

**Title**

Valuable – understanding valorisation

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## Introduction

The concept of valorisation as used in the Netherlands refers to the interactive process of value creation from knowledge. Several actors are involved in this process, including knowledge users and intermediaries. This paper presents a framework that enables the understanding of the process of valorisation. It builds upon scientific studies into innovation and social impact assessment and is in response to the needs of stakeholders. A model for the formative evaluation of valorisation is based on this framework. Use of this model enables the structuring of case studies and it broadens the assessment to include all actors involved.

## Prelude: Valorisation in the Netherlands

The Dutch Ministry of Education, Culture and Science introduced the concept of valorisation in the Netherlands in the 2004 Science budget (OCW (2004)). At that time, valorisation referred solely to the conversion of research results into economic value. It was seen as a panacea for the knowledge paradox.

In 2008 and 2009 two documents are published by the Innovatieplatform<sup>1</sup> on valorisation. These include a so-called valorisation-agenda signed by representatives from academia, business and government, to stimulate valorisation. Also, a comprehensive definition is proposed: *Valorisation is the process of creating value from knowledge by making knowledge suitable and available for economic and societal use and translating that knowledge into products, services, processes and entrepreneurial activity.* Followed by the specification: *Knowledge valorisation is a complex and iterative process in which interaction between knowledge institutions, business, NGOs and individuals- at all stages of knowledge development - is important.* The Ministry uses this definition from 2011 (OCW 2011). In this latter definition the process is central, whereas initially the economic value was the focus.

In 2009 the National Valorisation Commission (LCV) is established by the Dutch government. Its members come from academia, industry and government and the mission is to implement the valorisation-agenda, and to monitor, evaluate, advise and coordinate actions on valorisation.

One of the actions agreed upon in the valorisation-agenda is to develop indicators for valorisation: "The willingness to jointly agree upon appropriate (qualitative and quantitative) indicators for valorisation, that can serve as guideline for the contributions of parties to valorisation. This set of indicators should do justice to science / medical / technical disciplines as well as humanities and social sciences. It should build upon international initiatives aimed at the development of indicators." This agreement served as the starting point for the project on indicators for valorisation.

The project on indicators for valorisation was commissioned by LCV to a consortium of Technology Foundation STW (a research council), Rathenau Institute and Technopolis. In addition to the agreement on the valorisation-agenda, the LCV requested the consortium to develop a list of generic indicators for performance measurement of valorisation. The

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<sup>1</sup> This platform was chaired by the prime-minister; its goal to diminish the knowledge gap. Nederland Ondernemend Innovatieland (2009), Innovatieplatform (2008): *Valorisatieagenda: Kennis moet circuleren*

indicators should be useful in a wide range of settings, on several levels and for a variety of (evaluation) goals. Also, insight was asked into “the story behind valorisation,” so that the creation or the process of valorisation would be understood. This suggests the use in formative evaluations, where learning is the aim, more than judging.

The project ran from November 2010 to September 2011. The result was a well-received framework to assess valorisation (van Drooge, Vandeberg et al (2011)). An English translation (van Drooge, Vandeberg et al (2013)) will be published soon.

### **Methods - or productive interactions**

The researchers used a variety of sources and methods in order to respond to the requirements as formulated by the LCV. In terms of productive interactions, it can be described as follows:

- Indirect interaction: The literature studied ranged from scientific articles on impact assessment, through policy papers on valorisation and research evaluation, to letters on valorisation submitted to newspapers by concerned scientists. This way, the researchers aimed to take into account a wide variety of views and evidence.
- Financial interaction: The project on indicators for valorisation was commissioned – and financed – by the Dutch National Valorisation Commission (LCV). The feedback of members, who are all stakeholders in the innovation process, of the LCV was inevitable and crucial and shaped the result.
- Direct interaction: 35 People have been interviewed, ranging from vice chancellors, deans and science administrators, through civil servants of the Ministries of Education, Culture and Science as well as of Economic Affairs, Agriculture and Innovation, to representatives of the Confederation of Netherlands Industry and Employers.
- Indirect interaction: It was decided beforehand that the indicators should be presented in a brochure. The lay-out of the final brochure was discussed amongst the researchers, with communication experts and the designer. Especially the part of the framework, presented as ‘maps,’ was discussed heavily. The researchers aimed at a transparent visualisation, that would help to make the comprehensive framework easy to use.

Although these interactions are common to scientific research (external funding, interviews, presentations, literature study, textual and visual presentations), the mix of academic perspectives and private and public sector practitioners' views is less common. The information gathered was not only systematically analysed, it was also used to understand the requirements of the stakeholders.

### **Towards a framework**

A wide variety of studies on social impact assessment has been published in the last decade (see survey by Bornmann 2013). Molas-Gallart et al (2002) foresaw that “the process of indicator development [would be] (...) iterative, involving many stages of indicator definition, testing, piloting, validation, collection and analysis.” Five years on, Donovan (2007) divides the assessment of social impact into three phases. In the first phase, data on economic impact was

the focus. In the second phase, social impact in the local environment was included. The third phase is characterised by a case study approach.

The LCV requested to build upon international initiatives aimed at the development of indicators. At the time, there were no publications known - scientific nor policy - on the process of valorisation nor on the assessment of valorisation. Therefore studies on assessment of research quality, social relevance of research, knowledge exchange, innovation, technology or knowledge transfer, and third mission were analysed. They originated from the Netherlands, UK, Denmark, EU and US. 15 studies yielded a total of 194 indicators. Although the principles and approaches of the studies differ, there are similarities:

- Most indicators have not been tested and are not known to have been used since the study concerned was published.
- Most indicators concern economic use; few indicators relate to societal use.
- Most indicators apply to research in medical, technical or natural sciences; indicators for other fields of research such as humanities or social sciences are scarce.
- Most indicators relate to output; there are few indicators relating to impact, interaction or other stages of the research process.
- Most studies (and indicators) reflect the responsibility of the research institute, some the responsibility of private firms.
- Most studies are aimed at summative evaluations; few at formative evaluations.

It was also noted that

- Some studies present indicators on the level of the (responsibility of the) individual researcher, some on the level of a faculty, some of an institute.

So there was no ready-made set of indicators available that was near the definition nor the inherent character of valorisation or the requirement of the project. The researchers therefore developed a framework based on existing understanding from innovation literature and in response to the needs of the stakeholders.

Innovation is increasingly perceived as the collective effort of a variety of public and private stakeholders within the context of an innovation system. The innovation system is a heuristic (Kuhlmann 2001) in which innovation is conceived as interactions of distinct actors (e.g. companies, market, government and supporting organisations), acquiring, understanding and combining knowledge and producing, diffusing, or using technologies, which result in the (re-)design of technical systems. "[I]nnovation is a matter of producing new knowledge or combining existing elements of knowledge in new ways. It is thus, in the broadest sense, a 'learning process'" (Edquist and Hommen 1999). The concept of interactive learning in innovation processes was introduced by Lundvall in 1985 (Lundvall 1985) who later defined it as "a process in which agents communicate and even cooperate in the creation and utilisation of new economically useful knowledge" (Lundvall, Johnson et al. 2002, p226). The positive influence of interactive learning on innovation has been acknowledged in various studies (see e.g. Vandeberg 2009 for an overview).

## The result: four dimensions of valorisation, one valorisation map

In response to the requirements, the diversity of forms and practices of valorisation, the process-like nature of valorisation and the distribution of the responsibility for valorisation was taken into account. This resulted into four dimensions of valorisation:

### 1. Actors

Various parties are responsible for valorisation: the knowledge provider (university, institute); the knowledge user (business, industry, government, NGO, individual); and the intermediary (science financier).

### 2. Aggregation level

The responsibility for valorisation is held at different levels: from the institutional level of the university, company or financier, through to the mid-level of departments or programmes, to the practical level of the researcher or individual innovation project.

### 3. Discipline

Valorisation takes place in all disciplines and fields of research, both in mono-disciplinary and multidisciplinary research. There are appropriate forms of valorisation for each discipline: from patents and spin-offs, through advice on new legislation, to compiling an exhibition catalogue.

### 4. Stages

Valorisation is a process where awareness and interaction at all stages and levels of research are important: from the formulation of a mission and policies, through the development of research, agenda setting, and execution of research and dissemination of results, to implementation.

These four dimension together form a 4D model for valorisation. Every type of actor involved in valorisation, every level of aggregation, each discipline and every stage or phase of research can be taken into account in this model. A limited number of relevant and specific indicators can be formulated for each situation or each aspect of the model and placed on a valorisation map. This means that a valorisation map can be drawn for all situations in which valorisation is assessed. The same three dimensions are defined on each valorisation map: actor, level of aggregation and discipline. The indicators are presented in the fourth dimension, the research stage. Five valorisation maps that illustrate the model are included in the brochure; Figure 1 is one such map.

1. a university of technology;
2. a faculty of humanities (Figure 1);
3. a university of applied sciences 'knowledge network';
4. a science financier's thematic programme;
5. a company

The valorisation maps are examples. They are not standard formats; users are invited to develop a map specific to their situation. When used in this sense, the maps stimulate formative evaluations and as such innovation.

## The impact: use of the model leads to improved dialogue

Since publication of the report in September 2011, some 2,000 copies of the brochure were spread throughout the Netherlands on request. The work has been used in a variety of ways. It has been added to the body of literature used in policy circles on the issue of valorisation and it has been discussed in Parliament. More importantly, it has enriched the discussion on valorisation, from quantitative indicators for researchers and research organisations only, to a more process oriented approach that includes other actors as well.

- Research council NWO uses the framework to adapt the management of their programmes. Since 2013, “kennisbenutting” or valorisation, is a requirement criterion for applicants. This implies for instance adaptation of the review procedure.
- Agentschap NL (NL Agency) uses the framework in order to identify broader impacts of some of their programmes.
- NanoLabNL uses the valorisation map in order to create an overview for all involved stakeholders on the bases on which they can ‘meet, understand and interact’ in order to together provide a long lasting research infrastructure for innovation;
- Researchers in the humanities and social sciences refer to the framework in discussions on research evaluation.

## Discussion

The project has been rather successful, some 2,000 copies of the brochure have been ordered and users have reported that they welcome the framework. Interactions with the stakeholders were of crucial importance. The productive interactions concept was helpful to understand and order the methods that lead to the framework.

It should be noted that the framework was designed for use in formative evaluations. Most projects on social impact assessment refer to summative evaluations. Main reason to develop a framework for use in formative evaluations is to gain insight into the process of valorisation. With the ultimate goal to improve valorisation, it was agreed that gaining insight into the process would be most valuable. And so it can be seen as a next step in the iterative process of indicator development (Molas-Gallart 2002). The proposed framework and the accompanying maps can be identified as a fourth phase of social impact assessment (Donovan 2007). After the phases of economic impact indicators, social impact indicators and case study approach, the framework and valorisation maps enables the structuring of case studies and it broadens the assessment to include all actors involved. The process is central in this phase.

- Use of valorisation maps will substantiate case studies. The framework provides a robust structure for the cases and will strengthen the evidence. Indicators, whether quantitative or qualitative, can be presented in a robust way.
- The framework and maps include all involved in the process of valorisation. The discussion between actors can be improved, when sharing a common frame.

The framework that was designed was as comprehensive as the Dutch definition of valorisation. Nevertheless, since it is a simple structure that can be filled with appropriate indicators for each situation, it is very flexible. There is some evidence of use of the

valorisation maps. However, the challenge remains whether users will manage to come up with appropriate indicators for their own specific situation.

24 Waardeel - Indicatoren voor Waardeel		25 Waardeel - Indicatoren voor Waardeel	
<b>Kaart 2 – een faculteit geesteswetenschappen</b> Onderzoekgebied = geesteswetenschappen Partij = kennisaanbod Aggregatiewaarde = middelen			
Fase	Telwoord	Indicatoren toelichting	
Missie	Missie	Beschrijving van de maatschappelijke en economische missie van de faculteit.	Totale waarde van financiering uit thematische onderzoeksprogramma's (tweede geldstroom), door onderzoek (derde geldstroom) en advisering (percentage van het totale onderzoeksbudget, voorbeelden).
	Integraal beleid	Hoe is de maatschappelijke en de economische missie integraal onderdeel van beleid van de faculteit (onderzoek, onderwijs, bekostiging, kwaliteitszorg)? Hoe is valorisatie verankerd in HR-beleid? Hoe is het opgenomen in de planning & controlcyclus?	(Co)publicaties Aantal publicaties samen met of specifiek voor maatschappelijke stakeholders, publicaties voor een breder publiek, voorbeelden.
	Valorisatie beleid	Welk valorisatiebeleid heeft de faculteit en welke regelingen vallen onder dit beleid?	Publieke opbrengsten Aantal opbrengsten in de media, bijdragen aan het publieke debat, publicaties, voorbeelden.
	Budget	Hoogte van budget voor valorisatie en percentage van het totale onderzoeksbudget.	Artificelen Aantal tentoonstellingen, websites, methodes, voorbeelden.
Agenda'setting	Strategische samenwerking	Concreet voorbeelden van strategische samenwerkingsverbanden met maatschappelijke partners: musea, bibliotheken, archieven, culturele instellingen, overheden, opleidingsinstellingen, bedrijven.	Onderwijs en training Aantal opleidingen en cursussen voor organisaties/bedrijven, en voor een breder publiek, voorbeelden.
	Lidmaatschap onderzoeks-initiatieven	Concreet voorbeelden van participatie in onderzoeksinitiatieven met een maatschappelijke (en/of economische) doelstelling.	Gebruik Gebruik door de media van specifieke expertise voor duiding van factueel gebeurtenissen, voorbeelden.
Uitvoering	Instrumentarium	Aantallen voorbeelden van specifieke initiatieven en/of instrumenten: dus is hier- en onderzoek objecten; commerciële activiteiten zoals aan de faculteit verbonden adviesbureaus.	Bezoeken Aantal bezoeken van tentoonstellingen, bijzondere conferenties, inkomsten.
	Samenwerking	Aantal en voorbeelden van samenwerking met maatschappelijke organisaties en bedrijven in onderwijs en onderzoek, gezamenlijke collectievoering en -beheer.	Lezen Aantal verkochte boeken, aantal lezers van krantenartikelen en andere niet-verbodschappelijke publicaties.
	Maatregelen	(Relatief) aantal afstuderopectieven in samenwerking met gebruikers of gebaseerd op vragen van gebruikers, voorbeelden van dergelijke opdrachten.	Producten en diensten Gebruik van kennis in nieuwe producten en diensten en via overige artefacten; voorbeelden en inkomsten.
			Mensen Dubbale aanstellingen (Relatief) aantal onderzoekers met een dubbale aanstelling (relatief) aantal onderzoekers met eigen adviespraktijk. Advisering Participatie van onderzoekers in advies- en bestuursorganen van maatschappelijke organisaties, overheden en bedrijven; (in brief) aantal onderzoekers en voorbeelden. Loopbaan (Relatief) aantal afgestudeerden en onderzoekers dat hun loopbaan in bedrijfsleven en maatschappelijke organisaties vervolgt.

Figure 1: a Valorisation map for a faculty of humanities



## Literature

Lutz Bornmann (2013) What Is Societal Impact of Research and How Can It Be Assessed? A Literature Survey. *Journal of the American Society for Information Science and Technology* 64(2):217–233, 2013

Leonie van Drooge, Rens Vandeberg et al (2011) *Waardevol: Indicatoren voor Valorisatie* Den Haag: Rathenau Instituut,

Leonie van Drooge, Rens Vandeberg et al (forthcoming, 2013) *Valuable: Indicators for Valorisation* Den Haag: Rathenau Instituut

Donovan, C. (2007) The qualitative future of research evaluation *Science and Public Policy*, 34(8), 585–597.

Edquist, C. and L. Hommen (1999) Systems of Innovation: Theory and Policy for the Demand Side. *Technology in Society* 21(1):63-79

Innovatieplatform (2008): *Valorisatieagenda: Kennis moet circuleren*

Kuhlmann, S (2001) Future Governance of Innovation Policy in Europe – Three Scenarios. *Research Policy* 30:953-976

Lundvall, B.A. (1985) *Product Innovation and User-Producer Interactions*. SPRU (Sussex University)/Department of Economics (Stanford University)

Lundvall, B.A., B. Johnson et al (2002) National Systems of Production, Innovation and Competence Building. *Research Policy* 31(2):213-231

Jordi Molas-Gallart et al (2002) *Measuring Third Stream Activities. Final Report to the Russell Group of Universities*. Sussex: SPRU

Nederland Ondernemend Innovatieland (2009). *Van voornemens naar voorsprong: Kennis moet circuleren*. Den Haag: Interdepartementale Programmadirectie Kennis en Innovatie

OCW (2004). *Wetenschapsbudget 2004. Focus op excellentie en meer waarde*. Den Haag: Ministerie van Onderwijs, Cultuur en Wetenschap

OCW (2011): *Hoofdlijnenakkoord VSNU-OCW*. Den Haag: Ministerie van Onderwijs, Cultuur en Wetenschap

Jack Spaapen and Leonie van Drooge (2011): Introducing ‘productive interactions’ in social impact assessment. *Research Evaluation*, 20(3) 211-218

Vandeberg (2009) *Innovation through Collaboration – Interactive Learning in Nutrigenomics Consortia*. Utrecht University, Utrecht