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Review and critical analysis of methods and approaches to evidencing impact from investments in research

Background

Over the last decade, growing emphasis has been placed on research funding organisations to demonstrate how their use of public funds or donations benefits the research ecosystem and wider society [1-6]. The importance of accountability, transparency, and demonstrating value from research has necessitated that funding organisations optimise robust methods and approaches to evaluating the outputs, outcomes and impacts of funded research [7].

Why did we conduct this research?

The NIHR draws on multiple methods and sources of data to evidence how the organisation is progressing towards achieving its intended outcomes and impacts. The most relevant review on these methods was conducted over ten years ago, and focused on demonstrating the impact of investment on one large research programme within the health sector in the UK [8]. Therefore, given recent emphasis on increasing coordination in the research system [9] which enables the sector to demonstrate the impact and the value for public money spent on research [10], it was timely to conduct a new review.

The aim of this scoping review was to identify and catalogue the methods and approaches used to evidence the outputs, outcomes and impacts of research. The primary focus was on funding mechanisms relevant to NIHR, including research programmes, research infrastructure and schemes focused around supporting research careers (e.g., Fellowships).

What was our research approach?

A scoping review was conducted and followed an established methodological framework [11, 12]. Literature searches were conducted in electronic databases (Medline, Scopus, Embase, PsycInfo) and grey literature indexes (Overton and Google Scholar) in October 2023. Records were included if they reported on existing or emerging methods or approaches for evaluating or evidencing the outputs, outcomes or impacts of research investments. Eligible records included peer-reviewed journal articles, reports, web pages, news articles, and policy documents. Extracted data on the methods and approaches and types of research investments/returns was captured, summarised and catalogued.

What did we find?

- A wide range of terminology was used to describe outputs, outcomes and impacts, often interchangeably, adding complexity to the literature.
- Sixty-nine records on methods and approaches to evidencing outputs, outcomes and impacts from research investments in the UK (40%) and EU (60%) were identified and included in the review. These records from grey literature (53%) and peer-reviewed journal articles (47%) comprised evaluations of research investments in the areas of Health Research, Research Policy, Research and Innovation, Climate research, Social Sciences, Arts and Humanities, and Natural Sciences.
- The majority of records reported using methods and approaches with a mixed-methods design (59%), followed by records reporting on quantitative (24%) and qualitative (16%) designs. This suggests that since 2016 there has been increased widespread adoption of mixed-methods approaches rather than approaches that focus solely on quantitative or qualitative designs.
- The most commonly reported approaches or methods to evidencing outputs, outcomes and impacts were case studies/stories of change, bibliometrics, theory of change and logic models. These were used in different contexts and adopted all [design] types.
- Records from academic journals were more likely to report on the use of one approach, method or technique to address data issues experienced by organisations, such as the availability and quality of data (e.g., bibliometric data). For example, issues with data availability were explored using proxy indicators and some methods tested for their robustness to produce comprehensive evaluations.
- Reports from grey literature revealed that larger-scale evaluations (e.g., multi-national/-regional programme level) tend to involve implementation of a wider and more mixed range of methods and approaches. These reports also described adaptation of generic models for the development of tailored frameworks for addressing specific evaluation goals.
- Both academic and grey literature reported experimental studies/pilots to improve on well-established approaches by addressing the drawbacks of widely used methods, tools or techniques. However, these studies called for further investigation to determine whether and if these innovations work in different research contexts.

Organising frameworks for assessing the outcomes and impacts of research funding:

- Twenty-six formal approaches or frameworks, and 15 individual methods for evaluating and/or evidencing the outputs, outcomes and impacts of research were identified. These were applied to different types of funding investments and to report multiple types of outcomes and impact.
- Many organisations and evaluators favoured a mix of well-established theoretical (e.g., logic model) and operational (e.g., outcome mapping) approaches for assessing research investments. This allowed them to triangulate and complement evidence, facilitating a more comprehensive assessment of the value that research brings to society, economies, or research systems.
- Use of different approaches and methods meant that different levels of outcomes and impacts were captured: these included individual, project, programme, system, and global/societal.

Assessing the outcomes and impacts from different types of research investment:

- Out of 69 included records, 34 (49%) focused specifically on approaches and methods for evaluating research programmes and investments into research infrastructure and supporting research careers (e.g., fellowships).
- Despite some of the approaches being tailored to a particular type of funding mechanism, overall there was no evidence that any single approach is most suited for a particular type of research investment. Equally, there was no clear relationship between the specific methods used and the type of outcomes or impacts measured.

"Findings from the review have informed the NIHR's approach to assessing outputs, outcomes and impacts"

Reflection on findings and next steps

Findings from the review have informed the NIHR's approach to assessing outputs, outcomes and impacts, including exploring new, methodological strategies for measuring and evidencing the outcomes and impacts of research investments, with the goal of making more informed decisions about future research investment directions, and better demonstrating the value and contributions of funded research.

Reflecting on undertaking this review suggests that the NIHR should consider:

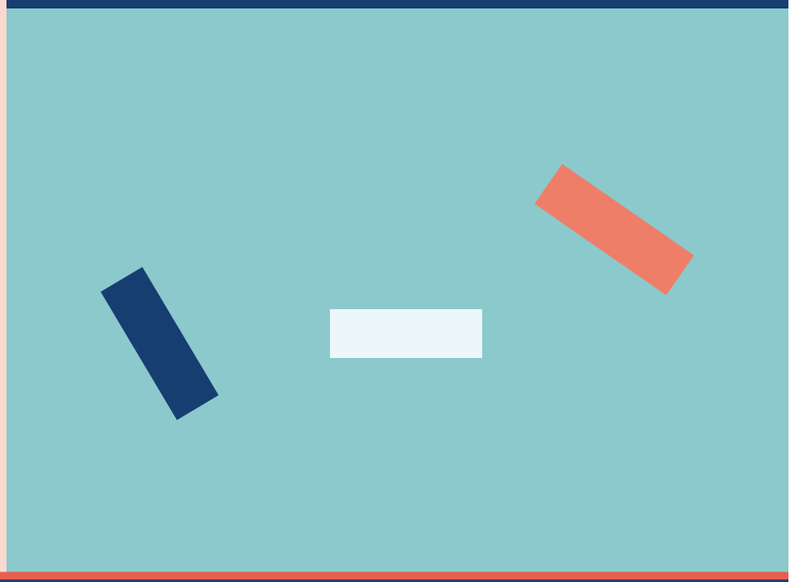
- Developing and implementing standardised terminology, definitions, and methods for evaluating research outcomes and impacts across the organisation. This includes using consistent language for describing different types of investment, evaluation methods, and definitions of outcomes and impacts.
- Integrating evaluation across all types of research investments (including programmes, fellowships and infrastructure). Collaborating to ensure data collection and analysis are aligned with organisational evaluation strategies.
- Continuing to recognise the limitations of relying solely on commonly used methods like bibliometrics to demonstrate impact. Utilise tools like logic models and Theories of Change (ToC) to develop and implement effective Monitoring, Evaluation and Learning (MEL) frameworks, identifying key data points needed for tracking progress, outcomes and impacts. Employ mixed-methods approaches that combine quantitative data with qualitative assessments to gain a more comprehensive understanding of research outcomes and impacts, using case studies, interviews, comparative analyses, and social network analysis.
- Investing in systemic data collection mechanisms across the organisation by conducting regular quality checks to ensure the data gathered is reliable and can be effectively used for a variety of evaluation methods. Balance and maximise the use of existing data with the need to generate new data to broaden the range of evaluation approaches available.

Conclusions

Evidencing research impacts is complex due in part to the lack of consensus on terminology, the specificity of organisational approaches and evaluation requirements, and the challenges of data availability and quality.

A variety of methods are widely used, relying on data available within organisations to evaluate research investments, but they have limitations in generalisability and data quality. The use of mixed methods is becoming more widely adopted. There is no single best approach for evaluating research impacts, and evaluators often draw on multiple methods to triangulate the evidence. It is important to find a balance between collecting comprehensive data and ensuring that the evaluation is practical and feasible to implement.

Further research is needed to explore the strengths and limitations of different evaluation approaches and methods in relation to their purpose, and identify the link between outcomes and impacts from individuals (researchers or fellows), research projects, and the outcomes and impacts of programmes and organisations .



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