



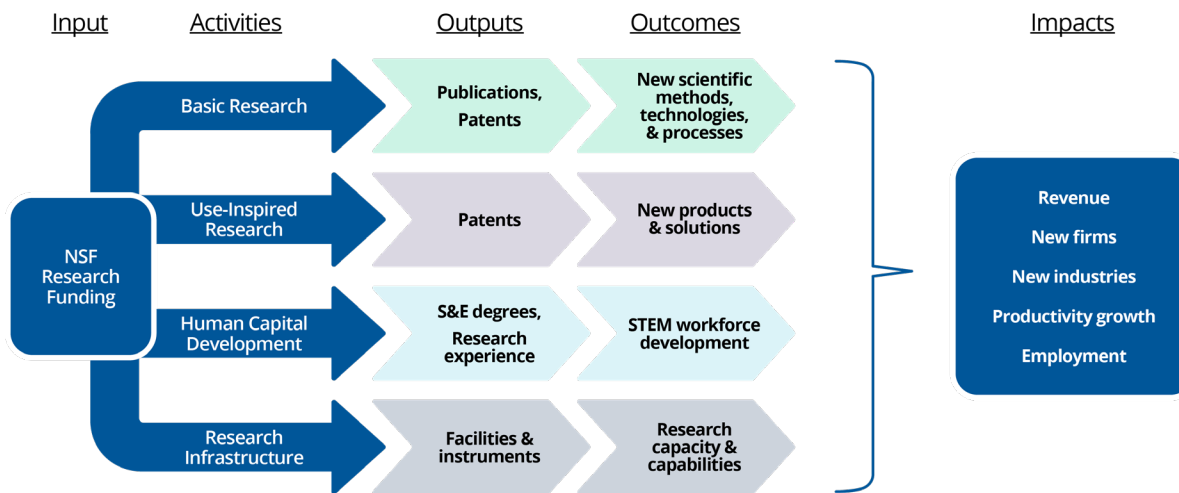
NSF's Evaluation and Assessment Capability (EAC) Unit conducted a literature review to examine how to measure the economic impact of the Foundation's research and development (R&D) funding. The review summarizes research on how federally funded R&D contributes to economic outcomes and identifies methods NSF can use to estimate the impacts of its investments.

Access the Report



[NSF Economic Impacts Literature Review](#)

Framework of NSF Funding Pathways



NSF funding supports four core R&D activities: Basic Research, Use-Inspired Research, Human Capital Development, and Research Infrastructure.

These activities produce publications and patents that lead to new scientific methods, technologies, processes, and, in some cases, products and solutions.

Value of Federal Funding

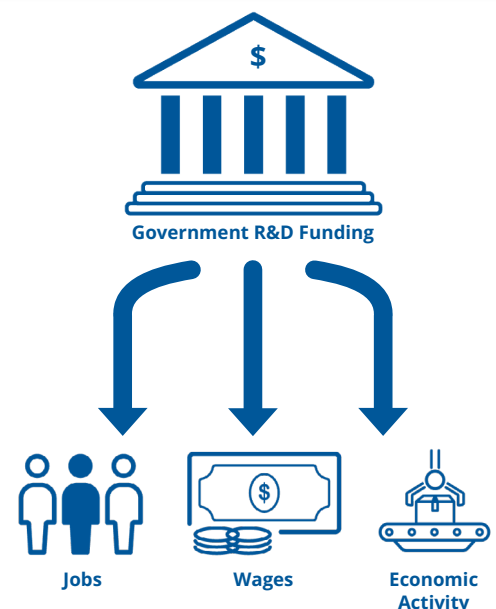
Government is an important source of R&D funding which generates economic value—supporting jobs, wages, and broader economic activity.

Recent U.S. data show the following (in 2022):

- The U.S. federal government financed **\$159.8 billion** (18%) of the \$885.6 billion in total U.S. gross expenditures on R&D.
- Federal funding supported **52%** of higher-education R&D and **5%** of business R&D.

Estimates from eight studies of the economic impacts of federal R&D funding indicate:

- **\$2.31 to \$2.86** in additional output *per \$1 invested*
- **\$1.46 to \$2.00** in value added *per \$1 invested*
- **\$0.94 to \$1.23** in employee compensation *per \$1 invested*
- **\$58,000 to \$92,000** in funding required *per job supported*



Estimating Economic Impact

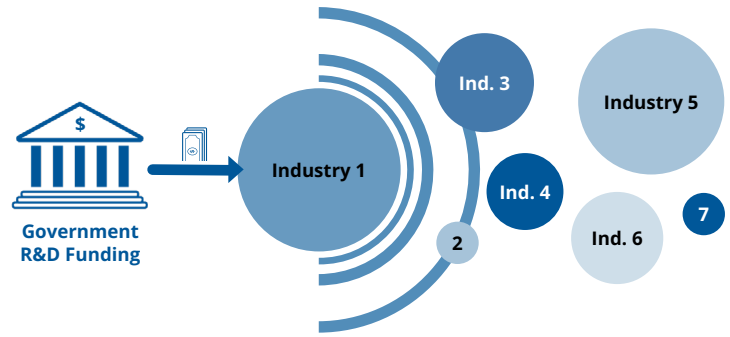
EAC conducted a systematic review of theoretical and empirical research on the economic impacts of federally funded R&D. The review found NSF can estimate economic impacts using a variety of approaches.

R&D Funding



Input-Output¹ (I-O models are practical for estimating short-term economic impacts of NSF awards (e.g., jobs, GDP) at the local, state, or national level.

1. I-O models show how spending in one industry creates ripple effects across the entire economy. They track the connections between industries to estimate how a change—like new investment or increased production—affects jobs, earnings, and economic output.



Intermediate Outcomes



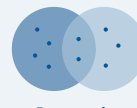
Econometric methods² can be used to examine intermediate outcomes, such as if federal funds stimulate additional non-federal research funding and if student financial aid increases the STEM workforce.

2. Econometric methods often use a mixture of economic theory, data, and statistical methods to quantify and test economic relationships as well as to evaluate public policy by estimating causal effects.

Example Econometric Methods



Linear Regression



Propensity Score Matching



Time Series Models

R&D-financed Discoveries



Production function³ and cost-benefit analysis (CBA) approaches⁴ are used for estimating long-term economic impacts of discoveries from NSF-funded research, which are typically generated when a new technology is commercialized successfully or is used to increase the efficiency of production processes.

3. A production function explains how inputs like labor, equipment, and research funding translate into outputs such as new technologies or scientific discoveries.

4. CBA compares the long-term benefits generated by scientific discoveries—like economic growth, innovation, or cost savings—to the costs of producing them, helping determine whether the investment delivers value over time.

