Understanding and communicating the value of research enterprises

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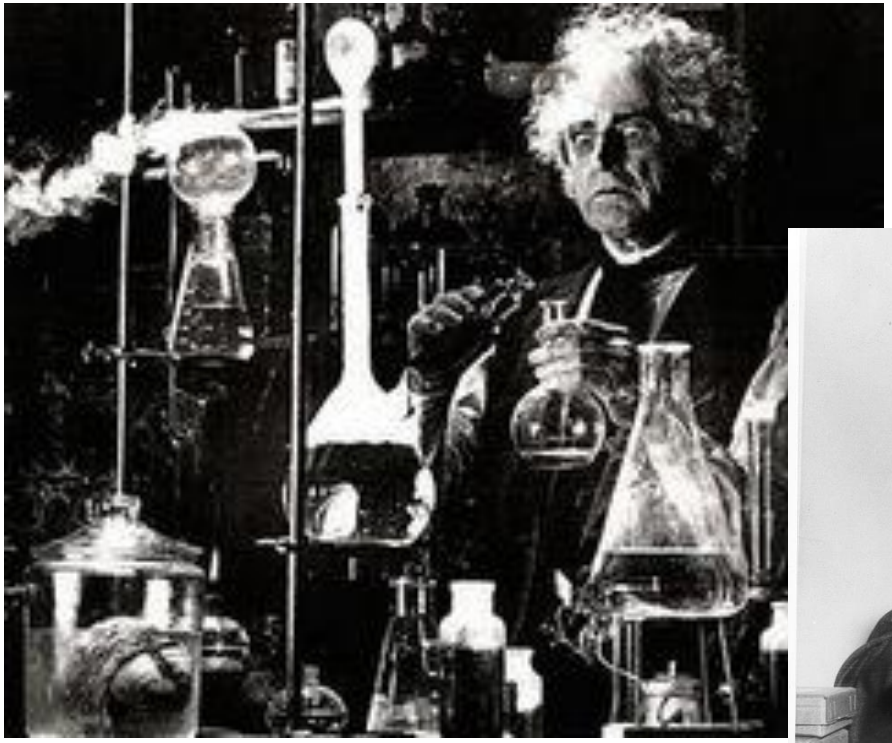
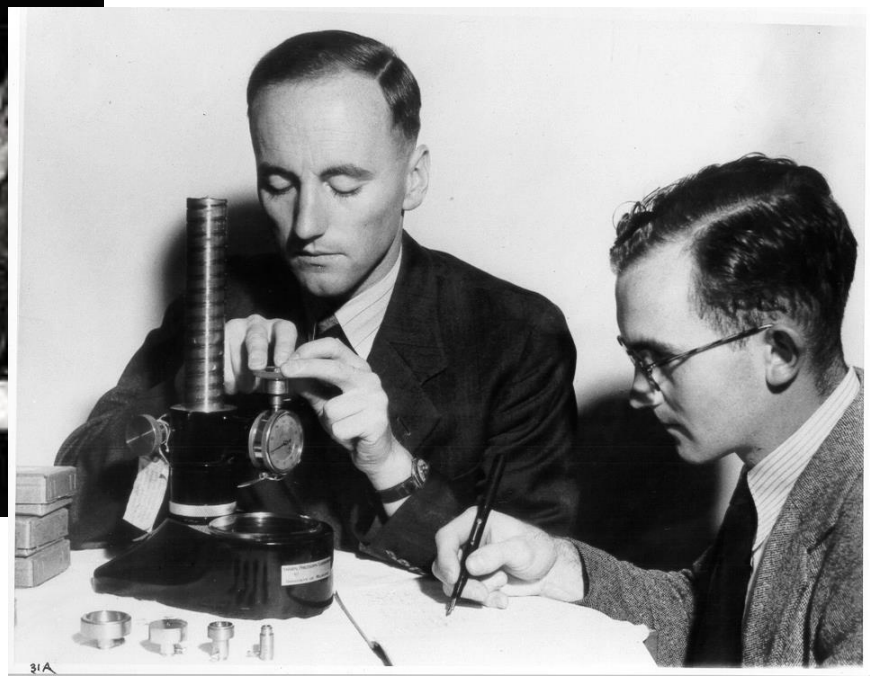
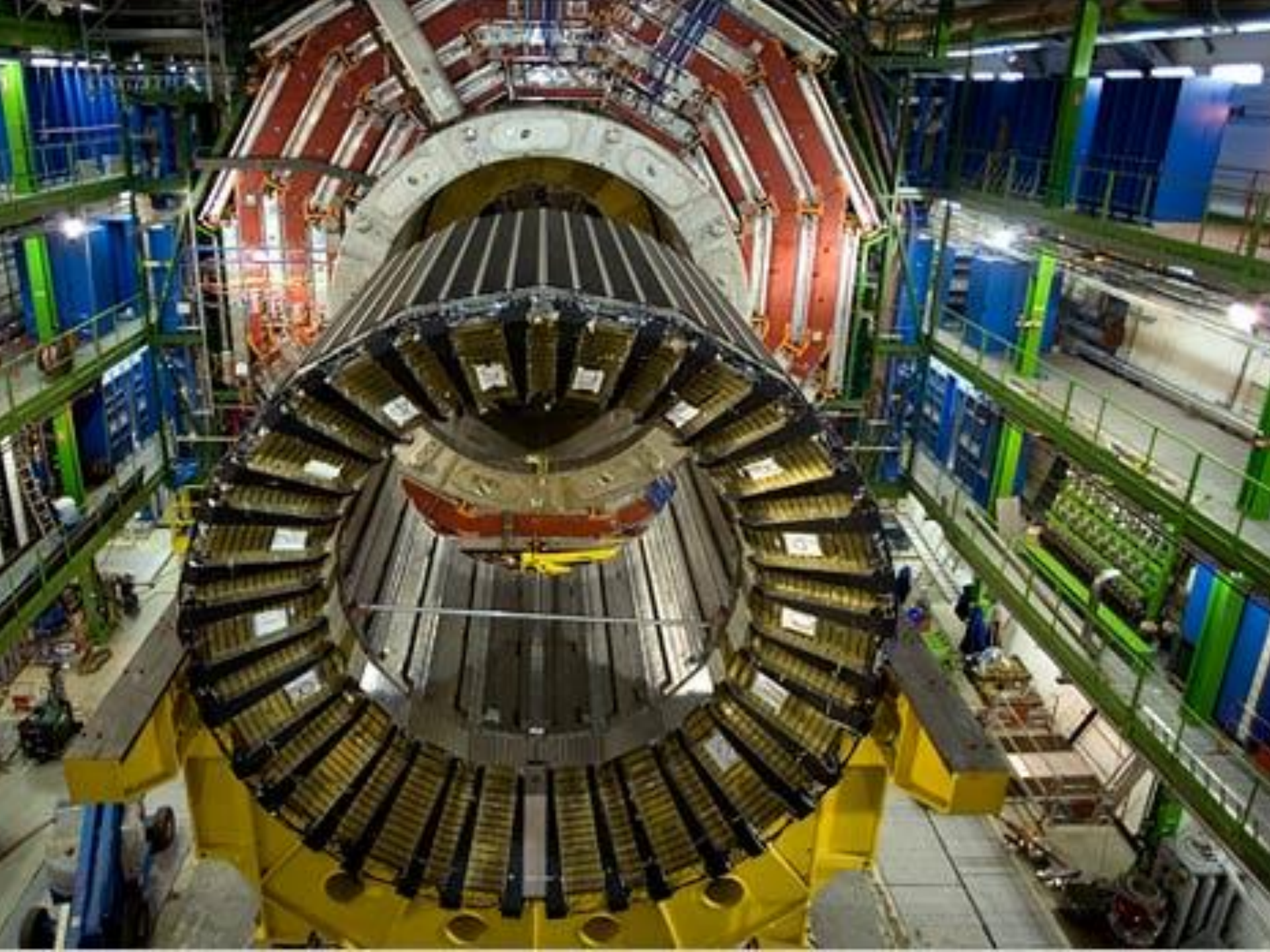
My Research:
Next Generation Research Enterprise

Computationally-Intensive

Research







Distributed, Computationally Intensive Science

Collaborative

Multi/Inter/Trans-disciplinary

Data & Visualization

Global & International

Shared Resources / Digital Infrastructures

Unprecedented Scale

Scrutiny – Funding Uncertainty

"Science Enterprises"

Larger-scale, Persistent Organizations

Research Enterprises…

Project
Institute
Center
Collaborative
Resource
Software
Facility
Laboratory
Foundation
Agency
Department

Why should we continue to fund you?
Why should we fund you in the first place?
Why should we increase your funding?
Why shouldn’t we decrease your funding?

Value

“the importance, worth, or usefulness of something”

Value: Relative to the Stakeholder

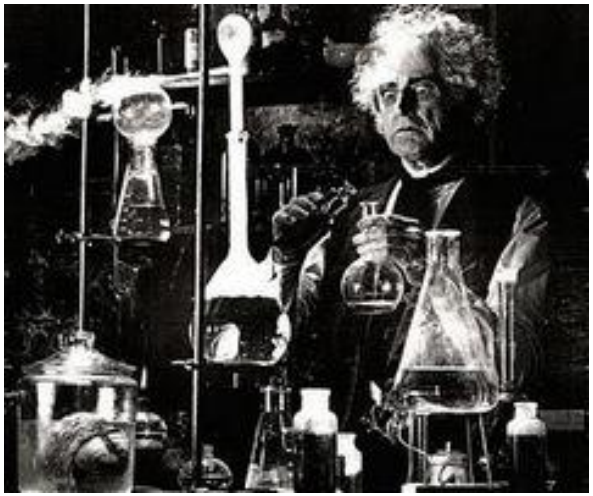
(Mark Rothko No. 6
$186 Million)

What researchers are interested in

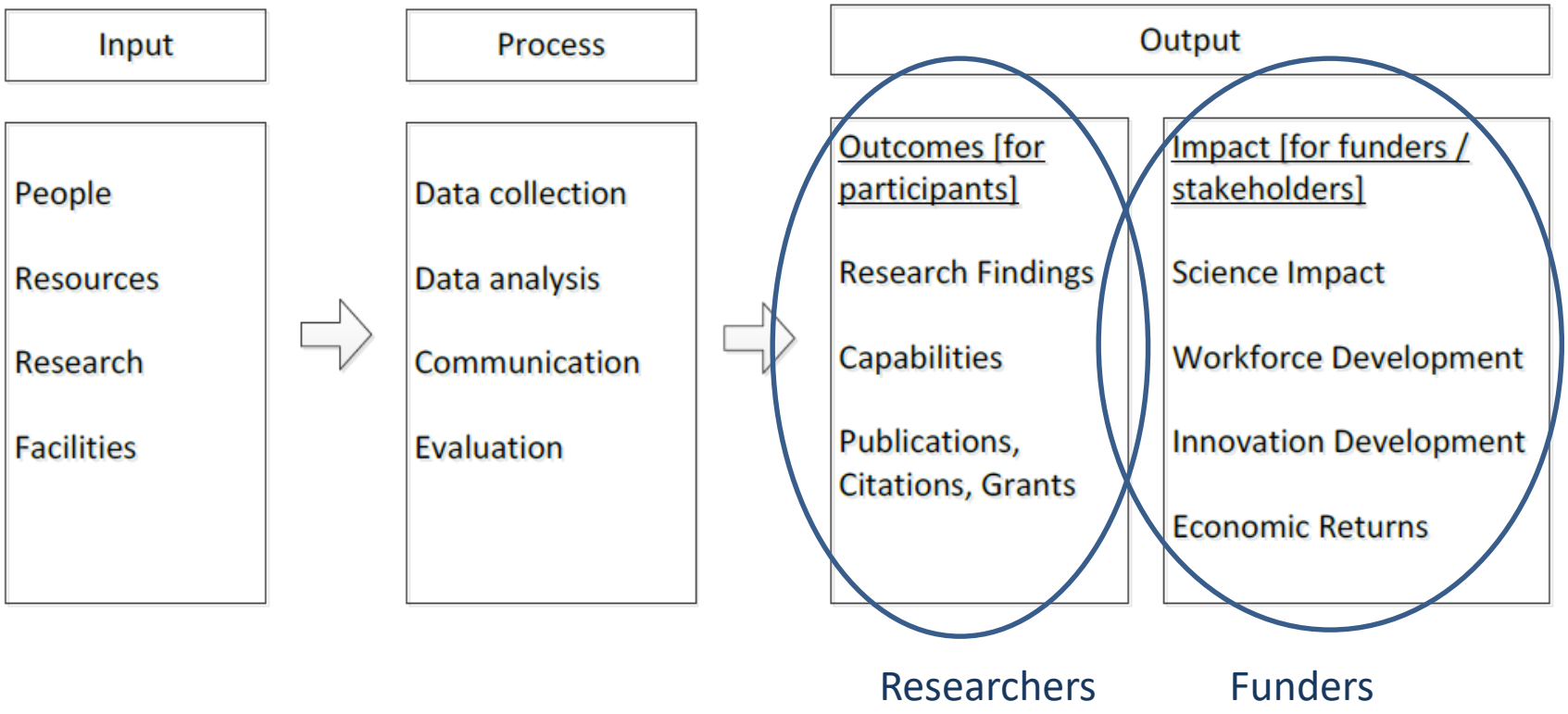
What funders are interested in

What interests researchers:

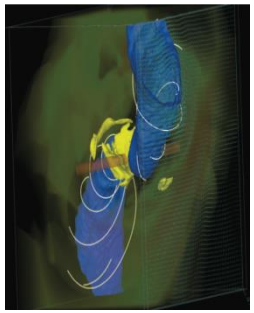
- Number of publications
- Status of journal
- Number of citations
- M-index, H-index, impact factor
- Grant funding…



Logic Model


Input
Process
Output
People
Resources
Research
Facilities
Data collection
Data analysis
Communication
Evaluation
Outcomes [for participants]
Research Findings
Capabilities
Publications, Citations, Grants
Impact [for funders / stakeholders]
Science Impact
Workforce Development
Innovation Development
Economic Returns
Researchers
Funders

Four Dimensions of Value for Sustained Science Enterprise



Scientific Findings

- Solving pressing problems
- Overall science trajectories
- Publications, citations

Workforce Development

- Training & education – grad students and practitioners
- Capabilities & capacity
- Diaspora & graduation

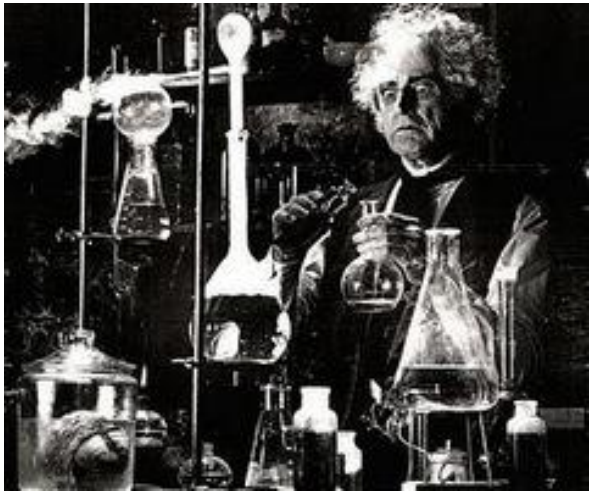
Economic Return

- Dollars / matching dollars
- Multipliers local / national
- Industry creation – potential & analogous

Innovations

- Technologies / patents
- New ventures
- Future benefits – tranformational vs. incremental
- Industrial product development

Communicating Value



Sustained Research Enterprises

Before you can **communicate** value,

you need to **understand** value

Value of…

… Center
… Resource
… Project
… Software
… Facility
… Institute
… Lab
… University
… Scientist

Be specific about which research enterprise.

Value for…

… Federal Science Agency
… Congress
… State / Region
… University
… General population
… Scientists
… Globe

Be specific about which stakeholder.

Value for…

… Scientific findings
… Economic
… Workforce
… Innovation

Be specific about which dimension of value.

Understanding & Communicating Value of a Science Enterprise

1. Identify important stakeholders
2. Value propositions for those stakeholders
3. Develop KPIs
4. Bring KPIs into the *culture* of the enterprise

1. Identify key stakeholders (vertical axis)

	Science	Economic	Workforce	Innovation
Nation				
State				
University				

2. Value Propositions for those Stakeholders

	Science	Economic	Workforce	Innovation
Nation (NSF)				
State (IL)				
University (UIUC)				

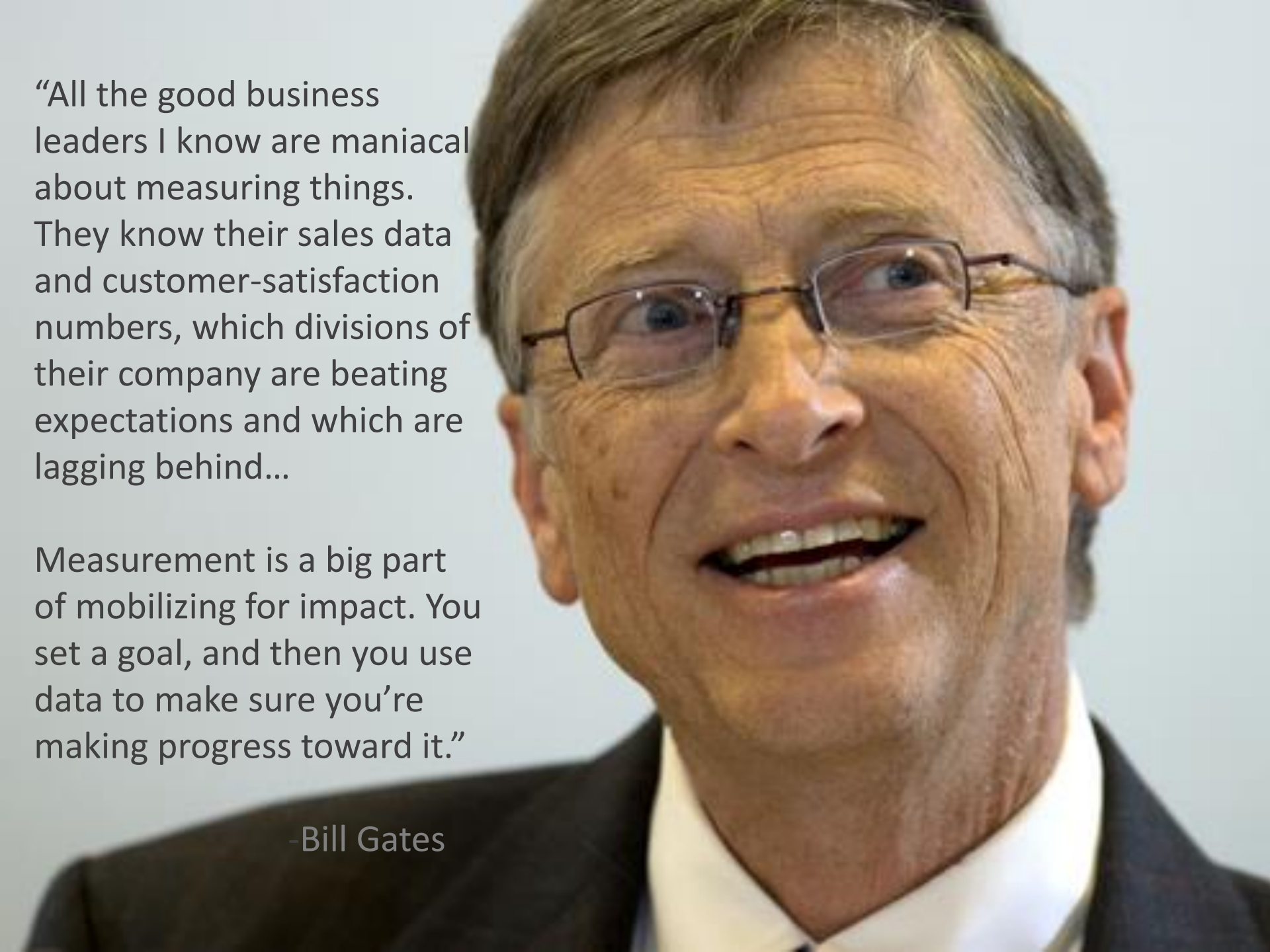
2. What Brings those Stakeholders Value? – specifically!

	Science	Economic	Workforce	Innovation
Nation (NSF)	*Impact Quantity*			*Translation*
State (IL)		*Generate funds to region*	*Workforce development*	*Commerce*
University (UIUC)		*Bring funds to University*	*Impact students*	

Stakeholder Segmentation
Identify key stakeholders and specific value propositions

	Operational	Science	Economic	Workforce	Innovation
Congress 1					
Congress 2					
Public 1					
Public 2					
NSF 1					
NSF 2					
State 1					
State 2					
University 1					
University 2					

Your turn:
Stakeholders & Value



"All the good business leaders I know are maniacal about measuring things. They know their sales data and customer-satisfaction numbers, which divisions of their company are beating expectations and which are lagging behind…

Measurement is a big part of mobilizing for impact. You set a goal, and then you use data to make sure you're making progress toward it."

-Bill Gates

Metrics

Metric – specific measurement through which we can evaluate performance toward a goal

Rules about metrics:
- Must be specific
- Must be measurable

Quantity and quality metrics
- Quantity sells!

Key Performance Indicators

KPIs describe the important criteria that you will use to analyze and redesign processes. Each KPI should have:

Title: In a word or two say what is important [e.g., "Minimize Defects"]

Description: Describe what this means [e.g., "A Defect invoice is any invoice that does not accurately list the customer information, product information, price, tax and shipping information."]

Metric: How will this be measured [e.g. "Defects per month" or perhaps, "Defects per 1000 invoices"]

Target: What is the acceptable metric? [e.g. "1 defect per month" or "2 defects per 1000 invoices"]

Goals

- Who is the stakeholder?
- What is the value proposition?
- Does the value proposition align with strategic *goals*?
- What are specific *objectives* with respect to this stakeholder?
- How can we measure progress toward these objectives?
- Develop Key Performance Indicators

Make metrics and KPIs part of the **culture** of the science enterprise

“Numbers beat no numbers every time.”

We completed 820 student-hours of training…

Contextualize Numbers

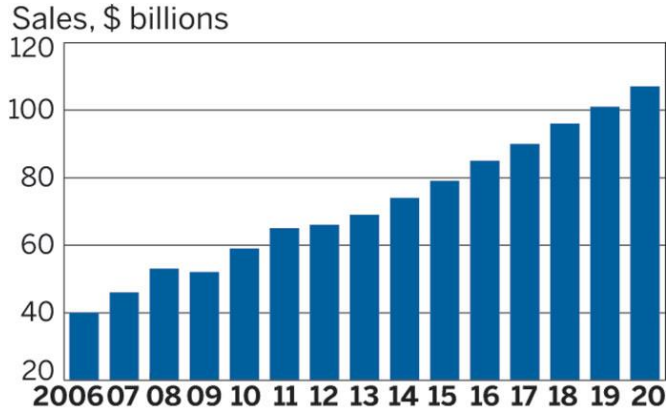
- Cost / ROI
- History / Trend
- Benchmark
- Target
- Visualizations

We completed 820 student-hours of training…

… Our target training hours are 600 per year

We completed 820 student-hours of training…

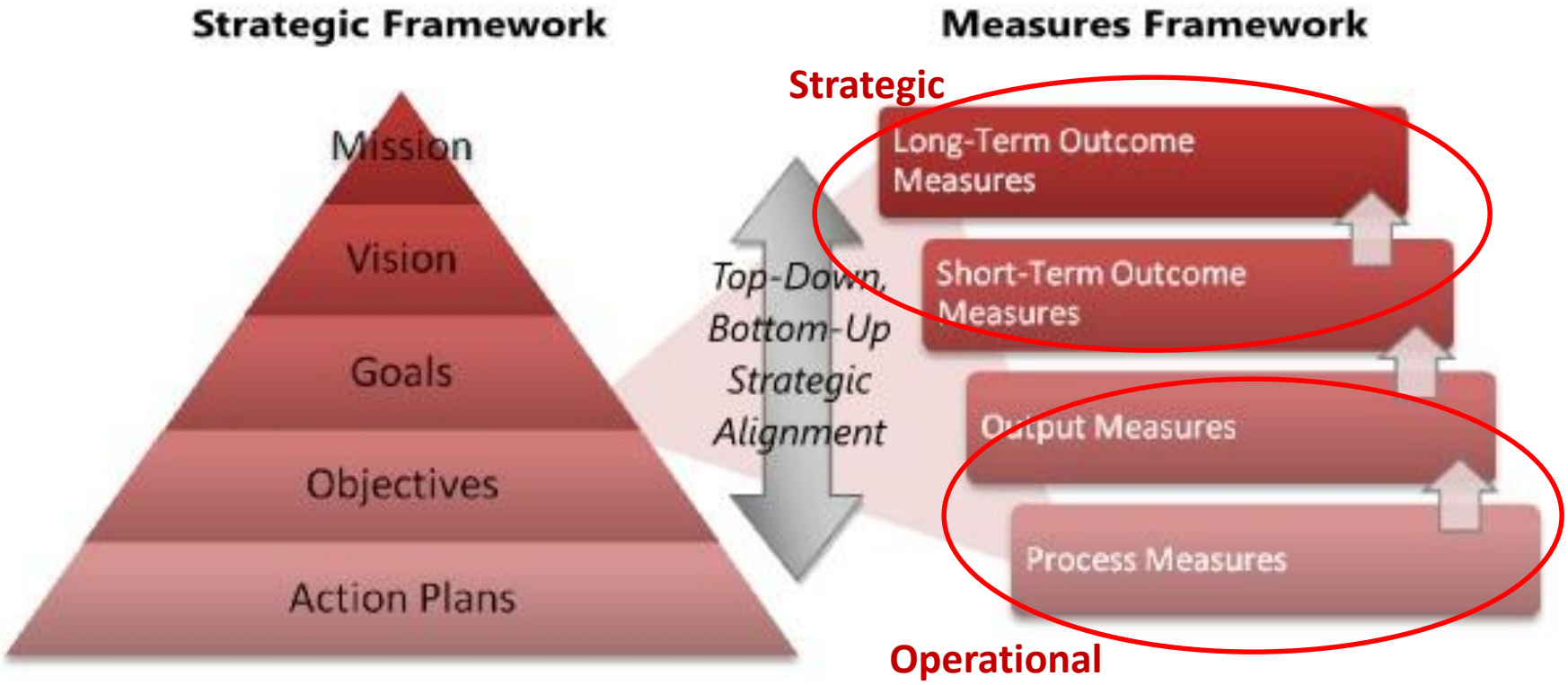
… This is 10% above last year, and 20% above the year before that



We completed 820 student-hours of training…

… For our $50,000 budget, that's $61 per student hour of training

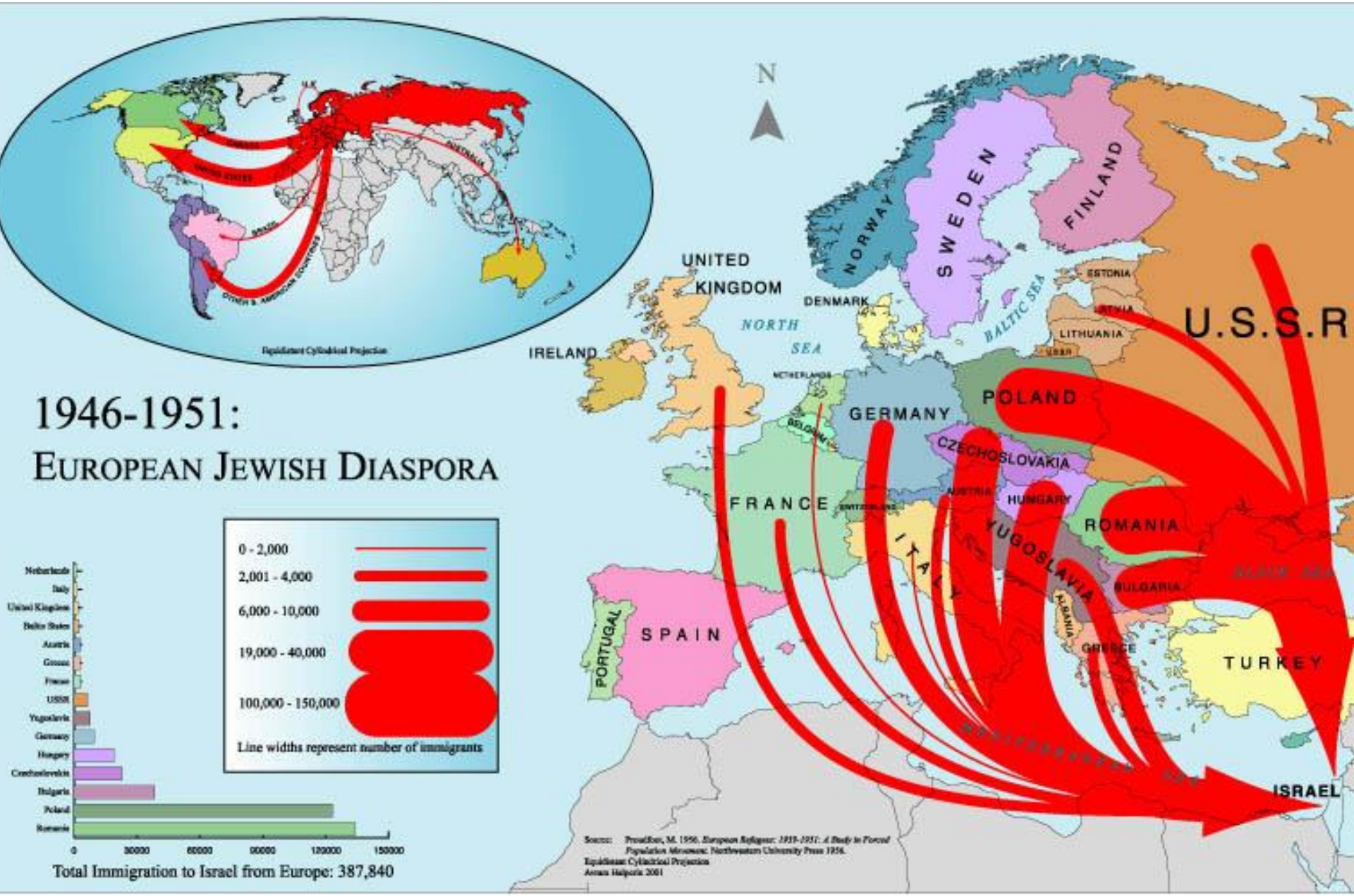
Goals

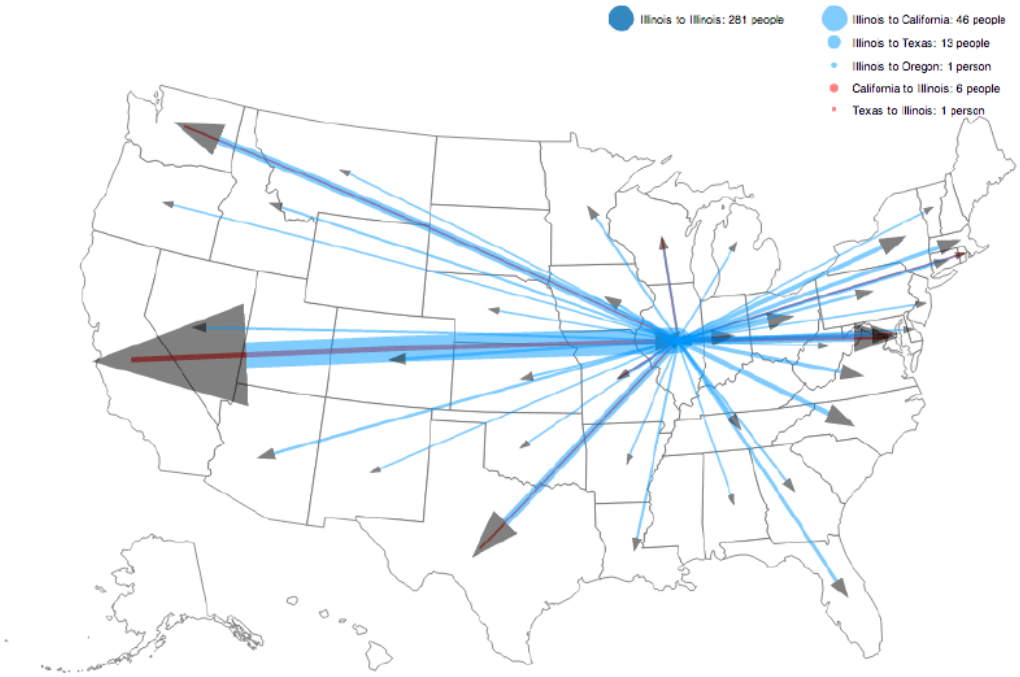


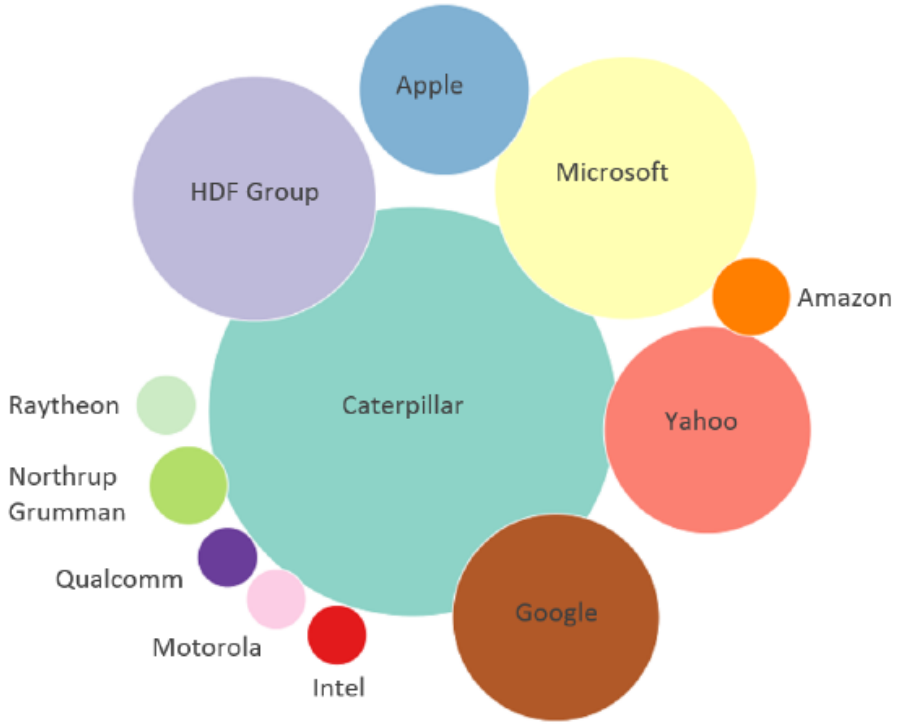
http://www.valueprism.com/strategyreview.html

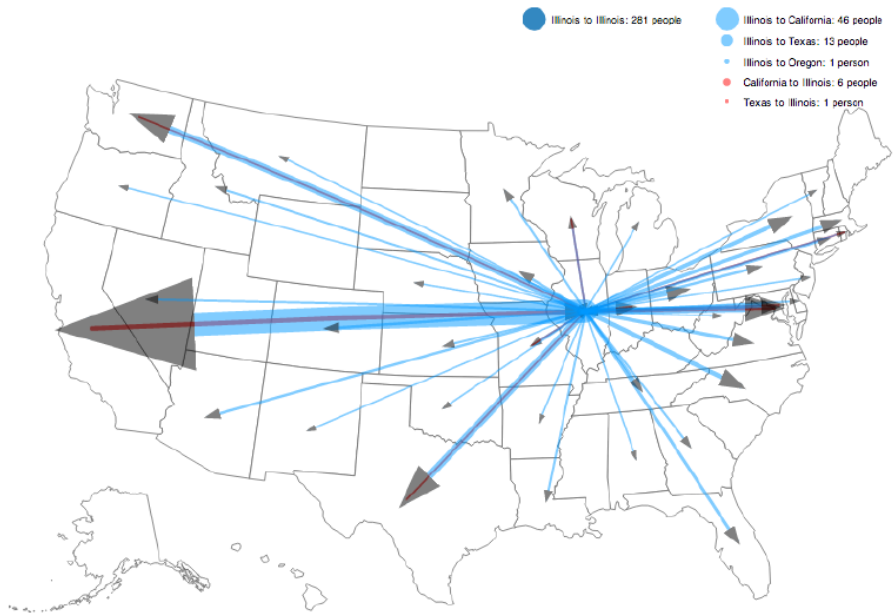
Stakeholder Segmentation & Key Performance Indicator

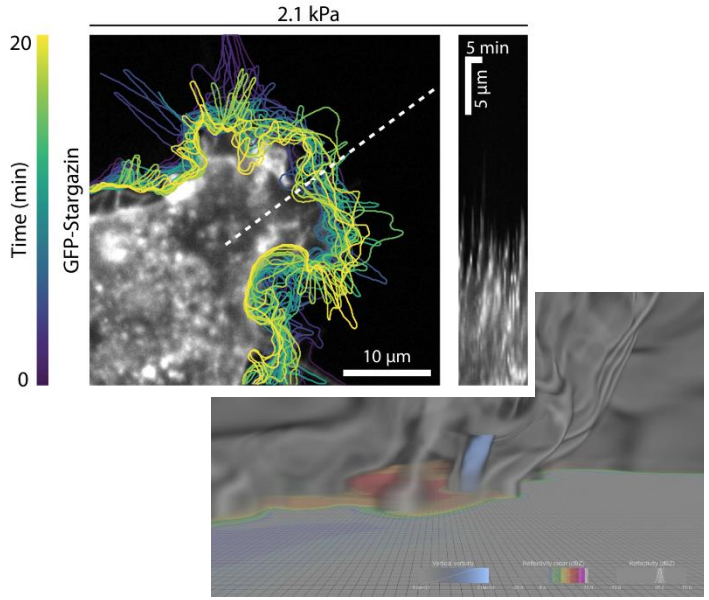
	Operational	Science	Economic	Knowledge	Innovation
Congress 1					
Congress 2				*National Competitiveness*	
Public 1					
Public 2					
NSF 1					
NSF 2					
State 1					
State 2					
University 1					
University 2					


1946-1951:
EUROPEAN JEWISH DIASPORA
N
UNITED KINGDOM
IRELAND
NORWAY
SWEDEN
FINLAND
DENMARK
NORTH SEA
BALTIC SEA
ESTONIA
LATVIA
LITHUANIA
U.S.S.R
NETHERLANDS
BELGIUM
GERMANY
POLAND
CZECHOSLOVAKIA
AUSTRIA
HUNGARY
FRANCE
SWITZERLAND
ROMANIA
ITALY
YUGOSLAVIA
BULGARIA
ALBANIA
GREECE
TURKEY
SPAIN
PORTUGAL
ISRAEL
0 - 2,000
2,001 - 4,000
6,000 - 10,000
19,000 - 40,000
100,000 - 150,000
Line widths represent number of immigrants
Netherlands
Italy
United Kingdom
Baltic States
Austria
Greece
France
USSR
Yugoslavia
Germany
Hungary
Czechoslovakia
Bulgaria
Poland
Romania
0
30000
60000
90000
120000
150000
Total Immigration to Israel from Europe: 387,840
Equidistant Cylindrical Projection


Illinois to Illinois: 281 people
Illinois to California: 46 people
Illinois to Texas: 13 people
Illinois to Oregon: 1 person
California to Illinois: 6 people
Texas to Illinois: 1 person


Apple
HDF Group
Microsoft
Amazon
Raytheon
Caterpillar
Yahoo
Northrup
Grumman
Qualcomm
Google
Motorola
Intel

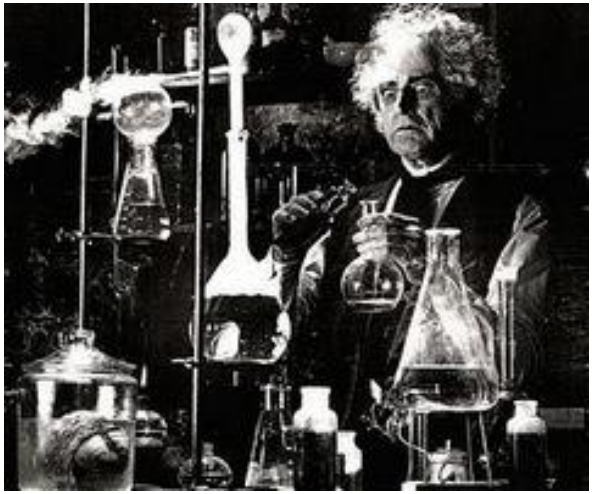




SBIR
STTR
Department
of Defense

Your turn:
Stakeholders & Value

Understanding & Communicating Value



Make metrics and KPIs part of the **culture** of the science enterprise

Additional Materials

Thinking like a Science Executive:
A Workshop Curriculum for Cyberinfrastructure Leaders*

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A report from the NSF-sponsored "Science Executive Session for CI Enterprise Leaders" workshop at the University f Georgia's Executive Education Facility in Atlanta, Georgia on October 11-12, 2013. The workshop was a pilot orkshop for the executive education curriculum funded by the NSF (grant #1240160) and described in this report.

https://www.ssrn.com/abstract=2881752

Leading Cyberinfrastructure Enterprise:
Value Propositions, Stakeholders, and Measurement*

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* A report from the NSF-sponsored "Leading Cyberinfrastructure Enterprise" workshop at the University of Michigan in Ann Arbor, Michigan, on February 14-16, 2013. The workshop is one of six workshops that comprise the Research Coordination Network (RCN) on Management of Collaborative Centers. We

https://ssrn.com/abstract=2416247

Additional Materials

http://distributedscience.ischool.utexas.edu/

Thank you!

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