

# Evaluation of Research in Context

## A Quick Scan of an Emerging Field

### 'Wikipedia' of contextual evaluation

*This Quick Scan is work in progress, a first step to collect information about contextual evaluation of research, that is evaluation that regards research in a broad context and includes all relevant output and the interaction of researchers with their social environment.*

*We invite readers to add articles and other literature, methods, topics, conferences etc. and turn this into a joint enterprise. What we plan to do is through the ERiC website ([www.eric-project.nl](http://www.eric-project.nl)) organize a 'living' document – indeed something like the Wikipedia encyclopedia - containing organized information on evaluation, in particular contextual evaluation. We'll form an editorial board with international members and will update the document regularly, at least four times per year. Next versions will be issued in September and December 2007. Both the ERiC-project and the Science System Assessment Department of the Rathenau Instituut will take responsibility for this. Contributions and comments can be sent to [leonie.van.drooge@bureau.knaw.nl](mailto:leonie.van.drooge@bureau.knaw.nl)*

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# 1 Introduction

In this report, we have started to create an overview of materials and organizations relevant for Evaluation of Research in Context. Why is this important? Often, evaluation of research only focuses on one specific type of output: the scholarly publications in high impact journals – as this is seen as the main output of research. However, it is increasingly accepted that researchers and research groups undertake research with a variety of goals, of which contributing to the research front is only one. Other intended outcomes of research activities are related to innovation, teaching, problem solving, consulting, and so on.

As individual research groups may have different portfolios of goals and activities, the evaluation of research should reflect this heterogeneity. In other words, research evaluation is context dependent.

This then poses the question of appropriate criteria, performance indicators and evaluation procedures to be used. And it asks for reflection about the role of research evaluation in decisions about research agendas, funding and organizing research.

In many different places, nationally and internationally, work is being done to increase our understanding of how to evaluate research in context. This draft report is a first attempt to give an overview of this work: people, projects, publications, organizations, conferences, and so on.

## **‘Wikipedia’ of evaluation**

The report is clearly unfinished at this moment, some of the paragraphs are still blank, some others contain just a first indication. But maybe this report never will be finished. What we have in mind is something like Wikipedia but then for evaluation. That is, we invite readers to add articles and other literature, methods, topics, conferences etc. and turn this into a joint enterprise. What we will do is put this on the ERiC website and use this as a ‘living’ document containing organized information on evaluation, in particular contextual evaluation. We’ll form an editorial board with international members and will update the system regularly, at least three times per year. Both the ERiC-project and the Science System Assessment Department of the Rathenau Instituut will take responsibility for this. From this moment on we welcome all feedback and suggestions for additions.



## 2 Evaluation of Research in Context – Main Concepts

In this chapter we introduce some of the main concepts in the area of (contextual) research evaluation, in the form of concise statements and some references.

### 2.1 Scientific quality

Scientific quality of research is a concept that most people intuitively connect with excellence, and with research pushing the borders of what is known. The concept of 'measuring' scientific quality is since long based on two ideas, one being that only scientific peers can judge the quality of scientific work, and the other that certain quantitative measurements can help the peer review process. These measurements are based on the ways in which researchers communicate with other researchers in their field about their findings. They do so through publications in international journals, and through referring to each other (citations), and that the more important the journal the higher the scientific quality of the published work is perceived to be. Other forms of acceptance and rewards also are used to measure scientific quality. Robert Merton (1973) is generally seen as one of the most important authors to write about reward and communication structure in the scientific world.

For decades, externally organised research evaluations have – next to peer review – focused on a particular set of indicators measuring the scientific quality of research, including production and impact scores. In the Netherlands, the CWTS institute specializes in bibliometric measurement of quality. According to its director, Anthony van Raan (1996), the fundamental purpose of evaluation is to promote research quality. Van Raan defines quality as “a measure of the extent to which a group or an individual scientist contributes to the progress of our knowledge. In other words, the capacity to solve problems, to provide new insights into ‘reality’, or to make new technology possible (ibid.: 398). In that sense, quality of research is a relative concept, it is measured in terms of the relation of research to existing knowledge.

### 2.2 Societal quality

In addition to scientific quality, the societal quality<sup>1</sup> of research has become more important over the last decades, in particular through discussions about the knowledge economy and political demands that science contributes to the development of society. Therefore, researchers are now asked on a regular basis to demonstrate for example the user relevance of research output, or their relationship to industry or the utility of research in relation to certain policy goals (e.g. van der Meulen and Rip 2000). For the measurement of societal quality, methods, indicators and criteria are less developed than is the case for scientific quality, although some progress has been made over the last decade (see [www.eric-project.nl](http://www.eric-project.nl))

### 2.3 Societal impact

Besides societal quality, the societal impact of research – which can be described as the implementation of research output by executive professionals, the policy field or other societal actors (industry, NGOs) – is also an important element to evaluate. It addresses the systematic and planned process of integrating new research findings or valuable procedures and techniques within normal practice routines. [check the website on science impact conference in Vienna, 10-11 May 2007 - <http://www.science-impact.ac.at/> under documentation]

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<sup>1</sup> See for example van der Meulen and Rip (2000) who identified (in a case study approach) dimensions of societal quality in environmental as well as in neuromuscular research and indicators linked to them. They found that the expectation that the research would contribute to socio-economic developments (relevance), the interaction with (possible) users and the actual use of results were the dimensions mainly used.

## 2.4 Contextual evaluation

Monodisciplinary sciences have become the minority, and more and more work is done in collaboration between various disciplines and with industry, governmental and non-governmental organisations. To evaluate research that is conducted in interdisciplinary settings (or multi- or trans-), the interaction of researchers and the wider context has to be taken into account. Sci\_Quest, a group of Dutch researchers, started developing a comprehensive evaluation system which includes the relevant context of research enterprises. While other evaluation systems are often criticised for the lack of recognition of the broader impact that some sciences have, Spaapen, Dijkstra and Wamelink (2005, 2007) developed the so-called sci\_Quest method to take this broader impact into account and to assess the societal quality and relevance of scientific research. They tested their method in two separate studies (one in agricultural sciences in 1998 and one in pharmaceutical sciences in 2002). They took the research group as their unit of analysis, to acknowledge the variety of research programmes in terms of mission, activities and output, that are gathered together in a university department (Spaapen and Dijkstra, 2005: 42). The method was used by the acting evaluation committees to assess the research programmes in a more comprehensive way than was previously possible (ibid.: 10).

This research points out that many researchers these days operate in a number of social domains. These domains can vary for different fields and may consist of the international scientific community, industry, politics, the public sector and the general public (end-users). Research programmes develop over time in mutual transactions with the complex context of a broader environment. Performing contextual evaluation entails the involvement of all participants in the research process, inside as well as outside the research group (Spaapen and Dijkstra, 2005: 26).

## 2.5 Research evaluation - ex ante, ex post

The distinction between ex ante and ex post evaluation refers to two different acts of evaluation, looking back and looking forward, or judging and foresighting. With ex ante evaluation usually projects are selected. Ex ante evaluation refers to an assessment of the likely future effects of proposals. It is the method by which proposals for research are rated, for example by funding bodies. On the other hand the ex post evaluation determines whether a research program or institution is supporting quality work. It is measured by looking at past performance, i.e. what has been produced in the near past. More and more, both forms of evaluating are linked together in current evaluations.

## 2.6 Research evaluation – formative, summative

Evaluations can have different functions, the main two being casting a verdict and improving research. The terms formative and summative evaluation refer to this distinction, although they have been used in different ways in the literature. **Scriven (1967)** coined the terms **formative** and **summative evaluation** in the context of curriculum evaluation, but they have been widely adopted both inside and outside the educational community. He provides the following definition of these terms:

“[Formative evaluation] is typically conducted *during* the development or improvement of a program or product (or person, and so on) and it is conducted, often more than once, *for* the in-house staff of the program *with the intent to improve.*” (**Scriven, 1991, 169; emphasis in original**), and, “Summative evaluation of a program (or other evaluand) is conducted *after* completion of the program ... and *for* the benefit of some *external* audience or decision maker. ... The decisions it services are most often decisions between these options: export (generalize), increase site support, continue site support, continue with conditions (probationary status), continue with modifications, discontinue.” (**Scriven, 1991, 340; emphasis in original**)

A gourmet distinction between formative and summative evaluation has been given by Bob Stake: “When the cook tastes the soup, that’s formative; when the guests taste the soup, that’s summative.” (**Scriven, 1991, 169**)

## 2.7 Governance

The Governance concept emerged in the corporate world, referring to processes of control and organization in a world that changes ever more rapidly under the influence of scientific and technological progress, the Internet especially. Globalization, decentralization, network society, and other developments characteristic for current societal development, all ask for new ways of policy and steering. The concept is now used in the public sector as well and although there is now precise definition of the



concept, we see the following key words in the literature: accountability, steering, control, transparency, checks and balances. Other concepts: planning and control, performance measurement.

Relate to the question how to implement methods for comprehensive evaluation in existing policy processes.

Use (2004, p.91) writes about the need for systems evaluations to address the governance challenge of 'evaluation of research in context' (see also Kuhlmann on this topic).

## 2.8 Multi-, inter- and transdisciplinarity

Within multidisciplinary research, synthesis of the different disciplinary contributions takes place post hoc, when the individual outcomes of disciplinary research are integrated within a problem solution. Interdisciplinary research on the other hand requires a more integrated approach throughout the research process: "Interdisciplinary research requires a joint research approach between researchers from different disciplinary backgrounds. Different disciplinary conceptual frameworks are used and problem definition, methodology and interpretation of results are dealt with in joint consultation" (RMNO 2005, translation FM).

"There are several definitions of transdisciplinarity but it is generally described as a specific form of interdisciplinarity in which boundaries between and beyond disciplines are transcended and knowledge and perspectives from different scientific disciplines as well as non-scientific sources are integrated (Flinterman, Tecler-Mariam-Mesbah et al. 2001; Thompson Klein, Grossenbacher-Mansuy et al. 2001)" (Pereira and Funtowicz 2005, vertaling FM). Transdisciplinary knowledge develops in the context of complex practical problems and transdisciplinary knowledge is not locatable on the prevailing disciplinary map (Gibbons *et al.* 2004).

According to (Klein 2006) five overriding themes emerge in the literature on evaluating interdisciplinary and transdisciplinary research:

- » the notion of quality depends on context
- » the value of coaching as opposed to formal evaluation
- » the centrality of integration
- » the interaction of social and cognitive factors
- » the need for change in peer review.

Use/discuss (Klein 2006) about the emergent literature on cross-disciplinary research evaluation.

Check Rosenfield (1992) – her publication marks the start of recent transdisciplinary research in US.

The idea of transdisciplinarity is traced conventionally to the first international conference on interdisciplinarity, held in 1970 in France and co-sponsored by the Organization for Economic Cooperation and Development (OECD). At the time, the word was one of four descriptors for teaching and research beyond disciplinary approaches. Over the next two and a half decades, "multidisciplinarity" and "interdisciplinarity" gained wider recognition. By 2004, though, "transdisciplinarity" had attained a new currency. When Roderick Lawrence and Carole Després introduced a special number of the journal *FUTURES* on the topic, they called it a word "*à la mode*" (403). The term had evolved from the original OECD definition of "a common system of axioms for a set of disciplines" to a label for new transcending fields, efforts to systematically integrate knowledge, and a particular kind of research practice. More attention has been paid to research. Yet, from the beginning the idea of transdisciplinarity was linked with the goal of changing higher education and its relationships to society at large. This chapter reflects on early and evolving theoretical and conceptual frameworks for transdisciplinary education, curriculum models in higher education, modes of learning in professional and community practices, and the lessons that derive from them. (From: Julie Thompson Klein: *Transdisciplinary Education: Frameworks, Models, and Practices*; see also the 2001 Basel conference on transdisciplinarity)

Refer to *Futures* special issue May 2004 as a reference towards recent ideas and conceptualizations of transdisciplinarity.

Refer to *Science and Public Policy* special issue July 2006

Maasen and Lieven (2006) have studied the discourses and practices that constitute doing transdisciplinarity and conclude that transdisciplinarity can be regarded as a new mode of governing science in society.

Transdisciplinarity focuses on complex problems in society that need a combined effort of researchers of different disciplines and stakeholders from society, policy and industry. It is closely related to postnormal science and mode 2 knowledge production (Klein 2004b).

## 2.9 Stakeholder oriented evaluation

Gubba and Lincoln (1989) coined the stakeholder oriented evaluation 4<sup>th</sup> generation evaluation. They aim at moving beyond the previous three phases of evaluation (characterized by the key-words measurement, description and judgement) which in their eyes are claiming to be objective and or scientific in their approach, while evaluation is fundamentally a social, political and value-oriented activity.

# 3 Evaluation of Research in Context – Thematic Overview

## 3.1 Interdisciplinary Research

Interdisciplinary research is growing and so is the practice of research evaluations, therefore the question of how to develop evaluations that are appropriate for interdisciplinary research is becoming more pressing. Evaluators working within different national systems respond by slightly adapting existing methods and procedures, but there is “no consensus about the best way of assessing interdisciplinary research” (Laudel and Origgi 2006).

### 3.1.1 Discussion of main literature

In April 2006 a special issue of *Research Evaluation* was published presenting empirical studies on the assessment of interdisciplinary research. Recurring themes in this issue are 1) the notion of quality, both as an explicit measure in funding systems and as a parameter orienting cognitive heuristics and 2) disciplinary perspectives on interdisciplinary research. The assessment of research quality in interdisciplinary research is a huge challenge, because disciplinary criteria do not suffice. In fact the consensual development of criteria for what constitutes good research is one of the achievements of doing interdisciplinary research. Recognition of this unique aspect of interdisciplinary research is growing and occasionally science policy makers are experimenting with new evaluation procedures that focus on mutual learning between evaluators and applicants and developing adequate reviewer expertise. In the USA for example “the National Institute of Health’s roadmap initiative, has begun to include ‘interpreters’ in their multidisciplinary review panels – individuals able to understand and negotiate cross-disciplinary differences emerging in the group.”(Boix Mansilla 2006). Laudel (2006) describes a form of peer review in which the empowerment of applicants and the enforced interdisciplinary learning of reviewers are key features of the procedure. Langfeldt (2006) uses three different perspectives to evaluate a broad range of peer review procedures: 1) peer review as an important control mechanism in the research community; 2) an uncertainty perspective; and 3) an organizational perspective. She concludes that when the aim is to promote interdisciplinary research a more risk-taking mode of peer review is needed. Lamont et al. (2006) examined “how panelists serving on interdisciplinary funding panels produce evaluations they perceive as fair.” On the basis of interviews with interdisciplinary researchers Boix Mansilla (2006) distinguishes three epistemic characteristics of good interdisciplinary research which could be used to shape review guidelines. These are: 1) Consistency with multiple disciplinary antecedents; 2) Balance in weaving together perspectives and 3) Effectiveness in advancing understanding. Feller (2006) also addresses the issue of quality. He shows how the quality criterium can be used to suppress interdisciplinary research. Furthermore his paper shows the complexity of assessing interdisciplinary research. It involves “multiple actors making multiple decisions in multiple organizational settings”. Drawing on observations from the United States he describes the interactions between decision making within three different sub systems of the science system (“government officials charged with allocating and evaluating public expenditures”; academic and laboratory administrators; and researchers engaged in different kinds of peer review).

General papers about interdisciplinarity:  
(Lengwiler 2006)

### 3.1.2 Conferences/Workshops/Symposiums/Lectures

2002-2003

Virtual seminar on Rethinking Interdisciplinarity organized by Christophe Hentz, Gloria Origgi and Dan Sperber and supported by the CNRS (Center National de la Recherche Scientifique, France).

Archived papers and discussions can be found at <http://www.interdisciplines.org/interdisciplinarity>

Paris, August 2004, 4S/EASST conference  
Session on the assessment of interdisciplinary research

February 2006 Workshop “Quality Assessment in Interdisciplinary Research and Education”

To advance the discussion of quality assessment in interdisciplinary research, researchers from Harvard University and the American Association for the Advancement of Science convened a select group of leading research administration (eg National Institutes of Health, Duke University), science journal editors (eg Physics Review) and social scientists, to share innovative practices and empirical results. Core insights are reported in (Boix Mansilla, Feller et al. 2006). The paper concludes that “understanding interdisciplinary research as an emerging form of knowledge production demands that we take learning how to do interdisciplinary work seriously.”

12 januari 2007, the Royal Netherlands Academy of Arts and Sciences hosted a symposium on interdisciplinarity in research programs in different areas, such as global change, energy and the environment. Themes were organisational issues, questions of integration, research methods and evaluation. [‘Interdisciplinarity in Research Practice’]

### 3.1.3 Research Organizations

#### 3.1.4 Funding bodies

In their guidelines for the preparation and review of applications in interdisciplinary research the Natural Sciences and Engineering Research Council of Canada propose to put less emphasis on the applicants’ track record when they start working in a field that is new to them (NSERC 2004).

#### 3.1.5 Intermediary organizations

Chapter on Evaluation in National Academy of Sciences report ‘Facilitating Interdisciplinary Research’ (National Academy of Sciences 2004).

The Academy of Finland Integrative Research (AFIR) team recommend a coaching model of evaluation rather than a jury model of evaluation for interdisciplinary research (Bruun, Hukkinen et al. 2005).

The *Advisory council for research on spatial planning, nature and the environment* (RMNO), the *Royal Netherlands Academy of Arts and Sciences* (KNAW), the *Netherlands Organisation for Scientific Research* (NWO) and the *Consultative Committee of Sector Councils for research and development* (COS) co-published a report on researchers’ experiences with interdisciplinary research in the Netherlands (De Boer, De Gier et al. 2006). Epistemological, methodological and organizational aspects of interdisciplinary research are discussed.

#### 3.1.6 Research Networks

#### 3.1.7 Experts

## 3.2 Transdisciplinary Research

There are two main approaches or conceptualizations to be found of transdisciplinary research, one in the USA, the other in Europe. In the USA transdisciplinary research is also referred to as team science, a strong form of collaboration between different disciplines in problem oriented research. [check definition]

In Europe, the term was brought to the fore by Gibbons et al in their 1994 book on the new production of knowledge. They distinguished between traditional academic monodisciplinary science and a new kind of research which they referred to as ‘mode 2’, in contrast to the ‘mode 1’ academic science. Mode 2 research was conducted in the context of application, and in teams that consisted of heterogenous experts, researchers, professionals, economists, technicians, policy makers, users or others.

Transdisciplinary research or team science has been strongly developed in a group of research centers affiliated with the US National Cancer Institute in the National Institutes of Health: the Transdisciplinary Tobacco Use Research Centers.

The European approach to transdisciplinary research is also problem oriented and cross-disciplinary, but differs from the team science approach as it emphasises the importance of including non-scientific, tacit knowledge of stakeholders and practitioners. Also the issues studied in European transdisciplinary research differ from those studied by team science. European transdisciplinary research is most strongly developed around issues of sustainability and spatial planning.

In the introduction to a special issue of *Futures* on transdisciplinarity Lawrence and Després (2004, p.399) discern four characteristics of transdisciplinarity. Transdisciplinarity:

- » aims to tackle complex problems, transcending any academic disciplinary structure;
- » needs to accept local contexts and uncertainty;
- » implies intercommunicative action;
- » is often action-oriented, 'entails making linkages between theoretical development and professional practice' (...) 'bridging the gap between knowledge derived from research and decision-making processes in society'.

Many of the problems that arise in evaluating interdisciplinary research, also apply to transdisciplinary research. In addition, in transdisciplinary research, the need to accept local contexts and uncertainties and the need to be action oriented means that other objectives apply, then those that normally structure academic research. Whereas interdisciplinary research can develop within the traditional research setting of an academic research group or a public knowledge institute, transdisciplinarity requires involvement with the local context. For deciding what constitutes good transdisciplinary practice, other than scientific criteria alone are needed (Merkx 2007b).

A recent Dutch study on transdisciplinarity in the field of integrated coastal zone management identified the scientific reputation system as one of the barriers for scientists to participate in transdisciplinary research (Merkx 2007a; Wesselink and Merkx 2007). Within the current scientific reputation system it is difficult to establish a career on transdisciplinary research. Scientific excellence and output in disciplinary oriented journals form the dominant evaluation criteria of scientific research.

The assessment of transdisciplinary research asks for new type of quality standards and evaluation mechanisms. Such evaluation mechanisms and quality standards would serve two goals. First, it would provide recognition of specific transdisciplinary skills, improving the attractiveness of transdisciplinary research as an alternative career path for scientific researchers. Second, evaluation mechanisms and quality standards are important if transdisciplinary researchers want to keep their independence, while working on societal issues and problems in which there are interests at stake. As Scholz et al. put it: "One critical issue is that the sciences keep their independence and develop appropriate strategies and standards for transdisciplinarity which extend and complement the traditional criteria." (Scholz, Mieg et al. 2000, p.486). The development of transdisciplinary quality criteria and evaluation mechanisms is slowly beginning to be taken up. Examples are discussed below.

### 3.2.1 Discussion of main literature

#### *Studies on transdisciplinary research*

In July 2006, a special issue of *Science and Public Policy* presented empirical studies on the practice of interdisciplinary and transdisciplinary projects. These studies provide insight in the specific characteristics of transdisciplinary research and are relevant when designing new procedures and evaluation criteria for transdisciplinary research.

Guggenheim (2006) for example studied transdisciplinary research within environmental consulting companies. He concludes that transdisciplinary research "leads to a strengthening of organisational aspects of knowledge production and, particularly, of a change in quality standards. Quality standards are increasingly defined in intra-organisational or project-dependent and procedural instead of disciplinary terms."

Pregernig (2006) has studied the impact of transdisciplinary science-policy forums almost a decade after they were formally finished. His two case studies show that the impacts of these transdisciplinary projects "can be found in many places but that assessments typically do not produce direct and immediate results. (...) Before that background, empirical studies that only focus on a transdisciplinary 'project' itself must, more or less inevitably, overlook many impacts and thus underestimate the potential of solution orientation." Pregernig therefore advises to take a 'distanced look' at transdisciplinarity, that is to assess the impact of projects long after they have formally finished.

Stokols (2006) argues that transdisciplinary action research should be "viewed as a topic of scientific study in its own right" in order "to achieve a more complete understanding of prior collaborations and to identify strategies for refining and sustaining future collaborations (and their intended outcomes) among researchers, community members and organizations."

#### *Evaluating Team Science*

(Stokols, Fuqua et al. 2003)

"This paper offers a conceptual and programmatic framework for evaluating the collaborative processes and the research and public policy outcomes of transdisciplinary science." Two ongoing evaluation studies of the initial phase of the Transdisciplinary Tobacco Use Research Centers (TTURCs) are described in this paper. Concept-mapping methodology (see <http://www.socialresearchmethods.net/mapping/mapping.htm>) was used as a method to "gain an overview of outcome domains in large-scale collaboration on complex health problems" (Klein 2006).

Further reading: (Stokols, Harvey et al. 2005). Evaluation criteria for TTURCs grant proposals are described in (Klein 2003) and (Klein 2004a).

### *Composite Scale for Assessing the Transdisciplinary Qualities of Doctoral Dissertations*

Mitrany and Stokols (2005) developed and applied a composite scale for assessing the transdisciplinary qualities of doctoral dissertations.

### *Catalogue of Criteria*

Defilia and DiGulion (1999) developed a modular questionnaire from which to construct (self) evaluation criteria for transdisciplinary research. The catalogue encompasses criteria both for ex ante and ex post evaluation and for evaluation of overarching projects as well as sub-projects. All criteria are qualitative. This study on evaluation criteria was commissioned by the Swiss Priority Programme Environment (SPPE) within the Swiss National Science Foundation (SNSF).

The report can be found on <http://www.ikaoe.unibe.ch/forschung/ip/specialissue.pano.1.99.pdf>.

### *Meta Scientific Evaluation and Evaluation by Politics*

Whereas most work on the evaluation of transdisciplinary research remains close to the traditional systems of scientific peer review or self evaluation, Krott (2004) claims that in addition to evaluation by a scientific community two other types of evaluation are relevant 1) meta scientific evaluations; and 2) evaluation by politics. “Meta scientific evaluation analyzes the progress of research with scientific methods only. Based on disciplines like economics, logic, or sociology, specific aspects of projects can objectively be proved and the performance can be explained better than the peers or the researchers themselves can do it. (...) Political evaluation is driven by facts, values and interests of the participants of the political system. The rationale might be weak but the impact on the decisions is the highest” (Krott 2004). Attributing politics a role in the evaluation of transdisciplinary research, Krott seems one of the few who incorporates action orientation and stakeholder values as important aspects to be evaluated in transdisciplinary research.

### *Quality Criteria of transdisciplinary research*

The research funding program Social-Ecological Research of Germany’s Federal Ministry for Education and Research has funded the project Evalunet – Evaluation Network for Transdisciplinary Research. The central result of this project is a guide for the formative evaluation of transdisciplinary research projects (Bergmann, Brohmann et al. 2005).

The guide “provides researchers with very detailed evaluation criteria and descriptions of evaluation methods and practices. The criteria and procedures were identified in an empirical process by evaluating a number of transdisciplinary research projects. (...) The main purpose of the guide is to provide guidance for the evaluation of transdisciplinary research projects. The criteria mainly support discursive evaluation processes that initiate learning processes for researchers and evaluators (formative evaluation). A set with a reduced number of criteria (Basic Criteria) offers a basic procedure for the evaluation, while the larger set with more detailed criteria (Detailed Criteria) provides explanations and assistance in making a judgement. Criteria can also be used for conceiving and constructing new research projects”(Bergmann, Brohmann et al. 2005). The criteria are organized in three groups which follow a project chronology (see Table 1).

The guide can be downloaded at: <http://www.isoe.de/english/reloadfo.htm?projects/transfoprax.htm>.

**Table 1.** Organization of Basic Criteria and Detailed Criteria (adapted from (Bergmann, Brohmann *et al.* 2005))

<b>A Project Construction and Formulation, Actors and Applying for Funds</b>
A.1 Actors and Competences
A.2 Problem Formulation, Focus, Goals, and Criteria of Success
A.3 Project Planning and Financing
<b>B Project Execution and Methodology</b>
B.1 Work Planning and Project Management
B.2 Transdisciplinary Methodology and Integration
B.3 Reflection and Communication
<b>C Results, Products, and Publications</b>
C.1 Results
C.2 Products and Publications
C.3 Generalizability and Implementability of Results
C.4 Justification of the Transdisciplinary Approach

### *Quality Assurance by Extended Peer Review - TIDDD*

Pereira and Funtowicz (2005) advocate quality assurance of transdisciplinary research through an extended peer community (Funtowicz and Ravetz 1990). 'The aim of knowledge quality assurance by extended peer review is precisely to open processes and products of policy relevant science to those who can legitimately verify its relevance, fitness for purpose and applicability in societal contexts, contributing with "extended insights and knowledge"' (Pereira and Funtowicz 2005). Extended peer review requires suitable spaces for knowledge representation and mediation. In the context of the GOUVERNe<sup>2</sup> project TIDDD – Tools to Inform Debates, Dialogues and Deliberations were developed to create such spaces.

(See: [http://agire.brgm.fr/TIDDD\\_GB.htm](http://agire.brgm.fr/TIDDD_GB.htm))

Further reading: (Corral Quintana, Funtowicz et al. 2002; Garin, Rinaudo et al. 2002; Pereira, Rinaudo et al. 2003)

Further reading on the assessment of integrative research:

(Spaapen, Wamelink et al. 2003) (Cashman, Reidy et al. 2004)

### **3.2.2 Conferences/Workshops/Symposium/Lectures**

Transdisciplinarity: Joint Problem solving among Science, Technology and Society, Zurich, 27 Febr – 01 Mar 2000, reported on in (Klein, Grossenbacher-Mansuy et al. 2001).

<http://www.digitalwork.ch/transdisciplinarity/>

NCI Conference on the Science of Team Science: Assessing the Value of Transdisciplinary Research  
Bethesda, 30-31 October 2006

[http://dcccps.nci.nih.gov/BRP/presentations\\_day1.html](http://dcccps.nci.nih.gov/BRP/presentations_day1.html)

Metanexus conference 'Transdisciplinarity and the Unity of Knowledge: Beyond the Science and Religion Dialogue', June 2-6, 2007 – Philadelphia, Pennsylvania.

<http://www.metanexus.net/conference2007/Default.aspx>

### *3.2.3 Research Organizations*

Institut für Sozial-ökologische Forschung (ISOE), Frankfurt am Main.

The current research project "Strengthening the practice of transdisciplinary research" aims "to support the conception, implementation and quality control of transdisciplinary research designs by putting together a comprehensive overview of theories, concepts, methods and procedures relevant to the practice of transdisciplinary research."

<<http://www.isoe.de/english/reloadfo.htm?projects/transfoprax.htm>>

Project: Transdisciplinary Cognitive Integration (in Social Ecology)

Some results: <<http://www.isoe.de/english/reloadfo.htm?projects/archivpr.htm>>

Sci\_Quest is a Scientific Consultancy Agency for Research and Higher Education Policy in the Netherlands.

<http://www.xs4all.nl/~jbspaa/>

### **3.2.4 Funding bodies**

Swiss Priority Programme Environment (SPPE) within the Swiss National Science Foundation (SNSF)

### **3.2.5 Intermediary Organizations**

The *Advisory council for research on spatial planning, nature and the environment* (RMNO) will publish a study on transdisciplinary research in the summer of 2007 (Regeer and Bunders, forthcoming, summer 2007).

### **3.2.6 Research Networks**

<http://sode.li/soso/websites/sagufnet/index.html>

sagufnet seems not very active anymore

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2 A Shared Cost Action financed by DG RTD, under FP 5. GOUVERNe stands for Guidelines for the Organisation, Use and Validation of information systems for Evaluating aquifer Resources and Needs.



<http://www.transdisciplinarity.ch/> td-net is the largest, multi-lingual information system serving researchers in a wide range of areas, with the starting point of environmental and sustainability sciences. The Bibliography may be searched electronically, and there is a separate roster of Journals

<http://perso.club-internet.fr/nicol/ciret/> >, Centre International Recherches et Études Transdisciplinaire.

<http://www.intels.cc/> INTELS is a research project that runs since 2002 to investigate interdisciplinary and transdisciplinary landscape studies in Europe. INTELS is interested in how projects cope with the demands of reaching integration between the involved disciplines as well as being problem oriented. Dissemination of results aims to improve the theory and practice of integrative landscape research in Europe and to develop benchmarks for the assessment of integrative projects.

Evalunet – Evaluation Network for Transdisciplinary Research

<http://www.isoe.de/projekte/reload.htm?evalunet.htm>

### 3.2.7 Experts

- » Matthias Bergmann, ISOE Institut für Sozial-ökologische Forschung (ISOE), Frankfurt am Main.
- » D. Stokols, University of California Irvine
- » J.T. Klein, Wayne State University, Detroit
- » J. Spaapen, Royal Netherlands Academy of Arts and Sciences KNAW
- » F. Merckx, Science System Assessment Department, Rathenau Instituut
- » B. Regeer, Athena Instituut, VU
- » J. Bunders, Athena Instituut, VU

### 3.3 Methodology

\* discussion of general methods for evaluation in context, in particular shared problems

a.o.:

- » REPP (Spaapen and Dijstelbloem 2005)
- » (Laredo and Mustar; Bongers, Den Hertog et al. 2003; Gläser, Spurling et al. 2004; Verspagen 2004; Antonangeli, Rizzuto et al. 2005; AWT 2005; Berghoff, Federkeil et al. 2005; Spaapen and Dijstelbloem 2005; Jordan 2006; Stuart and Thelwall 2006; Heinze, Shapira et al. 2007)

#### 3.3.1 Discussion of main literature

##### *Research Embedment and Performance Profile (REPP)*

The REPP has been developed by Sci\_Quest, a Scientific Consultancy Agency for Research and Higher Education Policy in the Netherlands.

“The central insight is that the mobility of participants and interaction and communication patterns furnish a heuristic for identifying differences in social domains or contexts for knowledge production. In each context, different expectations exist, with attendant norms, values and priorities. The REPP facilitates reconstruction of the relevant environment and the performance of the group within it. It seeks patterns and profiles, comparing results with a group’s self-proclaimed mission. A quantifiable benchmark is set for each indicator in consultation with researchers and policy-makers. Scores are then plotted on a radar-like graph that represents variegated activities in a quantifiable balanced way.” (Klein 2006)

(The Allen Consulting Group 2005)

##### *Examples of recently developed ex-post societal quality methods and indicators*

Spaapen, J. (1995). *Research for Society: Towards a method for the assessment of research in a policy context*. University of Amsterdam, Amsterdam.

Research embedment and performance profile (REPP) in agricultural sciences:

Wamelink, F., & Spaapen, J. (1999). *De evaluatie van universitair onderzoek: methodiek voor het incorporeren van de maatschappelijke waarde van onderzoek* (No. NRLO 99/12). Nationale Raad voor Landbouwkundig Onderzoek, Den Haag.

Callon, M., Law, J., & Rip, A. (1986). *Mapping the dynamics of science and technology*. London: MacMillian Press Ltd.



Dijstelbloem, H., Spaapen, J., & Wamelink, F. (2002). Knocking at the gatekeepers door: the distribution of accountability in pharmaceutical research. Paper presented at the Society for Social Studies of Science (4S) conference, 26-th annual meeting, Milwaukee, USA.

(Spaapen and Dijstelbloem 2005) Evaluating Research in Context. A method for comprehensive assessment. Consultative Committee of Sector Councils for Research and Development (COS), The Netherlands.

End-user relevance in agricultural and biological research organizations:

Lyall, C., Bruce, A., Firn, J., Firn, M., & Tait, J. (2004). Assessing end-use relevance of public sector research organisations. Research Policy, 33(1), 73-87.

Methodology for the (ex-post) evaluation of the societal impact of applied health research in which communication to health professional workers, quality improvements, implementation activities and the relevance of health care for policy are evaluated: Council for Medical Sciences. (2002). The societal impact of applied health research: towards a quality assessment system. Amsterdam: KNAW.

Social Sciences council and Humanities Council (2005): Judging Research on its Merits

### 3.3.2 Conferences/Workshops/Symposiums/Lectures

#### 3.3.3 Research Organizations

#### 3.3.4 Funding bodies

#### 3.3.5 Intermediary Organizations

#### 3.3.6 Research Networks

#### 3.3.7 Experts

## 3.4 General

### 3.4.1 Discussion of main literature

[authors, organisations, super short summaries, 3 pp.]

Ann Bruce [ISSTI] suggested the AEBC report on 'What shapes the research agenda in agricultural biotechnology'

[http://www.aebc.gov.uk/aebc/subgroups/research\\_agendas.shtml](http://www.aebc.gov.uk/aebc/subgroups/research_agendas.shtml)

Measuring the impact of publicly funded research, 2005, The Allen Consulting Group, report to the Australian Government department of education, Science and Training

### 3.4.2 Conferences/Workshops/Symposiums/Lectures

UK Evaluation Society's annual conference on Evaluation in Society looks relevant see <http://www.profbriefings.co.uk/EISCC2006/> for details of the programme.

EU / RTD network conferentie Maastricht 2002 [?]

2 NAVO conferences, 2004, 2006 [refs. Van Victor, Patricia Vogel]

New Frontiers in evaluation, 24-25 april 2006, Vienna, Plattform Forschungs- und Technologieevaluaiering

Berlin: Qualitätssicherung von wissenschaft im wandel. 1-3 juni 2006, Wissenschaftszentrum Berlin fur Sozialforschung (WZB)

Prague, 12-13 October 2006, Peer review, Its present and future state

“Science Impact. Rethinking the Impact of Scientific Research on Society and Industry” (10. and 11. May 2007; Vienna)

### 3.4.3 Research Organizations

The Danish Centre for Studies in Research and Research Policy

Contact: Karen Siune

Publication: Evaluating the Societal Impact of the Interplay between Universities and business Enterprises.

ISSTI, the institute for the study of science technology and information

Contact: Catherine Lyall

Manchester Business School, PREST

SPRU Science and Technology Policy Research, University of Sussex, Brighton

Contact: Jordi Molas Gallart, Aldo Genua

Main activity: Research encompasses measuring and assessing, as well as developing, deeper qualitative insights into the processes of knowledge generation and distribution in the UK and other OECD countries. The focus of our analysis are the interactions between two main groups of university actors (researchers and administrators) and agencies of government (including Research Councils, Higher Education Funding Councils, Regional Development Agencies, etc.), foundations (charities and other not-for-profit organisations affecting university behaviours through funding and lobbying), business (firms' managers, firms' scientists, etc.) and individuals (paying for the education and benefit, or not, from the development of science).

Rathenau Institute – Science System Assessment unit

Contact: Peter van den Besselaar

Technopolis, UK, the Netherlands, etc.

Contact: Erik Arnold

### 3.4.4 Funding bodies

Tip: The UK Research Councils are all promoting the notion of ‘knowledge transfer’ and also have initiatives on ‘science in society’. You might want to look at RCUK (Research Councils UK) [www.rcuk.ac.uk](http://www.rcuk.ac.uk) and the BA (British Association for the Advancement of Science) is also active in the area.

### 3.4.5 Intermediary Organizations

#### 3.4.6 Research Networks

PRIME stands for Policies for Research and Innovation in the Move towards the European Research Area. It is a Network of Excellence supported by the EU's 6th Framework Programme and involves over 200 researchers from 40 institutes. The focus is on integration, spreading of excellence and initiating joint research actions.

Contact: Kate Barker (also: Phil Shapira, Knut Sorensen, Barend van der Meulen)

Main activity: training courses in science policy (technology, innovation)

#### *European RTD Evaluation Network*

Activity: The Network, established in 1997 under FP5, aims at enhancing co-operation between the national RTD evaluation units/agencies or agencies concerned with evaluation and the relevant Commission Services. The Network is a forum of discussion and analysis of good practice in evaluation methodology, use of indicators and measurement of impact of research results. Attention will be focused, mainly, on publicly funded RTD, but experience and know-how from industry will also be discussed.

Austria Meeting of the European RTD Evaluation Network

Vienna, 23 April 2006

<http://www.orus-int.org> International University Reforms Observatory (ORUS) network of European and Latin American academics.

<http://www.ERIC-project.nl>

= Eric project

### 3.4.7 Experts



## 4 Developments in various fields

In this chapter we look at developments in a number of different research areas, in particular the areas of health research and of social sciences and humanities. Other areas will be added in the next versions.

### 4.1 Medical & Health Science

Medical research plays a key role in improving national health and prosperity. It is 'explicitly concerned not only with the acquisition of scientific knowledge as such but also with the usefulness and implementation of scientific achievements' (Council for Medical Sciences - KNAW 2002, p.10). In recent years the medical research community has recognized a growing need to demonstrate the wide range of socio-economic benefits that result from investment in medical research. As illustrated by a quote of a Dutch academic research manager: '...unfortunately, there was not enough time to evaluate both the scientific and the societal quality of health research. This was a pity ... additional problems were the shortcomings in the evaluation methods for societal quality. As a consequence, some non-university research institutes did not want to participate in the evaluation process because in their opinion the focus on scientific quality did no justice to quality of their research' (Van der Weijden 2007, p.99).

Researchers and research organisations are accountable for their use of funds to a range of public, charitable and commercial sources. Evaluation of how and why medical research delivers benefits is therefore crucial to research stakeholders, which include government, funders, industry, regulatory bodies, patients and public (UK Evaluation Forum 2006). According to Davies and Nutley (1999) evidence on effectiveness is more to the force in health care than in other public service. In conclusion, there is not only a great need but also a great opportunity to assess the impact from health research.

#### 4.1.1 Discussion of main literature

There have been a few recent initiatives attempting to develop methods to assess the broader outcomes and impact of medical research. This will help to build a dialogue with both politicians and the public. As recently shown by a study of NIGZ (Keijzers, Paulussen et al. 2005) Dutch policymakers think that scientific information is not directly applicable and relevant to make contributions in the policy-making process<sup>3</sup>. Furthermore, the methods to measure societal impact will support the case for investment in high-quality medical research. This section gives an overview of the evaluation methods and frameworks that have been used by national and international organisations to assess impact of medical research.

#### *Pay-back framework*

The most well-known framework is the Research Payback framework, developed by Buxton and colleagues (Buxton and Hanney 1996; Hanney, Gonzalez-Block et al. 2003; Hanney, Grant et al. 2004) at the Brunel University (UK) over the past 10 years (1996-2006). The framework describes the wide range of benefits that may result from medical research. It focuses on the output and outcomes of research. Five broad categories are identified:

- » Knowledge production
- » Research targeting (better targeting future research) and capacity building
- » Informing policies and product development
- » Health sector benefits
- » Broader economic and social benefits.

The first category in the pay-back framework includes the measurement of the traditional research output (publications and patents). The strength of the framework is that it highlights both the wider benefits of research and several economic benefits of research.

The pay-back framework consists of six stages and two interfaces:

Stage 0:	topic/issue identification
Interface A:	project specification and selection by peer review
Stage 1:	inputs to research
Stage 2:	research process
Stage 3:	primary outputs from research

<sup>3</sup> Research can make contributions in at least three phases of the policy-making process: agenda setting, policy formulation, and implementation (Hanney et al., 2002).

Interface B:	dissemination
Stage 4:	secondary outputs
Stage 5:	adoption
Stage 6:	final outcomes

During the years 2003–2006 some pioneering work on the application of the pay-back framework has been done by researchers from HERG group themselves, together with researchers from RAND Europe.

### Arthritis Research Campaign (UK)

The Arthritis Research Campaign (ARC) has used in 2003 the pay-back framework to improve understanding of how research is translated from bench to bedside (Wooding, Nason et al. 2007). ARC is a large medical research charity, investing 22 million pound a year in basic and clinical research into arthritis. The pay-back framework was applied to 16 research grants, selected as a representative of the range of ARC funding. The aim was to assess the extent to which different types of funding might prevent or promote the successful translation of research. Information was collected from document and literature review, semi-structured key informant interviews and bibliometric analysis. In order to identify factors associated with the successful translation of research a comparative analysis was done. Two approaches were chosen: (a) qualitative assessment of each case study based on a discussion with the project-team of the key observations and (b) scoring each case study on the five pay-back categories.

From the analysis ARC formulated six main conclusions:

1. there is a diversity of research pay-back
2. individuals translate research
3. project grants seems to provide value for money; payback arising from project grants is similar to that arising from other modes of funding
4. intended or unintended flexibility in funding is used advantageously
5. referees' contribution to the peer review process are of variable benefit
6. the pay-back framework could be operationalized and embedded by ARC

However, the researchers reported several limitations regarding for example the use and selection of cases; the selection of suitable time-window; the use of linear framework to structure analysis of the scientific process. In addition, they made recommendations, which are intended to help ARC to develop a system to ensure the successful translation of research that it funds. The UK Evaluation Forum (2006)) recently reported that ARC has just started with prospective evaluation of the research it funds. This prospective evaluation will be compared with retrospective evaluation at the end of the grant period and 10 years later to establish whether it is possible to predict outcomes of particular types of research funding.

### ZonMw (The Netherlands)

In 2005 the impact of the ZonMw Health Care Efficiency Research programme was assessed by a researcher from RAND Europe by using the pay-back framework (Oortwijn 2007). The Health Care Efficiency Research programme (HCER) actively promotes research on the recognition, assessment and implementation of cost-effective interventions and fosters generalisation of knowledge. It is a structural programme with an annual budget of 12.2 M€. It is the first time that pay-back evaluation framework was used in The Netherlands. This study had three goals: (1) to assess the impact of HCER research grants, in terms of improved patient care, improved policy support and improved future research; (2) to identify factors associated with the successful translation of research into policy and practice; and (3) to explore the possibilities to develop an evaluation system to monitor HCER research. Every research grant (N=43) was assessed on societal impact. A questionnaire was sent to researchers & users and dossiers were analysed. In addition five (HCER) grants were studied more intensively (case studies), which also included qualitative interviews with researchers and users. The ARC method (see above) was adopted to do perform a comparative analysis. Results were graphically visualised by making 'payback profiles', which allows comparability between the impact of different grants. Categories 1 till 4 of the pay-back framework could be used without any problems in this study. Interestingly, the HCER programmes seemed to have no broader economic and social benefits (category 5: decline/decrease in absence due to illness and sale of commercial products) because at the time the assessment was done most of the HCER project were just finished. Ooijwijn (2006; 2007) reported several limitations and discussion points, regarding scoring system (difficult or/and unclear), selection of experts (general vs. specific) who score societal impact of grants and remarks about the operationalization of the scoring marks.

### Advisory Council on Health Research (RGO; The Netherlands)

The pay-back framework is used in the RGO committee 'universitaire responsiviteit' which investigates the way how societal problems are setting the university research agenda. In 2007 the RGO advice will be published (Gezondheidsraad 2006).

### RMW framework

In 2002 a working group established by Council for Medical Sciences from the KNAW (RMW; The Netherlands) developed a methodology that could measure the societal impact of health care research outcomes. The criteria and indicators of the societal impact of research output developed by this working group are listed below.

CRITERION	INDICATOR
Content analyses	Professional publications Treatment guidelines and protocols Policy documents Cochrane library Textbooks Teaching materials Lay publications ICT and software
Citation analyses	Citations in scientific publications (both SCI and non-SCI) Citations in professional journals, policy documents, protocols and guidelines
Authorship	(Co)-authorship of documents mentioned above under 'content analysis'
Products	Health-care technology and services Instruments, programmes, methods for (assessments or implementation of) care
Funding of research	(Semi) governmental funding
Publicity	Presentation for a non-scientific audience Fact sheets Public media Internet
Memberships	Membership of a committee issuing a policy document or a treatment guideline Membership of an advisory committee
Teaching	Contributions to initial and post-initial education of health-care professionals based on research output
Implementation strategy	Membership of advisory committees Interactions between researchers and public administration
Independence	Operationalization of research questions Research methodology Analysis and publication of results

Source: Council for Medical Sciences (2002)

### Application of the RMW framework

The working group suggests implementing the evaluation of the societal impact of applied health research within Dutch the new national research evaluation system: 'Research institutes and groups can be asked to list and describe the indicated non-SCI research papers output they consider relevant in their societal mission. They can also be asked to present other data as to the potential societal impact of research results' (Council for Medical Sciences - KNAW 2002, p.28). The working group emphasises that it is important that both the scientific quality and societal impact are assessed together by a single external review committee. Also the feedback of stakeholders is important. Therefore, the working group proposes that the external review committee may consult a panel of stakeholders, such as professionals, patient organisations, health care institutions, policy makers and research clients. This proposed methodology was presented and discussed with international researchers, experts and policymakers in the field of quality assessment in an invitational meeting on 19 June 2001. In this meeting it was concluded that the new national research evaluation system offers ample possibilities for including an evaluation of the societal impact of applied research. Most criteria before can be easily implemented as part of a self-assessment (Council for Medical Sciences, 2002). Van der Weijden (2007) found in a survey study among Dutch medical and health research leaders that 50% of the responding researchers (n = 82) think that incorporation of societal indicators will stimulate researchers to improve their performance not only for scientific quality but also for societal quality. Almost one third of the responding researchers (n = 47) do not think this would be the case.

### *Frameworks developed by Dutch academic research institutes*

Nowadays, also academic research institutes are developing methodologies to deal with societal impact of academic research. In this subsections two concepts are presented as examples.

#### **LUMC framework**

The Leiden University Medical Centre (LUMC; The Netherlands) has developed a concept during the years 2004-2006. This concept is based on communication processes (Van Ark 2007). It concept may well be applied to other research fields as well. Evaluating the outcomes of research is considered as the valuation of communication of research groups with their relevant surroundings. Communication is considered as a two-way process of outputs from inside and inputs from outside. Four target groups are identified in the surrounding: 1) the general public 2) public institutions and policy institutions, 3) private industry and companies and 4) the scientific community itself. Four modes of communication are distinguished: (a) knowledge products; (b) knowledge transfer & esteem, (c) knowledge use and (d) attractiveness.

The model does not make a principal distinction between scientific and societal impact; only the target group differ. The concept is restricted to the level of research groups. The LUMC has two main goals by adopting this concept: (i) to show the societal outcomes of research and (ii) to strengthen societal profile of research without trading off on the scientific profile. Implementation of this concept will take place in 2007 by the LUMC Directorate of Research.

#### **Care framework**

Care, a Dutch academic health research institute, developed a framework in 2006 (CaRe 2006). The users of academic medical and health research are central in this framework. Four users are distinguished: (i) professionals; (ii) policy makers; (iii) patients; and (iv) the general public. Output indicators are developed to measure the societal impact of research accomplished in the research institute. The framework will be introduced in 2007.

**Professionals:** Number of: (a) clinical guidelines; (b) publication in professional journals, (c) presentations to professionals, (d) education (courses, including refresher courses) for professionals, (e) editorships of professional journals; (f) symposia and conferences contributions directed to professionals; (g) participation in committees developing policy advices.

**Policy makers:** Number of: (a) policy reports; (b) publications in policy journals; (c) presentations to policy makers; (d) education (courses, including refresher courses) for policy makers; (e) symposia and conferences contributions directed to policy makers; (f) participation in committees developing policy advices.

**Patients:** Number of: (a) presentations to patients; (b) symposia and conferences contributions directed to patients

**General public:** Number of: (a) public media contributions (tv, radio and newspaper), (b) symposia and conferences contributions directed to the general public.

### *Bibliometric data*

The UK Evaluation Forum (2006) reported that bibliometric data have been used to estimate the technology development (patent citation) and health services impact (citations of research in clinical guidelines).

### *Evaluating Team Science in transdisciplinary tobacco use research centers*

Stokols, Fuqua et al. (2003) have developed a method to evaluate transdisciplinary research in large-scale collaboration on complex health problems. For further references see chapter 3.2 on transdisciplinary research.

#### **4.1.2 Conferences/Workshops/Symposiums/Lectures**

- » Lecture 'Societal Impact of R&D' by Gerrit van Ark (ZonMw). Science System Assessment Meeting. Rathenau Institute. 27 March 2007.
- » Lecture 'Het meten van de maatschappelijke impact van gezondheidsonderzoek' by Wija Oortwijn (RAND Europe). Leergang VWS. 22 February 2007/ Kennis Beter Delen. 23 March 2006. <http://www.kennisbeterdelen.nl/index.php?id=193>
- » Lecture 'Hoe meet je de maatschappelijke impact van onderzoek' by Josien van Bensing (NIVEL). Kennis Beter Delen. 23 March 2006. <http://www.kennisbeterdelen.nl/index.php?id=193>



- » Symposium 'The returns of ZonMw health care efficiency research programme', 3 June 2005 organized by ZonMw (The Netherlands). <http://www.zonmw.nl/nl/programmas/doelmatigheidsonderzoek/actueel/archief/doelmatigheidsonderzoek-neemt-afscheid-van-juriy-wladimiroff.html>
- » First public meeting with Community and Stakeholder Organisations, 8 June 2006 organized by the Human Genetics Advisory Committee, Australian National Health and Medical Research Council (Australia). <http://www.nhmrc.gov.au/news/events/index.htm>
- » UK Evaluation Forum Symposium Programme 'Valuing health research-assessing the benefits to society', 2-3 June 2005 organized by the Royal Society (UK).
- » Invitation Meeting 'The Societal Impact of applied health research', 19 June 2001 organized by Council for Medical Sciences, Royal Netherlands Academy of Arts and Sciences (The Netherlands).

#### 4.1.3 Research Organizations

- » Brunel University (UK), Health Economics Research Group (HERG). HERG focuses on the economic evaluation of a broad range of clinical and health service technologies and its dual aim is to provide applied, policy-relevant research whilst developing and refining methods to increase the rigour and relevance of such studies. <http://www.brunel.ac.uk/about/acad/herg>
- » Brunel University (UK), Centre for Evaluation of Public Policy. The focus is on the evaluation and analysis of public policy, democratic procedures and public opinion. <http://www.brunel.ac.uk/about/acad/bbs/research/centres/bcde>
- » RAND Europe: an independent not-for-profit research institute whose mission is to help improve policy and decision-making through research and analysis. <http://www.rand.org>
- » World Health Organization, The Alliance for Health Policy and Systems Research (Switzerland). <http://www.who.int/rpc/alliance/en/>
- » Leiden University Medical Centre (The Netherlands), Directorate of Research. <http://www.lumc.nl>
- » Evaluation Forum Working Group: a broad representation from the UK medical research community (UK). <http://www.acmedsci.ac.uk>
- » Rathenau Institute (The Netherlands), Science System Assessment (Scisa). Scisa is investigating the dynamics of the scientific and technological process: how is the science system organised, how does it respond to scientific, societal and economic developments, and to what specific scientific developments does this lead? <http://www.rathenau.nl>

#### 4.1.4 Funding bodies

- » National Institutes of Health (USA). <http://www.nih.gov/>
- » ZonMw (the Netherlands). <http://www.zonmw.nl>
- » R&D programme of the National Health Services (UK). <http://www.nhs.uk>
- » Australian National Health and Medical Research Council (Australia). <https://www.nhmrc.gov.au>
- » Council on Health Research for Development (international organization located in Switzerland). Working Group on Research to Action and Policy: strove to improve the understanding of the issues underlying the frequent gap between research and its practical implementation. It focuses particularly on the decision-making aspect. One of the aims is to try and identify capacity development needs to help countries in their efforts to make research an effective tool for health development. <http://www.cohred.org>

#### 4.1.5 Intermediary Organizations

- » Applied Health Research Committee of the Council for Medical Sciences, KNAW (The Netherlands). <http://www.knaw.nl/rmw/>
- » The Advisory Council on Health Research (RGO; The Netherlands). Committee: University responsiveness. <http://www.rgo.nl>

#### 4.1.6 Research networks

#### 4.1.7 Experts

- » Martin Buxton: Brunel University, Health Economics Research Group (HERG; UK).  
<http://www.brunel.ac.uk/about/acad/herg/staff/martin>
- » Steve Hanney: Brunel University, Health Economics Research Group (HERG; UK).  
<http://www.brunel.ac.uk/about/acad/herg/staff/steve>
- » Wija Oortwijn: Rand Europe (The Netherlands). <https://www.rand.org>
- » Gerrit van Ark: ZonMw (The Netherlands). <http://www.zonmw.nl>
- » Jozien Bensing: NIVEL (The Netherlands).  
<http://www.uu.nl/uupublish/defaculteit/halloffame/bensing/lofrede/29762main.html>
- » Lex Burdorf: Erasmus Medical Center, Department of Public Health (The Netherlands). <http://www.eur.nl/fgg/mgz/>
- » Chris van Weel: University Medical Centre Nijmegen (The Netherlands).  
[http://www.ru.nl/onderzoek/onderzoekers/kennisbank/persoonpagina/umc/weel\\_c\\_van/](http://www.ru.nl/onderzoek/onderzoekers/kennisbank/persoonpagina/umc/weel_c_van/)
- » Inge van der Weijden: Rathenau Institute, Science System Assessment (The Netherlands).  
<http://www.rathenau.nl/showpage.asp?steID=1&item=2034>
- » Richard Grol: Center for Quality of Care research (WOK), Radboud University Nijmegen

## 4.2 Social Sciences & Humanities

Quality criteria and indicators that are suited for the natural sciences dominate in the practices of research assessment and evaluation. These criteria and indicators are not always suitable for the assessment and evaluation of social sciences and humanities research. Bibliometric indicators for example do not form an adequate research evaluation instrument because journals only represent 30% of all publications in the social sciences & humanities. The Arts and Humanities Citation Index is biased towards the English language and important publication media for the social sciences and humanities - like monographs and collective volumes - are not included in the Arts and Humanities Citation Index (KNAW 2005) (Archambault, Vignola-Gagné et al. 2006).

The dominance of the natural sciences in framing the quality criteria and indicators for research assessment is particularly problematic when evaluating the societal impact and quality of social sciences and humanities research. The use of bibliometric indicators creates an incentive for social sciences and humanities researchers to publish their work internationally in peer-reviewed journals. But, bibliometric indicators do not create incentives to publish in professional journals, to contribute to public debate and to contribute to policy making, since such publication media are not sufficiently taken into account. That is an important shortcoming, because non-academic publications are the excellent medium for social sciences and humanities research to transfer their knowledge to societal actors and to have societal impact. (KNAW 2005; AWT 2007).

It is currently widely acknowledged both nationally and internationally that social sciences and humanities research requires alternative methods for evaluating research quality and impact. Research Councils in Australia, Canada, the UK and the Netherlands are in the process of developing these alternative methods, both on the level of research groups (CHASS 2005; KNAW 2005) as well as on the level of research programmes (Nason, Klautzer et al. 2007; Wooding, Nason et al. 2007; AHRC?).

### 4.2.1 Discussion of main literature

#### *Contours of an evaluation method*

The Royal Netherlands Academy of Arts and Sciences' Council for the Humanities and the Social Sciences Council wrote an advisory report on judging social sciences and humanities research on its merits (KNAW 2005). It proposes an evaluation method in which self-evaluation and the institute's mission form the core of the method. The report provides a tentative list of target groups, including peers, students, policy makers, business community, professionals and broader public as well as a tentative list of indicators for each of these target groups.

#### *Valorisation policy for the social sciences and humanities*

The Advisory Council for Science and Technology Policy (AWT) recommends that valorisation activities should also be evaluated by users and principals, not just by academic peers. The Sci-Quest method (ref) is an example of an evaluation method in which societal impact is evaluated by stakeholders (see also 3.5). (AWT 2007)

### *Payback Framework for the social sciences*

RAND Europe in collaboration with the Health Economics Research Group (HERG) at Brunel University were commissioned to undertake a review of the policy and practice impact of the ESRC's 'Future of Work' programme. They used the Payback Framework developed by Buxton and Hanney (1996). The researchers conclude that "both the literature review and fieldwork showed that the Framework could be effectively applied to social sciences research" (Wooding, Nason et al. 2007).

The report is presented in two volumes. Volume one presents the methodology and main results (Wooding, Nason et al. 2007). Volume two presents the detailed data for each of the case studies as well as an extensive literature overview covering evaluation of social science and the use of research evidence in policy making (Nason, Klautzer et al. 2007). The two volumes can be downloaded at:

<http://www.esrcsocietytoday.ac.uk/ESRCInfoCentre/Support/Evaluation/publications/>

### *CHASS model for research quality and impact assessment*

The Australian Council for the Humanities, Arts and Social Sciences (CHASS) developed a model for research quality and impact assessment. The model can be applied across the research spectrum, including cross-disciplinary research. The model has been developed for evaluation on the level of research groups. The model identifies three factors that are important for research evaluation. The relative weight attributed to these three factors can be adjusted to suit the focus of the research group in question. The three factors are:

- » **Quality** The report finds that any assessment of research quality is best achieved by peer review of an evidenced-based case, informed by key metrics. It finds that potential indicators of quality are broadly comparable between science and non-science sectors.
- » **Impact** By contrast, the key indicators of the impact of research on other researchers and the broader community are diverse and highly discipline-specific. They need to be evaluated by a panel of experts drawn from academe and users and beneficiaries of publicly funded research.
- » **Capability** The model introduces a further category, research capability, which reflects the capacity of a research unit to contribute to future goals of research and research training; that is, to ensure the vitality and diversity of Australian research in the years to come. The case for capability, like the case for impact, should be evaluated by a panel of experts and beneficiaries of research. (CHASS 2005)

### *AHRC Evaluation Framework*

The Arts and Humanities Research Council (UK) has developed its own framework for evaluating the impact of its research funding activities.

The framework is underpinned by four key concepts:

- » Instead of evaluating individual awards the framework adopts the concept of a "research landscape, taking into account the relationships and interactions between research activities and the wider social, economic, cultural and educational realms."
- » Instead of a linear concept of impact and quality a research life-cycle approach is developed "recognising that impacts can and do occur at any point in the research process, from the formulation of new ideas, partnerships and research, to the dissemination and exploitation of results."
- » "Metrics of activity, such as citations, bibliometrics, or patents, have tended to be used in some other subject areas and disciplines as proxies for impact and quality." The AHRC considers metrics of activity as very different from impact assessment and assessment of quality. Hence, the AHRC makes a distinction between three evaluation elements: 'metrics of activity; impact assessment; and assessment of quality or excellence.'
- » These three concepts are bound together by knowledge exchange. (AHRC?)

The evaluation framework can be downloaded at: [http://www.ahrc.ac.uk/images/4\\_97008.pdf](http://www.ahrc.ac.uk/images/4_97008.pdf)

### *Alternative Performance Indicators for the Humanities and Social Sciences*

In the context of a research project commissioned by the HSSFC, researchers from the Centre for Policy Studies in Higher Education and Training explored some alternatives to performance indicators. They suggest the following strategies for dealing with the institutionalized call to provide quantitative performance indicators.

- » Changing the discourse. 'We ought to dispel the myth of accountability and move towards a set of mutual and multilateral expectations'
- » Re-valuing Teaching, Service and Students.
- » Performance indicators should be adjusted to specific institutional mandates.

- » Complementary methodologies to measure performance should be used, such as benchmarking, case studies, focus groups, longitudinal studies.
  - » Better communicate the results of humanities and social sciences research to the public. (Fisher, Rubenson et al. 2000a)
- Check indicators of research school CERES (Dietz)

#### 4.2.2 Conferences/Workshops/Symposiums/Lectures

Workshop “Social indicators and assessment of research in Social Sciences and Humanities”, Donostia, San Sebastián, June 9-10, 2003.

Workshop “The research in Social Sciences and Humanities: Methodologies of assessment and construction of indicators”, Donostia - San Sebastián, October 17-18, 2005.

Economic and Social Research Council (ESRC) symposium on assessing the non-academic impact of research, May 12-13 2005.

“The REC concluded from the results of the symposium that impact evaluations should:

- » look beyond research dissemination to capture evidence of application by research users
- » capture the wide diversity of social science impact, including improved economic performance, better informed public policy and decision making, and different ways of thinking about social and economic problems
- » examine the processes through which impact occurs in a particular setting”.

Davies, Nutley et al. (2005) wrote a report on this symposium, which can be downloaded at:

> <http://www.esrcsocietytoday.ac.uk/ESRCInfoCentre/Support/Evaluation/publications/>

Arts and Humanities Research Council (AHRC-UK) Impact Seminar 15th March 2006

[http://www.ahrc.ac.uk/about/ke/evaluation/impact/impact\\_fellows.asp](http://www.ahrc.ac.uk/about/ke/evaluation/impact/impact_fellows.asp)

‘Arts and Culture: another case of policy-based evidence making?’ Impact Seminar, 15th January 2007

[http://www.ahrc.ac.uk/about/ke/evaluation/impact/impact\\_fellows.asp](http://www.ahrc.ac.uk/about/ke/evaluation/impact/impact_fellows.asp)

#### 4.2.3 Research Organizations

Universidad del País Vasco, UPV/EHU, catedra Miguel Sanchez Mazas

Contact: Julieta Barrenechea.

Project ADIKER - Construction and validation indicators of scientific research and social connectivity in Social Sciences and Humanities at the UPV/EHU (2005).

This project seeks to develop an integral assessment methodology in which traditional indicators based on scientific excellence are complemented with ‘relational’ indicators. The methodology intends “to make connectivity visible, to valorise it, and in that sense to legitimate it as a relevant characteristic of university research practice.” (Barrenechea). So far all publications are in Spanish. English publications are coming up. <http://www.ehu.es/smk-ikergunea/english/projects.htm>

Rand Europe

Centre for Policy Studies in Higher Education and Training, Canada.

#### 4.2.4 Funding bodies

The Social Sciences and Humanities Research Council of Canada (SSHRC) provides funding for “research projects that will develop innovative approaches for measuring the outcomes and impacts of Canadian research in the social sciences and humanities”: Capturing the Outcomes and Impacts of Canadian Research in the Social Sciences and Humanities.

[http://www.sshrc.ca/web/apply/program\\_descriptions/presidential\\_fund\\_outcomes\\_e.asp](http://www.sshrc.ca/web/apply/program_descriptions/presidential_fund_outcomes_e.asp)

The Arts and Humanities Research Council (UK) devotes a lot of effort on knowledge transfer and evaluation policy, including the development of evaluation strategies dedicated to the arts and humanities.

Lisa Hill is head of evaluation: [l.hill@ahrc.ac.uk](mailto:l.hill@ahrc.ac.uk). A Position Paper on Impact Assessment (Arts & Humanities Research Council 2006) can be found at their website: <http://www.ahrc.ac.uk/about/ke/evaluation.asp>

The Economic and Social Research Council (UK).

“The ESRC is exploring new methods for assessing the impact of the research it funds on policy makers and practitioners, in order to demonstrate its broader contribution to society and the economy. This forms part of the new strategic emphasis on impact assessment alongside the Council’s work on bibliometrics and international benchmarking.”

<http://www.esrcsocietytoday.ac.uk/ESRCInfoCentre/Support/Evaluation/publications/>

#### 4.2.5 Intermediary organizations

The Royal Netherlands Academy of Arts and Sciences’ Council for the Humanities and the Social Sciences Council in the Netherlands wrote an advisory report on judging social sciences and humanities research on its merits (KNAW 2005).

The Humanities and Social Sciences Federation of Canada (HSSFC) carried out a research project “designed to research the context in which performance indicators are evolving and explore the known and unforeseen consequences of their implementation as they affect the social sciences and the humanities.”(Fisher, Rubenson et al. 2000b) Alternatives to performance indicators are also explored. See (Fisher, Rubenson et al. 2000a).

<http://www.fedcan.ca/english/projects/performance/>

The Australian Council for the Humanities, Arts and Social Sciences (CHASS) was established in 2004 as a peak representative body. “The aims of CHASS are:

- » To represent the interests of the sector
- » To promote the contribution of the sector to government, industry and the public
- » To provide a forum for discussion between the humanities, arts and social sciences sectors in Australia
- » To build up the innovative capacity of Australia, through better linkages between this sector and industry, as well as improved cross-linkages with science and technology.” <http://www.chass.org.au/>

CHASS has a significant voice in the current debate about research quality assessment in Australia. It conducted a large research project developing a method to evaluate quality and impact of research in the humanities, arts and social sciences (CHASS 2005)

ACE, Arts Council England

The ERIH is a Humanities in the European Research Area (HERA) project run by the European Science Foundation. The aim of the ERIH project is to create a list of significant arts and humanities journals in Europe, based on agreed criteria regarding national and international significance. The final list of journals will form the basis of the Index. More information on the ESF website

#### 4.2.6 Research Networks

The AHRC together with the Arts Council England is funding a number of research fellows to explore the development of new and existing methods for impact assessment in the arts and humanities. Through this programme the AHRC is establishing an ‘impact evaluation network – academics and professionals working on the impact of the arts and/or humanities’. For further information see: [http://www.ahrc.ac.uk/about/ke/evaluation/impact/impact\\_fellows.asp](http://www.ahrc.ac.uk/about/ke/evaluation/impact/impact_fellows.asp)

#### 4.2.7 Experts



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