Fostering Collaborations through Big-Data Analytics

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https://www.elsevier.com/research-intelligence/resource-library/ERI-Collaboration_Brochure
http://knowledgecenter.csg.org/kc/content/americas-knowledge-economy-state-state-review
Triple Helix System
What can be automated will be automated
BOUNDARY CROSSING COMPETENCIES
Teamwork, communication, perspective, networks, critical thinking, global understanding, project management, etc.

MANY DISCIPLINES
Understanding & communications

ME

MANY SYSTEMS
Understanding & communications

DEEP IN AT LEAST ONE DISCIPLINE
Analytic thinking & problem solving

DEEP IN AT LEAST ONE SYSTEM
Analytic thinking & problem solving

T-SUMMIT 2016
MARCH 21 & 22 | WASHINGTON, D.C.
What is the different between Detroit and Pittsburgh?
What is the different between Detroit and Pittsburgh?

Henry Ford did not give Detroit a university, Andrew Carnegie and Andrew Mellon gave Pittsburgh two great universities.

“Knowledge Economy”
What do New York City and Amsterdam have in common?

**ABOUT THE PROJECT**

The Cornell Tech campus on Roosevelt Island will be an innovative, sustainable academic campus made up of a combination of state of the art academic space, executive education center/hotel, housing for faculty, students, and staff, and publicly accessible open space. The campus will be built in phases, with the first opening in 2017. Overall, over two million square feet of new space will be located in a series of architecturally dynamic buildings.
What do New York City and Amsterdam have in common?

Engineering the future city.

AMS Institute [ex- cm – cs] is a new ambitious scientific institute located in Amsterdam. In this institute, science, education, government, business partners and societal organizations are working tightly together to create solutions for the complex challenges a metropolitan region like Amsterdam is facing. Now and in the future.

www.ams-institute.com
Starts with new knowledge discovery and follows with Dissemination and Use Driven innovation and economic growth.
FIGURE 4 WHO PERFORMS THE NATION’S BASIC RESEARCH?

<table>
<thead>
<tr>
<th>Year</th>
<th>University</th>
<th>FFRDCs</th>
<th>Industry</th>
<th>Other nonprofit and government</th>
<th>Federal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1953</td>
<td>25%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>50%</td>
<td></td>
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<tr>
<td>1965</td>
<td>60%</td>
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<tr>
<td>1970</td>
<td>70%</td>
<td></td>
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<td></td>
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<tr>
<td>1975</td>
<td>75%</td>
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</table>

Returns on Types of Collaboration

Source: Scopus (2006-2010)
Citations per article fold increase over institutional co-authorship
“A Team of Experts is not an Expert Team without Data”

“If a better economy is your destination, then better data is your map.”
Which industries and technologies should you bet on?

- Nanotechnology
- Electronics
- Food & Agriculture
- Logistics
- Life Sciences
- Medicine
- Nuclear
- Financial Services

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PASS LINE

Don't Pass Bar

PASS LINE

2 * 3 * 4 * 9 * 10 * 11 * 12
Our content and data assets are deep and broad

Approximately 3 petabytes of unique and high quality content and leading open sourced Big Data technology HPCC

- 12.5m articles on Science Direct
- 500 in 40 countries
- Events
- 1.4bn US business contacts
- Global business news
- Over 30k sources
- 57 languages
- Global patents
- 100 patent offices
- >93m records
- Secondary law
- (regulations, directives, cases)
- >60% of world’s primary laws published each year
- Global air fleet specifications
- Global commodities prices
- Global watch lists
- 1.2m+ entries
- 240 countries
- Global chemical compound & reaction databases
- 22m compounds; 35m reactions
- Global disease pathways
- 3.3m molecular facts
- US drugs database
- 16k branded drugs; 12k generic drugs
- 2,500 journals; 1,800 books
- 8.4bn US names, addresses etc.
- 3.3bn US auto insurance records
- 307m US criminal records
- Global watch lists
- 1.2m+ entries
- 240 countries
- US medical providers
- 6.5m entries
- 1.5bn US bankruptcy records
- 17% of global research
- 1.5bn US bankruptcy records
- 6.5m entries
- 240 countries
- 1.5bn US medical providers
- 6.5m entries
- 240 countries
National research assessment and benchmarking reports
• UK REF, UK BIS reports
• ERA (Australia)
• FCT (Portugal)
• VQR (Italy)

Global University Rankings
• Times Higher World University Rankings
• QS rankings
• US News rankings (Arab Region)

ProBono initiatives and reports (select examples)
• UK Royal Society
• Science Europe
• European Commission, FENS, HBP, Kavli Foundation, RIKEN BSI
• World Bank
• EuroStemCell, Kyoto University
• Snowball Metrics
International **Comparative Performance** of the UK Research Base – **2013**

A report prepared by Elsevier for the UK’s Department of Business, Innovation and Skills (BIS)
The Illinois science and technology roadmap

Full report
The Illinois science and technology roadmap

Mapping Research and Innovation Understanding Amsterdam’s Competitive Advantage

11 Comparator Cities

Amsterdam Barcelona Berlin Brussels Copenhagen Dublin Hamburg Madrid Manchester Stockholm Vienna
Top sub-areas within Medicine: Clinical Neuroscience and Cardiology

![Diagram showing the top sub-areas within Medicine, including fields like Clinical Neuroscience, Cardiology, Radiology & Nuclear Medicine, Oncology, and others, with a field-weighted citation impact from 2004-2013.](image)
Kansas City’s Knowledge Economy Strengths

Research Activity Index, 2010 – 2014, All Kansas City

- Agricultural and Biological Sciences
- Arts and Humanities
- Biochemistry, Genetics and Molecular Biology
- Business, Management and Accounting
- Chemical Engineering
- Chemistry
- Computer Science
- Decision Sciences
- Dentistry
- Earth and Planetary Sciences
- Economics, Econometrics and Finance
- Energy
- Environmental Science
- Engineering
- Ethics
- Health Professions
- Immunology and Microbiology
- Mathematics
- Materials Science
- Medicine
- Neuroscience
- Nursing
- Pharmacology, Toxicology and Pharmaceutics
- Physics and Astronomy
- Psychology
- Social Sciences

Kansas City United States
Working together – universities and industry

Academic-Industry Collaboration as % of Total Research, 2012

- New York: 3.5%
- Chicago: 3.1%
- Kansas City: 2.1%
- Hong Kong: 1.1%
- Los Angeles: 4.5%
- Toronto: 2.5%
- Amsterdam: 3.2%

Sources: SciVal Analytics Custom Report
America's Knowledge Economy: A State-by-State Review

TEXAS

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 319,000 publications in 2013. Predictably, states with larger populations also tend 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.

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

FIELD-WEIGHTED CITATION IMPACT, 2004–2013
1.58 Cited 58% more than global average

COMPARATIVE ADVANTAGE IN RESEARCH
MATERIALS SCIENCE
Ranked 7th among all states in terms of research impact and cited 9% more than the U.S. average.

CALIFORNIA
TOP COLLABORATING STATE, 2004–2013
36,577 collaborations from 2004–2013 (9.5% of all of Texas's publications)

RESEARCH AND DEVELOPMENT FUNDING, 2004–2013
3rd AMONG ALL STATES | $43.1 BILLION

CRITICAL MASS OF RESEARCH AND INNOVATION, 2004–2013
Texas researchers and inventors account for 7.8% of all U.S. research publications (4th among all states) and 7.1% of all U.S. patents granted (2nd among all states).

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www.csg.org/knowledgeeconomy

VIRGINIA

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 319,000 publications in 2013. Predictably, states with larger populations also tend 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.

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

FIELD-WEIGHTED CITATION IMPACT, 2004–2013
1.48 Cited 48% more than global average

COMPARATIVE ADVANTAGE IN RESEARCH
MEDICINE
Cited 11% more than the U.S. average.

MARYLAND
TOP COLLABORATING STATE, 2004–2013
15,446 collaborations from 2004–2013 (8.2% of all of Virginia's publications)

RESEARCH FROM MEDICAL SECTOR, 2004–2013
16.7% of Virginia's total research output is from its government sector, the 5th highest rate among all states.

RESEARCH FROM CORPORATE SECTOR, 2004–2013
6.3% of Virginia's total research output is from its corporate sector, the 10th highest rate among all states.

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www.csg.org/knowledgeeconomy
Relative volume and impact: New York has a growing advantage in computer science

- 4th among all states in relative volume, 10th among all states in relative impact
Relative volume: North Carolina specializes in the health sciences

- 28.7% of all US output was in the field of medicine, but an even higher percentage (38.6%) of North Carolina’s output was.
REACH NC is a Web portal that enables users to find experts and assets within North Carolina higher education and research institutions. Read More

CLICK TO VIEW REACH NC PROFILES

REACH NEWS FEED
Genetically-engineered preclinical models predict pharmacodynamic response
Preclinical testing a necessary step in drug development
READ STORY

UPCOMING EVENTS
There are no upcoming events at this time.

ABOUT REACH NC
REACH NC began as a way to allow North Carolina to tap into its own vast pool of experts and resources. As home to major research institutions, Research Triangle Park and a robust public university system, North Carolina is also the home to world-class scientists, engineers, artists and humanists.
LEARN MORE

http://www.experts.scival.com/reachnc/
The MCRN University Expertise Portal enables you to search through topics of research and expertise at Michigan’s universities and create a request to our business engagement offices to connect you to the on-campus resources your business needs.
“If a better economy is your destination, then better data is your map.”
States Spend Less on Colleges After Recession

Percent change in state spending per college student from fiscal 2008 to fiscal 2014, adjusted for inflation.

Students Shoulder Greater Share of Tuition

Tuition accounted for about 48 percent of public higher-education revenue in 2013—double what it was in 1988.

<table>
<thead>
<tr>
<th>Institution Type</th>
<th>% Agreeing Model Is Sustainable Over a Decade, 2014</th>
<th>% Agreeing Model Is Sustainable Over a Decade, 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Doctoral</td>
<td>53%</td>
<td>42%</td>
</tr>
<tr>
<td>Public Master’s</td>
<td>55%</td>
<td>31%</td>
</tr>
<tr>
<td>Public Baccalaureate</td>
<td>50%</td>
<td>34%</td>
</tr>
<tr>
<td>Public Associate</td>
<td>44%</td>
<td>36%</td>
</tr>
<tr>
<td>Private Doctoral/Master’s</td>
<td>48%</td>
<td>42%</td>
</tr>
<tr>
<td>Private Baccalaureate</td>
<td>45%</td>
<td>41%</td>
</tr>
</tbody>
</table>

Source: Center on Budget and Policy Priorities

Source: State Higher Education Executive Officers