

Sub-national STI Statistics: Recommendations for NCSES

Andrew Reamer

George Washington Institute of Public Policy

George Washington University

Developing Science, Technology, and Innovation Indicators
for the Future

July 12, 2011

STI Statistics Questionnaire and Roundtable

- Who uses STI statistics, what do they want, and why?
- 52 unique participants (26 q, 42 roundtable)
 - Users—federal, associations, policy research institutes, universities, technical assistance services
 - Perspectives—national, regional, institutional
 - STI data providers—NCSES, Census, BEA, USPTO, Economic Research Service (USDA)
- 20 participants with a regional perspective

Sub-national STI Statistics: Recommendations for NCSES

- **STI and the Federal Statistical System**
- STI and Sub-national Areas
- Recommendations for NCSES

Innovations emerge from complex adaptive systems

- Factors include
 - R&D
 - human capital
 - financing
 - infrastructure
 - relationships/networks
 - culture
 - law/regulation
 - market characteristics
- Certain factors and systems are place-based

Our understanding of STI processes is insufficient

- We need to better understand
 - the factor dynamics that enable innovation
 - the factor dynamics that lead from innovation to economic impact
 - the nature of market failures
 - how to design policies that effectively facilitate innovation, diffusion, and impact
- We need data-based research to create this understanding

The federal statistical system is essential to the nation's STI effort

The system should provide access to statistics that

- frame and enable research
- inform decision-making by
 - federal STI-related policy and program agencies
 - state and regional economic, technology, and workforce development organizations
 - STI market actors
 - businesses
 - research institutions
 - education and training institutions
 - workers and students

STI indicators should frame conditions and guide action

- STI indicators should be evidence-based
- STI indicators should encompass outcomes, outputs, and inputs
- STI input indicators should help explain outcomes and outputs

NCSES is core to a decentralized STI statistical system

At least nine federal agencies provide or fund STI-related data and indicators

- National Center for Science and Engineering Statistics
- Census Bureau
- Bureau of Economic Analysis
- Bureau of Labor Statistics
- Employment and Training Administration
- National Center for Education Statistics
- U.S. Patent and Trademark Office
- Economic Research Service (USDA)
- Economic Analysis Office (NIST)

NCSES is core to a decentralized STI statistical system

- Increasingly, non-federal STI data providers also offer valuable information on workforce, finance, new products
- NCSES is chartered as “a central Federal clearinghouse for the collection, interpretation, analysis, and dissemination of objective data on science, engineering, technology, and research and development. ”

STI is a collaborative enterprise

- Practice
- Public policy
- Social science research
- Statistics

Sub-national STI Statistics: Recommendations for NCSES

- STI and the Federal Statistical System
- **STI and Sub-national Areas**
- Recommendations for NCSES

Innovation is influenced by place

- To a large extent, innovation takes place within regional innovation systems
- Regional characteristics influence innovation generation and benefits
- Clusters play a significant role
- Regional/cluster size matters—economies of scale, choice, specialization, diversity
- A few clusters dominate any one knowledge-intensive industry

Current, reliable sub-national STI statistics are needed

To understand the

- geography of STI—U.S. and internationally
- role of place in the STI process

To inform the

- design and implementation of place-based STI policies
- decisions of regional STI market actors—research, education/training, business, workers, students

Priorities for Sub-national STI Statistics

- Tables for economic regions (metro, county)
- Microdata access
- Data comparability
- New data on
 - STEM education and workforce
 - Nonprofit R&D
 - Corporate finance
 - Innovation activity (beyond IP)
- Meaningful regional indicators

Sub-national STI Statistics: Recommendations for NCSES

- STI and the Federal Statistical System
- STI and Sub-national Areas
- **Recommendations for NCSES**

Proposed NCSES Roles in STI Statistical System

- Collect primary data, publish tables
- Create and facilitate access to secondary data tables
- Facilitate microdata access
- Publish and analyze meaningful indicators
- Provide leadership for federal STI statistical system

Principle of approach—demand-driven

NCSES Regional Priorities— Primary Data Tables

Provide metro and county tables of

- BRDIS data—R&D, workforce, IP
- STEM degrees—production and migration
- Academic R&D expenditures
- Federal R&D expenditures
- Total R&D (resurrect nonprofit R&D survey)

NSCES Regional Priorities— Secondary Data Tables

Provide metro and county tables of

- STEM jobs (Occupational Employment Statistics, BLS)
- STEM workforce migration (Local Employment Dynamics, Census)
- Patents (USPTO)
- STI equity investments (various sources)

NCSES Regional Priorities—Tables from External Sources

Aid other agencies in making reliable, relevant sub-national STI data available

- STEM occupational projections (BLS and ETA)
- STEM occupation classification (ETA)
- STEM graduate and workforce migration (NCES, Census, BLS)
- Firm innovation processes (ERS)

NCSES Regional Priorities— Microdata Access

Facilitate researcher access to internal and external microdata sets with adequate place identifiers

- Non-confidential
- Confidential microdata via Census RDCs
- Public Use Microdata Sets (PUMS)
 - Identifiers removed
 - Noise
 - Synthetic

NCSES Regional Priorities— Indicators

Users want STI comparisons across U.S. regions, between U.S. and foreign regions. NCSES should

- Work with users to design a series of regional indicators
 - Intensity – R&D, financing, patents, innovations, STEM occupations, skills
- Enable indicators development by researchers and other federal agencies

NCSES Regional Priorities—STI Statistics Leadership

Create and chair Interagency Council on STI Statistics to identify and address STI statistics issues and opportunities

- Coordinate and collaborate on STI statistical efforts
- Work with users to identify needs for improvements in STI statistics
 - Measurement of innovation outputs
- Facilitate data comparability
- Facilitate platforms for data integration

Sub-national STI Data and Indicators: Recommendations

Andrew Reamer, Research Professor
George Washington Institute of Public Policy
George Washington University

areamer@gwu.edu

(202) 994-7866