Institute for Scientific Information

Clarivate Societal Impact Framework: A guide to responsible impact measurement

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Gordon Rogers, Dmytro Filchenko

Author biographies

Gordon Rogers is a Senior Manager, Data Science at the Institute for Scientific Information. He has worked in the fields of bibliometrics, data analysis and software engineering for more than 25 years at Clarivate and its former parent company. As a previous member of the Clarivate Consultancy team, he has supported clients around the world in evaluating their research portfolio and strategy. ORCiD: 0000-0002-9971-2731. Web of Science ResearcherID: ABA-6554-2020.

Dr. Dmytro Filchenko joined Clarivate in 2024 as Senior Director, Research & Analytics at the Institute for Scientific Information. He holds a PhD in Mathematical Modelling and Computing from Ukraine and brings more than 15 years of experience in both academia and business. His diverse leadership background spans roles including Associate Professor and Deputy Vice-Chancellor at Sumy State University, Head of Benchmarking and Technical Director. He is also a business founder. Prior to joining Clarivate he worked at QS Quacquarelli Symonds, where he directed the development of the QS World University Rankings suite and a range of other edtech and research intelligence products.

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Foundational past, visionary future

About the Institute for Scientific Information (ISI)

The Institute for Scientific Information at Clarivate has pioneered the organization of the world's research information for more than half a century. Today it remains committed to promoting integrity in research while improving the retrieval, interpretation and utility of scientific information. It maintains the knowledge corpus upon which the Web of Science index and related information and analytical content and services are built. It disseminates that knowledge externally through events, conferences and publications while conducting primary research to sustain, extend and improve the knowledge base.

For more information, please visit **www.clarivate.com/isi**

About ISI reports

ISI reports offer concise and informative analyses of topical research trends, using best-in-class publication and citation data and analytics from Clarivate. This report, one of an ISI series on societal impact of research, explains how the Clarivate Societal Impact Framework can be applied alongside other approaches to support responsible research analysis. It aligns with existing principles of responsible research evaluation, ensuring that assessments are robust, transparent, and contextually meaningful.

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Summary

Executive summary

This is the third report in the Institute for Scientific Information (ISI) series on the societal impact of research. It shows how the Clarivate Societal Impact Framework can be applied alongside other approaches to support responsible research analysis in Web of Science Research Intelligence. It provides practical guidance, illustrative examples and recommendations for responsible use of societal impact data in Web of Science Research Intelligence for institutions and researchers.

Framework design

This report demonstrates how this structured yet flexible approach to evaluating the societal impact of research combines diverse, verifiable data from Clarivate sources with guidance from the ISI on responsible use. It integrates a wide range of impact indicators, while allowing users to select metrics relevant to their specific context. By structuring complex data and providing different levels of granularity and contextual insights, the Framework enables reproducible, meaningful assessment at country/region, institutional, or project levels.

Categorization of societal needs

The Framework categorizes societal needs using the United Nations Sustainable Development Goals (SDGs). It provides a transparent, reproducible methodology for mapping research outputs to SDGs through Citation Topics and Research Topics, ensuring that both obvious and less apparent impacts are captured accurately. This SDG-based categorization and its PESTLE-based aggregation serve as defaults, while allowing users to apply other national, local, or discipline-specific classifications.

Choice of impact indicators

Each indicator group includes a mixture of measures, metrics and qualitative and quantitative indicators. The underlying raw data is available to provide transparency on how each indicator is constructed.

Contextualizing measures

Interpretation of indicators requires careful context. Absolute counts can be misleading, especially when comparing small sample sizes or highly skewed data (Figure 1, Figure 2). Size-normalized data, national or global benchmarks, and an understanding of the limitations of each indicator help provide meaningful insights.

Societal Impact Profiles

The report shows how we create Societal Impact Profiles to help Web of Science Research Intelligence users navigate the challenging quantity and diversity of underlying data, metrics and indicators. These profiles are a graphic summary of an institution's observed and potential impact across societal facets that serve as a starting point for deeper interrogation (Figure 3, Figure 4).

Adapting to local needs

A key message in the report is that, although global by design, the Framework is intended to support national research assessment exercises (RAEs) and impact case studies. It supports the examination of impact through a variety of categorization schemas and allows the combination of external data sources with an institution's internal data.

The report contains two appendices: **Appendix A**, a list of the key terminology used, and **Appendix B**, perspectives of researchers and research offices around the world.

1. Measuring the societal impact of research: Challenges and approaches

Much has been written about the need for better ways of evaluating research beyond the use of scholarly citation-based indicators[1–3]. When assessing the effectiveness of research, whether at the institution, project or researcher level, a combination of qualitative and quantitative evaluation should be used, based on a wider array of data. Indeed, many funding agencies, governments, and industry stakeholders expect that research will have a greater impact on society than on academia alone.

However, measuring the societal impact of research is a challenge. There is no clear consensus as to what constitutes societal impact nor how it should be assessed. This was reflected in *Research Professional News*' "Research Offices of the Future" survey[4], where 56% of research office respondents identified "societal benefits" among all forms of research impact they will need to measure longer term and 70% found the societal impact of research difficult to measure.

The difficulty primarily lies in the complex pathways and resulting time-lag between research and impact[5,6], which create several challenges in identifying if and how research has an impact on society. Examples include[7,8]:

1. **A lack of data.** While expert assessment is recommended[3], a lack of data can make it harder for peers to properly assess the wider impact of research.
2. **Balancing quantitative and qualitative assessment.** Quantitative data are scalable and objective but often lack depth and nuance, while qualitative data can be less scalable and may be affected by subjective biases. Achieving a balance between the two is necessary to provide a comprehensive overview.
3. **Multiple assessment needs require multiple approaches.** There is no "one size fits all" approach for assessment of an institution or research group. Different fields require different approaches and necessitate the use of different data as part of their assessment. Assessments of societal impact should also be tailored around the nature of the institution or group being assessed[2].
4. **Time lag between research and observed impact**. Benefits may take decades to appear. However, assessors may need early signals to help with setting priorities. How can we reconcile these differing timescales?
5. **Attribution of societal impact to any given piece of research.** The underlying cause of any benefit may be difficult to identify. Multiple areas of research can contribute to a particular impact. How can their relative contributions be measured?

The Clarivate Societal Impact Framework is designed and developed by the Institute for Scientific Information (ISI) to tackle these challenges. It provides a broad set of raw data together with measures and contextualized indicators. The data are presented in a manner that supports the differing assessment needs for institutions and research projects and are structured into indicator groups that help track how research has an impact. These indicator groups consist of both forward-looking indicators of potential impact as well as retrospective indicators that measure observed outcomes and impacts. We continue to develop the Framework to improve how we address these challenges.

The Clarivate Societal Impact Framework complements other evaluation frameworks that have been developed to tackle some of these challenges[9–11].

2. Key considerations in Framework design

The Clarivate Societal Impact Framework[7] is designed to provide a structured approach for managing and analyzing data related to the societal impact of research on a global scale, complementing various existing national evaluation models. Clarivate has implemented the Framework as part of its new Web of Science Research Intelligence platform to facilitate exploring these data. Over time, additional data and functionality will be added to the platform to help broaden the perspective and insights it provides. We also encourage users to apply the structure of the Framework to their own data, in combination with ours, to gain additional insights beyond the current scope of Web of Science Research Intelligence.

Here are the key considerations that shaped the design of the Societal Impact Framework:

Diversity of impact indicators. The diversity and complexity of societal impact data can be seen in how various research assessment exercises (RAEs) approach the assessment of societal impact. The U.K.'s REF 2021 Panel criteria and working methods[11] provided around a hundred different indicators as examples of how panels might assess the wider impact of research. Other RAEs are similarly comprehensive[12-15]. Our Framework is designed to structure this diversity of data in a way that helps connect impact to the underpinning research.

Combining data sources. Many impact indicators can be derived from data available from sources external to institutions. However, other insightful data will only be available to researchers or institutions from internal sources. The Framework therefore facilitates combining data from both external and internal sources, to help provide a more comprehensive picture and support a more robust assessment.

Categorization of impacts. Making sense of such diverse data is a challenge, so the Framework organizes these data into a categorical format that makes it easy for the user to identify the data that are of most use to them. Are they interested in the economic impact or the impact on policy? The Framework provides a structured and comprehensive overview of where research has impact.

Flexibility and user-driven evaluation. While our default categorization of impacts may suffice for many, a user may decide that it doesn't meet their specific needs. They may prefer to analyze impact by Sustainable Development Goals (SDGs) or through a structure that aligns with their national RAE. The Framework supports examining impact through a variety of categorization schemas.

Observed and potential impacts. The pathway from research to impact can be long and complex. The Framework helps by organizing the societal impact data into two types of indicator groups:

- Retrospective indicator groups measure signals of observed impact.
- Forward-looking indicator groups provide signals of potential impact and can help identify actions to improve future impacts.

Granularity and context. Data should be presented at an appropriate level of granularity based on the nature of the subject under review, for example individual projects or entire institutions. The Framework provides different levels of detail and context for assessment of institutions and projects.

The implementation of the Framework in Web of Science Research Intelligence provides multiple signals of impact in a structured format, with a variety of categorization schemas designed to provide a starting point for examining the impact of research; it provides context for the signals as well as the underlying data behind the signals.

3. How societal needs are categorized in the Framework

From as early as the 1950s, analysis of the societal impact of research focused primarily on economic impacts[16,17]. By the 1990s and early 2000s, attention had broadened to cover social, cultural and environmental outcomes[8,18] through a mixture of qualitative and quantitative approaches. Other research also included looking at health and wellbeing outcomes[19-22].

Many current research assessment exercises, such as those from the Netherlands[12], Poland[13], or Hong Kong SAR[15], look at impact along similar lines, and CoARA's Societal Impact Subgroup also recommends assessing the impact of research on well-being as well as on social, environmental, economic and political grounds[23].

PESTLE model as a common ground

All these approaches carry a strong overlap with the well-established PESTLE model used for many decades to analyze impacts on businesses and government policy, covering **P**olitical, **E**conomic, **S**ocial, **T**echnological, **L**egal and **E**nvironmental factors. The Clarivate Societal Impact Framework utilizes this overlap and adapts the PESTLE structure to align with existing impact assessment practices. As this structure doesn't directly address education or health as distinct categories, the social component is split into Medical, Human Capital, and Social & Cultural facets. These accompany our five other societal facets: Political & Policy, Economic, Technological, Legal & Governance, and Environmental.

In many cases, it may seem obvious how outputs or indicators relate to these facets. Papers from medical journals will most likely map to the Medical facet while citations from policy documents about climate change could be associated with the Political & Policy and Environmental facets. However, it may not be immediately apparent that the wider impact of the research behind these papers could include a technological benefit that would link to the Technological facet. The Framework uses a layered approach to identify broader or less obvious impacts by considering what an output or outcome is about, rather than just where it is published or how it is cited.

At the core: Mapping to United Nations Sustainable Development Goals

Since 2015, the United Nations SDGs[24] have provided a framework for tackling some of the biggest challenges the world faces. While responsibility for meeting the goals rests with governments, academia has an important role to play in finding appropriate solutions.

Societal facets in the Framework are mapped[25] to SDGs based on the goals and targets associated with each SDG. Consequently, users of Web of Science Research

Intelligence can also analyze data by SDG, rather than our facets, if this is more relevant to their use case. A mapping from outputs – and, importantly, outcomes such as citing items – to SDGs completes the mapping to facets.

The mapping from outputs/outcomes to SDGs could have been implemented using a simplistic keyword-based approach. For example, the paper "How do National Parks Operate During Wildfires Elsewhere?" by Bozkurt (2025)[26] explicitly mentions SDG 15, Life on Land, in its text. However, deeper inspection reveals it provides a case study "helping students experience decision-making in a crisis setting that intersects with the macromarketing-public policy interface" with no relevance to SDG 15.

Alternatively, we could have utilized large language models (LLMs) or other forms of machine learning that can analyze the content of the paper. However, an AI model is a black box with no way of determining why it gives any specific answer, especially if that answer is wrong.

The approach used by the Framework fills a middle ground between these two extremes: the over-simplicity of pure keyword searches against the black box of AI. It aligns with that of the Steering Research and Innovation for Global Goals (STRINGS) project[27] that uses a mapping developed by researchers at the Centre for Science and Technology Studies (CWTS) at Leiden University.

Assuming papers that cite each other are generally about similar topics, we start by clustering papers based on their citations. These clusters are called Citation Topics. We then use a set of search terms for each SDG, based on those used by the STRINGS researchers, to identify relevant papers based on their title and abstract. Finally, we look at the percentage of matching papers in each cluster, and what those clusters are about, to decide whether to map a Citation Topic to an SDG. This approach assigns Bozkurt (2025), the paper used as an example above, to a Citation Topic called "Curiosity Studies", about the use of curiosity in education[28], and avoids incorrectly assigning it to SDG 15.

While this method works well for assigning papers to SDGs and is already used in Web of Science and InCites, its practicality is limited for other output types, such as patents or policy documents, which have fewer citations between themselves or to papers. For these outputs, we have created a new schema called Research Topics[25] that uses semantic analysis of the textual content of each document. These Research Topics are then mapped to SDGs in a similar way to Citation Topics. If an output does not map to any SDG, the associated outcomes are used to determine the relevant SDG.

From PESTLE-derived facets and SDGs to custom schemas

Suppose, however, a user wishes to analyze impact in terms of the categories defined by a national research assessment exercise instead of our eight default facets described above. Our layered approach provides this flexibility by making it possible to map additional categorization schemas to SDGs, Citation Topics or Research Topics through a similar approach as used for our default facets.

In summary, the Clarivate Societal Impact Framework exhibits the following structured, yet flexible, functionality:

SDG-driven

The Framework uses UN SDGs, and their aggregation to PESTLE facets, as the default categorization of societal needs

Cross-platform categorization

Designed to be applicable to multiple data types and data sources

Supports other categorizations

Designed to be adaptable to other categorization schemas, beyond aggregation of SDGs to the default PESTLE facets

4. An introduction to the indicator groups

The Clarivate Societal Impact Framework contains 11 distinct indicator groups, each of which addresses a different part of the pathway from research output to impact. The Framework recognizes the need for researchers, research offices, funders, and other stakeholders to identify signals of potential impact at early stages of research or soon after outputs are generated, as well as observed impacts that may take years or decades to be seen. The Framework therefore distinguishes between forward-looking and retrospective indicator groups.

Together, the indicator groups help to tell the story of how an institution's research has an impact on society: starting with which SDGs the research contributes to, through who the researchers collaborated with outside of academia, to who has built on that research either directly or indirectly.

Each indicator group includes a mixture of measures, metrics and qualitative and quantitative indicators to provide a comprehensive picture of each step on the impact pathway. The underlying raw data is available to provide transparency on how each indicator is constructed.

Appendix A provides further explanation of the terminology used.

Our choice of indicator groups and their underlying measures were guided by the latest *Research Professional News* survey (Appendix B) and feedback from Web of Science Research Intelligence development partners, early adopters and advisory groups.

4.1 Forward-looking indicator groups

After teaching and research, the so-called "third mission" of universities has grown to cover a variety of activities related to engaging with society. While a precise definition of this third mission is open to debate[29], such activities may range from supporting local businesses with consultancy and training, through the commercialization of research, to holding public exhibitions and lectures. None of these activities necessarily imply a direct impact from research on society itself, but they provide a signal of potential future impact.

Many of the forward-looking indicator groups look at how interactions between academics and society start to become productive, a potential first step towards wider impact[5,9].

Relevance

The applicability of institutional outputs or activities to specific societal needs is a pre-requisite for research to demonstrate future societal impact. The Relevance indicator group provides data showing the number of papers relevant to our PESTLE-derived societal facets, SDGs or the user's choice of categorization schema.

Sustainability reporting has become commonplace in the corporate sector, initially due to frameworks such as the Global Reporting Initiative (GRI) Standards[30], which focuses on the use of PESTLE. While efforts to apply similar reporting requirements to the higher education sector have had mixed results[31,32], national RAEs are frequently built around impact on economic, environmental, societal, cultural or health grounds.

The GRI Standards also encourage incorporating the SDGs into sustainability reports[33], and this applies to universities as a whole. Academic research provides a key component of a university's wider impact, so this indicator group also shows how research at the institutional level is aligned with the SDGs.

Communication

Communication of results via effective channels is essential for research to reach a wider audience and to be utilized in future. The Communication indicator group includes indicators about the different ways in which research outputs can reach a wide audience, including a count of papers published in open access journals.

Traditionally, communication of research happens via scholarly publishing, with a target audience focused on academia. This indicator group also measures alternative routes by which research can reach a wider audience, whether practitioners or the public, with examples including public lectures, press releases or publishing in trade literature.

The Social Impact Assessment Methods through Productive Interactions (SIAMPI) framework[9] focuses on productive interactions as a means for ensuring research has a wider impact; the Communication indicator group looks at the prior step in the pathway as for an interaction to become productive, it must first take place. And the more outreach happens, the more likely it is that those interactions can become productive and lead to a wider impact.

Attention

The level of attention given to recently published research can indicate its future societal impact. However, that information must be contextually guided. The Attention indicator group includes data, such as social media mentions or readership statistics by sector, to look at how communications start to become productive. It focuses on how non-academics begin to become aware of research.

Since altmetrics were first developed in 2010[34], researchers have assessed how well they provide an indication of both academic and societal impact. Evidence of correlation with academic citations is limited[35,36], and so it might be expected that any correlation between Attention data and societal impact, however that may be measured, is also limited. Furthermore, a simple count of mentions in social media lacks valuable context. Who mentioned a paper: a member of the public, or an analyst in a policy institute? How many researchers at healthcare companies have viewed or bookmarked a paper? By including this context, the Framework provides valuable background for understanding how Attention data might lead to impact.

Engagement

Engagement with relevant stakeholders provides a powerful mechanism for understanding community needs. The Engagement indicator group provides

indicators about how engagement happens through, for example, meetings, focus groups or roundtables[37].

The transfer of knowledge between academia and the wider community should provide effective feedback loops to help academics tailor research to tackle local issues. This aligns with the Mode 2 research model through an application-driven approach[38]. Strong interactions with stakeholders can help to ensure a research project meets any initial objectives related to societal impact[9]. Public consultations may provide a useful, but informal, format for guiding research while deeper forms of engagement with the public or specific bodies may help to ensure research is focused on specific needs.

Collaboration beyond academia

Collaboration between researchers and other stakeholders can result in more formal partnerships, such as co-authorship. The Collaboration indicator group includes indicators about how academics are collaborating with non-academics by sector, such as industry, healthcare or even museums or public arts venues[11].

Collaboration is a vital part of the research ecosystem, whether between academics or with researchers from other sectors, providing a vital conduit to further all parties' needs. Research has shown that high-performing research units actively encourage organic collaboration, whether between departments within an institution, with academics at other institutions, or outside of academia[39].

Collaboration outside academia may seem easy to define as anything that isn't academic, by which we mean a university, research institute, national academy or similar institution (full details are included in the Web of Science Research Intelligence documentation[25]). However, closer inspection reveals more nuanced differentiation is needed. While most hospitals would be part of the healthcare sector, does this include university hospitals? How should a company spun-out from a university be counted? The Framework takes into account such arrangements and looks at the proximity between organizations before deciding whether they count as a non-academic collaboration[40].

Transferability

Transferability of research outputs to address wider societal problems can act as a first step towards research making an impact. The Transferability indicator group includes indicators about patent applications, sponsorship of clinical trials and co-authorship of policy documents or industry standards.

Once the initial research has been completed, in many cases it becomes necessary to translate that research into something that has further impact. What form this takes varies from field to field. Filing a patent shows a potential commitment to developing an innovation beyond R&D. Clinical trials provide an avenue for testing the development of clinical interventions. However, these are early signals of potential impact, not signals of societal impact *per se*. For the latter, it would be necessary to determine whether those patents are granted and commercially exploited, or that the clinical interventions prove successful. These aspects of impact are covered under the retrospective indicator groups section below.

4.2 Retrospective indicator groups

This section looks at signals from outcomes and activities that have started to have some observed impact. While the full impact of any piece of research may take longer to appear and may depend on some of these observations in more complex ways[5], these indicator groups cover impacts that are already visible.

Uptake in R&D beyond academia

How researchers beyond academia are using, adopting or building upon institutional outputs in their own R&D efforts may provide a pathway through which research starts to create impact. This indicator group includes data about citations from non-academic research broken down by sector.

Research may be picked up from scholarly literature and developed further by an independent company. For example, many state-of-the-art machine learning techniques, including many leading chatbots, such as ChatGPT, Claude and Gemini, are based on an artificial neural network architecture called the transformer[41]. This was developed by researchers at Google, building on a concept called attention, developed by researchers at Jacobs University Bremen and the University of Montreal[42].

Looking at the sectors associated with the citing researchers can give an early indication of how research may be adopted. The Framework therefore breaks down the distribution of papers that are receiving journal citations to see whether citations are from industry, hospitals, charities or government bodies.

Uptake beyond R&D

This indicator group covers a wide variety of impacts reflecting the many varied ways that research can be used by stakeholders outside the research community. It includes data about the citation of research by policy documents, parliamentary records or professional guidelines.

Media coverage

Mentions of research, its authors or their affiliations in mainstream media outlets indicate societal acknowledgement of research outputs. Indicators in this group are based on mentions of researchers in such media and a count of the number of unique researchers mentioned from an institution.

Media coverage is frequently treated alongside social media as another form of engagement by academia with the public. REF 2021, for instance, includes "citation by journalists, broadcasters or social media" as one of many indicators of reach and significance[11]. However, it is important to distinguish between mentions in social media, discussed in the Attention indicator group, and mentions in more curated, better regulated media outlets.

Editorial oversight by reputable media outlets provides an important gateway restricting what content is published and how that content is presented. Social media, however, is far more fluid and usually unmoderated. Social media can provide a direct form of interaction between academia and the public, while traditional media tends to provide a unidirectional flow of content. However, in reality, social media posts by academics may only be read by other academics, while traditional media generally has a wider reach[43].

Recognition

Acknowledgement of research activity by high-profile recognition programs can provide qualitative, as well as quantitative, signals of research impact beyond academia. The Recognition indicator group includes survey data and data about prestigious awards [44].

The Dutch Standard Evaluation Protocol (SEP)[12] includes "marks of recognition" for "good scientific work that also has a recognizable social value". Such examples include membership of, or secondary appointments within, civil-society organizations. The reasons such appointments or awards are given can provide a qualitative indication of how the research is regarded among peers or the wider public.

For more than 15 years, the Clarivate Global Institutional Profiles Project has carried out an Academic Reputation Survey[45]. The results from this survey provide a simple, qualitative indication of which institutions are most highly regarded by academics for their teaching and research. The teaching component provides a guide, in the Human Capital facet of the Framework, of an institution's educational reputation, either globally or by region.

Nurture

The Nurture indicator group looks at the training, support and guidance that an individual or organization gives to other individuals who go on to demonstrate an impact on society. It includes data about the subsequent career paths of PhD students or postdocs after completing a research project.

This indicator group is a little different to the others; while they mostly cover the underlying findings from the research, this indicator group looks at how researchers themselves are influenced by their research environment. This is encapsulated within the Human Capital facet and looks at how, for example, PhD students and postdocs within a team can apply the skills they've learned before going on to make contributions to society elsewhere. But equally, other, more senior staff members may also apply techniques developed as part of one project to other projects elsewhere. Such insights may be useful when assessing the research environment as part of RAEs[11,15].

To conclude, the Clarivate Societal Impact Framework provides structured categorization of societal impact signals, exhibiting the following characteristics:

Accounting for the time dimension

The Framework distinguishes between retrospective and forward-looking signals of impact

Supporting multiple levels of granularity

Analytics are provided at different levels, from raw measures to metrics, indicators and indicator groups

Promoting balanced evaluation

Quantitative indicators are complemented by qualitative indicators

5. How to put underlying measures in context

When using any measures of societal impact, a robust understanding of their context is paramount for any effective analysis or decision making to take place. Such context can come in many different forms. Institutions may find it useful to know how they compare globally for any given indicator, or in other cases, it may be more useful to know how an institution compares domestically or against a bespoke group of other institutions. The Framework helps by providing an appropriate context for any measures used.

Caveats

There is no meaningful way of aggregating societal impact data that then permits assessing the context of those data in aggregate. Although it may be tempting to ask whether Institution A or Institution B has the bigger "impact" overall, such comparisons risk misinterpretation. Indicators should only be contextualized in isolation. For example, it is reasonable to ask how one institution's count of policy citations compares with other institutions from the same country. However, it makes less sense to ask how Institution A's aggregated count of media mentions and granted patents compares with Institution B's.

It also makes little sense to compare projects globally or domestically if there is a lack of consistency over how these projects are defined. While a user can compare the individual statistics associated with each indicator between two or more projects, it would be irresponsible for the Framework to support the analysis of project-level data against global or domestic benchmarks.

As previously mentioned, for a more complete view of societal impact, the Framework's data can be complemented with internal project or institutional data. Web of Science Research Intelligence currently supports this by enabling easy data export, with further data integrations planned for later this year.

Relative size

It is important to take size into account; with all else being equal, larger institutions or projects will naturally show greater overall impact, so it can be useful to look at relative as well as absolute output. For example, what percentage of papers have been cited by clinical guidelines? While the size of the faculty provides a better factor for normalization, it can be difficult to obtain relevant data in a globally consistent form, so we treat volume of output as a proxy of faculty size while acknowledging that productivity rates will vary.

Normalization

Globally, many institutions have little or no data for most impact indicators. This makes it difficult to use normalization techniques to facilitate comparison, and additionally, small data values lead to problems with the robustness of statistical analysis. Figure 1 shows the percentage of academic institutions by number of papers relevant to each societal facet for papers published between 2015 and 2025. Figure 2 presents the same distribution but for papers consistently cited by non-academics. In some cases, such as papers relevant to the Medical facet (Figure 1), fewer than 5% of institutions have no papers; however, for Legal & Governance, more than 60% of institutions have no papers consistently cited by non-academics (Figure 2).

While other approaches[46,47] have previously been suggested to deal with the problem of skewed data distributions, our approach is intended to be easy to understand and acknowledges that small samples inherently carry more statistical noise. We restrict comparisons to institutions with sufficient signals in the data, helping to reduce the influence of noise and avoid overinterpreting sparse observations. The use of relative positioning (e.g. quantiles) further supports comparability by accounting for differences in distributions across indicators. Thresholds are therefore calibrated in line with the characteristics of each metric. Indicators with limited data availability across institutions require more generous thresholds to avoid exclusion of institutions with lower signals of impact, but must be used with caution to prevent misinterpretation, whereas indicators with more abundant data require more

stringent thresholds to filter out noise. This balance helps ensure that the resulting comparisons are both credible and proportionate to the underlying data.

Figure 1: Percentage of academic institutions grouped by number of papers relevant to each facet. Publication period: 2015-2025.

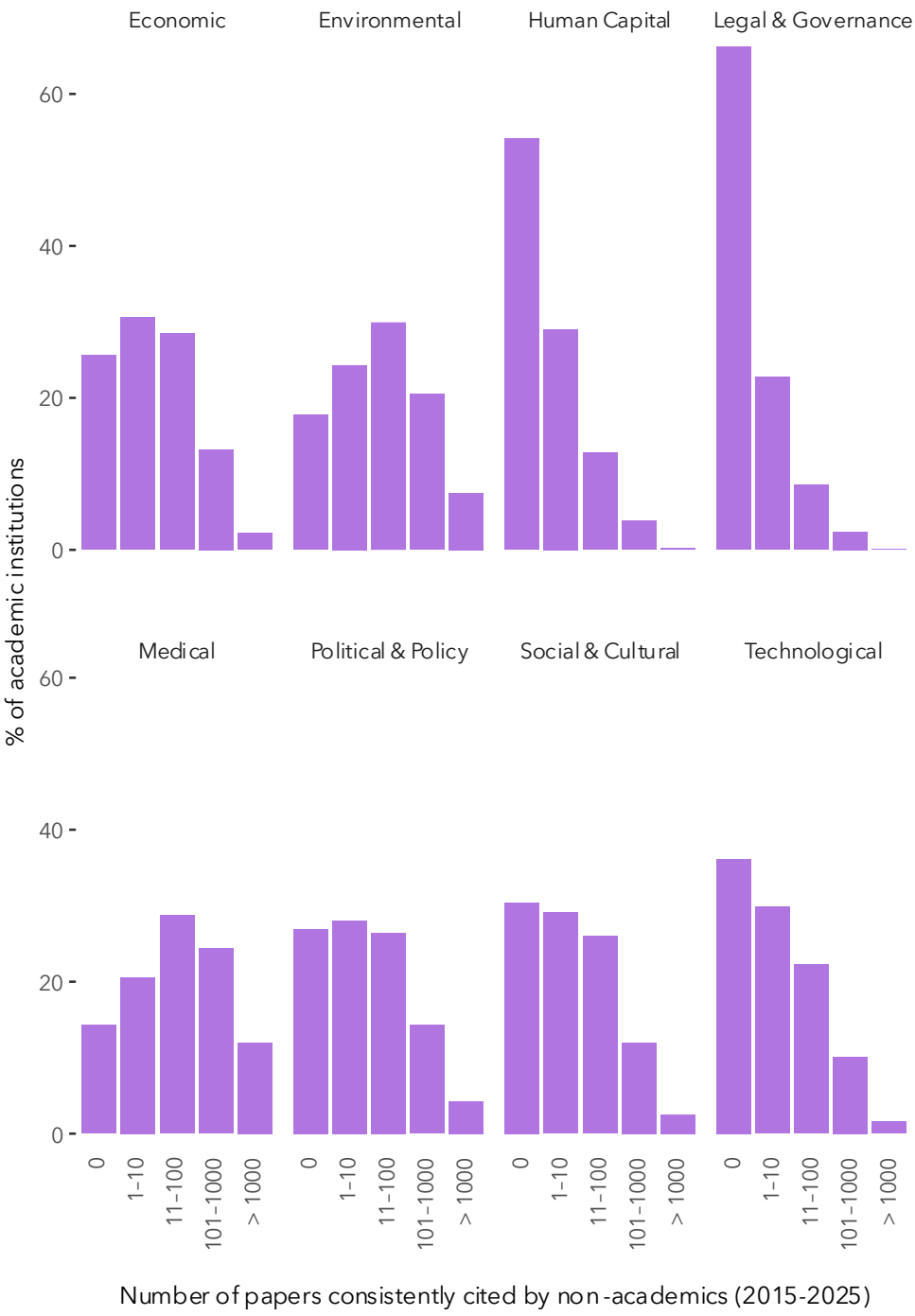

Figure 2: Percentage of academic institutions grouped by number of papers consistently cited by non-academics for each facet. Publication period: 2015-2025.

6. Societal Impact Profiles: Responsible data aggregation and interpretation

The Framework provides access to a lot of data, which can be challenging to navigate. After applying context to the data, how can one determine which signals are more significant and which less, especially as these signals vary from institution to institution?

It is therefore useful to provide a summary. But it is also necessary to ensure that any summary strikes the correct balance between summarizing too much and too little. Condensing the data into a single number, besides being conceptually flawed[48], provides no opportunity to navigate the underlying data. Equally, a summary that still leaves the user feeling overwhelmed, doesn't go far enough.

Societal Impact Profiles

The Societal Impact Profile available in Web of Science Research Intelligence is designed to achieve the appropriate balance and provides a general sense of where an institution has more relative impact and where its impact is less. It normalizes an institution's key indicators against global benchmarks and aggregates them by societal facet to give a general sense of how an institution compares globally. Web of Science Research Intelligence will also allow selection of alternative benchmarks, such as against national or custom groups of institutions. The Societal Impact Profile compares the retrospective and forward-looking indicators for each societal facet to give a sense of whether an institution's potential impact is higher, keeping pace or lower than its observed impact. The 'fade-out' visualization (see Figures 3 & 4) is designed to reflect the uncertainty involved in summarizing these data and discourages over-precise interpretation.

As most of the indicators currently available in Web of Science Research Intelligence are quantitative, at present the profile primarily provides a quantitative overview of impact. It should be used as a starting point to help explore the insights provided by the rest of the Societal Impact Report functionality in Web of Science Research Intelligence and any additional internal data available for any given institution.

Interpretation

An example profile, constructed using size-normalized indicators, is shown in Figure 3. It indicates stronger signals of observed impact (retrospective indicators) than potential impact (forward-looking indicators) in all facets, except for Human Capital, where the signals are comparable, and Medical, where signals of potential impact are higher. This can be interpreted as the institution's current capabilities being lower overall than its previous capabilities, relative to the wider group used for normalization. Changes in relative capability can result from changes in the performance of peer institutions as well as changes in the capability of the institution itself. Signals of impact are generally higher in Legal & Governance than in the other facets, so if this institution is interested in prioritizing where they already have higher levels of impact, this is the societal facet that should be investigated further. On the other hand, if they want to focus on where they have lower impact, they should look at the Technological facet first.

However, just as the Framework supports data categorization by SDG, a Societal Impact Profile can also be plotted by SDG. An example is shown in Figure 4. Here,

signals of observed impact (retrospective indicators) are strong in SDGs 6, 10, 13 and 16, while signals of potential impact (forward-looking indicators) are strong in SDGs 5, 7 and 16.

While the primary purpose of the Framework is to help institutions understand their own societal impact, whether across the institution as a whole or at the individual project level, we recognize that users may wish to use the Societal Impact Profile to compare themselves against their peers. Strategic differentiation was identified by half of research offices around the globe[49] among the top three reasons for evaluating the societal impact of research. Where this is the case, we recommend only making like-for-like comparisons. For example, generalist institutions should only compare themselves with other generalists, subject-specialists with other subject-specialists, and older institutions against other well-established institutions[50].

Projects

In keeping with SCOPE's evaluation impact matrix[2], these Societal Impact Profiles are only available at the institutional level to reduce the risk of misinterpretation. As discussed in Section 5, it is not clear how one could define a project to allow meaningful comparison at a national/regional or global scale. Furthermore, most projects will have few and disparate signals of societal impact, making responsible indicator aggregation or comparison difficult.

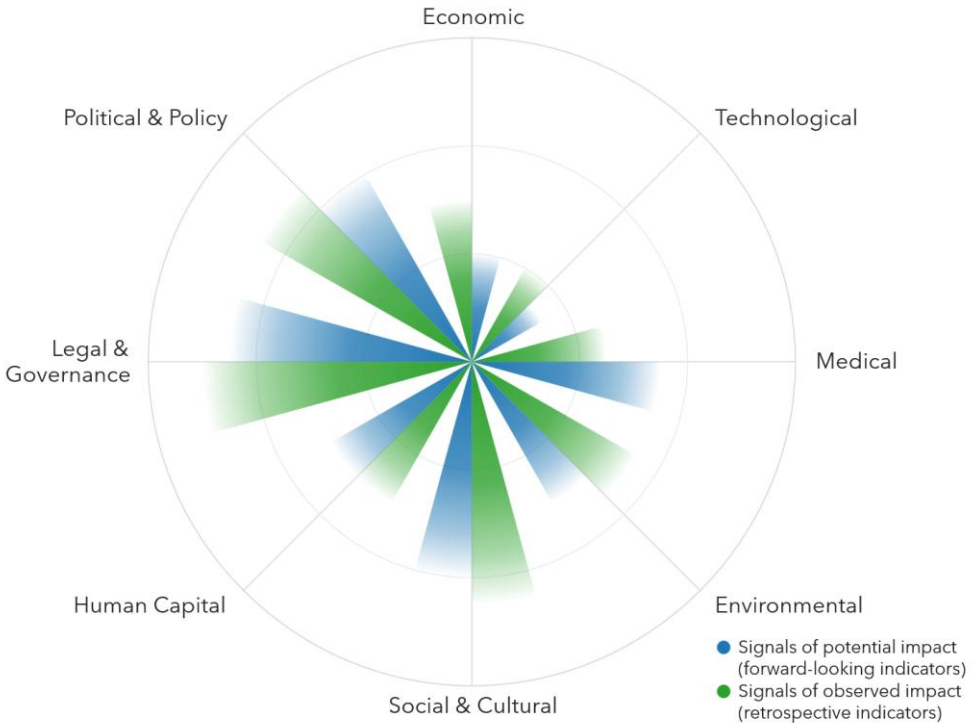

Figure 3: Example Societal Impact Profile showing the general trend in the signals of potential and observed impact over the eight facets in the Framework.

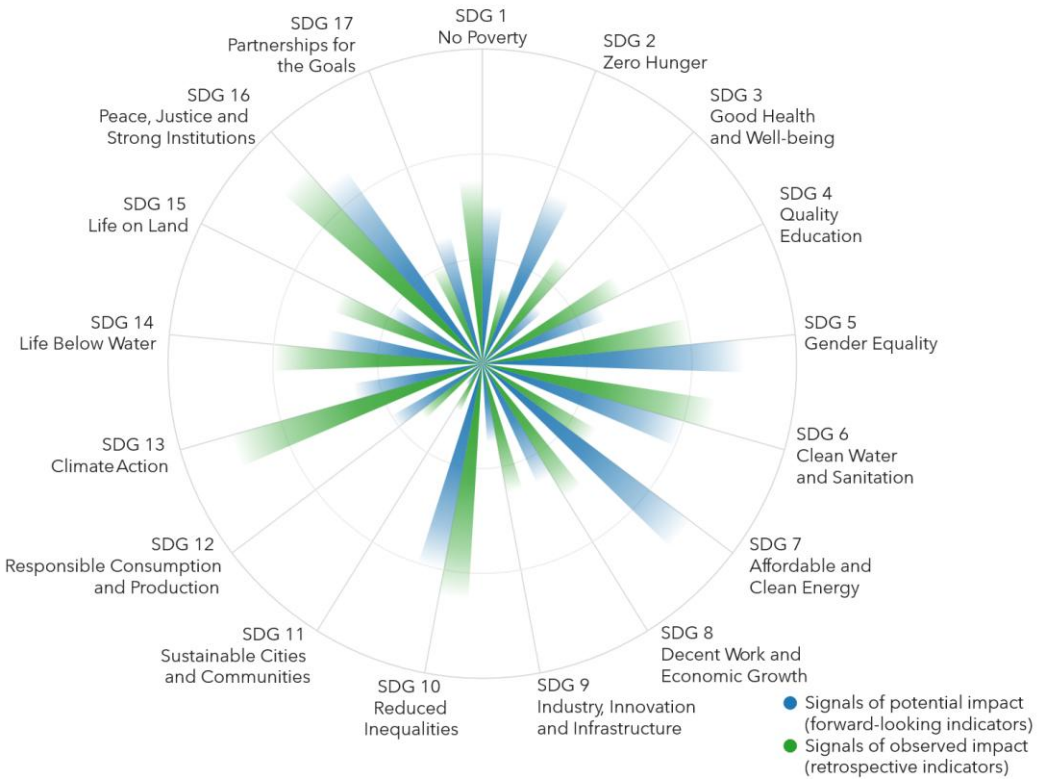

Figure 4: Example Societal Impact Profile showing the general trend in the signals of potential and observed impact over the 17 UN Sustainable Development Goals.

In summary, Sections 5 and 6 provide the following recommendations for responsible use of the Clarivate Societal Impact Framework in Web of Science Research Intelligence:

Prioritize context

Account for data distribution and the size of the evaluated entity. Use appropriate national, regional or global baselines

Benchmark with care

Compare like-for-like entities at the level of individual metrics or indicators

Dive into the details

Use Societal Impact Profiles as a starting point to examine underlying indicators, metrics, raw measures and source data

Avoid precision bias

Do not overemphasize small numerical differences. Focus instead on broader patterns and meaningful differences

Adapt to purpose

Not every indicator is relevant in every case. Tailor the approach to the type of entity being evaluated (e.g. institution, project)

Combine with additional data

Build a more complete picture of societal impact by integrating our data with other relevant data sources

7. Using the Framework to support national research assessment exercises

Many RAEs analyze the societal impact of research through impact case studies — narrative descriptions of the real-world impact of the research. The Societal Impact Report functionality in Web of Science Research Intelligence can support institutions in preparing, writing and validating these case studies.

Research assessment exercise requirements

Different funding agencies assess research impact in different ways. For example, the Dutch Standard Evaluation Protocol (SEP)[12] assesses impact on economic, social, cultural, educational and other relevant grounds, while the Italian Research Quality Evaluation (VQR)[14] bases its assessment along social, cultural and economic lines. As their definitions of these terms may not precisely align with ours, research outputs and outcomes can be mapped to a funding agency's categories using SDGs, Citation Topics, or Research Topics, as discussed in Section 3.

Similarly, different agencies will consider different examples of what they will accept as evidence of the impact of research on society[11,13,15]. The Framework provides a rich diversity of data to help the user identify pertinent impacts.

Impact case studies

Many RAEs require impact case studies to be structured into four main sections with some minor variations: what is the scientific contribution; what are the outputs from the underpinning research; what is the resulting impact; and which sources corroborate impact. In general, they focus on research projects and the resulting impact.

The choice of which project to showcase in a case study is typically based on existing knowledge of some of its wider impacts. Web of Science Research Intelligence can help identify additional impacts that may not have been previously identified to strengthen the case study.

Indicator groups

Many RAEs focus only on signals of observed impact, so the user may choose to consider only the retrospective indicator groups when writing their case study.

However, even in these cases, forward-looking indicators should not be completely disregarded as they may signal potential impacts that are likely to translate into observed impacts. We therefore also advise that researchers regularly review any signals of potential impact related to their projects as they may have progressed to observed impacts by the time of the next impact case study.

8. Conclusions and future direction

The Clarivate Societal Impact Framework in Web of Science Research Intelligence is a structured yet flexible solution that combines best practices for the evaluation of societal impact from RAEs and other evaluation frameworks with ISI expertise in

responsible research assessment. It includes unique features developed by ISI and is underpinned by a verifiable set of Clarivate data, whose breadth and depth are unique to Clarivate.

The Framework is designed to address the challenges, and mitigate many of the inherent risks, in evaluating research impact. It accommodates a variety of schemas to categorize different types of impact – including the widely-adopted SDG classification and those used by national RAEs – and provides evidence of both potential and observed signals of impact. It shows how interactions become productive, illuminating different pathways from research to impact, and providing context around the underlying data.

The Framework also provides Societal Impact Profiles to help users navigate the challenging quantity and diversity of underlying data, metrics and indicators. These profiles are a graphic summary of an institution's observed and potential impact across societal facets that serve as a starting point for deeper interrogation.

The Framework allows for data available in Web of Science Research Intelligence to be combined with relevant internal institutional data the user can access, to build a richer and more comprehensive overview of wider research.

Looking ahead, ISI will continue to refine and expand the Societal Impact Framework in several key areas:

- **We will further explore and integrate new data sources and metrics**. These will include both in-house Clarivate datasets and externally sourced data that meet standards of independent verifiability and reproducibility. All additions will be guided by best practices, rigorous quality standards, and clear guidance to support responsible use.
- **We will continue to investigate the incorporation of qualitative data sources.** This includes the use of societal impact-related surveys, as well as techniques such as sentiment analysis applied to uptake metrics, ensuring that such approaches are implemented in a robust manner.
- **We will continue to explore the application of large language models (AI)**. For example, these technologies may assist institutions and funders to validate impact case studies through analysis of the content of underpinning research outputs alongside reported outcomes, while maintaining transparency and methodological rigor.

Following the global release of Web of Science Research Intelligence, ISI will actively incorporate customer feedback into ongoing development. This iterative approach will ensure that the Framework continues to evolve in line with user needs and emerging best practices.

We welcome feedback from the research community on the Societal Impact Framework as well as suggestions to improve the measurement of the societal impact of research. The ISI team can be contacted at isi@clarivate.com.

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Appendix A

Clarivate Societal Impact Framework: Key terminology

Framework: A structured context for analytical work. For example, this could focus on evaluation, such as through a national research assessment exercise, or it could focus more specifically on transforming complex data into usable intelligence. The Clarivate Societal Impact Framework is primarily designed to provide a structured framework for data related to the societal impact of research, together with context for understanding those data. It is intended to complement other evaluation frameworks.

Research output (or "Output"): A document or similar artifact produced as a direct consequence of research. Examples include academic papers, books or patents.

Research activity (or "Activity"): Actions, processes or engagements that support, enable or extend research. Examples include supervision of PhD or postdoc research, taking on entrepreneurial, leadership or advisory roles in relevant organizations or initiatives.

Research outcome (or "Outcome"): A single measurable consequence of research output or activity. For example, a citation in a policy document would reflect a step towards wider impact but may not lead to any wider impact on its own unless that policy document is adopted and developed into something that affects behavior.

Societal impact (or "Impact"): While there is some debate around an accepted definition of societal impact, the SIAMPI project provides a useful working definition[9], paraphrased as "the measurable effects of research in a relevant social environment". "Measurable" is taken to be based on both quantitative and qualitative grounds. "Effects" covers changes in behavior or practices of organizations or people, for example in adopting a new protocol. And a "social environment" may be restricted to other researchers, especially when looking at academic impact, or it may cover wider societal groups, such as patients or patient organizations. The ISI definition of societal impact aligns with that of SIAMPI and refers to the "contribution of R&D outputs and activities to address real-world challenges faced by individuals, communities, organizations and economies"[7].

Potential impact: The effect that research may have on society in future, measured through early signals that indicate the potential for future observable impact. These are not outcomes in their own right. For example, launching a clinical trial doesn't have an observed impact unless that trial leads to a successful introduction of a clinical intervention. But starting a trial provides a signal for potential future impact.

Societal facet (or "Facet"): A societal area or type of impact that can be built around different classification systems: national strategies/priorities, national research assessment exercises, UN SDGs etc. In the Clarivate Societal Impact Framework, it defaults to an extended PESTLE model that covers: Political & Policy, Legal & Governance, Technological, Economic, Environmental, Social & Cultural, Medical and Human Capital.

Raw measure (or "Measure"): A simple quantifiable (measurable) property of a system. For example, a count of citations.

Metric: A piece of quantitative data, typically based on a measure, but with added context. A simple count of citations lacks context and is therefore a measure, not a metric. A metric derived from this measure is the Category Normalized Citation Impact (CNCI), which factors in field, publication year and document type.

Indicator: A piece of quantitative or qualitative data that reflects (indicates) the status of a system. There is some overlap between the widely accepted definitions of metrics and indicators. Indicators can refer to both a single metric and a combination of metrics to provide something more complex. For example, the Category Normalized

Citation Impact (CNCI, see Metric) is both a metric and an indicator. Indicators may be either forward-looking (leading) or retrospective (lagging).

Signal: A marker (sign) that something has happened (retrospective signal) or may happen (forward-looking signal). Measures, metrics or indicators can all serve as signals. For example, a policy citation is a signal that a research project may have political influence.

Qualitative data (information): Inherently non-numerical data typically gathered through expert reviews, interviews or surveys. Such data can provide a richer and more in-depth context for any quantitative (measurable) data but can be harder to collect and analyze in a consistent and unbiased way, particularly at scale. While a graded rating of support on a scale from 1 to 10 may seem numerical, such ratings are not based on a direct measurement and are therefore qualitative.

Appendix B

Clarivate Societal Impact Framework and perspectives of researchers and research offices

Research Professional News, an editorially independent part of Clarivate, conducted a global survey – Research Offices of the Future 2025 – of more than 1,100 research office staff and 1,400 researchers[49].

Among other questions, the survey specifically asked respondents which proxy measures are most important for their research offices in evaluating the societal impact of research, which of them will be most important in five years' time, and which of them are hardest to measure. Respondents could select up to three options from the following list:

- Relevance to UN Sustainable Development Goals
- Citations from research co-authored by non-academics
- Citations from patents
- Citations from policy documents
- Mentions in medical guidelines
- Mentions in clinical trials
- Media mentions
- Mentions in teaching/learning materials
- Recognition awards
- Views/readership statistics

Separately, research offices were asked to identify their three most important institutional outputs and activities when evaluating the societal impact of research from the following list: academic publications, policy documents, patents and patent applications, professional publications, clinical trials and others.

Below we summarize what respondents commented about each of these measures.

Relevance to UN Sustainable Development Goals

Included in the Framework as a forward-looking measure in the Relevance indicator group.

A decade after the adoption of the United Nations' 2030 Agenda for Sustainable Development, the relevance of research to the SDGs remains one of the most important – yet most challenging – proxies for assessing societal impact. One in three research office staff still rank SDG relevance among the top three hardest impact proxies to measure, particularly across the U.K., Europe, and North America, and among senior leaders. This difficulty reflects not only the complexity of mapping diverse and often non-traditional research outputs – such as grant proposals or early-stage projects – to specific SDGs, but also the need to move beyond broad goal alignment toward more precise connections with individual SDG targets and indicators.

Publishing in professional sources, e.g. magazines or online media

Included in the Framework as a forward-looking measure in the Communication indicator group.

Research office staff prioritized non-academic publications such as magazine articles or blogs in the top four most important institutional outputs in evaluating the societal impact of research. This highlights that future impact is not only about generating knowledge, but also about how effectively it is communicated to decision-makers, industry, and the public.

Views/readership statistics

Included in the Framework as a forward-looking measure in the Attention indicator group.

Researchers were far more likely to place views and readership statistics in their top three priorities for measuring societal impact, with 38% doing so. This measure was selected by only 18% of research office staff. Nearly half of researchers in arts & humanities and economics & social sciences prioritized this proxy measure of societal impact. Interestingly, the same pattern appears in responses from STEM researchers. This suggests that the value of this proxy measure is not limited to fields such as arts & humanities, where more traditional indicators may be lacking. Rather, it reflects researchers' interest in identifying signals of the impact of their work as early as possible, something that attention metrics are designed to capture. Although research offices did not prioritize these measures as highly as individual researchers, some regions demonstrated greater interest in them. Nearly one-third of respondents from Australia, New Zealand, and the Middle East indicated that this proxy measure would be important in the future. However, research offices in North America identified this measure as the most difficult to track.

Other non-traditional institutional outputs and activities: policy documents, patents, learning objects, medical guidelines, clinical trials

Included in the Framework as a forward-looking measure in the Transferability indicator group.

Research offices emphasized the growing importance of a diverse set of institutional outputs – particularly policy documents, patents and patent applications, learning objects developed through research, clinical trials, and medical guidelines – as key institutional outputs for evaluating the societal impact of research. Regional differences reinforce this trend. In the U.K. and across Australia and New Zealand, policy documents were ranked as the most important outputs for evaluating impact, reflecting a strong emphasis on informing decision-making and public policy. Respondents from Australia and New Zealand also rated patents as highly as traditional academic publications, highlighting the value placed on innovation and commercialization pathways. In the Middle East, patents emerged as the top-ranked output, with clinical trials and learning objects sharing second place alongside academic publications, underscoring a focus on applied research and practical implementation. Collectively, these findings point to the increasing importance of translating research beyond traditional academic formats into outputs that demonstrate broader usability, accessibility, and real-world application – signaling greater potential for future societal impact.

Citations from research co-authored by non-academics

Included in the Framework as a retrospective measure in the Uptake in R&D beyond academia indicator group.

Both research office staff and researchers placed citations from research co-authored by non-academics among the top four most important proxies of societal impact, both now and in the future, with broad agreement across regions. Notably, U.K. research offices assigned this proxy even greater long-term importance than media mentions, while for U.K. researchers it ranked as the single most important measure. The importance of this proxy was confirmed by researchers across most fields, except for arts and humanities where research citations are generally less frequent. Despite its purely bibliometric nature, non-academic co-authored research citations appeared in the middle of the list in terms of how hard research offices find it to measure. Research office staff in Asia even placed it among the two hardest proxies of societal impact to measure.

Citations from patents, citations from policy documents, mentions in medical guidelines, mentions in clinical trials, mentions in teaching/learning materials

Included in the Framework as a retrospective measure in the Uptake beyond R&D indicator group.

Survey respondents highlighted a clear shift toward prioritizing signals of research impact that extend beyond traditional R&D metrics, focusing instead on indicators of real-world uptake and influence. Looking ahead, the most important proxy measures identified globally were citations in policy documents, followed by citations in patents, mentions in teaching and learning materials, references in medical guidelines, and inclusion in clinical trials. These indicators collectively reflect how research is translated into policy, innovation, education, and practice – key pathways through which societal impact is ultimately realized. However, respondents also noted that some of the most valued measures – particularly citations in policy documents and mentions in teaching and learning materials – are among the most difficult to capture consistently, highlighting an ongoing challenge in balancing relevance with measurability in impact assessment frameworks.

Researchers broadly agreed with research office staff on the longer-term importance of policy citations. Unsurprisingly, policy citations are not a one-size-fits-all measure: They received limited support from STEM researchers, whereas around half of social scientists prioritized them.

Media mentions

Included in the Framework as a retrospective measure in the Media coverage indicator group.

Media mentions were identified by survey respondents as a key proxy measure of the societal impact of research, reflecting their role in amplifying visibility and shaping public discourse. Currently, 37% of research offices rank media coverage as the most important proxy, and an even greater proportion expect it to be among the most important indicators within the next five years. This forward-looking emphasis suggests a growing recognition that engagement with mainstream and digital media can signal how research reaches broader audiences and influences public understanding and debate. The importance of this measure is even more pronounced in regions such as North America, Australia and New Zealand, and the Middle East, where higher shares of respondents prioritize media mentions. Interestingly, researchers disagreed with research offices and showed weaker support for this proxy measure.

Recognition awards

Included in the Framework as a retrospective measure in the Recognition indicator group.

Recognition awards were consistently prioritized by research offices as a key proxy measure of the societal impact of research, ranking among the top three most important measures globally both now and in five years' time. Their prominence reflects the value placed on external validation, where awards signal not only academic excellence but also broader societal relevance and influence. Regionally, this importance is even more pronounced: Recognition awards are ranked as the number one proxy in North America and remain within the top two in Asia.

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