

Evaluating and improving research-society relations: The role of normal and extraordinary impact

Reflecting on current methods in evaluations of the societal impacts of research, this policy brief pinpoints the distinction between normal and extraordinary impact of research and the limitations of evidence-based case studies. Societal impact does not occur primarily as unexpected extraordinary incidents of particularly useful breakthroughs in science. Is it more often a result of normal everyday interactions between organizations that need to create, exchange and make use of new knowledge to further their goals.

Gunnar Sivertsen (NIFU) and Ingeborg Meijer (CWTS, Leiden University)

1. What is societal impact of research?

Societal impact has gained a central focus in research policy and evaluation. Research is increasingly expected to meet societal challenges and to interact responsibly with society. National and international research funding organizations are asking for evidence or indicators of societal impact, and several frameworks for the understanding and evaluation of societal impact have already been proposed and piloted. We will show that evaluation and policy designs can be improved and made more relevant and effective by using a distinction between *normal and extraordinary impact* and by separating *between organizational- and individual-level* activities and responsibilities in science-society relations.

We define *normal impact* as the more-or-less active, productive and responsible interactions between (units of) research organizations and other organizations according to their purposes and aims in society. Within the research organizations, such interactions will often occur informally at the individual researcher or research group level, but they may also follow formalized agreements or well-established traditions for collaboration. With a similar definition of societal impact, Spaapen & van Drooge (2011) “understand *productive interactions* as exchanges between researchers and stakeholders in which knowledge is produced and valued that is both scientifically robust and socially relevant”. While inspired by the concept of productive interactions, our definition of normal impact also includes cases where the expected interaction is missing, impaired or inadequate, or where the outcome is neither scientifically robust nor socially relevant.

In contrast to normal impact, we define *extraordinary impact* as more rare incidences where traditional and typical or new and untypical interactions have unexpected widespread implications for society. In this definition, we include

extraordinary cases of negative impact (‘grimimpact’, Derrick et al. 2018), since such cases can be understood and evaluated – not as accidents – but as violations of the expected normal and responsible impact. Current methodology for evaluating the societal impact of research, evidence-based case studies, tends to select individual incidents of particularly interesting or impressive impact. These incidents may be extraordinary in the sense that they have unusually wide implications or demonstrate impact in new relations where impact normally does not occur, e.g. in the relation between the humanities and the pharmaceutical industry.

Contrary to such extraordinary impact – which by definition is rare and often based upon serendipity – evaluation of normal impact implies a focus on the quality of everyday normal interactions between research and society in areas of research and sectors of society where such interaction can be expected.

2. REF methodology for evaluating societal impact

REF 2014, the Research Excellence Framework for the evaluation and funding of universities in the United Kingdom, was the first broad ex-post assessment of societal impact of research to be carried out (Derrick and Samuel, 2017), and the most studied and discussed so far in the literature (Pedersen et al., 2018). The REF methodology requires evidence of societal impact related to specific achievements in research. There is a template for the written case reports (REF2014, 2012) which among other things demands the identification and documentation of:

- The research that underpinned the impact: “This section should outline the key research insights or findings that underpinned the impact, and provide details of what research was undertaken, when, and by whom.”
- The resulting impact: “A clear explanation of the process or means through which the

research led to, underpinned or made a contribution to the impact (for example, how it was disseminated, how it came to influence users or beneficiaries, or how it came to be exploited, taken up or applied).”

The typical analysis of case studies based on the REF methodology has been to identify pathways, beneficiaries and effects of research in the reported cases, with a clear stance on excellence, not only in science but also in societal impact. This model for collecting and evaluating reported cases of societal impact is implicitly based on an understanding of societal impact that reminds of the so-called linear model of innovation (Godin 2006) or communication (Shannon & Weaver 1949). It thereby has a basic problem with being at odds with most empirical studies of the science-society interactions in our time and what more theoretically has been called Mode 2 in the interactive dynamics between science and contemporary societies (Gibbons et al. 1994).

Moreover, the REF requirements to demonstrate evidence of societal impact are exposed to some general problems with linking research activities to societal impacts. These are problems with e.g.:

- Causality: relationships between research and innovation inputs, activities, outputs, and impacts are often unclear or nonlinear.
- Attribution: it is difficult to separate the impact of research and innovation from other inputs and activities.
- Internationality: research and innovation activities, and value chains, are global and normally not identifiable in specific relations.
- Time scale: impacts in science-society relations are normally realized over very long time, and only extraordinarily of short time.

The REF is in the end about institutional funding. Inevitably, the REF methodology for evaluating societal impact is mostly focused on one side of the interaction. The case studies methodology also makes the universities report primarily examples of extraordinary impact, mostly at the individual level. This procedure has many valuable outcomes. It increases awareness of the societal responsibilities and provides strong stories to tell in the media. But the procedure does not result in an evaluation to learn from.

Instead, normal impact includes both sides of the interaction. Evaluating normal impact implies asking – in specific and typical relations – how the interaction is functioning on a daily basis on both sides, according to organizational purposes and aims. Moreover, the problems with causality, attribution, internationality and time scale are less important for the analysis. Other evidence about daily operations and their management and infrastructure will be in focus.

3. Alternative frameworks and methods

Potentially more in line with what we mentioned above as the Mode 2 theory of the interactive dynamics between science and contemporary societies are several other frameworks for the understanding of the societal impact of research, such as the Payback framework (Levitt, Celia, & Diepeveen 2010; Klautzer et al. 2011), the SIAMPI/ERiC model (Spaapen & van Drooge 2011; Molas-Gallart & Tang 2011; Olmos-Peñuela, Molas-Gallart & Castro-Martínez 2014), the Flows of knowledge framework (Meagher, Lyall & Nutley 2008), the Research Contribution Framework (Morton 2015), Contribution Mapping (Kok & Schuit 2012), and the IMPACT-EV (Flecha et al. 2014). An overview of such frameworks has recently been made by The Humanomics Research Programme at Aalborg University Copenhagen (Pedersen et al. 2018). Another overview, mostly focused on health research and outcomes, is found in Greenhalgh et al. (2016).

In these other frameworks for understanding and evaluation, the production and use of knowledge is understood as a process of interaction and co-creation rather than as a linear process that eventually leads to an effect or ‘impact’ outside of research. There is, however, little empirical evidence from the use of these alternative frameworks. The first empirical data was collected by the Arthritis campaign and the UK Heart Foundation based upon the Payback framework, and a few cases exist on the basis of ERiC in the (H2020) SIAMPI project.

The other frameworks are valuable for their theoretical, conceptual and empirical contributions to the field of research on societal impact, but they seem to be too laborious as designs for real evaluations. We think the reason for their practical shortcoming is that the commissioners of the models, often the funders of research, are not yet

asking for real evaluations of normal impact that can be learnt from on both sides of the interaction. They are asking for evidence of individual-level impact, requiring an extra effort, focusing on only one side of the interaction (the researchers). The quest for individual evidence seems to assume that the science-society interaction is not normal but might take place in any unexpected place and only in particular and sometimes extraordinary cases. This assumption results in a burden of evidence on the researchers' side of the societal impact evaluation methodology.

4. Normal interactions with society are different and typical for each field of research

The missions of general universities towards society are usually expressed in very general terms. Less vaguely expressed are the aims and purposes of research organizations with a more specialized profile (e.g. agricultural universities or public health research institutes). Evaluations of normal impact will need this kind of specificity, as societal relations differ by fields and subfields of research.

This was clearly demonstrated by two recent evaluations of the humanities and social sciences (SSH) in Norway. Both included evidence-based case studies and evaluations of societal impact according to the REF methodology. A few of the cases from the humanities demonstrated extraordinary contributions to information technology, bioethics, peace processes, emergency communication, and genetic counselling. The commissioner of the evaluations, the Research Council of Norway, chose to highlight these extraordinary cases when reporting from the exercise. However, the SSH research more typically contributed to societal development, policy design, public administration, international affairs, integration and understanding of different languages and cultures, education at all levels, cultural life, media and information, and history, the 'memory of society'. The case studies demonstrated that research in the SSH is integrated in, and not operating at a distance from, certain domains in society where the disciplines may have specific purposes and play specific roles in specific societal and cultural contexts. Musicology usually contributes to musical life and research in international relations normally to diplomacy and foreign policy.

These purposes and roles may often be more specific than seen in a general typology or

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R-QUEST is sponsored by the RCN's [FORINNPOL](#) programme for the period 2016-2024. It is managed by [NIFU](#) and involves a number of [research partners](#) as well as [policy/user partners](#).

description of pathways, beneficiaries and effects. Examples of such generalizations may be 'improving health and well-being' or 'commercialization and exploitation'. At the same time, the specific aims of the research-society interaction may be more general than the individual case report can account for. Hence, a more specific typology of typical societal relations in each field of research is needed.

Law studies, for example, are concentrated in the universities' Faculty of Law in most countries. Their typical interaction with society is different from other faculties and at the same time more specific than a university's general societal responsibility: It serves the legal system of a country, by educating professionals and responding to societal needs in the legal system. Moreover, studies in e.g. EU Law (the research is international in focus and applications) or Criminal Law (the research is national in focus and directly concerned with the civil society) will have different relations to society. Such specific relations need to be understood before they are evaluated. Extraordinary cases of particularly impressive impact will not be sufficient for such an understanding.

5. Involving stakeholders and improving relations

The frameworks mentioned above, all have their major focus on evaluating the research performing side of the interaction with society. This is understandable since they have been developed for research funding organizations and their needs. However, if the purpose of an evaluation is formative (not only assuring value for money but improve by learning from advice), and societal impact is studied as an interaction, both sides of the interaction should be able to learn from the evaluation.

In the literature, one approach to understand and evaluate on-going interactions is named 'realist evaluation'. The evaluation should include in-depth case studies, focus on formative 'real-time' evalua-

tion and take the ‘messy, unpredictable and evolving interaction’ into account (Raftery et al. 2016). Realist evaluation considers the mechanism through which the impact is made and suggests that research creates output only in so far as they introduce appropriate ideas and opportunities (mechanisms) in the appropriate settings (context) (Pawson & Tilly 1997). Realist evaluation “elaborates how mechanisms could work in a given context and asks the people who could know about it to provide evidence” (Stame 2004). In order to understand the context-mechanism-output, realist evaluation requires the contribution of the “people who know” (Stame 2004). The stakeholders must therefore be a part of the evaluation process.

6. Evaluating and facilitating normal impact

Case reports of individual impacts of research may be necessary in a domain of research evaluation where measurement seems very difficult and data and indicators of general performance are mostly missing. The limitation of the case report methodology still is that the evaluated organization will select the most extraordinary examples of societal impact under the pressure for achieving funding or positive results of the evaluation. Selecting the extraordinary impacts may be useful for convincing funders and for raising the public consciousness of what research can do for society. However, it is less useful if the aim of the evaluation is formative and there is a need for understanding the interactions between frequent and typical inter-actors at the organizational level, and for making the evaluation useful for both sides.

This is also in line with the official policy for Responsible Research and Innovation (RRI) in the Horizon 2020 programme of the European Union (Schomberg 2013; Stilgoe et al. 2013). The policy “implies that societal actors (researchers, citizens, policy makers, business, third sector organisations, etc.) work together during the whole research and innovation process in order to better align both the process and its outcomes with the values, needs and expectations of society.” RRI essentially is sharing responsibility and depends on groups and organizations rather than on individuals.

The RRI goals might be conflicting with the research evaluation criteria and methods connected to the more general research excellence policy. The selection processes based on international peer review might be disqualifying societal interaction.

This type of conflict between international research evaluation regimes and the interaction with local needs has been demonstrated in several studies recently (e.g. Piñeiro & Hicks 2015, Bianco et al. 2016, and Chavarro et al. 2017).

7. Dealing with values and needs of society and with research integrity

A medical faculty is not only part of a university, it is also part of a country’s healthcare system. In this perspective, the scientific fraud and misconduct of the Macchiarini case at the Karolinska Institute in 2016 (Nature 2016) can be seen as an extraordinary case of negative impact of individual research. In another perspective it is a case of violation of the ‘societal contract’ between the Swedish medical research organization and Swedish society. The Karolinska Institute, after years of disregarding various allegations of clinical and scientific misconduct against their scientist, eventually chose the latter point of view, took the responsibility and followed up. In this perspective, extraordinary negative impact (‘grimimpact’) is an organizational responsibility, and normal impact, positive or negative, should be considered so as well. So-called Health Technology Assessment (HTA), which is practiced in the health care sector of many countries, is an example of a well-organized methodology to responsibly deal with normal relations between research and health care practices (Raftery et al. 2016).

Research in the social sciences and humanities will often have less direct societal responsibilities and possible negative effects or ethical consequences than research in a medical faculty will have in the healthcare system. On the other hand, research in the humanities and social sciences will often concern things that are valued, needed or controversial in culture and society. It seems unavoidable that an evaluation of the working in society of the social sciences and humanities will need to deal explicitly with values, particularly if the interaction is seen from the perspective of society. A further development of how values are treated in the understanding and evaluation of societal impact is therefore needed.

Policy implications

- **Focus on normal impact rather than extraordinary impact:** Societal impact of research is normal and part of society. Normal impact is about daily activities and how well they are organized, not about

individual incidents of particularly interesting or impressive impact.

- **Focus on relations and interactions:** Societal impact evaluation needs to consider both sides in the relations between research and society. The main purpose of the evaluation should be the improvement of the relations, rather than the assessment or funding of one side of the relation. Typologies of impact (e.g. cultural and heritage preservation) needs to be supplemented by an identification of the relevant inter-actors or sectors in society, resulting in a typology of inter-acting organizations (e.g. museums).
- **Apply an organizational-level perspective:** In general, normal societal impact with possible positive effects can be seen as an organizational-level responsibility, not just as the responsibility of each individual researcher. An organizational perspective may also better serve the implementation and follow-up of societal impact evaluation. Evidence-based case studies imply a linear model of communication and interaction that creates well-known problems with attribution, time frames, etc. An organizational-level evaluation may instead focus on how well the systematic interaction is taken care of (in strategies, infrastructures, management, incentives, etc.).
- **Allow for diversity in incentive and reward schemes:** Normal impact may benefit from clear objectives and incentive and reward schemes that stimulate a wider diversity of tasks and skills within a research group or unit.

Further reading

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