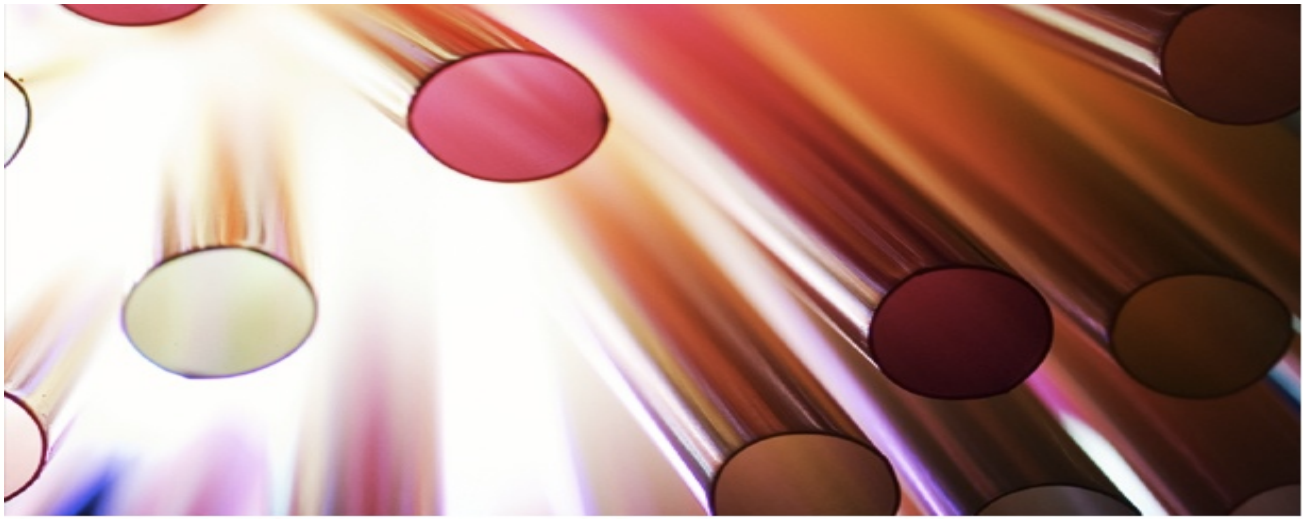
VI
COTEC
EUROPA
MEETING

Casa da Música
Porto, 7th October
Portugal



What's New In Innovation
October 7, 2010

Presented by:
Richard A. Bendis
President and CEO
Innovation America

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Good Morning!

BOM DIA!

BUONGIORNO!

BUENOS DÍAS!

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The World Has Changed

- Convergence of Complex Challenges
- Loss of Jobs
- Growing US Trade Deficit
- Greater International Competition in manufacturing and service industries
- Competitive advantages are increasingly tied to human capital and innovation
- Economic growth is closely related to education/workforce, energy, climate change, environmental, natural resource and geopolitical issues
- China! China! China!
- **"Innovation Matters"**

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Bill Gates - Microsoft

"Never before in history has innovation offered promise of so much to so many in so short a time."

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What is Innovation?




- **Radical Innovation:** a new product, process, or system that replaces its accepted predecessor and renders it obsolete.
- **Ideation** is applied knowledge; **Creativity** is applied ideation; Invention is applied creativity; and **Innovation** is the successful commercialization or adoption of radical invention
- **Innovation** results when a new approach is applied to an old problem that makes lasting and far-reaching changes in behavior
- "A new match between a **Need** and a **Solution**"

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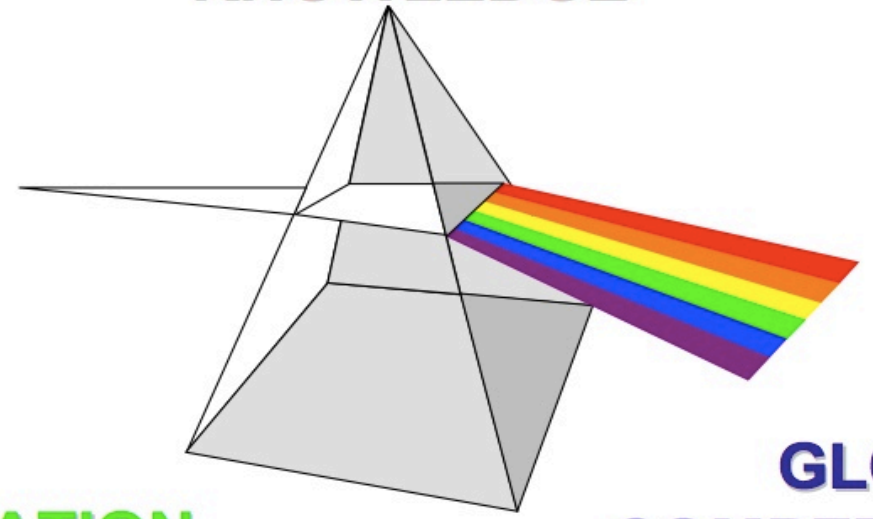
Innovation Economy

KNOWLEDGE



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GLOBAL COMPETITIVENESS

"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

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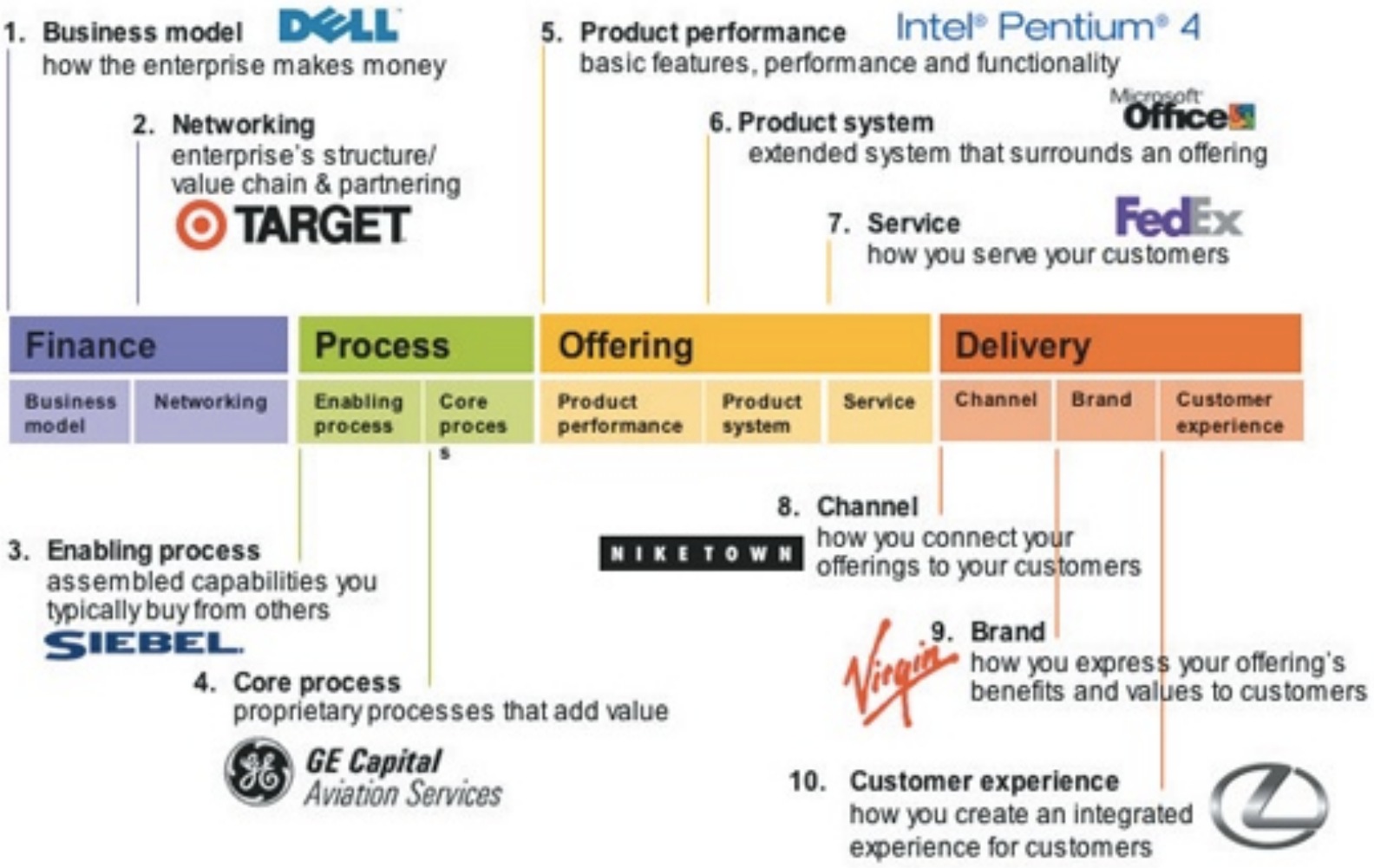
10 Types of Innovation



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Richard Branson Quote

"Ideally, since 80 percent of your life is spent working, you should start your business around something that is a passion of yours."

"A business has to be involving, it has to be fun, and it has to exercise your creative instincts."

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Global Innovation Network

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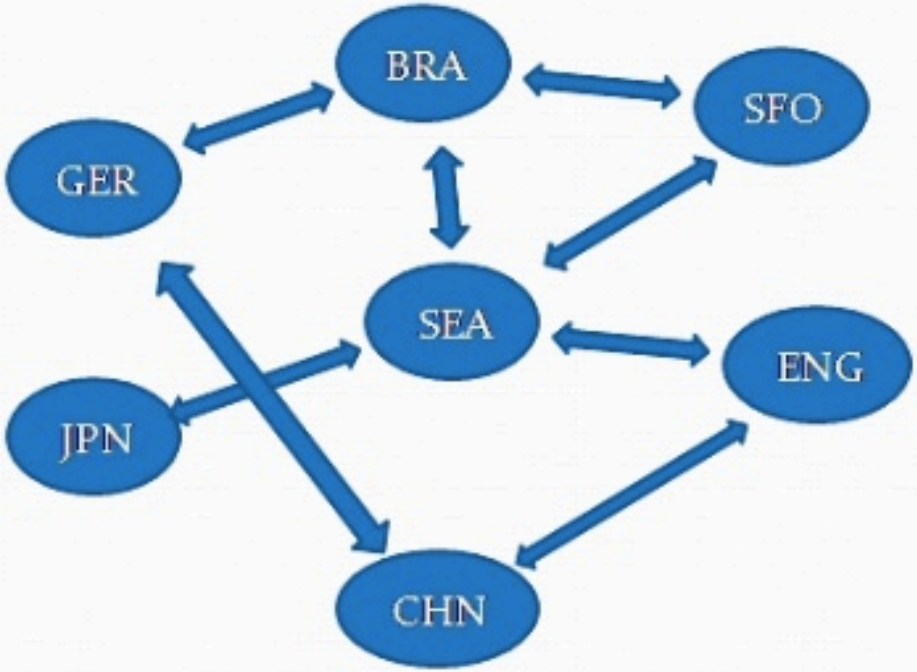
Global Innovation Networks

New Model: Regional Clusters making up Global Innovation Networks



Exchange of

- Ideas
- Talent
- Investment
- Supply Chain Linkages
- Design
- Manufacturing
- Sales
- Marketing

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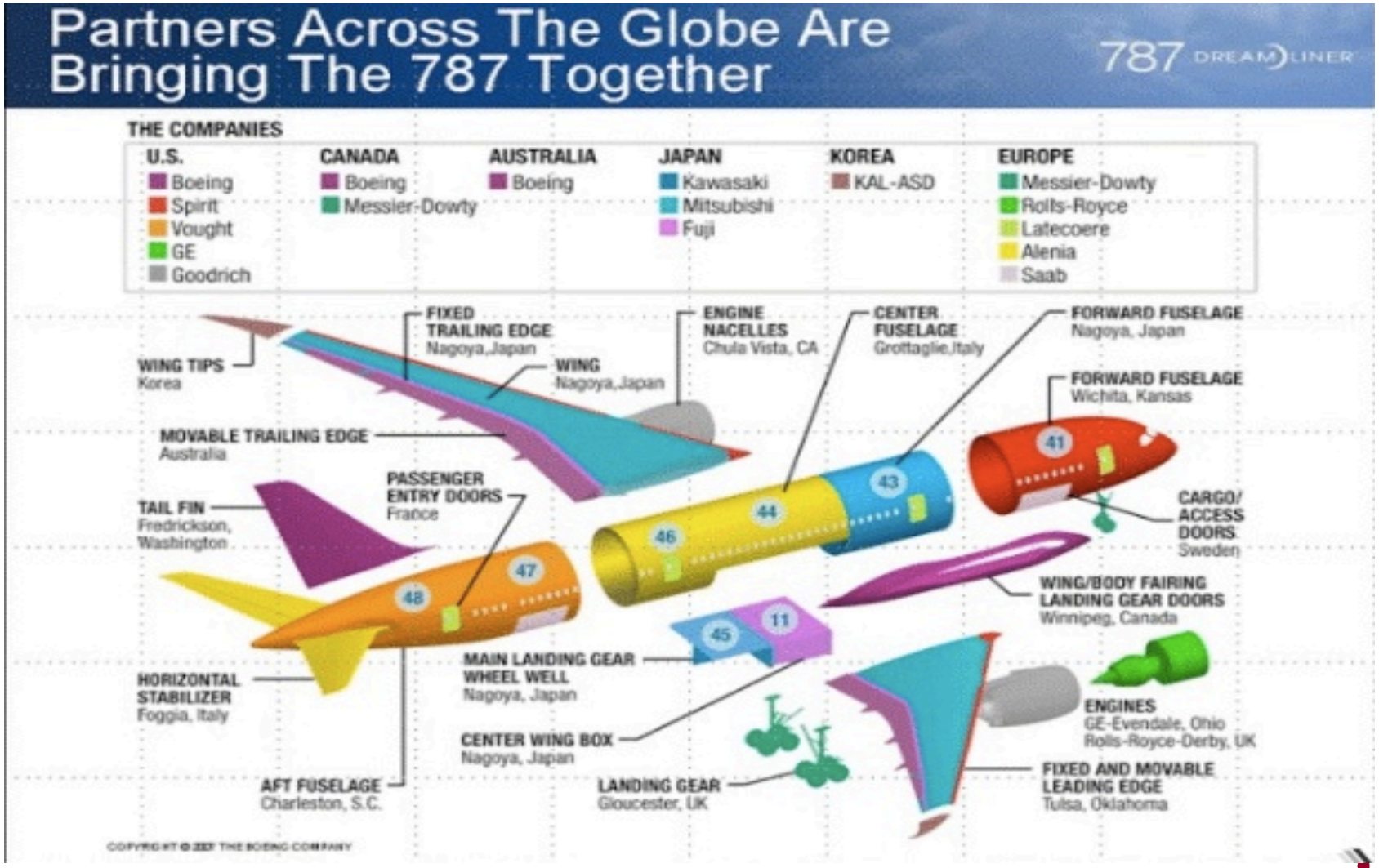
Global Innovation Networks



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Top 20 Innovative Countries –Innovation Capacity Index

1. Sweden 82.2
2. Finland 77.8
3. United States 77.5
4. Switzerland 77.0
5. Netherlands 76.6
6. Singapore 76.5
7. Canada 74.8
8. United Kingdom 74.6
9. Norway 73.5
10. New Zealand 73.4
11. Luxembourg 73.3
12. Denmark 73.3
13. Taiwan 72.9
14. Iceland 72.6
15. Japan 72.1
16. Hong Kong 71.3
17. Australia 71.2
18. Ireland 70.5
19. Korea 70.0
20. Germany 68.8

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Why Is Innovation Essential?

"INNOVATION DISTINGUISHES BETWEEN A LEADER AND A FOLLOWER."

-STEVE JOBS

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Can You Tell Which is the Real IPad?

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Social Innovation

- Social innovation refers to new strategies, concepts, ideas, and organizations that meet social needs of all kinds
- From working conditions and education to community development that will extend and strengthen civil society

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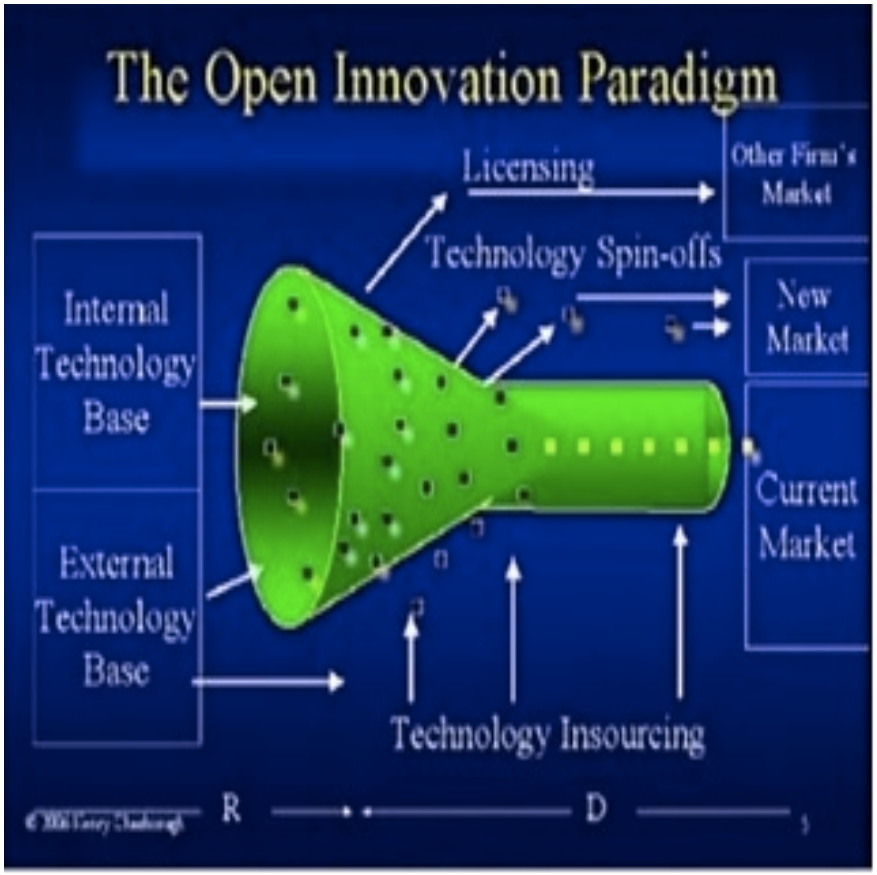
Open Innovation

Open innovation is what happens when big companies collaborate on a large scale with outsiders – university researchers, suppliers, small tech start-ups – to get new products or services to market.



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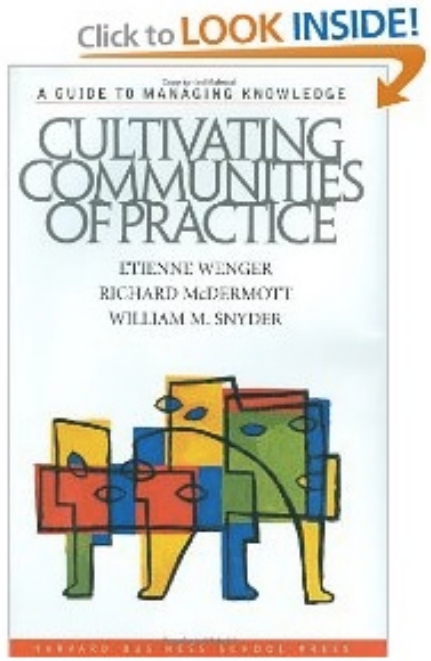
Communities of Practice

- Group of people who share a common concern, a set of problems or a passion about a topic.
- Deepen their knowledge and expertise by interacting on an ongoing basis.
- Follow a particular methodology which is based on theories of learning in action – learning while doing



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Crowdsourcing

- ***Crowdsourcing*** is the act of outsourcing tasks, traditionally performed by an employee or contractor, to a large group of people or community (a crowd), through an open call.
- ***Crowdsourcing*** is a distributed problem-solving and production model.
- Problems are broadcast to an unknown group of solvers in the form of an open call for solutions.
- Users—also known as the crowd —typically form into online communities, and the crowd submits solutions.
- The crowd also sorts through the solutions, finding the best ones.

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The Millennials

•Millennials, an abbreviation for *millennial generation, is a term used by demographers to describe a segment of the population born between 1980 and 2000 (approximately).*

•**76** million Millennials in the United States

•**186** million Millennials in Europe?

•As a result of growing up with the Internet and associated devices, Millennials are often said to be the most technologically savvy generation to date.

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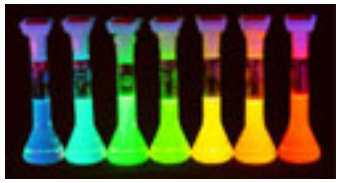
Implementing a New Innovation Paradigm

- 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 (IBED)**



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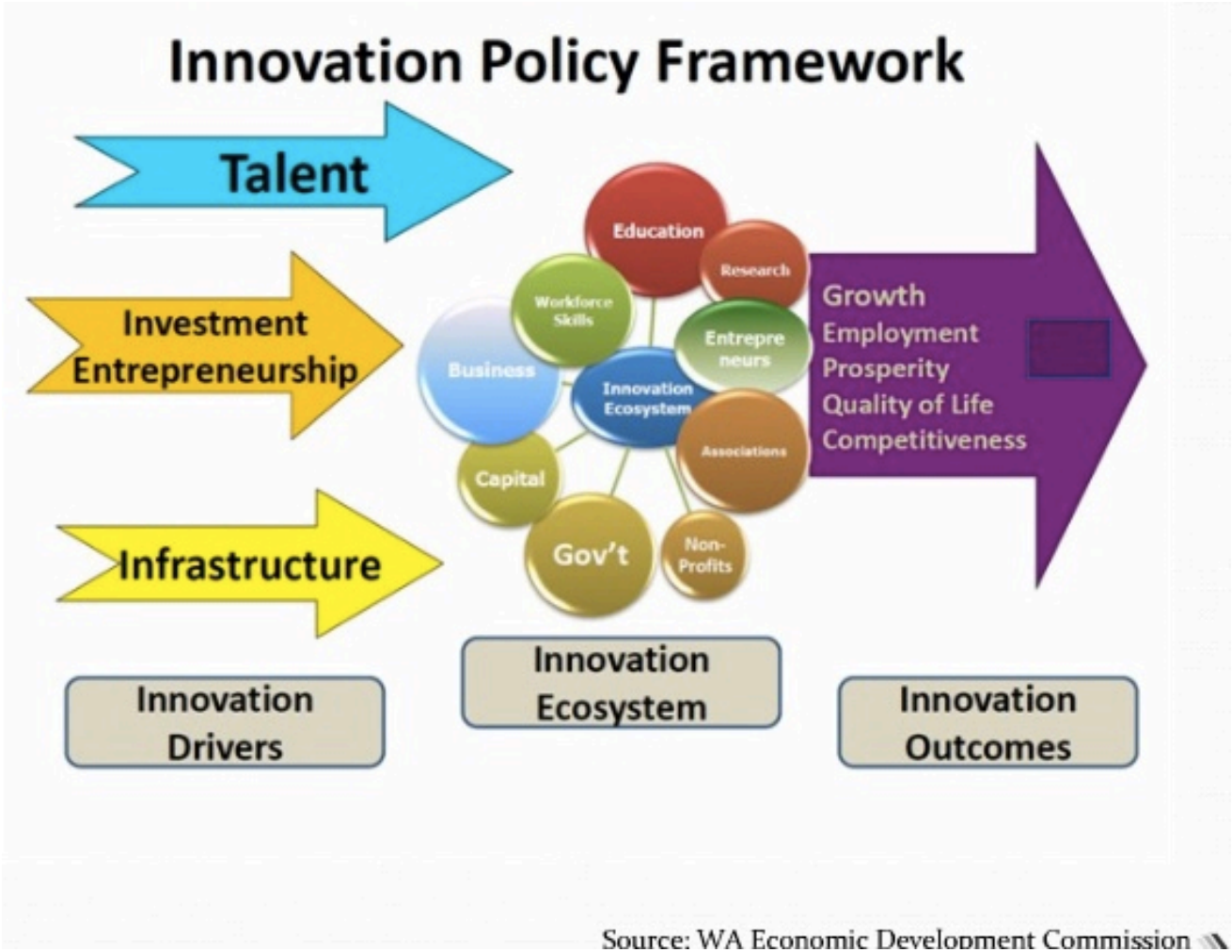
Innovation Policy Framework



Source: WA Economic Development Commission

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 both rural and urban economies
- Develop global innovation network

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Collaboration

A recursive process where 2 or more people or organizations work together in an intersection of common goals.

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

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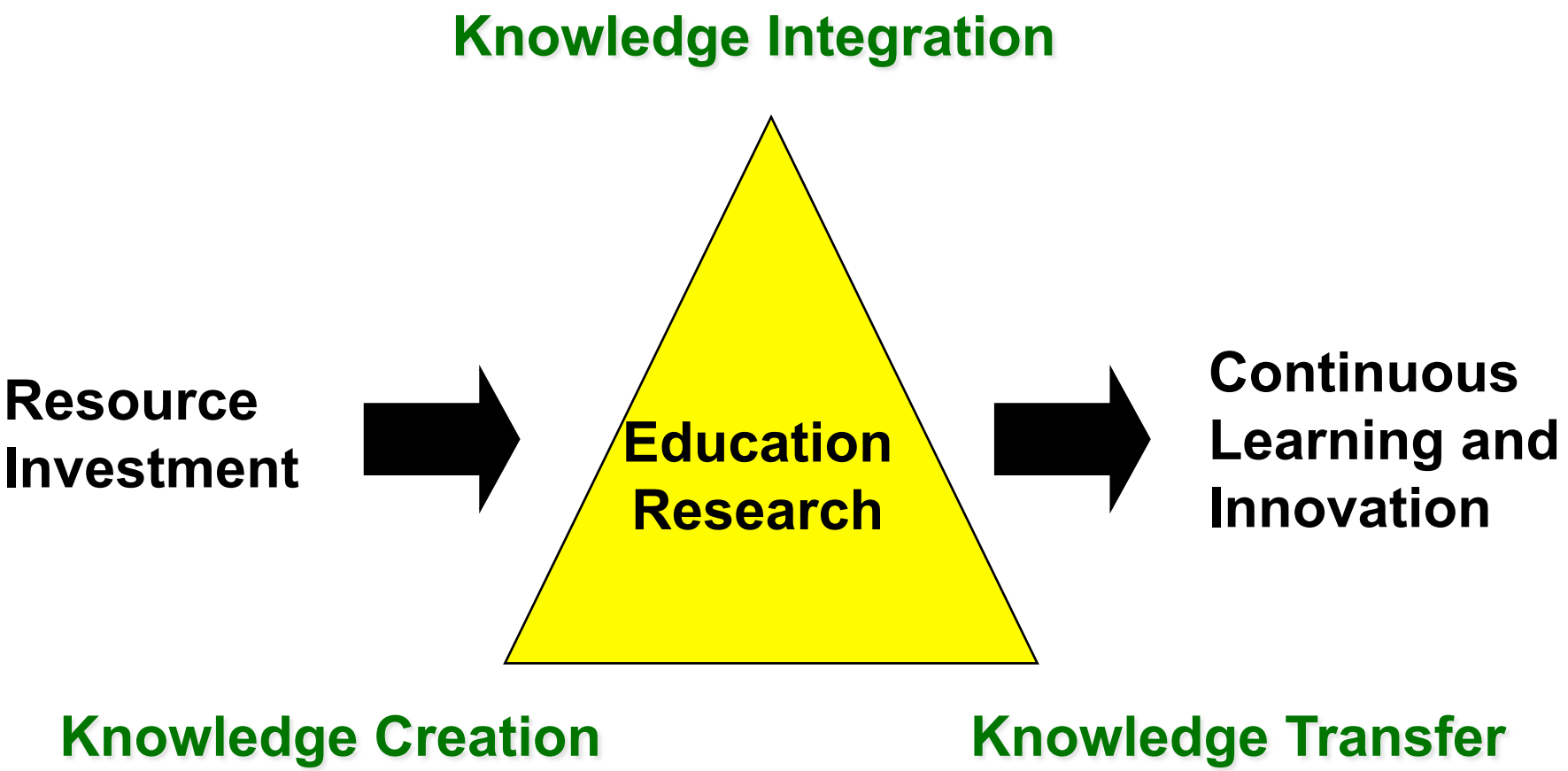
The Role of Education



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

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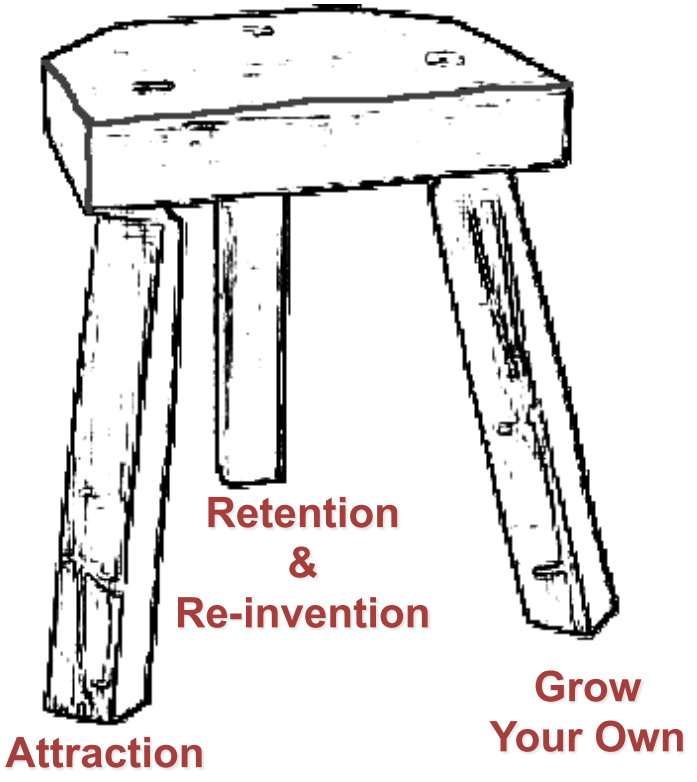
Economic Development

- Economic Development is a three-legged stool:
  - **Attraction**
  - **Retention & Re-Invention**
  - **Grow Your Own**
- IBED requires patience and persistence, continuity and consistency.
- Working with early-stage companies takes time.
- A balanced portfolio economic development strategy is best!



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Traditional & Innovation-Based Development

	Traditional		Innovation (Clusters)
• Competitive Basis	Natural resources Highways / Rail Proximity Costs	→	Specialized talent Networks, information University research / professors Market understanding Global Reach
	i.e. PHYSICAL		i.e. KNOWLEDGE
• Key values / offerings	Business parks Incentives	→	Access to research Workforce competencies Lifestyle
• Lead Organization	Chambers / EDCs	→	Economic developers **Innovation Intermediaries**

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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.

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Who Are Innovation Intermediaries?

- Innovation intermediaries are structured as an emerging form of broker that coordinates the flow of innovation requests and solutions across distinct, distant and previously unknown knowledge sources as well as provide managerial advise to internalize external sources of knowledge.

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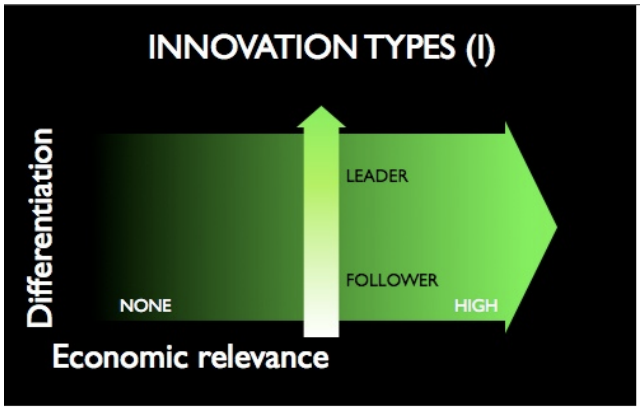
open for innovation



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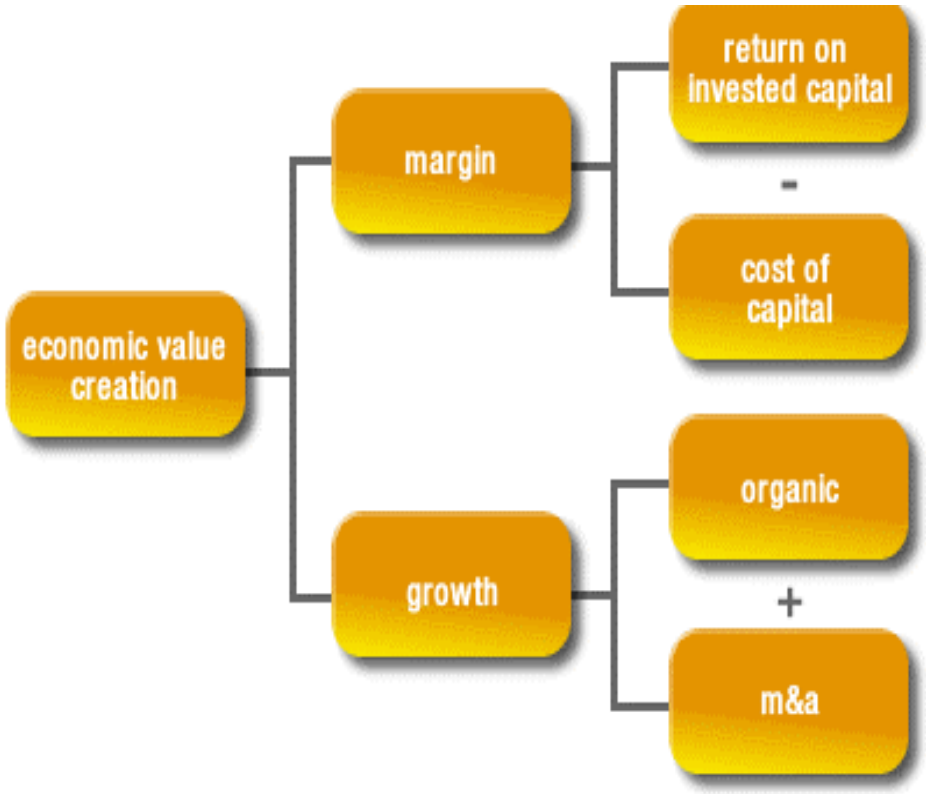
Innovation Paradigm Shift

PROOF OF CONCEPT
(Technological Feasibility)

PROOF OF RELEVANCE
(Market Pull)



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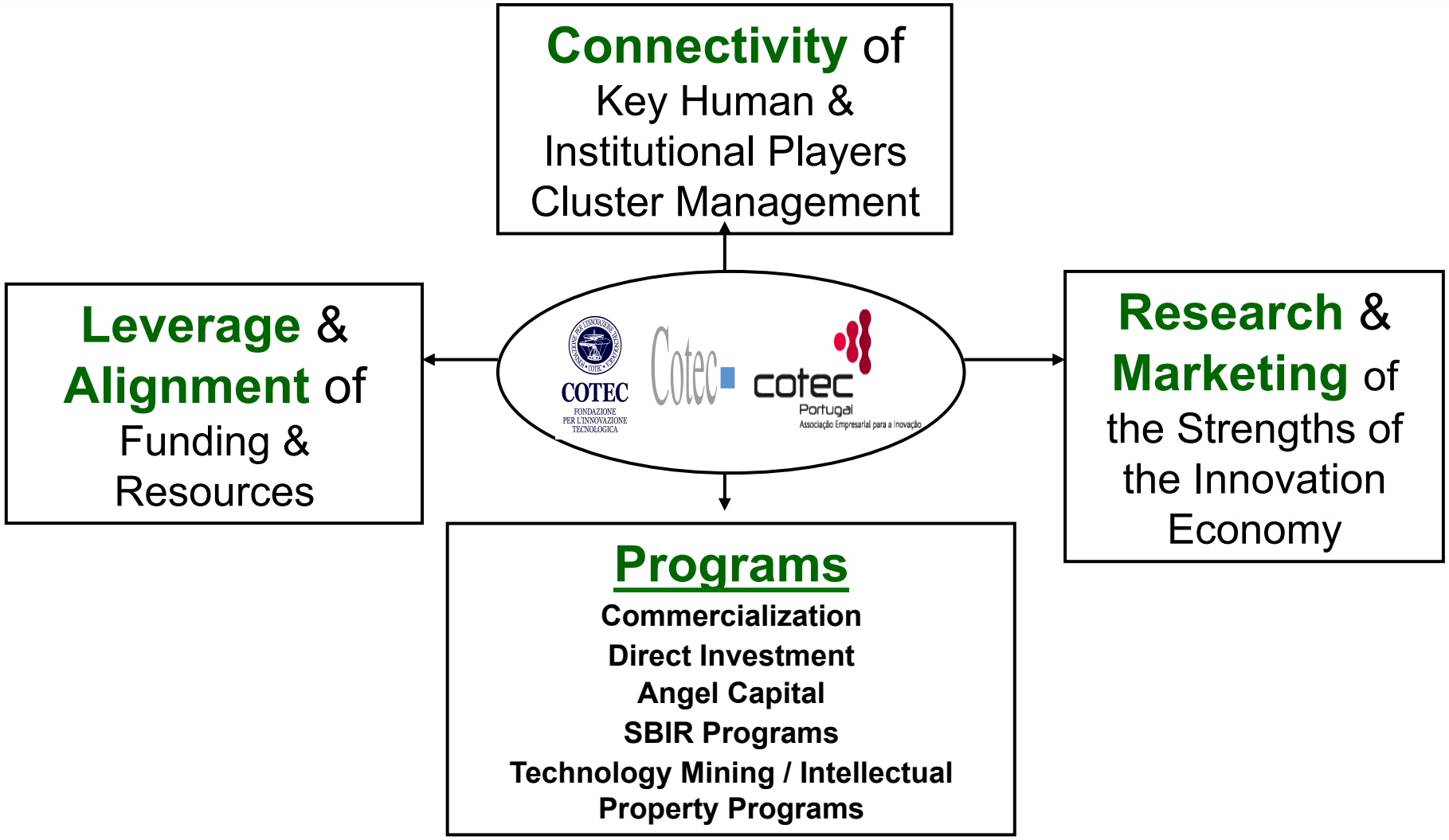
21st Century Innovation Intermediary



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Intermediary Best Practices

- Longevity
- Bipartisan Support & Champions
- Independent Organizations
- Continuous Reinvention
- PRIVATE SECTOR LEADERSHIP
- Understand Return On Investment
- Sustainability In Funding
- Accountable
- Innovative
- Effective Leadership

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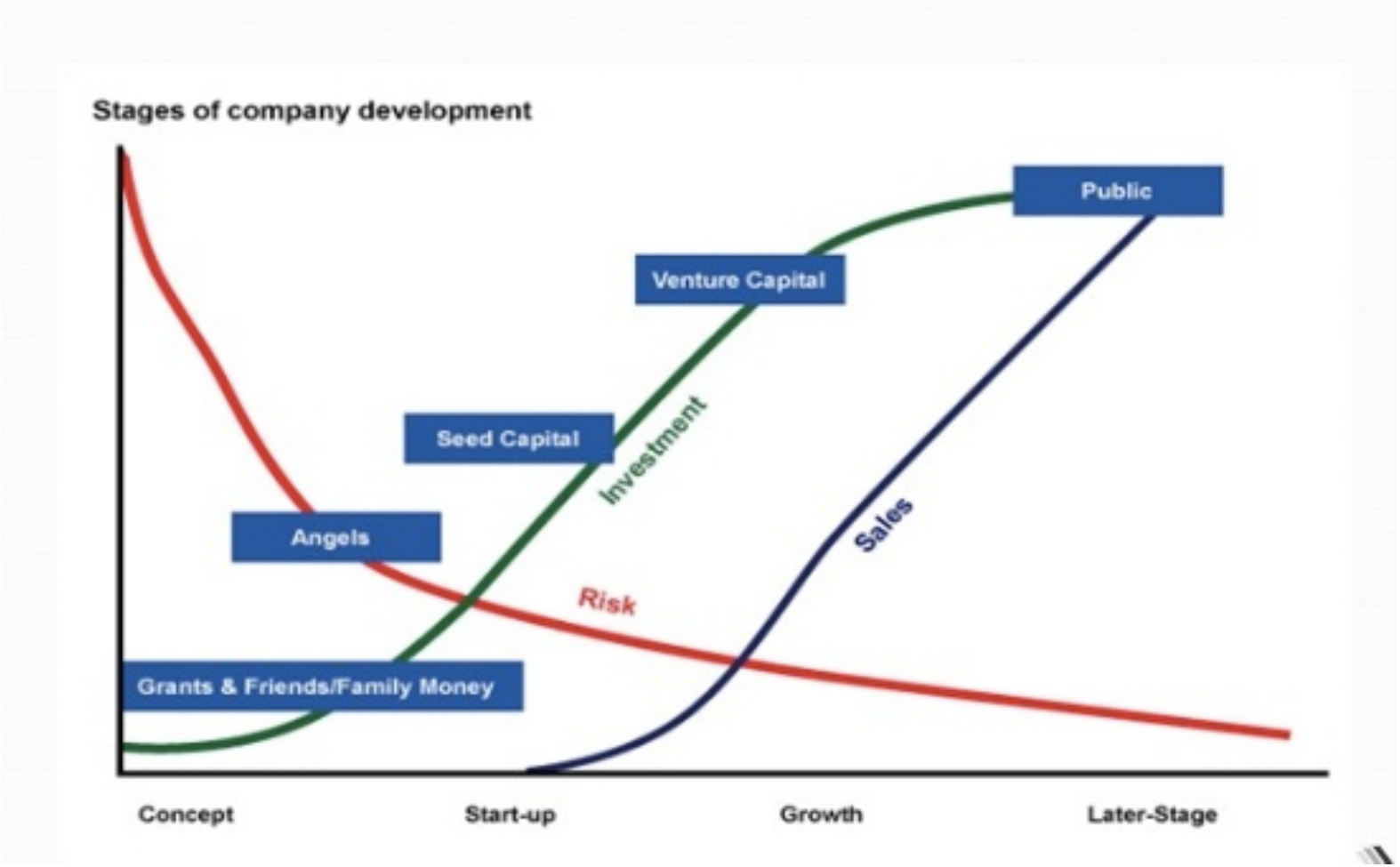
Stages of Investment



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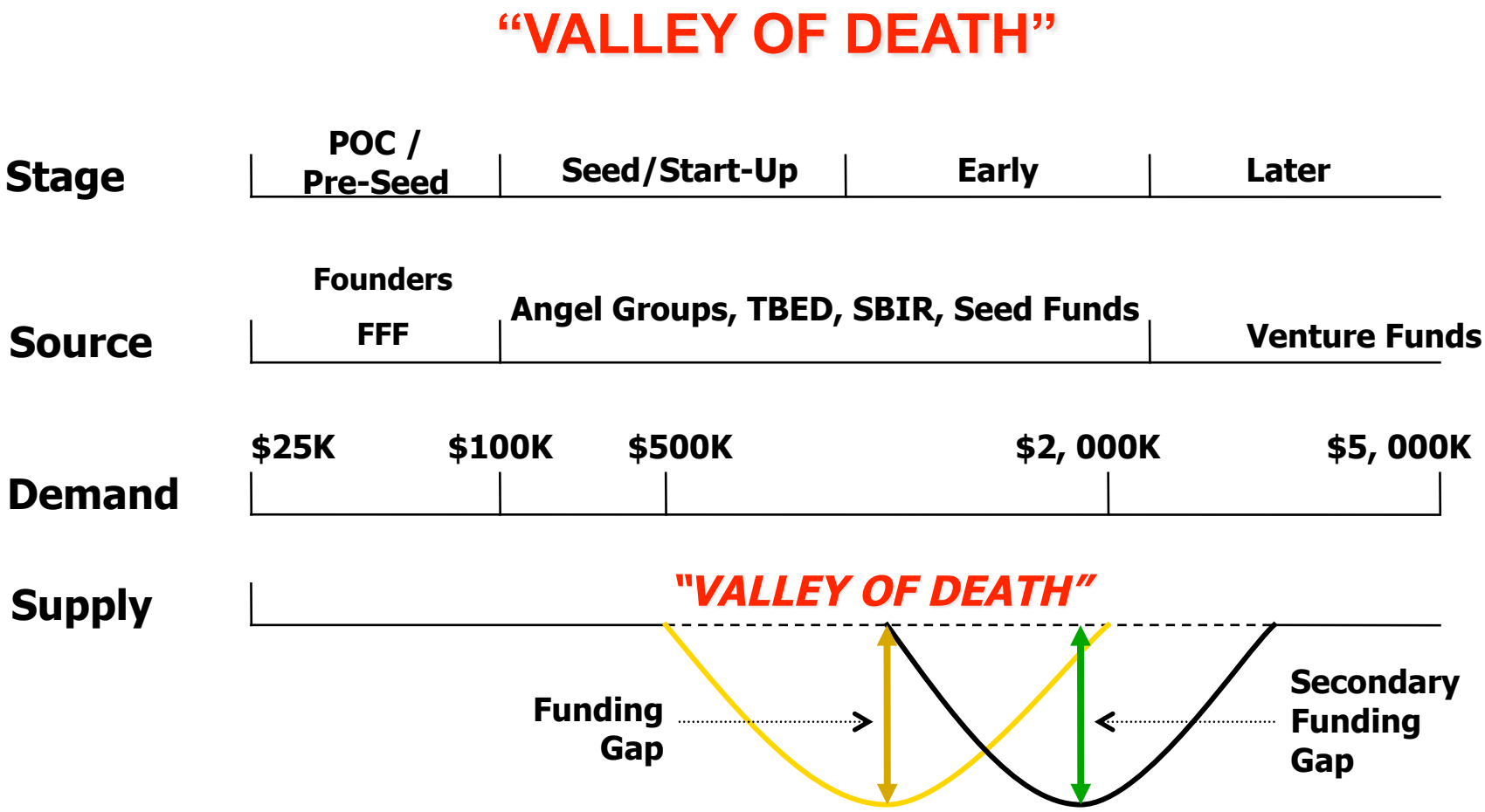
Innovation Capital Valley of Death



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Key Elements to Innovation

Investment and Entrepreneurship

- Capital Availability
- Experienced Enterpreneurs: Risk takers, take technology and apply to solve a real world problem.
- Network of advisors and resources.

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New Popular Venture Financing Products

Mentorship programs:

- Help startups ideate
- Form founding teams
- Build initial products.

seedcamp

Super Angels:

Provide capital and guidance to:
hire non-founder employees
further product development
market the initial product (usually to early adopters) and
raise follow on VC funding.

Y Combinator

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New Popular Venture Financing Products

Tradition VC's - (Sequoia, Kleiner, etc)

- Help companies scale and get to profitability.
- Access to broad networks to help with hiring, sales bizdev and other scaling functions.
- They are also experts at selling companies and raising follow-on financing.

SEQUOIA CAPITAL
THE ENTREPRENEURS BEHIND THE ENTREPRENEURS

Accelerator funds - Focus on providing partial liquidity and preparing the company for an IPO or big M&A exit.

- VC's played all of of these roles (lifecycle" investors).
- They incubated companies, provided seed financings & and later stage liquidity.
- Mostly the mentorship and angel investing roles were played by entrepreneurs who had expertise but shallow pockets and limited time and infrastructure.

KPCB

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Jobs! Jobs! Jobs!

Does Seed Investing

REALLY

Create Jobs?

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Public Investment In Job Creation

Category	CDVCA*	State of PA	State of MI	State of UTAH	Stimulus Bill
Funds Invested	$26M	$90M	$291M	$60M	$800B
Jobs Created	3.700	8,150	28,854	2,047	1,000,000 To 4,000,000
$ Per Job Invested	$7,100	$11,000	$11,728	$29,300	$800,000 To $200,000

*Community Development Venture Capital Association

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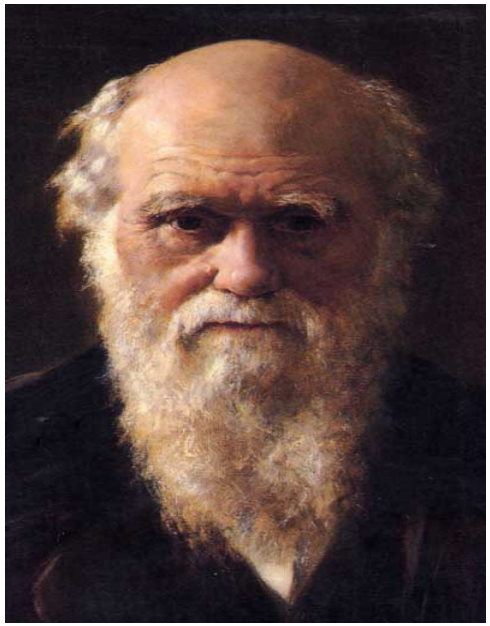
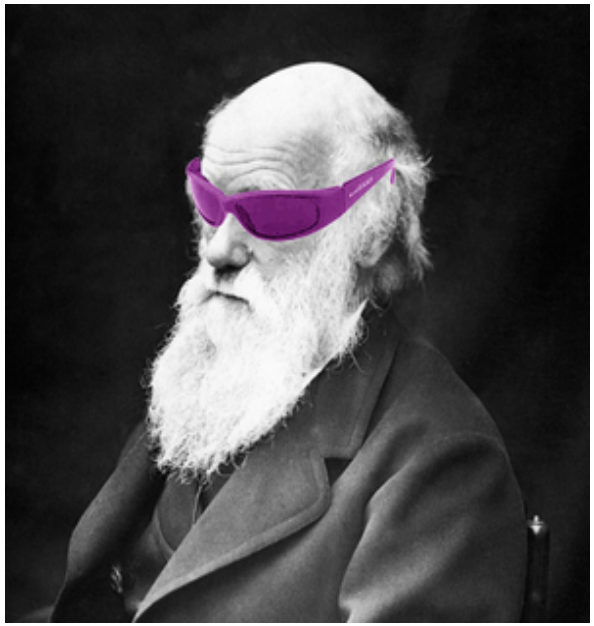
Change Is Inevitable

" It is not the strongest of species that survive, nor the most intelligent, but the ones most responsive to change."

-Charles Darwin





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What Is A Road Map…..Why Is It Needed?

- A roadmap answers the ***question "Where do we want to be and how to we get there?"***
- A cluster roadmap ***provides strategies and action*** plans to best ***achieve a vision of the future shared by a critical mass*** of industry-related organizations.
- The strategies and action plans are developed according to the unique strengths of the cluster and region as compared to a global market opportunity.

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Why Regional Innovation Capacity Matters

- In a knowledge-driven economy, new job and wealth creation derive from the accelerated commercialization of innovative, world-class technological breakthroughs
- A region's accumulated research and innovation assets is *the* "seed corn" that enables the growth of entrepreneurial science-based enterprises in that region
- Every region's research assets ("seed corn") differs ***(Are you growing "soybeans" or "wheat"?)***
- "Seed Corn" that is tossed on infertile growing conditions will not generate a rich harvest of jobs or wealth.

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Mapping The Characteristics of Innovative Regions

- **Each region's innovation capacity ("regional DNA") differs**
  - Every region has its unique path to building its cluster
  - Scientific expertise concentrated in a region is distinct from other regions
  - Regions need to understand what they *truly* have as assets
- **Must couple world-class scientific with business smarts for successful tech. commercialization**
  - Synergy in a cluster depends on functional social structures between technologists and business community

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Mapping The Characteristics of Innovative Regions

- **World class research institutions** as sources of intellectual capital
- **Appropriate business assistance programs** to accelerate technology commercialization
- **Seasoned senior managers with entrepreneurial "know-how"** that can work in tandem with scientists and engineers on teams to jump-start enterprise creation
- **Sources of "intelligent" startup capital** beyond what "sweat equity/boot-strapping" and "family and friends" capital can provide
- **Active entrepreneurial networks** that can support all the players involved in enterprise creation activities
- **Institutions of higher learning** that can train and quickly upgrade the skills of a world-class workforce for the region's growing high tech companies

All of these regional assets must be integrated for the entire eco -system to work!

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Key Innovation Road Map Elements

1. Asset Mapping
2. Cluster analysis
3. Innovation Benchmarking (Peer 2 Peer)
4. Innovation and Entrepreneurship resource identification
5. Innovation Economic Development organizational analysis and matrix
6. Gap Analysis (programs & services)
7. Public policy recommendations
8. Recommended organizational structure, governance, budget and funding sources (Private Public Partnership)
9. Organizational leadership and staffing
10. Program portfolio/implementation
11. Economic Impact Analysis
12. Branding and Market Research

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What Are Clusters & Do They Matter?

Clusters represent a new way of thinking about national, state, and local economies, and they necessitate new roles for companies, government, and other institutions in enhancing competitiveness.

-Michael Porter

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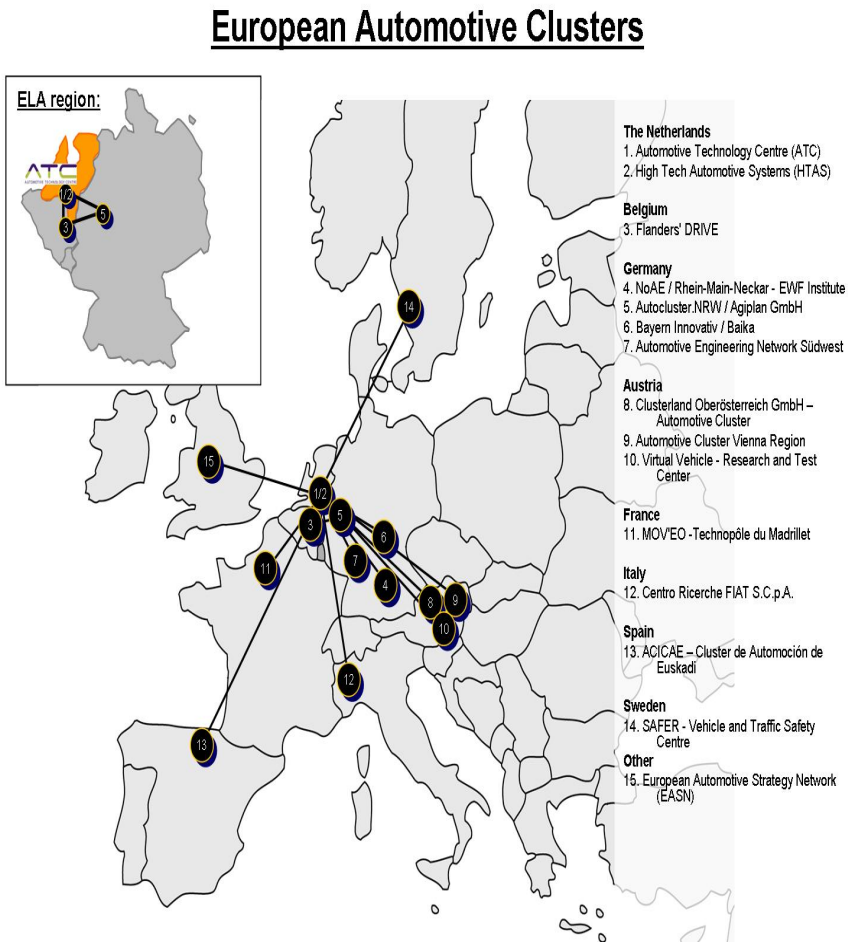
Why Clusters?

Clusters and cluster approaches holdout substantial attractions as the nation seeks to rebuild a damaged economy.

- *Pointing to impact, new research confirms that strong clusters tend to deliver positive benefits to workers, firms, and regions.*
- *As a matter of paradigm, clusters reflect the nature of the real economy.*



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General Principals for Cluster-Based Economic Development Strategies

- Don't try to create clusters.
- Use data and analysis to target interventions, drive design, and track performance
- Focus cluster initiatives on clusters where there is objectively measured evidence of under-capacity.
- As a matter of policymaking, clusters provide a framework for rethinking and refocusing economic policy.
- Maximize impact by leveraging cluster-relevant preexisting approaches, programs and initiatives.
- Align efforts "vertically" as well as horizontally.
- Let the private sector lead

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Government's Role in Cluster Development

•Federal policymakers can provide a rich base of information and related foundational resources for cluster practitioners nationwide.

•State policymakers should strategically invest their own resources in cluster-led economic development.

•Regional leaders should identify cluster challenges and coordinate cluster actors.

•Local policymakers should bring to tools to influence on-the-ground implementation of cluster-oriented economic development.

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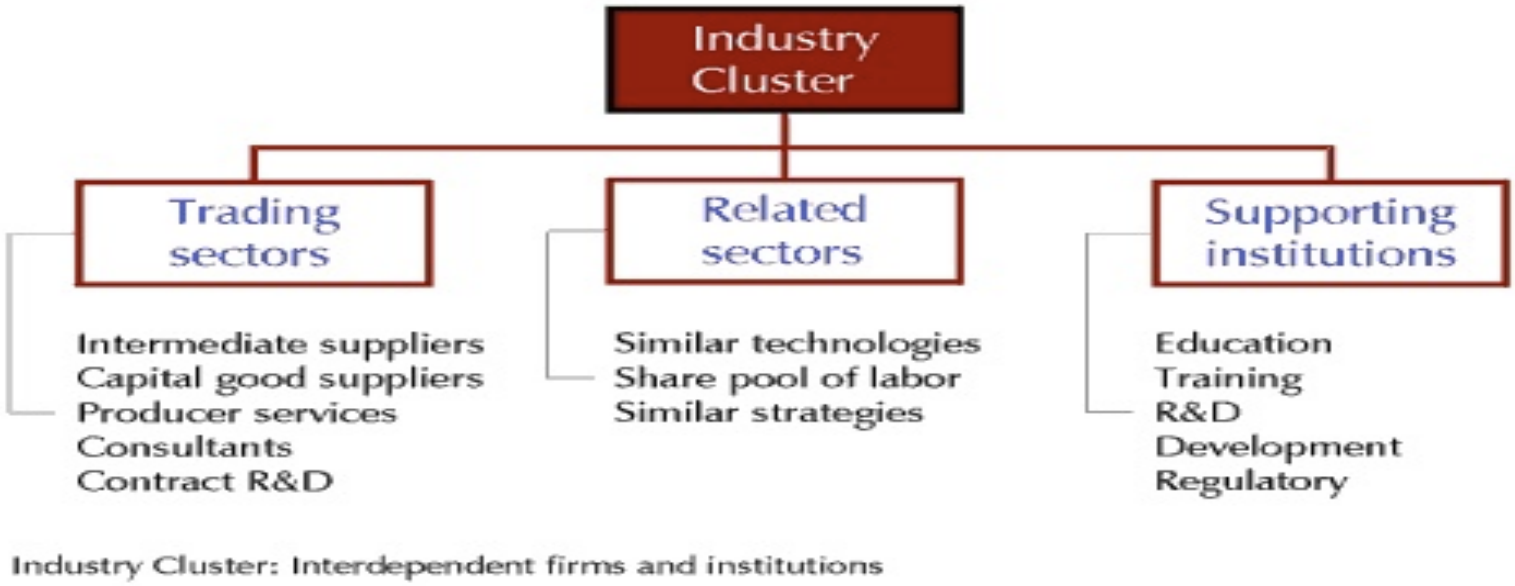
Cluster Benefits



Industry Cluster: Interdependent firms and institutions

Labor market pooling, supplier specialization, knowledge spillovers, Enhancing the local and innovation potential, encouraging, entrepreneurship & ultimately promoting growth in productivity, wages, and jobs.

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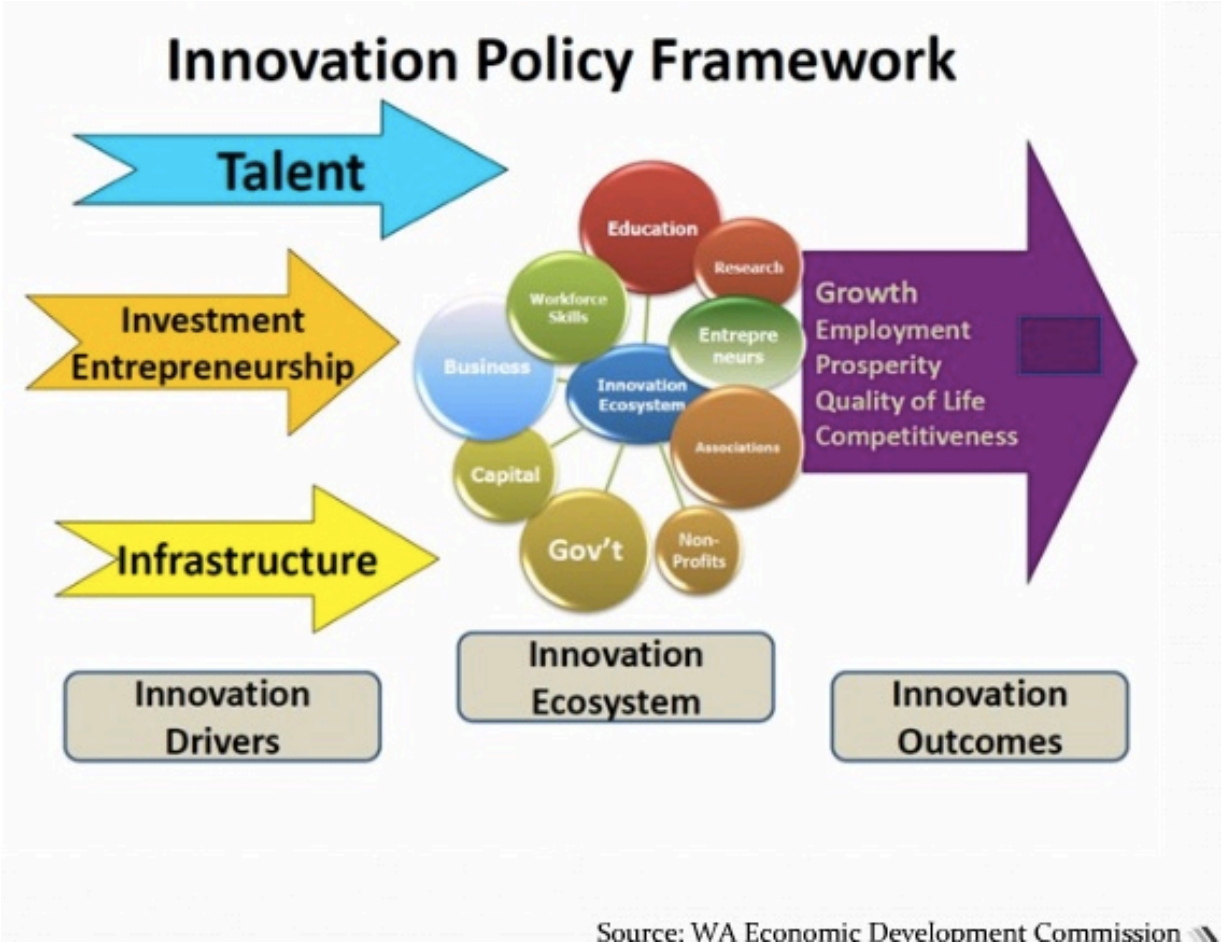
Innovation Policy Framework



Source: WA Economic Development Commission

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Collaboration

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U.S. State IBED Programs

Ben Franklin
Technology PArtners

Ohio | Third Frontier
Innovation Creating Opportunity

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KANSAS TECHNOLOGY
ENTERPRISE CORPORATION

OCAST

GEORGIA
RESEARCH
ALLIANCE

Maryland TEDCO
Technology Development Corporation
Maryland...Technology Starts Here.

USTAR
Turning innovation into industry.

TTDC
TENNESSEE TECHNOLOGY
DEVELOPMENT CORPORATION

First State
INNOVATION

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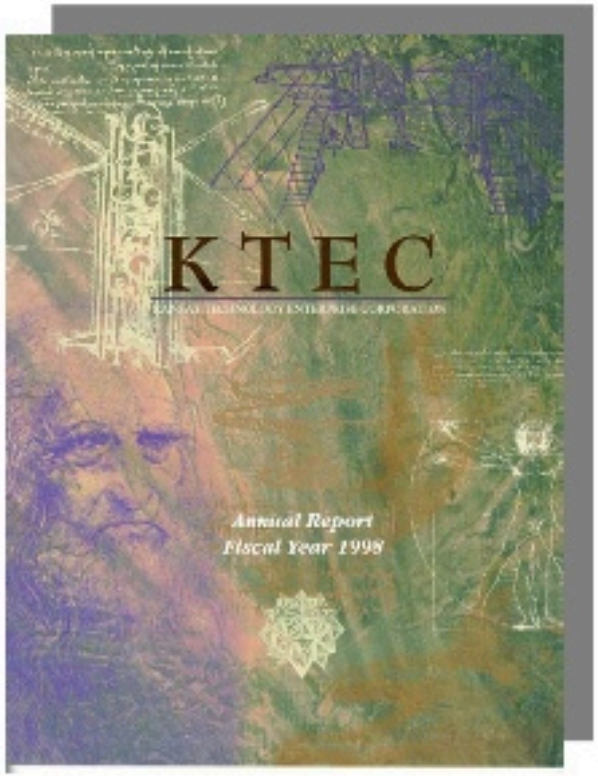
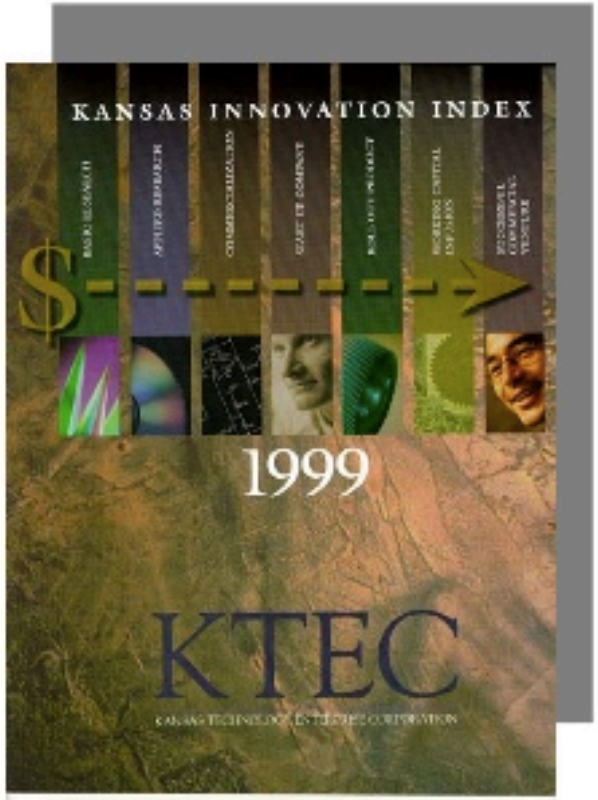
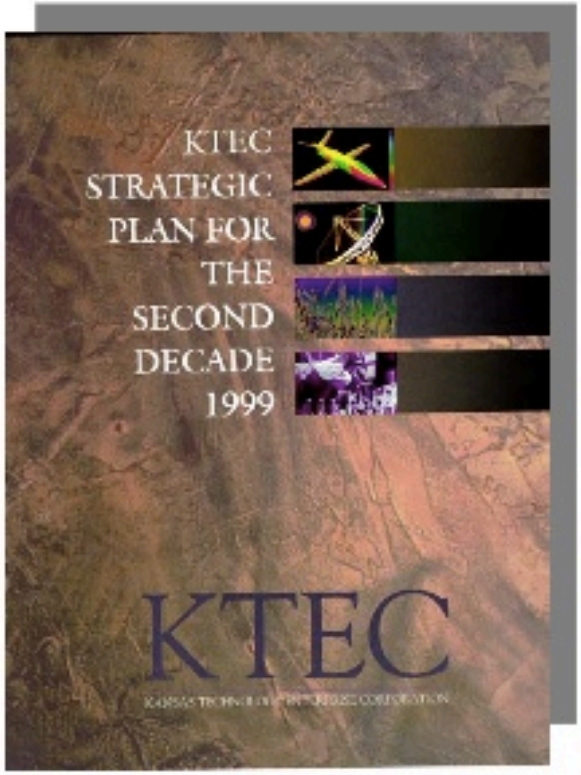
Past, Present and Future of Kansas Science and Technology

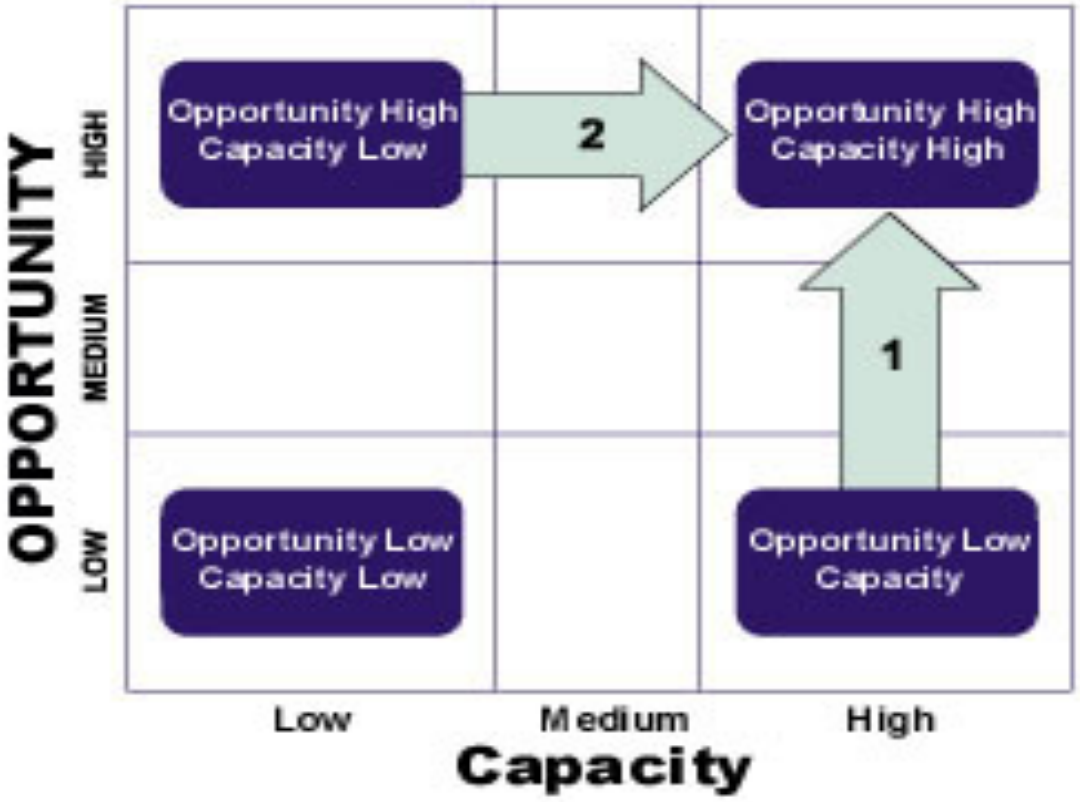






Linking Opportunity With Capacity

- Standardized rating system
- Determine level of capacity and opportunity for critical technologies



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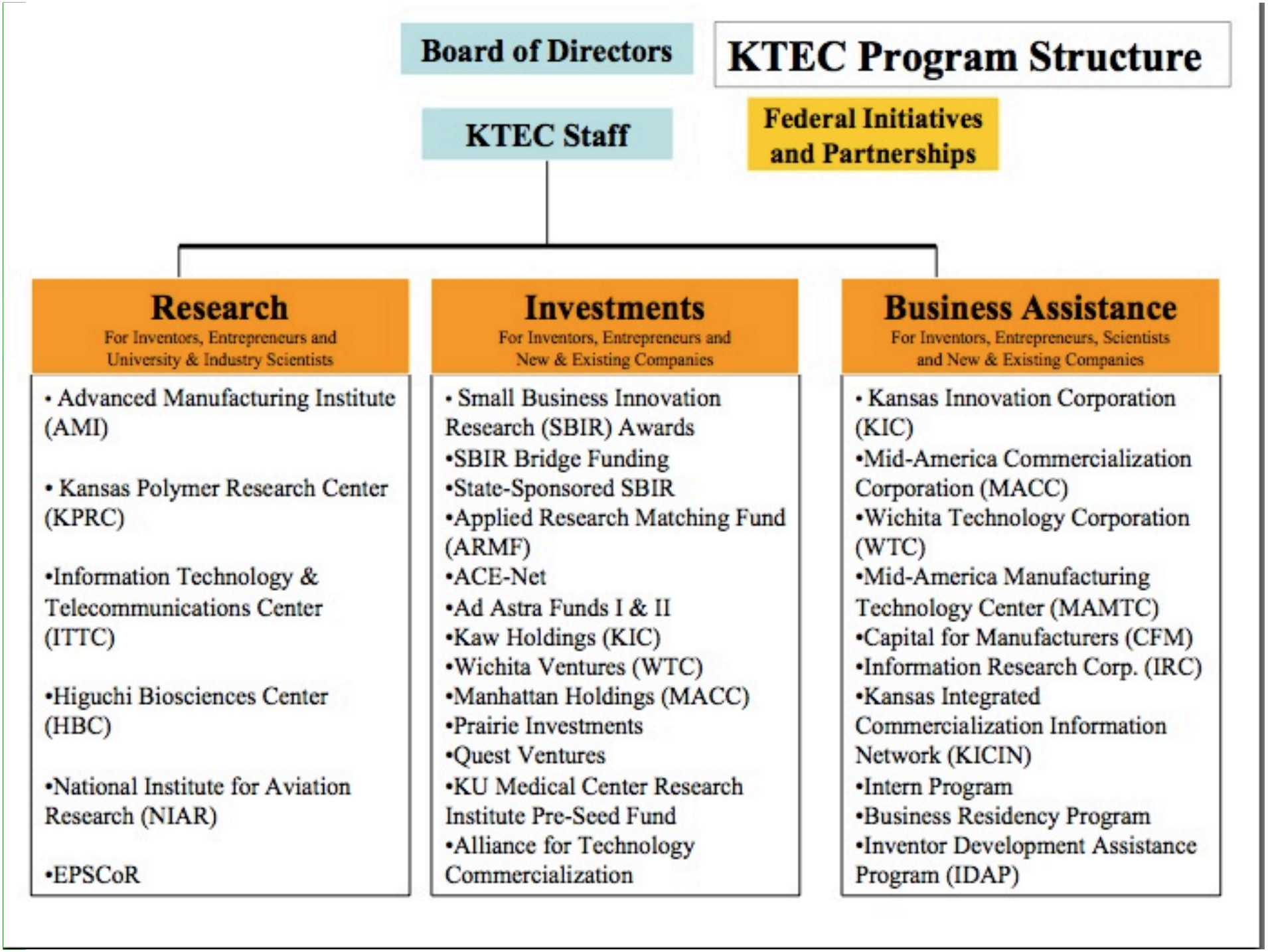
Board of Directors
KTEC Program Structure
KTEC Staff
Federal Initiatives and Partnerships
Research
For Inventors, Entrepreneurs and University & Industry Scientists
• Advanced Manufacturing Institute (AMI)
• Kansas Polymer Research Center (KPRC)
•Information Technology & Telecommunications Center (ITTC)
•Higuchi Biosciences Center (HBC)
•National Institute for Aviation Research (NIAR)
•EPSCoR
Investments
For Inventors, Entrepreneurs and New & Existing Companies
• Small Business Innovation Research (SBIR) Awards
•SBIR Bridge Funding
•State-Sponsored SBIR
•Applied Research Matching Fund (ARMF)
•ACE-Net
•Ad Astra Funds I & II
•Kaw Holdings (KIC)
•Wichita Ventures (WTC)
•Manhattan Holdings (MACC)
•Prairie Investments
•Quest Ventures
•KU Medical Center Research Institute Pre-Seed Fund
•Alliance for Technology Commercialization
Business Assistance
For Inventors, Entrepreneurs, Scientists and New & Existing Companies
• Kansas Innovation Corporation (KIC)
•Mid-America Commercialization Corporation (MACC)
•Wichita Technology Corporation (WTC)
•Mid-America Manufacturing Technology Center (MAMTC)
•Capital for Manufacturers (CFM)
•Information Research Corp. (IRC)
•Kansas Integrated Commercialization Information Network (KICIN)
•Intern Program
•Business Residency Program
•Inventor Development Assistance Program (IDAP)

The Kansas Experience - 2010

CLUSTER	ORGANIZATION	OUTCOMES
Human BioSciences	**Kansas BioScience Authority (KBA)** www.kansasbioauthority.org	•$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)** http://nabc.ksu.edu/content	•$650M Research Center •Focused on protecting America's agricultural infrastructure and economy from endemic and emerging biological threats.
Aviation	**National Institute for Aviation Research (NIAR)** www.niar.wichita.edu	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)** www.sitaks.com	Advocate for Kansas' software and information technology sector to help Kansas' software and IT companies grow and succeed.

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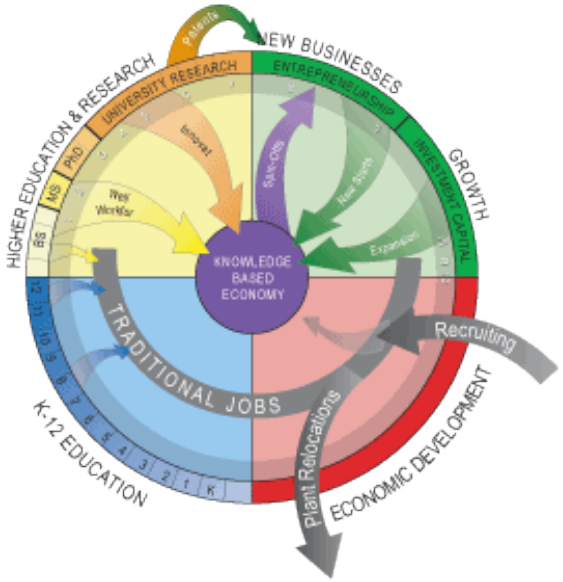
Kansas Bioscience Authority

- $581 million state-funded independent bioscience TBED organization
  - $75.5 million program budget; $3.5 million operating budget
  - 18 employees (8 “deal” people)

- Investment priorities
  - Expand the quantity and quality of bioscience research
  - Focus on the commercialization of bioscience discoveries
  - Foster formation and growth of bioscience companies
  - Position Kansas for international leadership in key clusters

KANSAS BIOSCIENCE AUTHORITY



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Pennsylvania's Sustainable Government Innovation

- Pennsylvania Governors Thornburgh and Ridge, as well as current Governor Ed Rendell, discuss the importance of committing to economic development through science, innovation & technology
- The governors focused on the effects that short-term decisions would have on long-term goals
- Three important ideas:
  - Think outside of the box
  - Measure your results and
  - Tell your story well.

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Pennsylvania's Industry Clusters

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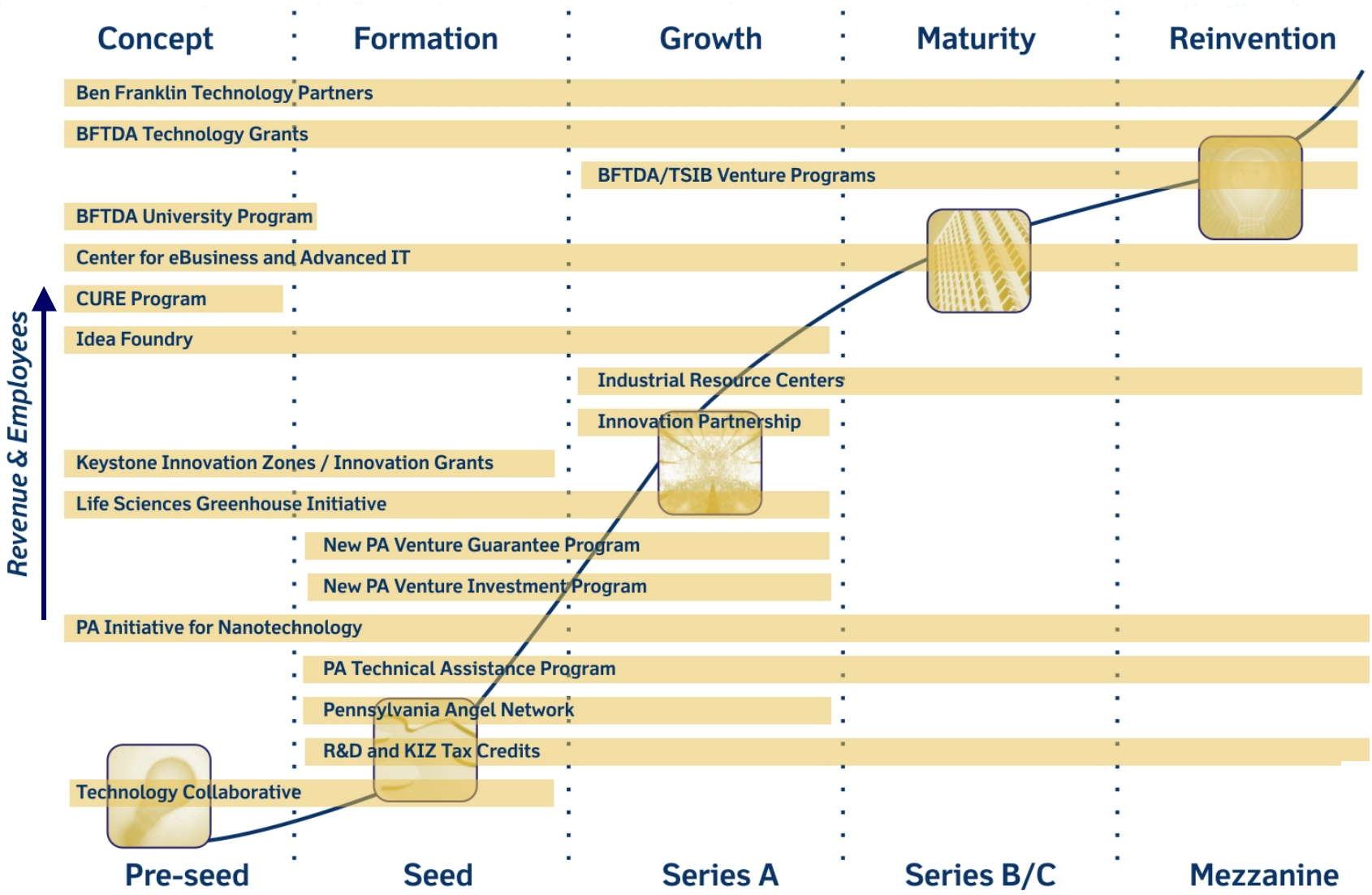
Technology Investment

Technology-based Economic Development Tools Along the Continuum

> ready > set > succeed



What Works for Effective Cluster Intermediaries

- **FOCUSED & INTEGRATED** Science & Technology Collaboration
- **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 **INDUSTRY CLUSTER** needs
- **SUSTAINABLE** Funding

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Regional Innovation Clusters and Cluster Initiatives Defined

- **Regional innovation (or industry) clusters are geographic concentrations of interconnected businesses, suppliers, service providers, coordinating intermediaries, and associated institutions like universities or community colleges in a particular field (e.g., information technology in Seattle, aircraft in Wichita, and advanced materials in Northeast Ohio).**

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Regional Innovation Clusters Initiative (RICs)

RICs are a geographically-bounded, active network of similar, synergistic or complementary organizations which leverage their region's unique competitive strengths to create jobs and broader prosperity.



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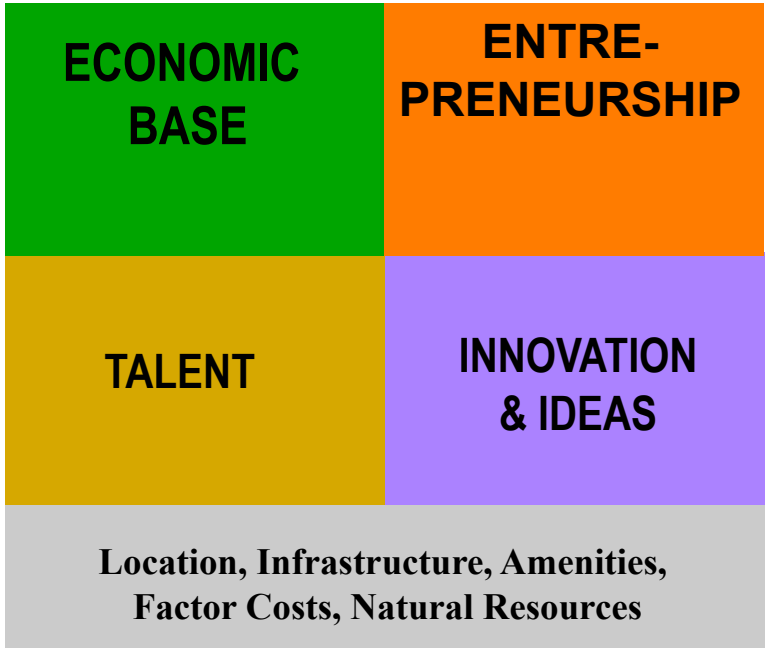
Regional Innovation Clusters

Five Key Components to Consider When Defining Unique Regional Assets

What you make, including your existing & prospective industry clusters

What you do: your workforce skills & human capital base



Your capacity to create companies wholly new or from existing firms

Your capacity to innovate and generate new ideas

The basic conditions defining the economic milieu of the region

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Energy Regional Innovation Cluster (E-RIC)

- $129.7 million over five years to create an Energy Innovation Hub
- Focused on developing new technologies to improve the design of energy-efficient building systems.
- Regional research centers will develop new building efficiency technologies and work with local partners to implement the technologies in area buildings.

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Best Practices in RIC Management

- **Regionally-Led** from existing networks & assets – bottom-up approach
- **Involve partnerships between private and public** at all levels (i.e. local, regional, state, and Federal)
- Unique **strengths of region are built upon** rather than trying to copy other regions (i.e. everyone can't support a biotech cluster)
- **Different strategies are developed for different clusters**
- Well-funded initially and **self-sustaining over the long-term**
- **Linked with relevant external efforts**, including regional economic development partnerships and cluster initiatives in other locations

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SBA 2010 Awards To 10 Regional 'Innovative Economies' Clusters

- Agriculture Innovation Cluster - (Monterey – Santa Cruz – San Benito, Calif.) Carolinas' Nuclear Cluster (N.C., S.C.)
- Connecticut Hydrogen-Fuel Cell Coalition (Conn., N.Y., Mass., Maine, Vt., N.H., R.I.)
- Enterprise for Innovative Geospatial Solutions (Miss., La.)
- Illinois Smart Grid Regional Innovation Cluster (Ill.)
- NorTech (Ohio) NorTech technology-based economic development in 21 counties of Northeast Ohio.
- Upper Michigan Green Aviation Coalition (UMi-GAC) (Mich.)
- Defense Alliance of Minnesota (Minn., N.D., S.D., Wis.)
- San Diego Advanced Defense Cluster (San Diego, Calif.)
- Von Braun Center for Science and Innovation (Huntsville, Ala.)

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SBA U.S. Small Business Administration

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Helping Regions Advance Their Leadership Capacity

- Regional leadership, like regional growth strategy, is not a one size fits all proposition.
- The “new normal” for effective regional leadership starts with a combination of business and business association leaders and regional economic developers.
- “Don’t just stand there, do something, any- thing!”
- Effective regional leadership requires an ongoing intermediary organization to keep regionalism alive.
- Regions need identities and a story to tell.
- Regional leaders and regional leadership are both made and born
- Worry less about defining a region and more about enabling it.
- It is possible to turn a competitive disadvantage into a collaborative advantage

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The New Tasks of National Leaders

1. Be Proactive
2. Begin with the End in Mind
3. Seek First to Understand, then to Be Understood
4. Put First Things First
5. Think Win-Win, Be Inclusive
6. Synergize
7. FOCUS



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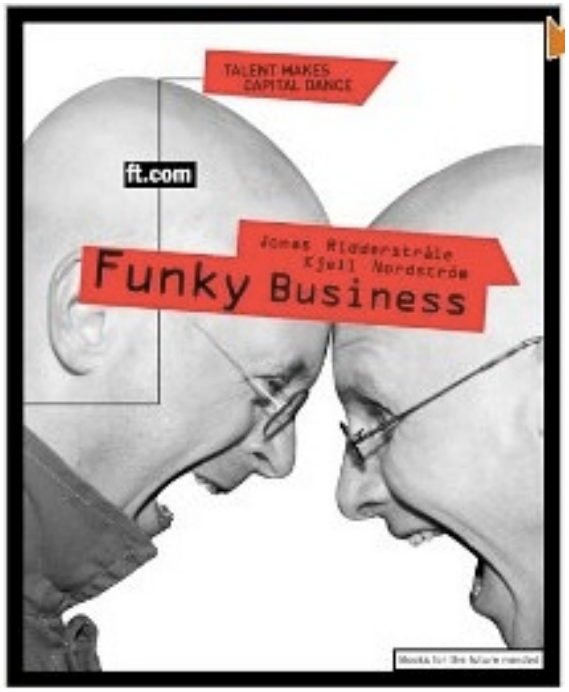
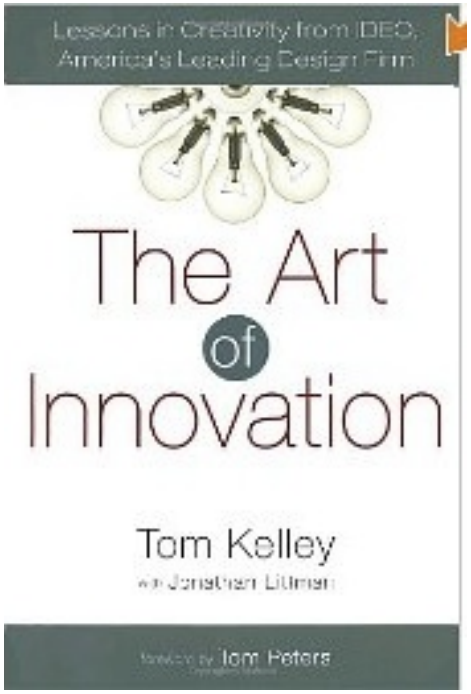
Innovation!! Innovation!! Innovation!!





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Read My Mind

10 Profound Innovations Ahead

The new mind-reading device shows letters on a screen that flash one at a time. When the user thinks of a letter, and then that letter finally flashes, brain waves send a signal to the computer that it recognizes as, "Hey, choose that letter." It is slow, but it works for crafting short messages such as tweets for Twitter. Credit: UW-Madison

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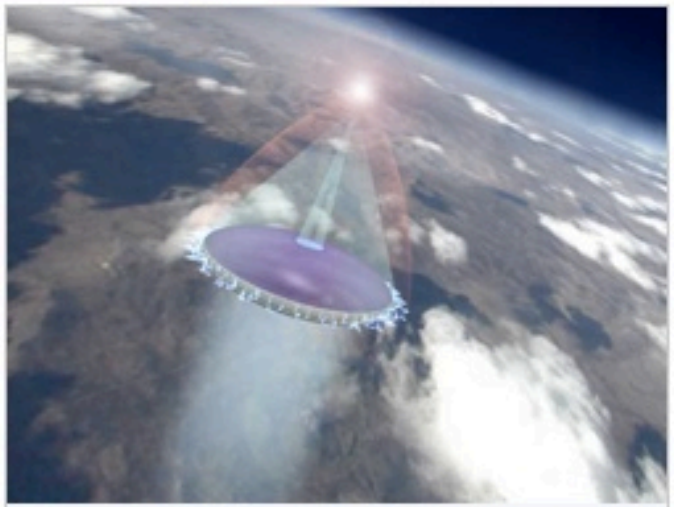
Read My Mind

True mind-reading devices remain in the realm of science fiction, and lie detectors rely on indirect cues to catch fibbers. Still, brain scans have allowed neuroscientists to predict what people will do during specific task experiments, and even to observe when a person will make a mistake up to half a minute beforehand. Another technique has used near-infrared light to figure out simple preferences based on brain activity. These feats rely on analyzing brain patterns that occur during specific actions, rather than truly cracking the brain's neural code, but they still have scientists and legal experts debating mind-privacy issues. Perhaps in the near future, they'll just use Twitter for a meeting of minds.

Around The World In 90 Minutes

10 Profound Innovations Ahead



Artist's concept of Lightcraft in hypersonic mode.
Credit: Media Fusion; Courtesy of NASA

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Around the World in 90 Minutes

Phileas Fogg took 80 days to go around the world, but travelers may eventually hop halfway around the globe in less than an hour. The U.S. Air Force and Brazil are developing a Lightcraft concept that could someday ride laser-produced explosions into the sky, and deliver passengers or cargo around the world. Barring that wild ride, space planes that could take off and land like regular aircraft have begun undergoing serious development in the U.K. and United States, and some could fly within the next few years.

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A Perfect Artificial Limb

10 Profound Innovations Ahead

U.S. Army Sgt. Juan Arredondo, outfitted with an i-LIMB after losing his hand in Iraq, says it does things naturally. The i-LIMB has flexible hydraulic drives located directly in the movable finger joints. Credit: Touch Bionics

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A Perfect Artificial Limb

U.S. veterans and other prosthetic users may soon wield artificial hands, arms and legs as easily as they control their natural limbs. The most advanced prostheses tend to use "smart" microprocessors that act as tiny brains to anticipate how a user will walk or move an arm. But both monkeys and humans have already used brain signals alone to control robotic arms and digital applications, which paves the way for new brain interfaces with artificial limbs. Such technology could then retrofit the latest prostheses to give users ultimate control over that "Luke" Skywalker arm.

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Know It All

10 Profound Innovations Ahead

SixthSense is a wearable gestural interface that augments the physical world with digital information and lets people use natural hand gestures to interact with that information. Here Sixth Sense projects web video onto a prototype newspaper. Credit: MIT Media Lab

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10 9 8 7 6 5 4 3 2 1

Know It All

People could eventually hold a hitchhiker's guide to everything that they see. Pick up a carton of OJ in the supermarket, and nutritional comparisons about that brand would appear. Flip through a new bestseller in the bookstore, and reader reviews might flash on the pages. MIT has already unveiled a prototype of such a technology in 2009, which combines a webcam, a projector and a smart phone to link the Internet's vast array of information with the real world. Such wearable devices would work together with embedded "smart" systems and tags to create an augmented reality, where staring at a street might bring up GPS coordinates and a local map. In the 21st century, information reigns supreme.

Regenerate The Body

10 Profound Innovations Ahead

The carbon-14 imprint left on cells from nuclear testing in the 1950s revealed the regenerative capacity of heart cells. Credit: Matthias Karlen

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Regenerate the Body

No one has regenerative powers just yet, but patients can expect a growing array of therapies to repair or entirely replace organs in the human body. A British team grew the world's first artificial liver from umbilical cord stem cells in 2006, and other researchers have since found that even the heart may harbor stem cells capable of regenerating the organ. Adult stem cells have also helped restore eyesight using a patient's own healthy eye stem cells in an Australian study, and Chinese scientists demonstrated the potential of adult stem cells by creating live mice from reprogrammed skin cells. The future of individually-tailored organs and therapies may soon arrive.

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Feed The World

10 Profound Innovations Ahead

Researchers tend to a test batch of heat-tolerant corn developed by University of Florida plant molecular biology researcher L. Curtis Hannah. Credit: University of Florida Institute of Food and Agricultural Sciences

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Feed the World

Solving world hunger represents an incredibly difficult task, given that the political situations and economics of each region bring their own complications. Nonetheless, scientists have moved to protect the important crops that feed most of the world. Researchers continue to develop different varieties of wheat, corn and rice that have greater yields and are more resistant to temperature changes, drought conditions and even insects. New information technologies can keep farmers updated on the condition of their crops and agricultural practices which preserve nutrient-rich soil in the long run. Even lab grown meat could help satiate the growing worldwide demand, if people can get over the ick factor. And if all else fails, scientists have stored thousands of seeds in a doomsday vault to safeguard the future of food.

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Eliminate Waste

10 Profound Innovations Ahead

New biodegradable plastics could be tossed into the ocean without harming the environment.

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Eliminate Waste

New technologies look to turn all our trash into reusable materials. Chicken feathers and other agricultural castoffs could become the future of plastics. Biodegradable plastics that dissolve harmlessly in seawater might actually encourage people to throw their garbage into the ocean. Food scraps, sewage and other waste has already begun to fuel some power plants and generators for the U.S. Army and civilians alike. Achieving 100 percent sustainability may still sound daunting, but the efforts do add up. MIT researchers have even begun a Trash Track project to gauge the costs and patterns of waste disposal in New York, Seattle and London, in hopes of helping more people think green.

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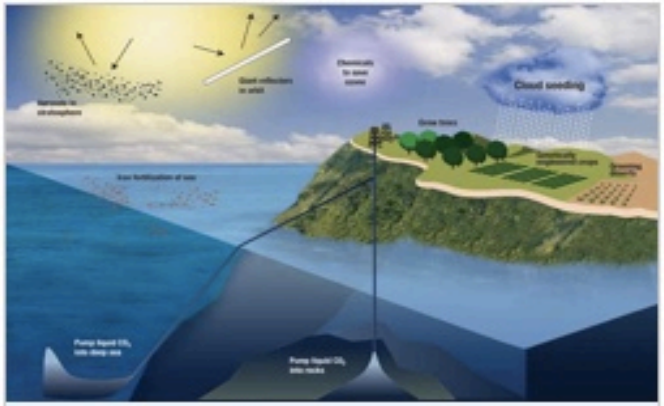
Global Climate Control

10 Profound Innovations Ahead



Researchers at Lawrence Livermore National Laboratory have drawn up a schematic representation of various geoengineering and carbon storage proposals.Credit: Kathleen Smith/LLNL

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Global Climate Control

Forget modest goals like trying to halt Mother Nature from raining on the Olympics. Geoengineering plans befitting Bond villains have become hot topics for the National Academy of Sciences, the American Meteorological Society and the White House science advisor. Ideas include lofting reflective particles up into the atmosphere to divert sunlight and cool the planet, or seeding the oceans with iron to encourage carbon-gobbling algae blooms. Even billionaire Bill Gates joined a patent filing on an idea to slow or stop hurricanes, by deploying a fleet of ships to churn the ocean and cool the warm surface water that fuels such storms. Climate control technologies have almost become reality, which raises the question of whether scientists and policymakers want to risk the side effects of such schemes.

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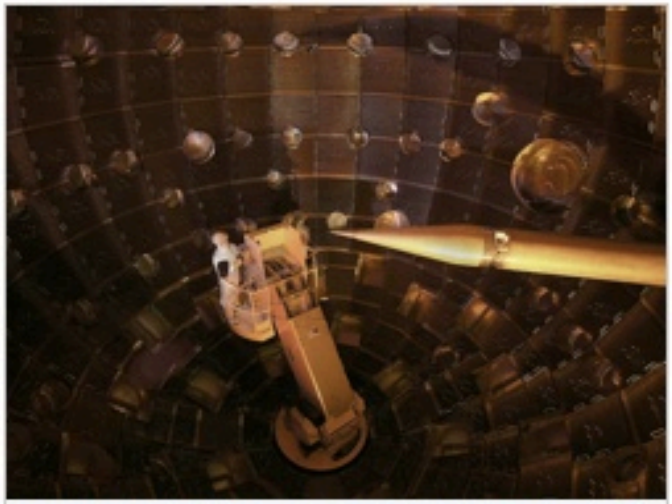
Harness The Sun's Fiery Furnace

10 Profound Innovations Ahead



The interior of the National Ignition Facility's target chamber, where researchers plan to use 192 giant lasers to ignite a pinpoint fusion reaction. Credit: LLNL/DOE

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Harness the Sun's Fiery Furnace

Nuclear fusion has kept the sun shining for billions of years. Now scientists want to recreate that power on Earth and finally tap into fusion's unbeatable energy efficiency. Giant lasers at the National Ignition Facility could help along that breakthrough by focusing their power on a tiny hydrogen fuel pellet, and ideally release more energy than what the lasers require. Still more alternatives involve the magnetic confinement of high-temperature plasma involved in fusion, or even a rebranded form of cold fusion. For now, LiveScience readers have already voted on their best bets for alternative energies.

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Hack The Brain

10 Profound Innovations Ahead

Scientists hope it is only a matter of time before the first artificial brain arrives. Credit: dreamstime.

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Back to Introduction

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Hack the Brain

Much of the human brain remains a mystery embedded in billions of neurons. Now researchers behind the Blue Brain Project have announced plans to create a functioning, artificial human brain within the next decade. They have already modeled part of an artificial rat brain using the IBM supercomputer Blue Gene, and said that the simulated brain cells have even begun self-organizing without human intervention. Success in reverse-engineering the brain could lead to a model for biomedical testing, as well as a better understanding of human consciousness. The researchers only caution that it's no artificial intelligence ... at least, not yet.

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Global Industry Key Locations Redrawn By 2040

Key industry cluster findings:

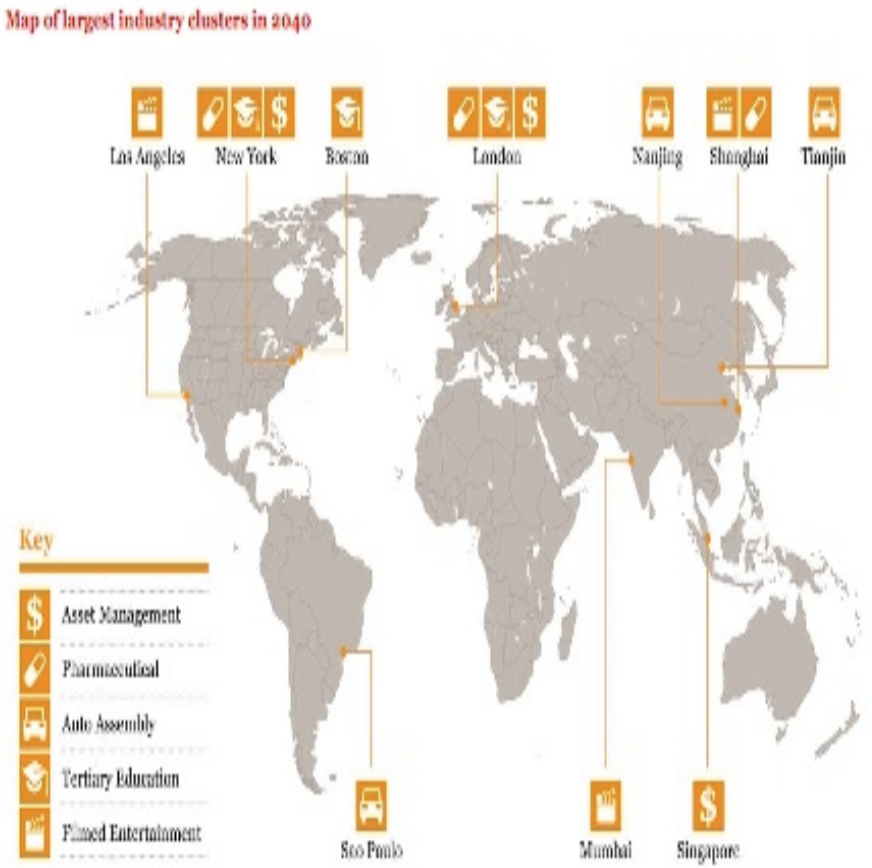
•***Asset Management*** **–** Singapore New York, London and Boston. The availability of public & private capital & increased regulation in US and Europe is driving Asian growth.

•***Automotive Assembly*** –Tianjin, Nanjing and Sao Paulo

•***Filmed Entertainment*** – Mumbai and Shanghai vie for dominance in Asia and Los Angeles remains dominant. Both Asian cities will have large entertainment centers as they move increasingly into mainstream productions.

•***Pharmaceuticals*** – New York and London---- Shanghai is expected to grow in importance helped by affluence and an ageing population

•***Tertiary Education*** – New York, London and Boston.



Source: PWCP 'Future Industry Clusters' September, 2010

14 Ways to Spark Innovation

- ★ FOLLOW YOUR FASCINATION
- ★ IMMERSE
- ★ TOLERATE AMBIGUITY
- ★ MAKE NEW CONNECTIONS
- ★ FANTASIZE
- ★ DEFINE THE RIGHT CHALLENGE
- ★ LISTEN TO YOUR SUBCONSCIOUS
- ★ TAKE A BREAK
- ★ NOTICE AND CHALLENGE PATTERNS AND TRENDS
- ★ TAKE A BREAK
- ★ NOTICE AND CHALLENGE PATTERNS AND TRENDS
- ★ HANG OUT WITH A DIVERSE GROUP OF PEOPLE
- ★ BRAINSTORM
- ★ LOOK FOR HAPPY ACCIDENTS
- ★ USE CREATIVE THINKING TECHNIQUES
- ★ SUSPEND LOGIC

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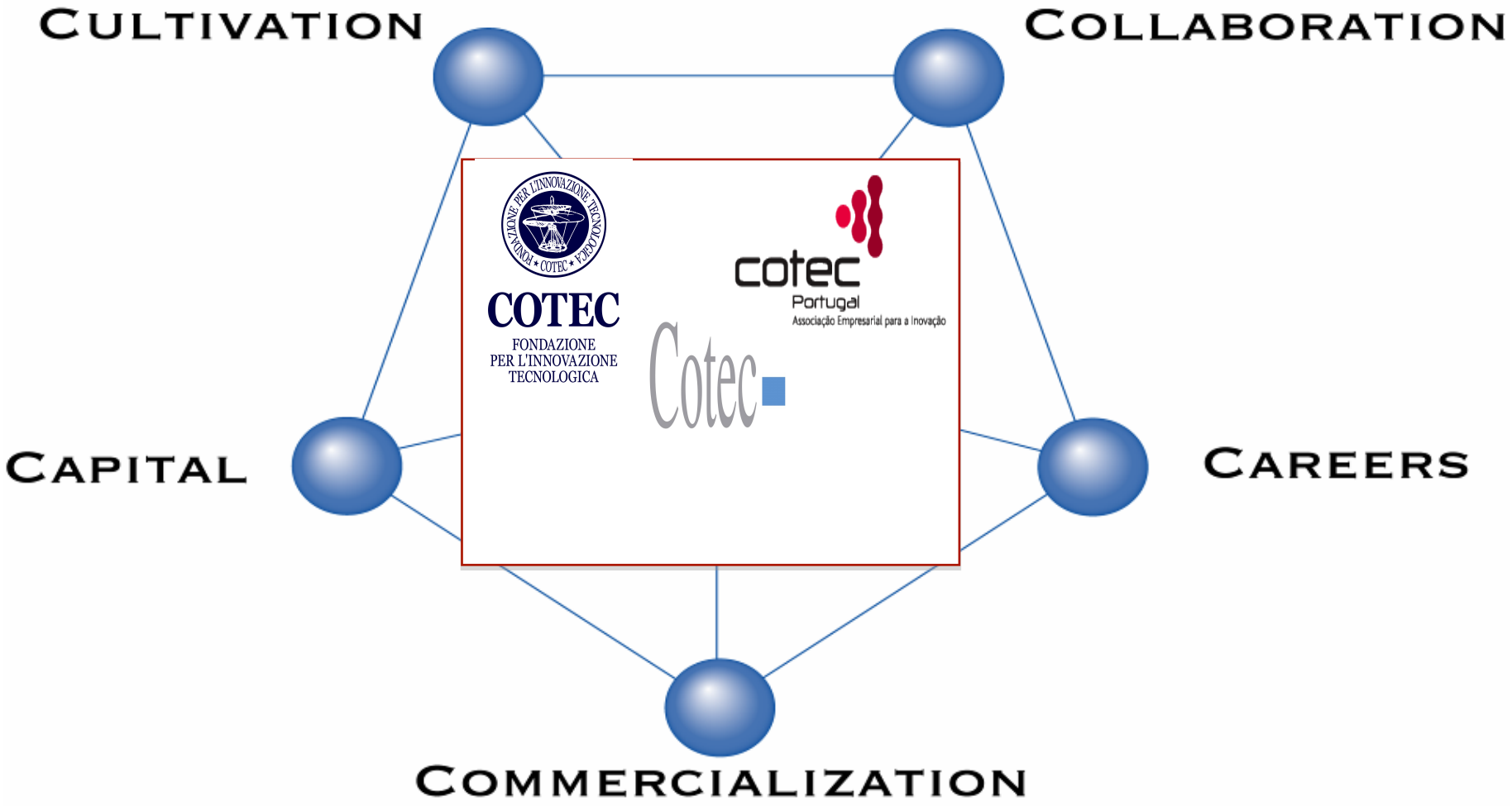
Innovation Paradigm



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THE BEST WAY TO PREDICT THE FUTURE IS TO CREATE IT

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Call To Action

"The world is more malleable than you think and it's waiting for you to hammer it into shape."

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Thank You

Obrigado!

Grazie!

Gracias!

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