Strategic T2 —Engaging the External Ecosystem

Orlando, FL

April 23, 2019

Instructor: Jenna Dix

Acting ORTA/T2 Program Manager at Naval Surface Warfare Center, Crane Division, FLC Midwest Deputy Regional Coordinator

jenna.dix@navy.mil
812.854.5049

- Four years experience executing and administering T2 agreements and providing support in NSWC Crane's Office of Research & Technology Applications

Instructor: John Dement

FLC Chair

NSWC Crane Division

John.dement@navy.mil
812-617-0617

- Over 12 years managing T2 at NSWC Crane and State government
- Lab ORTA for 8 years negotiating over 140 transactions
- IPA with State as T2 Subject Matter Expert
- Science Advisor to Fleet Maintenance Officer (Pearl Harbor, Hawaii)
- Systems Engineer at Headquarters (Washington DC)
- Structural Engineer on F-15E with McDonnell Douglas

Instructor: Dr. Lee Cheatham

Director of Technology Development and Outreach,
U.S. Department of Energy's Pacific Northwest National Laboratory

Lee.Cheatham@pnnl.gov
509.375.6597
pnnl.gov/business

Previously:

- Executive Director of the Washington Technology Center
- Founder and Director of Brookhaven National Laboratory's Office of Strategic Partnerships
- PNNL researcher and manager
- COO and GM of Commercialization at Arizona State University's Biodesign Institute

PNNL-SA-132909

Agenda

8:30-9:00 AM	Introduction
9:00-10:30 AM	Setting the Context
10:30-10:45 AM	Break
10:45-11:15 AM	What Does Your Lab Value?
11:15-11:50 AM	The View From the Outside
11:50-Noon	Common/Connected Values
Noon-1:00 PM	Lunch
1:00-1:20 PM	Engaging With Non-feds
1:20-2:30 PM	EXERCISE: Visioning the Future
2:30-2:45 PM	Break
2:45-4:00 PM	EXERCISE: Refining Your Map
4:15 PM	Wrap-up

Why Engage Your Ecosystem?

Class Overview

- Where we are today – setting the context
- Where things appear to be heading
- Thinking about the value proposition
- Vision casting your lab and its ecosystem

Introductions

- Name
- Organization
- Role and how long have you been in it
- Your pre-assessment of your lab & the ecosystem's maturity for collaboration
- What you hope to get from class
- Answer one of the pre-class question

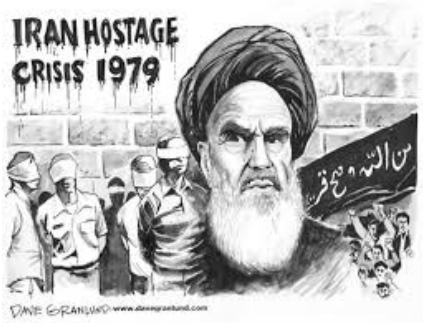
Table Talk: Pre-class Questions

1. What is the most prominent obstacle or challenge for the lab to interact with their local ecosystem?
2. What do you think the local ecosystem's perception is of the lab?
3. What expectations does the lab's leadership have for T2 operations with regard to the local economy?
4. How does the lab measure successful engagement with the local innovation support community?

Where We Are Today
(Fed T2 perspective)

Renaissance or Dark Ages?

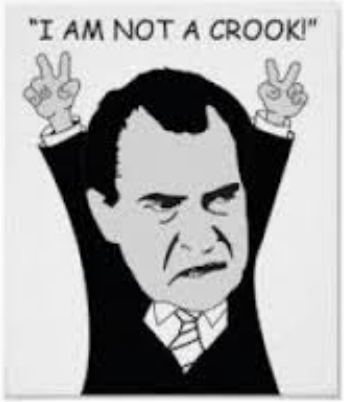
1970s - Upheaval

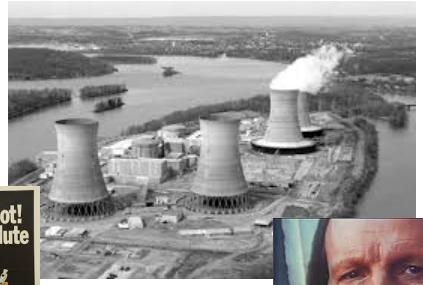


Equal Rights ERA Amendment

MICRO SOFT

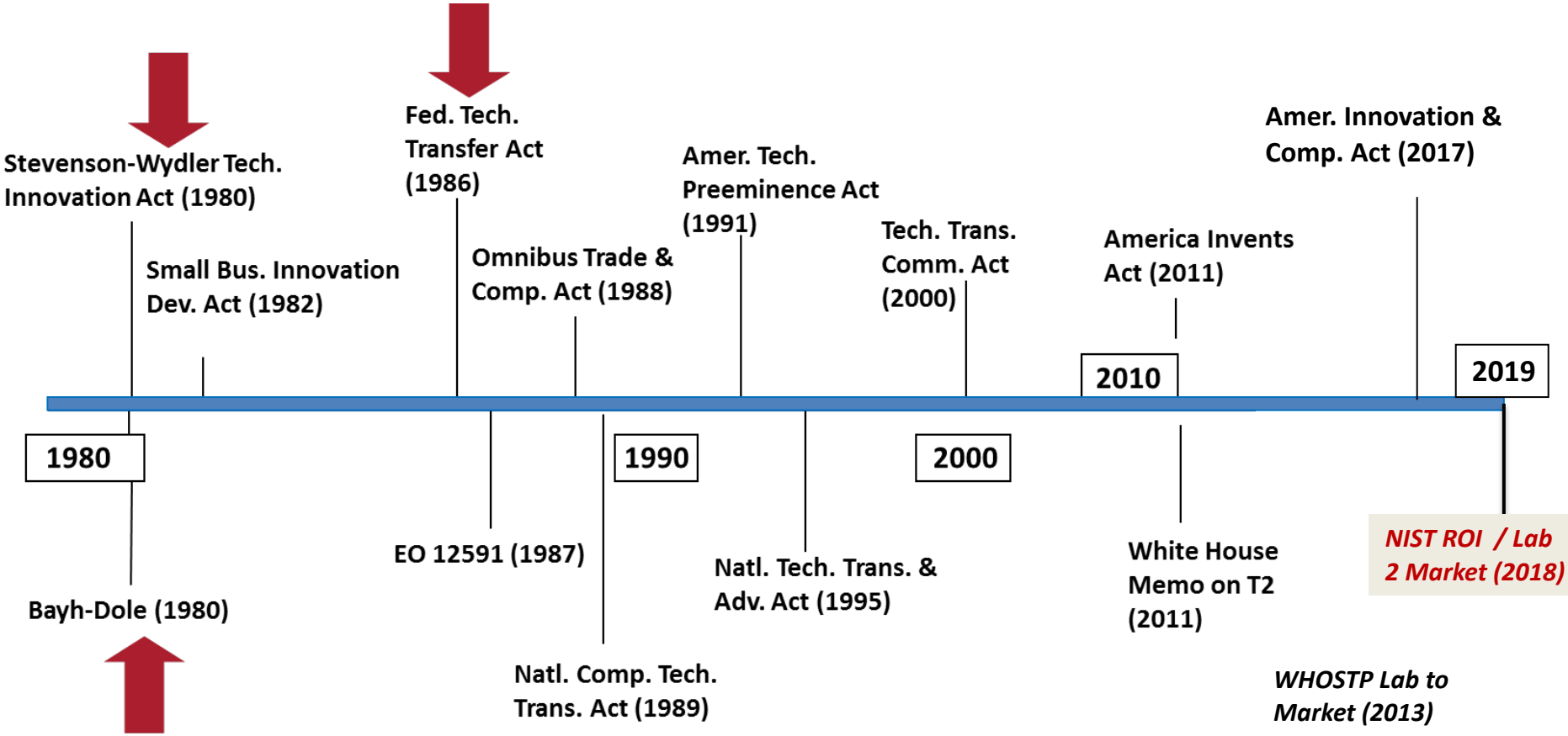
Apple Computer





Social - Economical - Political - Technological - Environmental

Legislative History



Legislative History

What was and is the overarching purpose of these legislations?

Agree or Disagree?

We have all the legislative authority we need.

Class Overview

- Where we are today – setting the context
- Where things appear to be heading
- Thinking about the value proposition
- Vision-casting your lab and its ecosystem

Introductions

- Name
- Organization
- Role and how long have you been in it
- Your pre-assessment of your lab & the ecosystem's maturity for collaboration
- What you hope to get from class
- Answer one of the pre-class questions

Table Talk: Pre-class Questions

1. What is the most prominent obstacle or challenge for the lab to interact with its local ecosystem?
2. What do you think the local ecosystem's perception is of the lab?
3. What expectations does the lab's leadership have for T2 operations with regard to the local economy?
4. How does the lab measure successful engagement with the local innovation support community?

Legislative History

What was and is the overarching purpose of these legislations?

Goal Overview

The Challenge

- The Federal Government invests approximately $150 billion annually[1] in research and development (R&D) conducted at Federal laboratories, universities, and other research organizations.
- For America to maintain its position as the global leader in innovation, bringing products to market more quickly, growing the economy, and maintaining a strong national security innovation base, it is essential to optimize technology transfer and support programs to increase the return on investment (ROI) from federally funded R&D.

The Goal

- Improve the transition of federally funded innovations from the laboratory to the marketplace by reducing the administrative and regulatory burdens for technology transfer and increasing private sector investment in later-stage R&D;
- Develop and implement more effective partnering models and technology transfer mechanisms for Federal agencies; and
- Enhance the effectiveness of technology transfer by improving the methods for evaluating the ROI and economic and national security impacts of federally funded R&D, and using that information to focus efforts on approaches proven to work.

The Strategies

Identify regulatory impediments and administrative improvements in Federal technology transfer policies and practices.

Increase engagement with private sector technology development experts and investors.

Build a more entrepreneurial R&D workforce.

Support innovative tools and services for technology transfer.

Improve understanding of global science and technology trends and benchmarks.

1: Analytical Perspectives, Budget of the United States Government, Fiscal Year 2019, ch. 18. https://www.gpo.gov/fdsys/pkg/BUDGET-2019-PER/pdf/BUDGET-2019-PER.pdf

Goal Leadership and Implementation

Walter Copan, Under Secretary of Commerce for Standards and Technology and Director, NIST

Michael Kratsios, Deputy Assistant to the President for Technology Policy, OSTP

Participating Agencies

U.S. Small Business Administration

Interagency Contributors[1]

- National Science and Technology Council Lab-to-Market Subcommittee
- Interagency Working Group for Technology Transfer
- Interagency Working Group for Bayh-Dole[2]
- Small Business Innovation Research (SBIR) Program Managers Working Group
- Interagency I-Corps Community of Practice
- Federal Laboratory Consortium for Technology Transfer

1: See https://www.nist.gov/tpo/lab-market for descriptions of participating working groups and strategy team focus areas
2: The Interagency Working Group for Bayh-Dole coordinates implementation of the Bayh-Dole Act; see 35 U.S.C. 200 and 37 C.F.R. 401 and 404.

FLC

Return on Investment (ROI) Initiative
Lab-To-Market Cross Agency Priority (CAP) Goal

PRESIDENT'S MANAGEMENT AGENDA

NIST National Institute of Standards and Technology U.S. Department of Commerce

Dr. Walter Copan, Director

"The technology transfer role that NIST plays on behalf of the Congress and all the federal complex was particularly important for me as someone who has been involved in the world of innovation and tech transfer over many years …"

"… look to expand the technology transfer reach of the NIST organization and indeed of the federal complex itself."

aip.org/fyi/2017/nist-director-nominee-discusses-his-vision-agency

Copan says he hopes to improve how small companies interact with government agencies to commercialize new technologies. "My personal priority is to find better ways [of] engaging with industry and finding partnerships." sciencemag.org/news/2017/09/cybersecurity-and-technology-transfer…

Big Picture of Federal T2

- White House and NIST Appointee – in FLUX
- Authorities – in place, open for more…
- Metrics – progressing, right measures?
- Story – value: qualifying, now quantifying
- People – improving, next level needed
- Intra- and Extra-mural innovation
- Thinking – progression of thought

Our Metrics

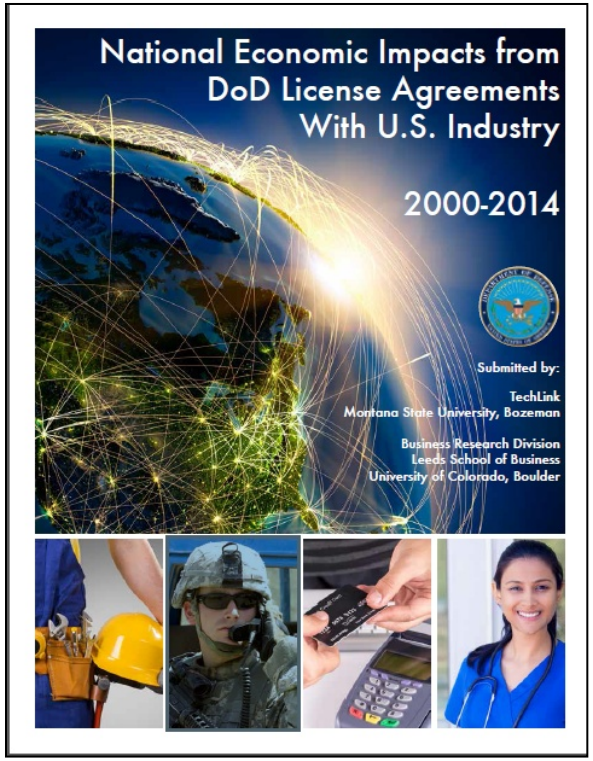
300+ Federal Labs

Quick Macro (2003-present) – order of magnitude:

- Patents issued ~ 20-30% increase, <2,000/yr
- CRADAs (new) ~ <50% increase, <3,500/yr
- Licenses (inventions, new) ~ *506/yr then 10% bump in 15*
- Royalties up ~ 35%, $202M in 2015
- Economic impact studies ~ big $Bs impact

Do we know what the "right" numbers should (could) be?
Seem right for 300+ labs and $128B in '15?

Our Story – Evolving…
Economic Impact of *Converting Federal Innovation into Jobs and Businesses*



The Why

- **TechLink study: 1,300+ DoD Licenses**
- **Results**
  - **Sales $27B new services &/or products**
  - **Economic activity $58.2B**
  - **Sales back to DoD $4.55B**
  - **Jobs 11,932 supported annually**
  - **Avg. salary $74.8k**
  - **$776M in outside investment capital**

http://techlinkcenter.org/articles/2016-report-economic-impact-dod-licensing-2000-2014

Progression of T2

- Focus: internal *to* include external (why?)
- Transactional: tactical *to* strategic
- Partnerships: PIAs *to* networks and institutes
- Marketing: push *to* mix of push/smart push/pull
- Ecosystem: huh? *to* developing strategies
- Miscellaneous: internal entrepreneurs, startups, use of social media, etc.
- Future…?: portfolio management, tech reuse, acquisition support …?

What Are We Most Missing?

- Common view on the purpose of fed T2 (??)
- Clear compelling story(ies)
- Right message told to the right people:
  - Lab director
  - Agency leadership
  - Congress
  - TBED community
  - Target markets

WHERE ARE WE TODAY?

(the rise of TBED)

Four Areas: The Traditional View

Policy with intent to increase prosperity

- Community Development
- Workforce Development
- Economic Development
- Science and Technology-based Development

Four Areas: The Traditional View

Policy with intent to increase prosperity

Community Development

Improve quality of life and well-being for people

- Housing, first response
- Medical access, childcare
- Arts, culture, open spaces
- Civic engagement
- Industrial redevelopment

Four Areas: The Traditional View

Policy with intent to increase prosperity

Workforce Development

Improve lives through education and training

- Pre-K, K-12 education
- Universities and colleges
- Vocational, technical training
- Certification, continuing education
- Non-English language support

Four Areas: The Traditional View

Policy with intent to increase prosperity

Economic Development

Create jobs to reduce need for public services;

Generate wealth that finances public goods

- Digital connectivity
- S&T, knowledge resource
- Productivity & cluster focus
- Commercialization
- Entrepreneurs, innovators
- Investors and financing

Four Areas: The Traditional View

Policy with intent to increase prosperity

Science and Technology-based Development

Capacity to improve the first three

- Innovation, research and entrepreneurship
- Recruitment, retention of companies
- Infrastructure investment
- Promote services, traded sectors
- Support exports, foreign direct investment

Updating Our View of Economic Impact

Today, our view is changing – in several areas:

economic, technological, cultural and resource availability

Community Development

Workforce Development

Economic Development

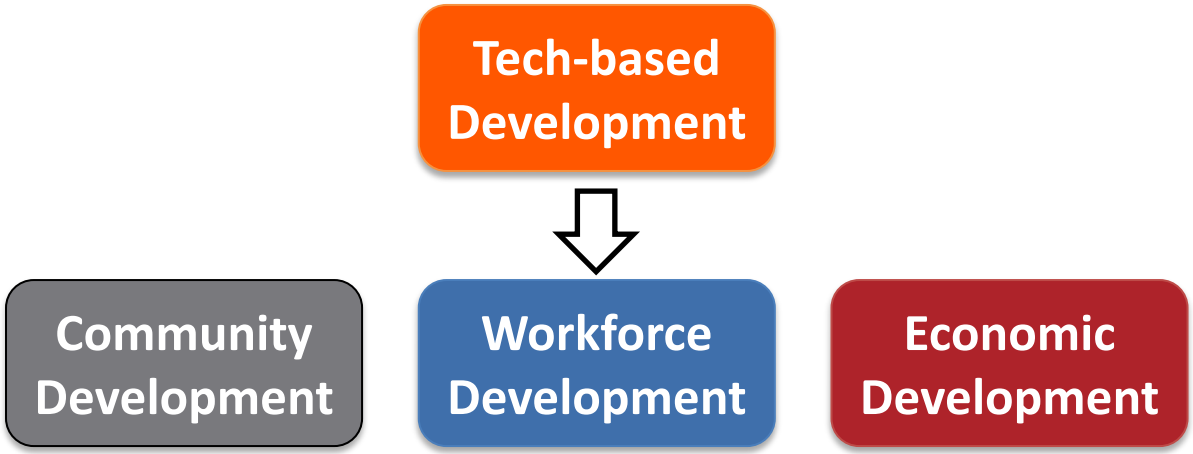
Tech-based Development

Updating Our View of Economic Impact

Today, our view is changing – in several areas:

economic, technological, cultural and resource availability

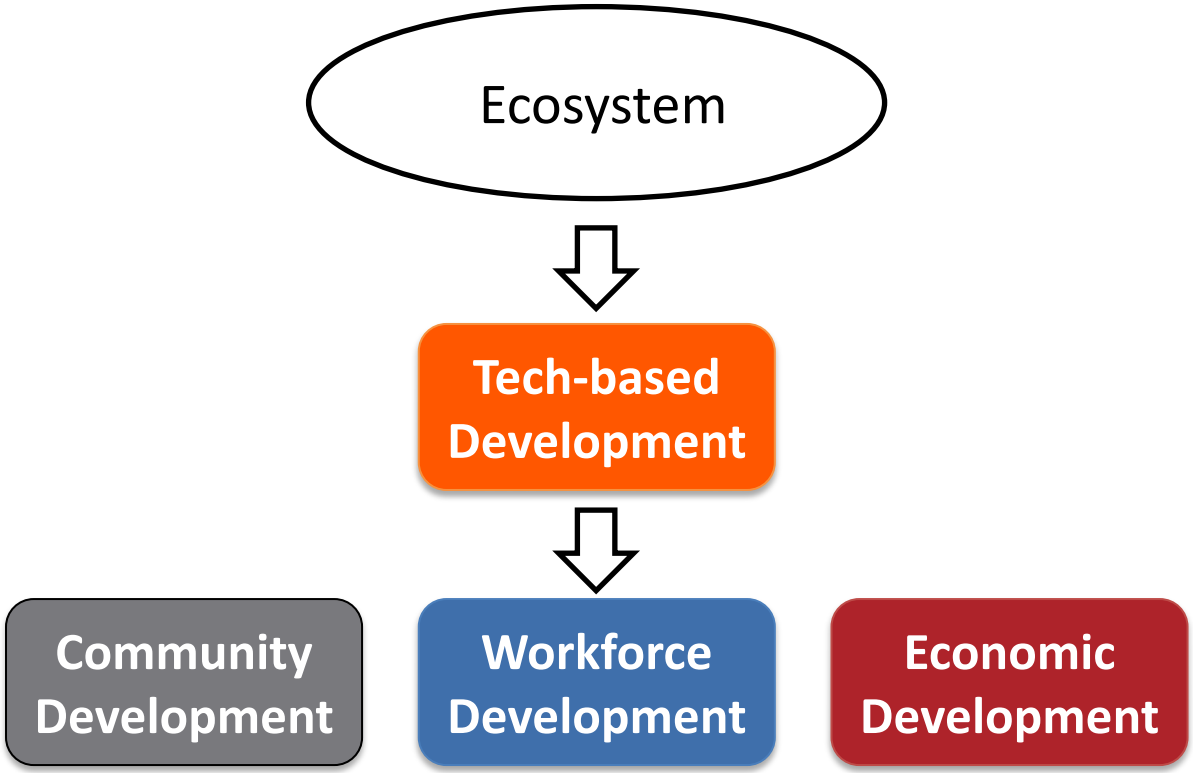
The TBED impacts must be fostered



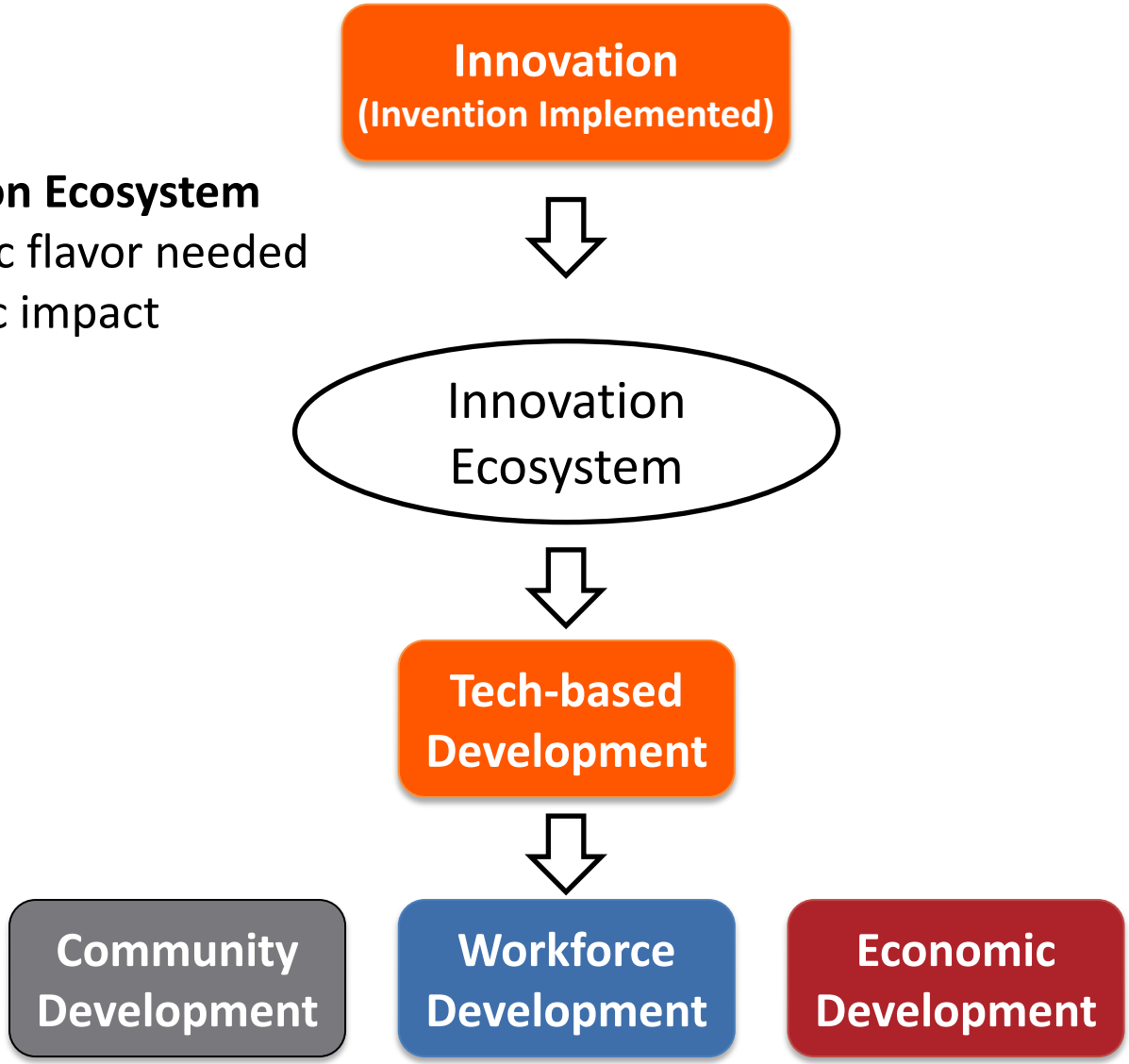
The "Ecosystem" Can Foster These Changes

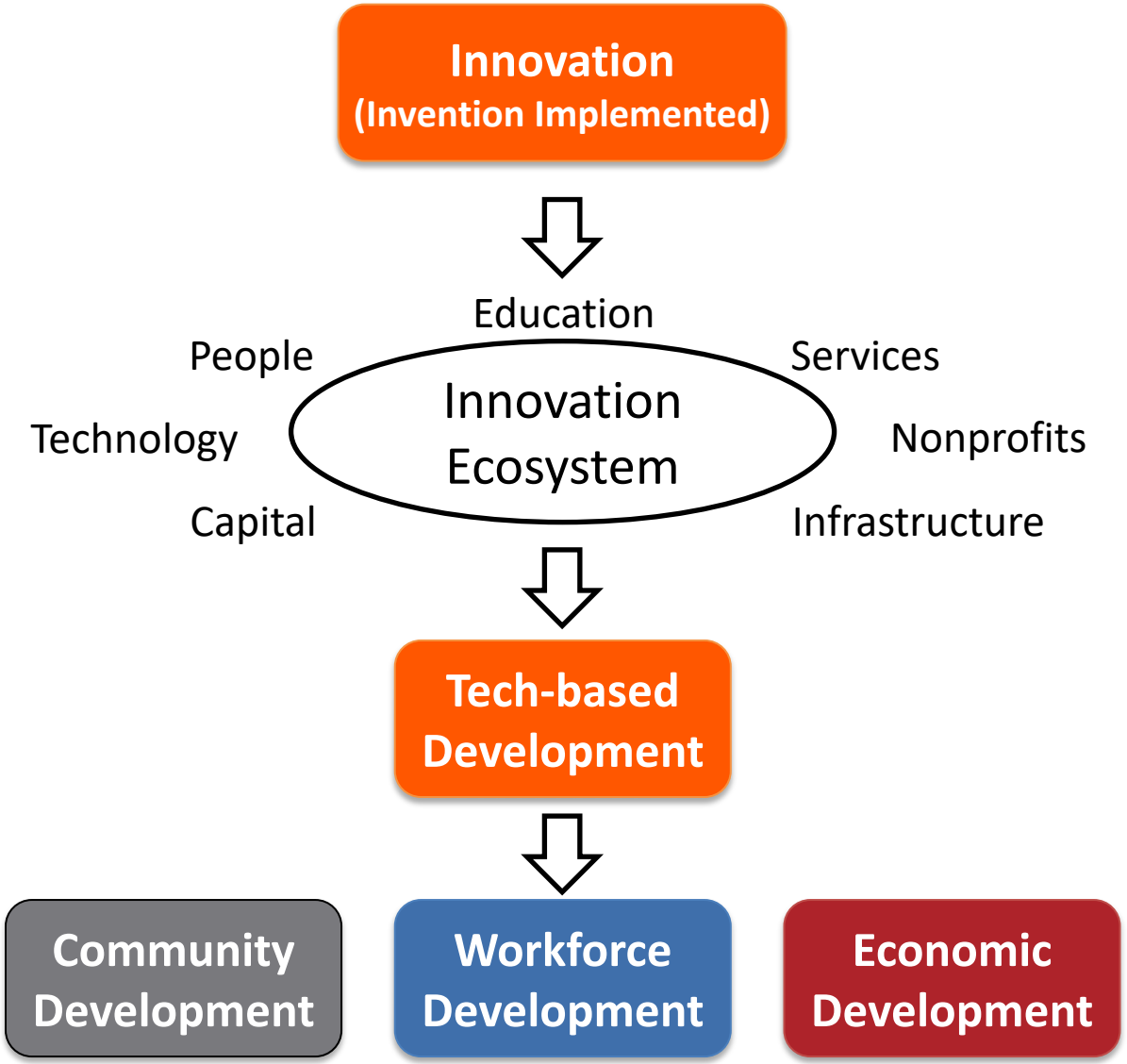
An ***ecosystem*** is a biological community of interacting organisms and their physical environment

We repurpose this definition of economic development



An **Innovation Ecosystem** is the specific flavor needed for economic impact




Innovation
(Invention Implemented)
Education
People
Services
Innovation Ecosystem
Technology
Nonprofits
Capital
Infrastructure
Tech-based Development
Community Development
Workforce Development
Economic Development

Entrepreneurship
(Drive to Try)

Innovation
(Invention Implemented)

Education

People

Services

Technology

Innovation Ecosystem

Nonprofits

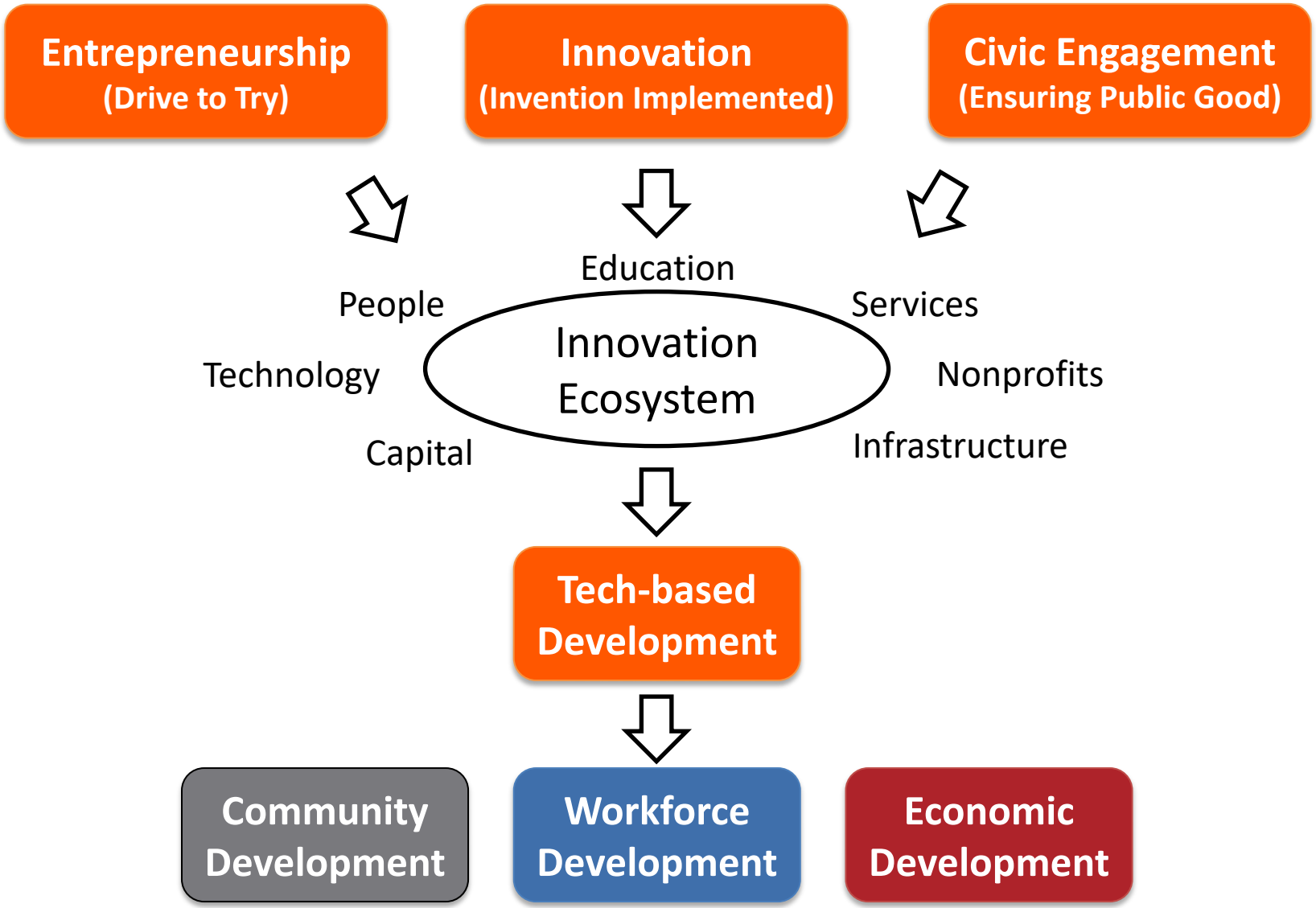
Capital

Infrastructure

Community Development

Workforce Development

Economic Development


Entrepreneurship
(Drive to Try)
Innovation
(Invention Implemented)
Civic Engagement
(Ensuring Public Good)
People
Technology
Capital
Education
Innovation Ecosystem
Services
Nonprofits
Infrastructure
Tech-based Development
Community Development
Workforce Development
Economic Development

Assets in Your Ecosystem

What is the Ecosystem's Scope?

States

- Governors and legislatures have diminished support
- Fewer investments result of changed priorities
- Research, higher education support is also reduced

Federal

- Recent policy changes to reduce the federal role
- Innovation investments are always uncertain

As a result, opportunities exist for **regions**

Are We Developing the Next Generation?

To ensure our global, economic competitiveness …

- Companies
  - Must continue to support current
    - Especially the mid-stage companies
  - Future depends on solid early-stage successes
- Scientists/engineers
- Entrepreneurs
- Business leaders
- Civic leaders

Table Talk Time

What stood out most to you in this morning's session?

Did anything in particular surprise you or maybe make you view differently?

What Does Your Lab Value?

- Generally?
- With respect to your agency or parent?
- With respect to the ecosystem (community)?
- Practical next steps…
  - What else would you like to know?
  - To whom else should you talk?
  - What documents should you understand?

“Tangible Solutions”

“Innovation” – 3Xs

“Through…Partnerships”

Pacific Northwest
NATIONAL LABORATORY

Proudly Operated by Battelle *Since 1965*

MISSION

We transform the world through courageous discovery and innovation.

VISION

*PNNL science and technology inspires and enables the world to live **prosperously**, **safely**, and **securely**.*

VALUES

*We value **Integrity**, **Creativity**, **Collaboration**, **Impact**, and **Courage**.*

BUSINESS DEFINITION

*We perform nationally important **research** and **development**.*

WE SUCCEED BY

Attracting and investing in exceptional people, enabling them to excel and create outstanding teams

• • • • •

Being stakeholder-centric, understanding and influencing our stakeholders and clients

• • • • •

Delivering trusted performance, consistently exceeding expectations, advancing science, and delivering innovative solutions

Pacific Northwest
NATIONAL LABORATORY

Proudly Operated by Battelle *Since 1965*

OUR VALUES

We demonstrate **Integrity** when we:

- *Practice intellectual honesty, personal responsibility for our actions, and transparency in real or potential conflicts of interest*
- *Employ a range of practices that characterize the responsible conduct of research*
- *Conduct business with uncompromising adherence to our principles*
- *Behave professionally, respectfully, honestly, safely, and sustainably*

We demonstrate **Creativity** when we:

- *Foster innovation and creative thinking to address our customers' most important objectives*
- *Encourage and reward informed risk-taking*
- *Treat failures as portals to discovery*
- *Push beyond established boundaries*

We demonstrate **Collaboration** when we:

- *Communicate and share resources, practicing collegiality in scientific interaction*
- *Harness the power of united and interdisciplinary teams to discover and solve the extraordinary*
- *Find and align the best and diverse talent to solve the problem, both in thought and experience*
- *Maintain an environment where all team members are heard and valued*

We demonstrate **Impact** when we:

- *Focus on delivering crucial outcomes for our customers and the nation*
- *Lead positive change in the world to make it safer, sustainable, and more prosperous*
- *Make and meet bold commitments with performance certainty*
- *Serve humanity, giving it discoveries that change the way we think about the world*

We demonstrate **Courage** when we:

- *Act as pioneers who overcome inertia in order to serve a greater purpose*
- *Strive to do what is right, even if it is not expedient or popular*
- *Adhere to our principles in the face of opposition*
- *Willingly acknowledge our mistakes and seek to learn from them*

General: My Lab "Values"

- Workforce and Leadership Development
- Technical Innovation and Excellence
- Ethos, Excellence, & Execution and the Values of Integrity, Honesty, Unity, Service, Empowerment, with a focus on providing Solutions
- Continuous Improvement in Business Processes
- Regional Embrace with Academia and Industry

(what do they measure?)

Source: Lab Director

Lab's View of What the Agency Values

Naval Sea Systems Command

- Design for Talented People
- Design for High-Velocity Learning Environment
- On-time Delivery of Ships and Subs
- Culture of Affordability
- Cybersecurity

(what do they measure?)

- **Collaboration across the enterprise**
- **Transition of technologies**

Source: NAVSEA's Campaign Plan to Expand the Advantage

Lab's View of What "We" Value FROM the Ecosystem

- Good community (quality of place) to attract and retain workforce
- Education for Workforce development
- Nurture and grow 'critical mass' outside of lab of companies (and workforce), services, etc., that are relevant to the lab's mission
- Advocacy!

Practical Steps Regarding Values

- What else would you like to know?
- To whom else should you talk?
- What documents should you understand?

Table Talk Time

What is the first thing(s) you'd like to do or know when you get back home to better understand who values what?

VIEW FROM THE OUTSIDE

The Life Cycle of a Technology

Roles Played by Federal Laboratories

Understanding Public Perception

Technology Readiness Levels

Used to assess the maturity level of a developing technology

"Spin-off" scales also exist for manufacturing and product development

- TRL 1 – basic principles observed
- TRL 2 – technology concept formulated
- TRL 3 – experimental proof of concept
- TRL 4 – technology validated in lab
- TRL 5 – technology validated in relevant environment
- TRL 6 – technology demonstrated in relevant environment
- TRL 7 – system prototype demonstration in operational environment
- TRL 8 – system complete and qualified
- TRL 9 – actual system proven in operational environment

Source: H2020

The Financing Life Cycle

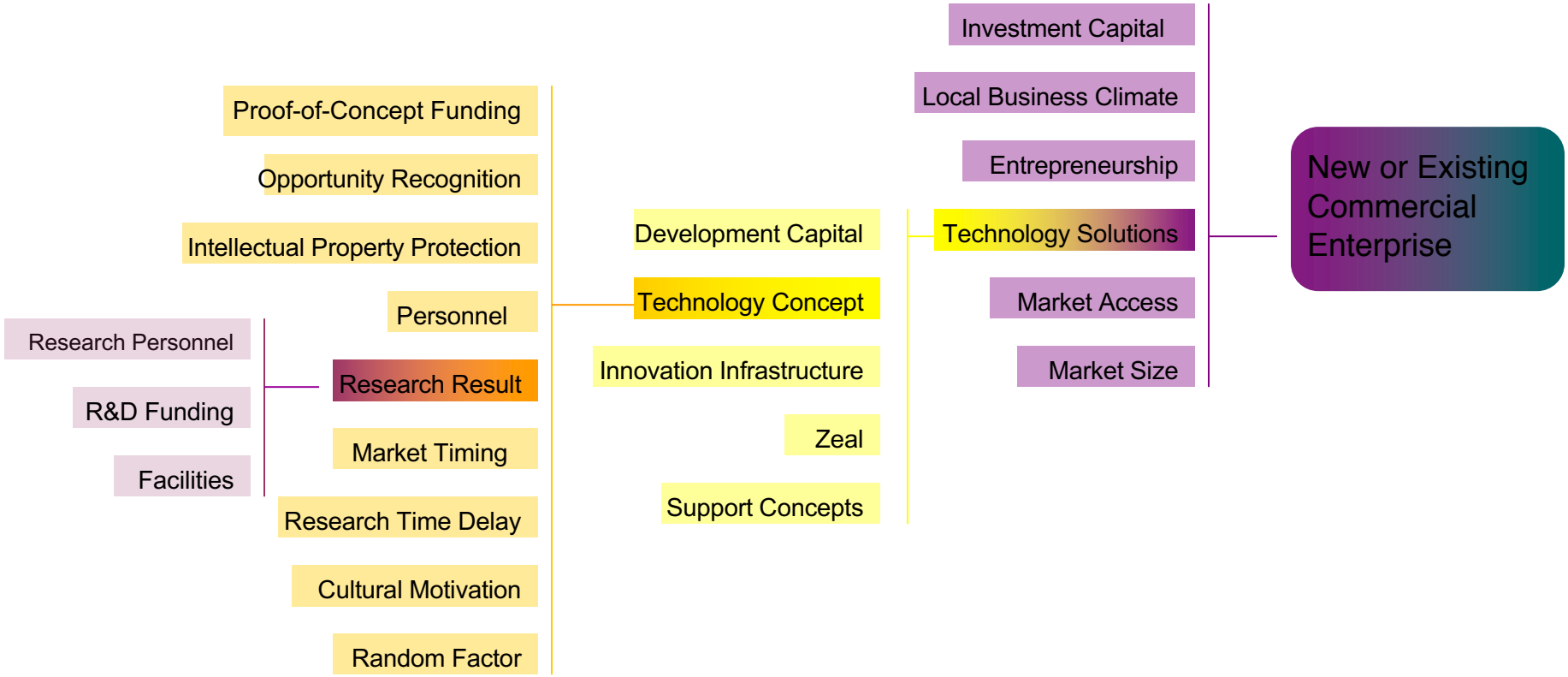
Product

Discovery | Product / Market | Pilot | Scale-up | Manufacturing and Delivery

Financing

Research	Seed	Early Growth	Later Growth	Operations
Scientific principle	Establish product market fit	Pilot-scale demo and early scale-up	Significant growth scale-up	Manufacturing and delivery
Federal funds Nonprofits Industry	Self-finance Angels Seed funds	Series A Series B	Series C Mezzanine	Public/private equity Revenue
Public sources	Savings, credit, individuals, early-stage funds	Venture funds	Private equity, venture funds, strategic partners	IPO Acquisition Operating rev.
$ millions	$10-300K	$10-25 million	$10-100 million	As needed

Technology Path to the Market



Prepared by the Technology Commercialization Steering Committee of the Washington Economic Development Commission

Laboratory-Industry Connections

Labs seek long-term, two-way industry partnerships

- Companies are labs' customers
  - Technology
  - Services
  - Education, best practices
- Labs benefit from industry perspective
  - Market directions and challenges
  - Feedback on labs' technologies

R&D Impact from the DOE Labs

Improved Airport Security

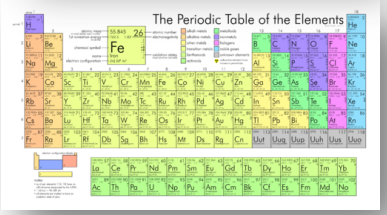
Metal and non-metal threats are easier to detect thanks to a scanning technology installed in airports worldwide

Put the Digital in DVDs

The optical digital recording technology behind music, video, and data storage

Levitated Trains with Magnets

Technology uses the attractive and repulsive forces of magnets to levitate and propel trains



Discovered 22 Elements

Among those discovered, several are named for labs: berkelium, livermorium, tennessine

Sources: Shanghai maglev, JZ, https://commons.wikimedia.org/wiki/File:Shanghai_maglev.jpg; Periodic Table Large, 2012rc, https://commons.wikimedia.org/wiki/File:Periodic_table_large.png

Commercializing Our Research

SerialTap

Cybersecurity tool protects industrial control systems

Licensed to Cynash

NRAP Toolset

Software models potential risks from CO_2 storage

Being used by 250+ stakeholders

MARCool

Cools using waste heat

Developed with Arkema, licensed to InnaVenture

IRcell

Detects and measures tiny amounts of toxic gases

Licensed to IRsweep

SLIM Technology

Advanced analytical instrument will improve precision medicine

Licensed to MOBILion

Friction Stir Scribe

Joins dissimilar materials for advanced manufacturing

Developed with automakers

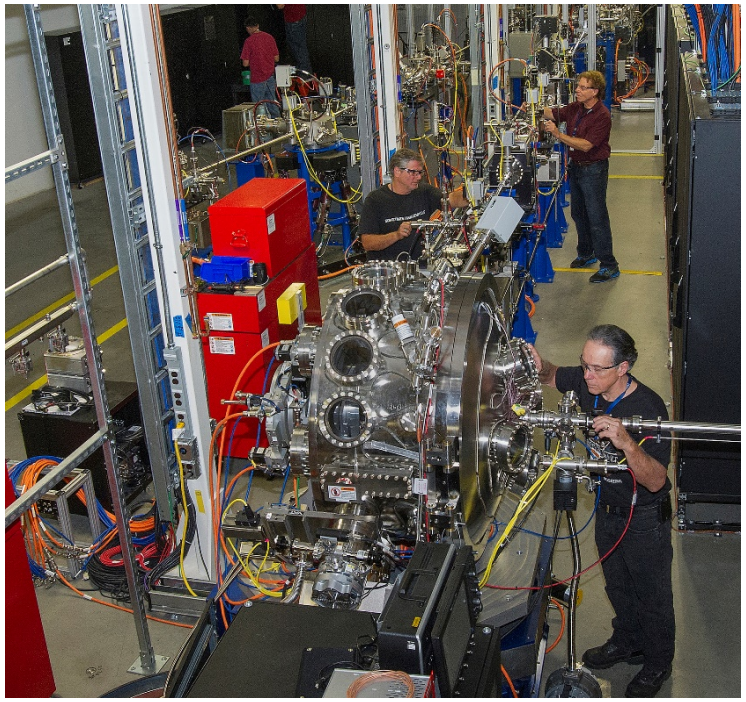
Acoustic Gunshot Detector

Wireless system alerts upon “hearing” gunshots in buildings

Licensed to SecurityUSA

Photographing Batteries and Drugs

National Synchrotron Light Source II
A giant microscope using x-ray, ultraviolet and infrared light



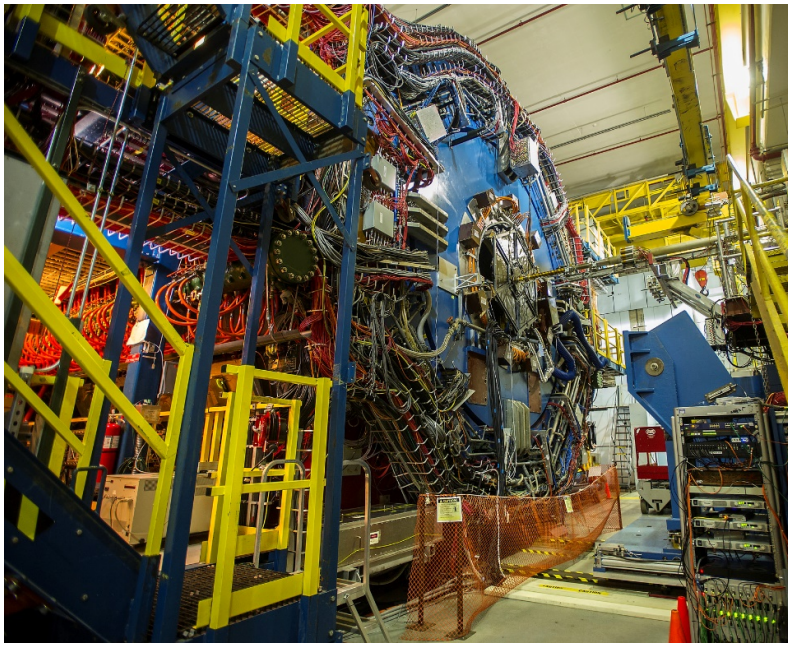
Recent Results

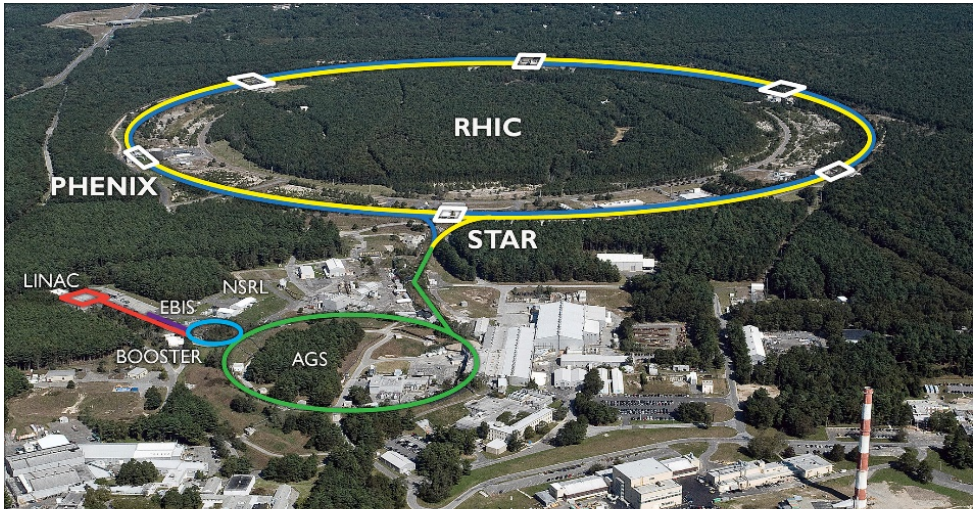
Looking inside a battery to see how lithium moves may lead to faster charging, longer lasting batteries

Molecular structure discovered for enzymes related to Lyme disease and AIDS

Basic Science User Facility – RHIC

Relativistic Heavy Ion Collider
To understand how the strong force shapes most of the visible matter in the universe





Recent Results

The 4-trillion-degree quark-gluon plasma recreates a few microseconds after the “big “bang” and is a “perfect fluid”

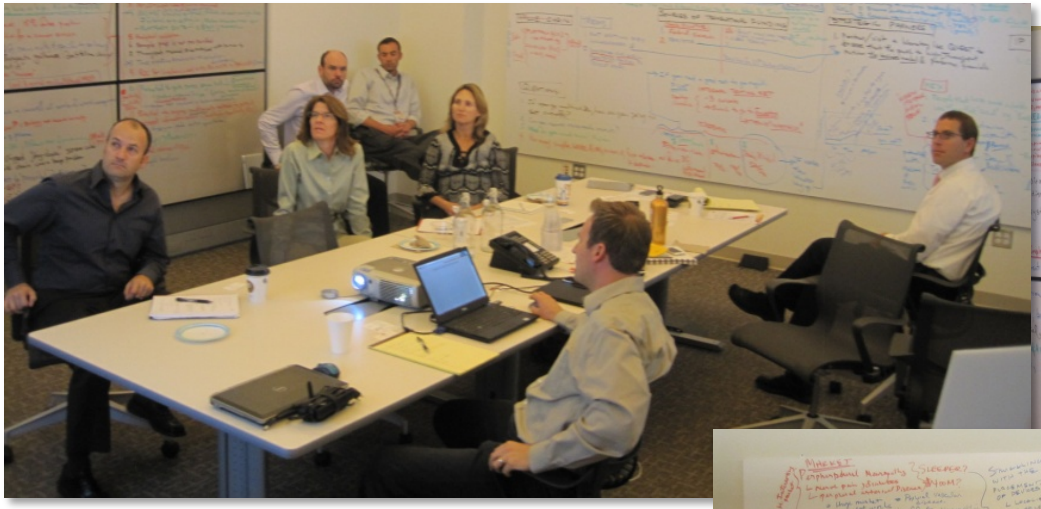
Gluons contribute to proton’s spin, a feature important for medical imaging

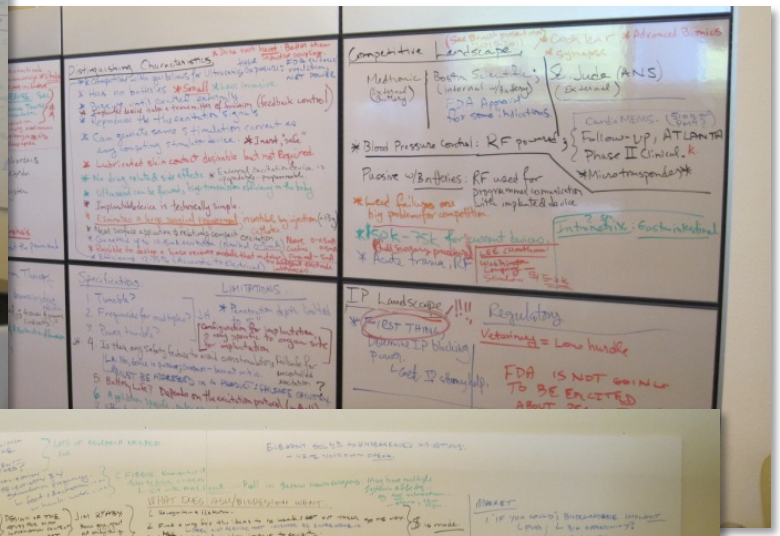
Laboratory-Industry Connections

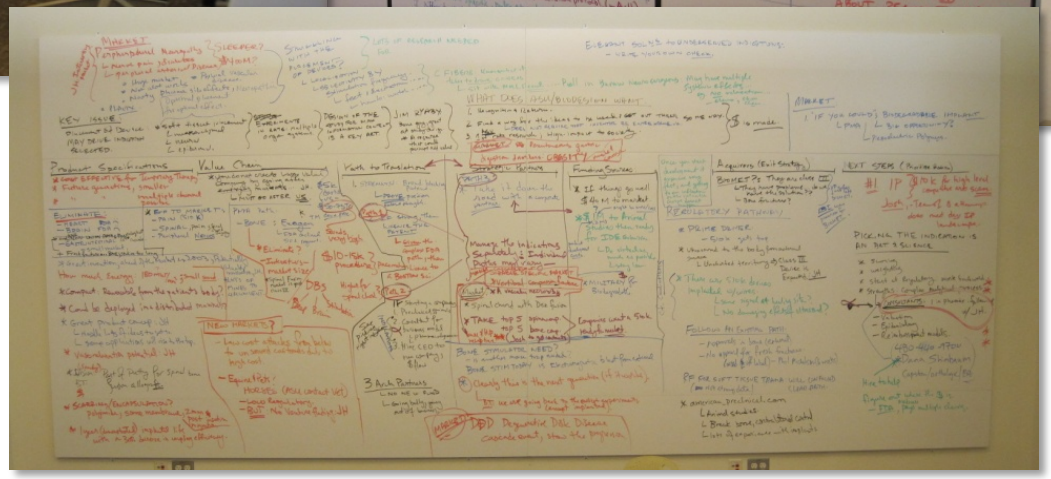
Labs seek long-term, two-way industry partnerships

- Companies are labs' customers
  - Technology
  - Services
  - Education, best practices
- Labs benefit from industry perspective
  - Market directions and challenges
  - Feedback on labs' technologies

Creation Space







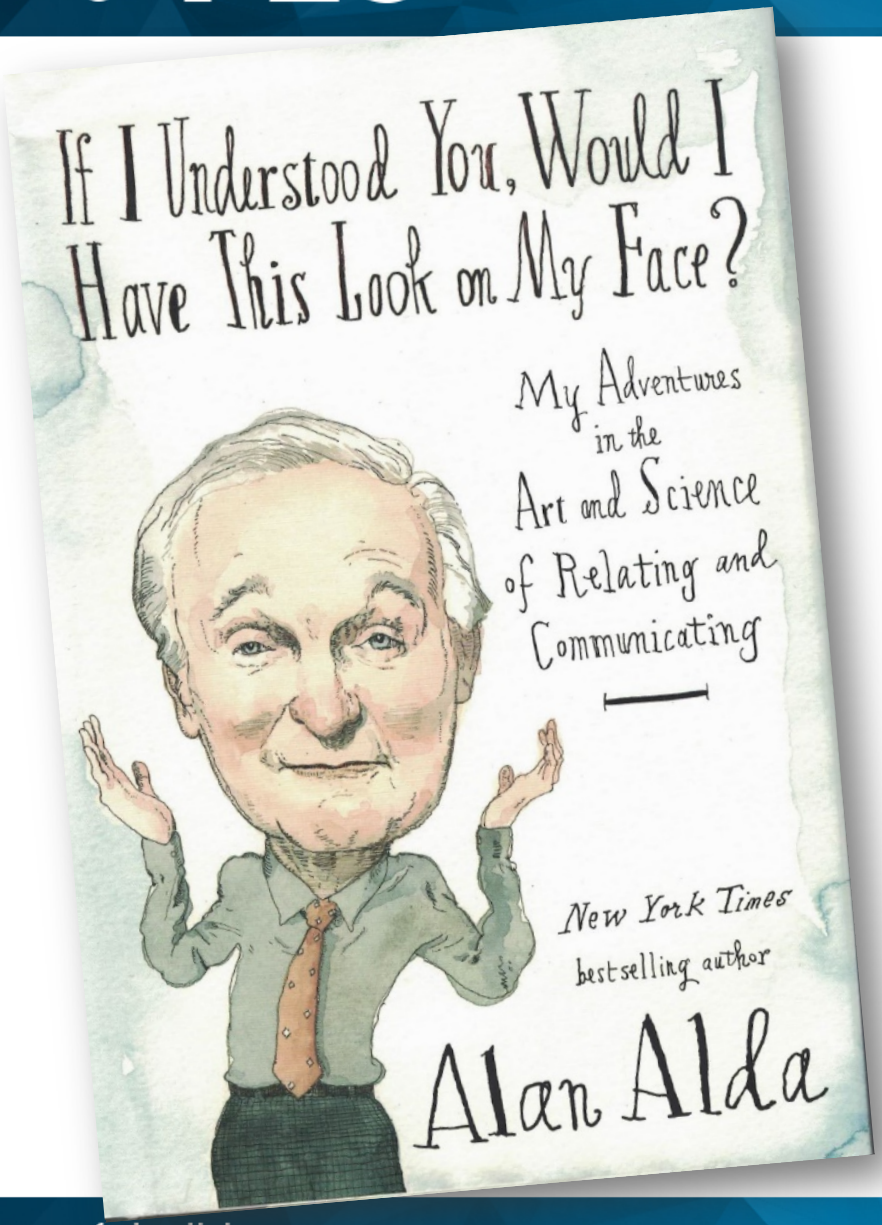
- Product ideas
- Business models
- Regulatory pathways
- Competitors
- Customer types
- Key development goals
- Guidance to researchers

"Imagine the possible commercial outcomes"

Industry Partnership - Thoughts

- Companies want products that are scaling or are ready to scale
  - Few will invest in additional development
  - Big companies buy little ones instead
- Not all partnerships can work
  - Can’t agree to terms
- Misconceptions
  - Too hard to work with
  - Don’t operate at the speed of business

Communications



- Communicating is always a challenge for scientists and engineers
- Many ways to improve
- Rule One: Listen first
- We are all working with technology
  - And it has a difficult relationship with the general public
  - SSTI commissioned a study a couple years ago

Table Talk Time

What is the first thing(s) you'd like to do or know when you get back home to better understand your local ecosystem?

IODD: OEA Defense Industry Adjustment Grant

Leveraging and Connecting Existing Entrepreneurial Networks

Entrepreneurial Network

TASK 1. Network "nodes" EXIST! Create the Directory

GAYLE & BILL COOK CENTER FOR ENTREPRENEURSHIP
Ivy Tech Community College Bloomington

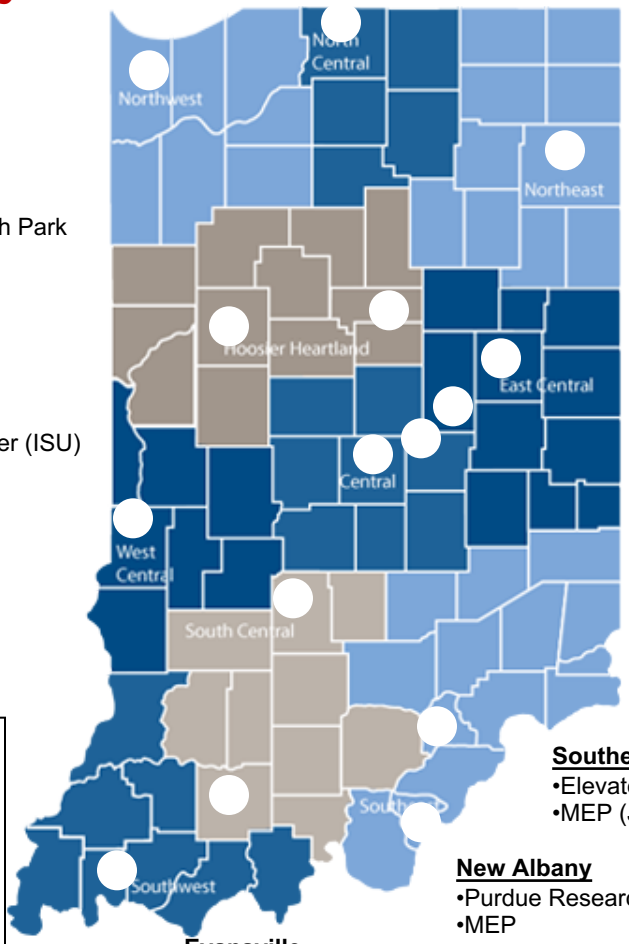
Northern Indiana
•Elevate Ventures EIR

Crown Point
•Purdue Research Park
•SBDC, PTAC

West Lafayette
•Purdue Research Park, Foundry
•BDM Ctr. for Entrep.
•Elevate Ventures EIR
•MEP
•SBIR

Terre Haute
•Launch Terre Haute
•Business Engagement Center (ISU)
•Rose Hulman Ventures
•SBDC (ISU)

Bloomington
•Ivy Tech Cook Center for Entrepreneurship
•SBDC (Ivy Tech)
•Bloomington Technology Partnership
•Indiana University



South Bend (North Central)
•North Central ISBDC (IU)
•MEP
•Elevate Ventures EIR

Fort Wayne
•Northeast Indiana Innovation Center (IPFW)
•SBDC, PTAC (IPFW)
•Elevate Ventures EIR
•MEP

Kokomo
•Inventek Technology Park

Anderson
•Flagship Enterprise Center

Muncie
•Muncie Innovation Connector
•SBDC (BSU)

Fishers
•Launch Fishers
•Launch Indiana (SBDC)
•MEP

Indianapolis
•Purdue Research Park
•TechPoint, LLC
•Indiana University Research & Technology Corporation
•SBDC, PTAC (Indy Chamber)

Scottsburg
•Mid-America Science Park

Southern Indiana
•Elevate Ventures EIR
•MEP (Jasper)

ISBDC Business. Smarter.

New Albany
•Purdue Research Park
•MEP

Evansville
•Innovation Point
•USI Center for Applied Research
•SBDC, PTAC
•MEP

- Universities Outreach, MEP
- OSBE: SBDC, PTAC, SBIR, & Launch Indiana
- Elevate Ventures
- Technology Parks
- Incubators / Accelerators
- Local / Regional Outreach
- Co-working/Passport sites

TASK 2. Connecting the "nodes" into the Entrepreneurial Network

TASK 3. Digitizing, online

Shared Values: Lab and Ecosystem

Things to consider:

- Common language (*words matter!*)
- Common shared expectations
  - Roles & responsibilities
  - Business cycle(s)
  - Timeframes
- Are there near- and long-term opportunities?
- Start small and learn OR "swing for the fence"?

Table Talk Time

What specific things immediately stand out as shared or connected values between the lab and its ecosystem?

Is language a barrier or a hindrance in identifying common values?

Applicable to any fed lab!

Guidebook for
Public/Private Partnerships
for Military Installations

A "how-to" process

***Hard Part*: "the what"**

(What do you want to do?")

http://www.in.gov/iodd/files/P3_Guide_for_Indiana_Military_Facilities_9_July_15_Final.pdf

ENGAGING WITH NON-FEDERAL PARTNERS

Build on the ecosystem model (previous session)

Don’t just engage because you can – have a reason

A Lab in Its Systems Context

Establish the lab's place in context of other systems

This placement changes depending on the scope of the partnership

These "systems" guide consideration of potential partners

- Companies
- Research partners
- Nonprofits
- Civic, government
- Investors, funders

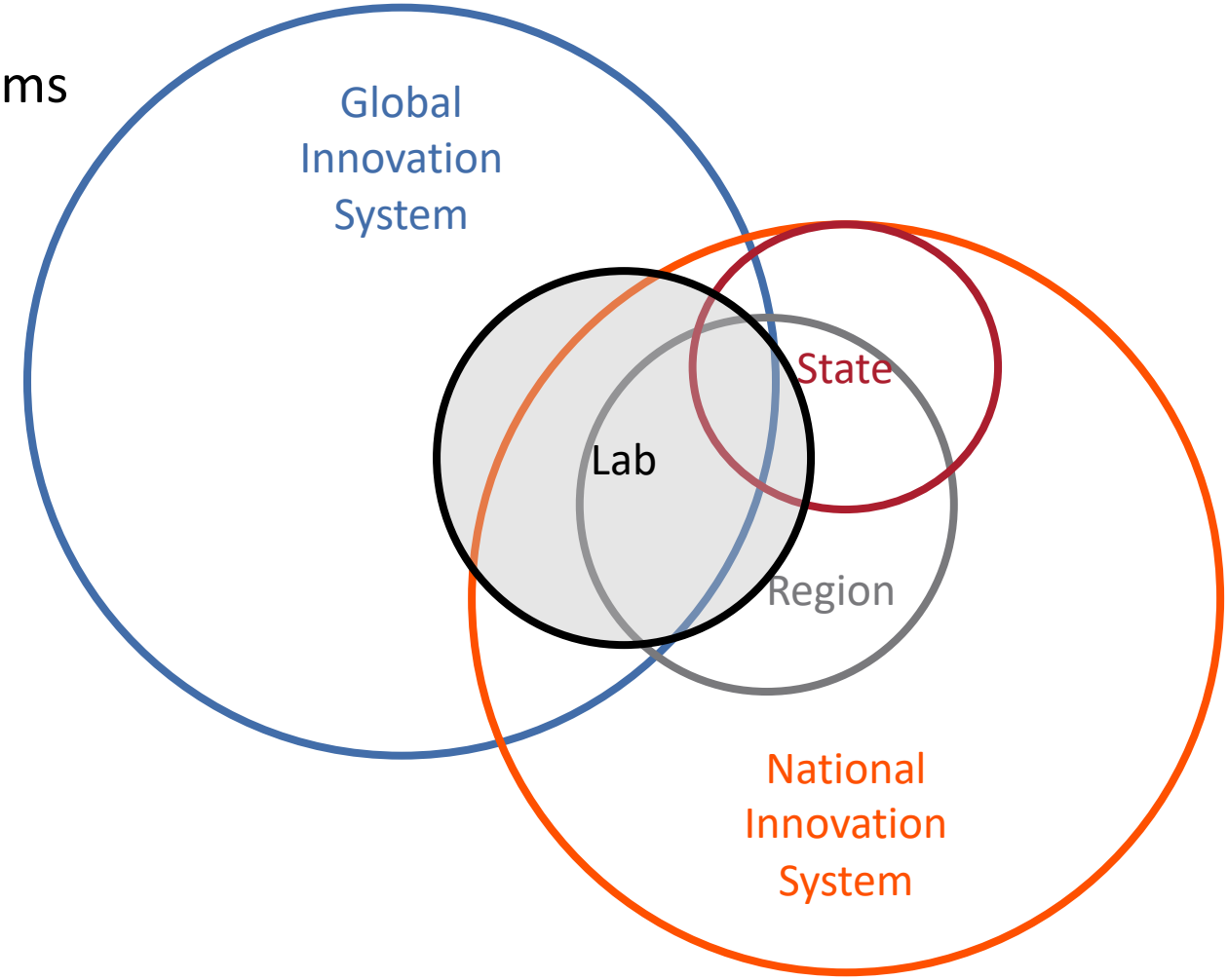


Diagram courtesy Mark Skinner, SSTI

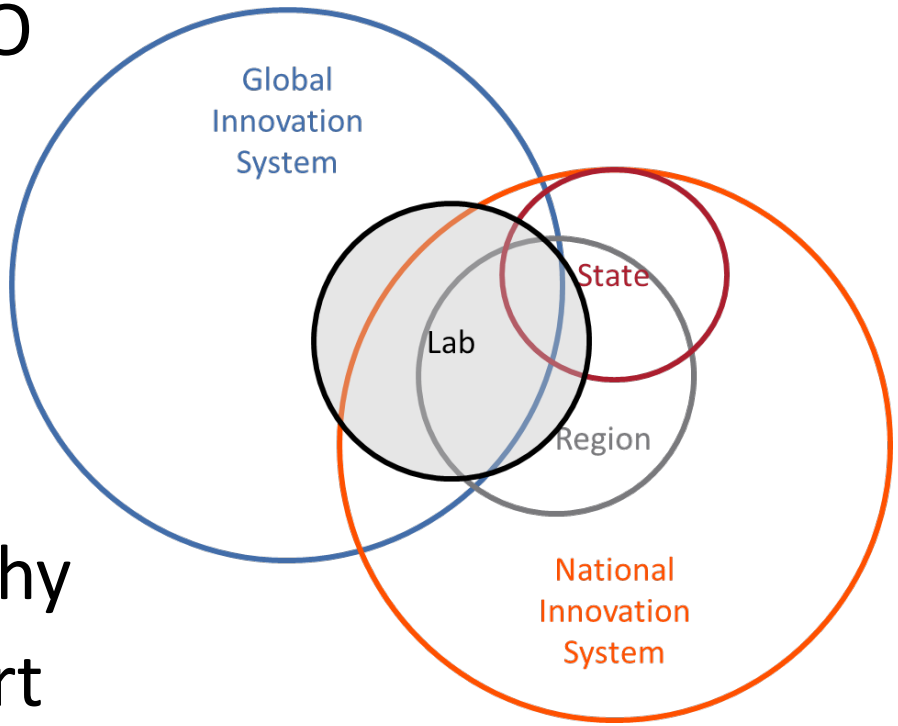
YOUR Lab in Its Systems Context

For the problem or opportunity you face …

- Where does the work of your lab fit?
  - within the context of the region's R&D needs?
  - industry and economic development output?
- What about the state, national innovation system, and the rest of the global innovation system?
- Where would you place your lab in relation to the other circles in this diagram?
- What is the scope of your system?
  - *HINT: It should be large enough to meet expectations, and small or targeted enough to allow focus on results*

Your Innovation Ecosystem

- Innovation Ecosystem scope
- Start with identifying WHO
  - Connections, contribution comes later
- Next is WHY
  - Motivations, expectations are critical to understand
- WHAT is based on who, why
- Success established at start
  - Establish metrics



Your Ecosystem: **WHO**

- Key industry/sector groups
- Leading companies
- Capital providers
- Economic developers
- Government programs
- Civic leaders
- Elected officials
- Research, development and engineering facilities
- Commercialization programs and facilities
- Innovation spaces
- Entrepreneurship training
- Workforce development
- Foundations

Select partners in the context of your systems

Your Ecosystem: **WHY**

These are attributes of …

Effective partnerships

Motivations are based on organization's purpose, mission, charter

Outcomes derived from the group's common motivations

All partners committed to outcomes for both the group and organizations

Difficult partnerships

Motivation is focused on funding, current or future

Partners unwilling to share their organization's motivations to participate

Partners unwilling to compromise at times

Partners do not respect others' constraints

Your Ecosystem: **WHAT**

- Outcomes can be developed once the partners agree on the basis for their partnership
- Developing the scope of your activity has two parts:
  - Outcomes – those things you intend to achieve
  - Programs – the mechanisms for achieving outcomes
- Outcomes and programs rely on the partners
  - Necessary capabilities, capital and influence are needed
- Your business model is a special type of program
  - If needed, it must meet all partners' needs
  - New institutions, if required, may delay agreement

Your Ecosystem: **METRICS**

- Metrics allow partners to view progress consistently
- Also, clarify outcomes during planning
- Partners must agree how to use metrics and manage performance
- Define how credit for performance by several will be counted

- Types of metrics
  - Direct outcome metric
  - Input, output
  - Process, efficiency
- Both data and stories
- Each metric relates to performance, over which you have control

Northwest Energy Innovation Alliance

- Formed to improve the competitiveness of the energy sector in the Pacific Northwest
  - Primarily through improving the impact of energy R&D
- Regional initiative – five states
- Research institutions, nonprofits initially
  - National laboratories, research universities, industry organizations, state energy officials
  - Companies will be included after formation

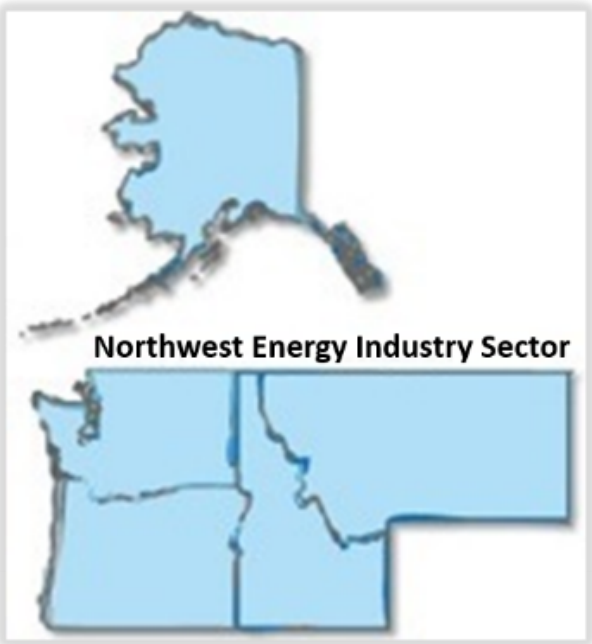
Alliance Partners:

DOE National Labs
Universities
Incubator/Accelerator
Energy Industry Groups
Energy Companies

Alliance Stakeholders:

US Dept. of Energy
Federal Research Agencies
State Government
Economic Dev. Groups

The Northwest Energy Innovation Alliance



Northwest Energy Innovation Alliance

Vision

Develop a globally competitive energy industry sector in the Northwest

… that draws upon energy-focused R&D from regional institutions

… and is globally recognized as one of the sought-out locations

… for energy companies, professionals and policymakers to locate.

Northwest Energy Innovation Alliance

Principles

The Alliance embraces the concept of an Innovation Value Chain and realizes that concept in these ways:

- Allow and promote each partner to excel in their chosen area(s) of excellence
- Engage, connect and integrate Alliance partners to realize exceptional capabilities in all critical elements of the Innovation Value Chain
- Adopt a common framework for the Innovation Value Chain and implement a common assessment model to develop a common view of expectations, outcomes and performance

Northwest Energy Innovation Alliance

Mapping Programs to Sector/Member Needs

NEIA Programs	NW Energy Sector Need	NEIA Member Need
Promotion: Market & promote NW energy R&D capabilities, facilities	Research & technology development to meet specific PNW energy sector needs	Partnerships, funding to address regional energy sector research needs
Assessment: NW snergy Sector's research needs and priorities	Encourage growth, expansion, relocation, startup of energy technology companies in PNW	
Collaboration: Joint Energy Innovation Center	Easy access to regional energy research and development capabilities that support growth of the Northwest's local energy industry	Integrated programs and facility to expand adoption of members' research, capabilities and available technologies, especially in areas common among NEIA members

Visioning the Future

- Individual Exercises (rapid):
  - SWOT analysis
  - Positioning
- Group Exercise - refinement

Visioning the Future: RAPID SWOT

Lab and Ecosystem

- Strengths
- Weaknesses
- Opportunities
- Threats

Visioning the Future: RAPID SWOT

Lab and Ecosystem

EXAMPLE

Strengths

- Regional assets in lab and universities
- New interstate connecting lab and IU
- Seed funding from local endowment, state, more…
- Lab is emotionally ready to play with outside
- PhD program and working with Purdue and IU
- Purdue located just outside the gate
- Regional momentum and excitement

Visioning the Future: RAPID SWOT

Lab and Ecosystem

EXAMPLE

Weaknesses

- Limited & immature regional leadership
- History of “close, but still nothing”
- No clear communicated and shared vision
- Lab’s fickleness
- Rural setting
- Local tech park fully dependent upon lab
- Scarcity of educated workforce

Visioning the Future: RAPID SWOT

Lab and Ecosystem

EXAMPLE

Opportunities

- New highway that connects Crane and IU
- University wanting to put an "outpost" at tech park/lab
- Local endowment launched Applied Research Institute and Regional Opportunity Initiatives fund
- Seed funding from multiple sources is available
- BIC finally successful (at WG)
- VP of US
- Agency very supportive

Visioning the Future: RAPID SWOT

Lab and Ecosystem

EXAMPLE

Threats

- New commanding officer every 2-3 years
- No clearcut vision or value understood
- Entities fighting for leadership (inside and out)
- Lab not committing
- HQ stopping
- Legal interpretations (enabling or restricting)
- Not enough ”capacity” to execute
- University snatching efforts and moving to their site

Northwest Energy Innovation Alliance

Mapping Programs to Sector/Member Needs

NEIA Programs	NW Energy Sector Need	NEIA Member Need
Promotion: Market & promote NW energy R&D capabilities, facilities	Research & technology development to meet specific PNW energy sector needs	Partnerships, funding to address regional energy sector research needs
Assessment: NW energy sector's research needs and priorities	Encourage growth, expansion, relocation, startup of energy technology companies in PNW	
Collaboration: Joint Energy Innovation Center	Easy access to regional energy research and development capabilities that support growth of the Northwest's local energy industry	Integrated programs and facility to expand adoption of members' research, capabilities and available technologies, especially in areas common among NEIA members

SWOT Analysis

Strengths

Idea Generation

- Strong R&D assets with energy leadership

Idea Conversion

- Testbed assets
- Significant federal energy R&D investment

Idea Diffusion

- Collaborative "ethos"

Weaknesses

Idea Generation

- Uncoordinated R&D programs

Idea Conversion

- Diverse stakeholders across value chain

Idea Diffusion

- Talent in urban areas
- Legacy sectors are innovation-resistant
- Limited access to capital
- Low energy costs impede new technologies

SWOT Analysis

Opportunities

Idea Generation

- Energy R&D seen as critical by state and federal elected officials
- Region has track record of collaborative energy R&D

Idea Conversion

- Significant investment in energy commercialization

Idea Diffusion

- PNW has many economic development programs
- Private sector fosters energy innovation efforts

Threats

Idea Generation

- Federal applied energy funding declining

Idea Conversion

- Commercialization approach not well-aligned with industry
- Energy sector companies and investors are moving more rapidly than research institutions

Idea Diffusion

- Mission innovation, once an opportunity, no longer a federal priority

Visioning the Future: Positioning

- 3 timeframes: today, 2021, and 2025
- Phrases (statements) to describe the ecosystem, including the lab
- Key characteristics (traits)
- Don’t get hung up on phrases & characteristics

IODD T2C: Technology Transfer and Commercialization

Leveraging Federal Innovation for Increased Military Value and Technology-Based Economic Development

EXAMPLE

T2C Today

- Assets exist across the state, not widely known or networked
- Robust capabilities exist largely at Purdue and IU
- Integration of assets and functions demonstrated via PILOT
- Desire among the entities to do more together
- State leadership necessary

T2C Next

- State and regions partnership on network and local management
- Accessible Indiana Innovation Portfolio
- Networked TBED & entrep. services
- Mentoring network
- Fund and capital networks
- Pilots to demonstrate & exercise networked capabilities

T2C Realized

- Nationally recognized state distributed (rural) model
- State-appropriate champion, leadership and funding
- Regional ownership on activities and programs

Indiana T2C Capability

2014-15 → 2016 → 2017 → 2018 → 2019 → 2020 → 2020+

Tech Park Vision

EXAMPLE

TP today

- Service contractors
- Training
- Minimal capabilities:
  - Lab space
  - industrial ops
- ***Characterized by***:
  - Today's requirements
  - Crane pays

TODAY (2014)

TP next

- TP today PLUS
- ***University Center***
  - Education
  - Entrepreneurship hub
  - Park management
- ***Characterized by:***
  - Adv tech dev activities
  - Associated high tech biz
  - More industrial ops/products
  - Some private funding
  - Crane says "we've lost control!"

3-5 years (today)

TP Realized

- ***Applied Research Centers***
- Previous PLUS
- Micro UARC-like entities
- ***Characterized by:***
  - Applied research activities
  - Tech cluster of biz, lab, and univ entities
  - Private investment on par/exceeds fed funds
  - Crane benefits from critical mass

10 years (2024)

Vision

Applied Research Institute (ARI)

EXAMPLE

Now

INDIANA

ARI Concept

ARI Now

- *Decentralized Research Activity*
- *Joint IP*
- *Org. structure in place*
- *Site Miners ID Collaborative Opportunities*
- *Eli Lilly Funding*

ARI Next

- *Faculty Exchange*
- *Major Federal Research Center*
- *Relies on Lilly and Federal Funds*

ARI Realized

- *Word Class Research*
- *Eminent Scholars*
- *Endowed Chairs*
- *Attracts Top Researchers to Indiana*
- *Self Sustaining*

Collaborative Applied Research Environment

2014 2015 2016 2017 2018 2019 2020

Developing Innovation Ecosystem and Partnerships

FUNDAMENTALS

2005 BRAC

2006 WestGate Crane Technology Park

2009 Radius Indiana

CAPACITY

2012 WestGate Academy — $6.6M

2013 Indiana Office of Defense Development (IODD) — $15.6M

BIC Battery Innovation Center

ACCESS

2015 Interstate 69 — $3B*

University of Southern Indiana

2016 OEA — $2.9M

ROI Regional Opportunity Initiatives, Inc.

Lilly Endowment Inc — $42M

INDIANA

Over $250M invested

LEADERSHIP

Purdue @ WestGate

Today

CAPABILITIES

2017 Duke Energy

$41M
176k solar panels
17megawatts

Today:
WestGate Tech Park – 15+ buildings, 35 tenants, 700 employees
EastGate Tech Park – 2 buildings, 9 tenants, 900 employees

EXAMPLE

2017

- Lots of disconnected activities
- Major programs emerging: ARI, ROI & state $1B
- Major players: state, Radius, IU, PRF, WG, BIC & lab
- Excitement and expectations – looking for outlet

2019

- External entity @ WG:
  - R&D, adv tech
  - T2/Comm
  - Educational
  - WFD
  - Lab presence
  - State presence
- Shared vision; aligning programs & roles & responsibilities
- Lab $ activities too, sees needs & value (buy-in, committed)
- Diversity of funding
- Industry presence

2023

- Defined ecosystem:
  - Leadership
  - Roles & responsibilities
  - Known gaps
  - Industry leading
- Emerging technology cluster (industry, academia & government)
- DoD only a subset of funding, goals & players
- Recognized model for rural setting

Visioning the Future

- Describe and discuss your ecosystems from MapIt! to the table:
  - Position Statements – make sense? What would help? (specific feedback)
  - What does your lab, agency and ecosystem value?
  - What are the major or key components of your ecosystem? What is your assessment of their maturity as a whole and how they engage or view the lab?
  - SWOT results
- For each, what are the critical next steps that the table recommends each individual should take to engage the ecosystem?
- Last 5 minutes - Identify and list common themes heard across all ecosystems (i.e., activities, key stakeholders, gaps, issues, etc.)

Table Talk
Brief Outs

Common theme(s) of your table?