



Journal Article

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Using research metrics responsibly and effectively as a researcher

Academic researchers today are faced with increasing competition for a limited number of academic positions and a decreasing pot of funding, all within a changing research policy environment. Furthermore, in the increasingly data-driven world, key performance indicators or research metrics are becoming more important than ever for a researcher's career prospects. Researchers are being challenged, and are under increasing scrutiny, to demonstrate both their academic and broader societal and economic impact.

Researchers therefore benefit from easy to use and effective qualitative and quantitative methods to help them demonstrate their excellence and manage their academic reputation. However, the number of metrics is increasing as research becomes more open and new data sources are indexed. Keeping track of the plethora of metrics with their benefits and limitations, the data sources behind them and the tools that present them, is becoming a significant challenge, especially bearing in mind that researchers are already over-stretched performing the many varied roles their academic positions demand of them.

Should a researcher show generated social media impact?

Publishing in good journals remains a key element of assessments for job, promotion and funding applications, and also in national assessments. Where a researcher publishes is not enough, though, to demonstrate or assess their excellence. Broader societal and economic impact of research seems to be requested in every application, for example. Which research met-

rics should a researcher use in their applications, and which should they not? Should a researcher show their h-index or a more complex, field-weighted indicator in a funding bid, alongside information about the journals they publish in? Should a researcher show the amount of social media activity their research has generated or mentions in the media to help demonstrate the broader impact of their research in their academic CV? Should they showcase their consultancy work with industry and the events they have organised for the general public?

Using Research Metrics: Two Golden Rules

In our roles within a research metrics team at a supplier of research data and metrics, we strive to make using metrics as easy as possible while ensuring that we encourage their use in a responsible manner. We promote two golden rules of using research metrics:

1. Always use quantitative metrics in combination with qualitative inputs such as peer review, as input into decisions.
2. Always use more than one metric, without exception, as part of the quantitative portion.

There are many ways that a researcher could choose to use research metrics. The most common are in a job or promotion application or a funding bid, to help the evaluator as they sift through the many applications they tend to receive nowadays. When building a view of their academic expertise or excellence, a researcher needs to demonstrate their qualifications in all areas of academic work: research, teaching and supervision, management and admin-

istration, as well as activities outside the university. Research metrics can play an important role in this across the more traditional output and citation based metrics to more recently developed non-citation based or so-called 'alternative metrics', which represent additional ways to demonstrate research impact and attention.

To help researchers navigate the research metrics landscape and use the best metrics for their decisions or demonstration of their academic excellence, there should be a broad basket of metrics, using the many different data sources available across the research workflow. Applying the extensive basket of metrics to models which will help researchers decide what metrics to use for a particular purpose or question, is one way to try and help ensure metrics can be used by everyone, responsibly and effectively.

Developing suitable models is not a straightforward task but we have drawn on our experience with the Snowball Metrics initiative [1] and our connections throughout the research community to build an initial version of a research metrics model for researchers, as illustrated in Figure 1. The model represents feedback we have gathered from stakeholders around the world, and highlights the many facets where researchers aim to demonstrate their excellence effectively and provide a more varied and nuanced view of their excellence. This extends from the demonstration of funding successes, productivity and quality, through to building a strong narrative about the broader impact and engagement of research through the use of alternative metrics such as media mentions and stimulation of activity in social networking services.

Facet	Theme	Metrics in areas of
Funding	Awards Can I support my research?	Number, value and duration of awards
Outputs	Productivity How productive am I?	Number, types and growth of outputs
	Visibility How prominent is my output in top outlets?	Impact of publication outlets
Research Impact	Influence How is my output used in academia?	Views, citations Reputation: awards, prizes, editorships
	Enterprise How is my output used in industry?	Commercial use (patents, licenses, spin outs, consultancy)
Engagement	Network How well linked am I within academia?	Collaboration: geographical, cross-disciplinary Network: number of collaborators, centrality, connectedness, geographical extent
	Connections How well linked am I outside academia?	Collaboration: cross-sector Celebrity: who's talking about me? Crowd-sourcing: collect and analyze data, raise funding
	Mentoring How do I transmit knowledge?	Who supervised me, and who have I supervised?
Social Impact	Social Impact What is my wider impact?	Direct and indirect impact on general public's well being, and understanding of research

Qualitative Input

Figure 1: A model for a researcher's basket of metrics to help prove their excellence

By providing an extensive and accessible basket of metrics for all peers and entities, we hope to enable researchers to use research metrics responsibly as part of their day-to-day work, and so better prove their research quality and impact. In addition, it will hopefully help researchers effectively hold evaluators to account when evaluators are using research metrics to help them in their judgments.



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References

[1] For more information, go to www.snowballmetrics.com



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