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Research Intelligence

Knowledge Economy -States' Competitive Advantage in Research and Innovation

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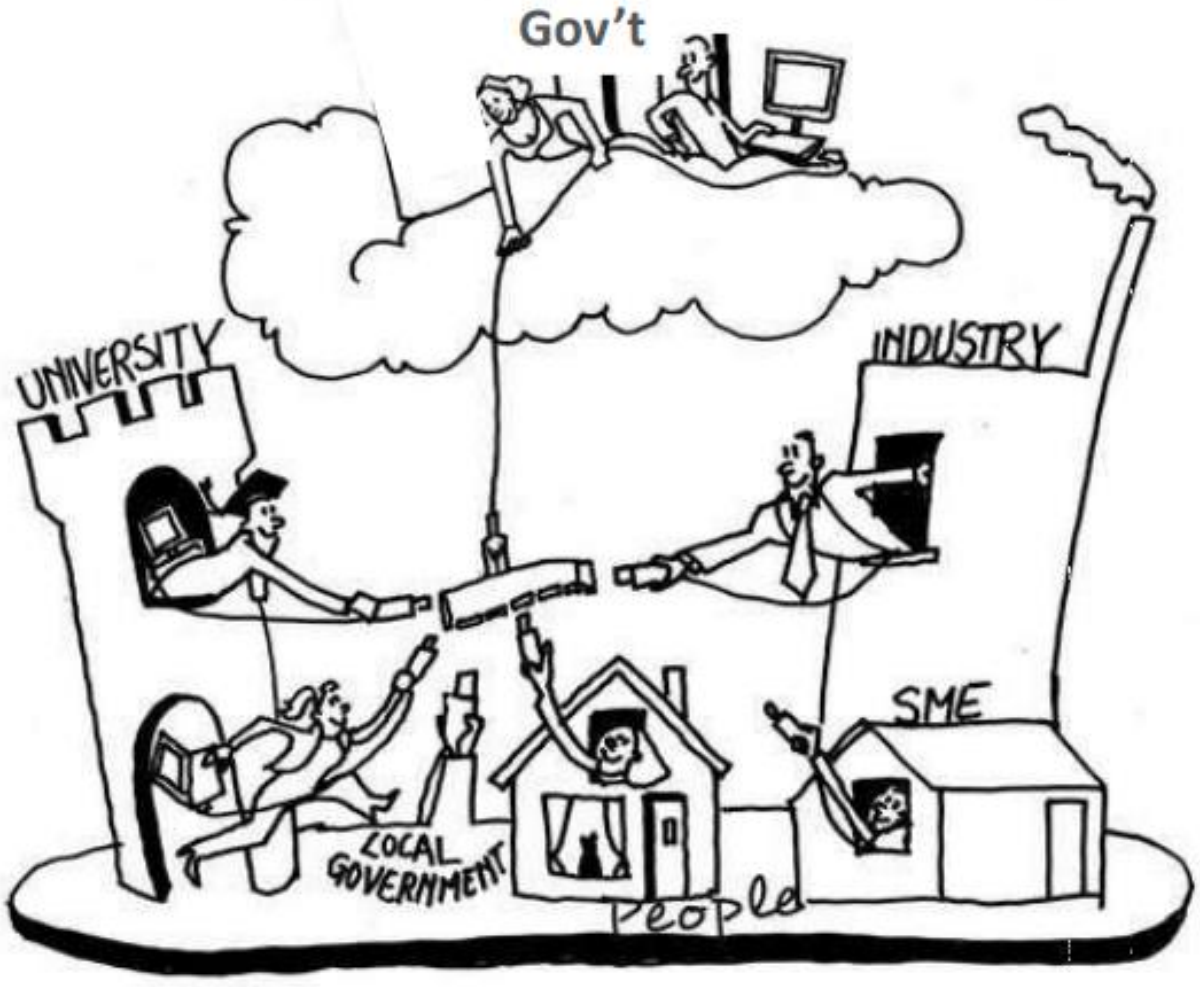
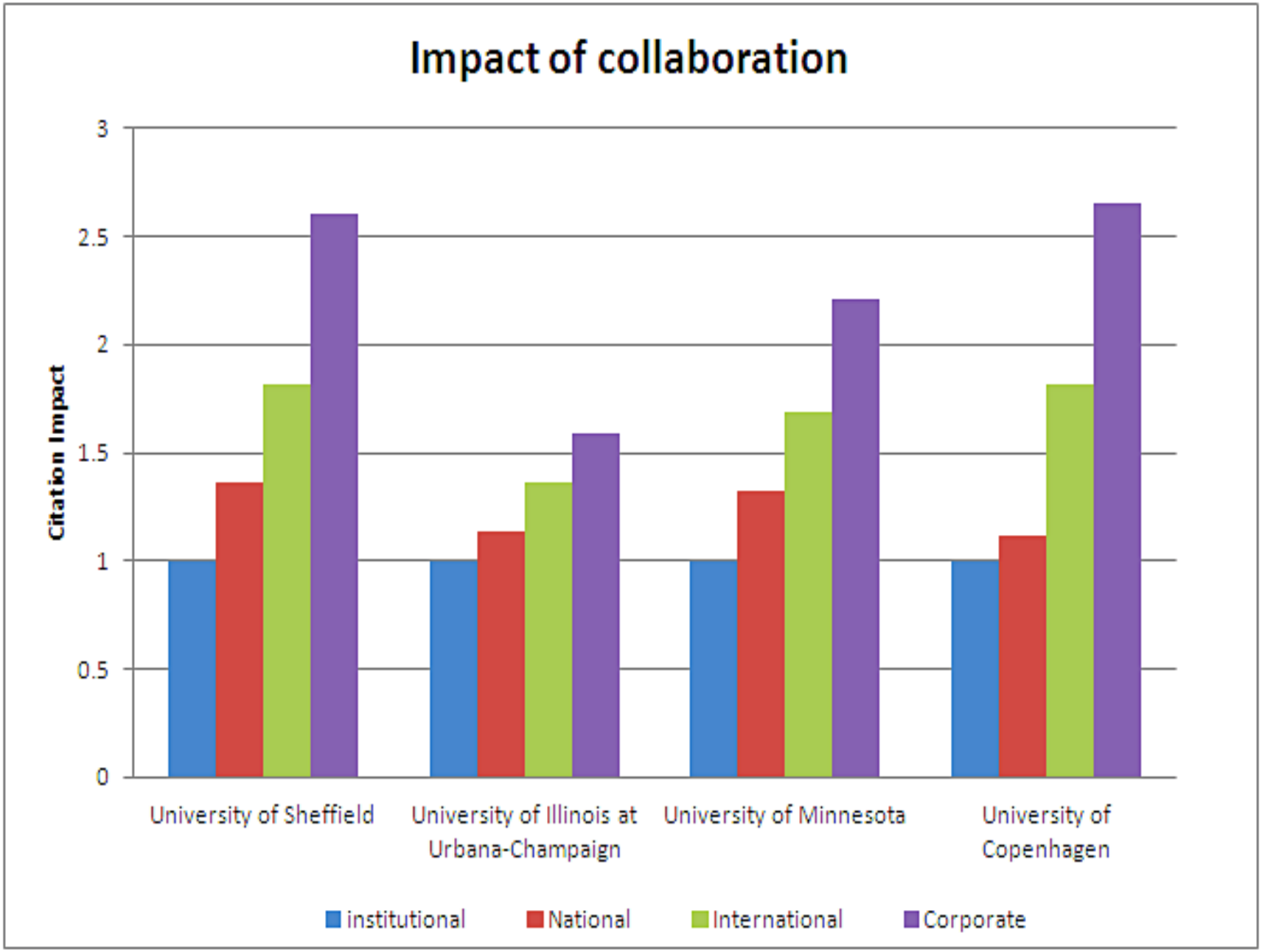
Empowering Knowledge

Triple Helix System




Impact of collaboration
Citation Impact
3
2.5
2
1.5
1
0.5
0
University of Sheffield
University of Illinois at Urbana-Champaign
University of Minnesota
University of Copenhagen
institutional
National
International
Corporate

Elsevier – CSG Report: America's Knowledge Economy

KEY FINDINGS

NATIONAL
1.7 PUBLICATIONS
PER 1,000 RESIDENTS

NATIONAL
6.5 PUBLICATIONS
Per million $USD R&D expenditures

TOP STATE
MASSACHUSETTS
7.5 publications produced per 1,000 residents, the highest of any state.

TOP STATES
MINNESOTA
10.5 publications produced per million $USD of R&D expenditures, the third highest among all states after Massachusetts and Delaware.

TOP RESEARCH FIELDS (NUMBER OF PUBLICATIONS)
1. MEDICINE
2. ENGINEERING

COLLABORATION PARTNERS
NEW YORK & MASSACHUSETTS
From 2004–2013, researchers from these states collaborated on 37,972 publications, of which 43% were in medicine.

TOP RESEARCH AREA (RELATIVE CITATION IMPACT)
COMPUTER SCIENCES
U.S. research in computer science achieves a field-weighted citation impact of 1.74, or 74% above the world average.

TENNESSEE | GROWTH IN RESEARCH IMPACT
The field-weighted citation impact of Tennessee's research grew from 1.54 in 2004 to 1.76 in 2013, or 1.5% per year over the past decade. This was the top growth rate among states that already achieved an impact above the U.S. average (1.49).

NORTH CAROLINA | RESEARCH STRENGTH IN MEDICINE
ranked in the top five among all states in both the relative volume of its research in medicine and the relative citation impact of its research in medicine.

America's Knowledge Economy: A State-by-State Review | NEW JERSEY

OVERVIEW: Research and development is a critical contributor to innovation and long-term economic growth, and the United States has a long history of being a global leader. According to a new collaborative report from The Council of State Governments and Elsevier—"America's Knowledge Economy: A State-by-State Review"—the United States published more than 536,000 publications in 2013. Predictably, states with larger populations also tended to publish more. For example, California and New York were the top two producers from 2004 to 2013. From 2004 to 2013, a big chunk of United States publications—more than one-quarter—focused on the field of medicine. Over the same period, Massachusetts and California produced the most impactful research—also called field-weighted citation impact—among all states. This brief offers a state-specific snapshot of data pulled from the report. To read the full report, visit *www.csg.org/knowledgeeconomy*.

1.87 PUBLICATIONS
PER 1,000 RESIDENTS, 2013
U.S. Average: 1.70 publications per 1,000 residents

FIELD-WEIGHTED CITATION IMPACT, 2004–13
1.79 Cited 79% more than global average

MOST IMPACTFUL RESEARCH FIELD
EARTH & PLANETARY SCIENCE
Ranked 2nd among all states in terms of research impact
and cited **53% more** than the U.S. average.

NEW YORK | TOP COLLABORATING STATE, 2004–13
20,683 collaborations (12.9% of all of New Jersey's publications)

RESEARCH STRENGTH IN BASIC SCIENCES, 2004–13
4TH AMONG ALL STATES in terms of relative impact of research in physics & astronomy, computer science, & mathematics.

8TH AMONG ALL STATES | Research impact across all fields, 2004–13.

The holy grail: measuring the real impact?

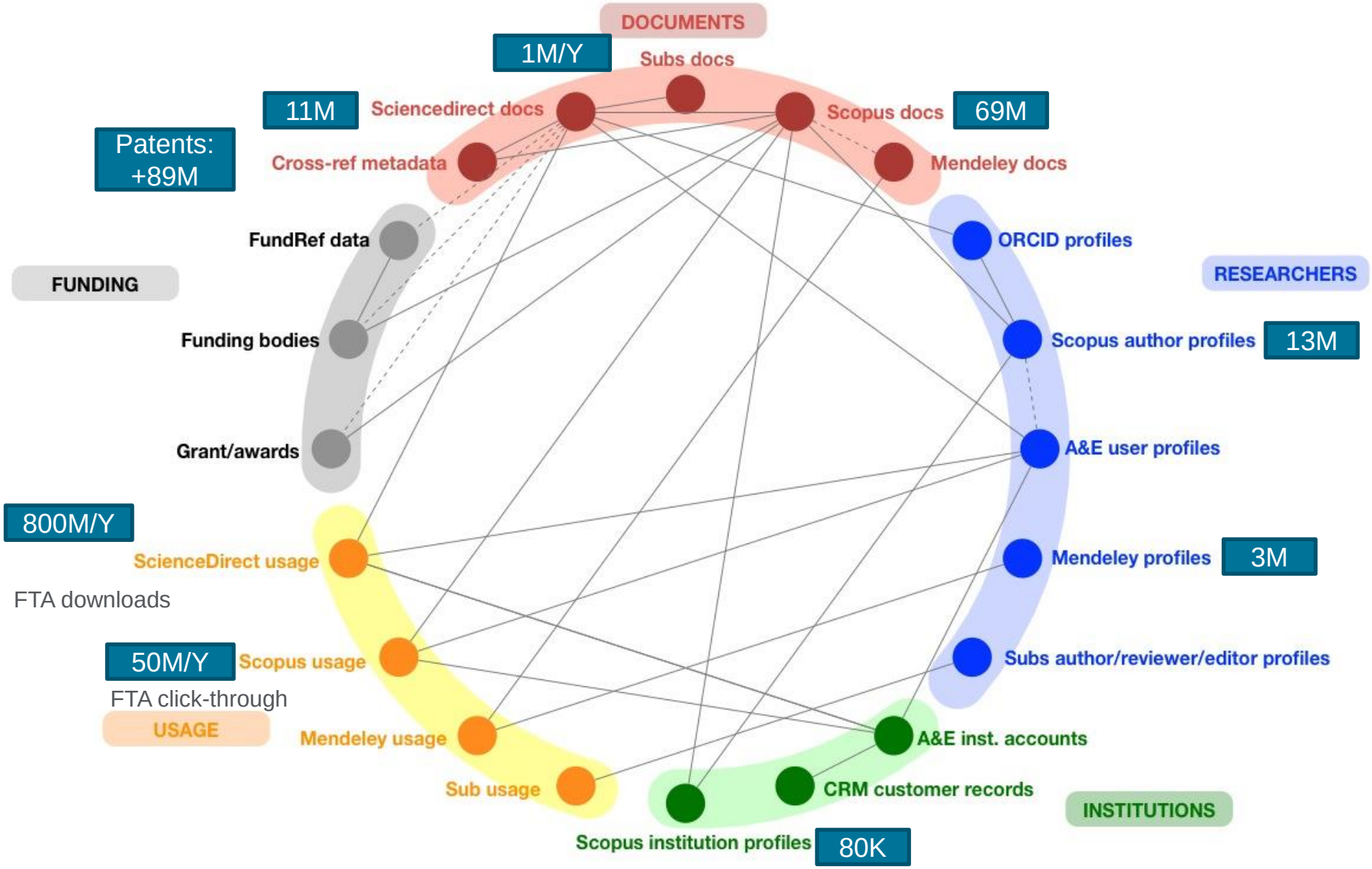
Education outcome

Knowledge Exchange

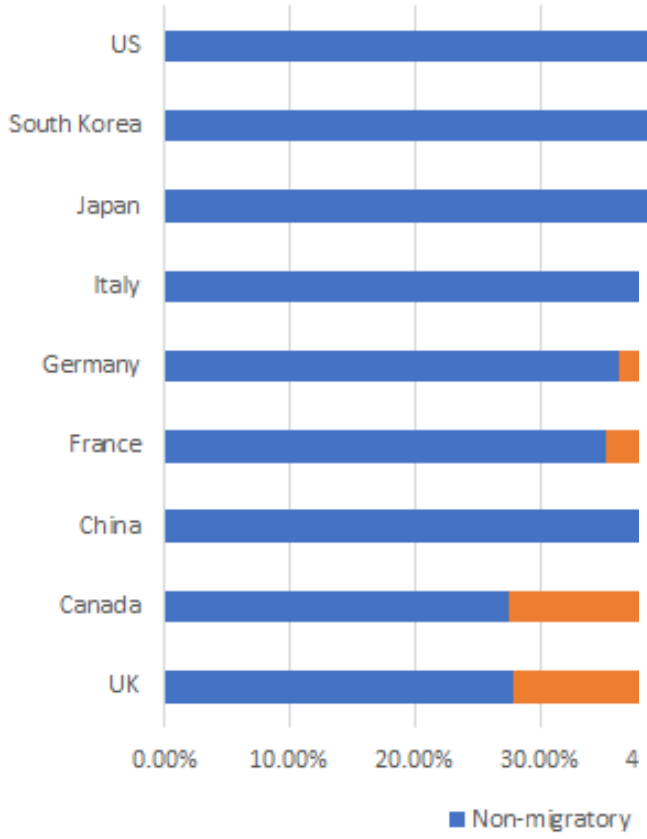
Commercialization of research

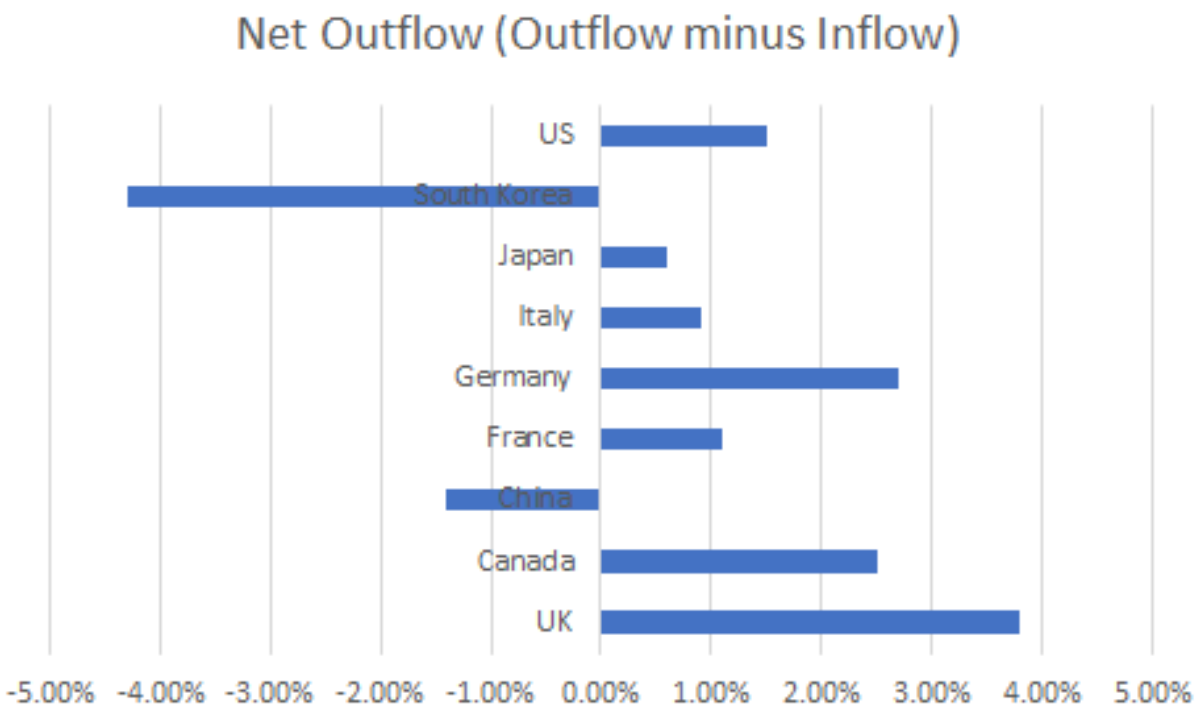
Innovation

Elsevier Data Assets: Connected, 360° View of Research



Knowledge Exchange: Measuring researcher mobility by tracking author profiles in Scopus publications





Knowledge Flows: Ohio Researcher Circulation

Returnee and transitory researchers have higher relative productivity than those that stay only in Ohio

Outflow
Researchers: **8.6%**
Relative Productivity: **0.65**
Relative Age: **1.07**
Cpp: 21.0

Returnees Outflow
Researchers: **5.9%**
Relative Productivity: **0.91**
Relative Age: **1.16**
Cpp: 19.9

Transitory (mainly nc
Researchers: **39.6%**
Relative Productivity: **1**
Relative Age: **1.11**
Cpp: 20.5

Transitory (mainly
Researchers: **13.5%**
Relative Productivity: **0.57**
Relative Age: **0.91**
Cpp: 19.0

Returnees Inflow
Researchers: **1.6%**
Relative Productivity: **1.01**
Relative Age: **1.19**
Cpp: 27.1

Inflow
Researchers: **9.2 %**
Relative Productivity: **0.65**
Relative Age: **1.11**
Cpp: 24.9

OH only
Researchers: **21.5%**
Relative Productivity: **0.41**
Relative Age: **0.72**
Cpp: 14.3

Non-OHIO

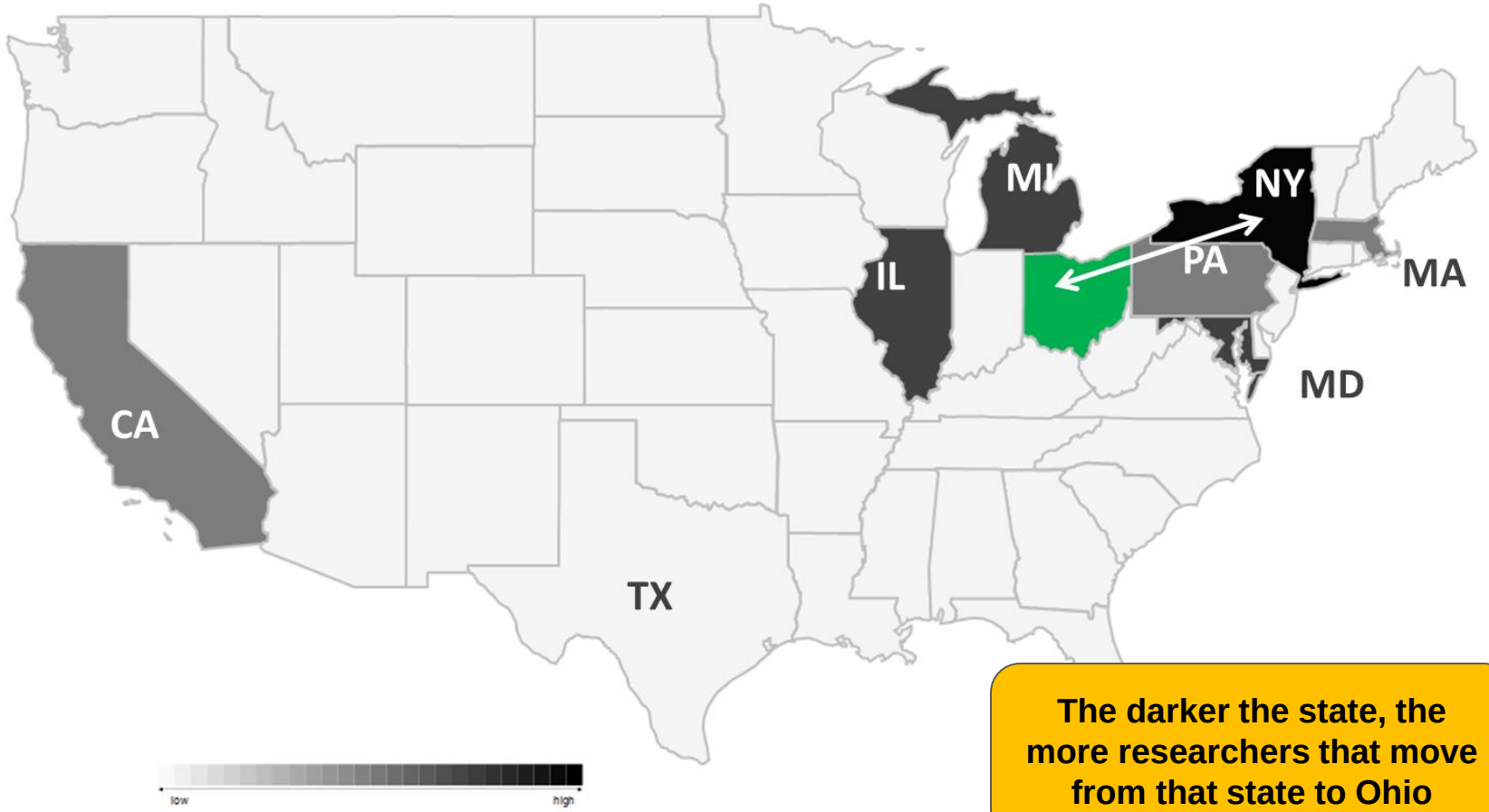
Brain Outflow
Researchers: **14.5%**
Rel. Product.: **0.76**
Relative Age: **1.11**
Cpp: 20.6

Transitory Brain Mobility
Researchers: **53.2%**
Rel. Product.: **1.29**
Relative Age: **1.06**
Cpp: 20.1

Brain Inflow
Researchers: **10.8%**
Rel. Product.: **0.71**
Relative Age: **1.13**
Cpp: 25.2

Source: SciVal Custom Analytics (October 2012)

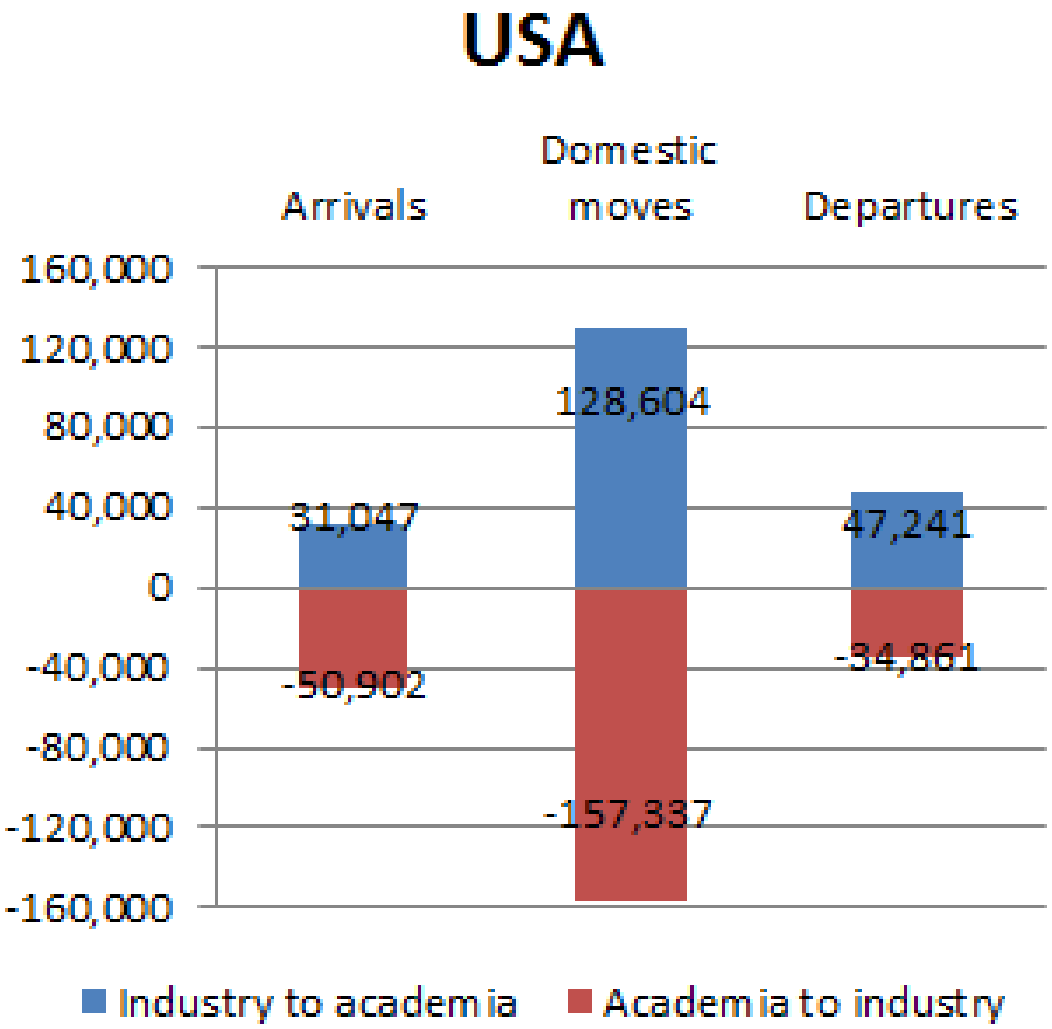
Knowledge Flows: Inbound Research to Ohio



The darker the state, the more researchers that move from that state to Ohio

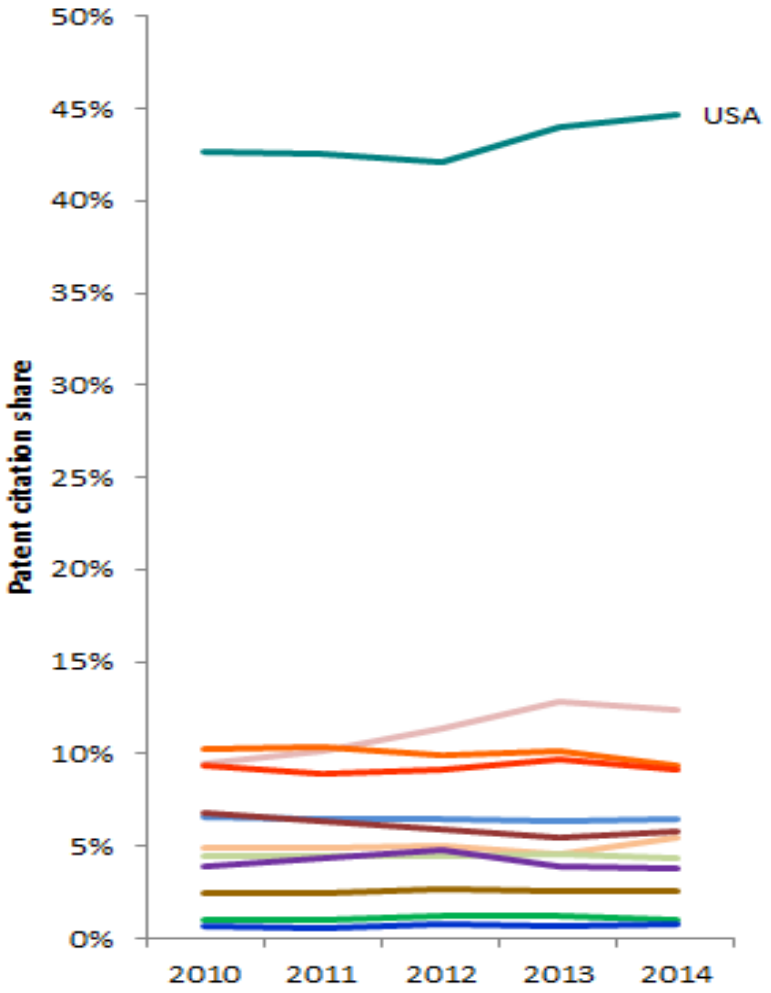
Source: SciVal Custom Analytics (October 2012)

Knowledge exchange and commercialization through intersectoral mobility

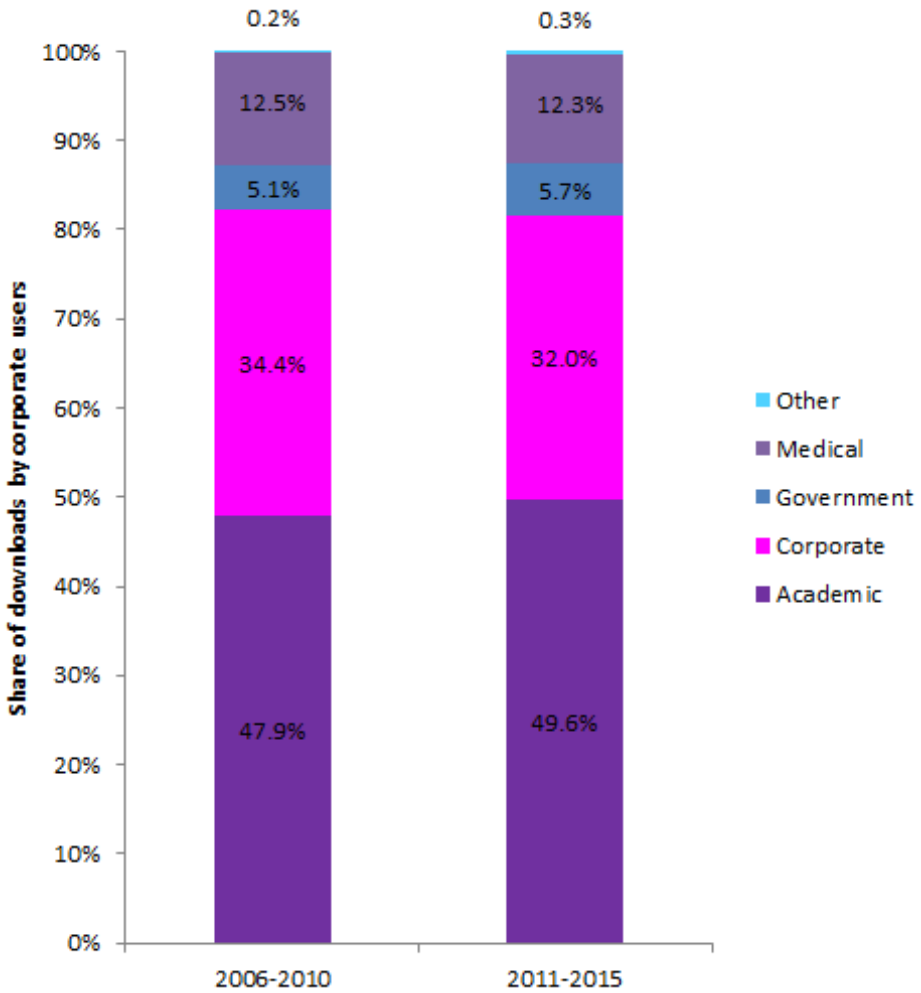


Commercialization of research & innovation by combining outputs with usage

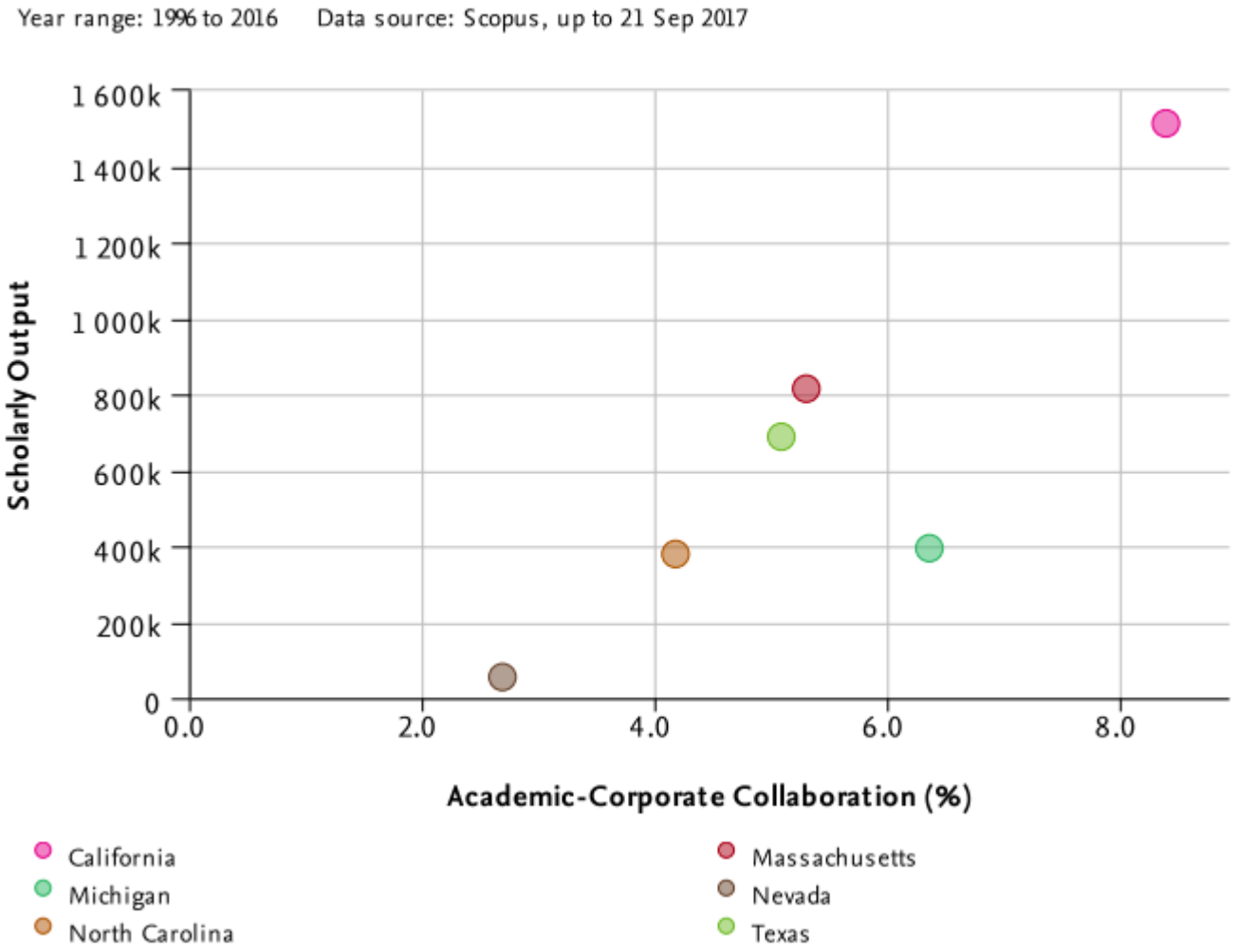
Citations from patents to research publications



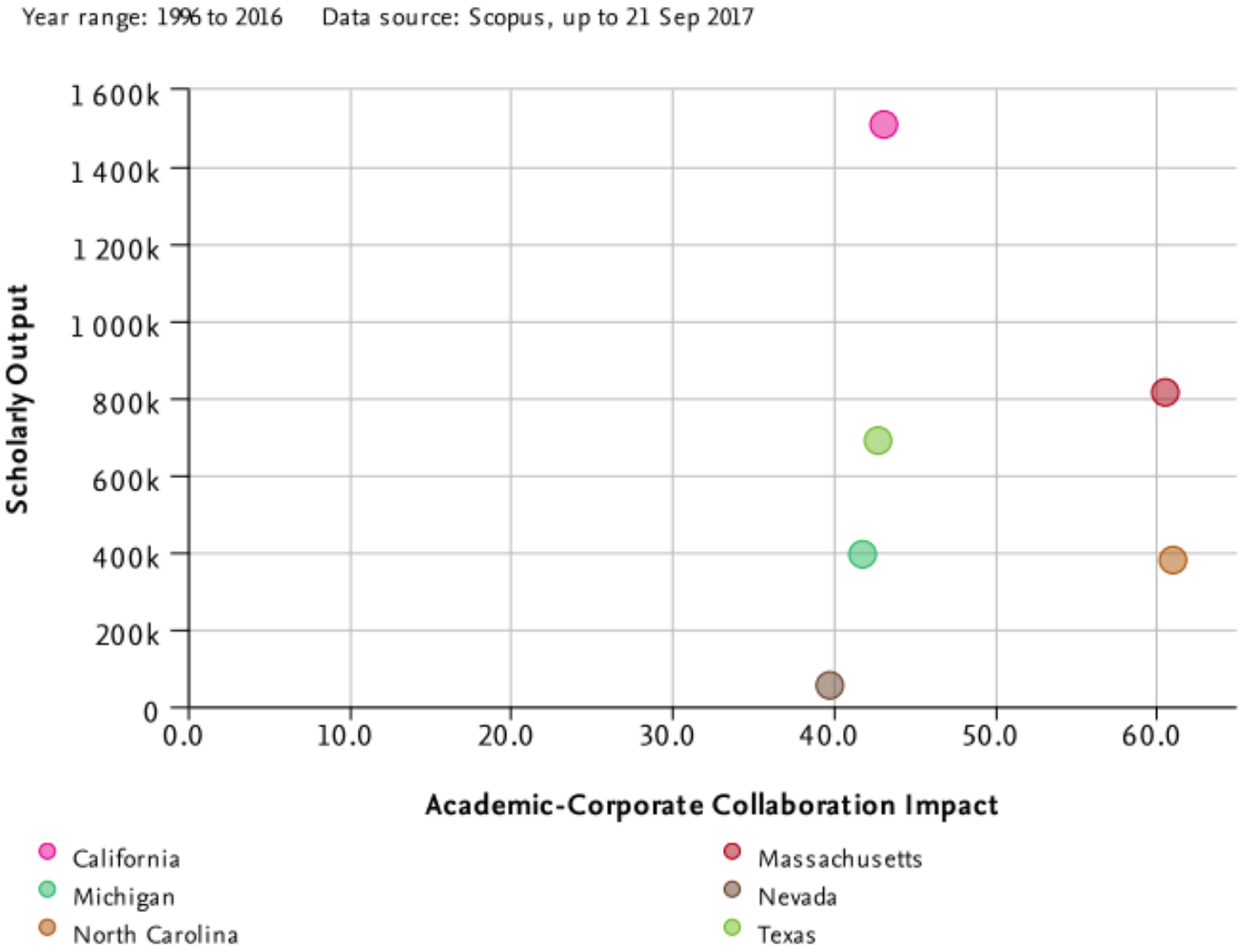
Full-Text article downloads



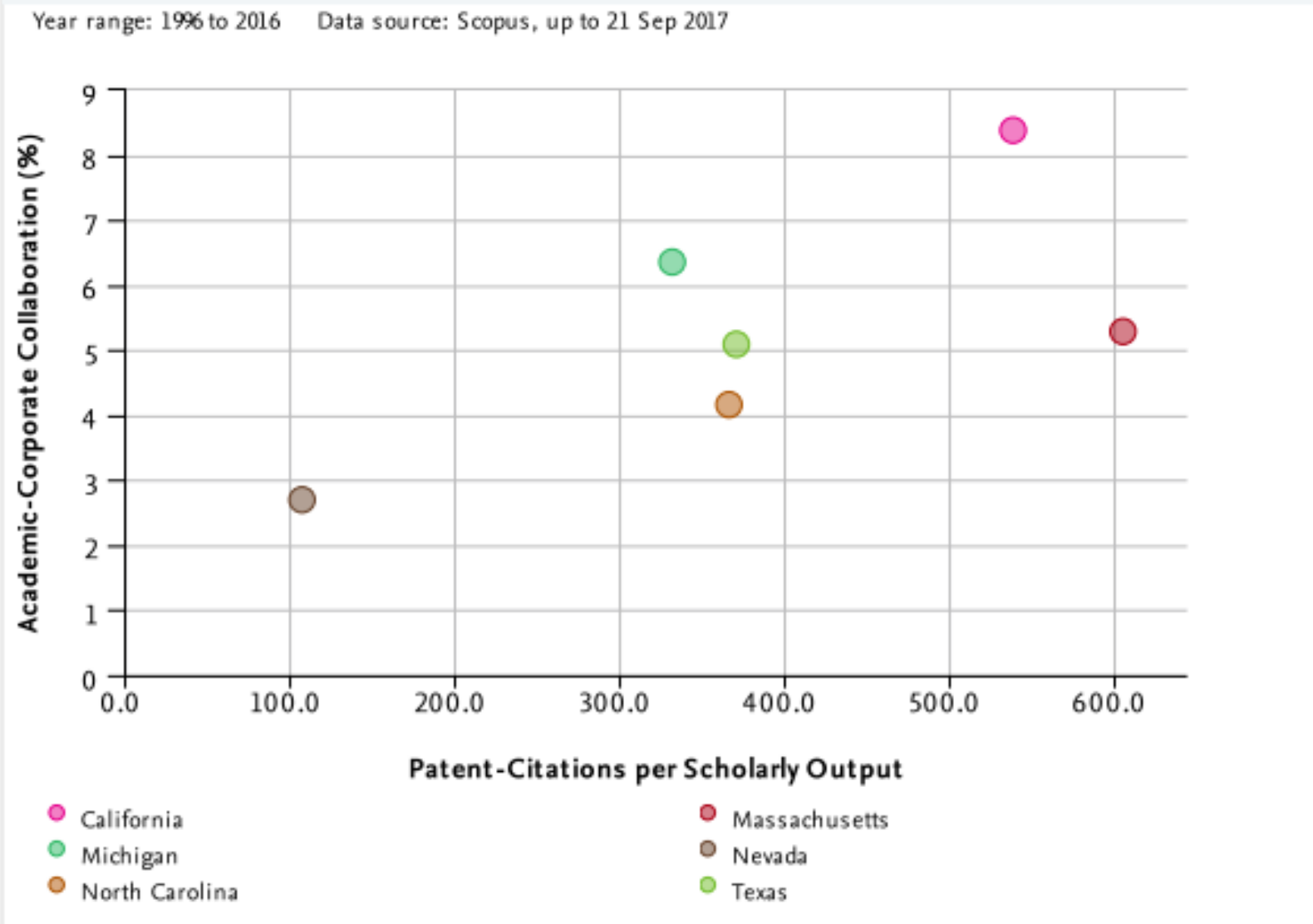
Academic Corporate Collaboration



Impact of Academic- Corporate Collaboration



Academic- Corporate Collaboration and Patent Citations per 1000 publications



Key parting thought

Measuring the **real Impact** of research and education is difficult, however,

- The increasing availability of **massive data sets**, and
- The potential of **new technologies and analytics tools**

will likely provide **closer proxies to quantitatively measure** the real impact.