Governor’s Economic Summit: Best Practices for Advancing Economic Development and Re-Inventing Connecticut

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October 6, 2011
A Word on Battelle’s Technology Partnership Practice

Battelle TPP is the economic development consulting arm of the world’s largest independent, non-profit research and development organization.

Demonstrated track record of translating industry strengths into development strategies and initiatives

Broad breadth – TPP projects across the nation over the past 10 years

Examples of State Level Projects

- Ohio Third Frontier
- Georgia Research Alliance’s Strategies in Life Sciences & Information Technology
- Arizona’s Biosciences Roadmap
- Iowa’s Cluster Strategies ... Life Sciences, Adv. Mfg., Information Technology
- Nebraska’s Competitive Advantage Strategy
- Massachusetts Technology Roadmap
- Connecticut IT Workforce, Connecticut Career Choices, Nanotechnology & Core Competency Assessment
Practitioner’s Lessons Learned on Growing High Quality Jobs

• **Lesson #1:** What it takes to put industry cluster development into practice

• **Lesson #2:** Importance of identifying your development niches within leading clusters

• **Lesson #3:** Addressing development pillars ... best practices:
  – Innovation
  – Talent
  – Industry-University Partnerships
Starting Point: Technology Readiness & Specialization Matters

- We are living in a high technology, high skills “knowledge” economy, where rising incomes and improved quality of life depends on the development and application of technology.

  Technology-based growth drives economic success – 65% of difference in economic success of U.S. regions from 1975 to 1998 accounted for by the growth & presence of high tech industries.

  Technology is critical for mature and established industries, not just new, emerging industries – 6 out of every 10 information technology workers in US employed outside of computer and telecom industries.

- “Regional economies can be thought of as developing specialized and distinctive technology capabilities, which give them unique global market opportunities.”

  - Michael Best, a leading scholar chronicling the growth and development of industries across states and broader regions, in *The New Competitive Advantage*
Lesson #1: Developing Industry Clusters Requires Attention to Every Link in the Development Chain

Links in the Economic Development Chain

- Basic Science
- Applied R&D
- Piloting & Demonstration
- Technology Transfer
- New Enterprise Development
- Business Expansion
- Business Attraction
- Existing NC Biotech
- Industry Cluster

Talent

Faculty, Post-Docs, Graduate Students, STEM graduates

Entrepreneurs, Professional Services, Line/Production Workers
North Carolina Biotechnology Center: Connecting the Links in the Development Chain

Supports for Biotechnology Sector Growth

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**FUNDING:**
- Biotechnology Research Grant
  - Supports investigators at universities and non-profits.
- Collaborative Funding Grant
  - Supports post-doc fellows or technicians in university research laboratories.
- Faculty Recruitment Grant
  - Assists with recruitment of top scientific talent to NC universities.
- Institutional Development Grant
  - Provision of core equipment to be used by six or more faculty members.
- Multidisciplinary Research Grant
  - Funding three or more scientists, from different disciplines, in collaborative research.
- Event and Meeting Grants
  - In support of scientific and associated meetings and events in North Carolina.

**INTELLECTUAL EXCHANGE:**
- Coordination of Scientific Interest Groups
  - Bioprocessing and Process Development.
  - Plant Molecular Biology Consortium.
  - RNA Society of North Carolina.
  - Smaller Eukaryotes Group.
  - Triangle Virology Association.
  - Triangle Immunology Interest Group.
  - Atlantic Coast Chromatin Conference.

**FUNDING:**
- Technology Enhancement Grant
  - Funds for moving technology towards commercialization readiness.

**FUNDING:**
- Technology Transfer
  - Business Acceleration and Technology Out-licensing Network.
  - Recruitment of entrepreneurial management.
  - BTD Partnering Portal
    - Companies sharing in-licensing and out-licensing needs.

**FUNDING:**
- Company Inception Loan
  - Funds to support business start-up.
- SBIR Bridge Loan
  - Supports Phase I SBIR recipients in sustaining technology Development.

**NETWORKING:**
- Biotech forums and annual conference + additional events.
- Links to angel and VC investors.

**INFORMATION RESOURCES:**
- Library, information and resource access and custom research services.

**HUMAN CAPITAL DEVELOPMENT** – (See Specific Dedicated Graphic)
- K-12 teacher and curriculum support programs.
- Community college programs.
- Workforce development and incumbent worker programs.

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**NCBC Supporting Activities and Programs**

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**Business Attraction**
- Existing NC Biotech
- NC Biotechnology Business Cluster

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Lesson #2: New Realities Driving Global Competition Place A Greater Emphasis on Finding Your Niche

New Realities

- Global economic competition
- Rapid technological change
- Innovation as a development engine
- Education and skills for a competitive edge
- Sustainability, a growing imperative

Recognition that not all states are built alike and it is the differences that can best guide development strategies

**Where the Puck is Today**
- Focus Areas of Growth in Industry Clusters

**Where the Puck is Going**
- Growth Prospects Within Technology Industry Clusters

**Growth Opportunities**
- Differentiation, Specialization and Global Leadership for Your State
Example of the Details for Line of Sight Analysis

**How Have Ohio’s Primary Industries Been Performing?**

**Industry Analysis**
- Identify competitive position of Ohio primary industry clusters:
  - Concentration
  - Growth Trends
  - Relative Trends to Nation
- Examine both employment and output
- Consider industry niches that stand out in performance
- Timeframes
  - Recent Growth Period of 2001 to 2007
  - Recession Period of 2008-2009

**Where is Ohio Positioned in Core Competencies to Drive Innovation and Growth?**

**Core Competency Assessment**
- Recent patent activities
- Presence of Innovative, Emerging Firms from pre-seed investments, VC funding, SBIR funding
- Changing academic strengths in publications and university R&D expenditures
- Crosswalking into industry clusters
Ohio Approach: Preliminary Results From Line of Sight Assessments

Step 1: Assess

RESULTS
Leading Industry Sectors
- Materials
- Aerospace
- Biomedical
- Energy
- Information Technology
- Instruments and Controls

Step 2: Identify

RESULTS
Potential Focus Areas
- Advanced Polymer Materials
- Composites and Ceramics
- Specialty Metals and Alloys
- Unmanned Systems
- Sensors
- Advanced Materials
- Propulsion Power Management
- Human Effectiveness
- Medical Imaging
- Molecular and Other In-Vitro Diagnostics
- Advanced Surgical Instruments and Equipment
- Implant Medical Devices
- Contract Research and Manufacturing Resource Services
- Drug Delivery and Development
- Regenerative Medicine
- Health Informatics and Logistics
- Solar Photovoltaics
- Wind Energy
- Smart Grids
- Biofuels and Biobased Energy
- Fuel Cells
- Energy Storage/Batteries
- Business Software and Enterprise Computing
- Test and Measurement
- Sensors
- Automation/Robotics
- Electronics/Embedded Systems

Step 3: Validate

RESULTS
Leading and Emerging Areas
- Advanced Materials
- Business Software and Enterprise Computing
- Energy Storage
- Fuel Cells
- Health Information Technology
- Medical Technology
- Propulsion Power Management
- Sensing and Automation Technologies
- Situational Awareness and Surveillance Systems
- Solar Photovoltaics
Baseline Connecticut Core Competency Assessment

Core Competencies

Primary Industry Competency | Primary University Competency | Industry-University Shared Competency
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Electromechanical | Environmental Sciences | Optics-related
Mechanical | Neurosciences | Materials
Electrochemistry | Musculo-skeletal | Information Technology
Cell & Vascular Biology | Drug Discovery & Development | Biomedical Engineering
Immunology | Genomics & Proteomics | Translational Medicine
Public Health |  |  

Platforms

Advanced Product Development

Advanced Information Systems

Biomedical Engineering

Translational Medicine

Potential Opportunities

- Advanced Materials
- Nanoscale Processing
- Fuel Cells & Energy Management Systems
- Optoelectronic Systems & Devices
- Information Security
- Web Services & Grid Computing
- Modeling & Predictive Analysis
- Bioimaging
- Neural Engineering
- Biomaterials & Tissue Engineering
- Personalized Medicine
- Stem Cell Applications
- Targeted Drug Development
- Clinical Research Consortium
Lesson #3 – Best Practices in Innovation

... Valley of Death Calls for Integrated Approaches to Technology Commercialization & Venture Financing

Sources of Capital

- Grants
- Specialized programs, friends/family
- Specialized Investment funds and/or angels
- Funds with side agreements to source locally
- "National" funds based locally and their syndicate partners elsewhere

Deal Stage

- R&D – Innovation
- Proof of principle
- Venture formation
- Pre-seed
- Early/seed-stage venture capital
- 2nd Round venture capital
- Mezzanine Venture Capital pre-IPO or sale
- Product/Service introduction
- Prototypes, pilot projects, test beds
- Human trials
- Engineering prototype – service models

Typical Firm Functions

- Break Even
- Cumulative cash flow
- Positive cash flow
- Sales
- 2 yrs. for IT-comm. services...
- 5–7 yrs. for devices & equipment...
- yrs. for drugs

2 yrs. for IT-comm. services... 5–7 yrs. for devices & equipment... yrs. for drugs
Meeting Innovation Challenges ... Best Practice Responses

Three Key Gaps:

Enhancing Intellectual Property and Valuing/Creating Business Opportunities

Business Mentoring and Support

Increasing Resources for Risk Capital Financing
Lesson #3 Best Practice: Growing Importance of Industry-University Partnerships & the Role of Talent

Growing Importance of Universities

- Build research excellence in strategic areas of importance to the region/state/global economy
- Attract and retain world-class faculty
- Invest in physical infrastructure
- Link academic researchers with industry
- Capture IP developed within the university to create new companies, products and processes.

Leading edge research universities are doing all five of these approaches.

How Talent Connects Higher Education and Industry

- Generate Jobs, Investments, Wealth, Pay Taxes
- Start-up Companies
- New Products via Technology Licensing
- Support Research Programs
- Educational Pipeline
- Research Funding
- Star Faculty
- Junior Faculty
- Post Doc
- Graduates
- Students
- Research Assistants
- Undergraduates
- Technicians
- K-12 Science, Technology, Engineering, Math Skills
- Industry Scientists, Product Developers
- Engineering Quality Control, Application Development
- Production
- Associate Degrees
- Technology Innovators
- Technology Workforce
- K-12 Science, Technology, Engineering, Math Skills
Key Opportunity for Industry-University Partnerships: Rise of Open Innovation Models

• Paradigm shift – firms now looking both externally and internally to develop and advance new ideas and technologies
  • Well noted decline of internal R&D labs of major corporations
• Rise of “supply chains for innovation” as well as production

Large firms – defense contractors, medical device and other large companies – have “outsourced” much of R&D and become more “systems integrators”

Small innovative technology firms play an increasingly important role in moving research to applications and commercialization

Small and Mid-sized Manufacturers want to maintaining and extending product life cycles, develop and producing new products

University Partnerships and Collaborations
Thank You!

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