

2009 Study of Nanotechnology in the U.S. Manufacturing Industry



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Nanomanufacturing

What NCMS Does ...



Leads in Precompetitive r&D

Evaluates New Technologies

Accelerates Applications

Develops Cross-Sector

Industry Collaborations

Enhances the Global

Competitiveness of Our

Members & Partners

Progressive *Nano*-Study Themes

2003 – Do U.S. manufacturers recognize the potential of nanotechnology? (80+ datasets)

2005 – Do surveyed organizations view nanotechnology differently from other advanced science and technology? (600+)

2009 – Are U.S. nanotechnology businesses viable, competitive and sustainable in current economically turbulent times? (270+)

Study Objectives

- **Snapshot of U.S. Nanotechnology Industry**
- **Assess Key Trends, Strategies, Plans, Concerns**
- **Report Aggregate Industry Statistics**
- **Benchmark for Best Practices in Commercialization**
- **Assess the Impact of Recession on Nanotech Industry**
- **Metric of NNI, Other Public-Private Initiatives**

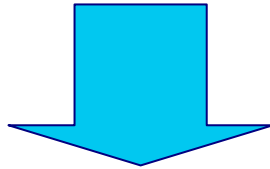
20 Strategic Issues Studied

1. **Industry Demographics**
2. **Geographical Location**
3. **Role in NanoSupply Chain**
4. **End-Use/Application Markets**
5. ***Nano-Product Type(s)***
6. **Corporate Priority**
7. **Coping with Transformation**
8. **Internal Capacity**
9. **Available Infrastructure**
10. **Direct Staffing**
11. **Collaboration**
12. **Offshoring of Developments**
13. **Partnering with NNI Centers**
14. **Perception of Competition**
15. **Commercialization Timelines**
16. **Role of Government**
17. **Key Challenges & Barriers**
18. **Contemporary Concerns**
19. **Impact of Recession**
20. **Short-term Predictions**

2009 Study Approach

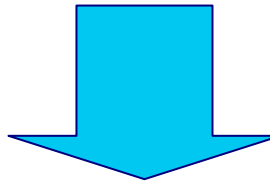
1. **Identification of Key Technical & Business Issues**

2. **20-Screen Interactive Electronic Questionnaire**



3. **Target Manufacturing & Nanotechnology Industry**

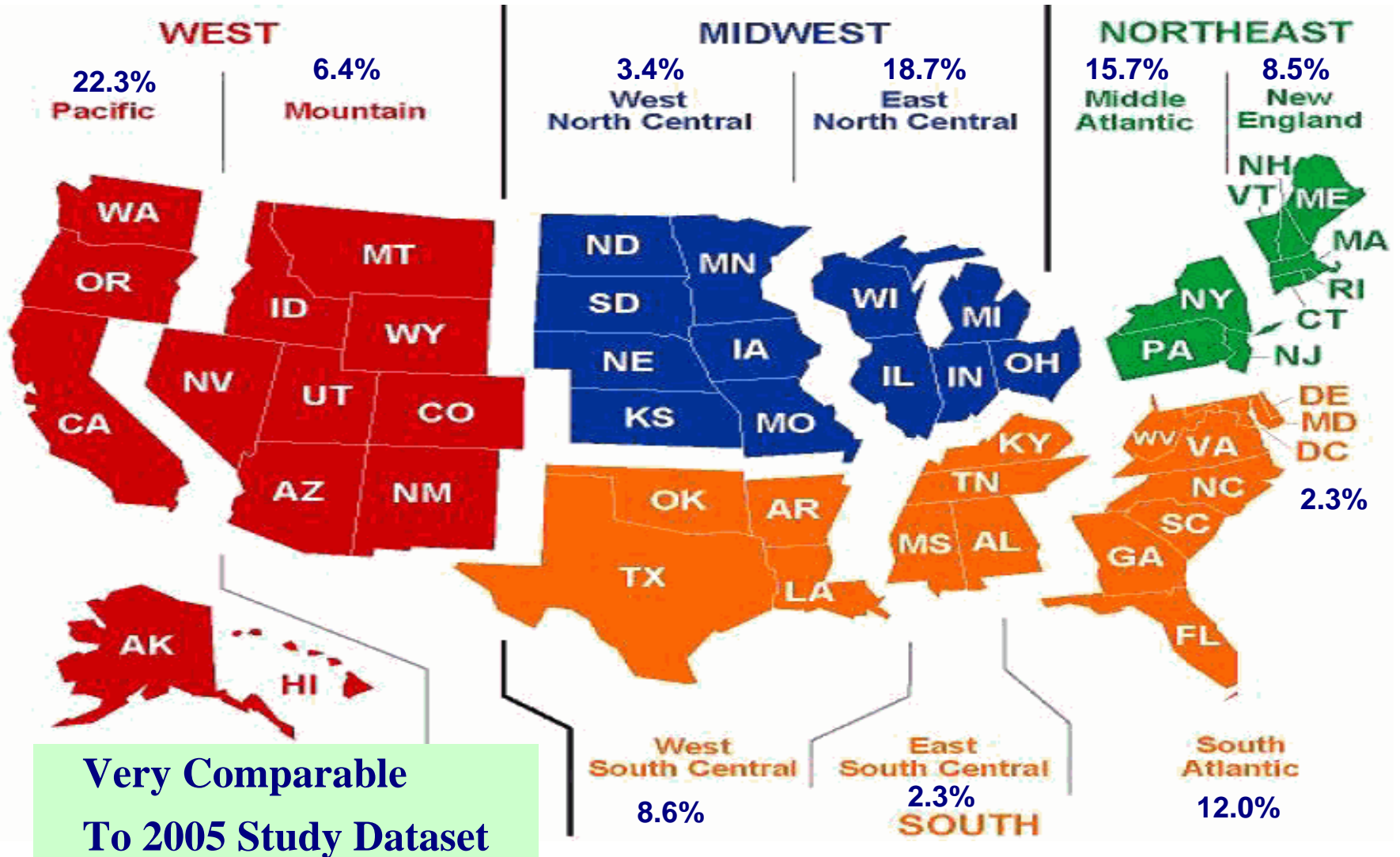
- **10,000 Executives Solicited by PennWell/Small Times**
- **Sampling Period: June – September 2009**



4. **Responses Analyzed, Report & Dissemination**

- **October – December 2009**

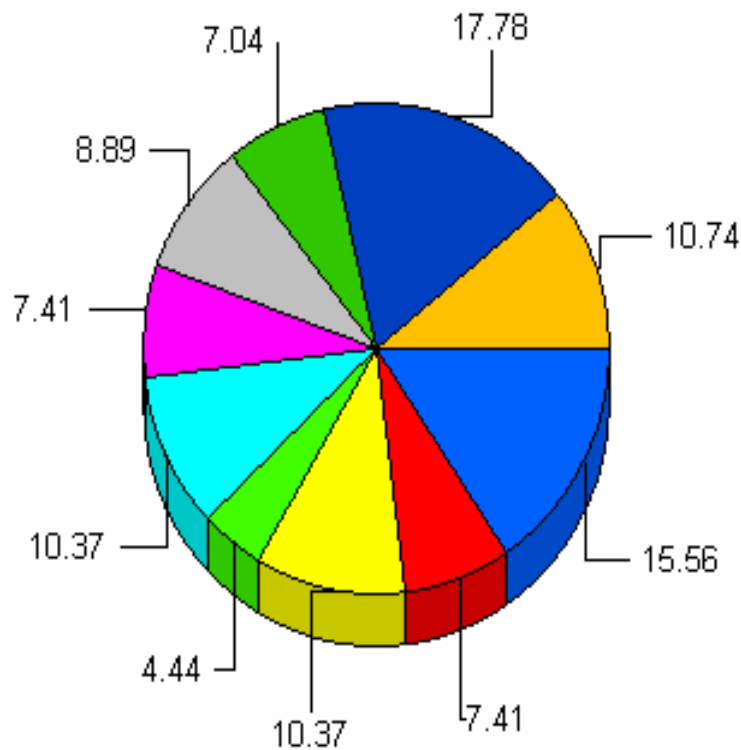
Distribution of 270 Responses



**Very Comparable
To 2005 Study Dataset**

The U.S. Nanotech Value Chain

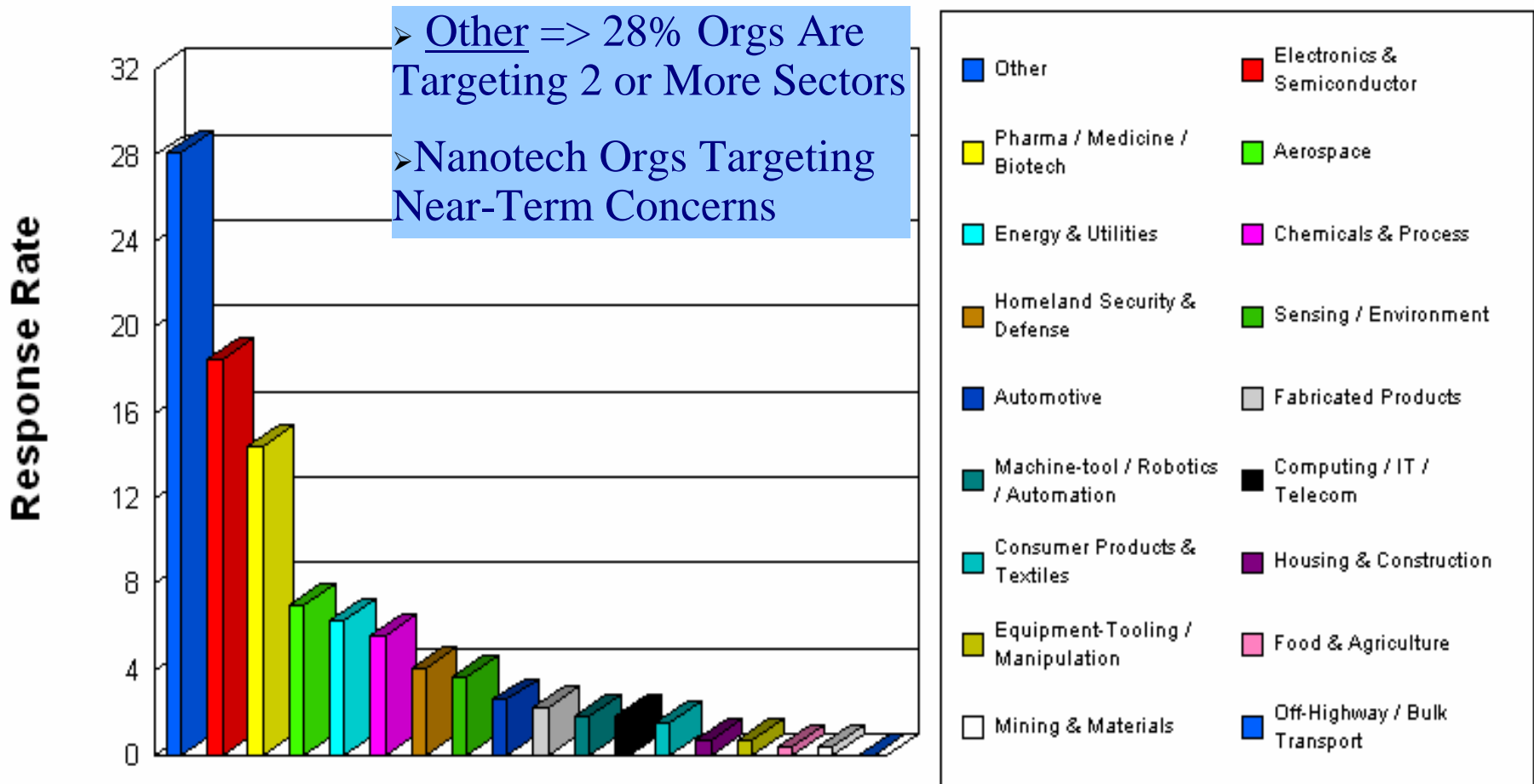
Increased Involvement of Academic Organizations in Tech Transfer



- Materials Supplier
- Intermediate Processor
- Equipment Manufacturer
- Component or Sub-system Supplier
- Manufacturer / Integrator / Assembler
- End user / Consumer
- Contract / Non-profit R&D
- Government Lab / Agency
- Academic Lab / Organization
- Other

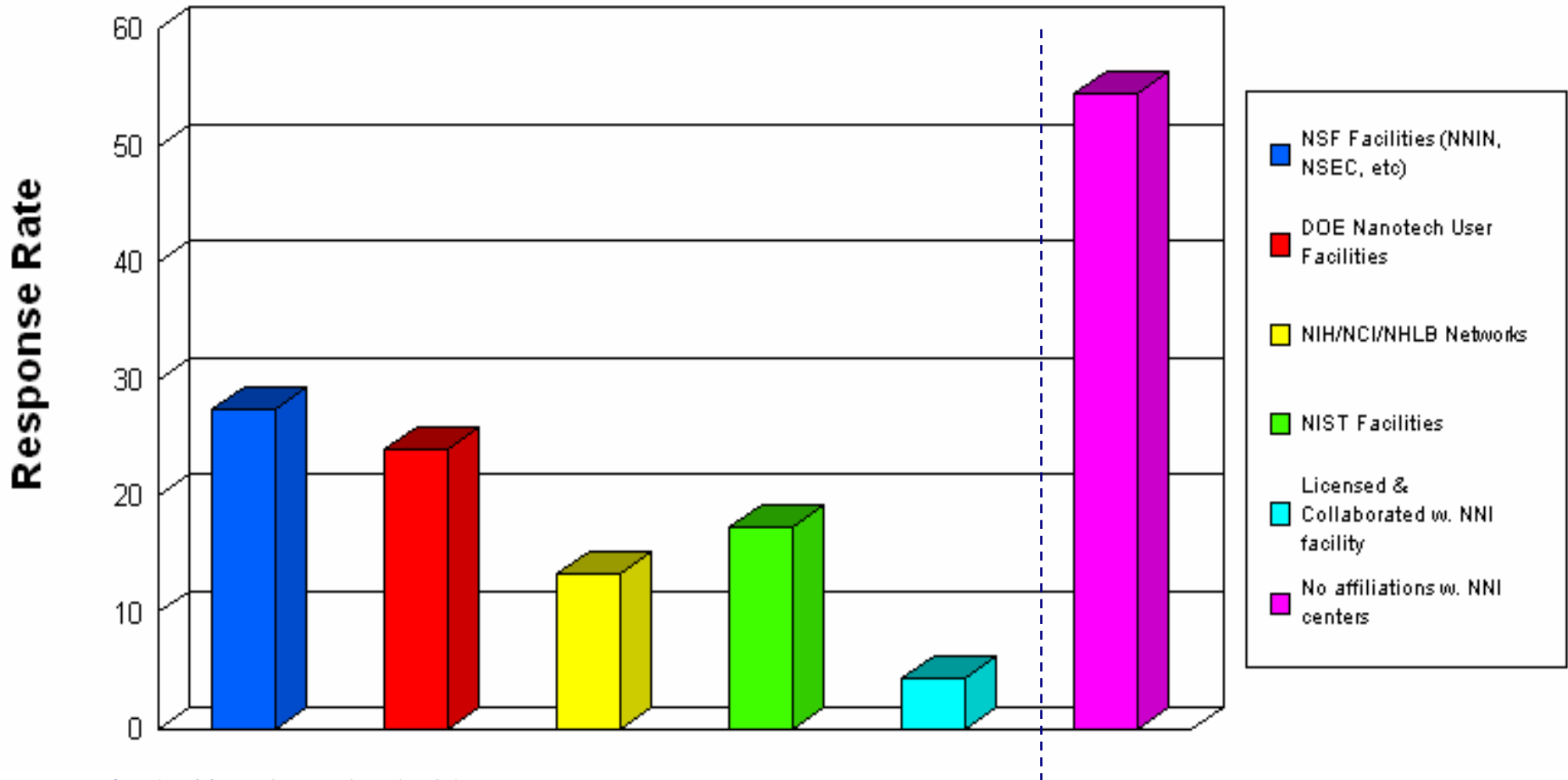
Nanotechnology Applications

Diverse, Addressing All Major Manufacturing Sectors



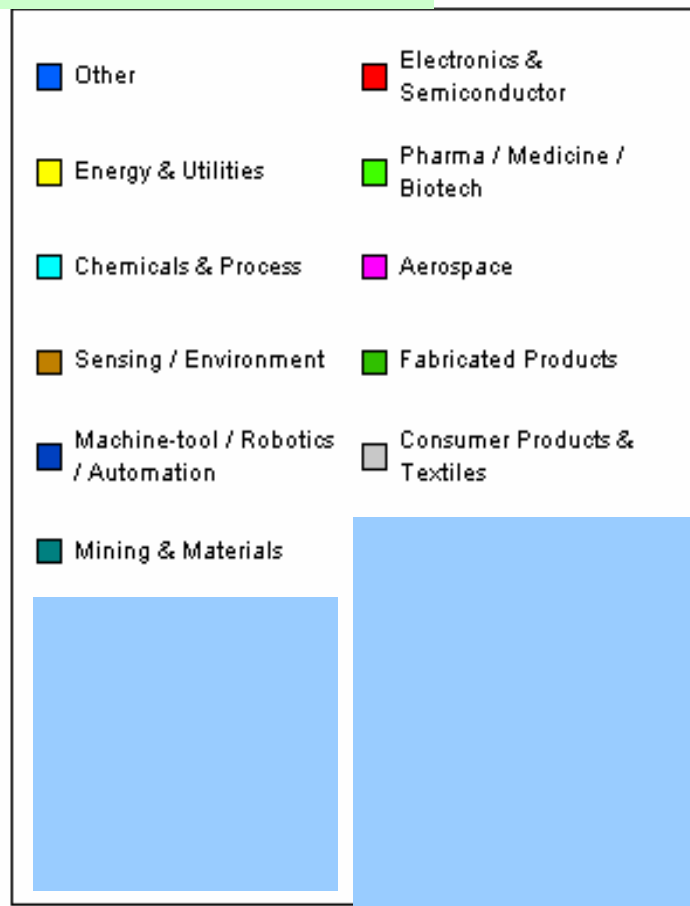
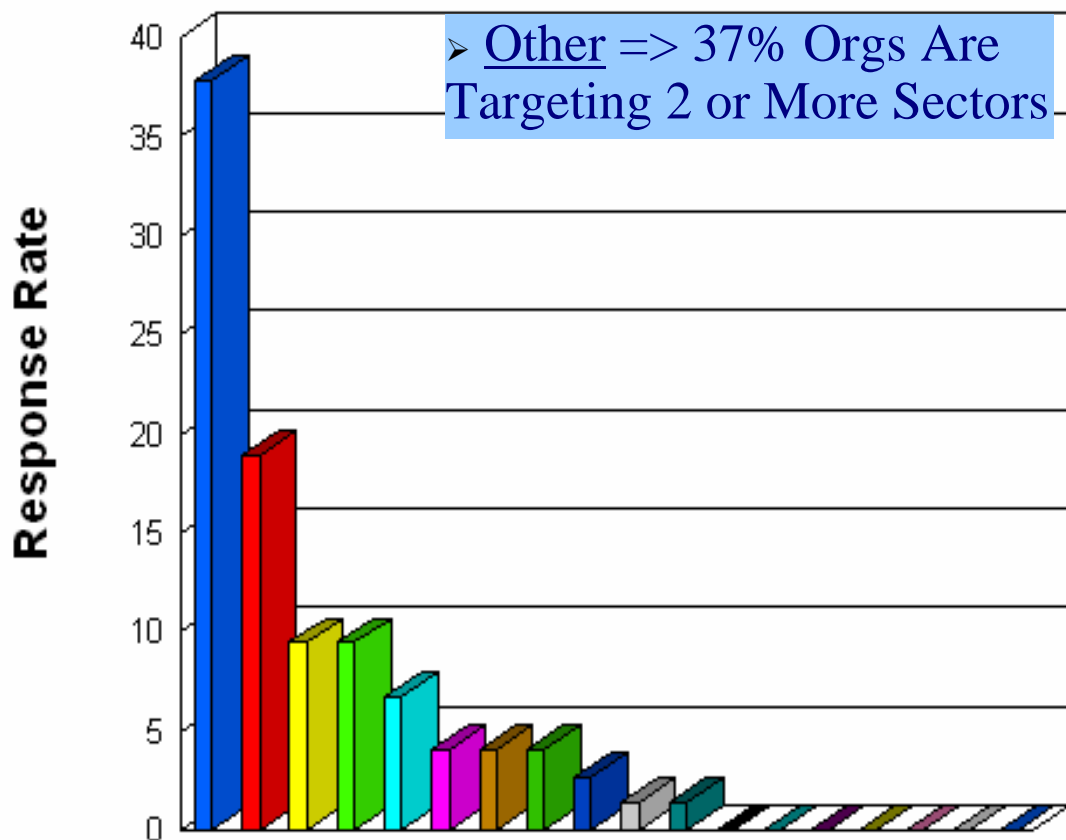
Collaborations with Federal R&D Labs

Opportunities Abound for Formal Interactions Between Federal/Academic Labs and Industry



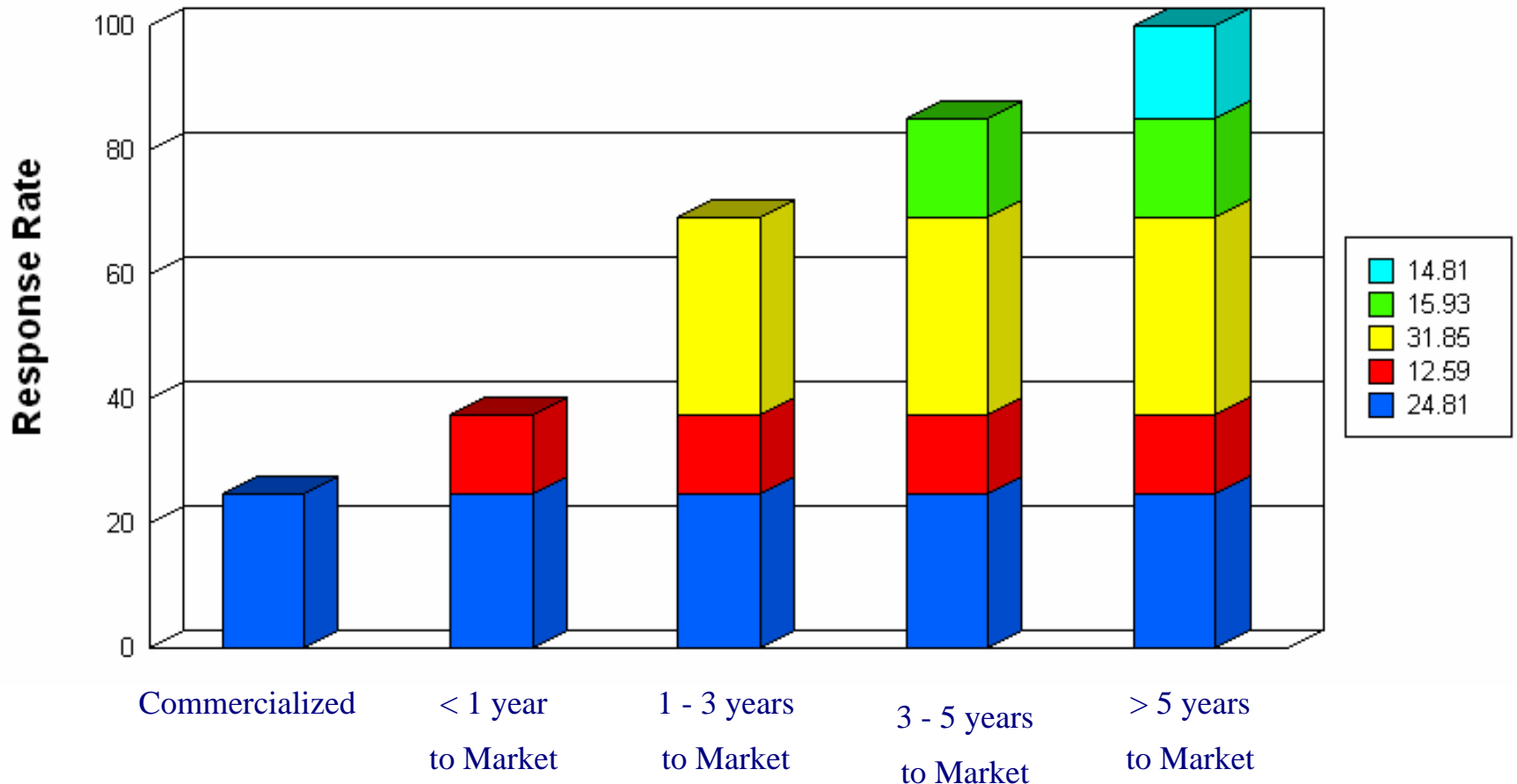
Market Sectors of NNIN/NSEC Collaborators

< 5% Respondents Indicated Licensing IP/Technology from Federal Lab Facilities



Commercialization Timeline

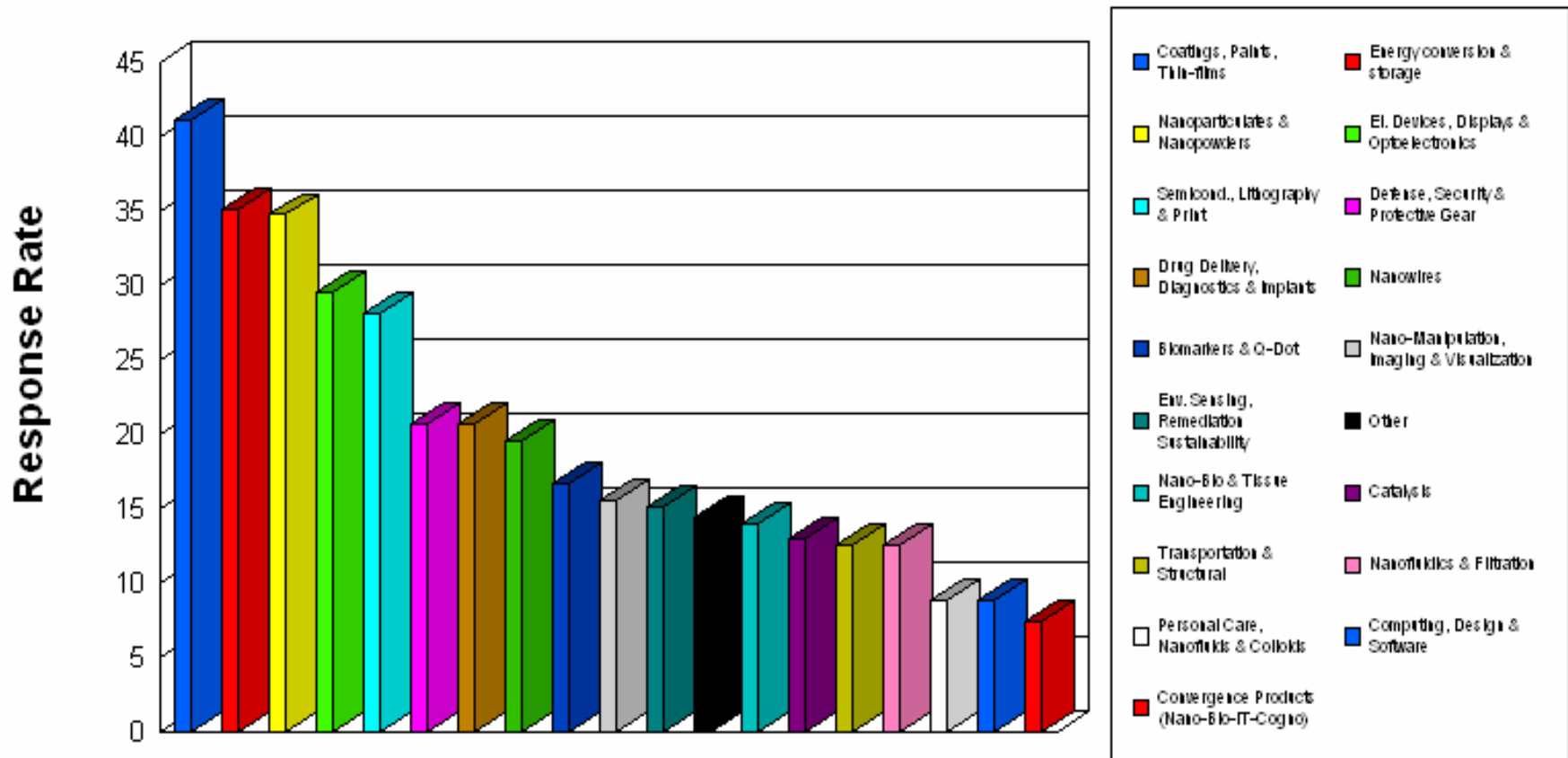
Recession Has Affected the U.S. Nano-Pipeline
Expect More Nano-Enabled Products in ~3 Years



Nano-Materials/Products

Near-Term: Advanced Coatings, Energetics, Particulates & Displays;

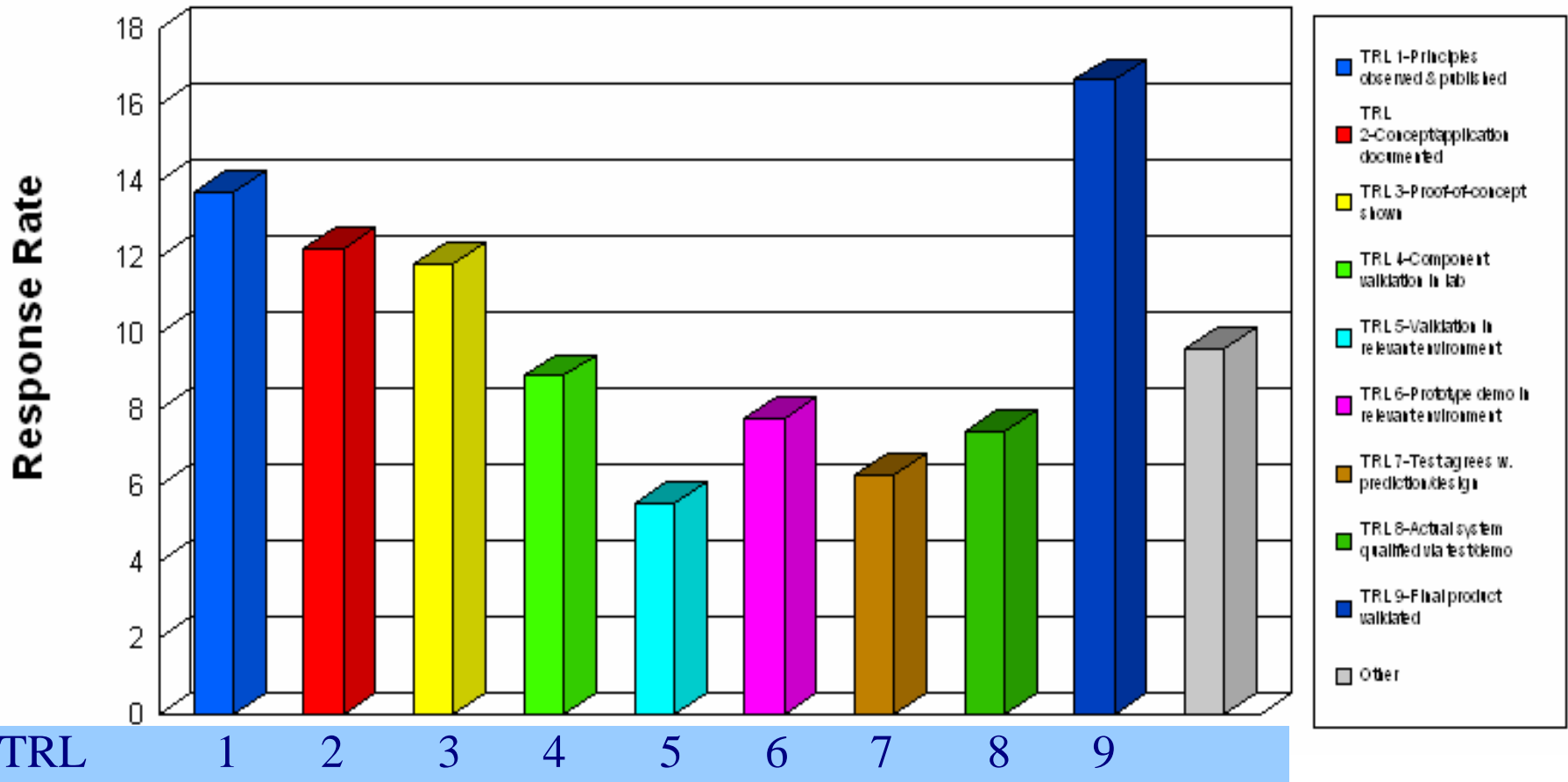
On The Horizon: Nano-Med/Biotech, Biomarker Products



Nanotech Readiness Levels (Aggregate)



Higher Readiness

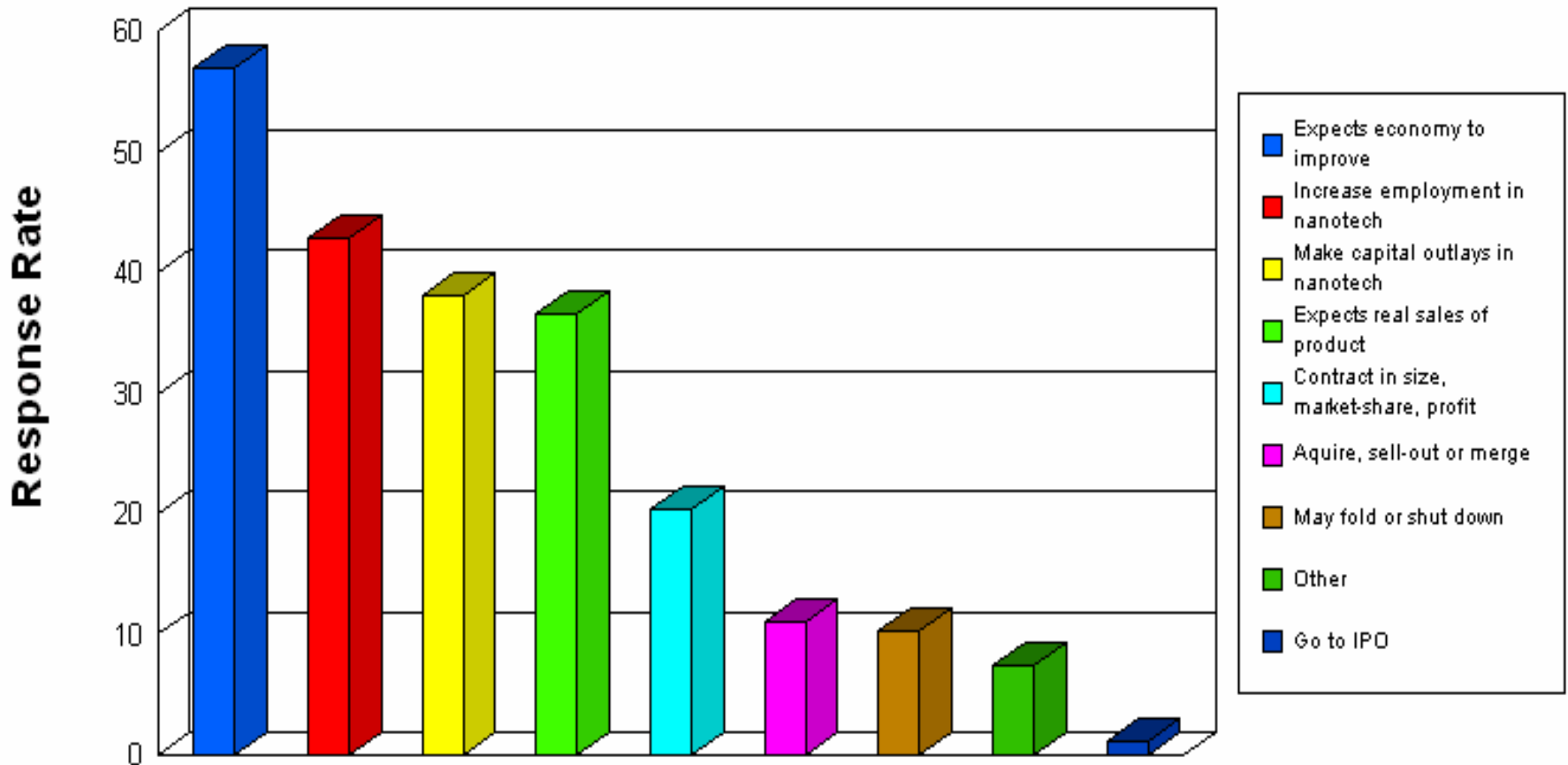


Nano-Products With Highest Readiness Levels

1. Coatings, Paints, Thin-films
2. Semiconductors, Lithography & Print Products
3. Nanoparticulates & Nanopowders
4. Energy Conversion & Storage
5. Electronic Devices, Displays & Optoelectronics

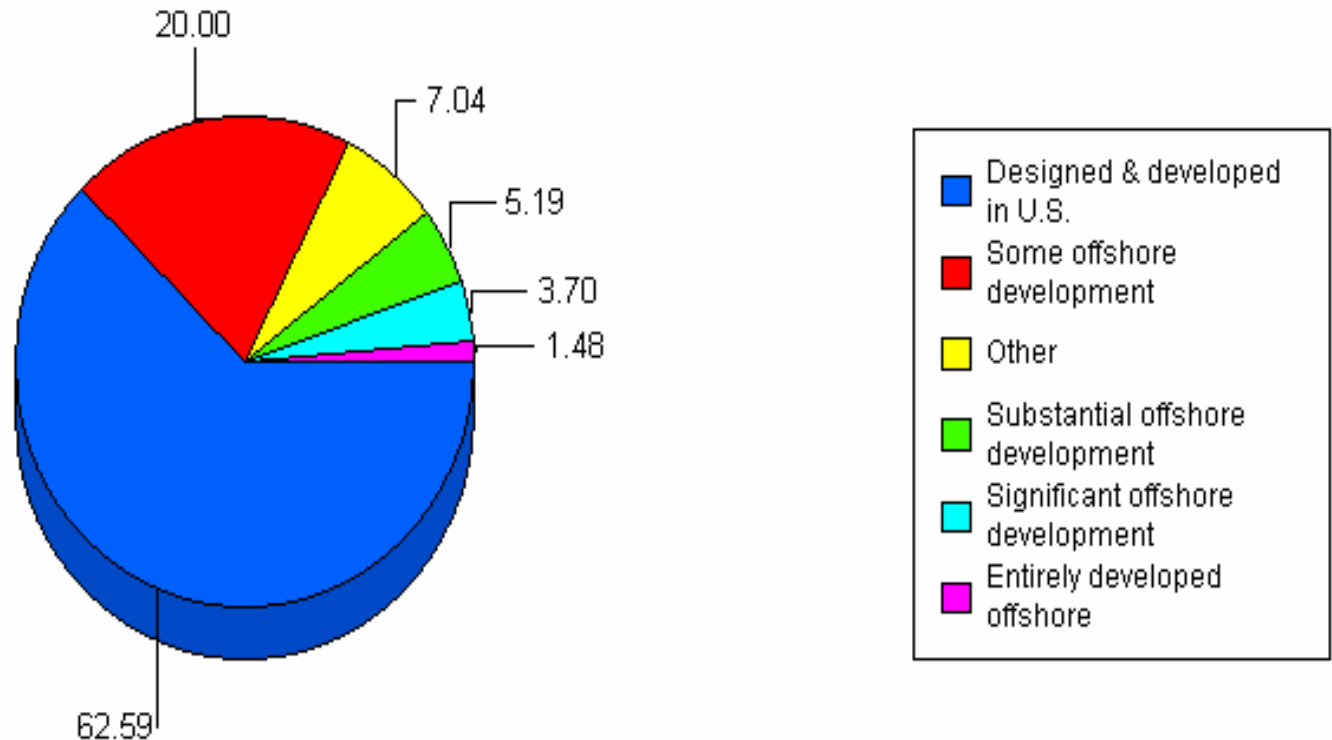
Near-Term Industry Outlook (~1 Year)

Respondents Are Cautiously Optimistic;
Suppliers Have Diminished Capacity to Ramp-Up in Recovery



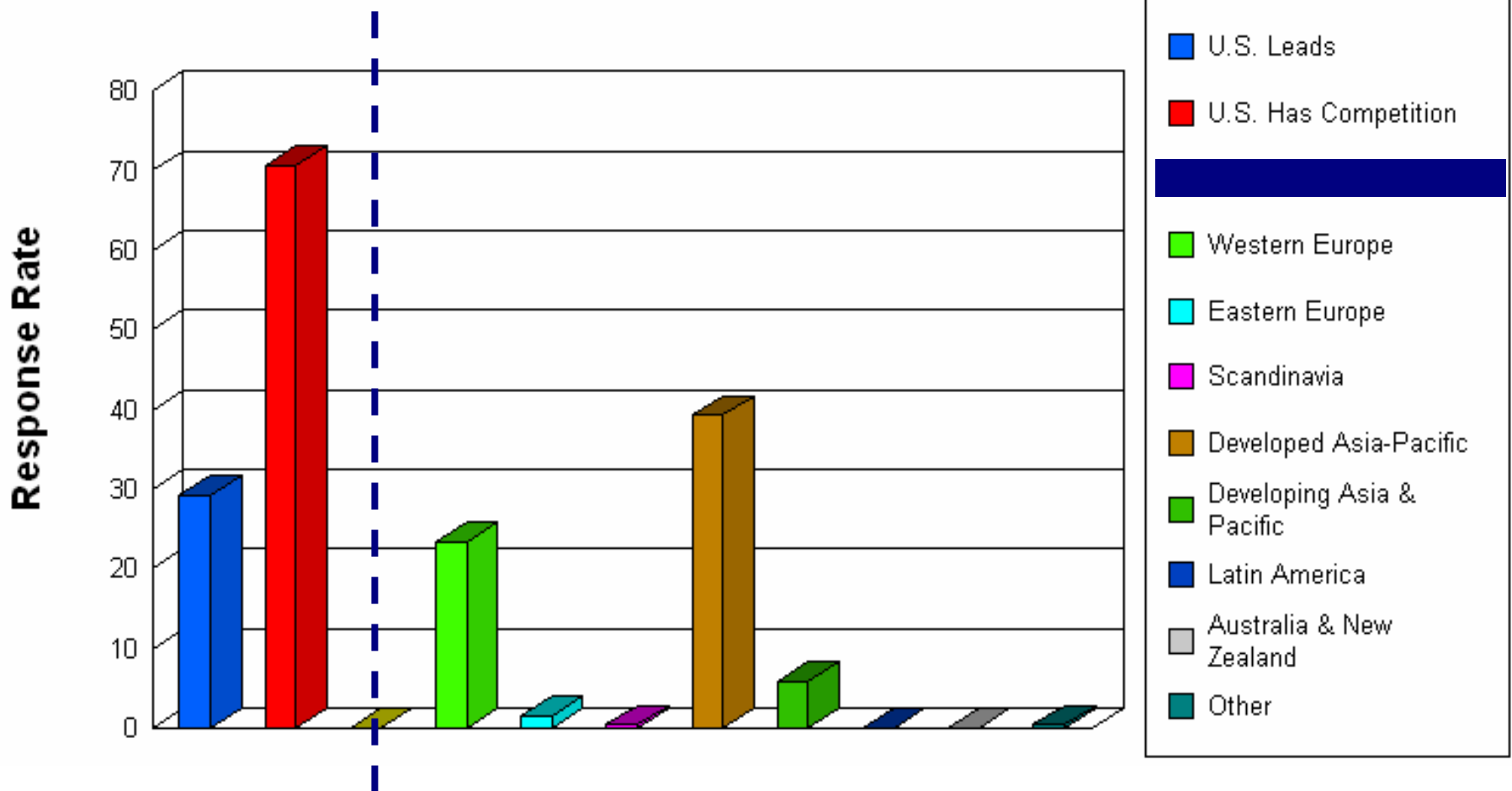
Offshore Developments in Nanotech

~40% Respondents Involved in Offshore Developments -
E.g., Electronics/Semiconductor, Pharma/BioTech, Energy



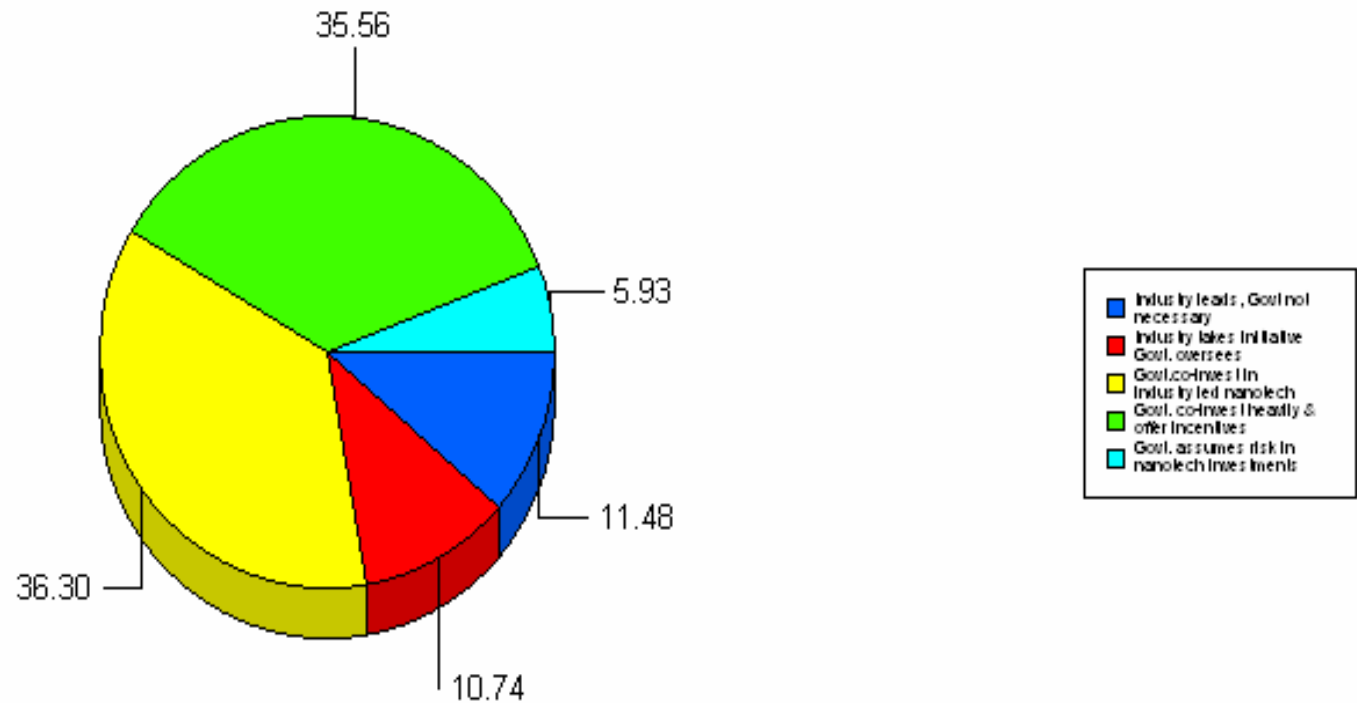
US Competitiveness in Nanotechnology

Bar Chart



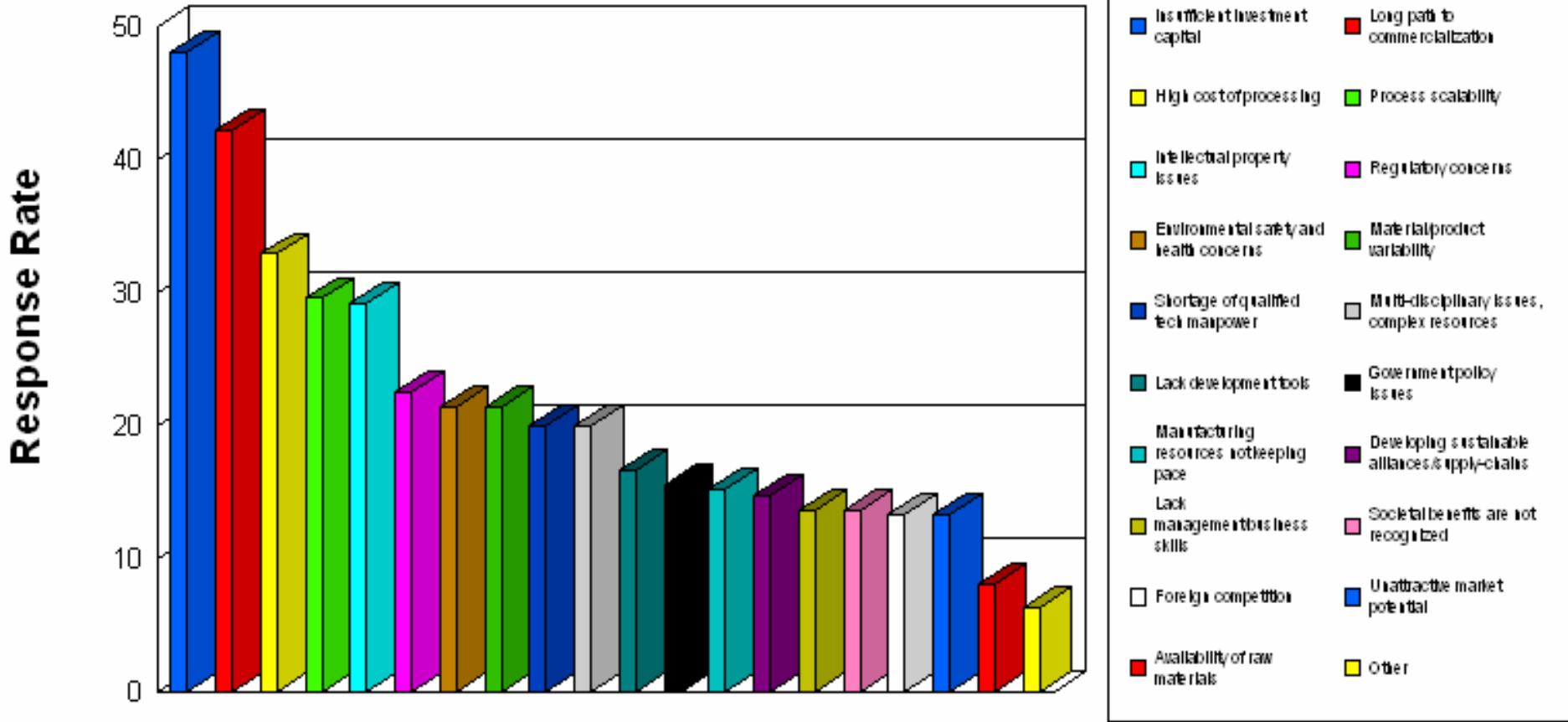
Role of Government

Federal & State Governments Have Critical Roles in Defining the U.S.' *Nano-Future*, post-Recession



Barriers to U.S. Nanomanufacturing Industry

List Largely Unchanged From 2005 NCMS Study



Conclusion

- Nanotechnology is well past the ‘hype’ phase!
- Commercialization efforts are better focused to address real industry problems, product performance concerns and critical pain-points
- Developers are moving up product value-chains, addressing sustainability, EHS and risk-benefits
- Organizations have scaled back lead-time ambitions, as well as narrowed their portfolios
- Access to non-dilutive capital is key for successful product launches and accelerating market-adoption of nano-enabled products

Specific Database Queries Invited...

- Direct Your Questions Regarding Specific Nano-Survey Study Topics or Trends To:
manishm@ncms.org
- Final Report Due January 2010

Thank You!