

The Economic and Social Value of the University Research Enterprise



University Generated Innovations:
Value to Economy & Quality of Life

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Economic Value of University Research

The Economist - Dec 12, 2002 Editorial

“Possibly the most inspired piece of legislation to be enacted in America over the past half-century was the Bayh-Dole Act of 1980.” “it unlocked all the inventions and discoveries that had been made in laboratories throughout the United States”

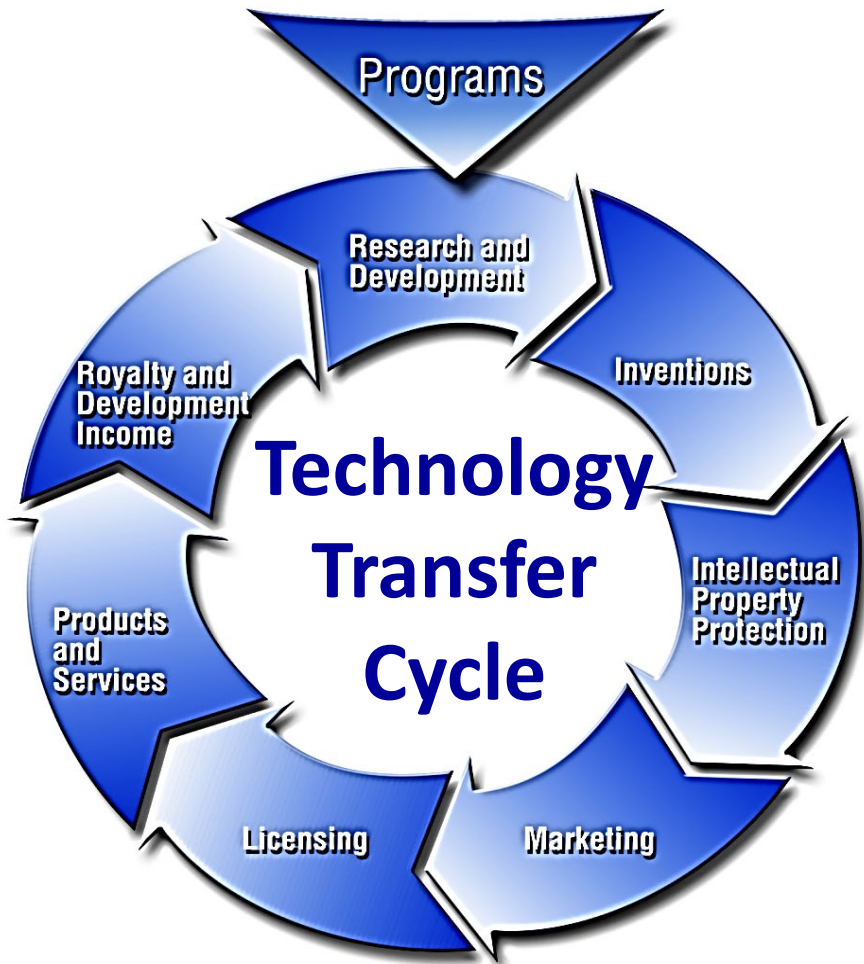
The logo for The Economist, featuring the words "The Economist" in white serif font on a red rectangular background.

A Former President of the NASDAQ Stock Market

Estimate: “30% of its value is rooted in university-based, federally funded research results, which might never have been commercialized had it not been for the Bayh-Dole Act.”



The Intersection of Innovation by Higher Education with Industry



- ▶ Innovations from University R&D
- ▶ IP Protection of Innovations
- ▶ Marketing and Licensing to Industry
- ▶ Production of Products/Services
- ▶ Income to University/Inventors-Creators
- ▶ Commercialization Grant Funding
- ▶ New Start-ups & High-Tech Jobs
- ▶ Public Benefit: New Products/Services

Association of University Technology Managers

U.S. Research Universities: 2020 Annual Data

Innovation at U.S. Universities

- R&D Expenditures: \$72 Billion
- IP Disclosures (innovations) : 24,000
- U.S. Patent Applications: 14,000
- Issued U.S. Patents: 7,600
- Option & License Agreements: 8,800
- Start-up Companies: 1,037



Performance Metric Comparisons: Outputs & Outcomes
Generated per Input (\$10 Million R&D Expenditures)



Academic Innovation: Summary of the Economic Impact of Licensing Innovations to Industry 2022 Economic Model*

Economic Impact of U.S. University Innovation

- Contributions of academic licensors to industry gross output range from \$631 billion to \$1.9 trillion, in 2012 U.S. dollars;
- Contributions to gross domestic product (GDP) range from \$333 billion to \$1 trillion, in 2012 U.S. dollars; and
- Estimates of the total number of person years of employment supported by licensed-product sales range from 2.4 million to 6.5 million over the 25-year period



* Economic Contributions of University/Nonprofit Inventions in the United States: 1996–2020 - Prepared for the Biotechnology Innovation Organization (BIO) and AUTM - by Lori Pressman, Mark Planting, Carol Moylan and Jennifer Bond. June 14, 2022

Regional Economic Impact of Adding High-Tech Jobs

University Innovation: High-Tech Jobs and Multiplier Effects

Moretti's Study of 320 Metropolitan Statistical Areas:*

- Each New High-Tech Job Generates a Regional 5X Multiplier Effect
- Five Additional Jobs are Created Locally Outside of the Technology Sector:
 - Two (2) Professional Jobs; and
 - Three (3) Non-Professional Sector Jobs.
- Traditional Manufacturing has a Multiplier Effect of 1.4 Jobs.

*U.C. Berkeley Economist Enrico Moretti: *The New Geography of Jobs* (2013)

Triumvirate Mission of a Public Research University: Education, Research and Public Service

The High Return on Investment for Publicly Funded Research

Sean Pool and Jennifer Erickson December 10, 2012 - Center for American Progress

Department of Energy Labs: 1943–2012

What we invested: A few million dollars in the early 1940s, growing to about \$5 billion, or 0.03 percent of GDP, in 2012. The Department of Energy labs also receive funding from other government agencies bringing the total spending to \$10 billion.

What we got: The optical digital recording technology behind all music, video, and data storage; fluorescent lights; communications and observation satellites; advanced batteries now used in electric cars; modern water-purification techniques that make drinking water safe for millions; supercomputers used by government, industry, and consumers every day; more resilient passenger jets; and better cancer therapies.

Economic Return on Investment - 2017. Jeff Dowd, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy: Taxpayer investment of \$12 billion in EERE's R&D portfolio has yielded more than \$388 billion in net economic benefits to the United States. Benefit-to-cost ratio was 33 to 1



U.S. DEPARTMENT OF
ENERGY

Triumvirate Mission of a Public Research University: Education, Research and Public Service

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National Science Foundation: 1950–2012



What we invested: Just \$3.5 million for its first full year of operation in 1952 (roughly \$29 million in 2012 dollars), growing to \$7 billion, or 0.05 percent of GDP, in 2012.

What we got: Google, which was started by a couple of students working on a research project partially supported by the National Science Foundation, is today (2012) worth an estimated \$250 billion and employs 54,000 people. This alone would pay for nearly all the program's costs reaching back to its inception, but funding has also been instrumental in the development of new technologies and companies in nearly every major industry, including advanced electronics, computing, digital communications, environmental resource management, lasers, advanced manufacturing, clean energy, nanotechnology, biotechnology, and higher education.

Google 2022 Net Worth Update: \$1,549 billion (\$1.5 trillion); 150,000+ Employees (\$18+ Billion Salaries)
NSF 2022 Annual Budget is \$8.8 Billion

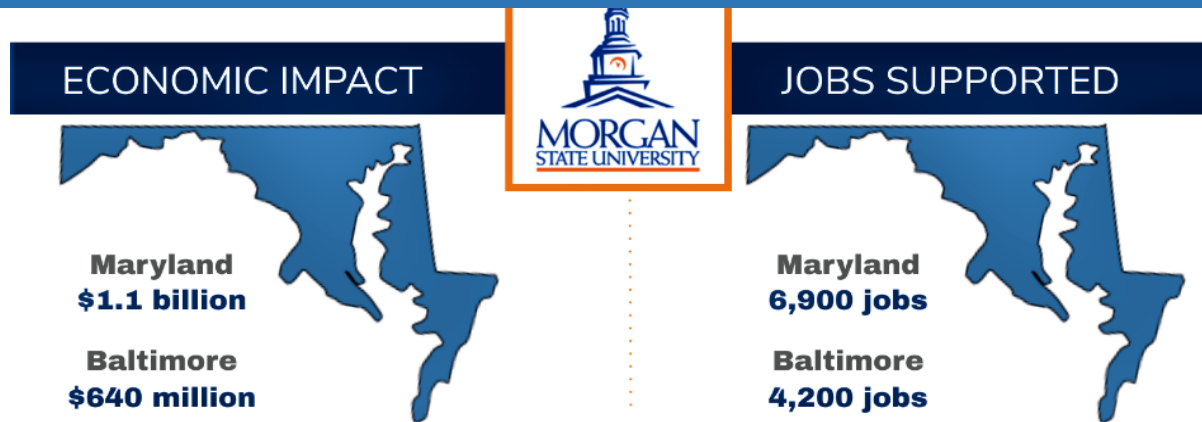
Morgan Economic Impact Update Summary Report

Econsult Solutions Inc. (Update Issued January 2021)

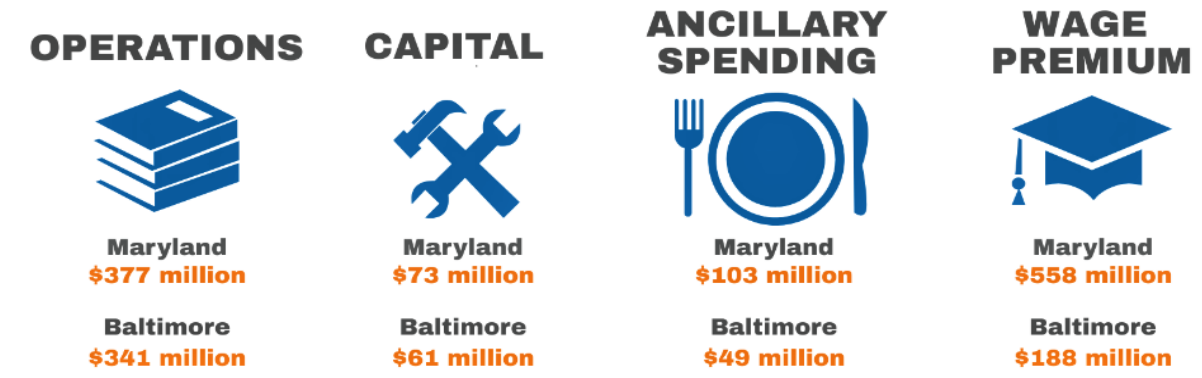
Econsult Solutions:

"Overall, Morgan is a significant driver of economic impact for Baltimore, the region, and the state of Maryland."

Morgan generates over \$1.1 billion in annual economic impact to the State of Maryland, with \$640 million of impact to Baltimore City.



ECONOMIC IMPACT BY CATEGORY



ANNUAL TAX REVENUES



Econsult Solutions:

Morgan's "research and innovation work produces scientific discoveries, yields startup ventures and tackles issues of strategic importance to the state."

"Dollar for dollar, Morgan is significantly more productive than the state's other research universities and produces at a level higher than the national average."