Helping U.S. government agencies track the usage of research assets

Advancing human progress together
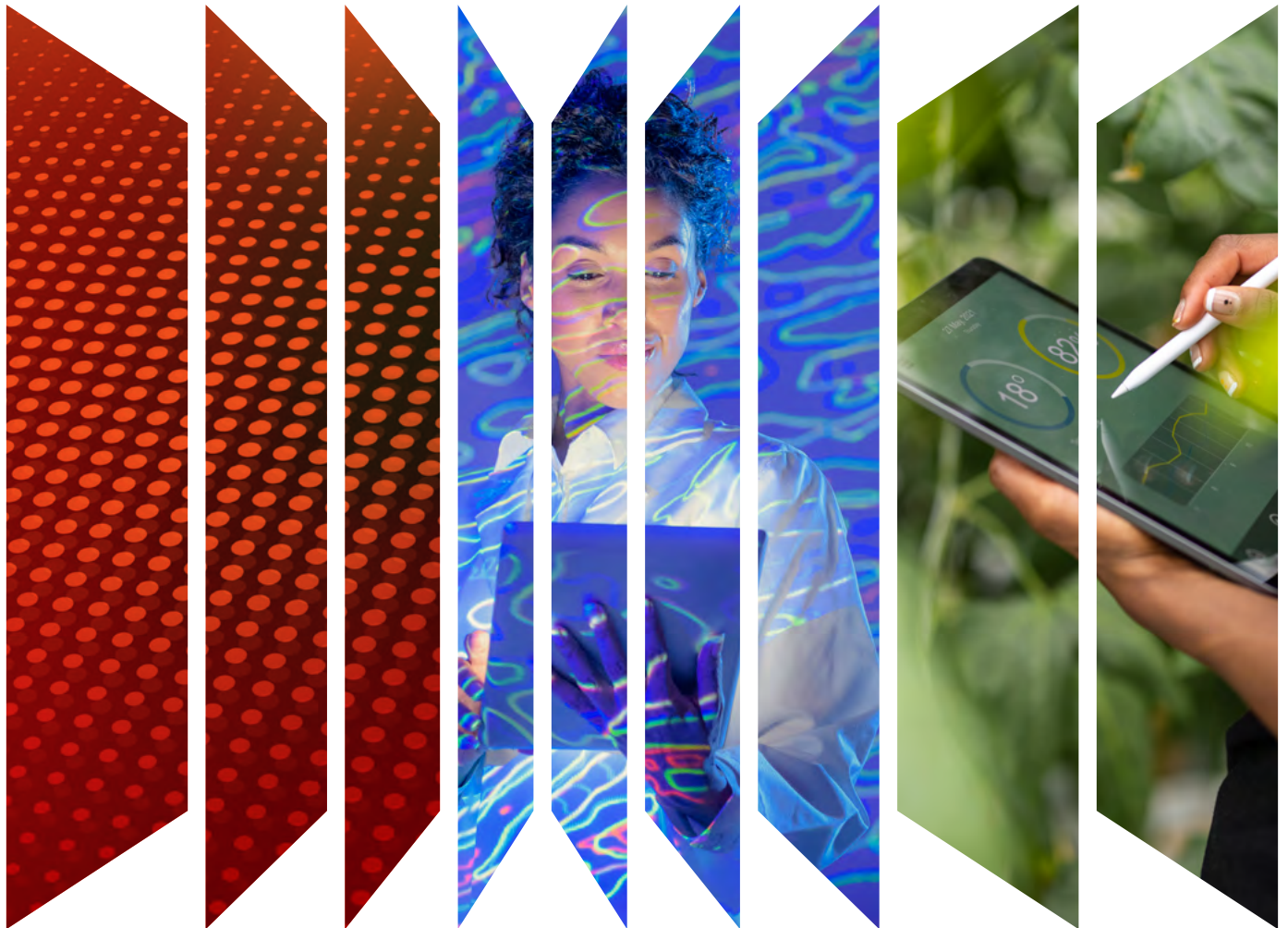
Executive summary

For decades, agencies like the United States Department of Agriculture (USDA), National Institutes of Health (NIH), National Science Foundation (NSF), and National Oceanic and Atmospheric Administration (NOAA) have produced or funded large numbers of research assets such as datasets, publications, patents, and policy documents.

InsightGraph: Transforming data into actionable
insights for government agencies and funding bodies

These research assets are essential for driving scientific progress, innovation, and evidence-based policymaking.

Yet until now, agencies had:

- **Few standardized ways** for knowing who used their research assets

- **Limited infrastructure** to identify where and how these assets are used in subsequent research and innovation

- **Limited methods and processes** to demonstrate the public value of their investments.

Without quality-assured visibility into usage, agencies struggle to justify investments, demonstrate societal impact, and support evidence-based policymaking. InsightGraph's capabilities change all that, enabling government agencies and funding bodies to:

Track the usage of their assets
across a uniquely comprehensive corpus of scientific literature

Measure the reach and influence
of taxpayer-funded work on research

Provide transparency and accountability
to funders, researchers, and the public.

With the help of InsightGraph, agencies can measure the reach and influence of these assets (for example, examining which research papers or breakthroughs utilized a given open dataset) and thereby demonstrate the public impact and value of their investments.

InsightGraph isn't just about data; it's a cornerstone of building a modern, evidence-driven public sector. It directly supports policy priorities like the open science movement, the Evidence-Based Policymaking Act of 2018, and the OSTP Nelson Memo (2022), which mandates open access and data transparency.

In this paper, we'll explore how InsightGraph has given U.S. agencies the ability to track the usage of research assets across the entire scientific literature, providing transparency and accountability to funders and the public. We'll discuss InsightGraph's capabilities and involvement in cutting-edge government initiatives to track the impact of publicly funded research, and explore case studies in which the solution has helped funding bodies fulfill policy goals and research missions.

In a broader sense, InsightGraph also serves as a compelling example of how Elsevier enables modern, data-driven accountability. InsightGraph is already at the forefront of solving new challenges, such as dataset impact tracking, which is difficult to address without employing advanced search capabilities across many different types of research outputs. It is part of a broader movement to ensure that publicly funded data serves the public good, and that its value is visible, measurable, and maximized.

The visibility problem:
public data,
hidden impact

In today's complex research environment, funders and governments are often forced to grapple with fragmented research assets, conflicting or overlapping objectives, strategic resource allocation, impact demonstration, and the ever-present possibility of reputational risk

Many also face increasing cost constraints, making it difficult to obtain all the necessary evidence they might need which can then result in incomplete or inaccurate insights. Navigating compliance and standing up to stakeholder scrutiny are additional sources of pressure, especially when data must be presented quickly and accurately.

These are significant issues, especially in the open science era, because agencies engaged in research and innovation not only care about the number of papers and patents they fund, but also how research and innovation activities contribute to broader scientific, economic, or technological impact. Against this backdrop, it's more important than ever to track the impact gained from spending the taxpayer's dollar.

That's why InsightGraph fills such a valuable need for analysts and administrators at a wide variety of organizations, including federal and state research agencies, public sector consultancies, boards, think tanks, and learned societies.

The solutions can assist with policy development, research funding strategy, and funding outcomes tracking. For program directors of research funding programs, InsightGraph can help with grant awards, program development, policy compliance, and evaluation.

The outcomes and benefits of InsightGraph include:

Enhanced strategic decision-making, with advanced analytics and visualization tools to extract actionable insights

Optimized resource allocation, identifying high-impact research areas or fields where additional capabilities are needed, enabling you to efficiently allocate funding to them

Building trust and justifying investments, using clear, transparent reporting to highlight project successes and demonstrate impact to stakeholders.

How InsightGraph works

InsightGraph is a data intelligence solution built on top of a holistic research data and insights knowledge graph; by integrating and interlinking data from multiple sources, InsightGraph provides a single source of truth for strategic decision-making. This analysis gives funders and government agencies a comprehensive overview of the research ecosystem, so they can make evidence-driven decisions with accuracy and confidence.

InsightGraph starts by integrating disparate data sources, beginning with Elsevier assets including Scopus data, Overton, and patent information, and supplementing that with other publicly available and client-provided data. The next step produces a detailed "knowledge graph" — which adds value and context to the data through the creation of links and the addition of semantic metadata. Knowledge graphs are particularly powerful for analyses, integration, sharing, showcasing, and AI support.

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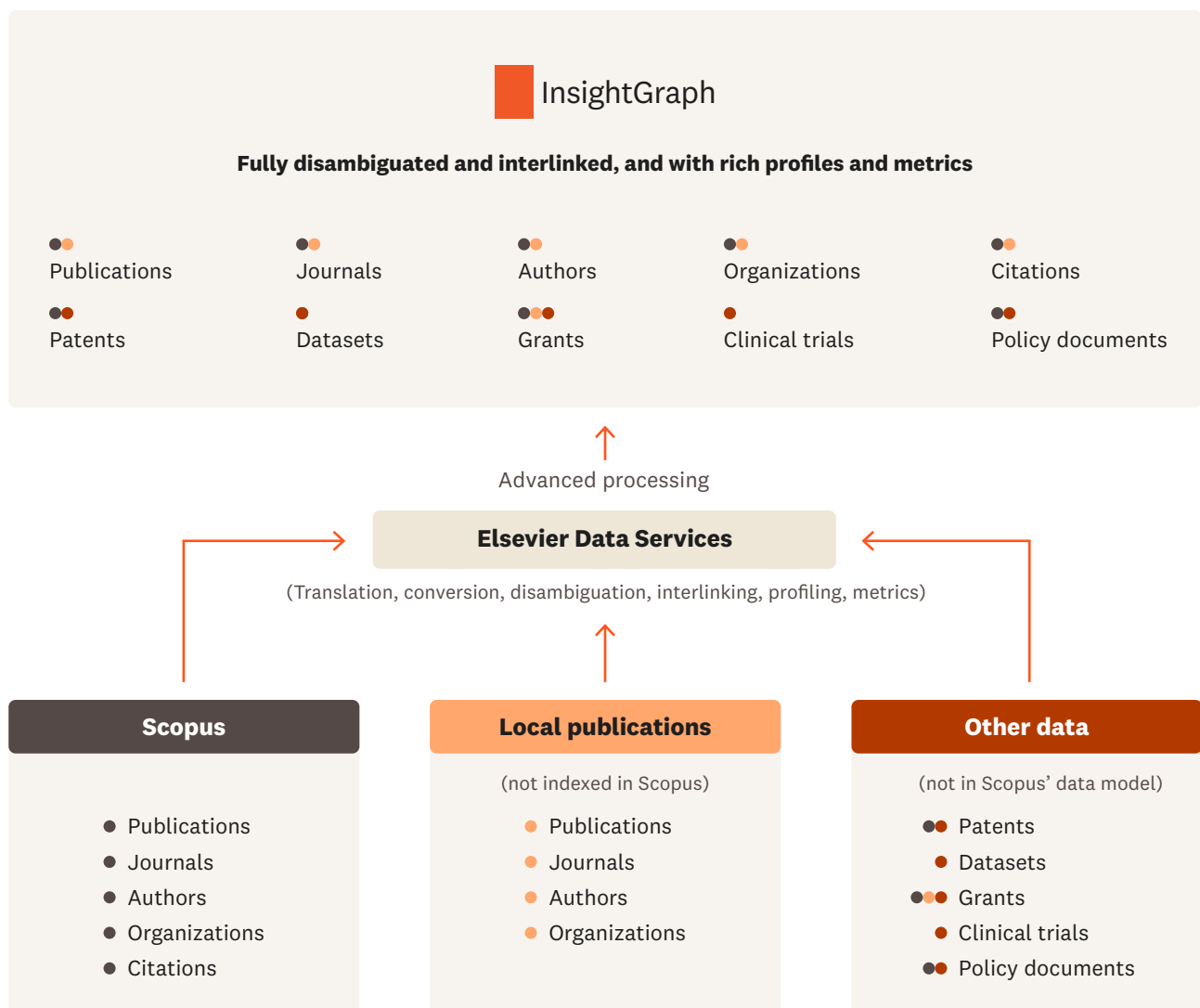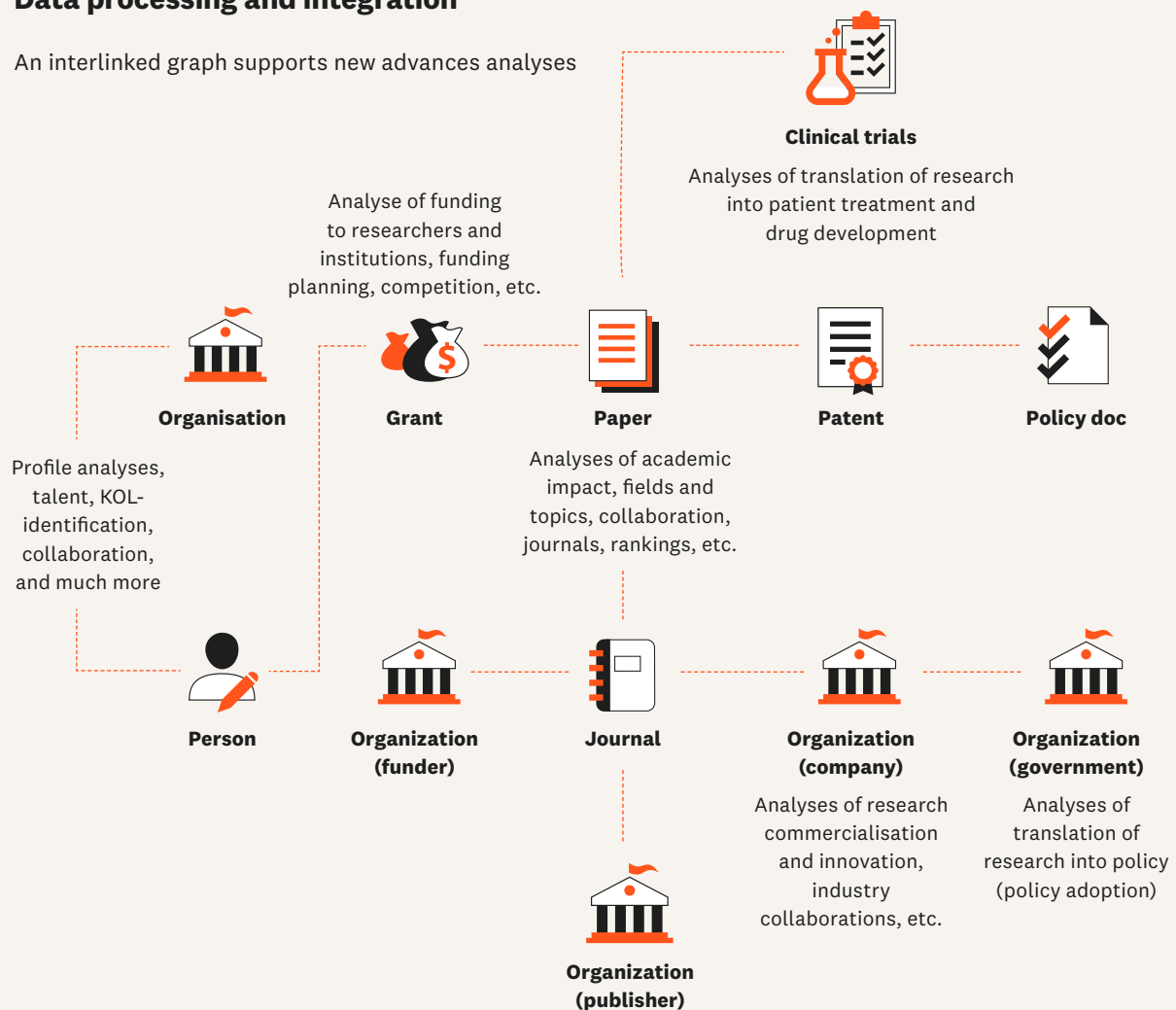
The process involves data cleaning and deduplication to ensure that the insights are accurate, reliable, and ready for strategic use. This integration spans various datasets — incorporating publications, patents, policy documents, and both publicly available and client-provided data — with reconciliation of people and institutions information to support accurate cross-source analytics.

Once the data is integrated and interlinked, InsightGraph can optionally include expert-developed, case-specific metrics and employ advanced analytics and visualization tools to extract actionable insights. Users can further explore the data through intuitive dashboards and reports, enabling them to understand complex relationships and trends within their research ecosystem.

Data processing and integration

An interlinked graph supports new advances analyses

Clinical trials
Analyses of translation of research into patient treatment and drug development

Analyse of funding to researchers and institutions, funding planning, competition, etc.

Organisation   **Grant**   **Paper**   **Patent**   **Policy doc**

Profile analyses, talent, KOL-identification, collaboration, and much more

Analyses of academic impact, fields and topics, collaboration, journals, rankings, etc.

Person   **Organization (funder)**   **Journal**   **Organization (company)**   **Organization (government)**

Organization (publisher)

Analyses of research commercialisation and innovation, industry collaborations, etc.

Analyses of translation of research into policy (policy adoption)

Aligning with policy

InsightGraph helps government agencies comply with legislation

In the face of changing regulations or legislative uncertainty, InsightGraph capabilities can help government agencies provide evidence of compliance with new directives, enabling them to report back on how they have met the updated requirements.

For example, the "Foundations for Evidence-Based Policymaking Act of 2018," also known as the "Evidence Act," was passed in January 2019. But more than six years later, many agencies are still struggling to implement the law's key provisions, which seek to transform governmental decision-making by introducing groundbreaking requirements for the modernization and transparency of federal data.

In particular, the technologies, tools, and talent required to make the law actionable have been lacking. But InsightGraph can help simplify this complex process and enhance the ability of agencies to track their impact, for example, from initial funding to policy outcome.

By analyzing research assets linked to a wide range of policy documents and publications, **InsightGraph enables users to:**

Identify outputs cited in policy documents, so they can see the societal influence of their funding decisions

Compare policy citations across fields to measure levels of policy impact

Highlight researchers whose work has influenced policy

Monitor how research contributes to policy changes over time, demonstrating value.

In another example, in August 2022, the White House Office of Science and Technology Policy (OSTP) released a memorandum on public access to federally funded research (also known as the "Nelson Memo"). This memo spelled out new requirements for those who conduct federally funded research.

The goal of the Nelson Memo is to provide free, immediate (without embargo, where appropriate), and equitable access to research that is federally funded. All federal agencies must comply, and the memo applies to both peer-reviewed publications and underlying scientific data.

InsightGraph can be used to:

Identify the research publications that acknowledge agency funding and then determine the Open Access status of those publications

Track the usage made of an agency's research assets across both publications and other research assets

Provide detailed geographic analysis of where the usage has occurred

Establish an evidence base (metrics and case studies) for reports that demonstrate compliance with the Nelson memo.

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From dataset to dashboard

How InsightGraph powers cutting-edge government initiatives

The NIH is one of the largest funders and sources of funding for researchers in the world, particularly in areas such as biohealth, the environment, and sustainability. To better understand how effective and impactful the institution's funding really is, the NIH launched the Generalist Repository Ecosystem Initiative (GREI).

The project aims to improve search and discovery of NIH-funded data in generalist repositories, as well as track the reuse of NIH-funded research in the scientific literature. Ultimately, the idea is to prove a return on investment for the various projects funded by the NIH, and ensure that researchers across the globe get access to funding for delivering positive societal outcomes.

Description: NIH GREI Objectives

The InsightGraph team supported certain aspects of GREI by integrating disparate data sources on NIH-funded datasets and publications. One of the project's hurdles was the inability to track dataset use and reuse; inconsistent researcher practices in dataset deposition, incomplete dataset information, and improper dataset citations in publications make it extremely challenging for the NIH to know when datasets resulting from their research funding are being reused. It also prevents NIH GREI from tracking changes in dataset reuse resulting from their efforts.

Lacking a blueprint to identify primary and secondary data reuse, the NIH is using InsightGraph to track how researchers share and repurpose data. By tracking publications that utilize other datasets, we're showing the connections across the scientific community that spur progress and result in tangible societal impact.

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The table below summarizes the challenges faced by the NIH and the capabilities InsightGraph brings to bear:

Challenge without InsightGraph input	What InsightGraph delivered
No scalable method to search millions of documents	Scalable search and matching across full-text articles
Lack of accurate data linkage	High-precision, human-validated AI matching pipelines
Difficulty in operationalizing insights	Production-grade dashboards and notebooks; metrics to understand data asset reuse in scientific literature
Need for agency trust in results	Transparent models, validation, and continuous feedback loops

In a similar vein, the Democratizing Data Search and Discovery pilot project — under the leadership of New York University, Julia Lane, and Nancy Potok — aimed to better understand how datasets are used, in the hopes of creating more access to high-quality public data. (We co-authored publications in a special issue of Harvard Data Science Review about the project, if you'd like to explore it in depth.)The project involved four statistical agencies (the National Center for Science and Engineering Statistics, Economic Research Service, National Center for Education Statistics, and National Agricultural Statistical Service). By connecting these agencies' datasets with Elsevier's Scopus database, the world's largest fully curated corpus of academic publications, we aimed to help showcase their value and impact — and the importance of making academic research open and accessible to all.

Essentially, our goal was to demonstrate how often these datasets (or reports based on them) were cited by different institutions or researchers — and to what end.

Working with our partners, the InsightGraph team:

Operationalized a scalable, accurate, production-ready discovery platform

Enabled agencies to better measure and report the public value of their datasets

Positioned InsightGraph as a strategic partner for national and global research intelligence initiatives

Built foundations for expansion into future evidence-building, open science, and data policy projects

Elsevier's combination of expertise in search analytics, metrics generation, and database linkage made us uniquely positioned to contribute to this project.

Case study:

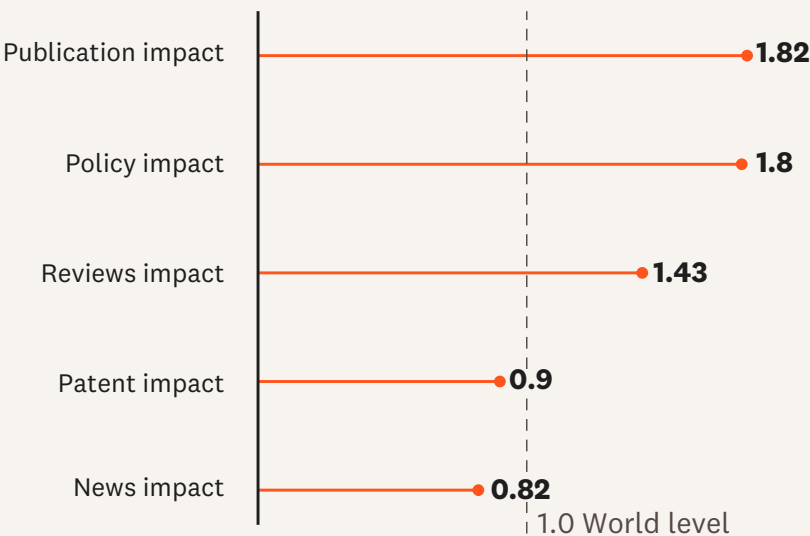# *Tracking research funding program outcomes*

One of our customers is a leading research funding body, dedicated to advancing scientific research and innovation across various disciplines. In its mission to drive societal progress through strategic research investments, this organization allocates substantial grant funds to researchers.

This research funding body faced several challenges, including:

- **Limited scope:** Traditional research metrics did not account for broader contributions to technology, innovation, policy, and societal well-being.
- **Data integration:** The funder needed to integrate several different data sources, including research publications, patents, policy documents, and business activities.
- **Strategic decision-making:** Without a holistic view of research impact, the organization would struggle to decide on future grant allocations and prioritize high-potential areas in research.

To address these challenges, the research funding body turned to InsightGraph, which helped the organization achieve several key outcomes, including:

- **Enhanced research insights:** The organization gained a clear view of how its funded research advanced knowledge, fostered collaboration, and influenced the global research landscape. Additional citation and collaboration metrics provided deeper insight into research impact.
- **Broader impact assessment:** By tracking translational impacts, including advancements in patents, policy, and industry, it was possible to assess tangible societal benefits produced by the funded research, such as sustainable solutions, new technologies, and policy shifts.
- **Data-driven decision-making:** Integrated data enabled informed, strategic grant allocations, enabling the funding body to prioritize research areas with strong potential for both academic and societal impact.
- **Commercialization potential:** Strong commercialization prospects could be identified by analyzing business activities linked to funded researchers, supporting innovation and industry growth.

Publication impact — **1.82**

Policy impact — **1.8**

Reviews impact — **1.43**

Patent impact — **0.9**

News impact — **0.82**

1.0 World level

Description: This figure shows the impact of the funder's grant-supported publications, as measured through:

- Citations by other scientific publications
- Citations by policy-relevant documents
- Citations by reviews
- Citations by patents
- Mentions in news

Each of these measures was normalized for meaningful comparison

Conclusion:
A replicable
framework for funders

As governments and institutions worldwide seek to align academic research with societal needs, InsightGraph sets a new standard, representing the highest quality and most comprehensive big-data platform available for research analysis in today's market.

By integrating diverse datasets and offering advanced analytics, the platform facilitates strategic decisions rooted in data. Providing a holistic view of a funding body's research impact, InsightGraph creates a common reference point for stakeholders, allowing for seamless communication and collaboration across research institutions, funders, and policymakers.

Beyond evaluating policy impact, the platform helps foster a culture of recognition, support, and trust for researchers and funding agencies — helping to justify their investment decisions and create positive impact in the world.

As the case studies in this paper show, our customers and partners realize enormous value from InsightGraph's ability to uncover unprecedented connections between disparate data sources, deriving insights that prove the value of research investments. At a time of enormous change in the research landscape, InsightGraph empowers users to make strategic, evidence-backed decisions that fulfil their mission of driving innovation and societal progress more effectively, ensuring that their investments in research yield meaningful and lasting outcomes.

To learn more about InsightGraph and how we can partner with your funding organization, please contact us.

References:

- Foundations for Evidence-Based Policymaking Act of 2018 — https://www.congress.gov/bill/115th-congress/house-bill/4174

- Memorandum for the Heads of Executive Departments and Agencies , Executive Office of the President, Office of Science and Technology Policy (OSTP), August 25, 20222 — https://bidenwhitehouse.archives.gov/wp-content/uploads/2022/08/08-2022-OSTP-Public-Access-Memo.pdf

- National Institute of Health (NIH)'s General Repository Ecosystem Initiative (GREI) website — https://datascience.nih.gov/data-ecosystem/generalist-repository-ecosystem-initiative

- Harvard Data Science Review, Special Issue 4, Democratizing Data: Discovering Data Use and Value for Research and Policy — https://hdsr.mitpress.mit.edu/specialissue4

- Stories of impact and excellence, powered by InsightGraph — Tracking Research Funding Program Outcomes

For more information, visit www.elsevier.com/products/insightgraph

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