry Carries All Costs and Risks of Invention Commercialization

- When a chemical company develops a technology
  - Development costs typically exceed 100X discovery costs
  - Cost for building a new world scale manufacturing plant is > $100MM
  - Only 1 in 10 is successfully commercialized
- Company profits from innovation successes must pay total costs of innovation failures. Licensing models for inventions from sponsored research should reflect:
  - high cost of development and commercialization
  - high risk of failure

Why Companies Worry About Foreground IP

- Companies want "reasonable control" of foreground IP (assured right to practice) because without this they may:
  - Be unable to use technology developed with their funding (bad research investment)
  - Have to pay licensing fees/royalties that make commercialization unattractive (bad business decision)
  - Find that the university decides to license the technology to a competitor (worst nightmare)

What Company Sponsor Wants

- Royalty-free license to University background IP (BIP)
- Lowest cost for project
- Assignment of University sole & joint subject inventions
- No royalties for subject inventions
- University does not publish research results without sponsor's permission

What Company Sponsor Wants & What University Should Offer

- Royalty-free license to University background IP (BIP)
- Lowest price for project
- Assignment of University sole & joint subject inventions
- No royalties for subject inventions
- University does not publish research results without sponsor's permission

- Access to University BIP at fair price
- Company pays true cost including overhead
- Assured exclusive license to subject inventions
  - Sponsor pays patenting costs
  - Field limited license
  - Capped or limited royalty (field appropriate)
  - Research license for U
- University has right to publish results

The University-Industry Demonstration Partnership

- New organization operating under auspices of GUIRR (NAS), founded in 2006
- Companies and universities are developing new partnership paradigms that will benefit both
  - 81 organizations have joined UIDP
    - 52 universities
    - 26 companies
    - 3 foundation
    - (28 Friends)
  - First project is TurboNegotiator
  - Established a working group on Rev Proc 2007-47
  - Four meetings held (12/06, 04/07, 07/07, 12/07)
    - Next Meeting - April 2008 (Kauffman Foundation)

TurboNegotiator is…

- Tool for conducting negotiation of research agreement
  - Principle-based rather than policy-based
  - partners answer questions about project and partnership (researchers & contracting officers)
  - answers map project into project/IP space
    - takes into account project-specific parameters such as who framed the research problem, relative contributions from each partner (funding, results of previous research, non-commercial samples or equipment)
    - suggests starting point for negotiation of IP and other terms
  - Should reduce cycle time and produce more reasonable agreement

Why Should We Care?

- The US innovation engine is very powerful but not fully engaged for the benefit of society and the economy
- Industry, Universities and National Laboratories are individually strong
- The process for moving nascent technologies to commercialization is not effective
  - We can improve this!