“GROWING THE GREATER ROCHESTER INNOVATION ECONOMY”

October 16, 2009

Rochester. New York

Presented by:

Richard A. Bendis
President and CEO
Innovation America
“It is not the strongest of species that survive, nor the most intelligent, but the ones most responsive to change.”

Charles Darwin
“If a man empties his purse into his head, no man can take it away from him. An investment in knowledge always pays the best interest.”

--Ben Franklin
Innovation Economy: Definitions & Terminology

• Knowledge is the confident understanding of a subject, potentially with the ability to use it for a specific purpose.

• Knowledge economy is based on creating, evaluating, and trading knowledge.

• **Innovation** is the creation and transformation of knowledge into new products, processes, and services that meet market need and interactions, entertainment forms, and ways of communicating and collaborating.
Goals of Innovation-Based Economic Development

*Intervene at the margins of private sector investment flows of capital (financial and intellectual) to:*

- Address economic transition
- Capture the benefit of investments in research and development, higher education
- Build entrepreneurial cultures
- Help existing industries modernize
- Diversify economy
- Develop global innovation network
Implementing a New Innovation Paradigm

- Willingness to deviate from traditional and parochial perspectives
- Encourage public investment and risk taking
- Developing trust through collaboration
- Ensuring the paradigm is responsive to partners’ missions
- Building consensus of all constituents through education, participation, and positive outcomes
- Move from technology-based economic development to Innovation-Based Economic Development
Government’s Role in Innovation

• Long term vision and planning
• Identify gaps and trends in science, technology and innovation
• Be a catalyst through long-term strategic investments and partnering
• Develop a balanced and flexible research and development investment portfolio
• Encourage private sector innovation
• Establish performance-based research and development
The Role of Academia

Knowledge Integration

Resource Investment → Education Research → Continuous Learning and Innovation

Knowledge Creation

Knowledge Transfer
The Role of Industry: Wealth Creation

Capitalism is a Process of Creative Transformation

“The interaction of technological innovation with the competitive marketplace is the fundamental driving force in capitalist industrial progress.”

--Joseph A. Schumpeter, 1942
Public/Private Partnership

• Progress is promoted by strong industry, government and university leadership
• Sustained by dynamic public/private partnerships
• These leaders create new, responsive models of governance
Economic Development

- Economic Development is like a three-legged stool:
  - Attraction
  - Retention
  - Grow Your Own (Innovation Philadelphia’s focus)
- TBED requires patience and persistence, continuity and consistency.
- Working with early-stage companies takes time.
- “If it worked in Philadelphia, it can definitely work in Rochester”

GRE’s Strategic Priorities

- Attract new companies to our region
- Support newly formed and emerging growth companies within our region
- Retain existing companies in our region, and help them expand their operations here
### Traditional ED vs. Innovation-Based ED

<table>
<thead>
<tr>
<th>Traditional ED</th>
<th>Innovation-based ED</th>
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</thead>
<tbody>
<tr>
<td>Natural resources</td>
<td>Specialized talent</td>
</tr>
<tr>
<td>Highways / Rail</td>
<td>Networks, information</td>
</tr>
<tr>
<td>Proximity</td>
<td>University research / professors</td>
</tr>
<tr>
<td>Costs</td>
<td>Market understanding</td>
</tr>
<tr>
<td>i.e. PHYSICAL</td>
<td>i.e. KNOWLEDGE</td>
</tr>
</tbody>
</table>

- **Competitive Basis**
  - Natural resources
  - Highways / Rail
  - Proximity
  - Costs

<table>
<thead>
<tr>
<th>Key values / offerings</th>
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<tbody>
<tr>
<td>Business parks</td>
</tr>
<tr>
<td>Incentives</td>
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<table>
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<tr>
<th>Lead Organization</th>
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<tr>
<td>Chambers / EDCs</td>
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</table>

- **Lead Organization**
  - Chambers / EDCs
  - Innovation intermediaries, Economic developers
What is an Innovation Intermediary?

• An Organization at the Center of the region’s, state’s or country’s efforts to align local technologies, assets and resources to work together on advancing Innovation.
21st Century Innovation Intermediary

Connectivity of Key Human & Institutional Resources Globally

Leverage & Alignment of Funding & Resources

Research & Marketing of the Strengths of the Innovation Economy

Programs
- Commercialization
- Direct Investment
- Angel Capital
- Federal Investment Programs (SBIR, CRADA, TIP)
- Technology Mining / Intellectual Property Programs

Attraction & Retention

Grow Your Own
Innovation Paradigm Shift

PROOF OF CONCEPT
(Technological Feasibility)
“It Works!”

PROOF OF RELEVANCE
(Market Pull)
“I’ll Buy It”

economic value creation

\[
\text{return on invested capital} = \text{margin} - \text{cost of capital} + \text{organic} + \text{m&a}
\]
Innovative Small Business Facts

- Innovative small business have generated 60 to 80 percent of net new jobs annually over the last decade
  - Employ 30 percent of high-tech workers, such as scientists, engineers, and computer workers
- SME’s produce 13 times more patents per employee than large patenting firms
- Small Companies are a key source of innovation by themselves and for Large Companies
  
  Source: Small Business Administration

Innovation Capital Facts

- Proof of Concept, Start-up, and Seed stage companies lack investment support
- Most Seed stage firms need investments of $500K - $2M
- The average venture capital investment today is $8.3M

Source: PriceWaterhouseCoopers – MoneyTree©
Reduced Angel Activity
- Angel Investors reduced their investments by over 26% in 2008
- Availability of investment capital among angels decreased dramatically by 40% in 2008

Venture Funding Moving Downstream
- The average investment by venture firms last year was $8.3 million per investment and only about 4% of the capital went to early-stage companies.
- First Quarter of 2009 was the worst quarter in 12 ½ in terms of total capital invested by venture firms

State TBED Budgets Decreasing
- 44 states have budget deficits

NO SBIR RE-AUTHORIZATION & TIP UNDERFUNDED
Innovation Capital Valley of Death

“VALLEY OF DEATH”

<table>
<thead>
<tr>
<th>Stage</th>
<th>POC / Pre-Seed</th>
<th>Seed/ Start-Up</th>
<th>Early</th>
<th>Later</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>Founders</td>
<td>Angel Groups, TBED, SBI R, Seed Funds</td>
<td>Venture Funds</td>
<td></td>
</tr>
<tr>
<td>Demand</td>
<td>$25K</td>
<td>$100K</td>
<td>$500K</td>
<td>$2,000K</td>
</tr>
</tbody>
</table>

Supply

“VALLEY OF DEATH”

Funding Gap

Secondary Funding Gap
Venture Capital Roller Coaster


- Raised ($m)
- Funds

Source: NVCA
http://paul.kedrosky.com
Does Seed Investing REALLY Create Jobs?
VC In The US --- Where We Are Today

For every dollar of venture capital invested from 1970-2008, $6.36 of revenue was generated in 2008.

### Public Investment Job Creation

<table>
<thead>
<tr>
<th></th>
<th>State of PA</th>
<th>CDVCA</th>
<th>Stimulus Bill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funds Invested</td>
<td>$90M</td>
<td>$26M</td>
<td>$800B</td>
</tr>
<tr>
<td>Jobs Created</td>
<td>8,150</td>
<td>3,700</td>
<td>4,000,000</td>
</tr>
<tr>
<td>$ Per Job Invested</td>
<td>$11,000</td>
<td>$7,100</td>
<td>$200,000</td>
</tr>
</tbody>
</table>
In the three years after the 1991 recession, Companies of less than 20 employees created 89% of net new jobs while companies over 500 employees created a net of 4%.
2001 Recession:
Small Business Drives Job Creation

- In the three years after the 2001 recession, Companies of less than 20 employees created 107% of net new jobs while companies over 500 employees eliminated a net of -24%

Source: Small Business Administration
National Best Practices, Common Attributes

- Longevity
- Bipartisan Support & Champions
- Independent Organizations
- Continuous Reinvention
- Private Sector Involvement
- Understand Return On Investment
- Sustainability In Funding
- Accountable
- Innovative
- Effective Leadership
U.S. Innovation Intermediaries' Best Practices

- Ben Franklin Technology Partners (BFTP, 1982)
  http://www.benfranklin.org/
- Kansas Technology Enterprise Corp. (KTEC, 1987)
  http://www.ktec.com/
- Innovation Philadelphia (IP, 2001)
  http://www.innovationphiladelphia.com/
- Oklahoma Center For The Advancement Of Science And Technology (OCAST, 1987)
  http://www.ocast.state.ok.us/
- UCSD Connect (1985)
  http://www.connect.org
- First State Innovation (2007)
  www.firststateinnovation.org
Greater Rochester Innovation Intermediaries

Excell Partners
www.excellny.com

Greater Rochester Enterprise
www.rochesterbiz.com

High Tech Rochester
www.htr.org

Rochester Angel Network
www.rochesterangels.com
Technology Investment
Pennsylvania’s Industry Clusters

Major Industry Strengths

- Biotechnology
- Nanotechnology
- Innovation
- Workforce
- Capital
- Manufacturing
- Support Services
- Telecommunications / Information Tech.
- Energy

- Collaboration

- Green Tech
- Optics and Imaging
- Food and Beverage Manufacturing
- Healthcare/Biotech
The Four Pillars of Innovation-based Economic Development

- Innovation
- Capital
- Workforce
- Support Services
- Collaboration
Technology Investment

Concept
The idea for the company is hatched

Formation
The company begins to establish itself and its product, hiring employees and winning customers

Growth
The company grows with increased pace

Maturity
The company has an established customer base and flattening growth

Reinvention
The company takes action to seek new market opportunities
Technology Investment

Technology-based Economic Development Tools Along the Continuum

<table>
<thead>
<tr>
<th>Concept</th>
<th>Formation</th>
<th>Growth</th>
<th>Maturity</th>
<th>Reinvention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ben Franklin Technology Partners</td>
<td>BFTDA Technology Grants</td>
<td>BFTDA/TSIB Venture Programs</td>
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<tr>
<td>BFTDA University Program</td>
<td>Center for eBusiness and Advanced IT</td>
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<tr>
<td>CURE Program</td>
<td>Idea Foundry</td>
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<tr>
<td>Keystone Innovation Zones / Innovation Grants</td>
<td>Life Sciences Greenhouse Initiative</td>
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<td>New PA Venture Guarantee Program</td>
<td>New PA Venture Investment Program</td>
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<tr>
<td>PA Initiative for Nanotechnology</td>
<td>PA Technical Assistance Program</td>
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<tr>
<td>Pennsylvania Angel Network</td>
<td>R&amp;D and KIZ Tax Credits</td>
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Revenue & Employees

Pre-seed  Seed  Series A  Series B/C  Mezzanine
Established in 1982 to stimulate economic growth through innovation, entrepreneurship, and the development and adoption of new technologies.

BFTP operates on a Regional level through four centers strategically located throughout PA, with offices in Pittsburgh, State College, Bethlehem, and Philadelphia.

Every dollar invested in BFTP yielded nearly $23 of additional income in the state.

BFTP generated 93,105 job-years at a cost to PA of $3,342 per job-year*.

The state garnered more than $400 million in additional tax revenue as a direct result of the program, which more than covered the operating costs of the program over the same period.

BFTP boosted Pennsylvania’s economy by $8 billion.

Web site – www.benfranklin.org
Kansas Technology Enterprise Corporation

www.ktec.com

KTEC Mission:

“To create, grow and expand Kansas enterprises through technological innovation.”
What is KTEC?

- A quasi-private entity created by legislation in the State of Kansas in 1986
- A holding company which manages a portfolio of programs, investments, subsidiaries & affiliates which operate as for-profit and not-for-profit entities
- An equity or royalty investor in emerging Kansas technology businesses
- 20-member industry-led board of directors comprised of stakeholders representing the legislature, government, universities and the private sector
- In addition to its enabling legislation, KTEC operates under corporate bylaws similar to a private corporation
- KTEC is managed by a professional technology management team
Kansas Strategic Technology Cluster Assessment and a Plan for the 21st Century

Published by The Kansas Technology Enterprise Corporation

Purpose of the Study:

• Technology revolution affecting the economy.
• We must map our course in this new innovation economy.
• Focus our resources on strategic technology clusters in order to compete.
Linking Opportunity With Capacity

- Standardized rating system
- Determine level of capacity and opportunity for critical technologies
The technology areas with high levels in both categories represent logical targets for investment activity. Other technologies which may not have scored as well may be so important to Kansas' economy as to also warrant consideration.
There is concrete evidence that KTEC’s efforts are improving the entrepreneurial climate in Kansas, which was ranked 8th in Nation for “Gazelle Jobs” - according to the 2008 State New Economy Index. Rapid growth “Gazelle” companies account for 80% of new jobs created.

The New Economy Index also ranked Kansas a “Top Mover” in “Fastest Growing Firms.” Through our direct equity investments and business assistance, KTEC has helped Kansas experience a large increase in the number of “fast growing firms” (i.e. those with growth exceeding 200% over 4 years). These firms provide a strong base for the state’s current and future growth.
Come Home to Kansas Initiative

- #1 issue for bioscience and IT companies is talent recruitment

- Garmin, LSI Logics, Perceptive Software, etc.

- KTEC & partners launched www.comehometokansas.com to address issue

- Site shows thousands current technology job openings, plus strong cluster of recognizable companies in Kansas

- Software crawls internet to match people with career opportunities
## The Kansas Experience - 2009

<table>
<thead>
<tr>
<th>CLUSTER</th>
<th>ORGANIZATION</th>
<th>OUTCOMES</th>
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</table>
| Human BioSciences                          | Kansas BioScience Authority (KBA)                 | • $581m Fund  
• Build world-class research capacity, growth of bioscience startups, expansion of the state’s bioscience clusters and facilitate industrial expansion and attraction. |
| Value-added Agriculture and Ag Bio         | National Agricultural Biosecurity Center (NABC)  | • $500m Research Center  
• Focused on protecting America’s agricultural infrastructure and economy from endemic and emerging biological threats. |
| Aviation                                   | National Institute for Aviation Research (NIAR)   | 24 year-old research and tech-transfer center established to advance the nation’s aviation industries that may benefit from aviation-related technologies. |
| Information and Telecommunications & Computing | Software and Technology Association of Kansas (SITAKS) | Advocate for Kansas’ software and information technology sector to help Kansas’ software and IT companies grow and succeed. |
Innovation Philadelphia’s Mission

A Public/Private Partnership created to:

Grow the Wealth and Workforce of the Greater Philadelphia Global Innovation Economy
Leveraging the Resources of the Greater Philadelphia Region

3 states
11 counties

- **Pennsylvania**: Bucks, Montgomery, Philadelphia, Chester, Delaware
- **New Jersey**: Mercer, Burlington, Camden, Gloucester, Salem
- **Delaware**: New Castle

**Finger Lakes Region**

- Population: 1,192,301
- Total Workforce: 630,900
- Geographic Size:
  - Comprised of 9 counties in Upstate New York:
    - Genesee, Livingston, Monroe, Ontario, Orleans
    - Seneca, Wayne, Wyoming and Yates
Innovation & Entrepreneurial Index

Is our glass half empty or half full?
Churning the Greater Philadelphia Innovation Economy

A Roadmap for Regional Growth

“You can always amend a big plan, but you can never expand a little one. I don’t believe in little plans. I believe in plans big enough to meet a situation which we can’t possibly foresee now.”

— Harry S. Truman
<table>
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<tr>
<th>Investment</th>
<th>Commercialization</th>
<th>Global &amp; Regional Workforce / Economic Development</th>
<th>Branding, Research &amp; Marketing</th>
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<tbody>
<tr>
<td>ESF Economic Stimulus Fund</td>
<td>Mid-Atlantic Commercialization Corporation</td>
<td>KIP Knowledge Industry Partnership</td>
<td></td>
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<tr>
<td>Research Dollars Fund</td>
<td>Phoenix IP Ventures</td>
<td>careerphilly.com</td>
<td></td>
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<tr>
<td>Innovation Partnership</td>
<td>World’s Best Technology Network</td>
<td>GP2 Greater Philadelphia Global Partners</td>
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<tr>
<td>MAG Mid-Atlantic Angel Group</td>
<td>Bio Advance / Ben Franklin Technology Partners</td>
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<tr>
<td>innovation AMERICA</td>
<td>IP innovation Philadelphia Science Center</td>
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<tr>
<td></td>
<td>DVIN Innovation Network</td>
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The first Web site dedicated to the career development of students in the Greater Philadelphia Region.

Provides Regional students with a search engine designed to help them find Regional job and internship opportunities.

A calendar of events provides students with a listing of career development and networking activities.

An advice section contains helpful information for students on the many aspects of their career development.
What Worked For KTEC and Innovation Philadelphia

- **FOCUSED & INTEGRATED** Science & Technology Collaboration for Kansas and the Greater Philadelphia region
- **PRIVATE** Sector Leadership and **COMMITMENT**
- Organization’s function as a **BUSINESS**
- Successfully manage a technology investment portfolio for **ROI**
- Operational **FLEXIBILITY**
- **ACCOUNTABILITY** with measurable outcomes
- Experienced **PROFESSIONAL** team
- Focus on the **ENTREPRENEUR’S** needs
- **SUSTAINABLE** Funding
Hot Off the Presses

Creating a National Innovation Framework

Federal Aid Sought for Equity-Backed Companies

More Signs of Capital Starvation

A Federal VC Fund of Funds?

Recession Knocks VC Funds to 5 ½ Year Low

Into the Valley of Death

Health Care Bleeds Small-Biz Finances

Buzz Article
US Government has not yet addressed the "Valley of Death" Funding Crisis

Nor Has It Developed

An Integrated Innovation Plan for America

Innovation America has a Plan!
U.S. Experiencing a Slowdown In Its Global Innovation Leadership

### GLOBAL INNOVATION INDEX

<table>
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<tr>
<th>RANKING</th>
<th>COUNTRY</th>
<th>SCORE*</th>
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<tbody>
<tr>
<td>1</td>
<td>Singapore</td>
<td>2.45</td>
</tr>
<tr>
<td>2</td>
<td>South Korea</td>
<td>2.26</td>
</tr>
<tr>
<td>3</td>
<td>Switzerland</td>
<td>2.23</td>
</tr>
<tr>
<td>4</td>
<td>Iceland</td>
<td>2.17</td>
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<tr>
<td>5</td>
<td>Ireland</td>
<td>1.88</td>
</tr>
<tr>
<td>6</td>
<td>Hong Kong</td>
<td>1.88</td>
</tr>
<tr>
<td>7</td>
<td>Finland</td>
<td>1.87</td>
</tr>
<tr>
<td>8</td>
<td>United States</td>
<td>1.80</td>
</tr>
<tr>
<td>9</td>
<td>Japan</td>
<td>1.79</td>
</tr>
<tr>
<td>10</td>
<td>Sweden</td>
<td>1.64</td>
</tr>
</tbody>
</table>

Source: Boston Consulting Group & National Association of Manufacturers

*Global Innovation Index evaluated both innovation inputs, such as fiscal and education policies, and outputs such as patents, technology transfer from basic university research, research and development, and business performance.*
UK Government Unveils Plans for £1BN Venture Capital Fund of Funds

30 Jun 2009. Source: AltAssets

The UK’s venture capital industry will receive a much needed boost as the government announced plans to commit £150m (€177m) to a new fund of funds, the UK Innovation Investment Fund.

The Department for Business, Innovation and Skills, with the Department of Energy and Climate Change and the Department of Health, will invest the money alongside the private sector in order to stimulate growth.

Government of Canada Announces $450 Million in New Funding for BDC to Assist Canadian Businesses

TORONTO, Ontario, June 15, 2009 — The Honourable Tony Clement, Minister of Industry, today announced that the Government of Canada is providing $450 million to the Business Development Bank of Canada (BDC) in support of small and medium-sized enterprises and innovative firms.

The funding will include $100 million to establish the Operating Line of Credit Guarantee and $350 million over three years to help drive venture capital investment in promising Canadian technology businesses.
MISSION: TO ACCELERATE THE GROWTH OF THE ENTREPRENEURIAL INNOVATION ECONOMY IN AMERICA

• Preliminary framework on how to finance and bring together organizations, networks, and resources involved in growing the nation's entrepreneurial innovation economy and creating new jobs.

• Private-public partnership such as Innovation America could be an innovation intermediary for facilitating this process between, State, Federal, University, Foundation and Private Sector stakeholders.

• Opportunity to leverage the federal innovation portfolio of programs with state and regional early-stage funds and IBED organizations.

• The moons are aligning to create and implement, an integrated innovation U.S. strategy and leverage the newly created Commerce Department Office of Innovation and Entrepreneurship.
Creating a National Innovation Framework

• The National Innovation Jobs Seed Fund and Technical Assistance Grant Fund

• The Federal Innovation Partnership and a National Innovation Advisor

• The National Private-Public Partnership Innovation Program
Partners in National Innovation Development

Community Development Venture Capital Alliance
National Innovation Framework

Angel Capital Association (ACA)*
Community Development Venture Capital Alliance (CDVCA)*
National Association of Seed & Venture Funds (NASVF)*
American Society of Mechanical Engineers (ASME)*
State Science & Technology Institute (SSTI)*
National Business Incubation Association (NIBA)*
Association of University Research Parks (AURP)*
Association of University Technology Managers (AUTM)*

*Potential national innovation partners

Federal Agency (TBD)
National Innovation Jobs Seed Fund
$2 billion fund
National Seed Fund of Funds 50 Seed Funds
$1.8 billion
Innovation Capital Technical Assistance Grant Fund
$200 million

NPPPI
501©3 Not For Profit (Innovation America)

establishes criteria, metrics & best practices

Investment
Commercialization
Technical Assistance, Education, & Mentoring
Technology, Economic & Workforce Development
Networking, Strategic Planning, Marketing & Branding

Federal Technology Innovation Programs
SBIR, STTR, TIP, MEP, WIRE, FLC, EPSCoR, EPSCoR, NSF-PFI, NSF-IUCRC, NSF-Eng’g Resource Center, DOE-Ind’l Tech. Program

Innovation Federal Capital Programs
CRA, CDFI, NMTC, NISF, TIP, SBIR
The Road from Basic Concept to Commercialization

...has many complex pieces!
All of the puzzle pieces must come together early in order for the project to have any hope of commercial success.
Human Connectivity

Intelligent Communities and communications networks have the ability to transform economic, political, and social relationships on a global scale.

- In the past, organizations strategized to gain **COMPETITIVE** advantage.
- The emphasis in the future will be to gain **COOPERATIVE** advantage.
- A core competency needed in individuals, organizations, and regions alike is **CONNECTIVITY**.

Source: Fast Growth
Innovation Connectivity in Rochester

GRE has the 5C’s of Innovation Connectivity:

Cultivation
Collaboration
Capital
Careers
Commercialization
Implementing a New **ROCHESTER** Innovation Paradigm

- Willingness to deviate from traditional and parochial perspectives
- Encourage public investment and risk taking
- Developing trust through collaboration
- Ensuring the paradigm is responsive to partners' missions
- Building consensus of all constituents through education, participation, and positive outcomes
- Move from technology-based economic development to Innovation-Based Economic Development
What’s Next For Rochester?

Today:

Tomorrow:

innovation

Rochester
• Small Business Council and GRE hosted Eyes on the Future

• More than 1,300 people in attendance this year
  • 75% of survey participants found event informative; 82% willing to recommend event to other

• To continue positive dialogue about economic development, launching weekly radio program on WHAM-1180

Purpose:

CALL TO ACTION FOR THE COMMUNITY TO PARTICIPATE IN ECONOMIC DEVELOPMENT!
“Somebody has to do something, and it's just incredibly pathetic that it has to be US.”

--Jerry Garcia of the Grateful Dead

The US is YOU!