What is Impact Assessment?

1. The nature of impact analysis

Impact analysis is a component of the policy or programming cycle in public management, where it can play two roles:

- *Ex ante* impact analysis. This is part of the needs analysis and planning activity of the policy cycle. It involves doing a prospective analysis of what the impact of an intervention **might** be, so as to inform policymaking – the policymaker's equivalent of business planning;
- *Ex post* impact assessment. This is part of the evaluation and management activity of the policy cycle. Broadly, evaluation aims to understand to what extent and how a policy intervention corrects the problem it was intended to address. Impact assessment focuses on the effects of the intervention, whereas evaluation is likely to cover a wider range of issues such as the appropriateness of the intervention design, the cost and efficiency of the intervention, its unintended effects and how to use the experience from this intervention to improve the design of future interventions.

Trying to maintain a strict boundary between *ex post* impact assessment and evaluation is probably not useful except for didactic purposes. Probably, the majority of impact assessments can contribute to addressing broader evaluation questions, and in many evaluation designs impact assessment is used together with other evaluative techniques in order to reach conclusions. A significant danger, however, is to confuse impact assessment and evaluation because (a) an impact assessment is not designed to answer as many questions as an evaluation, so it will have nothing to say about many things that matter in policymaking and (b) impact assessments tend to focus on a narrow and tightly-defined set of impacts, frequently presenting a rather narrow picture of the results of an intervention. This is especially the case where impact assessments focus overly on economic impacts.

The nature of impact assessments as part of the policy cycle also means that they are inherently not "neutral measuring instruments". They can cause "observer effects" where the fact of observation leads to changes in the things being observed. Especially important here are "Hawthorne effects", where the fact of observation tends to induce performance improvement. This is most clearly the case in performance-based research funding systems, which are these

days being extended to cover the impacts as well as the quality of research. These things in turn mean that impact assessments can themselves be used as policy interventions.

Impact assessment is, in more than one sense, a theory-based activity.

First, inherently it involves establishing a "theory of change", a "programme theory" or "intervention logic" – in other words, a description of the cascade of cause and effect leading from an intervention to its desired effects. There are multiple terminologies, but the essence of impact analysis is to establish such a supposed chain of causation ("theory") from intervention to impact and to measure or describe the changes induced along that chain. This approach has the advantage of specificity and focus but also tends to limit observed effects to categories that have been predicted, by definition omitting unexpected effects, including "perverse" or undesirable effects that had not been anticipated by the designers of the intervention.

Second, a theory of change itself builds on theoretical preconceptions. For example, a theory of change building on the idea of innovation systems would emphasise the role of context, complementary actions by different stakeholders and the effects of lock-ins, while a neoclassical economic approach would focus on economic incentives and signals, individual economic actors and assume that economic agents can easily change aspects of the production technology or the broader knowledge base upon which they rely. Impact assessments can therefore focus on one set of potential effects at the cost of others without this necessarily being obvious to the observer. Without a determined effort to experiment with the (theoretical and other) assumptions we build into theories of change, the theoretical preconceptions of those who undertake them risk limiting their findings.

While evaluation and impact assessment in research has tended to be disconnected from theory and practice in other fields, the influence of innovation systems thinking has encouraged its (implicit) philosophical basis to converge with that of "realist evaluation", which is increasingly the normal approach in the wider evaluation community.

Realism is a school of philosophy. It was developed to sit between positivism ('there is such a thing as the real world, which we can directly observe and about which we can derive "facts"') and constructivism ('since all our observations are shaped and filtered through the human senses and the human brain, it is not possible to know for certain what the nature of reality is'), Westhorp, 2014.

Strictly, realistic evaluation is a particular "school" within the theory-based tradition. Key ideas from realism that influence how theories of change are constructed, and therefore the kind of evidence that is used, include:

Realism asserts that both the material and social worlds are "real" in the sense that they cause effects;

All enquiry involves seeing the world through particular theoretical "lenses" so there is no "final" truth or knowledge;

Social systems are open systems. Hence, a programme interacts with its context and its systemic role has to be considered; the boundaries of the system to be evaluated are not "given" but must be chosen by the evaluator; and the relevant systems and boundaries may change over time;

Causation results from the interaction of an intervention and its context. (The role of the context may be hard to observe without doing comparative analysis of similar interventions in different contexts.);

Context affects which impact mechanisms operate and whether they operate.[1]

These points converge strongly with some of the key implications of the innovation systems perspective, notably the importance of context in effecting change, the uniqueness of individual innovation system contexts so that "best practice" lessons cannot simply be transferred from one to another', the importance of people and institutions – and therefore of behaviour and perception – in determining outcomes; and the interdependence of system components, which therefore co-evolve to generate different ways to solve similar problems without it being clear that there is one "optimum" solution.

2. The idea of "impact" is itself problematic

Traditionally, we refer to the "impact" of research on society as if there were a simple, linear relationship between the two. At the same time, the history of the relationship between research and society – conventionally referred to as the "social contract" between science and society – twists and turns. The idea of "impact" makes obvious sense in a linear model, where changes in research are expected to be the causes of changes in society. The linear idea was important in the Post-War period but has not been so central before or since. Under other social contracts, where the initiative for change comes from society itself, the idea of "impact" of research on society appears less coherent. Arguably, the arrow of causality can go the other way.

Current theories of innovation also stress the non-linearity of the innovation process and its dependence upon the surrounding "system" of innovation, i.e. the institutions, actors and wider social context within which innovation happens. This suggests there is variety in the mechanisms that link research activity with social change. A single "impact model" will in any case not do.

The idea of a self-steering "research" system that "impacts" the rest of society in various ways is a relatively new construct, dating from the years after World War II. Taking a longer time horizon reveals evolution in the "social contract" between science and society: namely, the terms upon which society is willing to sponsor or fund science. Rather than research being an

[1] These five points are summarized from (Westhorp, 2014).

independent variable and impact a dependent variable, as we like to model the relationship in economic impact analysis, the social contract has often involved an instrumental attitude to research, which has been expected to act as the handmaiden to society.

The medieval universities that emerged in Europe from the Twelfth Century onwards focused on training the medical and legal professions and on educating people for the church[2]. Monarchs and the church funded these institutions. The universities had few resources for research but produced human capital for a society that was cautious about what we would today describe as scientific progress, since this could bring conflict with established religious and social power structures.

From the Seventeenth and Eighteenth Centuries, new specialised higher education institutions and academies arose to develop knowledge and produce human capital for areas such as medicine, artillery and agriculture. Funded by lay groups within society, these were less intellectually constrained than the universities but nonetheless more orientated towards scholarship than research.

The Humboldtian revolution, enshrined in the creation of the University of Berlin in 1810 and involving the integration of research into universities and – at least in principle – the idea that academics should be free themselves to choose their own research topics, is generally held up by the academic community as defining a golden age, where academics governed themselves. In reality, the expansion of the university system was funded by the state and – especially in Germany – came increasingly under state control. Most of the resources available for research also came from outside the universities. This means that while in some areas such as the humanities academics could indeed exercise autonomy in their choice of research topic, technical and scientific subjects that required significant resources were more closely tied to society's – or at least, sponsors' – needs.

In parallel with the Humboldtian revolution a separate strand of university development led to the creation of new universities such as the German *Technische Hochschulen*, France's *Grands Écoles* and the US land-grant colleges, established to teach and research in practical subject, which provided significant contributions to innovations and industrial development – not least in the period before the Twentieth Century, when many companies did not have their own R&D departments and when both universities and research institutes or consultants such as Arthur D Little made big contributions to company innovation (Mowery and Rosenberg, 1989).

The social contract changed to some degree after the Second World War influenced by *Science, the Endless Frontier* (Bush, 1945), which served as a manifesto for the idea that the research community should manage itself and choose its own research agenda. It was claimed that this would result in large social and economic benefits but that these could not be predicted. While this influenced the creation of the US National Science Foundation, most US government research carried on being funded and directed by Departments of State. The essence of that social contract was that "The political community agrees to provide resources to the scientific

2 This short history is based upon Martin, 2012.

community and to allow the scientific community to retain its decision-making mechanisms and in turn expects forthcoming but unspecified benefits." (Guston, 2000) However, this was never the only contract in operation: a lot of research was funded "top-down" in pursuit of social goals.

During the 1960s and the 1970s, there grew up a once again more active desire to harness science – and especially technology – to societal needs, leading to the creation of innovation agencies, innovation-focused industry policies and other new ideas such as *grands projets* aiming to shift control more towards society. The OECD was instrumental in establishing the legitimacy of what it called "science policy". In 1963, the OECD organised the first international meeting of ministers of science and two years later it established a committee and an internal department for science policy, led by Jean-Jacques Salomon, which promoted the idea of a "technology gap" between the USA and the rest of the world, which justified the need for science policy. The "OECD line" came to be that:

Research should help reach national, politically-determined goals;

Research should be planned and organised to that end;

Research should be more interdisciplinary, in order to solve real-world problems;

The universities were rigid, organised by discipline and unable to change themselves. They should be "reorganised" in order to contribute more to the solution of societal problems and to reach national goals (Benum, 2007).

The increased state R&D budgets had high mission content and new terminologies such as "strategic research" (Irvine and Martin, 1984) and "targeted research" (Elzinga, 1997) began to emerge. The continued roll-out of the "new public management" has arguably reinforced the trend for this drift to continue (Hessels, van Lente and Smits, 2009).

Over the past couple of decades, the emergence of "challenge" or "grand challenge" funding reflects more clearly a rejection of the linear model and its replacement by a policy model in which the attainment of specific social and technological goals is central and research becomes the servant of these goals. An early example was in the technical challenge of building better supercomputers and challenges announced by the US government have gradually broadened out to cover a wide range of technical desiderata such as low-cost solar cells or real-time machine-based language translation (Hicks, 2014).

While in the USA, grand challenges tend to be couched in broad technical terms and aim to seize opportunities, the European variant – at least at the level of the EU Framework Programme – tend to be yet more broadly defined as "societal challenges" such as climate change, the ageing of the population, and so on. While the EU version may thus be seen more easily as focusing on the avoidance of catastrophe rather than the seizing of opportunities (de Saille, 2014), it shares with the US notion of "grand challenges" the "demand-side" emphasis; crucially, it provides a "focusing device" and therefore a way to orientate the work of the Framework Programme towards specific solutions rather than unfocused possibilities (Georghiou, Europe's research

system must change, 2008). This suggests that it will be important to understand the social construction of research and research agendas.

This type of policy reorientation has another fundamental implication. The evaluation question is no longer "What was the social impact of the research?" but "To what extent were we able to use research and other activities in order to meet this particular social need?".

While this discussion of the social contract points to the predominance of socially driven research funding and governance, it is important to note that this has historically tended to co-exist with researcher-driven research. Modern state research funding systems deliberately balance these two forms, normally through the use of Research Councils and mission agencies (including but not only innovation agencies). Different species of universities and institutes or academies tend to specialise in one mode or the other. The consequence for impact analysis is that the mechanisms of impact are likely to be diverse; certainly one generic story about how impact occurs will not fit all circumstances.

This document is based on: **OECD Directorate for Science, Technology and Innovation (2014), "Assessing the Impact of State Interventions in Research – Techniques, Issues and Solutions", unpublished manuscript.**

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