T he Innovation Imperative

Global Strategies for Competitiveness

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Building The Ohio Innovation Economy
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Charles W. Wessner, PhD.
Director, Technology, Innovation, and Entrepreneurship
The National Academies

What is Innovation?

- **Innovation means transforming ideas into new products, services, or improvements in organization or process.**
- **Innovation translates knowledge into economic growth and social well-being**

Why is it Imperative to Innovate?

- **To Grow our Economies,**
- **To become More Competitive,**
- **To provide a Future for our Children**
- **To ensure our National Security, and**
- **To Address Pressing Global Challenges that affect us all**

Leading Countries and Regions are Responding to the Innovation Imperative

- **They are providing five things:**
  - **High-level Focus on Growth and Strength**
  - **Sustained Support for Universities**
  - **Sustained 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.**

China's Drive for Innovation

Government with strong sense of national purpose that is

Focused, Committed, and Willing to Spend

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Innovation tops President Hu Jintao's Agenda

- **"Innovation is the core of our national development strategy and a crucial link in enhancing the overall national strength."**
  - **Report to the 17th National Congress of the Communist Party of China**

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

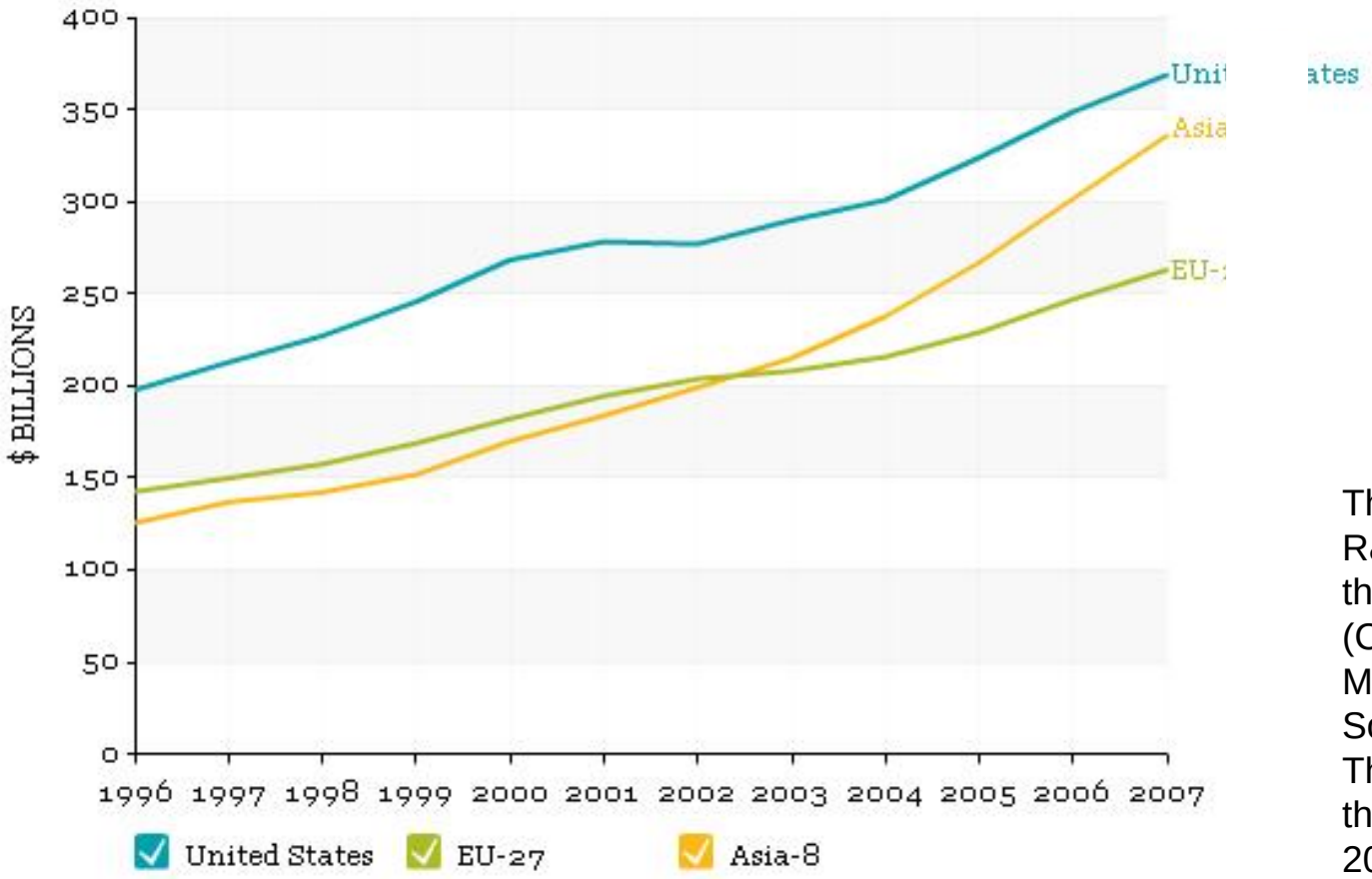
- **Boosting R&D Investments**
  - **Expenditure on basic research doubled between 2004 and 2008**
  - **Tax incentives for enterprises that invest in R&D**
- **Building R&D Infrastructure and Facilities**
- **Focus on building world class universities to create a Skilled Workforce**
- **Government procurement favors "Indigenous Innovation"**
  - **Foreign-owned technologies targeted for "assimilation"**

Source: Mu Rongpin, 2010 UNESCO Science Report

Global R&D: Measuring Commitment to Innovation

Chart | Data | Download

R&D expenditures for the United States, EU-27, and Asia-8 economies: 1996–2007



SEI 2010: Global Patterns of R&D Expenditures, Chapter 4.

The rapidly growing R&D expenditures of the Asia-8 economies (China, India, Japan, Malaysia, Singapore, South Korea, Taiwan, Thailand) surpassed those of the EU-27 in 2003.

Source: NSF 2010 S&E Indicators

The Challenge is not only Asia

Germany is Focusing on Innovation in Manufacturing and Exports

Germany's Strong Manufacturing

- **Germany is a high-wage, developed economy**
- **Yet, Manufacturing remains a National Priority, supported through...**
  - **Investments in job training and worker retention**
  - **Investments in higher productivity to offset high wages**
  - **Assistance to small manufacturers in getting their products to global markets**
  - **Energy and transportation policies that have fostered a German edge in manufacturing**
    - **Everything from kitchen equipment, to high speed rail and wind turbines, to capital equipment**

Why does Manufacturing Matter?

- **Fosters Economic Growth**
  - U.S. manufacturing produces $1.6 trillion of value each year
- **An important Source of Employment**
  - Manufacturing supports an estimated 18.6 million jobs in the U.S.—about one in six private sector jobs
- **Strengthens our Nation's Technological Capacity**
  - U.S.-based manufacturers conduct half of all private R&D done in the United States
- **Improves Competitiveness and Expands Trade**
  - It provides goods for export, and the currency earnings that come with exports to maintain national economic independence
    - **The Germans understand this...**

Source: National Association of Manufacturers, 2009

The Fraunhofer Model is an Example of Global Best Practice

- **A Contract Research organization funded by the state to help bring products to the market**
  - **Dense network of 59 Institutes of Applied Research, 17,000 employees**
- **Provides application-oriented research effective for SMEs and large Companies**
- **Huge €1.6 billion budget every year**
  - **Two thirds (€1.40 billion) of the research revenue from contracts with industry and from publicly financed research projects.**
  - **One third of revenue from the German federal and state governments**

German Manufacturers are even Succeeding in the Chinese Market

- **Rising exports to China are driving Germany's economic expansion**
  - **Driving growth of both large and small manufacturing firms**
- **German exports have jumped 17 percent this year, driven in large part by a 55 percent rise in overall exports to China**
  - **Exports now account for more than one-third of Germany's national output, more than double the rate in the United States**
- **Focus on manufacturing excellence make German products sought after**
  - **Chinese consumers see them as superior to goods made in China**

Source: Washington Post, "Made in Germany, Sold in China," September 17, 2010

What about the United States?

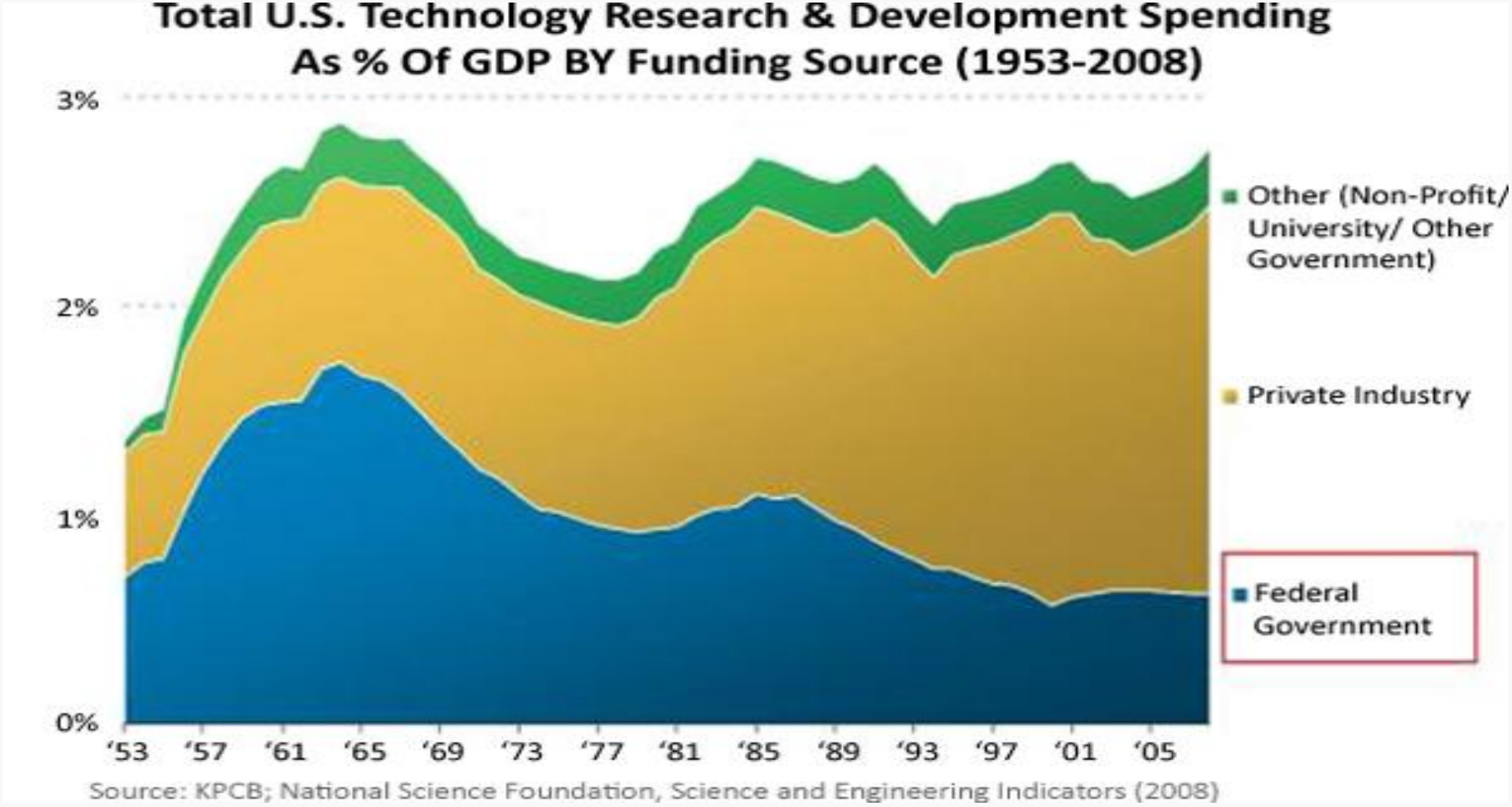
Are we investing enough?

What are some of our key states doing?

The Major Risks to the U.S.

- **Complacency about our competitive position in the world**
- **Focus on current consumption rather than investment for the future**
  - **A lack of investment in R&D on the scale of our fathers and our competitors**
- **A lack of understanding of how we built the country**

Federal R&D investment as a percentage of GDP has been declining



A Venture Capitalist's View

- **Private investment is almost making up for the decline in federal investment in R&D.**
- **"That's nice, but remember: private investment maybe have given us Facebook and Garmin, but public sector investment gave us the Internet and GPS."**
- **More government investment in technology, education, and infrastructure will be a key part of addressing the challenge of innovation**
  - **Mary Meeker, Kleiner Perkins**

What does History Show us about the U.S. Government Role?

- **1798 - Grant to Eli Whitney to produce muskets with interchangeable parts, founds first machine tool industry in the world**
- **1842 - Samuel Morse receives award to demonstrate feasibility of telegraph**
- **1903 – Wright Brothers fly, fulfilling the terms of an Army contract!**
- **1915 – National Advisory Committee for Aeronautics instrumental in rapid advance in commercial and military aircraft technology**

The U.S. Government's Role, continued...

- **1919 – Radio manufacturing (RCA) founded on initiative (equity and Board Membership) of U.S. Navy with commercial and military rationale.**
- **1925 – U.S. Postal Act launched U.S. Aircraft Industry**
- **1940s, '50s, '60s – Radar, Jet Aircraft, Computers, Satellites, Nuclear Energy, Semiconductors**
  - **Government-supported industries are "the Foundations of the Modern Economy," Cohen & Noll**
- **1969-1990s - Government investment in forerunners of the Internet (Arpanet) and establishment of the Global Positioning System**
- **2000s – Focus on Nanotechnologies, Flexible Electronics, Biomedical Research**

Government Role in Innovation

- **Listening to some Americans critical of the government's role brings to mind the Jewish patriot criticism of the Romans in the Monty Python film "Life of Brian"."**

  – The Economist, May 1, 2004

- **But what, apart from the roads, the sewers, the medicine, the Forum, the theater, education, public order, irrigation, the fresh-water system and public baths… what have the Romans ever done for us?**

(and the wine, don't forget the wine…)

Initiative from the States

How are New York and Ohio meeting the Innovation Imperative?

New York's Nanotechnology Initiative

- **Over $2 billion in state 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**

Payoff for New York

- **Impact: More than $5 billion in investment have been drawn into the state**
  - **Companies such as IBM, AMD, Applied Materials, and Tokyo Electron are making significant investments in New York State**
    - **Source: Syracuse Post Standard, September 9, 2010**
- **Impact: Manufacturing and High Value Jobs are moving to New York State**
  - **One of America's only green field silicon wafer fabrication plants is being built near Albany by Global Foundries at a cost of $4.5 billion**
  - **Will provide the region with 1,400 new jobs.**
    - **Source: Wall Street Journal , December 3, 2010**

Lessons from New York

- **Address emerging needs**
- **Concentrate your Resources**
- **Encourage Innovative Management**
  - **Universities out from under traditional state rules**
- **Create Strong Connections between Universities and the Private Sector to identify needs and attract funding**

How is Ohio Addressing the Innovation Imperative?

Ohio is Reinventing its Economy

- **Objectives:** **Draw on existing strengths and new investments to build the industries of the future**
- **Strategies:**
  - **Ohio Third Frontier: Investments by the state of $1.6 billion over 10 years (2002-2012) to assist Ohio companies develop next-generation products and services**
  - **Technology Coalitions (e.g., NorTech) work to stimulate start-ups and help manufacturers adopt best practices and new technologies**
  - **University-industry partnerships (e.g., University of Akron) to commercialize university research**
- **A Remarkable, Multi-Institutional Effort**

Payoff for Ohio

- **New Firm and Cluster Growth**
  - **Growth of over 400 companies in the advanced-energy space**
  - **Developing cluster for Flexible Electronics**
  - **Developing cluster for photovoltaic manufacturing, polymer-based technologies**
- **Is it Enough? Can you do it alone?**

Ohio can also benefit more from Federal Programs and Initiatives

The President's New Innovation Strategy

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President Obama Understands that Innovation is Key to our Nation's Future

- **"The first step in winning the future is encouraging American innovation."**

– **President Obama, January 25, State of the Union Message**

The President's Innovation Strategy

- **Invest more in research**
  - One time $18.3 billion in Stimulus funds for R&D
  - Doubling the R&D budget of key science agencies
  - Target of investing three percent of GDP in R&D
  - Make the R&E tax credit permanent
- **Grow and Attract a Skilled Workforce**
  - $200 billion over the next decade for scholarships and tax credits for students
  - Race to the Top to incentivize K-12 school performance
  - American Graduation Initiative to produce 5 million more community college graduates by 2020
  - Improve the processing of high-tech visas

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

The President's Innovation Strategy

- **Invest in Innovation Infrastructure**
  - Modernize the Electric Grid
  - Build a high-speed rail network of 100-600 mile intercity corridors
  - Support the creation of regional innovation clusters with $50 million in EDA matching grants
- **Invest in Clean Energy Innovation**
  - Support American manufacturing of advanced vehicle technologies with $25 billion in loans
  - Provide grants to catalyze private sector investment to build a globally competitive domestic battery and electric drive component industry
  - Proposed 10 year, $150 billion investment in the research, development and demonstration of clean energy technologies

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

Quite an Agenda!

- **Arguably the most comprehensive and well though-out Innovation Policy the U.S. has ever seen.**
- **Key Questions Remain:**
  - **Will these proposals be enacted?**
  - **Will they have sufficient funding?**
  - **Will they work?**
  - **What else should we do?**

Ohio can further Leverage Federal Public-Private Partnerships

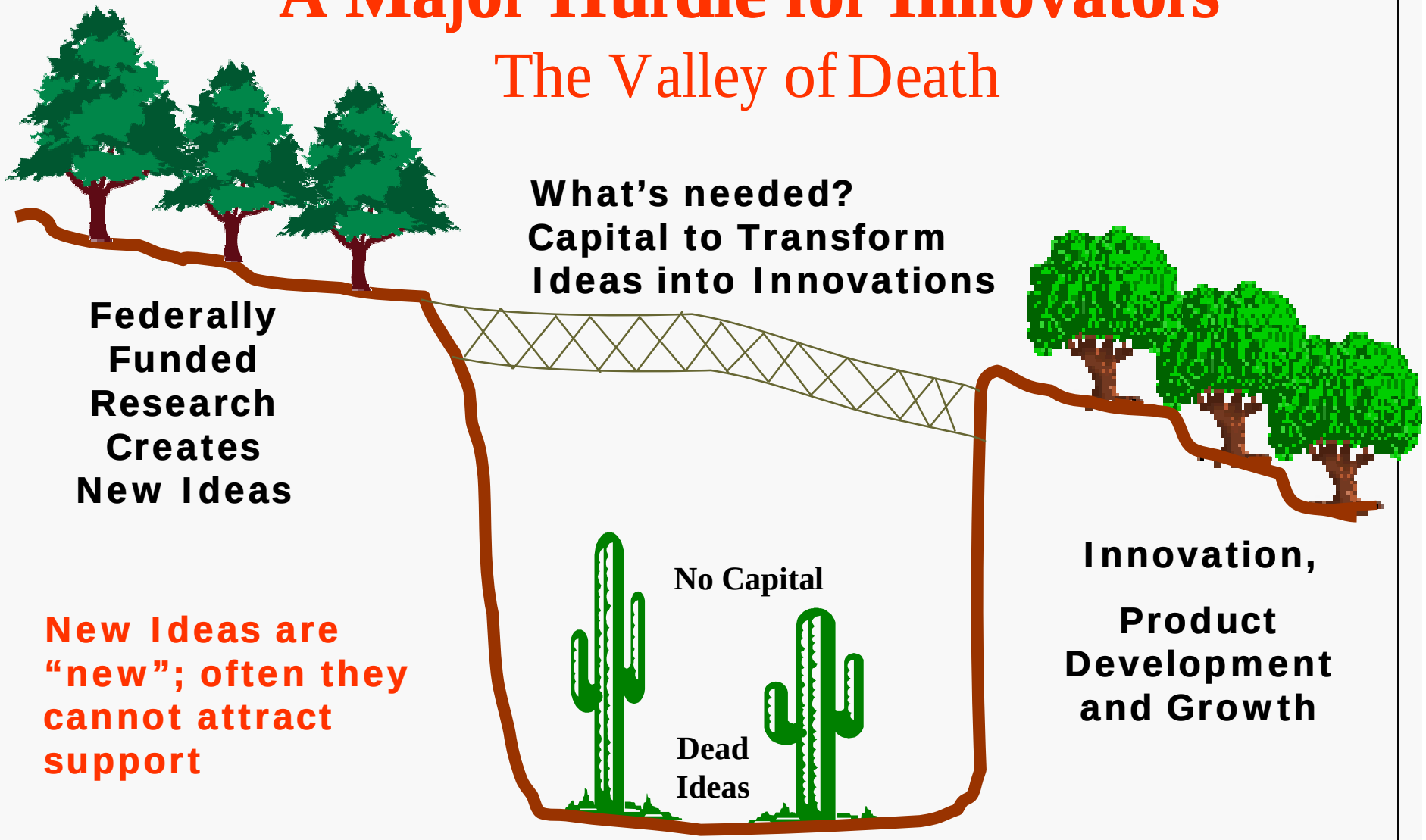
- **More Research Funding**
- **New Partnerships to Develop New Ideas**
- **Proven Partnership Mechanisms Include:**
  - **Innovation Awards—SBIR and TIP**
  - **Industry-University Cooperation**
  - **University-Linked S&T Parks**
  - **Research Consortia: DOE's SunShot Initiative**

Important:
Need to focus on the Small Companies

- **Small Businesses make many Contributions**
  - **Grow Jobs**
  - **Increase Market Competition**
  - **Generate Taxable Wealth**
  - **Create Welfare-Enhancing Technologies**
  - **Over time, innovative small businesses (like Intel, Microsoft, and Google) transform the composition of the economy**
- **But small innovative businesses face the "Valley of Death" in bringing new ideas to market**

A Major Hurdle for Innovators

The Valley of Death



New Ideas are "new"; often they cannot attract support

How can Innovative Small Firms Cross the Valley of Death?

There are Many Paths

The Small Business Innovation Research Program (SBIR) is one Proven Path across the Valley

What does SBIR do?

- **SBIR funds small businesses to develop new products**
  - **Encourages technological innovation in the private sector**
  - **Strengthens small business participation in federal R&D**
  - **Provides early-stage funding for innovative business ventures**
    - **Phase I: $150,000**
    - **Phase II: $1000,000**

SBIR's Best Practice Features

- **Focus on Valley of Death:** Funds Proof of Concept and Prototype: "The first money & the hardest"
- **Stable Program:** Long reauthorizations
- **Growing Budget:** 2.5% allocation of Agency R&D budgets for small business awards & contracts
- **Large Scale:** Largest U.S. Innovation Partnership Program: Currently a ~$2.5 billion per year
- **Portfolio Effect:** Substantial sums invested in new companies over a long period increase success
- **Decentralized & Adaptive:** Each Agency uses its funds to support research by small companies to meet its unique mission needs

Federal Programs Can Help Ohio Firms

- **SBIR for "First Money" for New and Small Companies**
- **Innovation awards like TIP to advance Critical National Needs**
- **NIST programs to set standards, support manufacturing, and accelerate innovation**
- **EDA grants to build out the Infrastructure**
- **S&T Parks to bring Universities and the Marketplace together**
- **DOE Consortia and Loan Guarantees to Jump Start new High-tech Firms**
- **Ohio needs to reach out!**

Conclusion

Ohio needs to address the Innovation Imperative

The Nation and Ohio need to Invest in Critical National Needs

- **Infrastructure**
  - **Roads, Bridges, Broadband**
- **Research and Development**
- **Universities**
- **Companies**
  - **Attractive Business Environment**
  - **Competitive Taxes**
  - **Lower Regulations**

The Challenge for our Children

- **Will we forego current consumption to make the investments our children need to sustain their future?**
- **Will we make the investments in research, in universities, in infrastructure, and in companies to enable the U.S. to compete in the new global economy?**
- **Our future growth and security depends on it.**

Thank You

Charles W. Wessner, Ph.D.
Director, Program on
Technology, Innovation and Entrepreneurship
The U.S. National Academies
500 Fifth Street NW
Washington, D.C. 20001
cwessner@nas.edu
Tel: 202 334 3801

http://www.nationalacademies.org/step