The Innovation Imperative

Fostering Regional Clusters for Innovation

Building Strategies for Regions of Innovation
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Current Global Mega-Challenges

- Fostering Economic Growth through Innovation
  - Driving domestic Growth and Employment
- Developing New Sources of Energy
  - Commercializing renewable alternatives to oil
- Addressing Climate Change
  - Growing a Green Economy; A major Growth opportunity
- Delivering Global Health
  - Transforming large investments in research to affordable and personalized treatment and care
- Improving Security
- Innovation is key to addressing these challenges

Leading Countries and Regions look to Innovation to Respond to these Challenges

- They are providing five things:
  - High-level Focus on Growth and Strength
  - Sustained Support for Universities
  - Rapidly Growing Funding for Research
  - Support for Innovative Small Businesses
  - Government-Industry Partnerships to bring new products and services to market
- They are investing very substantial resources to create, attract and retain the industries of today and tomorrow.

Clusters are widely seen as Key to Innovation

- Many regions around the world are seeking to replicate the success of Silicon Valley
- National and regional governments are seeking to build clusters by geographically co-locating:
  - Private sector R&D companies
  - Related manufacturing and service industries
  - Research universities and teaching institutions
  - Government sponsored laboratories and technology programs

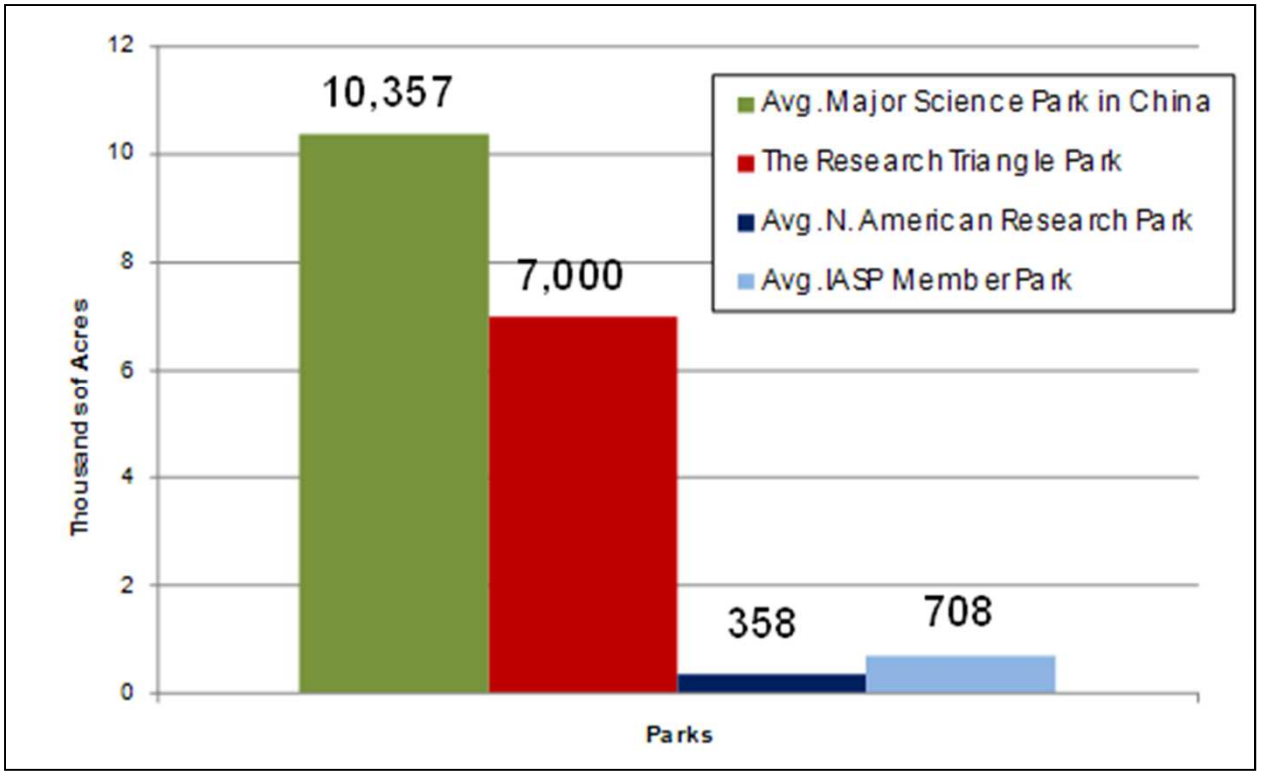
Source: National Academies Conference on "Growing Innovative Clusters"- June 3, 2009

China's Goal: To Become an "Innovation-Driven Economy" by 2020

- Boosting R&D Investments
  - Expenditure on basic research doubled between 2004 and 2008
  - Tax incentives for enterprises that invest in R&D
- Building R&D Infrastructure and Facilities
- Developing world class universities to create a Skilled Workforce
- Building Innovation Clusters though the development of large S&T Parks

Source: Mu Rongpin, 2010 UNESCO Science Report

The Importance of Scale: China's Mega Research Parks

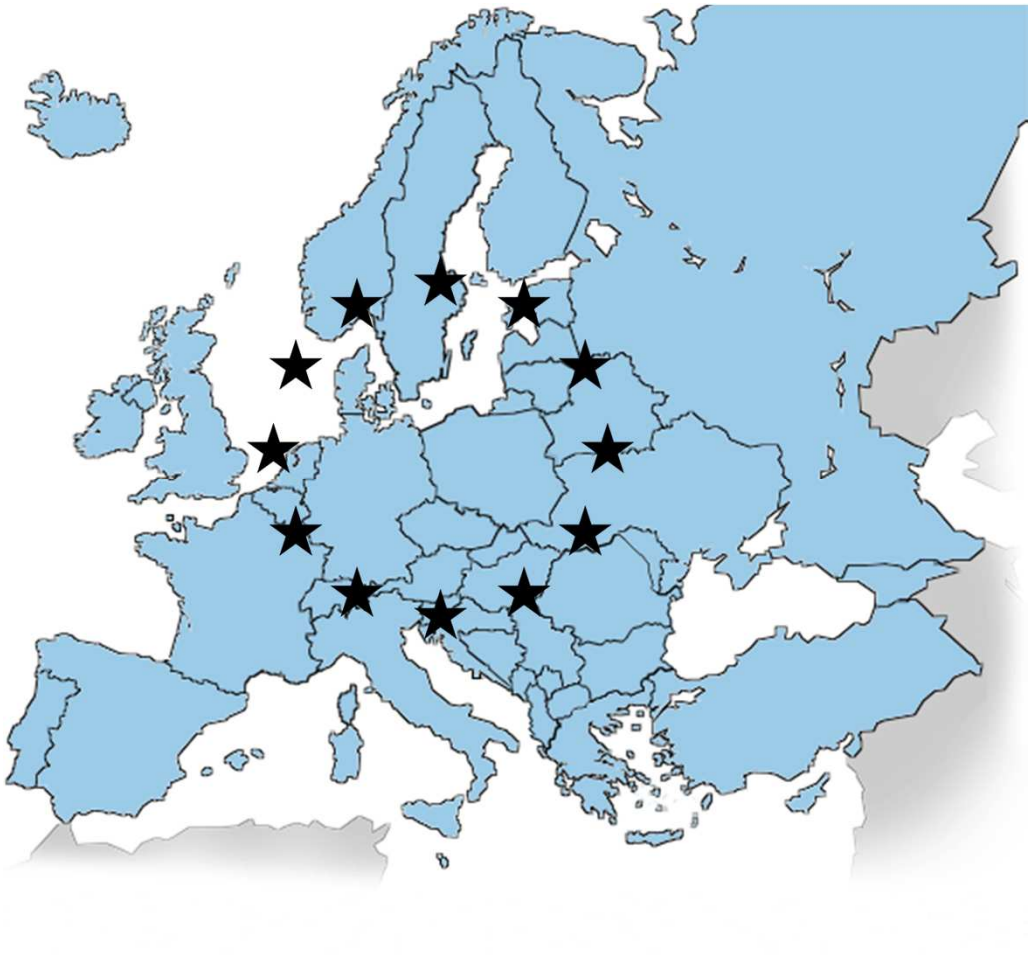


- China has more than 54 state-level economic and technological development zones, and 53 national high-tech development zones

Singapore is Seeking to Become an Innovation Cluster

- The city-state's goal is to be Asia's preeminent financial and high-tech hub.
- Government is investing $12.8 billion under the Research, Innovation and Enterprise 2015 plan
- A*STAR's task, with $5 Billion in funding, is to:
  - Attract a skilled R&D workforce
  - Draw major investments in pharmaceuticals and medical technology production
  - Invest in S&T Parks: Biopolis & Fusionopolis
  - Focus on funding for Early-Stage firms (SBIR)

How is Europe Addressing the Innovation Imperative?



Europe's Best Innovators are Changing

- Finland, Sweden, the Netherlands, & France are among those
  - Making Substantial public R&D investments
  - Reforming university structures and public research institutes
  - Mobilizing private capital for start-ups and growth companies (eg. by providing "tax grants")
  - Introducing new partnership programs
  - Investing in Innovation Clusters

France's Pôles de Compétitivité

- Goal is to develop productive inter-linkages among France's research institutes, universities, and industry
  - Incentives for Collaboration: through incentives in the form of direct aid, tax deductions, and access to sources of funding.
  - Competitive Process: From more than 100 proposals from vying regions, 66 competitiveness clusters were selected in 2005, of which six were labeled *pôles de compétitivité mondiaux* and ten *pôles de compétitivité à vocation mondiale*.
  - Substantial Funding: € 1,500 million for the first three years and ministries were encouraged to allocate around 25% of their funds to collaborative projects.

EU Support for Clusters

- Regions of Knowledge initiative
  - Implemented under the Seventh Framework Programme
  - Aims to strengthen the research potential of European regions
    - Encourages the development of research-driven clusters associating universities, research centers, enterprises and regional authorities and supporting their cooperation.
- Regions for Economic Change initiative
  - Assists trans-national networks of regions in their efforts to improve their regional innovation systems, complements this program.

President Medvedev's Skolkovo Initiative

- Skolkovo Science City outside Moscow is to provide a cutting edge science park to capitalize on Russian scientific assets.
- The city will focus on:
  - IT
  - Biomedical
  - Energy
  - Space
  - Nuclear Industries

President Medvedev's Skolkovo Initiative

- Goal is to "attract international and domestic intellectual capital, and encourage technical innovation."
  - Postgraduate, research-led university
  - 5 major research centers
  - 50 corporate RD centers of major multinational companies
  - Technopark with more than 1,000 start-ups, venture capital firms
  - Substantial tax benefits: No VAT; Customs exemptions; no income tax for companies making less than $30 million per year.
  - Fast-track visa and work permit procedure for qualified foreign professionals.

President-Elect Putin's Innovation Push

- Establish several "world-class" research universities by 2020
  - Skolkovo Institute of Science and Technology to partner with MIT
- Substantially increase public funding of basic and applied research
  - Grant money to rise from around 15 billion roubles (US$500 million) a year to 25 billion roubles by 2018
- Reform the Russian Academy of Sciences
  - More open, peer-review processes
  - Redistribute RAS's budget — currently about 50 billion roubles per year — to other institutions and universities

Source: Vladimir Putin, *Vedomosti* (January 2012) as reported in *Nature* (March 2012)

How is the United States Addressing the Innovation Imperative?

Framework Conditions and New Initiatives

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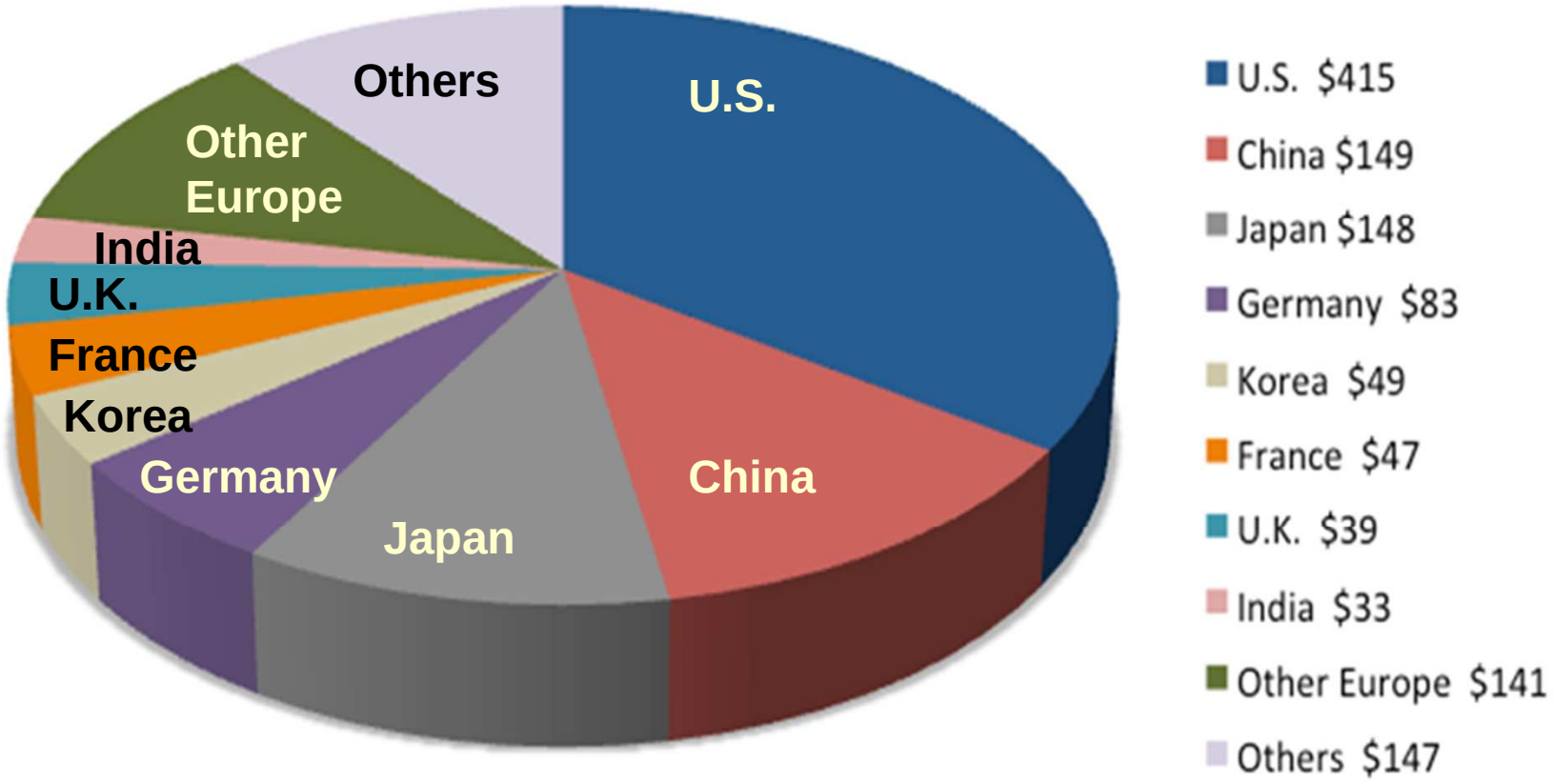
FRAMEWORK CONDITIONS IN THE U.S.

US has a Large Share of Global R&D

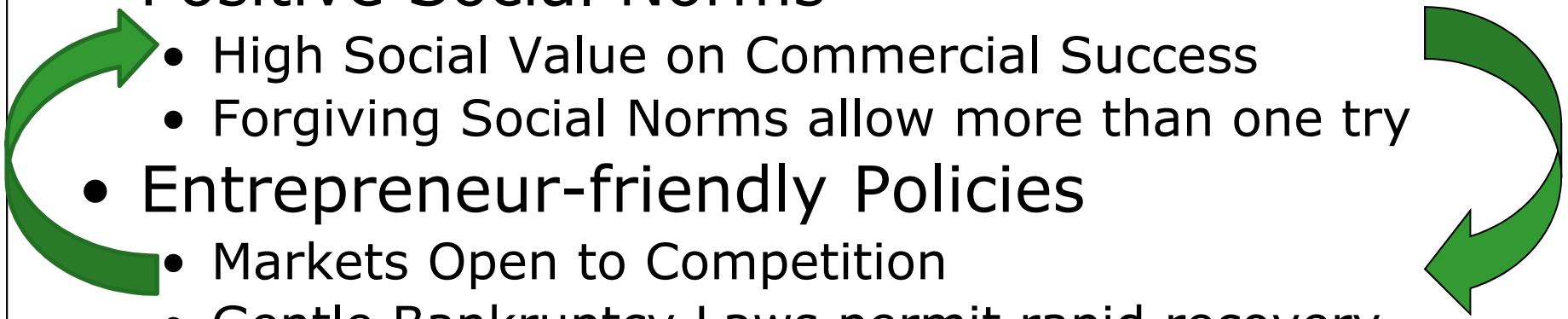
Total global R&D spending reached $1,252 billion in 2010.



SOURCE: Battelle and R&D Magazine, *2012 Global R&D Funding Forecast* (December 2011).

Major U.S. Advantages in Innovation

- Openness to science and innovation
  - Trust in Science & Scientific Institutions
- Positive Social Norms
  - High Social Value on Commercial Success
  - Forgiving Social Norms allow more than one try
- Entrepreneur-friendly Policies
  - Markets Open to Competition
  - Gentle Bankruptcy Laws permit rapid recovery
  - Taxes give Prospect of Substantial Rewards
- Strong Intellectual Property Regime:
  - Encourages Research & Diffusion of Research Results



NEW INITIATIVES IN THE U.S.

The Obama Administration has launched a comprehensive Innovation Strategy

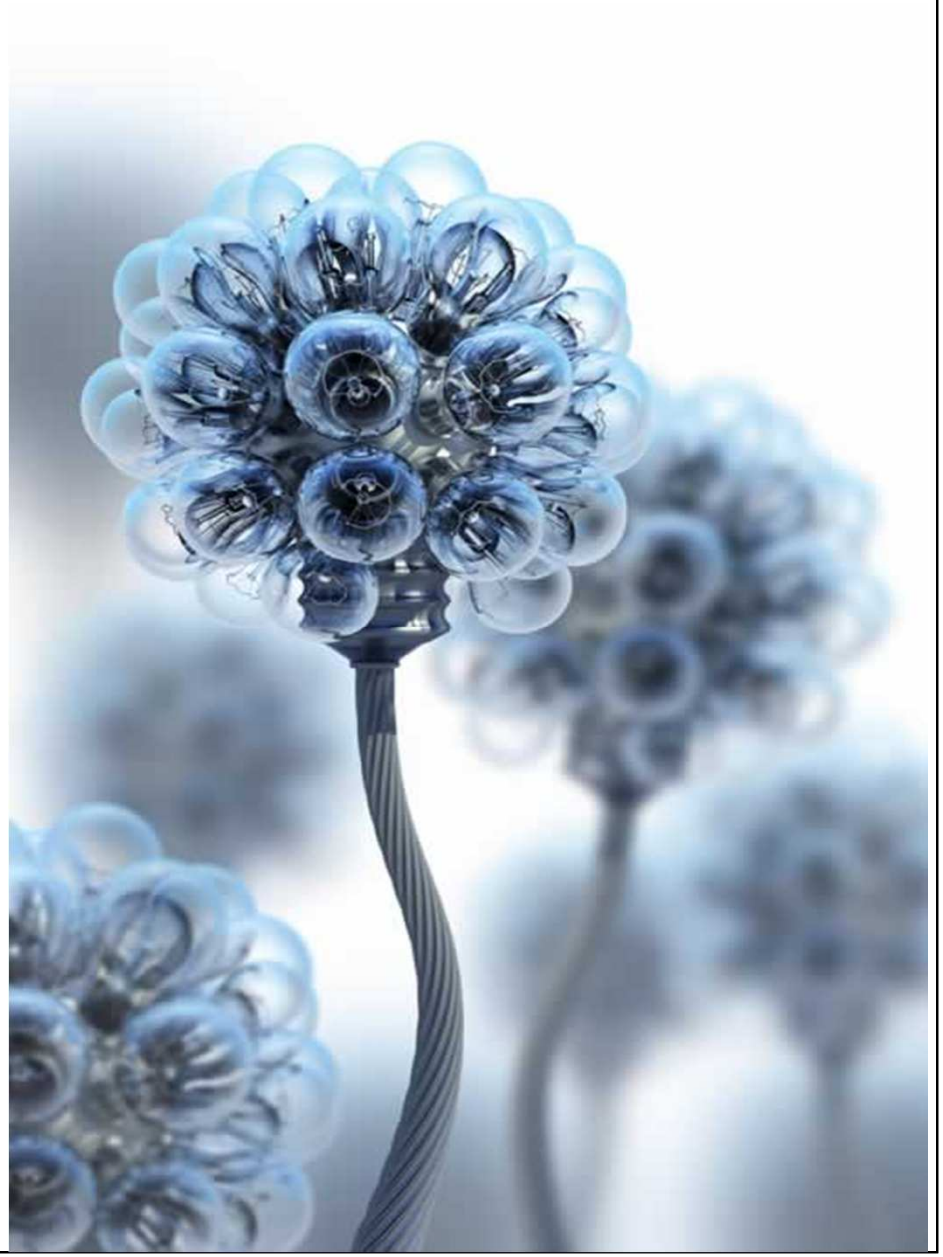
- Full spectrum of investments in Research, Technology Development, and Commercialization

What are the key Elements of the President's Innovation Strategy?

- ✓ Invest more in R&D
- ✓ Grow and Attract a Skilled Workforce
- ✓ Renew the Manufacturing Base—New
- ✓ Invest in Clean Energy Innovation
- ✓ Reform the Patent System
- ✓ Encourage Entrepreneurship
- ✓ Grow Innovation Clusters

- Source: "A Strategy for American Innovation, White House NEC, OSTP, February 2011

Growing Regional Innovation Clusters in the United States



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In the U.S., Limited Federal Role in Building Clusters

- State and Local Initiative: States take the lead in Regional Economic Development in the U.S.
- Lack of Critical Mass: State and local efforts often lack critical mass of resources and partners
  - Limited funding and facilities
  - Lack of sustained policy support
  - Inadequate State-Federal partnering
- This is changing.

New Federal Initiatives for Clusters

- Energy Regional Innovation Clusters
  - DOE initiative to develop regional clusters in solar power, energy-efficient buildings, nuclear energy, and advanced batteries.
- Regional Innovation Strategies Initiative
  - Commerce-EDA initiative to map clusters and provide grants to support infrastructure for local cluster programs
- Nanoelectronics Research Initiative
  - NIST initiative brings together industry, government, and academia to develop next-generation semiconductor technologies
  - Index, a 11-university consortium, is based at the State University of New York-Albany.

New Manufacturing Initiative Fosters Innovation Clusters

- The National Network for Manufacturing Innovation (NNMI) announced on March 9th, 2012
  - $1 billion private-public partnership program aimed at commercializing and manufacturing U.S. developed technologies.
  - Hosted at NIST with collaboration from NSF, DOD and DOE
  - Modeled after the German Fraunhofer Institutes
  - Calls for precompetitive consortia for applied research on new technologies and design methodologies
  - Multiple institutes, each supporting a regional ecosystem of manufacturers, skilled workers, researchers

Source: www.whitehouse.gov

What are Some States Doing to develop Innovation Clusters?

- ✓ Making Substantial Investments
- ✓ Focusing on Specific Technologies
- ✓ Capturing Synergies with Federal Investments in R&D

New York's Nanotechnology Initiative

- Over $2 billion in state and private investments are fostering research, investment, manufacturing, and jobs focused on nanotechnology and semiconductor manufacturing
  - Public-private research programs
  - Academic programs and state-of-the-art research laboratories at the State University of New York at Albany
    - Source: Pradeep Haldar, NAS Conference on Innovation Clusters, 2009

NE Ohio is Reinventing its Economy

- The region is drawing on existing strengths and new investments to build the industries of the future
- Strategies:
  - **Technology Focus:** Photovoltaics, Flexible Electronics
  - **Ohio Third Frontier**: $2.3 billion initiative to assist Ohio companies develop next-generation products & services
  - **Technology Coalitions:** work to stimulate start-ups and help manufacturers adopt best practices and new technologies—e.g., Nortech, MAGNET
  - **Ohio Capital Fund** to encourage more VC activity
  - **University-industry partnerships** (e.g., University of Akron) to commercialize university research

Michigan's Advanced Battery Cluster

- Michigan is investing to diversify its industrial base.
  - Providing Leadership: Led by then Governor Granholm, the state legislature took a number of initiatives to develop new technological clusters
  - Building on Local Strengths: leveraging existing strengths in engineering knowhow and automobile manufacturing
  - Financial Incentives: Loans and grants to help larger companies commercialize manufacturing and green-energy technologies; Refundable tax credits for battery manufacturers
  - Building Partnerships: Linking industry with University "Centers of Energy Excellence"

Capturing Federal-State Synergies in Michigan

- Federal Support: Michigan's early efforts to build a cluster was supported by $1.3 billion in federal funds
  - Helped to attract companies such as A123, General Motors, Johnson Controls, XTreme Power, and South Korea's LG to build lithium-ion cell or battery-pack factories in the state.
- Private Investment: This federal investment has encouraged private companies to invest a further $5.2 billion, with the potential to create up to 40,000 new jobs over the next five years and attract out-of-state manufacturers of related technologies.
- Military Procurement: Growing demand by the military for electrified transportation is helping to reinforce the growth of this new industry.

To Conclude

Our Common Challenge

Clusters and the Future of Regions

- State and regional governments see innovation clusters as the basis for their future growth and employment prospects
- Here is what they are doing to secure that future:
  - Focusing on strengthening university research, including workforce training, and providing funding for small-businesses
  - Investing in infrastructure needed for innovation-driven economies
  - Drawing on synergies from state and national sources
  - Strengthening linkages within clusters with public-private partnerships

Our Common Challenge

- The Challenge for the Europe and the United States is to Adjust to the new Globalization Dynamic
- This involves Encouraging Clusters of Small Firms, Large Firms, Research Institutes, and Universities
- Cooperation and Mutual Learning are Essential to Ensure our Common Prosperity

Thank You

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