IDA SCIENCE AND TECHNOLOGY POLICY INSTITUTE

Evaluation-Related Recommendations in STPI EPSCoR Study

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Two Recommendations in STPI EPSCoR Study Related to Evaluation

- Recommendation 2.4: The EPSCoR Section should focus future program-level evaluation efforts on the research competitiveness goal and not on improvements in the S&E research base within EPSCoR jurisdictions.

- Recommendation 2.5: Small, focused studies analyzing the difference between EPSCoR and non-EPSCoR jurisdictions in particular aspects of research competitiveness or S&E research base quality may be appropriate to guide future EPSCoR efforts.

EPSCoR Section asked STPI to expand on these recommendations to stimulate discussion regarding future evaluation efforts

Recommendation 2.4: Future Program-Level Evaluation

- NSF (e.g., through BFA) should repeat on regular ongoing basis calculations made in STPI study:
  - Average award size
  - Number of proposals per academic STEM investigator
  - Proposal success rate for academic investigators
- NSF should also consider calculating:
  - Proposal success rates by investigators and class of institution (e.g., based on Carnegie rankings)
  - Success rates for centers proposals
  - Success in winning MRI and REU awards
  - Success with "prestigious people" awards (e.g., GRFP, NRT, CAREER)
- Goal is to assess whether on a per-investigator basis EPSCoR jurisdictions are approaching non-EPSCoR jurisdictions with respect to competitiveness for research funding, and to understand remaining differentials

Recommendation 2.4: Difficult to Assess EPSCoR Impacts on Building S&E Research Base

- STPI study placed great deal of effort on EPSCoR activities related to building the S&E research base in jurisdictions
  - Cataloging E/O/D and innovation-promoting activities
  - Analyzing changes in institutional policies and procedures that promote research
  - Analyzing activities and influence of State Committees
- Because of the diversity of activities undertaken and outcomes intended, result of these analyses were primarily descriptive
  - Identified advances, but could not necessarily attribute causality to EPSCoR itself
- If EPSCoR program-level evaluation is focused on research competitiveness, project-level evaluation could focus on RII awards' efforts to build the S&E research base in their jurisdictions

Recommendation 2.4: Consider Tracking Quantifiable Indicators of S&E Research Base

May be value to EPSCoR Section to track other quantifiable information to compare EPSCoR and non-EPSCoR jurisdictions with respect to varying aspects of S&E research base, including:

- STEM education indicators
  - NAEP scores (4th and 8th grade, math & science)
  - Ratio of associate's degrees, bachelor's degrees, and graduate students in STEM fields to population
  - Percentage of undergraduate (or graduate degrees) awarded in STEM fields at public institutions by race/gender/ethnicity
- State-level support for R&D indicators
  - State R&D funding per unit of GDP
  - Laboratory space at public universities
  - Carnegie Foundation rankings of public universities)
- Innovation indicators
  - Patent rates
  - SBIR/STTR awards
  - Venture capital funding
  - Percentage of workforce in S&E occupations
- Research quality indicators
  - Article output per 1,000 S&E degree holders in academia
  - Field-normalized citation rates of articles with at least one author from jurisdiction

Recommendation 2.5: Focused Studies

1. Lessons learned from jurisdictions that are recently exited/soon to exit EPSCoR designation
2. Comparison of jurisdictions just above and below current NSF EPSCoR eligibility criterion (0.75% of NSF funding) to identify potential areas for improvement or activities that might be undertaken in EPSCoR jurisdictions

Example of Potential Focused Analysis: Kansas vs. Iowa

Kansas (0.58% of NSF, FY15 EPSCoR Eligibility Table)

- 2.9M total population, 2013
- 1 Carnegie RU/VH institution (University of Kansas)
- 2 RU/H institutions (Kansas State, Wichita State)
- 2,500 S&E degree holders in academia in 2010
- Universities had 2.2M square feet of research space in 2011
- Universities received $166M in Federal R&D (2012)
  - $99M HHS, $38M NSF, $6M DOD, $6M DOE
  - Additional $66M in Federal R&D in 2012

Iowa (0.83% of NSF, FY 15 EPSCoR Eligibility Table)

- 3.1M total population, 2013
- 2 Carnegie RU/VH institutions (University of Iowa, Iowa State)
- No RU/H or Doctoral institutions
- 3,900 S&E degree holders in academia in 2010
- Universities had 2.3M square feet of research space in 2011
- Universities received $288M in Federal R&D (2012)
  - $197M HHS, $42M NSF, $13M DOD, $6M DOE
  - Additional $325M in Federal R&D in 2012

Sources: U.S. Census Bureau, Annual Population Estimates, http://www.census.gov/popest/data/state/totals/2013/; Carnegie Foundation for the Advancement of Teaching, Carnegie Classifications Data File, February , 2012; National Science Foundation, Science and Engineering Indicators 2014 Arlington, VA (NSB 14-01) | February 2014, Table 8-49; National Science Foundation, National Center for Science and Engineering Statistics. 2013. Science and Engineering Research Facilities: Fiscal Year 2011. Detailed Statistical Tables NSF 13-309. Arlington, VA., Table 6; National Science Foundation, National Center for Science and Engineering Statistics. 2014. Federal Funds for Research and Development: Fiscal Years 2012–14. Detailed Statistical Tables NSF 14–316. Arlington, VA. Table 104.

Example of Potential Focused Analysis: Kansas vs. Iowa (cont.)

Analysis 1: Proposal Rates

University	Proposals	Awards	Success Rates
U. Kansas	187	30	16%
K. State	142	27	19%
U. Iowa	164	37	23%
IA. State	347	52	17%

Question: Why are proposal rates so much higher at Iowa State U. than at Kansas universities?

Analysis 2: Non-University Federal R&D

Category of non-university Federal R&D	Kansas	Iowa
By: Industry	$35.5M	$211.1M
By: GOGO + GOCO	$24.4M	$103.1M
From: DOE	$2.1M	$30.7M
From: DOD	$33.6M	$210.9M
From: NASA	$1.1M	$2.2M

Question: Does the broader innovation ecosystem in Iowa contribute to universities' success in winning NSF funds?

Sources: NSF Budget Internet Information System (BIIS) FY2013 data, http://dellweb.bfa.nsf.gov/awdfr3/default.asp; National Science Foundation, National Center for Science and Engineering Statistics. 2014. Federal Funds for Research and Development: Fiscal Years 2012–14. Detailed Statistical Tables NSF 14–316. Arlington, VA. Table 104.