



# Competing and Cooperating in High Technology Industries: Insights from the Global Bioscience Sector

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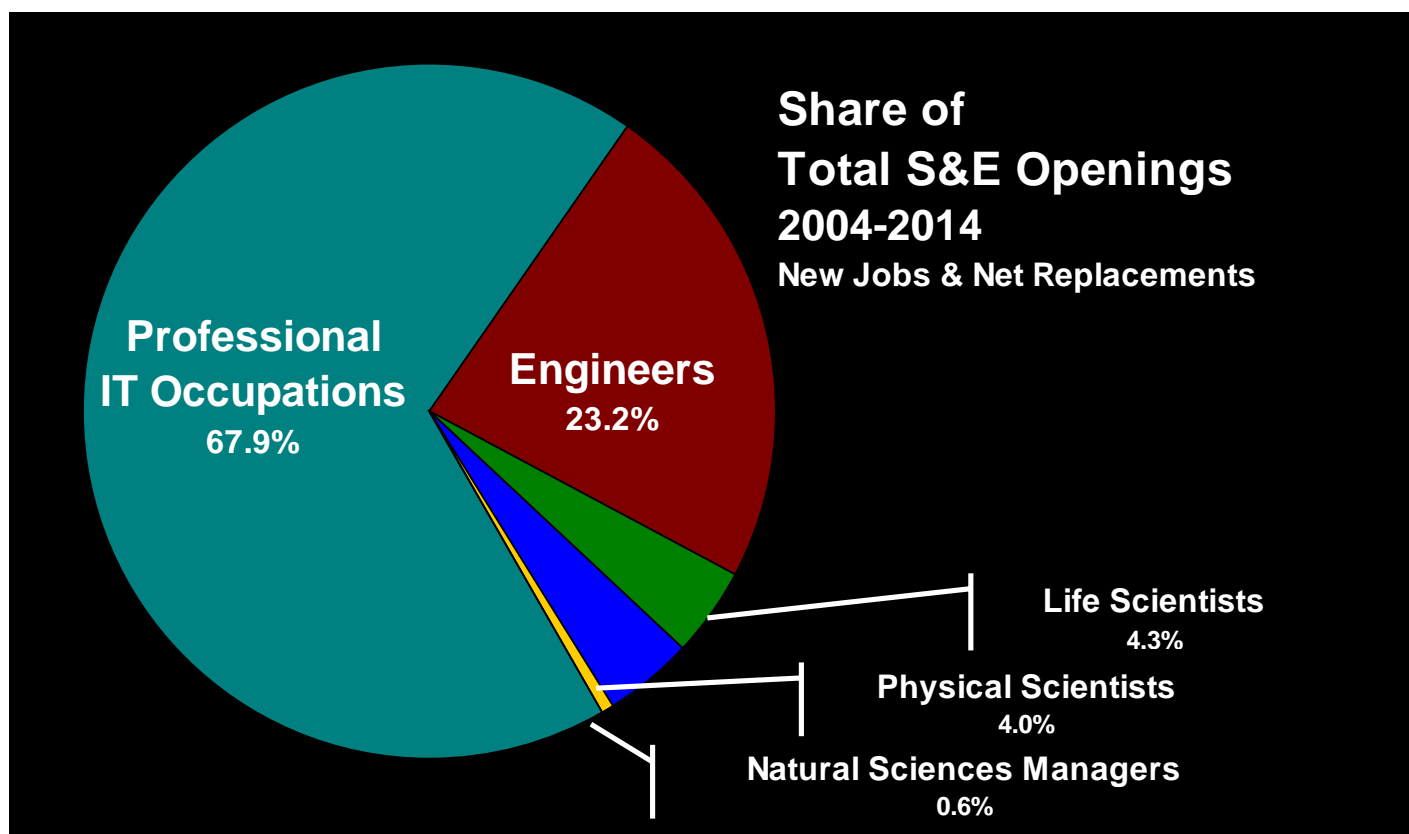
## Why Biotech?

- Most countries and US states investing heavily to build biotech clusters
  - Singapore = Biopolis, Scandanavia = Medicon Valley
- Why?
  - Highest skilled jobs
    - Most Phd and masters as % of workforce
  - Among the highest paying jobs
    - Avg. salary = \$79k – drugs & pharma, \$66k all bioscience vs. \$39k national average
    - Large multiplier effects
  - Sticky jobs
    - R&D historically most likely to remain in home country

## Why Not Biotech?

- Relatively few jobs
  - Employment around 200,000 in dedicated biotech firms
  - Although growing at over 12%

# New Jobs and Net Replacements, 2004-2014

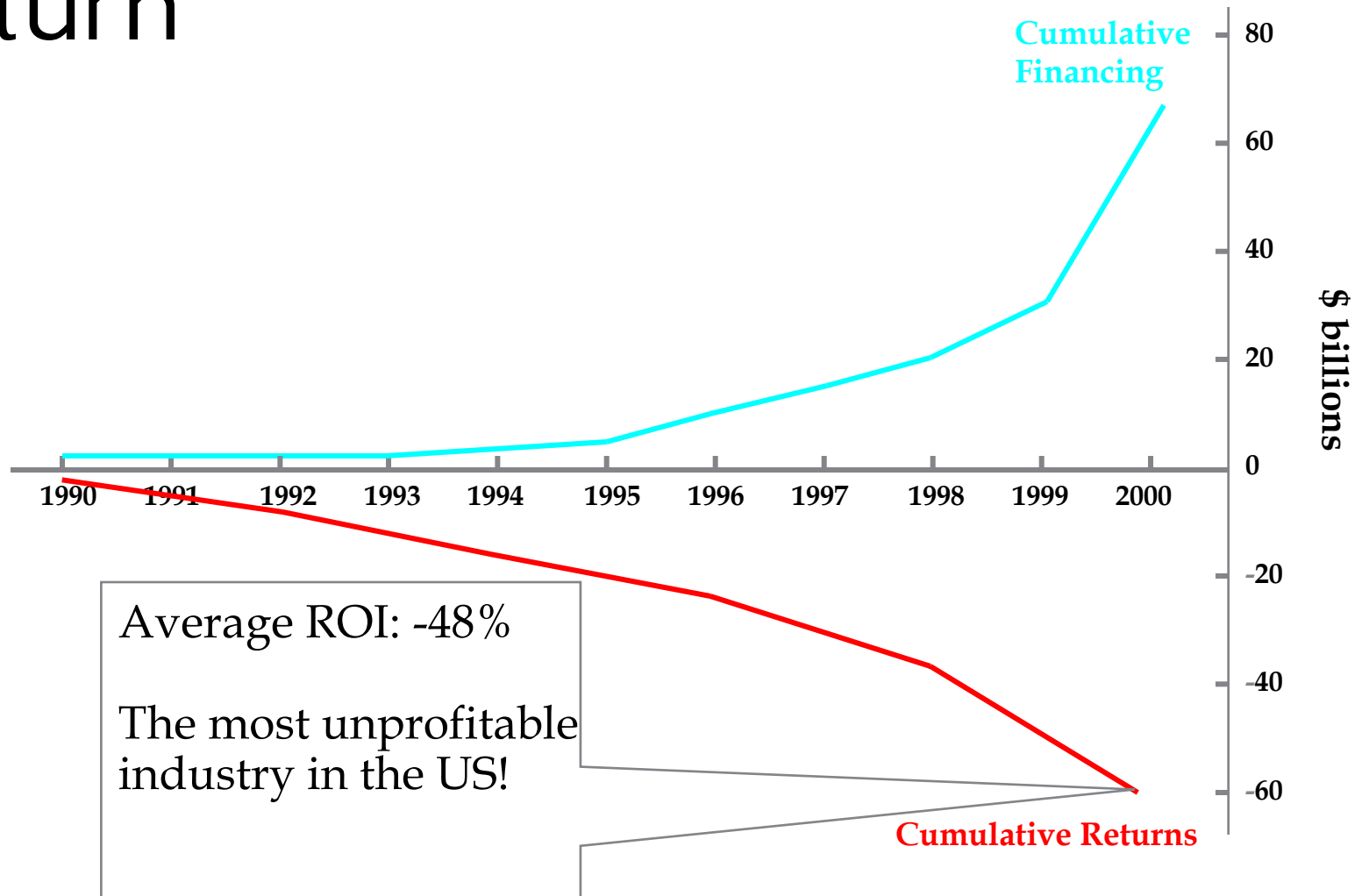


Source: BLS slide by John Sargent, Senior Policy Analyst, Technology Administration, U.S. Department of Commerce 2007

## Why Not Biotech?

- Relatively few jobs
- Few globally viable clusters
  - Silicon Valley, San Diego, Cambridge, MA
- High failure rate
  - Over 90% of drugs don't make it through clinical trials
  - Even harder after Vioxx
- Historically not a profitable sector

# US private investment and return

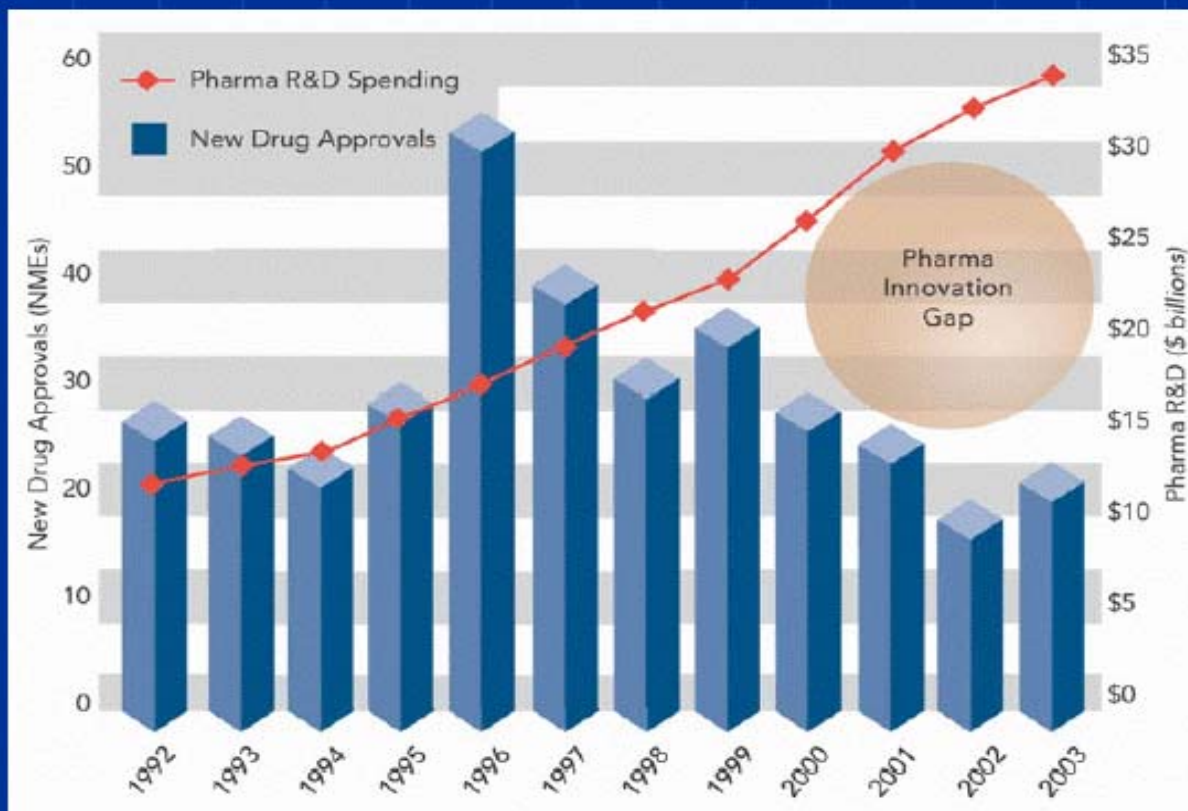


Source: West, Ernst & Young

## Why Does Biotech Have a Future?

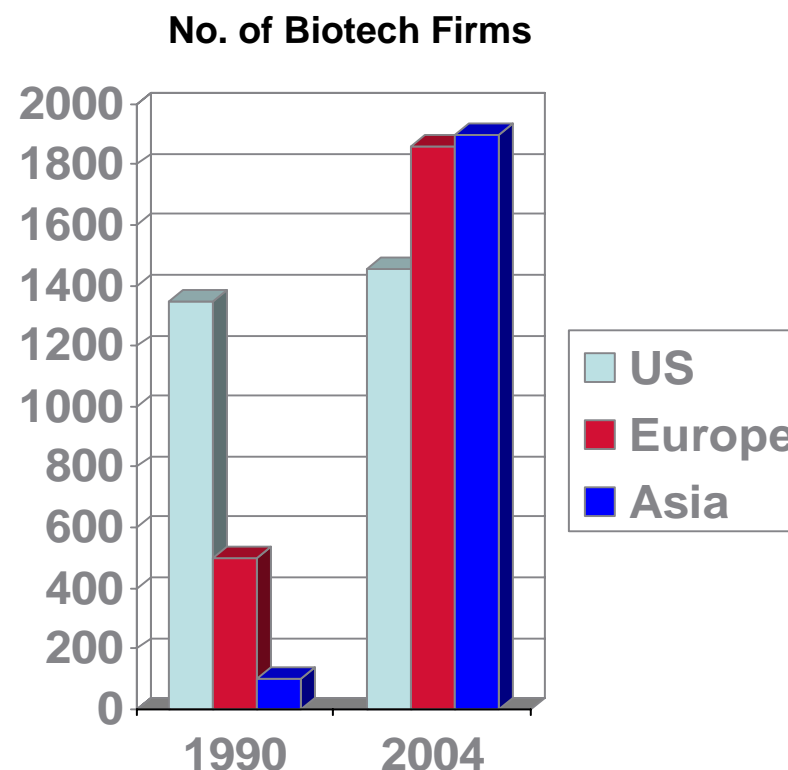
- Core enabling technology for the 21<sup>st</sup> Century
  - Much broader than just biomedical
    - Agriculture, environmental, industrial applications
  - Could impact up to 25% of global GDP (Shahi, 2004)
- Fills large unmet medical needs
  - Investors with personal stake in the outcome
  - Aging populations
- Synergistic with large pharma
  - Over half of all new drugs now submitted to the FDA are biologics
  - Pharma business model broken

## Innovation Gap



# Growing competition in highest skilled segments: Biotechnology

- US unchallenged leader entering 1990s
- Still home to the most successful biotech firms
- But Europe and Asia catching up rapidly
- India and China entering the game with change in patent regime
  - India alone now has 400 bioscience firms
  - Most created in last 5 years



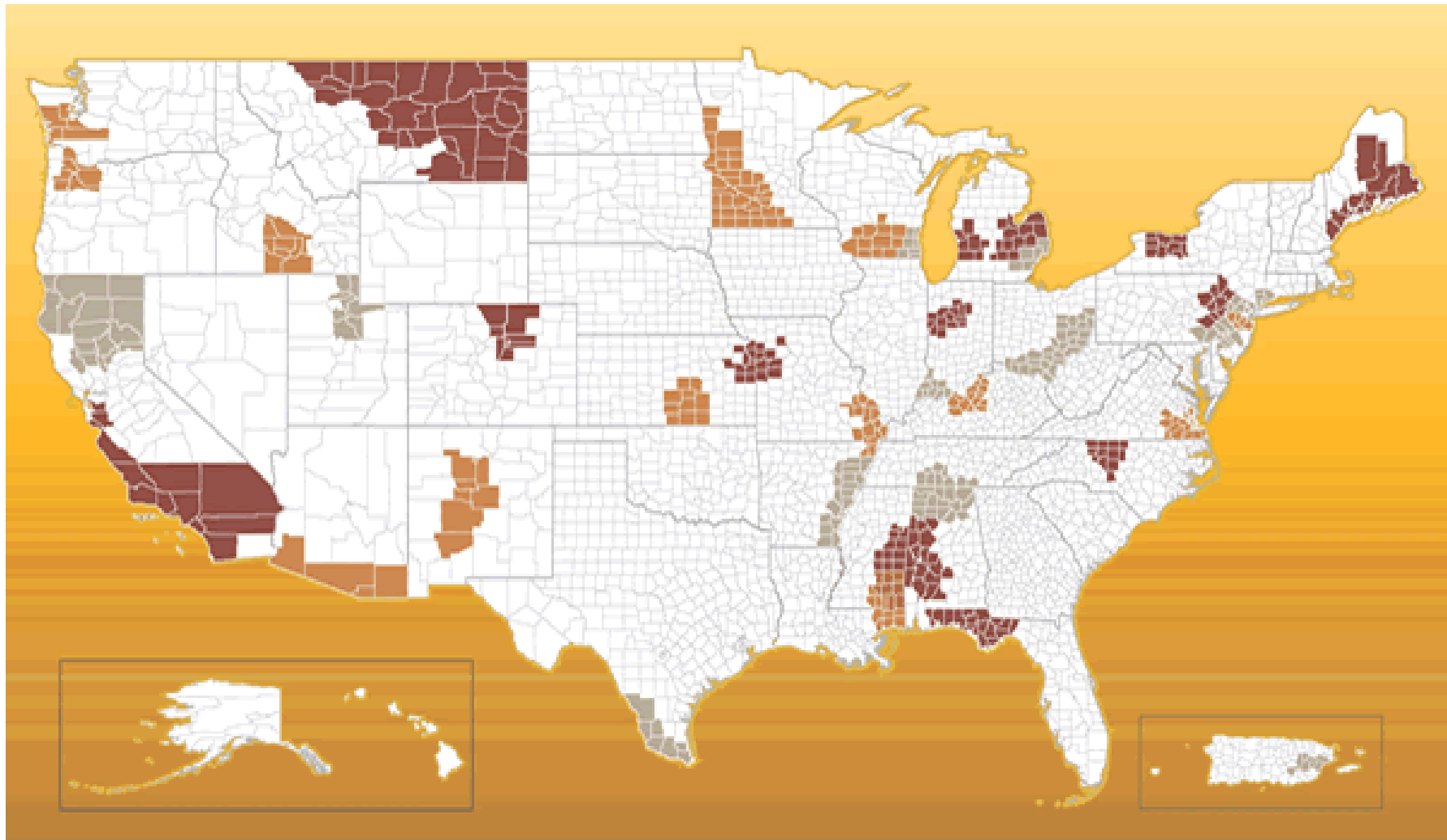
## Policies to Sustain US Biotech Advantage

- Continue large public R&D investment
- Make real investment in FDA's Critical Path Initiative
  - Transform drug development & approval processes
- Improve the STEM educational pipeline
  - Domestic and global
- Encourage new product development models
  - Public-private partnerships
- Avoid changes in regulatory environment that will likely harm biotech sector
  - Stock options, patent protection have been vital
- Foster development of world-class clusters
  - WIRED

## WIRED = Workforce Innovation & Regional Economic Development

- US Dept of Labor initiative to create clusters
  - Combines workforce and economic development
  - Integrates WIBs more closely with employers and education providers
- Began in February 2006
- \$325 Million awarded thus far to 39 regions
- New Jersey = most WIRED state
  - Bio-1 = Foster life science cluster in Central NJ along Route 1 Corridor
    - Rutgers to Princeton

# 39 WIRED Regions



# Investing in a world-class workforce

## Bio-1 WIRED: Core Elements

- Enhance the P-12 pipeline
- Develop clear career paths and articulation agreements
- Expand internships and cooperative education at all levels
- Create new professional master's degrees
- A new retraining program – Flak jackets to Lab Coats
- Support for bioentrepreneurs
- Enhanced global partnerships

## WIRED Ultimate Goal: Foster More High-Skill Ecosystems

- Catalyst
  - Research to fuel innovation
- Nourishment
  - Flows of human and financial capital
- Supportive environment
  - Culture and regulations supporting innovation and specialized infrastructure
- Connectivity
  - Foster local networks, social capital

## Issues Regarding WIRED Approach

- Still far too early to evaluate
- Concern that it will not continue with a new Administration although issue is bipartisan
  - Common US policy problem
- Sectoral focus uneven
- WIRED grantees without strong prior regional leadership capacity have struggled
- Resources inadequate to stimulate HSE development
  - \$5 million/3 years
  - But intended to leverage other \$\$\$
    - Bio-1 connects over \$200 million in existing grants