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ACcelerate CO-creation by setting up a Multi-actor PLatform for Impact from Social Sciences and Humanities

Coordinated by Sustainable Society University of Groningen (NL)

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Analysing co-creation in theory and in practice – A systemic review of the SSH impact literature

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1. Introduction

There is a growing interest across the European research and innovation system in how to assess and communicate the diverse impacts of scholarly work. Across the European research community, scholars, university administrators and policy-makers are looking to impact assessments and impact toolkits to better communicate the value of scholarly work, to increase collaboration with non-academic partners and to achieve a broad range of other benefits. The notion of research impact has gained significant importance and has, to a varying extent, been embedded in research policies referring to universities' contributions to the knowledge economy, solving global grand challenges, building an open and inclusive European Research Area, and more.

Demands that publicly funded scientific research should demonstrate its broader societal relevance have been a political commonplace for some time. In the United States, talk of "broader impacts" at the National Science Foundation appeared in 1997, when the agency changed its criteria for the ex-ante review of the 50,000 proposals it receives each year. The broader impact agenda is reflected in current research and innovation policies in which the linear model of how high quality scientific research trickles down to society is no longer sufficient. Stakeholders across the public sector, industry, academia and civil society expect demonstrable impacts and to be engaged in the co-creation and co-production of socially robust knowledge.

This Working Paper explores the question: 'What is research impact in the humanities and social sciences (SSH) and how might we measure, accelerate and stimulate it?' The working paper is divided into five chapters. Chapter 2 deals with models for impact assessment. Chapter 3 deals with methods and components in SSH research impact assessment. Chapter 4 provides an overview of various discussions of impact pathways and concepts. Finally, chapter 5 takes stock of the co-creation literature and guiding principles for designing broad-based, impact-focused research and innovation projects in the social sciences and humanities.

The report has two main aims: first, to introduce the general reader to a new and somewhat specialised literature on the science and policy of research impact assessment (pertaining to the social sciences and humanities) and, second, to contribute to the development of theoretical components and taxonomies of research impact in this complex and rapidly growing field. Summarising evidence from the academic as well as policy literature, the report considers definitions of impact and their conceptual basis as well as the strengths and limitations of different approaches to impact assessment and co-creation. We conclude not by recommendations or prescriptive guidelines, but by suggesting where future research on research impact might be directed.

A key finding of this Working Paper is the observation that research impact in the social sciences and humanities is a dynamic and highly unstable object. There exist many definitions of research impact and co-creation extending across a wide literature (see Chapter 1). Different policy actors and funding agencies use different definitions of SSH impact reflecting their particular institutional interests, values and missions. Likewise, the literature on research impact and co-creation is vast and complex reflecting a number of interrelated conceptual frameworks and empirical case studies. Notions such as co-production, co-creation, academic engagement, knowledge dissemination, knowledge transfer, knowledge mobilisation, creative clustering and partnership approaches to research are often used to describe various overlapping aspects of research impact in SSH and beyond. Rather than offering a

uniform definition of impact, this Working Paper, therefore, simply reviews the literature and compares different impact frameworks.

Refocusing research and innovation in the social sciences and humanities around the notion of societal impact is often related to stimulating the application and uptake of knowledge for the benefit of the social, cultural and economic development of society. Notions and frameworks for SSH impact inevitable shape the interaction between universities and academic research with the wider society (Pålsson et al., 2009; Tran, 2009). Several frameworks have been suggested to describe this interaction in the academic literature, such as 'Mode 2 knowledge production' and the 'Triple' and 'Quadruple Helix' network of university-industry-government-society relations (Gibbons et al. 1994; Etzkowitz & Leydesdorff, 1998; European Commission 2016). However, these remain at a rather general level and do not assess societal impact at the level of research projects and programs. For this, a range of models have been proposed and developed (Davies, et al. 2005; De Jong et al, 2011; Spaapen & Van Drooge, 2011; Donovan & Hanney, 2011; Bozeman & Sarewitz, 2011). Inspired by these models and methods, science policy-makers and funding agencies have introduced a variety of instruments to stimulate relationships between science and society, including the ACCOMPLISSH project (Accelerate Co-Creation by Setting up a Multi-Actor Platform for Impact from Social Sciences and Humanities) of which this literature review is a part.

The diversity and complexity of the impact agenda in SSH is also reflected in the number of actors interested in creating, demonstrating, assessing and incentivising broader societal impact. Being able to demonstrate the societal impact and value of SSH research is seen by many policy actors, funding agencies and research units as a key component in ensuring accountability, especially in a political climate in which the impact of SSH cannot be taken for granted by universities and funders. Furthermore, funding agencies such as the European Commission and national research councils are expected to demonstrate the benefits from their research investments, and there is pressure to orient research towards impact-focused research and innovation programmes across all scientific domains. By demonstrating how research projects and funding instruments perform, impact assessments are used for a variety of purposes e.g. to inform decision-making, research communication, collaborations, career management and allocation of resources.

Another key finding of the Working Paper is the observation that methods of impact assessment will vary significantly according to whether the evaluation is at the project, programme or system level. The emphasis of this report is impact frameworks in the social sciences and humanities at the project and programme level, where attribution is often clearer than analyses of impact from the overall science and innovation ecosystem. Likewise, the impact of research can be considered at various stages in the lifetime of a programme. Again in this context different approaches to assessing research impact make different assumptions about the nature of knowledge, the purpose of research, the definition of research relevance, the role of values in research and its implementation, the mechanisms by which impact is achieved, and the implications for how impact is measured. There simply is no one-size-fits-all and no way of getting around the significant influence of value assumptions in the research uptake system. In this regard, the Working Paper concludes that the absorptive capacity and readiness of sectors, markets and collaborators outside academia are at least as important in creating impact as the contribution from research and knowledge organisations themselves.

1.1. Scoping review

The working paper consists of a systemic review of studies of research impact covering literature published between 2005 and 2016. The review is based on a systematic search of databases (including grey literature) plus hand searching and reference checking. The review identifies over 135 academic papers and 130 policy documents describing various impact models and frameworks and their empirical applications, although only a little segment of the reviewed contributions are empirical case studies. The material presented in this report constitutes the most comprehensive review of the academic and policy literature on the impact of the social sciences and humanities (SSH) to date. The report has a disproportionate focus on UK experiences with the Research Assessment Exercise (RAE) and Research Excellence Framework (REF) explicitly referred to in 29 per cent of the included texts (N=283). This imbalance is the inevitable result of our search strategy to review only the Anglophone literature.

Despite this limitation, the review includes descriptions of most major frameworks and models to assess and accelerate impact-oriented scholarship in the humanities and social sciences, including EU-funded projects and national activities. Furthermore, the approaches examined in the report have been selected on the grounds that there is currently considerable academic and/or policy interest in them. In the Appendix, we present a more detailed elaboration of the methods used in the review.

Beyond impact assessment frameworks and tools for demonstrating impact across the SSH disciplines, the working paper in Chapter 5 examines frameworks for co-creation and co-production of research with partners outside academia. This literature is part of the broad-scaled impact literature but focuses also on collaboration between research groups and end-users of research to the effect of designing research projects and programmes to accelerate the eventual impact of the projects concerned. Understanding the various ways in which research can contribute to society and the multiple pathways by which this take place, is of great importance when developing appropriate and responsible metrics and when designing research projects in collaboration with stakeholders. Furthermore, considering how impact in the social sciences and humanities can be achieved is central for the appropriate support for these processes, assisting in maximising the potential use of research for societal benefits, and for setting up partnerships with actors outside universities at the regional, national and transnational level. This is not to say that the working paper contains a recipe for creating or determining research impact in SSH. Rather, by highlighting the eclectic and complex nature of SSH research impact, the report provides guidance for a more nuanced and informed discussion about impact assessment, support and certification before, during and after the research process is completed.

1.2. Outlook and acknowledgements

In this Working Paper, the EU H2020 ACCOMPLISSH Project Consortium (WP2a) reflects on impact and co-creation approaches to SSH research, and how the concept of research impact has broadened and changed in recent times. The document analyses the current context in which societal impact is discussed across the social sciences and humanities and beyond, and how this impact is pursued as an evaluation and funding practice at the level of universities and governmental agencies. Furthermore, as part of the commitment of the ACCOMPLISSH project, the working paper widens the scope and understanding of accelerating and assessing research impact and its explicit recognition inside and outside of universities. Building a robust impact portfolio in the humanities and social sciences will

have significant consequences for the entire research ecosystem, including universities, researchers, funders, governments, private and public stakeholders, media and the public at large.

The report is the result of work in ACCOMPLISSH WP2a undertaken by the Humanomics Research Centre at Aalborg University (Denmark). The report contains descriptions of many complementary perspectives on SSH research and impact. These perspectives are grounded in more than 250 studies of academic and policy documents. Also, the working group has built on the results and input of other partners in the ACCOMPLISSH project in order to scope the review (see Appendix A for further details).

This report is prepared by Jonas Grønvad, Rolf Hvidtfeldt and David Budtz Pedersen. We would like to thank the following persons for their feedback and involvement in the development of this document: Sharon Smits, Peter Dobers, Jonas Stier, Lasse Johansson, Frederik Stjernfelt, Simo Køppe, Claus Emmeche, Hans Siggaard Jensen, Andreas Brøgger, Marianne Lykke, Birger Larsen and Gunnar Sivertsen.

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We acknowledge that any views or omissions are the responsibility of the authors, not the organisations listed. This is a working paper and feedback via the ACCOMPLISSH WP2 Project Team is welcome.

David Budtz Pedersen

Copenhagen September 2017

This document is written for those involved in all stages of allocation of funding, designing research, assessing impact and supporting knowledge transfer in science and innovation systems. It is not designed to be prescriptive, but rather offers examples and guidance based on lessons from across the SSH impact literature and practice.

2. Impact assessment models

This chapter presents and discusses 12 impact assessment models which are used to assess research in the social science and humanities and beyond. Each model is described in some detail with special focus paid to the particular aims and methodology of the model in question. We conclude the chapter by highlighting similarities and differences between the assessment models discussed. Further conceptual distinctions and considerations will be presented in the chapters to follow.

Table 2.1 provides an initial overview of the assessment models discussed below. The two topmost assessment models in the table are national evaluation systems, which are used to assess research across fields and disciplines from universities and other research institutions in UK and the Netherlands respectively. Then follows eight research-driven models, which to different extents have been used to study and assess research projects and institutions in various national contexts. The two bottommost models are based on explorative research, but constitute more conceptual and strategic frameworks.

Table 2.1: Impact Assessment Models extracted from the review corpus

	Abbreviation	National context
National based evaluation systems		
Research Excellence Framework	REF	UK
Standard Evaluation Protocol	SEP	NL
Empirical driven impact assessment models		
HERG Payback Model	HPM	UK, CA, AU
SIAMPI	SIAMPI	EU, NL, ES, UK, FR i.a.
Linkage and Exchange	LE	UK, CA
RAPID Outcome Mapping Approach	ROMA	DC
IMPACT-EV	IMPACT-EV	EU, DE, UK, ES, FR i.a.
Flows of Knowledge, Expertise and Influence	FK	UK (ESRC)
Research Contribution Framework	RCF	UK, UA
Contribution Mapping	CM	NL
Conceptual and strategic framework		
Enlightenment model	EM	US, UK
AHRC Engagement Model	AHRC	UK (AHRC)

2.1. The Research Excellence Framework (REF)

The Research Excellence Framework is a national evaluation system with the aim of assessing the impact and international quality of research carried out at British universities. REF is conducted every five years in cooperation between the four national research policy authorities in England, Scotland, Wales, and Northern Ireland. In practice, a special administrative unit answering to the Higher Education Funding Council for England (HEFCE) manages the evaluation. This unit's work is regularly monitored by a steering committee involving representatives from all participating institutions.

REF is based on extended peer review. Assessments are conducted by teams of academics and experts who are assigned to rank research from different organizations other than their own. Assessment is carried out within 36 subject-based Units of Assessment (UOA), such as "Clinical medicine", "Law", "Chemistry", and "Philosophy" to name a few. The Research is evaluated along three different dimensions: Research output, impact, and research environment, which are weighted in the following way:

- **Research output** covers 65% of the evaluation and is defined as products of any form e.g. both traditional publications such as scientific articles, monographs and book chapters, but also more unconventional outputs such as design, performances and exhibitions. As a basis for evaluation, all research institutions have submitted up to four research outputs for each employee selected to be included in the evaluation. These outputs are evaluated based on criteria of originality, influence and stringency.

- **Research impact** covers 20% of the evaluation and is defined as any impact, change or benefit to the economy, society, culture, public sector or services, health, environment, or quality of life outside the university sector. The impact assessment is based on case studies and so-called "impact templates". Case studies briefly describe the impact activities and impacts that have taken place in relation to specific research projects. These impacts are evaluated based on criteria that deal with scope and significance. In addition, a template explains how the research unit has strategically worked to create impact through research as well as the unit's strategy.

- **Research environment** covers 15% of the evaluation and is defined as strategies, resources and infrastructure that support activities in the research unit and contribute more widely to the research discipline. The assessment is based on submitted templates and statistical data. The submitted templates describe the research strategy, support for researchers and students, revenue for research, infrastructure and facilities, research collaboration and broader contributions to the discipline. The institutions also provide data on the amount of research income and number of scientific degrees and prizes. In the end, the research community is assessed based on its overall vitality and sustainability (REF 2012, 2014, 2015b)

REF is performed every five years in the UK and covers a five-year performance account. It is not permitted to submit material or examples of impact that precedes the ongoing evaluation interval, and consequently the model has a quite limited time horizon. REF has been criticized for being time- and resource-consuming, and it has been highlighted the model takes valuable time from both researchers and evaluators (Greenhalgh, Raftery, Hanney, & Glover, 2016; Martin, 2011). The evaluation costs Britain between 400.000 and 500.000 million GBP every five years and requires a great deal of effort from universities in collecting data and explaining case studies. Further, the model has been criticized for cultivating a strong competition between the British universities where universities may benefit from recruiting research profiles up to the submission of their evaluation. Thus, in certain areas, a transfer market has emerged in which top researchers are offered coveted positions and payrolls, not necessarily because research supports the local research community, but due to the university's ambitions of performing well in the REF. Another weakness relates to the very open-ended impact templates and the lack of standardized ways evidence is collected and assessed (Claire Donovan, 2011). Not all types of research may be able to provide clear empirical evidence that inform an impact

narrative. This may create a bias towards projects with certain types of impacts that are traceable and extraordinary.

The strength of the model is that it provides a comprehensive, nuanced, quantitative and qualitatively enriched image of the academic and societal impact of research (ex post). With the REF, British decision makers and authorities have the opportunity to orientate themselves to a wide range of indicators and parameters in scientific research. REF has led to a general change of behaviour at British universities where merit of impact-oriented research today has a more prominent significance than in comparable European countries. Another strength of the model is that the collected data on publications and impact can be used for a wide range of analyses that may help to shed light on roles and values in research (King's College London and Digital Science, 2015) and generally contribute to creating a higher community commitment in the different phases of the research process

2.2. Standard Evaluation Protocol (SEP)

The Standard Evaluation Protocol (SEP) is used to assess research at universities and other research institutions in the Netherlands. The purpose of the assessment is to demonstrate and confirm the quality and relevance of research to society and, if necessary, create improvements where needed. The evaluation is conducted every sixth year. The current protocol has been prepared and adopted by the following research organizations: The Association of Universities in the Netherlands (VSNU), the Netherlands Organization for Scientific Research (NWO) and The Royal Netherlands Academy of Arts and Sciences (KNAW). These organizations have agreed to undertake an evaluation of all research carried out within their organization in the period 2015-2021 (KNAW, 2011, 2013; VSNU, NWO, & KNAW, 2015).

The assessment is carried out on the basis of research units and assessment committees to ensure a transparent and independent assessment process. It is the boards of research institutions that define the research entities to be evaluated. A unit may comprise of a research group, a research institute or a third type of classification. The members of the assessment committees are selected as experts who are familiar with the unit's area of research. Initially, assessment committees carry out a qualitative (in text form) and then a quantitative assessment (awarded a score of 1-4) based on three overall assessment criteria: *quality of research, relevance to society*, and *viability*. The assessment criteria for research quality and social relevance are subdivided into requirements for documenting: 1) detectable products, 2) use of products, and 3) signs of recognition. The assessment of viability is based on a so-called SWOT analysis that, on the one hand, focuses on the research unit's own strengths and weaknesses, and on the other hand external possibilities and barriers. The empirical basis for the evaluation is conducted using both quantitative and qualitative data types and methods, which are not strictly defined and delimited in advance. It is largely up to researchers themselves to select the indicators that best describe their research in relation to the assessment criteria used. The research unit submits a report describing strategy and specific objectives, selected performance indicators, results obtained in research and society etc. These self-evaluations are supplemented by visits from the assessment committee at the research unit, interviews with researchers, and relevant quantitative data sources (KNAW, 2011, 2013; VSNU, NWO, & KNAW, 2015).

The Standard Evaluation Protocol does not present a ready-made assessment model. Instead, the protocol must be understood more as a plastic exercise in which form and content can be shaped by

individual research institutions and administrations. On the one hand, it may appear as a weakness that the protocol does not provide a clear methodology of how to carry out an assessment and collect data and evidence. On the other hand, it is possible to adapt the protocol across scientific domains and cultures that may produce various products and have different forms of usability.

Figure 2.2: Diagram of criteria and indicators in the Standard Evaluation Protocol
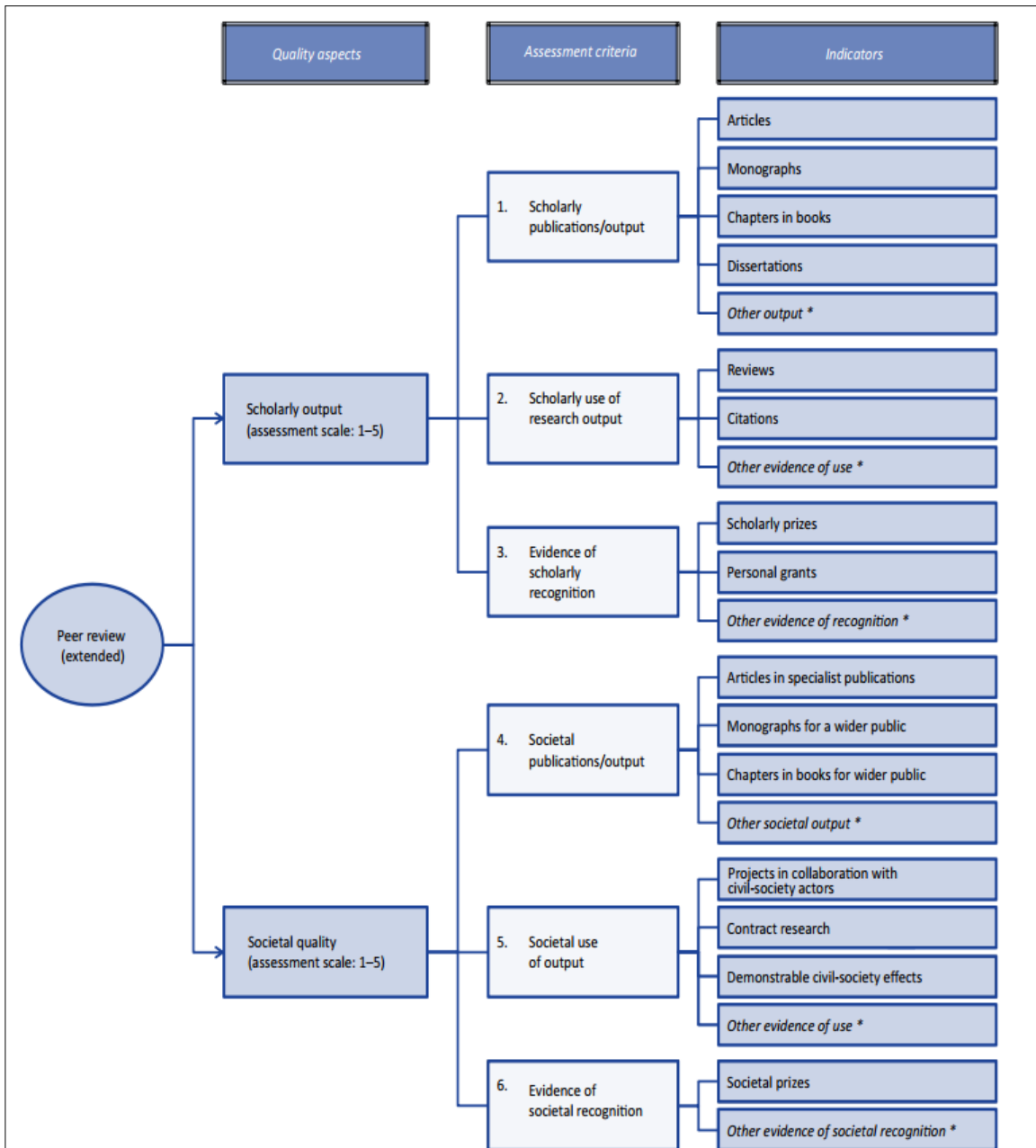
Source (KNAW, 2011)

Another advantage is that it is easier to collect data on different types of scientific products and use of such products, than it is to gather evidence on impact and broader societal effects. Still, an assessment may choose to focus on less tangible links between research and society. Additionally, it is emphasized

that not all products should be regarded as evidence of societal relevance. External assessors will need to be aware of contextual factors as well as the research culture in question before making final judgements. In the end, the assessment relies on subjective expert judgement in order to assess both quality and relevance of research.

2.3. The HERG Payback Framework (HERG)

The HERG Payback Framework is a problem-solving and policy-driven model with a linear representation of knowledge transfer and impact. The model is similar to the Research Excellence Framework in its focus on the outcomes, benefits or paybacks of research. The HERG Payback Framework was initially developed for the health sciences as one of the earliest models to incorporate both academic outputs and societal impact as criteria for assessment. It is one of the most used assessment models across scientific fields (Buxton and Hanney, 1996). The model has been modified to evaluate social science research through the Future Work Programme on how researchers inform policy-makers (Klautzer et al., 2011). It has further been adapted in an assessment of arts and humanities research at the University of Cambridge (Levitt, Celia, & Diepeveen, 2010).

The HERG Payback Framework consists of two elements: A linear logical representation of the complete research process and a series of categories to classify the individual paybacks from research at different stages (Buxton, 2011). The model is divided into seven stages (0–6) and two interfaces between the research system and the wider political, professional and economic environment. It facilitates narratives of research ideas from initial inception (Stage 0) through the research process (Stage 2) into dissemination (Interface B) and on towards its impact on society and its wider social and economic benefits (Stage 6). Methodologically it uses an outcome-oriented case study approach that tracks the individual paybacks on the background of pre-defined categories (Donovan & Hanney, 2011). The main sources in the assessment model are documents and literature, semi-structured informant interviews and bibliometric databases. The assessment model also makes use of surveys and stakeholder involvement as important sources of information (Klautzer et al., 2011)

The HERG has shown considerable limitations with regards to capturing impact from social science and humanities. SSH research involves complex and entangled variables and factors which renders search for *direct* relations between research and societal impact difficult and uncertain. Rather than direct links, outcomes and impact in SSH often happen stepwise and incrementally. Furthermore, the lack of codification and formal mechanisms of research output registration in the social science and humanities makes it even more difficult to detect traces of influence and impact (Klautzer et al., 2011). Another limitation of the HERG Payback Framework is that it is very project-oriented and therefore unable to explore and account for the impact that draws on efforts across project portfolios, which may lead to economic and intellectual synergies (Greenhalgh, Raftery, Hanney, & Glover, 2016).

The strength of the model, however, is its ability to capture the diverse pathways and the bidirectional interactions between researchers and users at all stages in the research process – from initial agenda setting to dissemination and implementation. By tracking research in this way, it is possible to uncover whether specific effects are caused by research. Further, it is a quite flexible method since the outcome categories can be adapted to better suit different types of research in various fields. At the University of Cambridge, the model has been expanded to include teaching and academic impact as separate stages for humanities researchers (Levitt et al., 2010). In the social sciences, an increased focus on the

role of policy and practice impact has been implemented in relation to the Future Work Programme (Wooding et al., 2011)

Figure 2.3: The HERG Payback Framework adapted for the humanities
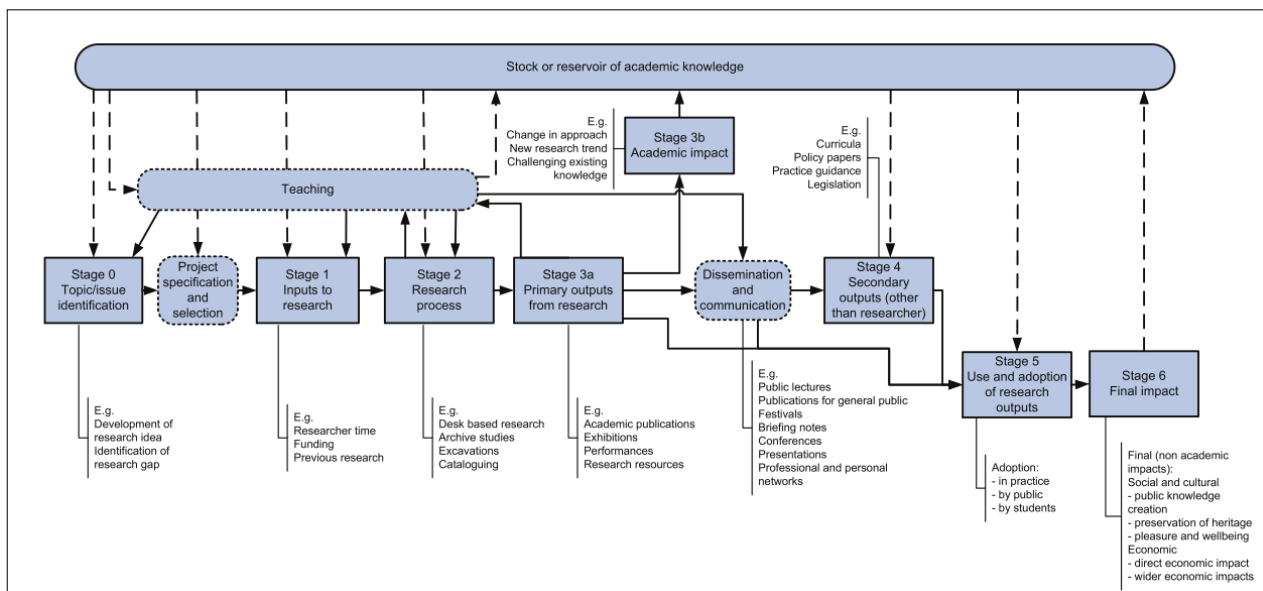
Source (Levitt, Celia, & Diepeveen, 2010: 37, adapted from Hanney et al., 2004)

2.4. The Flow of Knowledge, Expertise and Influence (FK)

The Flow of Knowledge, Expertise and Influence model is an interactive assessment model with a focus on the processes leading to impact developed e.g. by Meagher et al. These are represented as non-linear interactions and connections between researchers and users (Meagher, Lyall, & Nutley, 2008a). The framework was developed as part of a research project funded by the UK Economic and Social Research Council, which aimed to investigate new approaches to assess policy and practice impacts. The original project used empirical studies from psychology in order to assess the wider non-academic impact of research (Meagher, Lyall, & Nutley, 2008b).

The conceptual model resembles a network where the various actors and components are construed as operating within an integrated system. The model recognizes that research and knowledge take many different forms and flow in different directions, not only from science to society but also vice versa. Fundamentally, the model distinguishes between different uses of knowledge by referring to instrumental and conceptual types of impact. *Instrumental impact* is where a specific piece of research is used to define solutions to specific problems or decision*s*. *Conceptual impact* is a more wide-ranging definition of impact that comprises the complex and often indirect ways research influence and shapes knowledge, understandings, and attitudes of policy-makers and practitioners. Impact of social science and humanities will often fall under the latter concept. While such impact may be less demonstrable, it is no less important than more instrumental forms of knowledge use (Meagher, 2009).

Methodologically the FK-framework is centered on a row of core questions meant to direct the research assessment towards how impact is produced. These questions relate to the roles of

knowledge producers, users, the specific impact of research and the pathways and possible barriers and enablers for influencing policy (see list below).

1) **The primary knowledge producers** (e.g. discipline, objectives and engagement strategies)

2) **Knowledge users, beneficiaries, brokers and intermediaries** (e.g. involvements, affects)

3) **Impacts** (e.g. type of impact, direct and indirect influence on policy or practice)

4) **Research impact processes** (e.g. activities, roles, timeframe)

5) **Lessons learned** (e.g. barriers and enablers)

6) **Methods for identifying and assessing non-academic research impacts**

Based on these questions, the assessment model uses a combination of methods. Initially, a questionnaire aimed to capture non-academic impacts and activities arising from research grants are sent to grant-holders. By this method, a number of clusters of grants are identified and case studies developed within each of these clusters (in relation to social psychology, criminal justice and learning). As part of the case studies, interviews, document reviews, and focus groups are carried out. For three case studies, bibliometrics are used to assess scientific dissemination. The conceptual model and core questions serve to navigate and guide the assessment in order to synthesize findings across the various methods and data sources (Meagher, Lyall, & Nutley, 2008a).

The evaluation study identified different challenges and problems in documenting policy impact from the social sciences related to both timing and the context of research. It was found that short-term research impact is often better understood as a process and contribution factor in creating gradual societal effects rather than a *"full-fledged impact"* (Meagher, Lyall, & Nutley, 2008b). Furthermore, impact often proved to be localized and context dependent and could not necessarily be transformed into a broader impact in society. The potential for broader uptake was found to depend on governmental and political pressures (ibid.). Finally, the assessment study indicated that processes leading to impact are often complex and diffuse, which causes considerable difficulties in attributing a particular impact to a particular research project. It is often more feasible to attach an impact to a researcher's full body of research rather than tying impact to a specific project as *"it seemed to be the depth and credibility of an on-going body of research that registered with users"* (Meagher, Lyall, & Nutley, 2008a: 170).

Figure 2.4: Flow of knowledge, expertise and influences
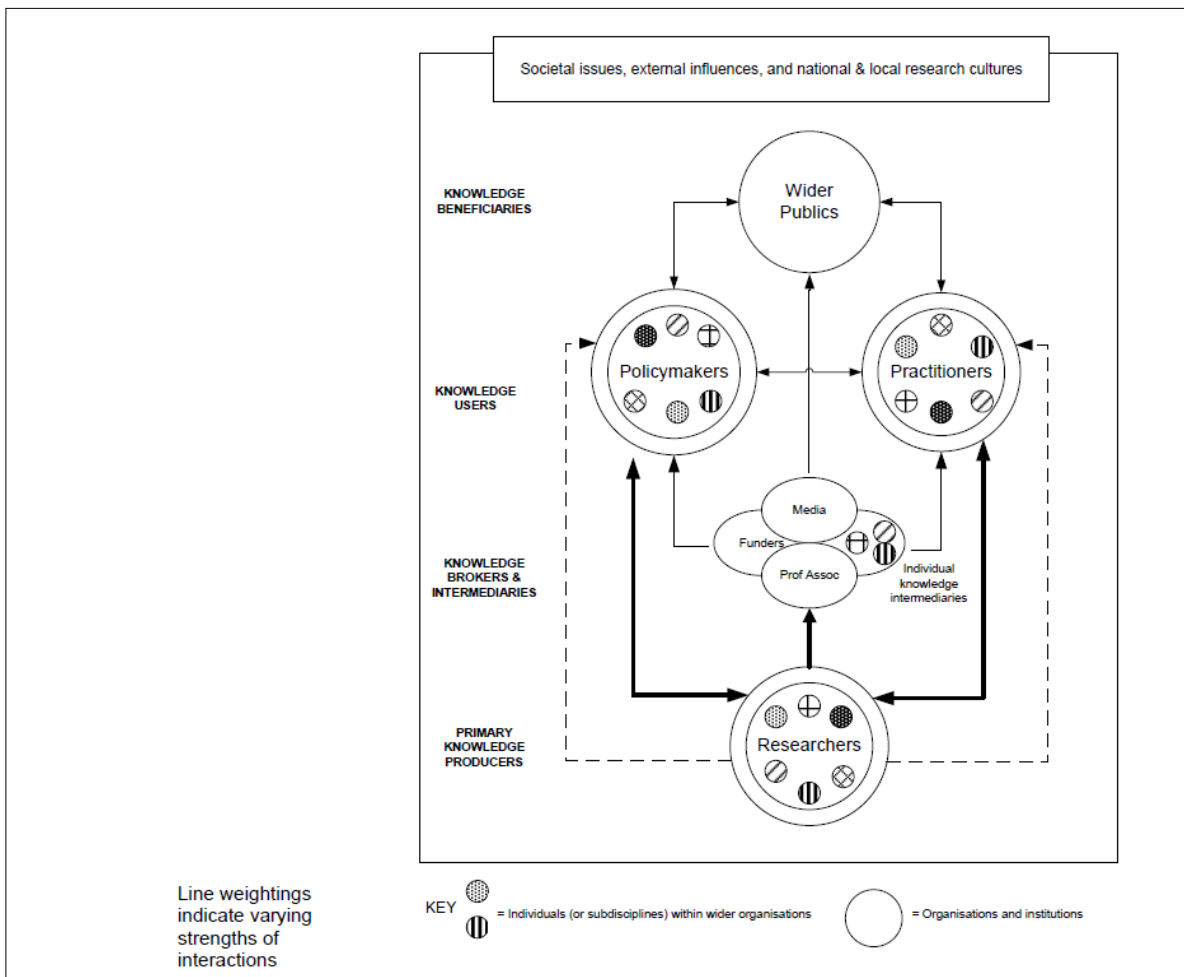
Source: (Meagher, Lyall, & Nutley, 2008a: 166)

2.5. SIAMPI Model

The SIAMPI approach is funded through a research-led project consortium under the European Union Seventh Framework Programme (FP7/2007-2013), and further developed by the Rathenau Institute in the Netherlands and the pan-European League of Research Universities (LERU) in 2017. The general aim is to uncover indicators for the assessment of social impact. The project consortium has studied different scientific domains such as nanotechnology, health sciences, information and communication technology and social and human sciences. More detailed studies have been carried out in Holland, France, Britain, and Spain and at the European level (SIAMPI, 2011).

The model introduces the concept of *productive interactions* that is considered to be the central factor for research to become relevant to society, according the main authors (Molas-Gallart and Tang 2011, De Jong et al. 2011, Spaapen and Drooge 2011). The model is built around a non-linear understanding of social impact as a result of dynamic interactions and joint efforts between several actors (including scientists). Research is understood as part of a larger circuit or network where knowledge is absorbed, transformed and exchanged in various innovation chains over time. As an evaluative tool the objective

is to locate and describe these interactions. SIAMPI distinguishes between three different types of productive interactions:

1) Direct interactions

2) Indirect interactions

3) Financial interactions (SIAMPI, 2011).

Jointly these types of interactions reflect that knowledge can be disseminated and applied in many different ways e.g. as a research publication, political report, guideline, website, membership of a committee or through meetings or by financial contributions. The distinction between *direct* interactions, *indirect* interactions and *financial* interactions is a useful heuristic for identifying different types of impact. In practice, most productive interactions involve combinations of various forms of connective interactions. A publication may lead to consultancy contracts and further long-term collaboration. The assessment of social impact (including the development of indicators) is seen as a joint effort between researchers and relevant stakeholders, which stresses the interactions that are likely to have impact (de Jong, Barker, Cox, Sveinsdottir, & Van den Besselaar, 2013; Molas-Gallart & Tang, 2011; Spaapen & van Drooge, 2011). In concrete assessments of research impact, it is necessary to focus on the purpose of a given research project to capture the relevant context and stakeholders. Qualitative as well as quantitative methods are used for data collection. Table 4.3 highlights the most important elements included in the model.

Table 2.5: Indicators on productive interactions based on the SIAMPI Model

Direct interactions (Personal interaction between stakeholders)	Indirect interactions (Interaction between stakehold through media or 'carriers')	Financial interactions (Material interaction between stakeholders)
Face-to-face interactions	Articles	Research contracts
Phone	Books	Facility, instruments, sharing
E-mail	Annual plans	Start ups
Video conferencing	Reports	Contribution 'in kind' (people)
Radio, tv or internet	Web pages	IPR arrangements
Mobility arrangements	Clinical guidelines	Project grants
Meetings	Designs	Lump sum grants
Conferences	Models	Professional training
Chance encounters,	Musical arrangements	Patents
Old friendships	Exhibitions	Licenses
…	…	…
Social impact		
Behavioural change	Uptake, use	Collaboration
Methods		
Interviews, focus groups	Quantitative data	Reports or similar documentation

Source: http://www.siampi.eu/

As an evaluation tool SIAMPI aims to synthesize multiple data sources and provide an overall assessment of the impact of research within the social sciences and humanities and beyond. The approach can be used both prospectively (ex-ante) and retrospectively (ex post), assuming that you can describe impact strategies in advance and document actual impact once the research project has been completed. It is a strength of the approach that data and enriched metadata are included in the context of the performance of the research, which may help establish a connection between objectives, research designs, processes and outputs. Conversely, it may be difficult for researchers to describe ways to achieve impact already during or at the end of a project. In addition, very detailed impact strategies can be difficult to define and compare to corresponding documentation from other research programs

Figure 2.6: Illustration of productive interactions using the SIAMPI model
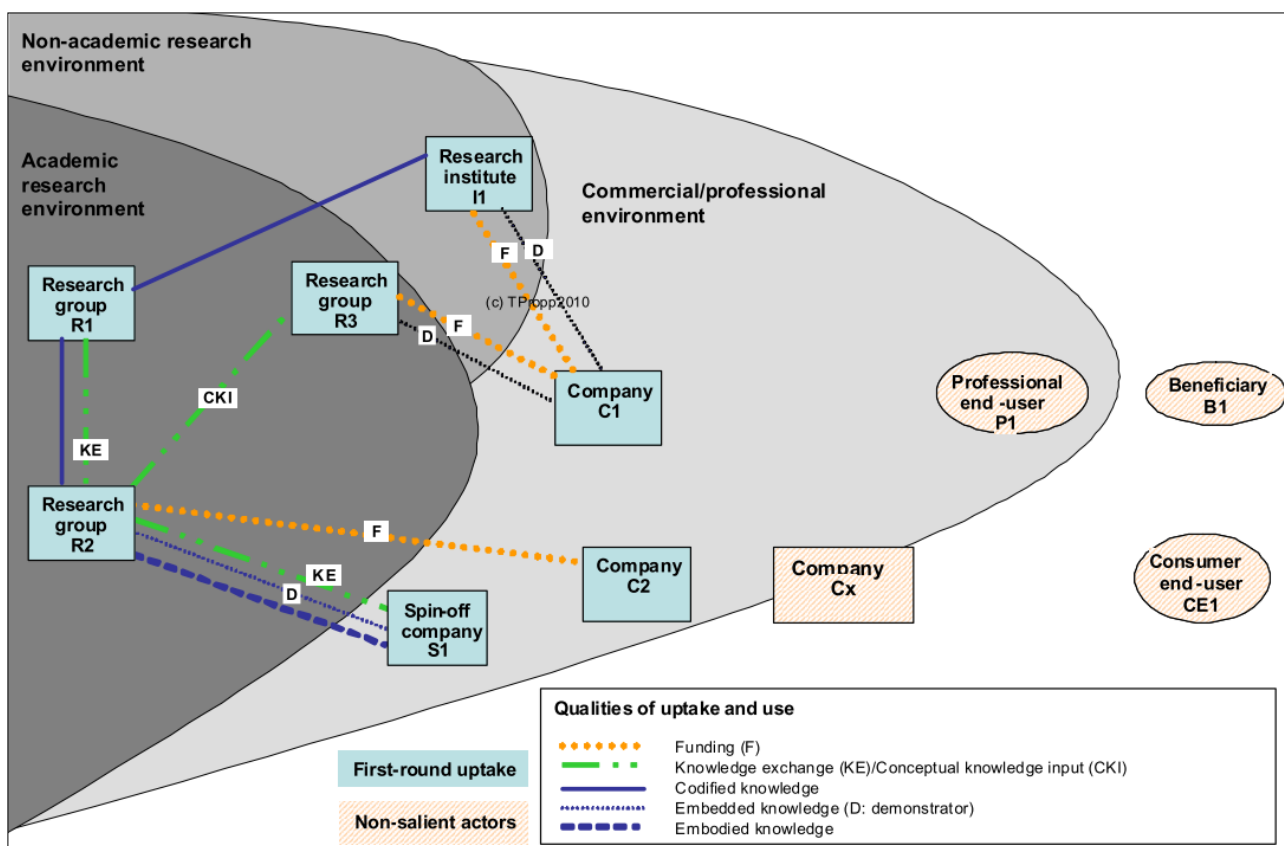
Source: (SIAMPI, 2011: 12). The figure shows the downstream knowledge uptake in NanoScience and Technology. Most knowledge relations are with stakeholders with strong R&D profile. Relations with end users, beneficiaries and consumers in lighter areas are only indirect and outside the realm of researchers.

2.6. IMPACT-EV

IMPACT-EV is a project funded by the European Commission, which specifically aims to evaluate Impact of social science and humanities through an evaluation of a large number of research projects sponsored by the Commission. The projects are assessed on the basis of the EU 2020 targets. In the definition of impact, a distinction is made between the scientific, political and social impact of research and the impact on the European Research Area. The scientific impact refers to scientific excellence and

productivity and is primarily measured based on publications, citations, dissemination in scientific networks and the further development of research derived from project results. The political Impact consists primarily of the transfer of research results to the EU, national governments, or local organizations. Policy-related effects in terms of influence and uptake of the research results are assessed through meetings with policy makers and other stakeholders. Thus, the policy impact covers both the dissemination and inclusion of research in policy-making processes. The social impact is assessed solely through concrete evidence of social improvements in relation to the EU 2020 targets. Thus, here it is not enough to convey results to a wider public through press or social media. Finally, the impact of projects is assessed in terms of strengthening the European Research Area (ERA) through, education of younger researchers, researchers' career improvements, interdisciplinary, or international collaboration.

To evaluate the different forms of impact, the evaluation uses a mix-method approach in which different types of data are collected as a basis for an evidence-based and outcome oriented assessment. Bibliometric indicators figure centrally in order to measure the scientific impact, whereas a survey aimed at research PIs serve to measure the political and social impact. For every project, an impact grade is calculated on the basis of the various activities. The activities and outputs related to specific types of impacts are assigned different weights given their scope and likely impact. For example, a higher weight is given to activities that directly influenced political strategies compared to disseminating research on social media. In Table 2.7, the different types are impacts are briefly described together with the methods used to measure and assess it.

Table 2.7: Impact categories used in IMPACT-EV

Scientific impact	Political impact	Social impact	Strengthen ERA
Scientific excellence, productivity and dissemination	Evidence that research is taken into account or influenced policy decision making	When published or disseminated research results lead to an improvement on the goals set by EU.	ERA priorities to improve the efficiency of national research systems.
Primary methods/indicators used			
Bibliometric and quantitative data for measuring:	*Surveys, desk research (reports, websites) and altmetric for measuring:*	*Surveys, interviews, desk research for measuring:*	**Surveys and other quantitative data for measuring**
• *Number of peer reviewed articles* • *Books/chapters* • *Citation* • *Conferences* • *Seminars* • *Lectures* • *Workshops* • *Subsequent projects*	• *Research included in the directives, decisions, strategies, evaluations, protocols, etc. of governments or supranational institutions.* • *Research results included in national organizations programs (NGOs, companies, trade unions, etc.)* • *Research results have been presented or discussed at political forums, meetings, etc.*	• *Increased employment* • *Reduction of the number of discontinued school courses* • *Reduction of the number of people in (or risk of) poverty and social exclusion* *...*	• *Cross-national cooperation* • *Interdisciplinarity* • *Education of young researchers* • *Research Mobility*

Providing evidence of especially the social impact of research has proven to be a very difficult task for many explorative research-driven evaluation models. There are several reasons for this. For instance, many of the assessed projects were still on-going when the evaluation was conducted. Hence, impact had little or no time to occur. Furthermore, it has proved difficult to provide quantitative evidence of research impact across cohorts of projects. As a consequence, evidence was not collected for all projects along all dimensions. Another weakness of IMPACT-EV is that a large part of the reporting is voluntary and thus biased, since only the researchers and knowledge institutions with time and interest are included in the study database. Furthermore, only selected success stories were chosen for further assessment creating an additional bias in the evaluation (Flecha et al., 2014).

A clear strength of the model is that it tries to create a multi-dimensional description of social science and humanities research often absent in purely econometric impact assessments. Funding agencies and science policy-makers can use results from IMPACT-EV to enhance the understanding of social science and humanities research and its broader societal value. The model also tries to develop a permanent system for monitoring, selecting, and evaluating impact on the basis of quantitative indicators, which may be analysed and compared. This distinguishes the evaluation model from other assessment systems such as the Research Excellence Framework and Standard Evaluation Protocol that uses peer review to quantify and rank research. However, it is unclear whether it is a good starting point to quantify number of dissemination efforts, relationships and outcomes related to policies, programmes, and use these data as basis for calculating and ranking impact. In many cases, only few direct relations and policy outputs exist, though they may be needed in order to influence policy. Thus, the quality of these engagements, interactions and outputs cannot necessarily be quantified.

Table 2.8: Scoring scheme for success stories with Political Impact using IMPACT-EV

| | | Policies (weight 5) [2,3] | | | | | | | | Programmes (weight 3) [4] | | | | | | | | Forums (weight 1) [5] | | | | | | | | Political Impact Value | Political Impact Score [10] |
| | | Int / European (weight 20) [6,7] | | National (weight 15) | | Regional (weight 10) | | Local (weight 5) | | Int / European (weight 20) | | National (weight 15) | | Regional (weight 10) | | Local (weight 5) | | Int / European (weight 20) | | National (weight 15) | | Regional (weight 10) | | Local (weight 5) | | | |
ACRONYM	Pillar [i]	N	Score [ii]	N	Score	N	S	N	Score	N	Score	N	Score	N	Score	N	Score	N	Score	N	Score	N	Score	N	Score		
ASSPRO CEE	Fairness	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4	2	--	--	3	1	--	--	50	5
CAP-IRE	Growth	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	1	--	--	--	--	--	--	120	9
COINVEST	Jobs	1	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	1	1	2	1	--	--	--	--	210	10
DISCIT	Democratic change	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7	3	--	--	--	--	145	9
DOMAC	Fairness	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10	3	--	--	--	--	--	--	160	9
ENACT	Democratic Change	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--	3	1	--	--	--	--	--	--	80	7
EURO-JUSTIS	Fairness	--	--	--	--	--	--	1	1	1	1	--	--	--	--	--	--	2	1	7	3	--	--	--	--	150	9
FINNOV	Growth	--	--	1	1	--	--	--	--	--	--	--	--	--	--	--	--	2	1	--	--	--	--	--	--	95	8
IMPROVE	Democratic change	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4	2	--	--	--	--	--	--	40	4
INCLUD-ED	Jobs	1	1	--	--	1	1	--	--	1	1	--	--	1	1	--	--	5	2	2	1	--	--	--	--	295	10
MERCURY	Growth	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--	4	2	--	--	--	--	--	--	100	8
MIRRIS	Growth	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	16	3	--	--	50	5
MONFISPOL	Growth	--	--	--	--	--	--	--	--	1	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	105	9
NOPOOR	Fairness	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5	2	--	--	2	1	3	1	55	6
PIDOP	Democratic Change	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	1	--	--	--	--	--	--	120	9
POLINARES	Democratic change	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	1	1	--	--	130	9
PRIV-WAR	Fairness	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	1	3	1	--	--	--	--	135	9

Source: (Flecha et al., 2014: 20)

2.7. Research Contribution Framework (RCF)

The Research Contribution Framework (RCF) is an evaluation approach initially used to evaluate public sector change programmes where several complex factors influence behaviour and change. In such cases, the approach has been implemented to help managers, researchers, and policy-makers conclude what kinds of contributions a programme makes to specific outcomes (Mayne, 2001, 2008). The ESRC has adapted the approach to assess investments in genomics looking at the social and economic implications of developments in the life sciences (www.genomicsnetwork.ac.uk). Further, the framework has been modified to investigate the impact of participatory research in social science. Sarah Morton and the Centre for Social Action (CSA) at De Montfort have contributed to the model through different case studies focusing on partnerships between academic research and social organizations in UK and Ukraine (Morton, 2015; Morton & Flemming, 2013).

RCF is based on the idea of research utilization as a complex interactive process. Impact is not considered as simply a handoff of research findings, but rather as a process of engagement with research users at different stages in the research process. Unlike technological or scientific developments, social science findings cannot drive change on their own. Instead, they contribute to change through dialogue and interaction with relevant members of the public, practitioners, community organizations, policy-makers and the press. RCF seeks to provide a method of linking research and knowledge exchange activities to wider outcomes, while including contextual factors that can help as well as hinder research impact. This is done by looking closer at stages that take place prior to impact and by separating out the ideas *of research uptake, research use,* and *research impact* (Morton, 2015).

The RCF uses a process-oriented case-study approach with a focus on the problem and purpose of a specific research project. On this basis, a 'theory of change' (TOC) is developed that includes contextual factors, value assumptions and risks involved in processes of change (Mayne, 2001, 2008; Morton 2012). Further the model seeks to capture what might be termed *the audit trail* (record-keeping, citations, public use) by identifying key informants and otherwise tracking the influence of research. Ideally, impact assessment should begin at the planning stage when the links between research and society is being developed.

- Map a pathway to impact linking activities to increase research uptake to outcomes
- Identify assumptions and assess risks for each stage of the pathway
- Identify indicators for research uptake, use and impact
- Collect evidence
- Review pathway, identify gaps in evidence and try to fill
- Write a contribution story (Morton, 2015; Morton & Flemming, 2013)

The RCF makes use of qualitative and quantitative methods such as interviews and surveys with key individuals as well as analyses of seminars, briefing papers, press coverage, e-mails, launch events etc. The method for analysing and collecting evidence may vary according to the mission, the interactions, and type of impact in question and may even need to be adjusted throughout the assessment process (see figure 2.10). A central assumption is that often societal contribution is co-produced in settings where researchers and research users are reworking ideas to better suit their needs. As Sarah Morton state *"...the idea that any change in a system could be attributed to research is untenable within this process, instead a theory based approach is needed."* (Morton, 2012: 267)

Figure 2.9: RCF basic pathways to impact
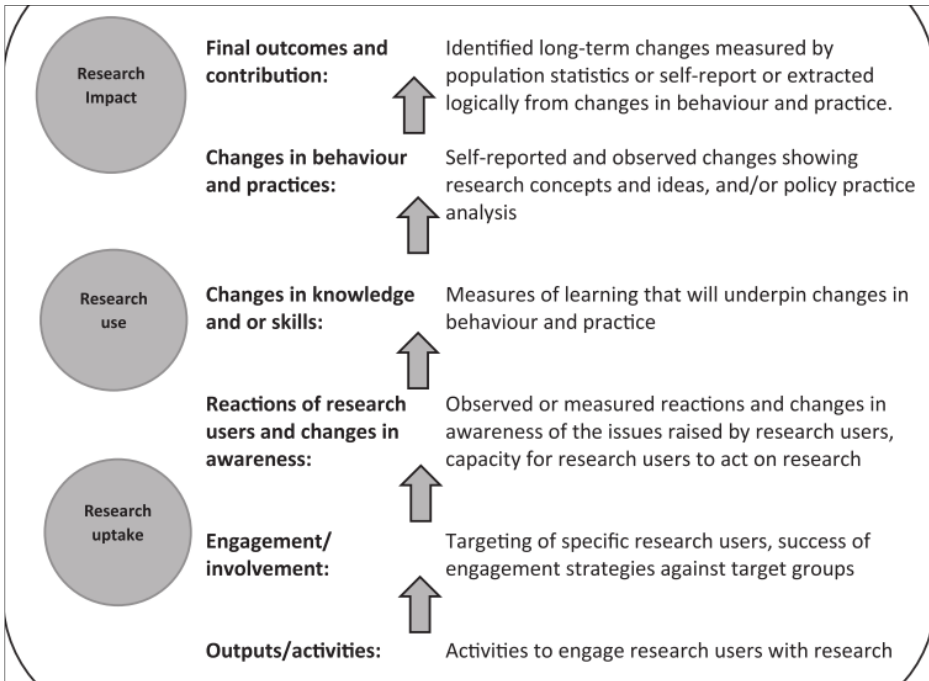
Source: (Morton, 2015: 411)

Figure 2.10: Annotated impact pathways for the case study on sex education practice
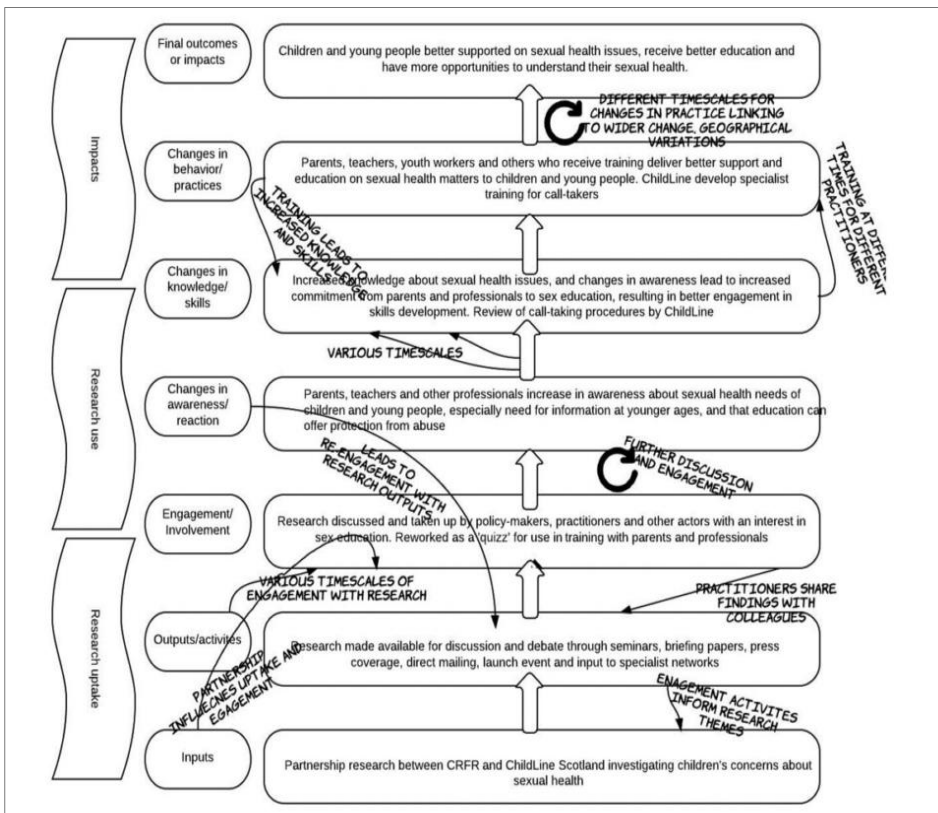
Source: (Morton, 2015: 417)

RCF concludes that a complexity-informed approach is better suited to capture activities and impact closely linked to the research process that would otherwise be neglected. It is a strength that the assessment model is able to annotate and change the case study and theory-based logic model while studies are conducted. Furthermore, the model is able to include both the mission of a research project as part of the assessment while taking into account the interests of external stakeholders as well as directly involve researchers.

There are a number of drawbacks of the RCF model as well. First, it has primarily been used to assess research that has direct links to specific societal organizations in terms of partnerships and formal collaborations. The model appears to be less suited for assessing research project characterized by less direct interactions with multiple and diverse target groups. Further, the model requires researchers to develop a clear idea of how they plan to engage with specific societal actors in order to drive change and impact. This may be a challenge for some types of projects. Finally, the model has a strong focus on projects and may thus exclude impact that happens through less formal engagements in between official projects.

2.8. Scale models - Linkage and Exchange (LE)

The Linkage and Exchange framework aims to emphasise interpersonal connections and interactions between research and societal actors. The framework seeks to promote research uptake in specific contexts as well as encourage research that is of use to partners or users in society. The linkage and exchange model has primarily been used by Cherney et al. to empirically explore academic-industry collaborations in the social sciences (Cherney, Head, Boreham, Povey, & Ferguson, 2013; Cherney, 2015; Cherney & McGee, 2011; Cherney, Head, Povey, Boreham, & Ferguson, 2013)

The linkage and exchange model implemented by Cherney et al. makes use of a linear representation of how research is communicated by applying a scaling model inspired by empirical studies by Réjean Landry (Landry 2001, Knott and Wildavsky 1980). The scaling model comprises six separate stages; transmission, cognition, reference, effort, influence, and application (see table 2.11). At each stage, researchers are asked to estimate their research using a 5-point scale. The scale is cumulative in the sense that each stage can be navigated to generate increasing forms of research uptake. Through the different stages the model includes issues such as science push, demand pull, dissemination, and interaction variables. Most attention is paid to supply-side factors such as research outputs and the context of research, but the study also looks into demand-pull in terms of the needs and efforts of users in applying research to practice (Cherney, Head, Boreham, Povey, & Ferguson, 2013).

Methodologically, the studies make use of a combination of surveys (researchers) and interviews with (stakeholders and researchers). The study finds that some types of impact from research incorporates linkage and exchange activities and co-production processes that *"require skills, expertise and the know-how to engage policy-makers and practitioners"* and *"…efforts at customizing research that is tailored to end-users"* (Cherney & McGee, 2011: 156). The study supports the conclusion made by other assessment studies, that social science and humanities research does not lead to many direct applications but often has cumulative and *"percolating effects"* on policy and practice (ibid).

Table 2.11: The stages of knowlegde utilization

Stages of knowledge utilization		Descriptions provided to respondents in the questionnaire
Stage 1	Transmission	I transmitted my research results to the practitioners and professionals concerned
Stage 2	Cognition	My research reports were read and understood by practitioners and professionals concerned
Stage 3	Reference	My work has been cited as a reference in the reports, studies and strategies of action elaborated by practitioners and professionals
Stage 4	Effort	Efforts were made to adopt the results of my research by practitioners and professionals
Stage 5	Influence	My research results influenced the choices and decisions of practitioners and professionals
Stage 6	Application	My research gave rise to applications and extensions for the practitioners and professionals concerned

Source: (Cherney, Head, Boreham, Povey, & Ferguson, 2013: 784, adopted from Landry, Amara & Lamari, 2001)

The stage model has been criticized for undervaluing non-linear and indirect pathways through which research can compel actions and decisions in society. The problem is, it is argued, that the model fundamentally construes impact as going through specific sequential stages (Davies & Nutley, 2008; Nutley, Walter & Davies, 2007). However, the research utilization scale does recognize that research processes vary between a range of different activities spanning from knowledge transfer, translation and uptake. Further, the scale provides opportunities to measure the significance of factors that separate different levels of research utilization. The model does not presuppose just one strictly ordered recipe for climbing up a ladder (Knott & Wildavsky, 1980; Landry, Amara & Lamari, 2001).

2.9. The RAPID Outcome Mapping Approach (ROMA)

The RAPID Outcome Mapping Approach (ROMA) is developed by the Overseas Development Institute in order for planning international development work and measuring its results. The ROMA approach consists of theoretical work, case-studies, and practical implementations in order to highlight and identify interrelated factors which determine whether research-based evidence is likely to be adopted by policy makers and practitioners. The method has been field tested in more than 40 workshops and training courses around the world. ROMA looks at political context, the science, and the links between policy and research. The model can be described as an outcome-oriented approach that seeks to document the progressive changes in attitudes and behaviours of users, beneficiaries, and consumers. ROMA focuses on backtracking from a policy change to determine the factors that have contributed and help identify and prioritize changes (Court & Young, 2006; Young et al., 2014).

The ROMA model involves three different stages. **The first stage** can be characterized as a preparation stage, during which a document review and informal conversations are carried out to develop an initial picture of the intended changes and impact on policy. This is done by reviewing project reports, research products, newspapers, articles and other relevant literature related to the project and the policy environment. Conversations with staff and stakeholders contribute to identify policy objectives

and key actors. **In the second stage** workshops are conducted in which policy changes and processes are identified by the stakeholders. The workshops involve actors such as the project team, key stakeholders, and external experts linked to the project. **The third stage** involves a follow up process that allows the researchers to triangulate and refine the narratives of change. At this stage, all information gathered in the preliminary stages and the workshops is used in order to confirm linkages and influences. On this background, the model is able to determine and assess the nature of the contributions to change (Young et al., 2014).

Figure 2.12: Main steps in The RAPID Outcome Mapping Approach (ROMA)

Source: (Young et al., 2014: 2)

Figure 2.13: External influences of policy change

External influences –
socio-economic and
cultural influences,
donor policies etc.

The **political context** –
political and economic structures
and processes, culture, institutional
pressures, incremental vs radical
change etc.

The **links** between policy
and research communities –
networks, relationships,
power, competing discourses,
trust, knowledge etc.

The **evidence** – credibility,
the degree it challenges
recieved wisdom, research
approaches and methodology,
simplicity of message, how
it is packaged etc.

Source: (Young et al., 2014: 4)

The Rapid Outcome Mapping Approach constitutes a policy oriented and practical model that is sensitive towards the pre-conditions and processes determining specific policy changes. ROMA involves a learning potential through providing insight into how researchers can gain support and influence policy makers (see table 4.12). The approach actively seeks to develop tools and guidelines that can be used by researchers, partners and other stakeholders to develop shared understandings of the objectives and of what needs to be done to influence policy and promote change. The approach acknowledges that research use and uptake can be a highly political process involving networks and coalitions of actors with conflicting values and interests. ROMA represents a very flexible method that can be combined with other evaluation tools and methods. It is especially suitable for exploring the impact and influence of research in complex environments where different actors are involved in generating and driving research impact. The drawbacks are that it fits projects that have direct effects and personal interactions and relations with users that can be actively included in the assessment process far better than less clear cases. As a consequence, the model face difficulties when attempting to trace more indirect links and pathways of research projects which operate with multiple and diverse users or beneficiaries.

Table 2.14: How to influence policy and practice based on the ROMA experience

What you need to know	What you need to do	How to do it
Political • Who are the policy makers? • Is there policy maker demand for new ideas? • What are the sources/ strengths of resistance? • What is the policy-making process? • What are the opportunities and timing for input into formal processes?	• Get to know the policy makers, their agendas and their constraints. • Identify potential supporters and opponents. • Keep an eye on the horizon and prepare for opportunities in regular policy processes. • Look out for – and react to – unexpected policy windows.	• Work with the policy makers. • Seek commissions. • Line up research programmes with high-profile policy events. • Reserve resources to be able to move quickly to respond to policy windows. • Allow sufficient time and resources.
Evidence • What is the current theory? • What are the prevailing narratives? • How divergent is the new evidence? • What sort of evidence will convince policy makers?	• Establish credibility over the long term. • Provide practical solutions to problems. • Establish legitimacy. • Build a convincing case and present clear policy options. • Package new ideas in familiar theory or narratives. • Communicate effectively.	• Build up programmes of high-quality work. • Action-research and pilot projects to demonstrate benefits of new approaches. • Use participatory approaches to help with legitimacy and implementation. • Clear strategy and resources for communication from start. • Face-to-face communication.
Links • Who are the key stakeholders in the policy discourse? • What links and networks exist between them? • Who are the intermediaries and what influence do they have? • Whose side are they on?	• Get to know the other stakeholders. • Establish a presence in existing networks. • Build coalitions with like-minded stakeholders. • Build new policy networks.	• Partnerships between researchers, policy makers, and communities. • Identify key networkers and salespeople. • Use informal contacts.
External influences • Who are main international actors in the policy process? • What influence do they have? • What are their aid priorities? • What are their research priorities and mechanisms?	• Get to know the donors, their priorities and constraints. Identify potential supporters, key individuals, and networks. Establish credibility. Keep an eye on donor policy and look out for policy windows.	• Develop extensive background on donor policies. • Orient communications to suit donor priorities and language. • Try to work with the donors and seek commissions. • Contact (regularly) key individuals.

Source: (Court & Young, 2006: 88)
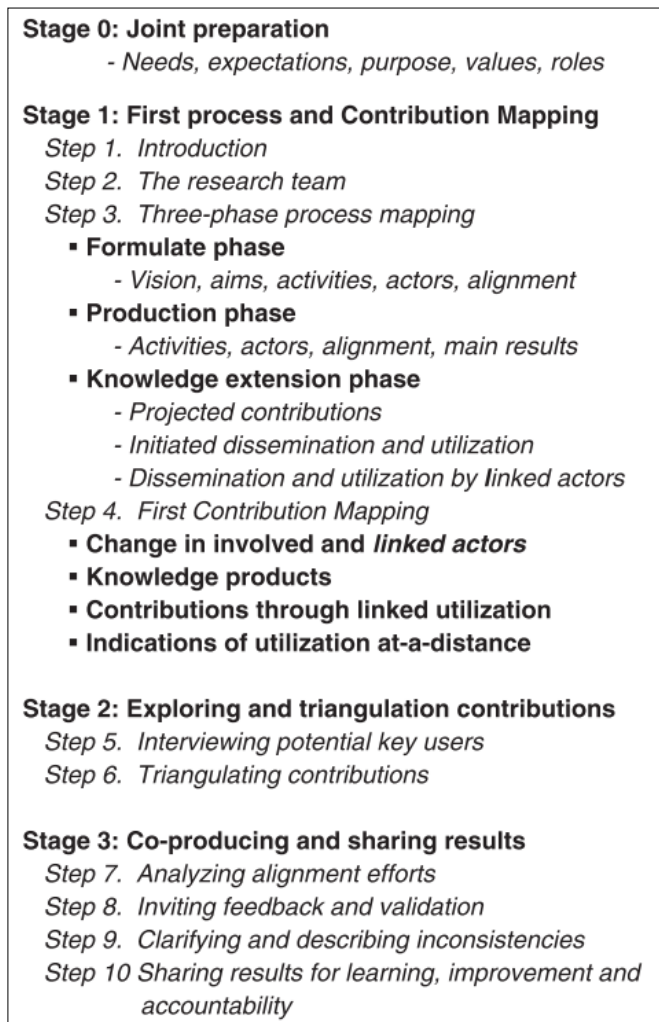
2.10. Contribution Mapping (CM)

In Contribution Mapping, research is represented as an ecosystem consisting of complex and unstable networks of people and technologies. Instead of looking at the final impact, contribution mapping looks at the activities and alignment efforts of different actors before and during research processes (Greenhalgh et al., 2016). Contribution Mapping is a forward-tracking approach in which the routes to impact are traced by interviewing researchers as well as other actors associated with the research project. Contribution Mapping has primarily been designed to improve practice, the use of technologies, organization care etc. in order to assist research in the health sector (Kok & Schuit, 2012). However, the model is inspired by social studies of how research impact evolves over time in complex settings, and may be a useful model in relation to other fields than the health sciences.

The model consists of three different stages: **The first phase** is a so-called *formulation phase*. In this phase, investigators of a research project are interviewed in order to develop a preliminary version of the process map and an estimation of specific research-related contributions. The activities are directed towards mobilizing resources, formulating, selecting, and funding the research projects. During this phase, researchers can seek to align and attune their research according to specific needs of potential users. **The second phase** is the *production phase* in which the various activities that need to take place in order to realize the specific knowledge product and impact are spelled out. At this stage, potential key-users and other informants are interviewed to trace, explore and triangulate possible contributions. This may include training staff, adapting organizational practices, establishing relation with policy makers, recruiting participants, and so on. It may also include descriptions of knowledge outputs in the form of theories, observations, statistical analysis, and discussions that need to be aligned and configured. It is emphasized, that researchers as well as users can learn something during the processes that occur before the formal output of research. **In the third phase**, *the knowledge extension phase*, the activities are aimed at making knowledge available to potential users. At this stage, researchers and linked actors can disseminate the produced knowledge and stimulate utilization directly through personal interactions or, at a distance, through presentations, publications in popular media and scientific journals and so on. The model describes how various and overlapping knowledge reservoirs can be made accessible to different potential users in a variety of ways. How research need to be disseminated and applied depends on the absorptive capacity and competencies for utilization among the users of research (Kok & Schuit, 2012)

Contribution Mapping is a policy driven model with its focus on the processes of knowledge production involving the joint effort of both researchers and users. The framework may be integrated into the planning stage of research programmes and projects, and may thus help stimulate learning activities and critical reflections that improve the contribution of research during the research process and afterwards. In this respect, the model takes into account the complex processes in which different actors are involved in producing knowledge as well as making it useful. By only looking at the linked utilization, the model is able to focus an assessment on specific objectives and direct uptake. This makes it possible to analyse and compare different projects with each other. The drawbacks are that the model is less capable of accounting for research use and uptake which are not directly linked to the research project. The impact assessment model depends on the possibility of identifying and involving specific users in the process of formulating and producing knowledge. This is not possible for all types of research. Furthermore, the model has only been applied a few times. Thus, the adaptability of the

model to different types of research, for instance in the social sciences and humanities, has not yet been empirically studied.

Figure 2.15: Stages and steps in Contribution Mapping

Stage 0: Joint preparation
- *Needs, expectations, purpose, values, roles*

Stage 1: First process and Contribution Mapping
Step 1. Introduction
Step 2. The research team
Step 3. Three-phase process mapping
- **Formulate phase**
  - *Vision, aims, activities, actors, alignment*
- **Production phase**
  - *Activities, actors, alignment, main results*
- **Knowledge extension phase**
  - *Projected contributions*
  - *Initiated dissemination and utilization*
  - *Dissemination and utilization by linked actors*
Step 4. First Contribution Mapping
- **Change in involved and** *linked actors*
- **Knowledge products**
- **Contributions through linked utilization**
- **Indications of utilization at-a-distance**

Stage 2: Exploring and triangulation contributions
Step 5. Interviewing potential key users
Step 6. Triangulating contributions

Stage 3: Co-producing and sharing results
Step 7. Analyzing alignment efforts
Step 8. Inviting feedback and validation
Step 9. Clarifying and describing inconsistencies
Step 10 Sharing results for learning, improvement and accountability

Source: (Kok & Schuit, 2012: 10)

Figure 2.16: Contribution Model three-phase process model

Figure 1 The three-phase process model. In the graphical representation of the three-phase process model, the two vertical lines separate the three phases. The search process narrows when a research proposal is formulated. At the beginning of the production phase, the search processes may widen again, before they are narrowed and the knowledge products are realized. During the production phase, there may already be some dissemination and uptake of emerging knowledges. After the knowledge products have been realized, the extension phase commences with dissemination and utilization in evolving actor-scenarios. Investigators are inside the research process, while *linked actors* are outside, but able to interact with the process. Both investigators and *linked actors* can connect the research process to evolving actor-scenarios.

Source: (Kok & Schuit, 2012: 5)

2.11. Enlightenment Model (EM)

The Enlightenment Model is a conceptual framework put forward by Eleonora Belfiore and Oliver Bennett to describe impact from the Arts (Belfiore & Bennett, 2010). The conceptual framework is inspired by Carol Weiss' (1995) studies on research utilization in policy that criticizes a simple and instrumental understanding of use and impact. Instead, Carol Weiss suggests that research impact should be understood as a gradual sedimentation of insights, theories, concepts, and perspectives. She states that different kinds of diffuse and undirected outputs from research can gradually shift political thinking as well as perceptions of social problems and solutions. This may in the end result in new insights and policy developments. Research is thus not necessarily immediately useful, but may involve activities and contributions that make people think in different and innovative ways (Weiss, 1995). Belfiore and Bennett argue that arts and humanities research often encourage creative and critical thinking, challenge orthodoxy, and promote self-expression and understanding of the human condition. Arts and humanities deepen awareness and appreciation of cultural distinctiveness, heritage, and history. Thus, the arts and humanities can have transformative effects at both the individual and societal level, as long as one looks beyond the mere economic and instrumental value (Belfiore, 2015).

As a more theoretical than empirical framework, the Enlightenment Model highlights important reflections and problems in the study impact. Research does not always have a visible and direct use and impact but may gradually influence society through the introduction of new ideas or critical

thinking which slowly change awareness of specific issues. This may lead to changes in behaviours and priorities. According to the Enlightenment Model, research has a critical role to play in society, e.g. supporting and giving voice to valuable or marginalized groups or challenging prevailing discourses in society. In this way, research is more confrontational than collaborative. Furthermore, impacts may also take a long time to reach full effect and leave a less than perfectly visible trail. Theoretically the model is in opposition to the more user-driven models which focus on the direct links and contributions of research in relation to specific users.

2.12. The Engagement Model (AHRC)

Art and Humanities Research Council (UK) have developed a strategy and a set of guidelines for planning and demonstrating effective policy engagement. Notably, these guidelines explicitly exclude the requirement of demonstrating impact. Rather than looking at end-impact, the strategic model focuses on the extent to which researchers are engaging with policy-makers, practitioners, or the public in a systematic and active way. The guidelines state that: *"Even where it is not possible to prove a direct policy impact, what academics engaged in policy-relevant research can do is to demonstrate engagement with policy-makers, practitioners or the public that lays the groundwork for future policy impact"* (AHRC, 2013a: 5). The Engagement Model provides a framework built around a range of qualitative and quantitative indicators developed to capture various engagements. These indicators are related to input, resources and planning, research activities, and the co-production of knowledge as well as the output and outcomes of research. The engagement model acknowledges that only certain engagements will result in observable policy change, and that such are often beyond the control of the researcher. The model reflects the position that the best way to create the potential for impact is to incentivize knowledge exchange, engagement, and communication efforts. Rather than rewarding impact and the outcomes themselves, assessment system should focus on the processes by which these outcomes are reached (Spaapen & van Drooge, 2011; Upton, Vallance, & Goddard, 2014).

Figure 2.17: AHRC active engagement model
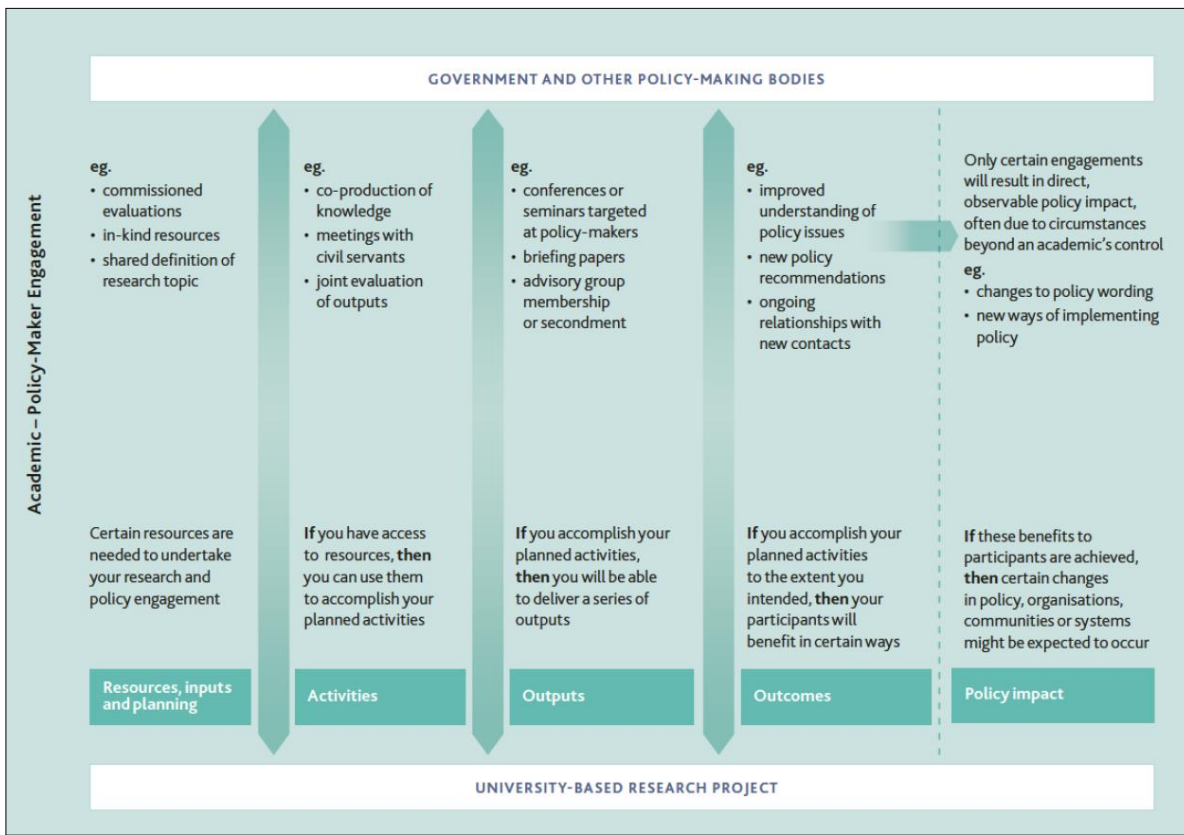
Source: (AHRC, 2013a: 5)

2.13. Main directions and distinctions

Through analyses of the impact assessment models discussed above, it is possible to point out some interesting directions and differences regarding how research is understood, measured, and assessed. In the following sections, general similarities and differences will be discussed. In the chapters to follow, additional distinctions and considerations will be identified in relation to methodological strategies used to measure and assess impact, conceptual understanding, classification of impact, and the engagement and relations of social science and humanities research to society.

Figure 2.18: Main directions and distinctions in relation to impact assessment models
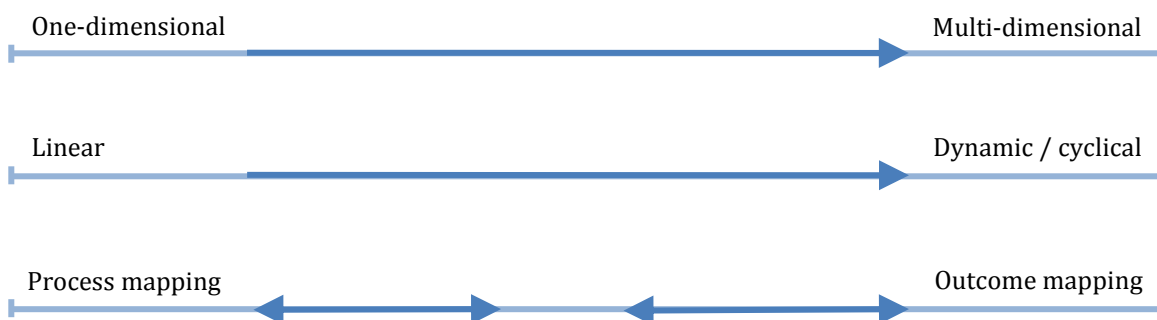
From one-dimensional models to multi-dimensional impact assessment models:

This review demonstrates the complex and multifaceted ways impact can be defined, measured, and assessed. A broad and flexible conceptual understanding of impact is required in order to address different types of impact from SSH research such as economic, technological, social, political, public, cultural benefits, values and effects. To account for the different types of impact, assessment models need to adapt a flexible methodology that often takes into account the divergent stages and timeframes involved in driving and generating impact. Collectively, the impact assessment models also describe various considerations and attention points towards different factors and processes in linking research to society. Connections are defined in relation to both scientific outputs and in-person engagements between researchers and societal actors. These connections may be characterized in various ways. They can be cooperative or confrontational, formal or informal and directed towards specific target groups or, at a distance, towards multiple users and beneficiaries. Thus, there is no standard and fixed model to assess impact across the field. An assessment model further needs to be flexible in relation to the missions, pathways, outcomes and impacts. It also needs to take into account contextual factors determining how research can influence different external actors or sectors in society. The multi-dimensionality of assessing impact from the social science and humanities will be discussed in detail throughout the following chapters of this report.

From linear models to multi-dynamic and cyclical impact assessment models:

The impact assessment models all presents multi-dynamic or cyclical understandings of how impact is measured and assessed. No impact assessment model included in the review defines impact as a simple and linear process from research to society. Many models do make use of a linear logical representation of the pathways to impact, such as the HERG Payback Framework and the Research Contribution Framework. The linear logical representation helps break down processes and single out specific stages, outputs and outcomes of research. The HERG Payback Framework emphasizes the multiple feedback loops between the stages from initial inception, through the research process into dissemination, and on towards its impact on society (C. Donovan & Hanney, 2011). The model is also adapted to better capture specific outcomes of research from the social science and humanities (Klautzer et al., 2011a; Levitt, Celia, & Diepeveen, 2010). This is necessary, as research from the social sciences and humanities *"…often demonstrates the complexity of social life and the intervening variables that complicate direct relations between inputs and outputs"* (Klautzer et al., 2011a: 208). The Research Contribution Framework also makes use of a logic model developed for individual research project in order to account for a theory of change that can be refined and annotated during the research process. As Sarah Morton puts it, "…research might be used by different actors at different times (…) and "…the processes set out on the pathway are often cyclical" (Morton, 2015: 415). The impact assessment models all acknowledge that research impact often results from gradual, dynamic, and iterative processes which involve multiple actors influencing the process as well as the final outcomes of research. The different impact assessment models describe how research is "embedded in networks" (SIAMPI, 2011) characterized as "dynamic and complex" and involving "two-way processes between research, policy, and practice" (Court & Young, 2006) that may change and be more or less stable over time (Morton, 2012, Kok & Schuit, 2012). Thus, the research processes and the impact generated often resemble what may be called knowledge spheres or knowledge ecosystems rather than a simple linear relationship between research and society (British Academy, 2008).

A balanced approach

In order to assess the impact of SSH research, assessment models cannot focus solely on the outputs and outcome of research. Attention has to be directed towards the research pathways, processes, and activities leading to impact. Our literature review identifies a number of models that explicitly attempt to map the preliminary stages of research. The importance is placed on clarifying policy and research objectives, identifying key actors and events, and developing strategies for dissemination, engagements, and alignment efforts. Our review further identifies models focusing on the ongoing productive interactions and activities between research and society. Tracking key activities and clarifying timelines, external influences, and other contextual factors are considered very important to account for potential research impact. It is generally found that research can be used and taken up in society through various activities (e.g. through conferences, expertise, advisory, formal or informal collaborations) and different outputs (e.g. scientific articles, book chapters, policy documents, media outlets, technical drawings, art works) influencing society in many different ways (e.g. through inspiration, dissemination, practice development, business models). In the literature, we find that impact assessment models that ultimately seek to document the outcome and impact of research face difficulties in documenting what proportion of impact should be attributed to individual researchers, projects and organizations. It is generally found, that if models are designed to focus solely on the immediate outputs and outcomes of research, then much impact in the social science and humanities will not be captured (e.g. Molas-Gallart, 2015; Upton, Vallance, & Goddard, 2014). Research is produced and transformed in wider academic conversations and influence society in indirect or interactive ways (Molas-Gallart, 2015; Meagher, Lyall & Nutley, 2008b). As a consequence, some models are looking at the potential outcome and impact from research acknowledging that only certain engagement and research outputs will result in directly observable impacts. In order to assess research from the social science and humanities, a balance must be struck between focusing on processes and outcomes. Impact assessments need to look at the mission of research and various contextual factors influencing the different activities and outputs of research. All of these elements have different potentials for impact - and the effects, benefits and values of such activities cannot always be traced and documented.

3. Methods and components in SSH research impact assessment

This chapter accounts for methodological strategies used for assessing the impact of SSH research. The discussed methods range from scientometric and bibliometric analysis, through statistical databases and commercialization statistic, open data repositories and impact templates to different quantitative and qualitative methods such as surveys, interviews, workshops, and focus groups. In the following these different techniques are described in detail alongside their main strength and weaknesses. Finally, the chapter will present some methodological directions and tensions that need to be taken into account when empirically assessing research impact from SSH. Table 3.1 counts the individual components and methods frequently mentioned in the literature while table 3.2 shows how these different methods and components are distributed across the impact assessment models, presented in chapter 1.

Table 3.1: Methods and component discussed and used for assessing SSH impact (n=283)
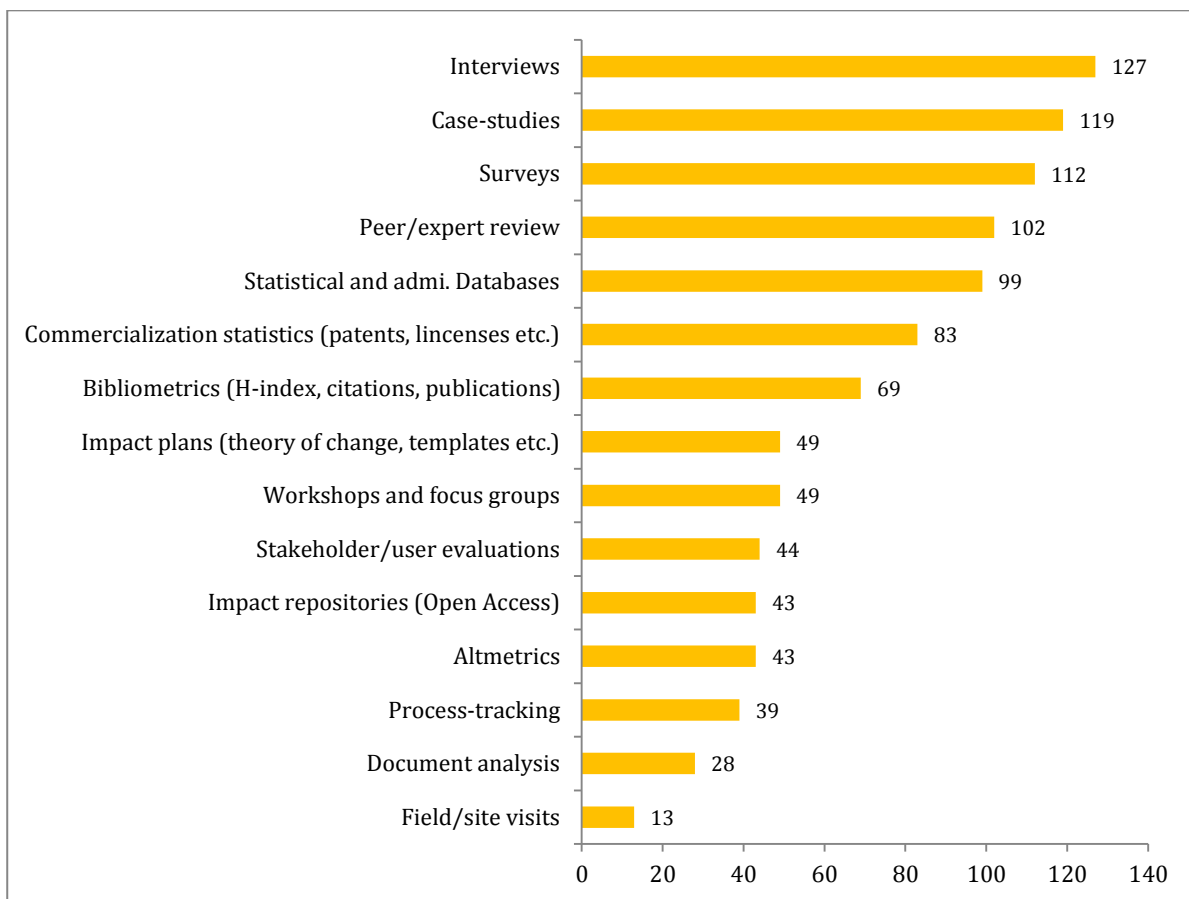
Table 3.2: Main components and methods used by the empirical impact assessment models

	REF	SEP	IMPACT-EV	HPB	SIAMPI	CM	RCF	FK	LE	RAPID
Implemented ex ante (Prospectively)				■	■	■	■			■
Implemented ex post (Retrospectively)	■	■	■	■	■		■	■	■	
Impact plan, template, theory of change	■	■			■	■	■	■		■
Tracking from process, interactions		■		■	■	■	■	■		
Tracking from outcome, impact	■		■							
Logic model/representation				■			■	■	■	
Stakeholder inclusion (alignment efforts)						■				■
Bibliometrics indicators	■	■	■	■	■	■	■	■		
Altmetrics indicators	■	■	■	■	■	■	■			
Register and adm. data	■	■	■	■	■		■			
Commercialization statistics	■	■	■	■	■		■			
Peer/expert review (judgement)	■	■		■	■					
Impact repositories	■		■							
User-information			■	■	■	■	■		■	■
Case-study (impact narrative)	■			■						
Surveys				■	■		■	■	■	
Interviews		■		■	■	■	■	■	■	
Workshops/Focus groups				■	■	■	■	■	■	
Field/site visits		■								
Document analyses			■	■	■	■	■	■		■

3.1. Bibliometrics

Bibliometric methods are mentioned in 69 texts. Bibliometric methods focus on the production and citations of scientific outputs including information about research output such as data, reagents, software, researcher interactions and funding. Bibliometrics represent a straight forward and widely accepted statistical method to asses and rank scientific performances, mainly on the basis of individual authors as the unit of analysis (Wouters & Costas, 2012). The H-index is an example of a bibliometric indicator that combines individual productivity with citations covered in systems such as ISI WOK and Scopus. The index is calculated by ordering the number of publications by a single researcher on the basis of the total number of citations they have received. Citations analysis such as H-index allows for studies on whether research is being pursued at the highest level and cited by other researchers in the field (LSE Public Policy Group, 2011; Wilsdon et al., 2015). Bibliometric analyses may contribute to the objectivity and transparency of the research evaluation process and provide an overview of publications patterns and scientific networks that cannot be seen from the perspective of the individual researcher. This may provide useful information on how specific research fields are connected, growing or declining over time (KNAW, 2005).

However, bibliometric indicators have primarily been developed from the life and natural sciences and are found to be very limited in covering the diverse publication channels of SSH research. The importance of non-journal publications and the limited coverage of non-English language publications are specific challenges that need to be addressed when using bibliometric indicators (Nederhof, 2006; KNAW, 2005). Further, the notion of quality differs between different scientific domains which, therefore, are not easily compared. A focus on the particularities of SSH research is needed in order to better understand the scientific communication, citation and publication behaviour of the field including interdisciplinary research positioned between different fields (Wouters et al., 2015; Rafols et al. 2012; Zuccala 2012). Despite these limitations, bibliometrics are generally considered to be a useful method in the assessment of the quality of research, when used carefully. But one should keep in mind that traditional bibliometric indicators only cover part of the written communication between researchers and say very little about the broader communication efforts and engagement of researchers in the wider society (KNAW, 2005; Bornmann, 2014a).

In addition to these challenges, the literature further emphasizes that an exclusive use of bibliometric indicators may have negative performative effects on an evaluation system as a whole. Performing well academically is not the same as making research useful and relevant in a broader societal context. Moreover, several studies discuss how researchers are not to be considered passive recipients of research assessment systems. Narrow indicators and incentives may lead to strategic behaviours and gaming of research e.g. by goal displacement or the establishment of citation cartels. This is a potential consequence of the production of scientific outputs becoming more or less an end in itself (Dahler-Larsen, 2012, 2014; Wilsdon et al., 2015). In the different impact assessment framework included in this review, bibliometric quality indicators still carry the highest weight when academic impact is measured. Other methods and indicators are increasingly introduced, however, in attempts to capture research activities and outputs oriented towards broader audiences and societal uptake.

3.2. Altmetrics

In the literature, we have located 43 text with mentions of alternative outputs and methods (altmetrics) for assessing scientific impact (most often based on a scientometric tradition) (Bornmann, 2014b; Bornmann, Haunschild, & Marx, 2015; Waltman & Costas, 2014; Hammarfelt, 2014; Zahedi, Costas, & Wouters, 2014). While much attention has been given to text-based outputs in peer-reviewed publications, researchers in SSH produce a wider variety of outputs which are not normally taken into account (Wilsdon et al., 2015; Hazelkorn, 2014). Altmetrics cover the growing interest in the broader communication, sharing, and use of research through social media and digital platforms such as Twitter, Facebook, blogs and digital sharing services e.g. Mendeley, Cite U Like, Altmetric.com, or Impact Story. Altmetrics further cover outputs, which are not necessarily digital products e.g. policy reports, white papers, or designs. Different forms of data can be collected as indicators from these sources, ranging from citations, views, downloads, clicks, tweets, shares, likes, bookmarks, and comments. Many of the studies have focused on comparing altmetrics to bibliometrics or have focused on disciplinary differences in relation to using social media such as Mendeley or Twitter (Bornmann 2014a, Zahedi, Costas, & Wouters, 2014; Holmberg & Thelwall, 2014; Hammarfelt, 2014).

The main advantage with these alternative methods is the ability to harvest big data that makes it possible to quantify wider dissemination efforts and effects. In an evaluation context, these methods work well as supplements to case-studies and narrative approaches. Altmetrics may be used to

measure broader societal outputs than traditional bibliometrics (Waltman & Costas, 2014). Further, the effects of media presence can be measured in a very short timeframe (Mohammadi & Thelwall, 2014). Generally, there is little doubt that the sharing and uptake of research do take place in a more comprehensive environment than captured by traditional scientific metrics.

Altmetric methods also have several limitations. Altmetrics do not create data which are easily compared between different research disciplines, or even across different research themes or topics (the problems of normalisation). Additionally, altmetric data is often biased towards specific users and it is rarely possible to have access to precise user statistics or samples for different types of social media data. Furthermore, it is often unclear what a citation, mention or download is actually an indicator for. In contrast to citations in scientific journal articles, which are fairly standardised and transparent, citations and references in policy reports or on social media are far less clear. Research used in such contexts is not always cited and not everything cited is actually used (Bornmann and Daniel 2008; Neylon, Willmers & King, 2014). Consequently, there is still a lack of knowledge concerning the reliability, validity, and context of specific metrics and altmetrics. It is recommended that altmetrics are used carefully and not as the central method for assessing societal impact of research (Wilsdon et al., 2015; Hicks, Wouters, Waltman, Rijcke, & Rafols, 2015). However, increased attention towards wider communication efforts is certainly relevant when studying broader dissemination effort. This might be fruitful for SSH activities which are characterised by producing a variety of outputs towards different sectors in society.

3.3. Commercialisation statistics

In the literature, we also find 83 references to different forms of commercialisation statistics as a method for assessing the societal impact of research. Commercialisation statistics are often narrowly associated with measuring different types of economic effects, primarily in relation to the business sector and technology transfer. Standard indicators used are patents, licences, joint R&D, contract research, industry funding and spin-outs. Nevertheless, commercialization statistics can be used to study various other types of entrepreneurial activities (Abreu & Grinevich, 2013; D'Este, Tang, Mahdi, Neely, & Sánchez-Barrioluengo, 2013; Martinelli et al., 2008; Perkmann et al., 2013). Advantages related to commercialisation statistics are the ability to identify formal and contractual relations between research and societal actors, where quantitative evidence on economic and commercial research uptake can be accounted for and compared. However, it is often hard to compare different types of commercial effects especially across different disciplines and national contexts. The literature further problematizes the narrow focus on formal transactions and indicators (e.g. spinouts and patents) which is considered inappropriate for commercialisation efforts in SSH. Furthermore, SSH research is often of interest to non-market sectors such as the public sector, third sector or the general public. Here links and activities are more informal and disseminated via diverse communication channels such as policy reports, stakeholder meetings, public lectures or books written for general audiences (Abreu & Grinevich, 2014; Hughes, Kitson, Probert, Bullock, & Milner, 2011; Olmos-Penuela, Benneworth, & Castro-Martinez, 2014). Thus, traditional commercialisation statistics are inadequate with respect to documenting the societal effects of SSH.

3.4. Impact repositories

In the review, we find 43 mentions of impact repositories and databases especially in relation to the policy literature (VSNU, NWO, & KNAW, 2015; HERA, 2014; European Commission, 2015; Flecha et al., 2014; LERU, 2013). These databases and repositories can be seen as part of an open science agenda focusing on opening up the research landscape for broader cooperation and knowledge sharing. As part of the Research Excellence Framework, an impact database has been created, where all the submitted impact case studies can be found (REF, 2012). The Art and Humanities research council (AHRC) has also developed a portfolio with over 100 impact case studies in an ongoing initiative to create an evidence base for research impact. Some of these impact-case studies has been published and disseminated in reports such as the report *"At Home in Renaissance Italy"* (AHRC, n.d.a) describing the impact of a major cultural exhibition and the report *"Fighting crime through more effective design"* (AHRC, n.d.b). The European Commission has also taken up initiatives such as OpenAIRE and CORDIS to support open access policies. OpenAIRE is a source for data collection in order to measure the impact of Horizon2020 projects, whereas CORDIS functions as the primary public repository and portal to disseminate information on all EU-funded research (European Commission, 2015).

The different databases make it possible to locate key individuals (both peers within universities and collaborators outside academia) linked to specific research projects. It is also possible to share and create access to research results and empirical data that can create a culture of broader dissemination and sharing across scientific projects and fields. Repositories further makes possible explorative empirical studies based on the collected data. Such may provide comprehensive, nuanced and enriched images of the academic and societal impact of research from different disciplines or fields (King's College London and Digital Science, 2015). The disadvantages are that repositories require researchers to invest a considerable amount of time in documenting and describing their impact and pathways. There are also ethical considerations in relation to the share and use of data and questions on how to secure sensitive information. Additionally, the open repositories do not necessarily reach the desired users and target groups and it can be expensive to administrate.

3.5. Stakeholder involvement

Stakeholder-involvement is a method that is mentioned in 44 texts included in the review. In some cases, stakeholders are part of the actual research project as partners and collaborators partaking in the co-design of the project and the co-production of knowledge. In such cases, stakeholders can play an integral role in how a research projects functions and naturally in how it should be assessed. In other instances, stakeholders and users may be seen as important informants and data sources in order to learn more about how research is taken up and used by different societal actors. The different types and degree of stakeholder involvement can be used together with methods such as surveys, interviews, workshops, and focus groups in order to generate insight of potential partners and users. Involvement of stakeholders can happen at the design phase in order to orient research towards specific needs and goals (Martin, 2010; Campbell & Vanderhoven, 2016). This can help break down barriers and cultural difference between researches and its potential partners, users or broader beneficiaries. Stakeholder involvement can also be implemented doing the research process to gather information of impact closely linked to practice (Molas-Gallart & Tang, 2011; Morton, 2015; Young et al., 2014). Further, user-involvement is often used as a central data source in an ex post evaluation to document how research is adapted and used in specific contexts and how it has influenced awareness

or behavioural change. There is always a risk that especially partners, can have a vested interest and be too involved in the research project to function as neutral informants. It is difficult to avoid biases and positive ascription of research impact, which makes selection and balancing in relation to data gathering processes very difficult tasks. Furthermore, it is not always possible to identify specific users or beneficiaries of research. Finally, user-involvement can be a very costly and time-consuming method in all phases, including collecting, transcribing, and analysing data (Boaz, Fitzpatrick, & Shaw, 2009).

3.6. Administrative and statistical databases

Administrative and statistical databases are mentioned and discussed throughout the literature. Statistical databases are used by the two national impact assessment systems and several of the other assessment models included in the review. Statistical databases can be used to describe the research infrastructure, facilities, income, scientific degrees and prices, and may provide reliable data and information from different scientific fields. It is possible to follow developments over time and between research units, and often it is possible to combine data across administrative and statistical records. Administrative and statistical databases are often able to describe facilities and infrastructure within academia and also the broader societal environment in which specific research disciplines are situated. The disadvantages are that administration and user rights can hinder experiments and require repetitive renewal of agreements between researchers about joint utilization of established data sets. This can prevent access to data for both scientists and other interested parties. Registries may be inadequate and require ongoing update, maintenance, documentation, validation, as well as quality development. It can be difficult to document and derive impact from specific projects from administrative and statistical databases alone.

3.7. Case-studies (narrative approaches)

Case-studies are mentioned 119 times in the literature and thus represent a central method in most of the assessment models extracted from the review corpus. Case studies are used as a way to unify and synthesize different forms of empirical data and evidence into a single coherent narrative or impact story. In case studies, researchers often participate in collecting evidence that may contribute in describing both the pathways and the effects of their research. In order to quantify the impact narratives, some impact assessment models make use of peer reviews to score and rank research based on specific criteria (REF, 2015; VSNU, NWO, & KNAW, 2015). The method is found to have several advantages. Case-studies can deal with a high degree of complexity and are able to describe specific pathways that lead to a concrete use, uptake and impact from research to society. Case-studies can be used as a way to create a coherent impact narrative based on diverse data sources (Martin 2011, Bornmann 2013, Boaz et al.2008). The method is often criticized for its lack of objectively and quantification, as it can be difficult to compare different case-studies. Additionally, not all types of research may be able to provide clear empirical evidence of specific impact, which may create a bias towards only including successful projects with traceable and extraordinary impact. Case studies also risk idealising pathways and impacts by not accounting for barriers and negative effects. Lastly, the method is often a very labour intensive exercise that demands a lot of time and resources from both researchers and assessors.

3.8. Impact plans and templates, theory of change and logic models

The literature discusses and makes use of different forms of impact plans, templates and logic models to account for the pathways from research to impact. The impact plans may be developed retrospectively to describe the context, activities and outputs of research that have influenced society in different ways. Impact plans can also be used prospectively explaining how a specific research project is expected to bring about desired results. In REF, impact plans and templates are used to account for the context of the individual case studies and provide additional information about the wider range of activity and its capacity for impact associated from a specific unit of assessment. This allows the assessment panels to take into account particular circumstances that may have an influence on the case-studies selected for assessment. In such cases, impact case-studies are used retrospectively.

The literature includes impact assessment models (e.g. ROMA Approach, Research Contribution Framework) that use impact plans already at the preparation phase based on a theory of change. An impact assessment that builds around a theory of change can be useful in order to determine the expected contribution of a specific research programme on predefined goals. It is possible to examine the different factors that have the potential to affect basic assumptions of how impact may be achieved. A theory of change ideally functions as a road map, which guides the actors engaged in the project. This can help ensure that both researchers and relevant linked actors do not lose the direction of a given project. This is achieved by mapping possible activities, key actors and desired outcomes from a project. A theory of change is useful in situations where a project is able to describe their activities, key actors and societal effects in advance. For projects that are more descriptive, explorative or experimental it can be difficult to determine basic assumptions of expected changes already at the planning phase of research (Mayne, 2008). Many research projects within SSH do not rely on positivist methodologies and, consequently, it makes little sense to isolate specific societal effects that can be attributed to research. Instead SSH research may strive to maintain openness and acknowledge the iterative nature of the research process (Alvesson & Ashcraft, 2012), where the contribution of research is not necessarily established at the beginning of a project. Additionally, research may be directed towards multiple social groups in society instead of specific societal users. In SSH, theories of change are not used to describe specific causal links between research goals and activities and specific societal changes and effects. Instead some impact assessment models allow for the theory to be altered and refined during the research process (Morton, 2012; Kok & Schuit, 2012; Spaapen & van Drooge, 2011; Young et al., 2014, Meagher, Lyall, & Nutley, 2008). The theory of change-framework illustrate that it is often necessary to look at the mission of researchers, the context and interest of external actors and the specific activities linking research to society in order to account for the impact of research from SSH.

Finally, many impact assessment models (e.g. HERG Payback Framework) combine a logic model (to depict input-activities-output- impact links) with impact plans and templates build around case studies. The purpose of this is to capture the complex processes and interactions through which knowledge is produced, taken up, and used in society. Logic models can be useful tools for tracking specific outcomes resulting from research. Some assessment models are adapting the logic model to specific research projects (Morton, 2012; Young et al., 2014) while others present more general models of stages and different types of outcome associated with the research process (Donovan & Hanney, 2011). In both cases, it is necessary to be sensitive towards the less directly attributable

aspects and links between research and society. The logic models can only serve as an ideal illustration of the possible pathways to impact where different forms of qualitative data and narrative accounts are used to describe how specific links have emerged and developed over time.

3.9. Process-tracking, activity registration

Process-tracking is based on methodological techniques that seek to explore and trace utilization pathways from research to society. Overall, the approaches can be divided into forward-tracking and backward-tracking strategies. Impact can either be traced forward from initial research towards research use, outcomes and impacts, or impact can be traced on the basis of pre-defined outcomes back to the specific research initiatives and outputs (Meagher, Lyall, & Nutley, 2008).

A backward tracking approach is used by the HERG Payback Framework to account for specific outcomes of research (Buxton & Hanney, 1996; Wooding et al., 2011). The method has several advantages. It is very policy-oriented in tracing the return of investment from a variety of empirical data sources. This makes it possible to uncover "how" as well as "why" specific outcomes or impacts have succeeded. The methods allow research projects to be measured up against the same goals set by a research institution or funding organizations. The methods can be used in combination with other methodological techniques. The drawbacks of the method are that backwards-tracking tends to rely heavily on the quality of and access to relevant documentation. It further may involve difficulties related to attributing specific outcome to research - especially when accounting for more indirect pathways to outcome and impact that is also influenced by other actors in society (Boaz, Fitzpatrick, & Shaw, 2009)

The SIAMPI model and the Research Contribution Framework make use of forward-tracking approaches. These frameworks seek to identify links and productive interactions that have the potential of leading to socially relevant application. The SIAMPI model finds that *"it is only by analysing the processes that induce social impact that we have a chance of recognizing potential research impacts and the contributions made by research that might otherwise not be evident"* (Spaapen & Drooge, 2011: 213). The Research Contribution Framework also emphasize tracking relations and pathways forward based on a theory of change taking into account the different factors influencing later use, uptake and outcomes (Mayne, 2008; Morton, 2012). Forward-tracking techniques can help establish a connection between 1) research objectives, framing and design, 2) the research processes and outputs and 3) later outcome and impact. It is also able to highlight barriers and enablers of achieving research impact. The methods can be based on both qualitative (e.g. interviews, impact logs) and quantitative explorative approaches (e.g. social network analysis, geo-referencing, contextual response analysis etc.). However, it can be difficult for researchers to systematically describe ways to achieve impact already during, or at the end of, a project, because of the relatively short time horizon. Additionally, descriptions of pathways can quickly turn anecdotal if not systematically collected. For example, impact assessment studies using the SIAMPI model found that information on productive interactions were hampered by the lack of systematic data on the productive interactions with stakeholders. Researchers often claimed importance for specific forms of interactions, but no systematic data on these forms were available for assessment (SIAMPI, 2011). New ways of systematically accounting for the different activities and interactions between research and society is needed to better understand the societal links from SSH.

3.10. Surveys

Surveys are used or discussed in 112 texts as a method for studying the societal impact of SSH research. In the literature corpus, we find several empirical studies using surveys to explore how SSH activities are engaged with different sectors in society (Upton, Vallance, & Goddard, 2014; Cherney, Head, Povey, Boreha, & Ferguson, 2013; Abreu & Grinevich, 2014; Bastow, Dunleavy & Tinkler, 2014; Hughes, Kitson, Probert, Bullock, & Milner, 2011). These different studies show that surveys are often a useful method in collecting quantitative data on different variables such as motivations, perceived barriers and enablers and engagements between research and the wider society. Surveys can be used to collect information of potential partners or users. Another advantage is that surveys open for repeat analysis and comparison at different stages in the research process and across different scientific disciplines. However, surveys also have its limitations. Surveys are only able to provide self-reported evidence of impact, which means that it is often easier to measure involvement and activities than actual impact and societal effects. In addition, survey response rates are often poor and rely on the access to relevant respondents. This may produce several biases in the responses (who are responding and not responding to the survey). Another limitation is that surveys assume that research impact can be measured quantitatively and, to a certain degree, captured in interesting ways by means of a standardized questionnaire. As a consequence, surveys often require other types of methods to support and validate self-reported evidence. Lastly surveys are not very responsive to unforeseen impacts and context-specific factors (Boaz, Fitzpatrick, & Shaw, 2008, 2009)

3.11. Interviews

Interviewing as a method is mentioned or used in 117 texts and are thus one of the most discussed methods to study the impact of SSH research. Interviews are often an integral part of assessment models and are used to involve users of research in order to capture context-specific effects. The method can be applied to researchers, partners and end users. A flexible interview situation allows informants to determine the conditions for how questions are answered and interviewers can react and customize the questions based on the informant's responses. A basic structure in the shape of an interview guide allows interviews to be compared and may uncover motivations, new understandings and specific barriers and enablers of impact. The method can be applied both at the beginning of research to gather information from relevant stakeholder, during the research process to uncover impact associated with practice and policy developments, or after the conclusion of a research project. The disadvantages of the method are that informants may not always be aware of the more indirect pathways of impact that happens gradually. Furthermore, selecting key informants may be difficult. There is always a risk of positive ascriptions of impacts that did not originate from research itself. Furthermore, it is often necessary to train interviewers to ensure the quality of the data. As with other qualitative methods, transcribing, analysing, and comparing data can be a very time-consuming task (Boaz, Fitzpatrick, & Shaw, 2008, 2009).

3.12. Peer review/expert review

Peer/expert review is a method mentioned in 102 texts. Peer review is used as an umbrella term for expertise-based review practices, including the review of journal manuscripts, applications for funding, and hiring and promotion. But additionally, national systems for science assessment are sometimes based on peer review, such as the Research Excellence Framework in UK and the Standard

Evaluation Protocol in the Netherlands (REF, 2015; (VSNU et al., 2015). Peer review is broadly regarded as one of the most important methods for ensuring quality control across the scientific fields (Wilsdon et al., 2015). In peer review, research quality is assessed by the researchers' peers or external experts, but the reviews can also be supported by external quality indicators that go beyond the content of the research results themselves. Quality indicators can for example be output indicators (e.g. publication in high cited journals or bibliometric indicators) or indicators of esteem (e.g. prizes, scholarly positions, and other evidence of external recognition) (KNAW, 2005). Furthermore, in the Research Excellence Framework and the Standard Evaluation Protocol, the peer /expert review are assessing not only scientific quality, but also impact or societal relevance of research based on a case study approach (REF, 2015; VSNU, NWO, & KNAW, 2015).

Peer review represents a very flexible method that can be performed at different times in the research process. It can be used both for allocation of research funding (ex-ante) or as a mid-term or final evaluation (ex post). Experts can deliver both credibility and accept of research quality as well as the impact of research. It is possible to include different indicators in the assessment from both qualitative and quantitative data sources. Furthermore, it is possible to quantify data and evidence by awarding research an impact score. As part of the peer review process, feedback, learning, and criticism can be directed towards the scientific product or the evidence and strategy for achieving impact. The method can be criticized for delivering acceptance rather than measuring and validating impact from research. Peers and experts can have a preference for the work of specific high profile researchers, leading to an accumulation of positive judgments and funding for researchers with a good reputation (the so-called Matthew effect). Furthermore, the method used to access impact can be a time-consuming and impractical method due to the number of experts involved. It also requires that experts are well informed and have an in-depth knowledge on the specific research area. This may be harder to provide for impact assessment than academic quality assessment. Lastly, it can be difficult to develop a broad range of quality and impact indicators that can help experts in the assessment process (KNAW, 2005; Wilsdon et al., 2015).

3.13. Workshops and focus groups

Workshops and focus groups are mentioned in 49 texts in the review corpus. These methods can be described as an organized form of discussion that can involve researchers, partners, and other relevant stakeholders. The method can be applied in different phases of an assessment and research process. Workshops may be used early on to bring researchers and relevant stakeholders together in order to share ideas and experiences on how to contribute to societal impact. Workshops can encourage more direct use, help tailor approaches to the audience, assist in developing successful dissemination strategies, and explore potential evidence of impact (Nutley, 2003). The methods can also help identify relevant pathways and research users. In contrast to more expensive methods, workshops and focus groups are relatively cost-effective ways to increase confidence in the influence of a research project. Workshops and focus groups can also be applied after a research project has ended in order to create insight into the immediate effects of research in relation to specific research users or target groups. In such cases, a consensus and common understanding can be achieved among participants that would not otherwise have been reached through individual answers. The methods also have several weaknesses. There are risks that participants in focus groups may not describe all the positive or negative effects of a research project. Participants may also have selective memory

when thinking back on the potential impact and risk, and may for instance ascribe impact that did not result from research. Lastly, the method is not suitable for sensitive and conflicting issues (Boaz, Fitzpatrick, & Shaw, 2008, 2009).

3.14. Field visits

Field visits are another approach that is mentioned in 13 texts. As an example, as part of the national evaluation system in the Netherlands, the approach is used to assess research at universities and other research institutions. The purpose is to demonstrate the quality and societal relevance of research (VSNU, NWO, & KNAW, 2015). Field visits, can give evaluators a chance to observe research on the ground, so to speak. Field visits can generate valuable insights, especially when triangulated with data from other sources. However, the reliability of the more qualitative data can vary and the method consequently faces the same challenges as other qualitative measures such as workshops and interviews.

3.15. Review and analysis of documents

Documents analyses cover the review and interpretation of existing documents such as books, policy reports, whitepapers etc. Review of documents can be used both qualitatively and quantitatively in combination with computational text analysis (e.g. text mining, topic models, semantic text analysis etc.) or traditional coding strategies (e.g. categorised coding, thematic syntheses etc.). The method can provide an understanding of both content and the context of specific outputs. The method depends on the quality of existing outputs and the ability to find and collect them systematically. The method says little about the non-written outputs from research. Furthermore, there is not one method that can be easily adapted and used, but many different methodological strategies which may complicate study design. Consequently, it often requires expertise and time to adapt or adjust the chosen method.

3.17. Main directions and distinctions

From the different methodological techniques presented in this chapter specific directions and distinction can be identified on how to document and assess the pathways and impact of research.

Figure 3.3: Main directions and distinctions in relation methodological strategies
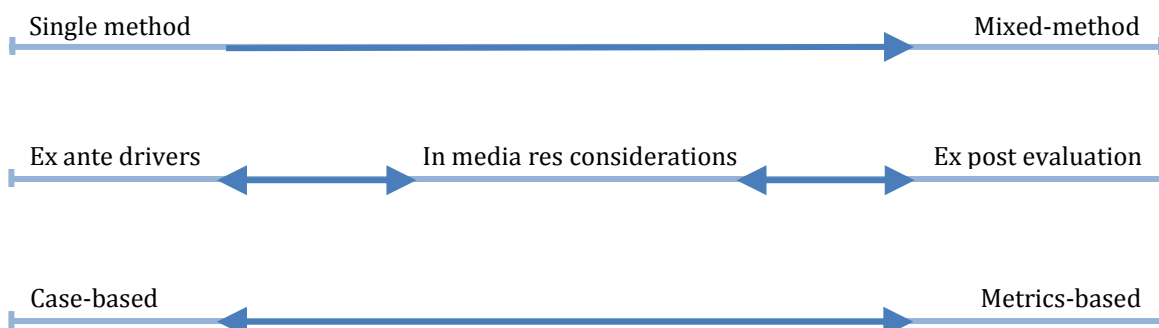
A move from single methods to mix-methods approaches:

Due to the complexity and different understandings of impact, the assessment systems and models incorporate diverse and flexible methods and indicators of impact and its pathways. Quantitative (such as citation counts, commercialisation statistics) as well as qualitative methods (such as case studies) need to be used reflectively and often in combination with each other. Different methodological techniques each have their advantages and disadvantages. For example, bibliometric indicators can be used carefully to assess academic impact in a combination with other methods and indicators. However, bibliometrics are unfit to account for the broader communication efforts and engagement from research to the wider society. There is no one size fits all model for measuring and assessing impact. The methodological strategies chosen may need to be tailored towards the specific mission and goal of both the research projects and the institution or funding organization. Research has to be understood in the specific academic and societal context and assessments must take into account the specific links and connections that exist between research and society, which generate both long-term and short-term values, change and effects.

Incorporation of ex ante, in media res and ex post drivers, considerations and assessments:

The methodological strategies presented in this chapter are not only measuring impact after research have been produced (ex post), but looks at outputs and activities associated with the research process (in media res) and stages before research is initiated (ex-ante drivers). In an ex ante assessment, excellence policies, per reviews, and citation indexes can help frame and structure research projects at grant level. Impact plans, and a theory of change, can be used to clarify the mission, identify potential external partners and target groups, and develop strategies for broader dissemination efforts and user-involvements. Similarly, workshops, focus groups, and user-engagements are found to be useful in stakeholder alignment for specific types of projects by directing and driving research towards societal needs, already at the planning phase of research. In addition to ex ante drivers and assessments, several frameworks also have an attention towards the research process (In media res) and the associated connections and productive interactions. Many activities from SSH are found to be linked to the contributions and experiences of actors outside the research community. Thus, efforts to communicate, achieve and assess impact often need to take into account the contributions of external partners, users, or beneficiaries. Linking research with societal actors may lead to the development of proxy indicators of connectivity to show how research is actually being co-produced, implemented, or used. This can help focus a final evaluation (ex post) towards the long-term and short-term effects and benefits in accordance with the mission, interest, and roles of the actors involved.

A distinction between case-based and metric-based approaches:

Due to the technological advancement, a number of new methods and indicators are being developed in order to create alternative indicators of research impact. These methods stand in opposition to the more labour-intensive impact models that require manual assessment of documents or researcher interviews build around an impact narrative. Metric-based methods can contribute to the objectivity and transparency of the research evaluation process and provide quantitative (big) data that can be compared between research units of assessments. However, bibliometrics and citations analyses are criticized for creating narrow understandings of research performances and impact, often based on inaccurate data and arbitrary indicators. Similar problems are associated with metric-based indicators in relation to the broader societal use, uptake and effects of research. As a consequence, impact

assessments risk being led by data and evidence that can be collected. This is the pitfall of letting only what is countable count. Nevertheless, the literature review identifies several contributions that develop responsible principles and guidelines for the use of metrics in research evaluation (Wilsdon et al., 2015; Hicks, Wouters, Waltman, Rijcke, & Rafols, 2015). For example, in the Leiden Manifesto Dianna Hicks and colleagues describe ten principles to guide research evaluation. They argue that metrics should always protect locally relevant research and be able to account for variation in specific research fields against the mission of research. An assessment exercise further needs to be part of an open and transparent analytical process in which quantitative evaluations support qualitative and expert assessment – not the other way around. Finally, it is pointed out that an impact evaluation always needs to be reflective in recognizing the potential effects of using specific indicators. An assessment system built around too narrow indicators may lead to unintended effects on the system itself (Dahler-Larsen, 2012, 2014). In order to account for the broader impact of research, it is recommended to include case-based methods and flexible indicators which are able to capture impact from different styles of research and disciplines including SSH. A narrow focus on short-term, proximal impacts may create perverse incentives, especially when assessing complex and context-sensitive research where impacts may be indirect and informal and thus harder to account for.

4. Impact Classifications and Pathways

Even though impact as a keyword is shared by almost all texts included in the review corpus (98%), it is associated with many different meanings and discussions. There is no common understanding of impact in the literature, but rather several more or less overlapping uses of the word. The concept of impact can be understood as a floating signifier in that the word is broadly used, but conceptually vague, highly variable, and unspecified. Impact, and related concepts such as value, effects, and benefits, is often paired with different words such as scientific, cultural, policy, economic, teaching, technology, or public to define different types of impact and pathways from research to society. In the following chapter, brief descriptions of the different types of impact are provided. The chapter ends by drawing some general distinctions regarding how impact is understood and achieved. The different impact classifications are far from perfect taxonomies and may overlap with one another to different extents. Further, the discussion around impact is connected to a larger literature that goes well beyond assessing and evaluating research. Policy impact is referring to literature on policy advice and evidence-based policy-making, economic impact refers to a literature on academic entrepreneurship, cultural impact is embedded in a larger discussion of the value of art and culture, whereas questions on health and wellbeing is part of an ongoing scientific discussion on how to understand and treat mental and somatic illnesses. It goes without saying that an exhaustive discussion of these issues cannot be provided here. Instead, this chapter aims to address some basic considerations and reflections on how impact is conceived in the literature. The chapter shows, that if one wishes to measure and evaluate the broader societal impact of research, it is important to remember the complexity and multitude of pathways, effects, and values that can be generated from research and which is far from easily captured by any set of fixed indicators.

An illustrative example of the complexity is provided in a report by Jonathan Grant at King's College London and Digital Science. The report applies a text-mining approach to the submitted impact case-studies in REF UK, which is divided into 36 units of assessment (UOA). The analysis first makes use of a semantic analysis of the case study descriptions, the result of which is 149 field of research (FOR). The analysis then identifies 60 different kinds of substantive impact from research to society. The topics are based on words harvested from the descriptions of impact and by applying text mining and topic modelling techniques. Even though data mining and topic modelling is often described as a dangerous and dirty methods involving high risk of misrepresentation, it is a useful way to capture and visualize some of the complexity that is part of the debate around impact and the pathways to impact. The table 5.1 shows an alluvial diagram taken from Grant's analysis which relates the 149 fields of research within the 36 units of assessment to the 60 impact topics. The analysis finds 3.709 unique pathways that research may take. This goes to show that impact can be hard to narrow down and that there is a lot of crossover between fields of research and different impact topics (King's College London and Digital Science, 2015).

Figure 4.1: Alluvial diagram linking FORs with UOAs to impact topics (impact pathways)
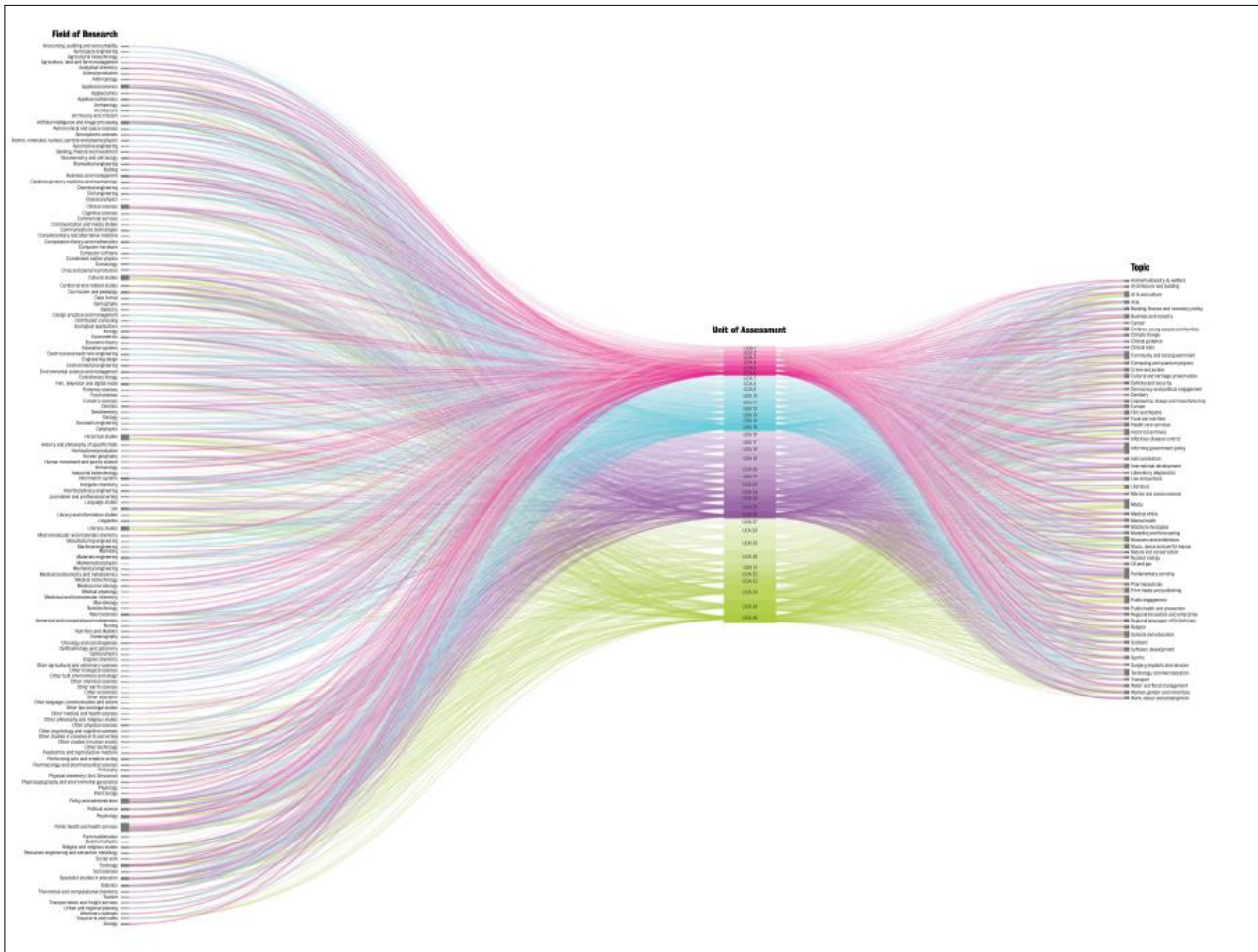
Source: (King's College London and Digital Science, 2015: 39)

In the literature review this is reflected in the many different uses of the classifications of impact. The ones most frequently mentioned are represented in table 4.2. These will be explored further in the following sections.

Figure 4.2: Impact classifications frequently discussed in the literature (N=283)
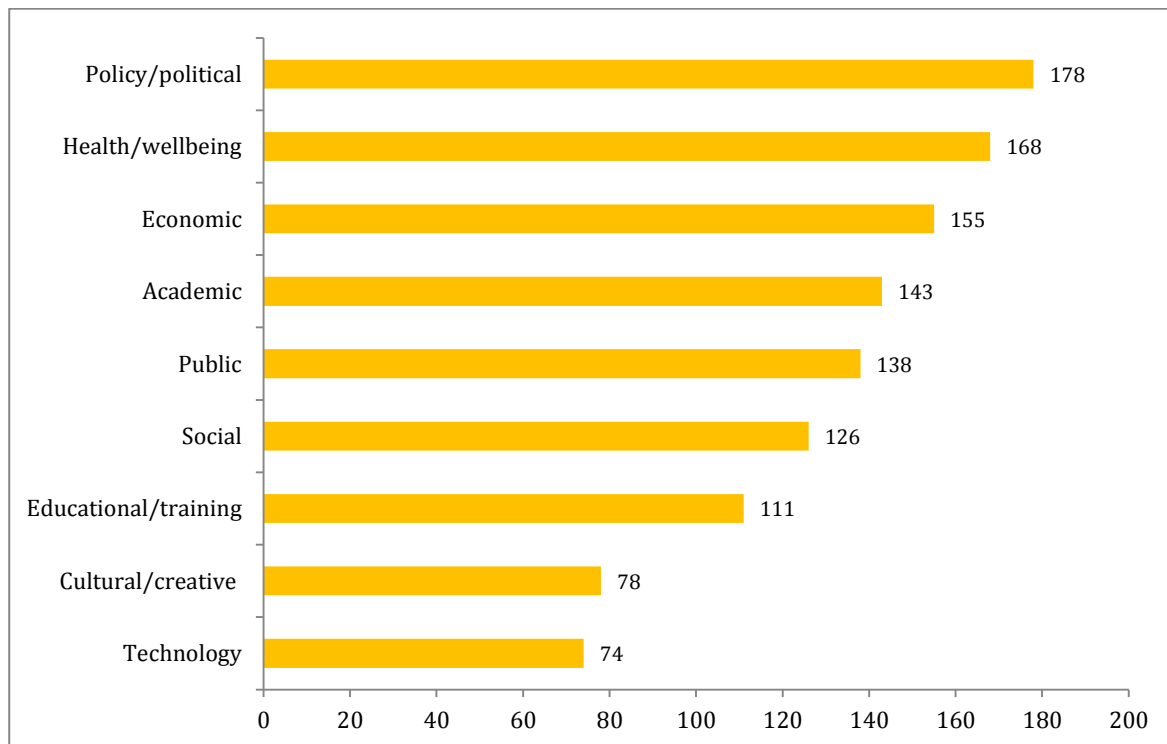
4.1. Academic impact

Academic impact is generally defined as: 1) the production and discoveries of new knowledge in relation to, for instance, theories, methodologies, scientific models, 2) the establishment of new resources through academic training and 3) the formations of disciplines and the development of interdisciplinary activities. Indicators used to assess academic impact include bibliometric analysis, citations in grant applications, scientific recognition (e.g. prizes, awards), and post publication peer review of books and scientific articles. Metaphorically speaking, academic impact is often described as the maintenance and advancement of the reservoir (or stock) of existing knowledge which can be tapped into and used by users and beneficiaries in society (e.g. European Science Foundation, 2014; Lane, Koka, & Pathak, 2006; Levitt, Celia, & Diepeveen, 2010; Martin & Tang, 2006; NESTA, 2009; UNESCO & ISSC, 2010; Upton, Vallance, & Goddard, 2014). Studies of academic impact primarily look at the contributions to science itself before subsequently studying its translation, influence and uptake in a broader societal context (Wilsdon et al., 2015). The relationship between research impact and societal relevance is sometimes described as a hierarchy, in which research impact (excellence) is concerned with ensuring the quality and validity of research, while societal impact refers to the broader relevance of research. In this basic distinction, it is argued that only research that is found to be scientifically sound by peers should be judged by its wider relevance to society – as inferior research risk misleading society (VSNU et al., 2015). It is also emphasised that research of high academic quality and esteem should not necessarily be regarded as societal relevant in and of itself since research may need to be refined, translated or modified both within and outside research. Universities may aim to deliver both high academic impact and research that is of relevance to the wider society (the double hurdle), but it is often suggested that a differentiation of roles is needed so

that different types of researchers and external actors play their own part in ensuring the uptake, use and influence of knowledge throughout the entire knowledge translation value chain (Ellwood, Thorpe, & Coleman, 2013).

4.2. Economic impact

Economic impact is mentioned in 155 texts included in the literature review. We find several reports and policy-driven studies on the economic effects and the return of investment in SSH research (Warry, 2006; PA-Consulting Group and SQW consulting, 2007; AHRC, 2005). The economic and commercial benefits are also discussed in relation to the scientific literature on academic entrepreneurship towards the business, industrial, and commercial sectors. Here studies have traditionally focused on direct and formal relationship between research and society. Indicators of economic impact include research contracts, industry funding, income from industry, increased turnover or reduced cost for industries and businesses, new products and services and spin-out companies as well as patents and licenses granted on the basis of research (Abreu & Grinevich, 2013; Perkmann et al., 2013).

In the literature, economic impact has also been used as a point of departure for broader discussions of how SSH influence and create value in society. It is generally found, that SSH research benefits society in ways that are often less easily capitalized by users and beneficiaries and are not only linked to the business sector, but often involves public bodies, non-profit organizations, and community groups (Benneworth & Jongbloed, 2010). Economic impact is sometimes expanded by looking into broader (socio-) economic effects and paybacks from research, such as the improvement of public policy and services through better healthcare, cultural benefits or different kinds of social policies. The broader notion of economic impact is also adapted in the policy literature. In the Warry report, for example, economic impact is defined as actions or activities that *"affect the welfare of consumers, the profits of firms and/or the revenue of government… "* that may *"…range from those that are readily quantifiable, in terms of greater wealth, cheaper prices and more revenue, to those less easily quantifiable, such as effects on the environment, public health and quality of life"* (Warry, 2006). Economic impact does not only refer to direct monetary benefits, but includes other types of investments and contributions as well. However, the broader notions of economic impact have still been criticized for applying a monetary value to non-market goods by using a simple investment logic attached to other types of utility such as welfare or wellbeing (Belfiore, 2015). Figure 4.3 presents a model illustrating an attempt to broaden the view of entrepreneurial activities. The model is used by Maria Abreu and Vadim Grinevich in an empirical study to show how research activities may translate into economic effects through different channels, some of which are easier to track down than others due to IP protection (Abreu & Grinevich, 2013).

Figure 4.3: Entrepreneurial activities and the underlying types of knowledge and use
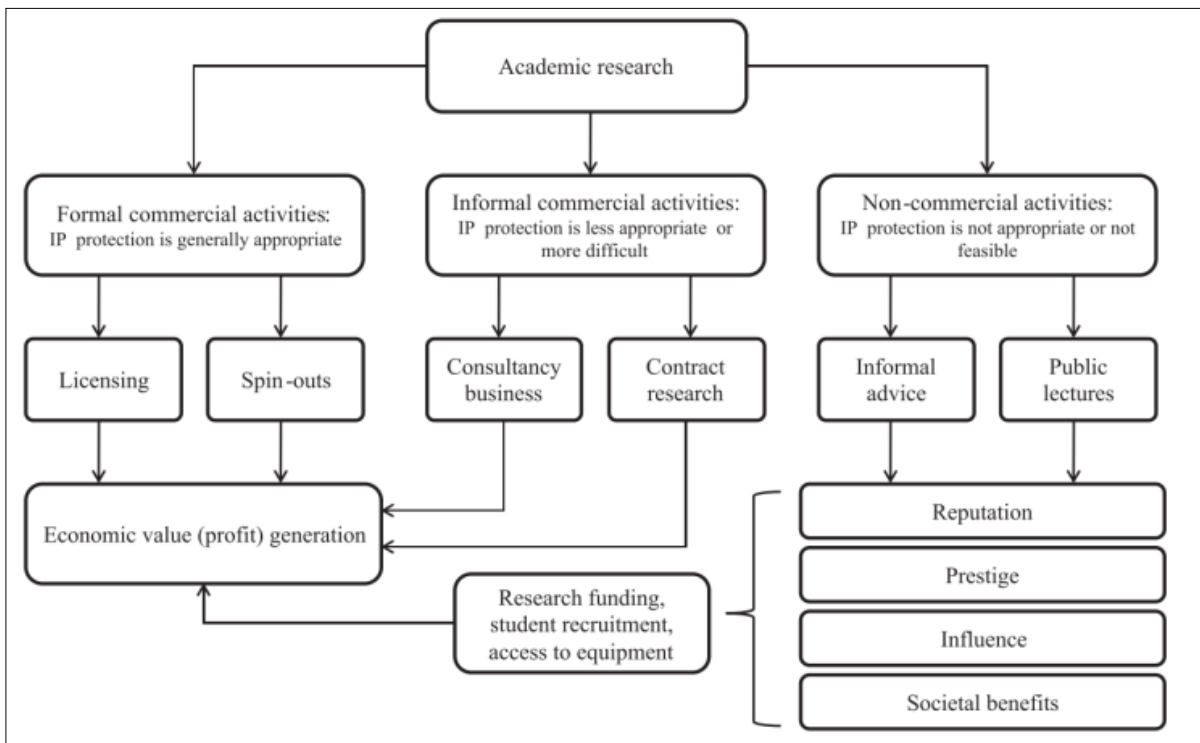
Source: (Abreu & Grinevich, 2013: 412)

4.3. Technological impact

Technological impact mainly refers to research contributions to the creation of products, service innovations, and technological know-how. Such can be measured through indicators such as intellectual properties (patents, licenses), development activities (R&D), and formal collaborations. However, technological impact is found to be very rare and unimportant type of impact to explain the societal contributions from SSH (Abreu & Grinevich, 2013; Bullen, Robb, & Kenway, 2004; Hughes, Kitson, Probert, Bullock, & Milner, 2011). Instead of talking about technical innovation the literature tries to re-focus the debate on innovation by introducing concepts such as *"creative", "social"* and *"civic"* innovation which goes well beyond conventional technology transfer practices (Etzkowitz, 2014; Gulbrandsen & Aanstad, 2015; D. J. Phipps & Shapson, 2009; Aalestad, Acham, Caughie, Moeran, & Holm, 2006). In relation to technology transfer and impact it is further emphasised that technical systems are always embedded in larger social systems. Solutions to technical challenges and problems concerning e.g. clean, sustainable and efficient energy, climate change, transportation, or urban planning often raises questions on the political, social, cultural or ethical conditions as well. These question and challenges can best be solved by including SSH in a broader (sometimes interdisciplinary) understanding of societal challenges (e.g. ALLEA, 2013; LERU, 2013).

4.4. Impact on health and wellbeing

The health dimension generally refers to the impact of research on public health such as life expectancy, prevention and prevalence of illness, and impact on the health care system which is traditionally covered by basic, clinical, and public health research (European Science Foundation,

2012, REF, 2014). In discussions of health impact, it is argued that SSH contribute with more holistic approaches to broad issues on health and wellbeing as well as collaborations with wider systems of social care (e.g. Morton & Flemming, 2013). For example, research on both mental and somatic health issues include disciplines from social science, psychology, and educational sciences, which provide insight into cultural, social, developmental, behavioural, and psychological dimensions. This may include the promotion of wellbeing, the prevention of mental disorders, treatment and rehabilitation of persons affected with mental disorders and so on. It is further suggested that interdisciplinary fields in the arts, humanities and social science can provide insight into the basic human condition as well as questions about responsibility, personhood, and suffering that also influence health and wellbeing (e.g. LERU, 2013). Furthermore, research studies show that arts, design and other cultural products can be a part of therapeutic processes and design of hospital environments, which also constitute important ways in which art and culture research can contribute to health and wellbeing. This may include broader community activities to engage people in thinking about their own health (Crossick & Kaszynska, 2016).

4.5. Social impact

Social impact is often used as abroad term for the many types of impact that do not create economic effects, but contributes with improving social conditions in society such as community welfare, quality of life, behaviour, practices, and other activities of individuals and social groups. In relation to social impact many different links and connections are emphasised. The literature discusses the multiple and diverse ways research engages with wider social goals. For example, the report *"Hidden Connections: Knowledge exchange between the arts and humanities and the private, public and third sectors"* illustrate that if conceptualisations of knowledge exchange processes is broadened beyond technology transfer, richer and more diverse links between research and society can be identified (Hughes, Kitson, Probert, Bullock, & Milner, 2011). The survey study has focused on the Arts and Humanities and show that activities such as informal advice, lectures for the community, attending conferences and participation in informal networks are central activities for understanding the connections between research and society. Related studies show a similar pattern for the social sciences as well (Bastow, Dunleavy, & Tinkler, 2014).

Figure 4.4: Modes of interaction with society
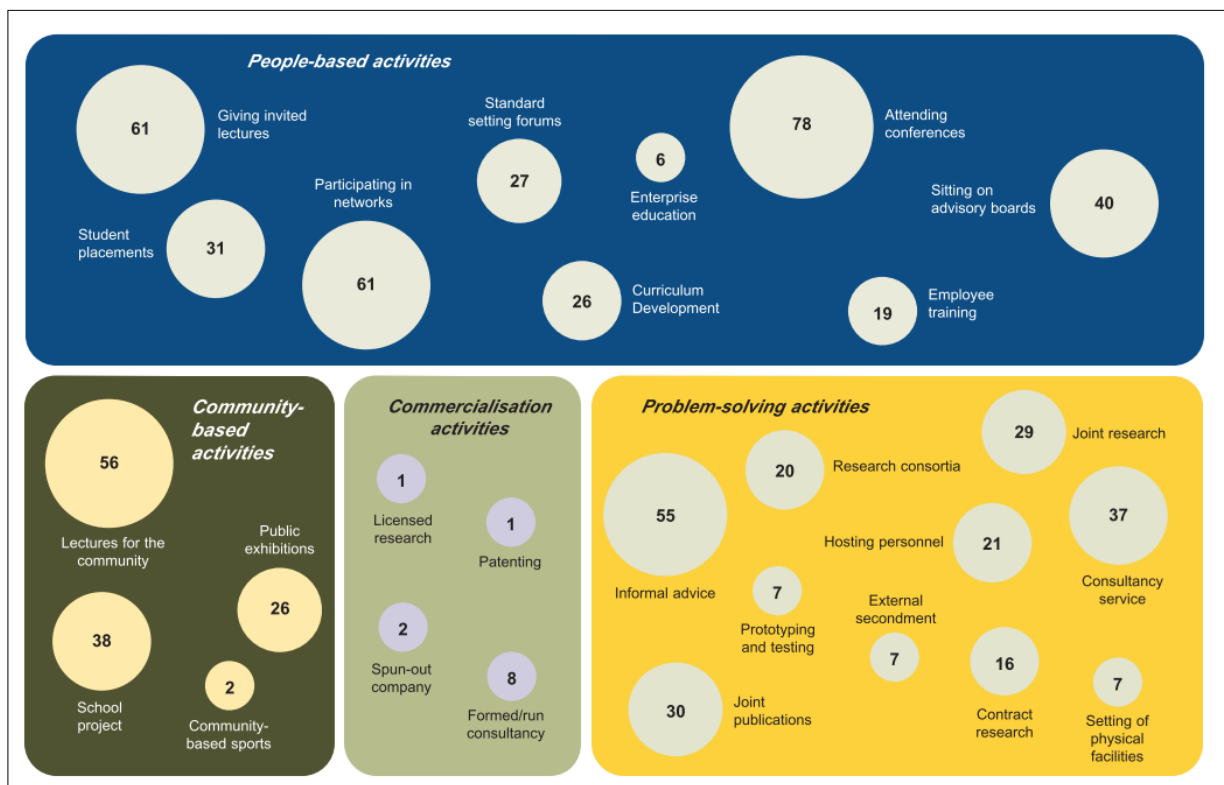
Source: (Hughes, Kitson, Probert, Bullock, & Milner, 2011: 17)

4.6. Educational and broader training impact

In the literature, teaching or training impact is often emphasized as a pathway for SSH impact both *within* and *outside* academia. A large percentage of the population in Europe participates in higher education, and a high proportion of these students are studying SSH subjects (British Academy, 2008). An impact study conducted at the University of Cambridge shows that researchers in SSH place a very high importance on teaching and supervision of university students. Such activities cannot easily be separated from other impact activities. Teaching can for example have an academic impact when a student widens researchers understanding of topics and disciplines and thereby affect generation of new research questions. Teaching at the universities may also have a wider influence to society when students later pursue careers outside academia (Levitt, Celia, & Diepeveen, 2010). In addition to teaching students at higher research institutions, SSH may also have broader teaching and training impacts through contributions made to other learning institutions. SSH researchers may, for instance, contribute to the shaping of national curricula in primary and secondary school. This includes writing textbooks, written works on school students' reading lists, research informed school curriculum content, or development of school teaching methods used in specific subject areas. Researchers may also directly contribute to the training of teaching staff and other professional pedagogical tools and qualifications (Levitt, Celia, & Diepeveen, 2010; European Science Foundation, 2012; REF, 2015a). Looking beyond the educational system, it is also possible to identify a broader training impact linked to the development of skills and capacities of different societal actors e.g. private, public or third sector institutions. Here the concept of capacity building is introduced to describe impact through technical

and personal skills development. This is found to be a very important contribution from SSH as well (Nutley, Walter, Davies, 2007). Indicators specific to educational and training impact include career data for graduates, staff movement between academia and industry, review of documents on research influence on curricula. In relation to concrete skill development and capacity building more qualitative measures can be used to measure the adoption of new practices and behaviour, including development of individual and group knowledge, abilities, and skills.

4.7. Policy impact

Policy (political) impact is mentioned in 178 scientific articles and policy reports. In the literature, specific models and methods which focus on measuring and assessing policy impact are discussed (Boaz et al., 2009; Bornmann, Haunschild, & Marx, 2015; Meagher et al., 2008; Young et al., 2014). Further, a number of empirical studies focus on the specific links and engagements relating SSH to the political sector (Bastow, Dunleavy, & Tinkler, 2014; British Academy, 2008). Policy Impact mainly refers to 1) the active efforts of researchers to disseminate, collaborate, and engage in policy and practice, and in addition 2) how research is taken up at local, national, or supranational levels. Policy impact is thus closely linked to the practice and decision-making processes that take place in the intersection between research and wider societal institutions (e.g. KNAW, 2005; REF, 2014; Flecha et al., 2014).

The literature describes specific channels through which SSH research may inform the development of policy and practice. Research can influence policy by personal interactions and involvement through e.g. working groups, task forces, workshops, commissions, advisory groups, but also through more informal networks and meetings with stakeholders and beneficiaries. Research may also influence organizations through wider outputs and products such as policy reports, reviews, or evaluations written by researchers themselves (Hazelkorn, 2014; SIAMPI, 2014; Flecha et al., 2014). Additionally, SSH research may be cited or referred to in policy reports, white papers etc. (Bornmann, Haunschild, & Marx, 2015). The different connections can have various effects and benefits in society by providing answers to specific questions through modelling, monitoring, and evaluations of policy initiatives, and by scrutinising and analysing policy trends, challenging current paradigms, identifying new approaches and concepts, or by raising a general public awareness of key problems and issues (Young et al., 2014).

When analysing different dissemination and engagement efforts it is often emphasized that research is very much determined by the political context and societal environment. The generation of policy impact tends to involve multiple actors and interests, why research is only able to *inform* policy rather than provide evidence bases or *"clear steer for action"* (Nutley et al., 2007: 37; Bastow, Dunleavy, & Tinkler, 2015). Political contestation, institutional pressures, and vested interests play an integral role in how research is taken up and used. Research has to fit within the political and institutional limits and resonate with specific interest, but it must at the same time provide sufficient pressure to challenge and influence basic policy assumptions and views. In relation to policy impact, it is argued that research often needs to be packaged the right way to attract policy-makers interest. This may include providing credible and convincing practical solutions to specific policy problems (Court & Young, 2006). Policy impact in SSH is not a straightforward task, as social problems often involve multiple social concerns and different types of evidence. The process is never apolitical, since competing values and interests may appeal to specific types of evidence. There is thus always a risk of

the politicization of science and of misuse and manipulation of evidence to promote specific interest. At the same time, there is also a concern of the de-politicisation of politics, in which complex social issues can be obscured or marginalized through the promotion of certain forms of evidence (Parkhurst, 2017). Figure 4.4 is an illustrative example of the different forms of linkages from research to the political sector. The model is taken from a research project containing an empirical analysis of how academic research in the social sciences achieves public policy impacts. The study further investigates how research contributes to economic prosperity and informs public understanding of policy issues as well as economic and social changes (Bastow, Dunleavy, & Tinkler, 2014).

Figure 4.5: Five main forms of government to university linkages
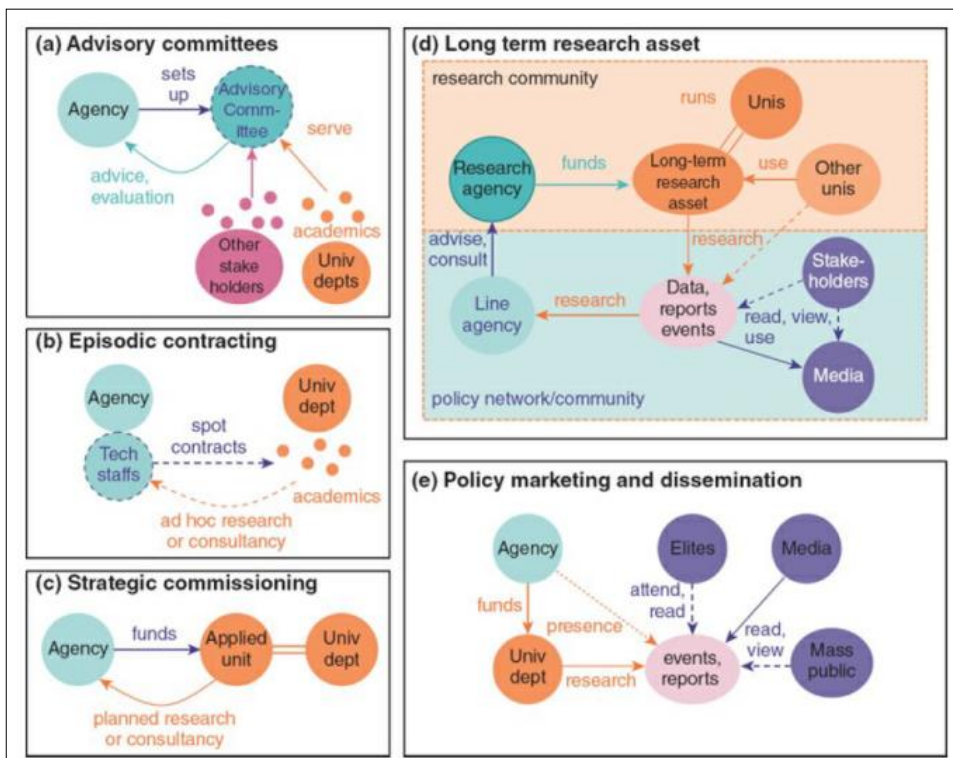
Source: (Bastow, Dunleavy, & Tinkler, 2014)

4.8. Cultural impact

Cultural impact is mentioned in 78 texts and is generally very hard to define in a simple and uniform way. Cultural impact is not discussed extensively in relation to the social sciences, but it is central for the arts and humanities. In formal definitions, cultural impact refers mainly to the preservation of heritage and culture and the contributions to creative industries, leisure and entertainment (e.g. European Science Foundation, 2012; REF, 2012). Research from SSH works towards maintaining knowledge on e.g. languages, documents, artefacts, buildings, traditions, and rituals in relation to various topics such as minorities, linguistics, or local communities. Research makes further contributions to the creative or cultural sector through creative thinking and development of innovative services and outputs. Here cultural impact refers to the effects of activities and outputs generated in close contact with institutions such as museums, libraries, art festivals, theatres, galleries, or private and public industries in entertainment, fashion and tourism (Levitt, Celia, & Diepeveen,

2010; Abreu & Grinevich, 2014). The pathways to cultural impact can be diverse. Often they are associated with broader outputs from research such as books, artworks, design, translations, and visual recordings (Hazelkorn, 2014) or involve different forms of societal engagement or creative cluster collaborations (Etzkowitz, 2014). The different connections and outputs may lead to value and effects such as stimulating creative and critical thinking, the improvement of quality of life, new creative approaches to social issues etc.

Empirical studies concerning the cultural impact of research are quite limited in numbers. Instead, the literature on cultural impact is pre-occupied with determining the value of culture in itself rather than singling out the contributions from research. There exists a large and quite rich literature on the impact of arts and culture that goes beyond this review to account for in detail. The report *"Understanding the value of arts & culture: The AHRC Cultural Value Projects"* summarizes a large part of this literature showing that arts and culture can have effects on many different aspects and sectors in society in contributing to civic engagement, community regeneration and spaces, economy and innovation, health, ageing, wellbeing and education (Crossick & Kaszynska, 2016). It is also found that cultural effects may not be visible and traceable when focusing on single individuals or institutions but only at an aggregate level at which culture, over time, can make an influence (e.g. Stern and Seifert 2008; Belfiore & Bennett, 2010; Crossick, 2006).

To illustrate some of the complexity and the different dimensions associated with art and cultural impact, the Art and Humanities Research Council UK has developed a model describing different types of impact from the humanities. Figure 4.5 below distinguishes "maintenance" and "growth" on the first axis and "economic capital" and "civic capital" on the second. The model describes that research may not always produce societal growth or change but can also be about maintaining knowledge. This knowledge reservoir may then be accessed and disseminated through curricula, public debates, installations etc. Further, the value of research may be oriented towards other types of capital than pure economic gains (AHRC 2009).

Figure 4.6: AHRC model of the impact of arts and humanities research
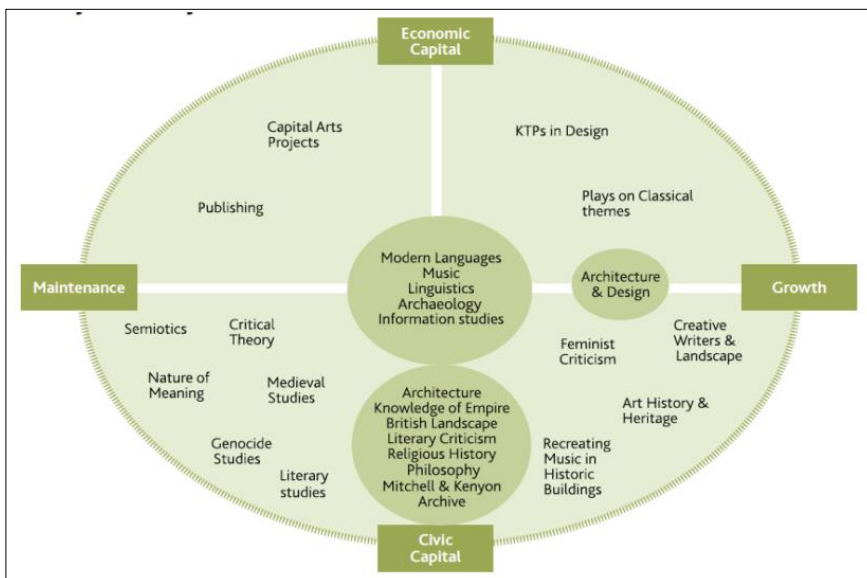
Source: (AHRC, 2009)

4.9. Public impact (value)

Public impact is mentioned in 138 different texts. In the formal impact taxonomies, such as REF UK, public impact primarily refers to the enhancement of public understandings of issues and challenges in society and the impact on public services and legislation. In the scientific literature, the concept of public impact is often replaced by a broader conceptual discussion on how to understand the *public values* of research. The discussion encompasses critical and theoretical reflections on the basic values that are produced by research (Benneworth, 2014; Benneworth & Jongbloed, 2010; Brewer, 2011; Hammersley, 2014; Belfiore, 2014) Bozeman and Sarawitz argue that a basic social theory for science is needed which moves beyond a simple market failure model. This could give science policy a sense of direction on whether research serves specific public values or not (Bozeman & Sarawitz, 2011). They further argue that values tend to receive less attention because of the absence of concrete ways of thinking about them. Thus, research policies should be based on formulated social goals and public values that are *"able to understand the multiple determinants of social outcomes and roles of research as part of the web of institutions, networks, and groups giving rise to social impacts"* (Bozeman, 2003: 12). A similar focus on defining values is introduced by Martha Nussbaum, who highlights the need to reflect on the capabilities one wishes to promote in society. She argues that a narrow concern with national economic growth will neglect important initiatives in research and teaching, such as the promotion of critical thinking, sympathy towards marginalized groups, and competence in dealing with complex global problems (Nussbaum, 2010). A capability approach can be seen as a useful theoretical framework for describing the fundamental values and substantive freedoms which research can be oriented towards enhancing. The potential to live to old age, engage in economic transactions, or participate in political activities may replace a narrow focus on individual utility (happiness, desire-fulfilment, or choice) or access to resources such as income and commodities (ibid.).

4.10. Main directions and distinctions

From the chapter on impact and pathways it is possible to draw some distinction on how impact is understood and achieved (see figure 4.6).

Figure 4.7: Main directions and distinctions in relation to impact classifications and pathways

Academic impact	Technology & economic impact
	Broader impact
Short term impact Connective impact	Long-term impact Cumulative impact
Negative, disguised impact	(Normative, value based) Positive impact
Informal links	Formal links
By product (broader)	In person
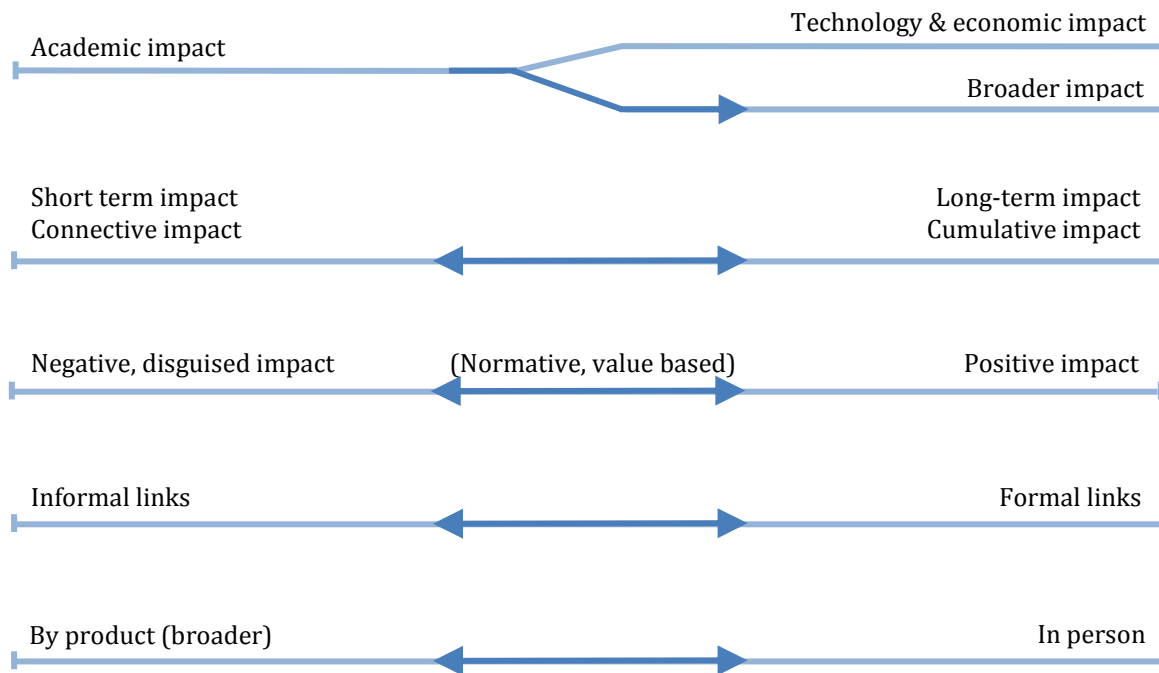
First of all, a basic distinction can be made between academic research and the societal impact and relevance of research. Academic impact mainly refers to the scientific excellence and quality of research traditionally measured through classical peer review and quality indicators related to publications and patterns of citation. In contrast, societal impact refers to the wider influence of research in society. The methods used to measure societal impact varies according to the specific type of impact ranging from economic, technical, health, social, policy, educational, cultural, or public impact.

A second distinction can be made between short-term and long-term impact. It is found that impact can happen already at the planning phase of research or as part of the ongoing research process. If an assessment comes too late, certain types of impacts may have already come and gone. The transience of specific types of procedural and slowly growing impact makes them hard to account for, as they may not be captured by a current snapshot of e.g. policies debates (Klautzer et al., 2011). Related to short-term impact, different concepts such as connectivity, links, and productive interactions are introduced as a way to explain the dynamic interactions and joint efforts that exist between research and actors in society. Research is seen as part of a larger circuit or network in which knowledge is absorbed, transformed, and exchanged by various actors both within and outside academia. Understanding and describing these connections may provide a better evidence base for documenting impact and the flow of knowledge that emerge during the process of knowledge creation. Descriptions of such connections may also be helpful in steering an impact and assessment study towards the long-term effects and impact of research.

As Simon Bastow and colleagues states: *"The problem of hunting for an apparently series of causal processes whereby academic research is done at point A and has visible impact at point B is problematic. The problem is that this assumed causality is desperately hard to prove, not to mention isolate in separation to many other factors or causal influences that come to bear on policy decisions"* (Bastow, Dunleavy, & Tinkler, 2015: 28). Research in the social science and humanities is often described as a cumulative and collective process originating from various contributions and leading to gradual changes (Oancea, 2015, Klautzer et al., 2011, Meagher, Lyall, & Nutley, 2008). Impact potential may be captured by looking at the different interactions and relations which integrate research with the larger society while at the same time acknowledge that some types of impact may be very difficult, if not impossible, to track down.

A third distinction can be made between negative and positive impact. It is found that SSH research influence society in less visible ways and can be hard to account for in ex post evaluations using pre-defined criteria and fixed indicators. This may create a bias towards impact that is easier to account for. It is also argued that assessment criteria and indicators are always normative. Brewer (2011) speaks of "disguised" impact that occurs when the results of basic research are rejected - not because they are irrelevant or uninteresting, but because they contradict assumptions in society and the political field. There may be sections of public research that have potential uses but are not integrated into society, simply because results and insights contradict values and interests. Disguised impact occurs when the impact of research is either hidden or not recognized (Brewer, 2011). Successful as well as unsuccessful impact cases depend on a complex set of prerequisites constituted by a combination of research results and social readiness, interests, and values (Rip, 2015). Hammersley (2014) describes a number of situations in which the desire for research impact does not create the expected positive changes. For example, behavioural psychological or economic theories can provide information that can be used to justify widely different social policies. This observation emphasises that the impact assessment will differ according to interest and normative horizons - and that impact cannot be assessed without background in a wider value theory. To avoid a narrow perspective of research that produce easy-to-measure impact, impact assessments require considerations regarding the "public values" which determine what is desirable (and undesirable) effects of research (Hammersley, 2014).

In relation to pathways to impact it is found that SSH research engage with society in less formalised ways and are often embedded in local environment and practice settings where impact is less easily codified (Hughes, Kitson, Probert, Bullock, & Milner, 2011; Olmos-Peñuela, Molas-Gallart, & Castro-Martínez, 2014; Abreu & Grinevich, 2014; Spaapen & Drooge 2011; Pilegaard, Moroz, & Neergaard, 2010). Thus, it is problematic if an impact assessment exercise only looks at research outputs and engagements which are easy to account for, such as scientific publications, citations, contracts, patents, licenses, and income sharing as this may neglect important relations between research and society.

A final important distinction can in be made between interactions with society that happen in person or by product (Spaapen and van Drooge 2011). On the one side, societal impact can happen through products when researchers write scientific articles which are later taken up, cited, and used in a wider societal context. Here, a central concern is that indicators of scientific products to the wider society will only be based on the citation of scientific articles (see discussion of altmetrics in chapter 3). Research from SSH are generally found to produce a wide range of different products such as books, translations, artwork, newspaper articles, curricula, reports etc. These are sometimes co-created with

societal actors and may feed directly into policy and practice. On the other side, researchers may also engage with society through their personal capacity in meetings, interviews, media appearance, and workshops etc. Researchers may participate as advisors or experts on specific subject areas alongside other societal actors. These types of connections are found throughout the SSH landscape.

5. Drivers and enablers of societal impact and the co-production of research

In the literature review different ex ante drivers are identified which may advance knowledge transfer activities and impact in social science and humanities. Some of these are based on empirical and conceptual research, while others are introduced as toolkits and recommendations from different research and policy institutions. When going through the different drivers and enablers of societal impact, it is important to remember that the recommendations to some extent reflect a normative interest in how research is to be organised and performed. The barriers and enablers of research impact has to be understood as constructs that has arisen from a political agenda concerned with the question on how to understand the roles of researchers in society. With issues such as these, it is hard to draw definitive conclusions. This is also mirrored in the literature that mainly consists of conceptual frameworks and reflective contributions introducing different perspectives of how to drive societal impact.

5.1. Funding and reward system for societal impact from SSH

It is emphasized by several contributions that the generation of non-academic impact is not sufficiently recognized and supported by current academic reward systems and funding schemes. This is highlighted in a survey with humanities researchers presented in the AHRC Report "Hidden Connections: Knowledge exchange between the arts and humanities and the private, public and third sectors". Here the primary constraints that academics perceive as hindering their interactions with other organizations are lack of time and difficulties caused by internal bureaucracy (Hughes, Kitson, Probert, Bullock, & Milner, 2011). It is argued, that if the generation of non-academic impacts were viewed as valuable, more effort would be put into processes leading to impacts. Missing incentives and reward systems can lead to barriers such as a lack of resources spent on impact related activities since impact activities in general is given a low priority by researchers (Meagher, Lyall, & Nutley, 2008; Nutley, Walter, &Davies, H., 2007). The report "Maximizing the impacts of your research: a handbook for social scientists, published by the LSE Public Policy Group, also states that demand and supply mismatches as well as insufficient incentives are main reasons for the gaps between academic work and external impacts. The report states that there often are *"…too few or too weak incentives, either for universities to undertake applied or potentially applicable research, or for businesses or government users to provide active, consistent demand and associated support for universities' applied efforts"* (LSE Public Policy Group, 2008: 173). The report also states that there may be mismatches in how governments allocate research funding support in relation to the economic importance of different sectors. As an example, it is mentioned that "*85 percent of the UK economy is based around the service sector but still 84 percent of research funding flows into the STEM disciplines, covering all the physical sciences"* (ibid 167). Following this discussion, the report repeats a concern that politicians in the UK and US may be overly pre-occupied with an outdated model of science that focuses disproportionately on research areas related to manufacturing and technology industries. A greater awareness should be placed on human dominated systems in society involving social learning and development of new service products etc. (LSE Policy Group, 2011).

In a broader European context, there are several political initiatives working towards a better integration of SSH research. Within these, focus is on the potential contributions of Social Sciences and

Humanities research in relation to solving the grand challenges in interdisciplinary projects. The Europe 2020 Growth Strategy and the Horizon 2020 Framework Programme for Research and Innovation both focus on new and more interdisciplinary solutions to tackling societal challenges. In this perspective, knowledge from heterogeneous sources must be bundled in order to harvest benefits from different approaches and methodologies. This way, research is supposed to move beyond so-called research silos that isolate diverse sources of knowledge (Schindler-Daniels, 2014). Similar LERU has published an advice paper, *"The future of the social science and humanities in Europe"*, which recommends that the European Commission includes SSH research in the research programme. The LERU paper makes the claim that questions related to e.g. health, sustainable agriculture, efficient energy or integrated transportation cannot be solved without looking into cultural, social, developmental, behavioural, and psychological dimensions. Especially, the importance of understanding the way in which traditions, religious beliefs, socio-cultural differences, gender, age, and aesthetic preferences influence the distinctive nature of a specific area and societal challenges as well as geo-graphical influences and political strategies (LERU, 2013). Science Europe has made similar arguments in the policy report "Embedding Social Sciences and Humanities in the Horizon 2020 Societal Challenge". The report stresses that *"it is essential that mistakes from previous Framework Programmes are avoided, where SSH was often included at a late stage in planning scientific programmes"* (Science Europe, 2013: 2).

5.2. Academic training in societal impact production

It is frequently suggested that researchers lack the training necessary for achieving active collaborations and partnerships as well as the communication skills required for disseminating research to external actors and audiences. In a discussion paper, Andrew Pettigrew talks about the double hurdle of research: that researchers have to publish high quality papers in academic journals *and* achieve outputs accessible for practitioners. He problematizes that traditional research educations primarily focus on intra-academic challenges – that is, the mastery of methods and production of research papers. He questions whether this model prepares the researchers for the challenges that lie beyond the academy (Pettigrew 2008; Pettigrew 2011). Paul Ellwood et al. also advocates for university education to prepare researchers to a better understanding of how to contribute to both theory and practice. This may require additional training, including: How to understand different types of engagement or develop long-term relationships and networks with external actors (Thorpe, Eden, Bessant, & Ellwood, 2011: 428). Ellwood et al. argue that research education programmes should be informed by a more holistic notion of scholarship, which would enable social researchers to make more informed choices about the contributions they wish to make throughout the course of their career (ibid).

The concerns about the lack of skills, and need for training, are echoed in more empirical studies included in this review. In a, cross-sector review Isabel Walter, Hew Davies, and Sandra Nutley find that an often-mentioned barrier for working in partnership is the lack of skills of those involved in the collaborative process. They find that researchers participating in partnerships often have difficulties in balancing agendas of partnerships and power differentials that both need to be recognized and managed (Walter, Nutley, & Davies, 2003). A similar qualitative interview study on humanities-industries partnership by Elizabeth Cassity and Ien Ang conclude that researchers in the humanities often lack the experience and established contacts necessary for successfully engage in partnership

and Mode 2 collaborations (Cassity & Ang, 2006). In the article "An Auto-Ethnographic Perspective on Academic Entrepreneurship: Implications for Research in the Social Sciences and Humanities" Morten Pilegaard, Peter Moroz, and Helle Neergaard reaches similar conclusions based on a qualitative study of successful spin-offs from a university humanities department. In the study, they find that researchers often need what they call "twin skills" in order to balance research and commercial goals and to mediate between business and research-based cultures and worldviews (Pilegaard, Moroz, & Neergaard, 2010: 56). Pilegaard et al. find that twin skills are necessary for successful collaborations and specific requirements may vary across different types of research and collaborations. In the social sciences, collaborations are characterized as *"less codified, limited in terms of transmitting tacit knowledge through networks and personal contact, and less likely to influence firm creation"* (ibid. 57). Pilegaard et al. argue, that knowledge entrepreneurship from these types of research could benefit from a focus on the context of communities and entrepreneurial activities at a microenvironment level. The generation of business networks and community support require skills that are operational throughout the life cycle of the spin-off process (ibid.)

Figure 5.1: A general process model of the University spin-off
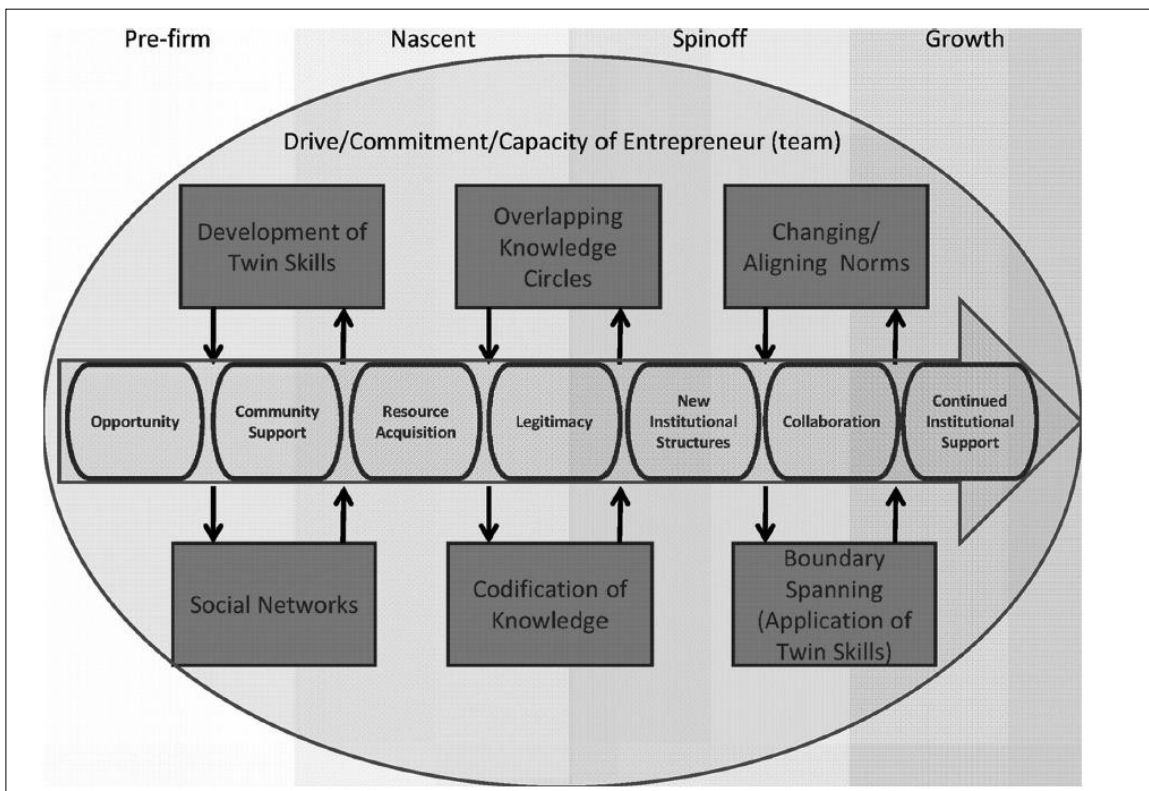
Source: (Pilegaard, Moroz, & Neergaard, 2010: 57)

In relation to the policy domain there is a substantial literature on how to influence and deliver scientific policy advice, which is often described as not a straightforward matter (see section on policy impact). In the report "Punching our weight: the humanities and social sciences in public policy making" thus recommends developing and providing support for transferable skills training for especially postgraduate research students and postdoctoral researchers. Researchers have to learn how to create awareness of findings in specific research fields, adapt appropriate methodologies, and

be capable of designing and managing research. But they also need training in broader communicating of research-based evidence to policy audiences (British Academy, 2008: xii).

5.3. The roles of research in the knowledge translation value chain

The literature highlights many different roles that researchers and societal actors can play in generating societal impact. Pathways to impact are often described as very complex consisting of multiple stages. Individual researchers or research organisations do not necessarily play a part or role in all of them. Basically, it is found that it takes collective and communal efforts of researchers and stakeholders to insure impact. In the process, some researchers and research institutions may be mainly involved in theory development, reporting basic research results, or work towards applying theoretical knowledge to specific practice settings. Other researchers and research institutions may be more involved in wider dissemination efforts, working towards translating and adapting basic research to specific societal contexts or developing useful solutions or products for different societal actors. At the same time, researchers may work closely together with external actors or participate in public debates, creating awareness, or challenging dominant views (Young et al., 2014). The literature finds that a simple distinction between basic and applied research is often misleading, as different forms of research has the potential to respond to social needs in different ways (Potholes and Schadauer, 2009). Basic research may, however, require more steps before potential social impacts is realised, or may not always lead to specific end-user benefits and products (e.g. Spaapen and Drooge ,2011; Sarah Morton, 2015; Kok and Schuit, 2012). An increased awareness towards the entire knowledge translation chain is needed in order to appreciate the different roles of research and potential partners and users. Research goes through a multitude of steps in order to become relevant to society. To capture this, a mix of theorising and empirical studies may be needed alongside critical research.

To illustrate the different dimensions of the knowledge translation value chain, Richard Thorpe and colleagues have developed a valuable conceptual framework. The framework aims to include researchers' contributions to practice over time and thereby indicate the range of roles required to translate research to the wider society (Thorpe, Eden, Bessant, & Ellwood, 2011; Ellwood, Thorpe, & Coleman, 2013). The framework is based on Ernest L. Boyars (1990) model of scholarship, which distinguishes between different roles in research related to discovery, integration, application, and education. A researcher engaged with scholarship of discovery is concerned with the development of the stock of knowledge and therefore focuses on what is to be known in research. In contrast, a researcher working with scholarship of integration focuses on what findings of research mean in a wider context. Here, contexts and connections that help academics focus on specific problems are emphasised as opposed to research that remain internal to a single discipline. Scholarship of application moves away from investigation and synthesis entirely, and suggests that individuals need to take responsibility and act on the issues they observe. These actions might take the form of application of ideas in academia or beyond, as is characteristic of Mode 2 research (Gibbons, Limoges, & Nowotny, 1994). Lastly, scholarship of education covers activities of teaching and education of future students with a focus on transforming, extending, connecting, and integrating knowledge. Boyer's argument is that all these four perspectives are interlocked and may all be pursued by individual researchers. But they can also be handled at an aggregate level, e.g. in research groups or universities (Boyer, 1990). These distinctions indicate that there are many different roles in research

which are equally important and may be pursued by different actors over time. On this background, Thorpe and colleagues present a model that describe the process of knowledge production and impact as running through a number of different stages. Researchers are only part of the translation process from research to practice, as external actors are involved in co-producing the outputs and products that is integrated into society. The pathways from research to impact can take multiple forms. It is argued that research institutions need to acknowledge that there exist different phases in the knowledge translation chain and that a sole focus on scientific production alone is counterproductive (Thorpe, Eden, Bessant, & Ellwood, 2011). It will most often require different skills, expertise, and know-how to make research useful in a wider societal context.

Figure 5.2: Knowledge translation value-chain and institutions operating at different places
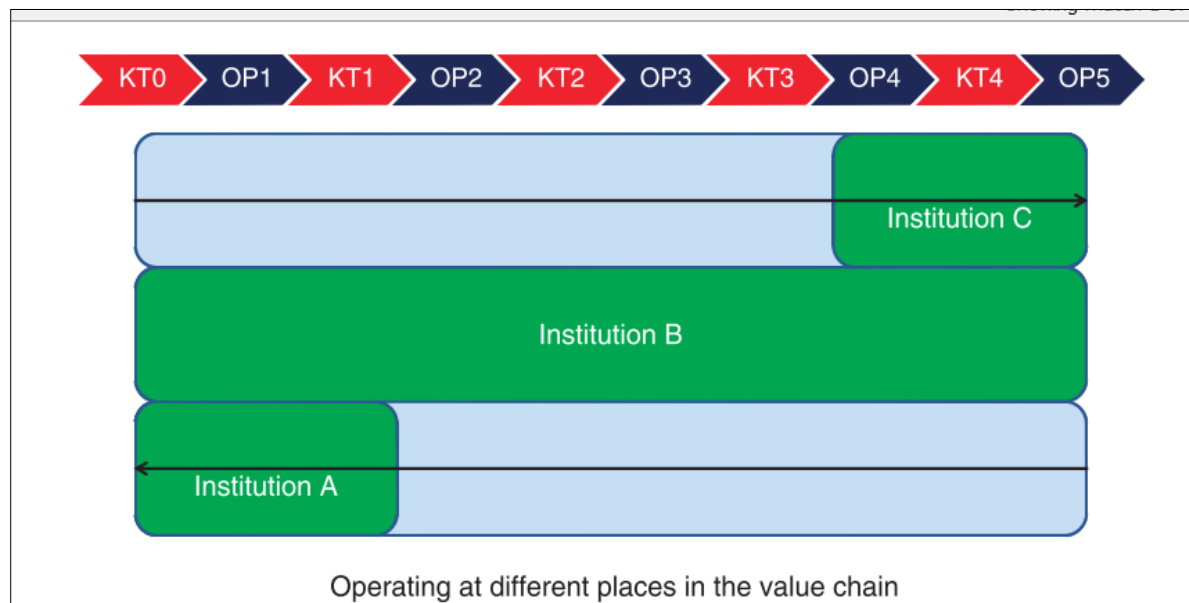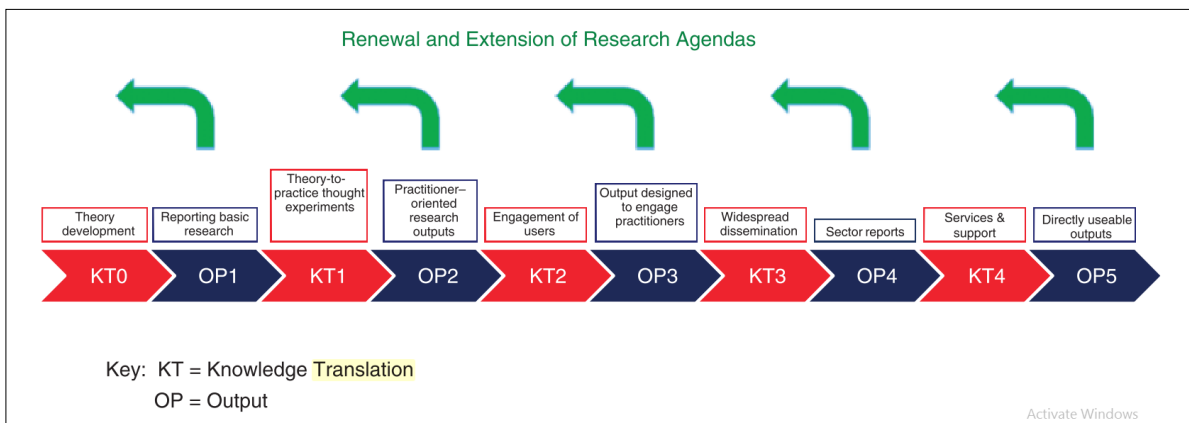

Source: (Ellwood, Thorpe, & Coleman, 2013)

5.4. The different forms of usefulness and impact
The literature emphasises the need to expand the notion of which types of research can be described as valuable, applicable or relevant to society. A simplistic understanding of usefulness risks neglecting

specific type of activities, and outputs from research, that do, in fact, generate various societal effects and value. Societal contributions from research have traditionally been understood and directed toward technology transfer and activities encompassing patenting, licensing, and the creation of spin-off firms and technology parks (Venditti, Reale, & Leydesdorff, 2013; Trencher, Yarime, McCormick, Doll, & Kraines, 2014; Perkmann et al., 2013). However, in the literature there are numerous attempts to expand the notions of the different pathways and types of engagement which go beyond economic and technological dimensions. Many of these have been discussed in the previous chapter about variations in the use of the impact concept/construct. For instance, Laura Meagher and colleagues introduce five categories of impact from research: *Instrumental impact* defined as tangible products or services taken up by companies, policy-makers, and practitioners. *Conceptual impact* generating new understanding or raising awareness among potential users of research findings. *Capacity building* including training or developing collaborative activities and cultural changes. And, finally, *enduring connectivity impacts* that can shape both willingness to engage in knowledge exchange activities and the establishment of sustainable relationships between knowledge producers in and outside universities (Meagher, 2009). Alis Oancea and John Furlong (2007) in a similar way reflect on the different expressions of excellence in the article "Expressions of excellence and the assessment of applied and practice-based research". They argue that quality in applied and practice-based research cannot be reduced to narrow definitions of science, impact, or economic effects. Drawing on Aristoteles, they distinguish between three domains of excellence in applied and practice-based research: *episteme* (knowledge that is demonstrable through valid reasoning); *techne* (technical skill, or a trained ability for rational production); and *phronesis* (Practical wisdom, or the capacity to act truthfully and with reason in matters of deliberation, thus with a strong ethical component) (Oancea & Furlong, 2007). This differentiation is considered a discursive tool to go beyond traditional oppositions between academia and policy, theory and practice, blue-sky and applied research in order to show that there exist different types of quality, modes of knowledge, and rationality which contribute to the relationship between research and practice (ibid. 124). This is opposed to different concepts of scientific excellence that forms the domains in which they should be judged.

Figure 5.3: Domains of quality
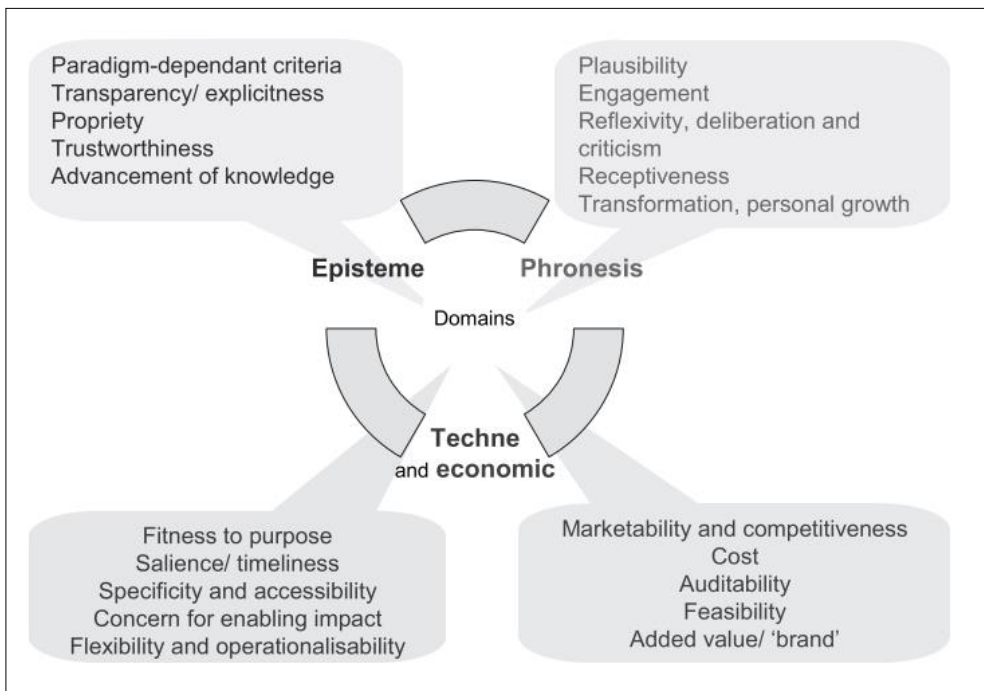
Source: (Oancea & Furlong, 2007: 133)

5.5. The co-production of research

In the literature review the concepts of co-production and co-creation is used in a variety of policy reports and academic articles. Both concepts are vaguely defined and are often used synonymously. Basically, there are two meanings of the word co-production: 1) Co-production of public policies based on collaborations and joint production, and 2) co-production of science and innovation referring to how scientific knowledge is embedded in and influenced by social practices, identities, norms, conventions, discourses and institutions (e.g. Jasanoff, 2004). Co-creation as a conceptual framework is most often linked to the former literature, i.e. the co-production of public policies, designs processes etc. Co-production and co-creation are frequently used alongside concepts such as academic entrepreneurship, engaged scholarship, action research, public-private collaborations, community partnerships, etc. In the present context, however, the concept is used to describe research activities in which scientists are engaged, and actively co-operate, with external actors in different societal sectors, e.g. industry, policy, and local communities. At the same time co-production is used in conjunction with a larger family of concepts such as knowledge transfer, knowledge exchange, knowledge uptake and knowledge mobilization that describes the way research is being used and integrated in society. In this context, co-production refers to a non-linear understanding of research impact. The key point is that the societal impact of both basic and strategic research does not occur in a social or cultural vacuum, and is not simply transferred to society. Impact is realised in a network of interacting actors, interests and institutions.

Generally, the literature on co-creation in SSH is characterized by a strong emphasis on the non-linearity of research utilization as well as non-linear approaches to the research process itself. Research utilization and value-creation do not take place along a predefined and linear pathway

starting from academic knowledge production and extending through knowledge application to uptake and commercialization. Rather, research processes that lead to impact involve the entire value chain. This value chain is characterized by value-adding interactions throughout the research process (e.g. user engagement, dissemination, networks, consultancy) as well as an understanding of context (e.g. policy relevance, user receptiveness, timing, financial and political issues). All of these factors co-determine the likelihood that a particular piece of research is taken up and applied in society. No individual agent in the translational process is responsible for the uptake of knowledge: producing, circulating, mobilizing, and absorbing knowledge is the collective responsibility of multiple agents and networks. In effect, partnership approaches to research and innovation highlight the need for inter-organisational collaborations as well as person-to-person interactions that link researchers to other societal actors. These interactions are described by quid-pro-quo arrangements amongst the partners in a way that research involves mutual benefits to several partners. In some cases, this leads to conflict with other, competing frameworks for understanding and incentivizing impact. For instance, Kellard & Śliwa (2016) discuss the links between research impact and a variety of contextual factors. They show that the idea of direct links (inherent in the UK Research Excellence Framework) between impact and the work of academics sometimes can be very difficult if not impossible to highlight. *"The construction of knowledge in the social sciences usually follows from debate that takes place amongst a broad community of scholars; scholars who are located across many institutions... Hence, in contrast to the 'hard' sciences, it becomes questionable whether drawing a direct link between impact and the work of a single or group of scholars within one particular university is appropriate."* (Kellard & Śliwa, 2016). In this context, co-creation may be a better and more sensitive way of describing the multiple actors and conditions that need to be aligned in order for research impact to occur.

5.6. Co-creation and stakeholder involvement

A recurrent theme in the literature is that for research to become relevant to society it needs to evolve through close integration of potential research users. This position is described in different ways throughout the literature. Several contributions highlight how collaborative knowledge production involves academic researchers as well as external partners in solving specific problems and challenges. Typically, these approaches argue that a necessary precondition for high impact scholarship is the active inclusion of external partners in the research design and research process. It is often emphasised how engaged scholarship needs to depart from the traditional linear model of innovation (stable transfer of knowledge from one sector to another) and instead stimulate interaction and collaboration as an active means of closing the relevance gap between research and the needs of society (Durose, Beebeejaun, Rees, Richardson, & Richardson, 2012). Generally, the existing literature on co-production is dominated by conceptual contributions, that is, contributions consisting of theoretical models of collaboration between academics and research-users. Empirical and ethnographic case studies are less frequent. Several authors acknowledge that in order to enrich the conceptual framework more empirical studies are needed in the future (e.g. Morton 2012, Reale et al. 2014).

In the political science literature on co-creation and collaborative knowledge production focus is primarily on barriers for cooperation with policy-makers. For example, The British Academy (2008) looked into the challenges of providing better SSH inputs to public policy making. Here models of co-creation are highlighted as a means to addressing societal challenges identified in partnership with

policy makers and researchers. For this to happen, the Academy foresees an important role for research intermediaries and the development of effective communication skills as well as higher mobility (secondments) between academy and policy (British Academy, 2008).

In the public management literature, there are several reflections on what drives partnership approaches to research and innovation, and why working closely with end-users may increase research impact. We also find discussion of the risks and benefits of engaging in different types of partnerships. For example, Duijn et al. (2010) talks about co-produced reflective knowledge that is grounded in 1) the researcher's ability to explore how things work in general and, 2) the practitioner's knowledge of how things work in a specific situation. Together, these two approaches contribute to the management of complex public sector projects. In this process, researchers must bear some of the responsibilities for the outcomes of the projects in which they take part, while policy practitioners, on the other hand, must leave room for research-based expertise beyond simple problem-solving (Duijn, Rijnveld, & van Hulst, 2010). Similarly, Antonacopoulou (2010) introduces practice-relevant scholarship as a baseline for accelerating the societal impact of research. In this context, a greater sensitivity towards delivering impact trough collaboration is needed. Scholars and external partners co-create knowledge through the development of a shared understanding of the research subject, which can help overcome the perennial problem of translating ideas into action (Antonacopoulou, 2010). O'Brien et al. (2013) introduce a framework of participatory interdisciplinarity, which describe the research process as an integrated contribution of different disciplines with contrasting paradigms, combined with significant stakeholder participation (O'Brien, Marzano, & White, 2013).

In the academic entrepreneurship literature, several empirical studies emphasize the different types of engagement and benefits that may occur when researchers co-create and co-produce knowledge and solutions in partnership with private organizations (Perkmann et al., 2013). For example, Cherney et al. (2013) explores the realities of knowledge co-production in the social sciences through a qualitative interview study with academic researchers and industry partners. The study is concerned with projects involving collaborations between higher education researchers, government, and non-governmental organizations. The study finds that social trust plays an important role in generating and sustaining synergies between academic researchers and policy makers and practitioners. It also finds that the investment in research translation is important for successful collaborations and that partners needs to be involved from the beginning in order to benefit fully from shared projects (Cherney, Head, Boreham, Povey, & Ferguson, 2013). A survey conducted by Abreu and Grinevich. (2014) highlights the specific characteristics of the academic environment in the creative arts which influence the nature of entrepreneurship in the field. The study finds that the following characteristics are important for accelerating impact through co-creation: a practice-based approach to research; the role of networks, particularly networks linked to teaching; the importance of non-monetary rewards; and the role of proximity. The last point refers to the fact that local or regional research collaborations are more likely to occur in SSH in comparison to research in other disciplines (Abreu & Grinevich, 2014).

There is disagreement regarding the extent to which external partners should be involved in the research process. Likewise, there is disagreement about which type of interactions should be described as co-creation. In the literature, we find different typologies that emphasize the involvement of external actors (Robinson & Tansey, 2006; Martin, 2010). Robinson and Tansey, for instance, distinguish between dialogical research (which seeks to establish some form of conversation between

researchers and the researched subjects) and transformative research where the purpose is to engage users already when defining the problem (Robinson & Tansey, 2006: 152). Ross et al. develop a three-part typology that goes from formal support to integral partnering in the research process. Partners may simply endorse and provide input to the research design, or they can be a significant partner throughout the entire research process and shape the way research is carried out (Ross et al., 2003). Martin develops a similar typology in the shape of a continuum from informants to co-researchers (see table 1). He argues that practitioners may be involved in different roles and types of engagement, and the more engaged they are at each of these stages, the more likely it is that the research will meet their needs and, thus, have impact (Martin, 2010).

Figure 5.4: Modes of co-production of research

Utilisation Academic independence		Design				Evidence gathering		Analysis		Dissemination	
		Initiation	Scoping and specification	Commissioning	Methodology	Literature review	Data gathering	Processing evidence	Reporting	Publication	Learning
Informant							X				
Recipient							X				X
Endorser			X				X				X
Commissioner		X	X	X	X		X			X	X
Co-researcher		X	X	X	X	X	X	X	X	X	X

Source: (Martin, 2010: 214)

Another disagreement relates to the extent to which researchers must have direct and formalised relations that delivers benefits to users. As discussed above, partnership approaches to research and innovation often highlight the need for inter-organizational collaborations, often person-to-person interactions that link researchers to other societal actors. These interactions are described by quid-pro-quo arrangements amongst the partners in a way that research is often of mutual benefits to several partners at the same time. In the literature and among different frameworks knowledge transfer activities is frequently described as an interactive process, where it is often impossible to isolate SSH contributions (Bastow 2015; SIAMPI, 2011). Knowledge from SSH can be absorbed and internalised into professional tacit knowledge and blended in with many other sources of knowledge (experience, anecdote, received wisdom, lay knowledge etc.) it is argued (Meagher, Lyall, & Nutley, 2008). For instance, Kellard & Śliwa (2016) discuss the links between research impact and a variety of contextual factors. They show that the idea of direct links (inherent in the UK Research Excellence Framework) between impact and the work of academics sometimes can be very difficult, if not impossible, to capture. *"The construction of knowledge in the social sciences usually follows from debate that takes place amongst a broad community of scholars; scholars who are located across many institutions. Hence, in contrast to the 'hard' sciences, it becomes questionable whether drawing a direct link between impact and the work of a single or group of scholars within one particular university is appropriate"* (Kellard and Śliwa, 2016). Similarly, Jack Spaapen and Leonie van Drooge distinguish between interactions involving direct personal contact and interactions via media or material products such as, texts or artefacts such as exhibitions, models, or films (Spaapen and Drooge, 2011). They emphasize that the latter types of interactions may be less predictable, since a publication may

lead to consultancy contracts and further long-term collaborations (ibid.). A similar point is put forward by Maarten Kok and Albertine Schuit, who also emphasise that links between research and society may change and lead to new competences, behaviours and relationships among the involved actors (Kok and Schuit, 2012). In a broader context, co-creation may be a better and more sensitive way of describing the multiple actors and conditions that need to be aligned in order for research impact to occur that does not necessarily happen through direct and formalised links.

5.7. Bridging cultures and establishing trust

Several contributions highlight the need to overcome difficulties in the different understandings and interest of academics and potential users and beneficiaries. SSH research is less likely to be used where findings are controversial and upset the status quo, or simply when other sources of information are valued more highly. This may lead to *neglected impact*, which is rejected not because it is wrong, but due to its opposition to current norms, policies, or government objectives etc. (Brewer, 2011). In the article "Making an impact: New directions for arts and humanities research", Hazelton points out that research from the art and humanities is predominantly a curiosity-inspired endeavour "which does not easily lend itself to user inspired team-based projects. Results cannot be simply codified into new products and services" (Hazelkorn, 2014: 36).

To overcome these challenges some contributions highlight the need of "de-siloing" research and encouraging more joined-up scholarship that can help facilitate and overcome cultural differences. Kevin Orr and Mike Bennett describe how co-produced research is always an inherently political process involving negotiations between members of different "tribes". Bridging gaps between communities involve many challenges such as dealing with the political issues that arise between members of the partnership, who may have different interests, expectations and priorities vested in the process. The politics of co-produced research thus involves balancing very diverse interpretations as to what constitutes good research and impact (Orr & Bennett, 2016).

The LSE Policy group, for example, finds that businesses and academia may also be prejudiced towards each other's motives. On the one hand, business commentators believe that academics do not always empathise with the difficulties and struggles of businesses operating in a competitive environment. On the other hand, academics tend to believe that businesses or government officials are ignorant of, and under-value, relevant theoretical knowledge. In relation to evidence-based policy-making, academics may feel that political groups risk degenerating into a search for short-term benefits. To overcome these prejudices, it is emphasised that fostering cultural convergence requires long-term encounters between university researchers and their potential network partners in business or government (LSE Public Policy Group, 2011).

5.8. The absorptive capacity of research users

A central challenge in relation to creating societal impact is the (lack of) absorptive capacity of the relevant knowledge users. In the literature, we find several uses and references to the concept of absorptive capacity (e.g. (Channer, Owens, & Lee, 2013; European Science Foundation, 2009; Gulbrandsen & Aanstad, 2015; Martin & Tang, 2006). The concept was initially introduced by Wesley Cohen and Daniel Levinthal in 1989 and refers to an organization's ability to identify, assimilate, and exploit knowledge (Cohen and Levinthal 1990). There is a substantial literature on the concept of

absorptive capacity (Lane et al., 2006) and it is well beyond this review to account and explore this in detail.

Nevertheless, the notion of absorptive capacity is fundamentally based on the idea that organizations need the right (distributed) cognitive structures and learning capabilities in order to make full use of existing knowledge. Absorptive capacity can be understood as the potential for individual knowledge transfer activities across different units both within and outside an organization. Thus, effective communication, and a shared language between the involved actors, is highly important. The concept of absorptive capacity further highlights the need for complementary expertise as well as developing strong networks and relationships which increase the potential for integrating new knowledge. Additionally, other factors may influence absorptive capacity, for example the incentives to learn or the volume and difficulty of the knowledge that need to be acquired by an organization (Van den Bosch, Volberda, & De Boer, 1999; Cohen & Levinthal, 1990; Zahra, & George, 2002).

There are a number of models that seek to explain the various factors influencing an organizations ability to incorporate new ideas and knowledge (Lane et al., 2006). In the literature, however, we have not found any model that has been adapted to explain the specific challenges for SSH research. Nevertheless, different empirical studies underline that researchers are not alone in ensuring that research can be taken up and used by societal actors. In the report "The role of universities in enhancing creative clustering" Juan Mateos-Garcia and Jonathan Sapsed discuss the absorptive capacity in the creative economy. They find that especially small, medium, and micro creative organizations often lack the expertise and know-how required to absorb outputs of different knowledge transfer activities and initiatives (Mateos-garcia & Sapsed, 2011). In such cases, external support may be needed in order to facilitate uptake. Cassity and Ang find that knowledge in the humanities is not easily directed towards meeting the needs of industry due to the fact that: *"…humanities typically produce explanatory models and rich and nuanced interpretations of complex questions".* As a consequence, *"…the expertise, resources, and assets that the humanities bring to social problems are often not understood by potential partners…"* (Cassity & Ang, 2006: 52). A similar point is put forward by Alis Oancea. In the article "Research Impact and Educational Research" she discusses the necessary societal readiness for research to be taken up. Based on a qualitative study with researchers from different disciplines across the scientific fields, she finds that humanities self-reported impact is described as a slow cumulative process with a long-term conceptual, cultural, and discursive change on society. Enabling societal readiness in relation to research which challenge established norms or slowly increase awareness around specific issues can be a very difficult task indeed (Oancea, 2015).

Figure 5.5: A Process Model of Absorptive Capacity: The Antecedents, and the Outcomes

Note: **Bold text** indicates the name of the construct or construct dimension; (parenthetic text) indicates the construct's (dimension's) relationship with absorptive capacity.
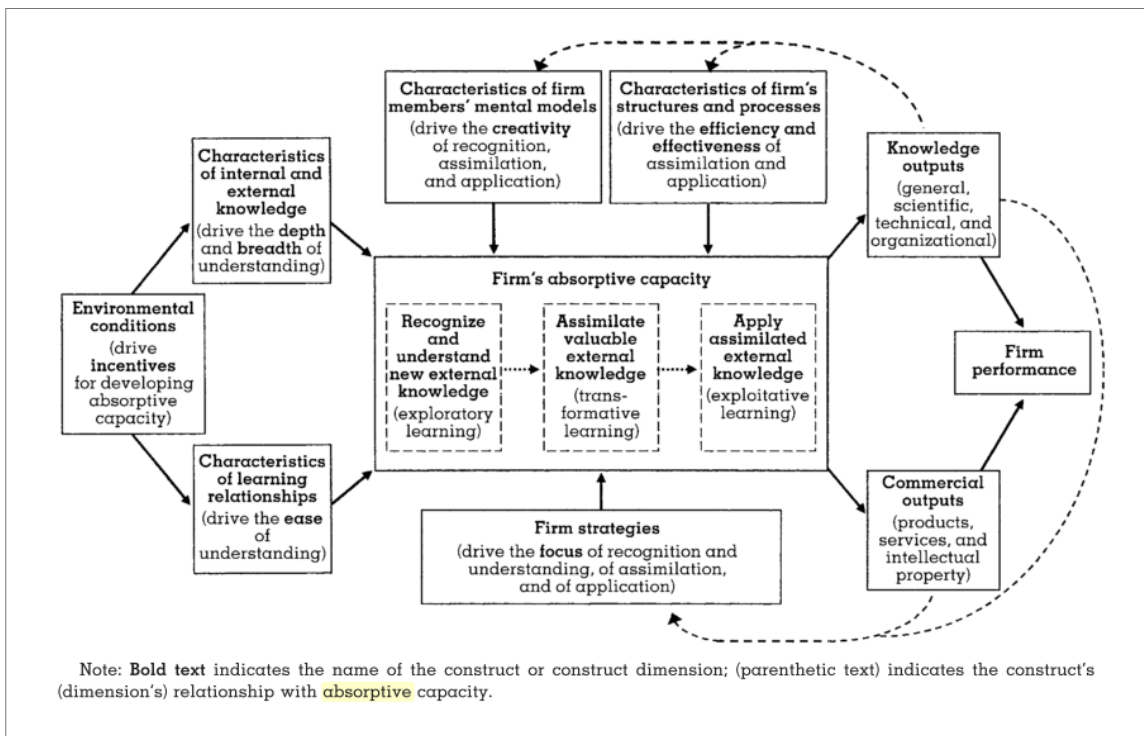
Source: (Lane, Koka, & Pathak, 2006: 856)

5.9. Open Science and broader communication efforts

In the literature, the generation of impact is often concerned with the access and sharing of research. Research may not reach interest groups outside science if researchers are only publishing in journals which are rarely read by other than academic peers. Open Science is a movement towards a more transparent, sustainable and socially inclusive share and use of knowledge, in which research is made available to a larger audience. In the literature, we thus find a strong focus on the broader communication and dissemination efforts from research to society. Researchers can be more or less effective in reaching non-academic audiences. The possibility of research having an influence on society is often construed as correlated to the extent research findings are communicated clearly and is readily available to users and knowledge intermediaries (Bannister and Hardill 2013, Sebba 2013). The communication of robust findings can help to increase user awareness and possible uptake of findings into policy or practice. The literature therefore highlights the need for open access and the sharing of research result, but also more broadly a focus on the different activities, channels and messy engagements that can make useful research accessible and encourage uptake by external actors. Research communication towards societal actors is generally not understood as a simple dissemination or knowledge transfer activity, but rather through more complex, interactive concepts such as knowledge translation, knowledge exchange, knowledge mobilization, or transition all of which often involves the use of research brokerage or intermediaries (Knight & Lightowler, 2010; Lightowler & Knight, 2013; Sebba, 2013). Knowledge use is not easily achieved, but requires some sort of summarizing or interpreting intervention which relates findings to specific contexts or draws out policy or practice implications. Such interventions may also involve meeting users in their local context (co-location) in order to make sure that research is understood and taken up. Thus, research

dissemination often involves an active effort beyond mere scientific publications and dissemination in order to make research relevant in a broader societal context.

5.10. The use of knowledge brokers and knowledge intermediaries

Knowledge intermediaries and knowledge brokers are highlighted as potential facilitators for making research relevant for societal actors. Lomas defines knowledge brokering as activities that links decision makers with researchers, facilitates their interaction so that they are able to understand each other's goals and professional cultures. In that way, academic and external actors can improve the possibilities of influencing each other's work, forge new partnerships, and promote the use of research-based evidence in decision-making (Lomas, 2007). Kammen and colleagues argue that the focus of knowledge brokering is not just about transferring results of research, but also about organizing the relationship as a fundamental, interactive process (Kammen, Savigny, & Sewankambo, 2006).

In the review "Knowledge brokering: the missing link in the evidence to action chain?" Vicky Ward, Allan House, and Susan Hamer identify three main models of knowledge brokering: *Knowledge management, linkage and exchange models* and *capacity building* models (Ward, House, & Hamer, 2009a, 2009b). Knowledge management models are primarily focused on finding, packaging, and disseminating information. The main concern is that research cannot easily be transferred to society, but has to address cultural barriers and be translated into appropriate language. The Linkage and exchange model is more related to facilitating actual interactions between researchers and decision makers. It is based on the notion that involving decision makers in the research process is the best way to ensure that research is being used. Finally, capacity building models is about developing capacity for future knowledge that can address shortcomings in the ability of decision makers to interpret and use research evidence (ibid.).

In the literature, knowledge brokering is mentioned as a new profession that can build bridges between research and policy communities. It is highlighted that non-academic impacts can be enhanced by the contributions of dedicated staff that have the expertise and time to promote it. Impact-generating processes can also be aided by financial or logistical support by research institutions (Meagher et al., 2008). Researchers may need support in order to reach wider audiences and identify the best channels for disseminating their results. In a qualitative interview study with knowledge brokers, David Phipps and Sarah Morton identify different competencies that knowledge brokers need to possess in order to help researchers make their research relevant. The personal qualities of knowledge brokers include abilities to function in a high degree of change, bring people together to share a common agenda, and, in this process, tight-roping between the involved communities (D. Phipps & Morton, 2013). Lightowler and Knights describe how the roles of knowledge brokers involve navigating ambiguity and hybridity. The definition of the roles and responsibilities of knowledge brokers may be very unclear and differ among employees, managers, and external stakeholders. Further, the profession can be described as hybrid professionals who perform many different roles in both professional and academic domains. These roles include providing education, administration, writing and editing outputs, nurturing relationships with stakeholders, undertaking research, monitoring impact and so on (Knight & Lightowler, 2010; Lightowler & Knight, 2013).
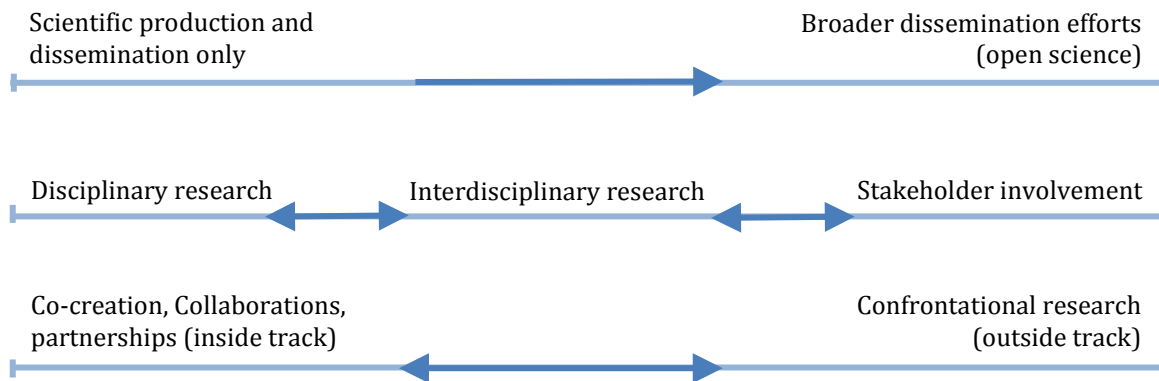
In the literature, we have identified some barriers in relation to facilitating knowledge broker activities. The first and most important barrier is the lack of knowledge about how knowledge brokering works and the factors which influence effectiveness (Ward, House, & Hamer, 2009). The lack of knowledge is partly due to the lack of agreement about key functions and skills of brokers. This is a natural consequence of the multiplicity of brokering models which are mainly conceptual and often combined in various more or less stringent ways. On the existing theoretical background, knowledge brokering must be conceptualized as complex social activity which is very difficult to evaluate (ibid.). A further challenge is the time and resources required for effective brokering. Although the literature suggests that it is not necessary for knowledge brokering to be the sole responsibility of researchers, it is still a fundamentally a very time-consuming activity for academics. The third challenge is the skills required that can range from the ability to gather and critically evaluate, synthesize and tailor research as well as understanding issues related to decision-making. This may require additional training and new roles for researchers and other university employees (ibid.). To sum up, knowledge brokering and knowledge exchange professionals can be seen as facilitators in securing that research becomes societally relevant and that researchers can collaborate more easily with external actors. However, it is contested to what extent researchers in general should be involved in and evaluated on the basis of brokering activities.

5.11. Main directions and distinctions

In the literature, it is possible to identify certain central directions and distinctions for conceptualising societal impact and co-production of research. First of all, a new research and innovation landscape seems to take form based on networks, knowledge sharing, and open research. A sole focus on scientific production in high ranking journal is not necessarily the best way for research to influence different sectors in society. Open data, open learning, open publications and the sharing of knowledge through social media, external engagements and data services help change the way in which research is organized, used, and evaluated. Thus, a focus on broader dissemination efforts, skill developments, roles, and knowledge brokering is introduced as drivers that can help researchers engage with society. These different concepts can collectively be seen as a movement towards a more transparent, sustainable, and socially responsible production and use of knowledge. However, the balance between the different roles and responsibilities of research and external actors is still very much contested. It is worth noting that the literature on these issues is mostly conceptual and policy driven.

Another important distinction is the different types of collaborations and engagement efforts from research that may support societal impact. The literature emphasises that societal impact is often not produced by individual disciplines, but frequently involve interdisciplinary efforts to solve societal challenges that require different perspectives to capture complex social issues. Furthermore, stakeholder involvement is emphasised as a useful step towards societal impact as knowledge and interest from users or key actors can be taken into account. Stakeholder involvements can happen through partnership approaches and direct collaborative efforts. Here co-creation is introduced as a term to describe the collaboration that occurs among researchers and external partners, often in order to create knowledge about concrete issues or challenges. Co-creation constitutes a particular type of knowledge production, in which stakeholders and collaborators from business and civil society are involved in research processes and production of knowledge, often already at the planning phase.

Figure 5.6: Main directions and distinctions in relation to the co-production of knowledge

Scientific production and dissemination only	Broader dissemination efforts (open science)

Disciplinary research	Interdisciplinary research	Stakeholder involvement

Co-creation, Collaborations, partnerships (inside track)	Confrontational research (outside track)

The literature, however, does also acknowledge that research can influence society from a distance. It is not always possible or productive to engage in partnerships with external actors in formal settings, since research can sometimes be very confrontational towards prevailing discourses in society, the protection of valuable groups, or creating a general awareness around specific (neglected) issues. Furthermore, researchers may be involved as consultants and advisers through more informal and temporary channels. In such processes, research is not entering into partnerships in a traditional sense, but is still very much engaged with societal actors.

A final important distinction addresses the fact that links, engagements, or partnership is not necessarily established from the beginning of a specific research project, but may evolve over time. Sometimes interactions may result from synergies between different research projects or research form a collective institution. Thus, it is important not to focus exclusively on predictable partnerships and links that can be identified at the beginning of a research project, but also be sensitive towards the dynamic interactions and connections which are formed and rearranged during the research process.

Judging from the literature, there is no "one-size-fits-all" method for driving societal impact in SSH. Dissemination, communication, co-production, co-creation, knowledge transfer, knowledge exchange, knowledge mobilization, and knowledge uptake are all components of a larger literature on research impact concerned with how to drive research in real-world practices. As such, there currently exists no co-creation or co-production "metrics" or assessment tools with criteria and indicators for describing successful or desirable collaborations or external engagements. Rather, there are several overlapping frameworks for mapping, driving, and evaluating wider societal impact activities in SSH – of which co-creation is one among several tools. Because of the vagueness and multi-layered meaning of concepts such as "co-production", "co-creation", and "knowledge brokering", a number of questions are currently unanswered in the literature. For instance, which expectations can universities and policy-makers confer on different disciplinary areas (or styles of research) in terms of co-creation or knowledge broker activities? Can co-creation extend across applied and translational research to fundamental research, or is co-creation primarily effective in relation to research already in close proximity to 'real-world' problems? As a collaborative toolbox, concepts such as co-production and co-creation can be further explored by research funding bodies and universities (along with overlapping frameworks, such as knowledge exchange and knowledge mobilization) as a vehicle to drive research partnership.

Barriers and enablers of societal impact are most often not directly discussed in the literature. But judging from the current body of evidence, it is clear that co-creation and wider dissemination efforts offer several challenges to academics and knowledge institutions. For the academic, engaging with and communicating research to external stakeholders can be troublesome and exhausting, and the unease of not meeting expectations for impacts that are 'significant' enough for external impact assessments or evaluations can trigger reluctance (probably some of these anxieties could be avoided by a clearer understanding of baseline criteria). For research and higher education institutions, co-creation and broader dissemination require skills, staff, and support which are necessary for providing responsibility and recognition for making research relevant to a broader audience. Finally, we should not forget the challenges that co-creation and research uptake poses to external partners. Many companies, public sector institutions, NGOs, and citizens are not used to working together with academics or absorbing scientific knowledge. Thus, they may be concerned with how well their input and suggestions are received by the academics. When working in Quadruple Helix settings there are often remnants of traditional knowledge hierarchies with academics on the top and professionals, business representatives, and citizens following downwards. In opposition, co-creation and knowledge sharing frameworks suggest a more open and non-hierarchical form of collaboration, in which participants from different institutions are invited to participate already at the stage when research questions are being formulated.

Users of research need to be able to see how well the research fits their needs, and how accessible and useful it is. "Unless work is appropriate and suitable for the audience, it's unlikely to achieve its impact aims and will just introduce more burden into the user community", Bayley (2016) argues. Therefore, co-creation takes considerable training, planning, strategy building, resources, and information management in order to achieve demonstrable impacts. Importantly, researchers may need to include key societal actors from the start, building partnerships and translating knowledge into suitable formats, whilst values, resources and strategic connections are established beyond academia.

6. Conclusion

This Working Paper has demonstrated a widespread interest across the research and policy literature for how to assess and communicate the diverse impacts of scholarly work. The social sciences and humanities are – like other scholarly fields – committed to demonstrating the vital role of SSH research in contributing to society, in terms of the production and dissemination of knowledge, and through sustained engagement with non-academic stakeholders.

In this report, we have analysed the current context in which societal impact of SSH is discussed, how the impact agenda is pursued, and how current definitions of impact have significant consequences for the SSH research ecosystem, including universities, researchers, funders, governments, private and public stakeholders, civil society and the public at large.

A key finding of the Working Paper has been that (1) knowledge production is not a linear process starting with basic research and resulting in direct applications, but rather a dynamic, multi-directional and interactive process that is heavily dependent on collaborative efforts, and that (2) demonstrative societal impact of research is not only the result of rigorous academic work, but to a large extent depends on the absorptive capacity and readiness of stakeholders to integrate research into practice. SSH Impact occurs in an iterative process of interaction between academic and non-academic stakeholders across different time scales, different locations and different sectors. In conclusion, the analysis presented in this report calls for a more networked, context-sensitive, and socially responsible notion of research impact in which different partners contributes to a joint problem-solving.

Insights into the mechanisms and pathways leading to research impact should as early as possible be integrated in the design of research projects and dissemination strategies while at the same time allowing for substantial divergence, uncertainty and unexpected impacts to occur. Very little is known about the substantive number of variables that needs to be in place in order to create the necessary and sufficient conditions for research impact across SSH disciplines. It belongs to the nature of assessing and accelerating the societal impact of the social sciences and humanities that the mechanisms through which research and education lead to socially valuable knowledge and relevant changes are deeply complex.

Yet, different impact frameworks and definitions focus on different components of impact ranging from academic impact, policy impact, social impact, educational impact, cultural impact to economic impact. So, while there exist no one-size-fits-all and no way of getting around the significant influence of cognitive and social values, the models and frameworks reviewed in this report each focus on different aspects of impact. As we emphasised in Chapter 1, a key finding of the report is that different approaches to assessing research impact make different assumptions about the nature of knowledge, the purpose of research, the definition of research relevance, the role of values in research and the mechanisms by which impact is achieved.

As the literature review illustrates, research on research impact is a rapidly growing interdisciplinary field, spanning diverse subfields such as science policy studies, knowledge translation and implementation science, social studies of science, economics, informatics, sociology of science and

higher education studies. In this report, we have primarily reviewed theoretical components and taxonomies of impact assessment. This emphasis of the report is reflected in the current literature's:

1) Lack of specific co-creation studies involving the social sciences and humanities, and

2) Lack of empirical studies of impact pathways, best practices and data-driven impact metrics

We could add to the deficit of the current literature, that not only is most of the literature conceptual (and quite speculative) in nature. It often operates on an underlying notion of accountability, which focuses on increasing impact simply as "good" or "desirable" change in society. Future research should also address the topical question of whether the pursuit of impact leads to undesirable and unintended consequences. It is time for a more coherent epistemology and ethics of impact. This point can be framed in a number of ways. To begin with, we must raise the question of harmful impacts – what are sometimes called *grimpacts*. A moment's reflection is enough to show the vacuity of the idea that impacts are always beneficial.

Another priority for future research in this field is an assessment of how far the reviewed approaches rely on recorded empirical data about productive interactions i.e. activities, transactions, engagement, networks, products and processes. Being able to provide a more coherent understanding of the nature and breadth of impacts, can in the future help ground a more established and nuanced approach to SSH impact assessment.

Future research should also address the question of whether research impact tools could be used to help guide specific collaborations and co-creation activities and lead to the creation of new reward structures. In most of the studies reviewed in this Working Paper there is no attempt to align impact assessment models with incentives or scientific careers. Without such an alignment, it is likely that research impact in SSH and other fields will be considered as "extra work" or part of "other obligations" not related to research. Here, university managers should aim to align research impact assessment with wider "third mission" activities, which are often seen as separate.

We finally note that knowledge exchange and knowledge brokering is not only a task for researchers but for university support officers as well. In the end, research impact is the shared responsibility of academic and non-academic stakeholders. For this to co-responsibility to be acknowledged, assessing SSH impacts should be based on (i) *contributions* of research to societal impact instead of *attributing* societal impact to specific research projects, (ii) it should be based on a clear understanding of values and scales (interests, temporality, locality etc.), and finally (iii) it should be based on the joint contribution of several actors, all acknowledging that successful impact and innovation takes place in a complex interplay between institutions.

Appendix A: The review strategy

The scientific and political agenda for the societal impact of SSH research is not easily summed up. SSH is a heterogeneous field that consists of researchers with different motives, practices, and research styles working with different sectors in society. Currently, there is no agreement on what is the best definition or the superior methodology for assessing impact and knowledge exchange activities in SSH. Rather, several more or less overlapping frameworks for understanding, mapping, and evaluating SSH research impact compete for pole position. The impact agenda in SSH spans over several different literatures and institutions discussing various aspects of the societal relevance and uptake of research. As such, the literature on impact assessment and impact-stimulating initiatives is characterized by wide semantic diversification, including the often overlapping or synonymous use of concepts such as knowledge brokering, dissemination, co-creation, research partnerships, external engagements, research outcomes, uptake, mobilization and impact. To create a better overview of the diverging literature this review aims to map both the scientific and political literature regarding the relevance, impact and uptake of SSH knowledge in society in order to create a more substantial understanding of the current policy and academic agenda surrounding SSH. The review is guided by the following questions:

1) In which ways can the societal impact of SSH research be understood?

2) How can societal impact of SSH research be measured, assessed and supported?

A.1. The overall review strategy

To answer these questions the report makes use of a literature review in order to summarize the large amounts of available information and knowledge on the societal impact of SSH research. A systematic review is seen as a useful tool to collect, examine and integrate contributions originating from numerous research areas and political institutions, but at the same time ensuring a systematic and transparent methodological approach in describing the search procedure, inclusion and exclusion criteria and analytical strategy chosen. It is important to emphasise that this review does not aim to provide quantitative or qualitative evidence on the effectiveness of specific frameworks or impact strategies, nor does it involve any quality appraisal or assessment of the included studies. In this respect, the review deviates from literature reviews found in health science that seek to isolate and assess the predictive power of specific research findings or effects. The reason for this is that the literature on societal impact is not to be regarded as a coherent scientific literature but rather a policy driven agenda. During the search process, it was quickly realized that the SSH impact agenda draws on many different types of conceptual and empirical contributions from various scientific fields and topics concerning research evaluation, scientometric, management of research, STS, political science as well as science on culture and education. In order to map and synthesise the diverging literature, the report identifies analytical themes and associated shared views and distinctions in how societal impact is to be understood, measured and supported (Chapter 3-5). Furthermore, the review also extracts specific framework and models that has been developed in order to describe and assess impact from SSH and beyond (Chapter 2). In the following the search strategy, inclusion/exclusion criteria and the analytical approach will be described in more detail.

A.2. Presentation of search strategy

The literature search was conducted at Aalborg University from April to September 2016. The study selection process can be divided into different sequential steps: A systematic search of publications (journal articles, monographs, books, reports etc.) was performed using digital literature databases and internet search engines on selected keywords. The databases chosen for the review were SCOPUS and Web of Science. The databases and web-searches were followed by the tracing of references in selected documents included in the review study. Additional documents were found through expert and peer consultations in the ACCOMPLISSH project and by attending scientific conferences. In between these search steps, screenings of the selected documents were conducted applying the inclusion and exclusion criteria to all retrieved text titles, then abstracts and finally by reading and analysing the documents. Documents were only included in the final text corpus if they meet all inclusion criteria. The search selection process is described in the figure below.

Figure A.1: The search selection process

<div style="border:1px solid">

Stage 1: Electronic database and web-searches
1. Database and web-searches from keywords
2. Screening process: Inclusion/exclusion first from title, abstract/summery and reading and analyzing the documents

Stage 2: Reference-tracings
1. Reference-tracings of selected documents from database and web searches
2. Screening process: Inclusion/exclusion title, abstract/summary and from reading and analyzing the documents

Stage 3: Peer consultations
1. Additional input from the ACCOMPLISSH project group and participation in scientific conferences.

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A.3. Keywords, inclusion and exclusion criteria

The included articles and reports were identified by using specific keywords combinations. The identified texts were then screened against specific inclusion and exclusion criteria that were redefined several times through the initial search process. The final inclusion and exclusion criteria relates to both the publication type, linguistic limitations, time period, author, population as well as more qualitative study characteristics. The criteria are presented in the table below.

Table A.2: The inclusion and exclusion criteria

	Inclusion	Exclusion
Publication type	Published peer review articles Published peer reviewed books Published reports	Working papers Conference papers Newspaper articles Blogs Webpages …
Linguistic	Written in English	Written in other languages
Time period	Published between 2005-2016	Published before 2005 Published after 2016
Authors*	Policy reports published by national or supra-national research organisations in the European Research Area.	Policy report published by national or supra-national research organisations outside the European Research Area
Study characteristic	Develop or discuss concepts, methods or tools for understanding, measuring or driving the wider societal impact	Only addresses academic impact (e.g. bibliometrics, quality indicators, quality assessment, peer review…)
Population	Explicitly include Social Science and/or Humanities research	Does not include Social Science and Humanities research but only impact from other fields of research (e,g, health science, natural science…)

*These inclusion/exclusion criteria only apply for policy reports

The review has chosen only to include peer reviewed articles, books, and policy reports that are published from 2005 to 2016, and the texts are also limited to publications written in English. As a consequence, the literature review mainly identifies the national impact agenda that is most prominent in the English scientific literature, which turns out to be the experiences from the UK and the Netherlands in particular. Finally, the review has chosen only to focus on the impact agenda related to SSH and does not include any searches on individual research discipline in the SSH field such as psychology, history or sociology. This limitation was made to ensure a manageable corpus size and to focus on contributions that try to capture the diversity across the disciplines in the social sciences and humanities. The literature review is thus not able to account for individual variation in impact, pathways, and drivers from specific disciplines and further cannot account for the impact agenda in other scientific domains. The keywords used in the search process are presented below.

Table A.3: Keywords combinations used in the search process

Societal impact		Research area
Cultural Social Societal Health Public Policy Political Broader Wider Policy Economic	Impact	Social science, art and humanities Social science and humanities Social Science Humanities Art and humanities
Knowledge	Transfer Mobilization Exchange Circulation	
Impact	Evaluation Assessment Valorization	
Public value		
Co-creation		
Co-production		
Academic entrepreneurship		

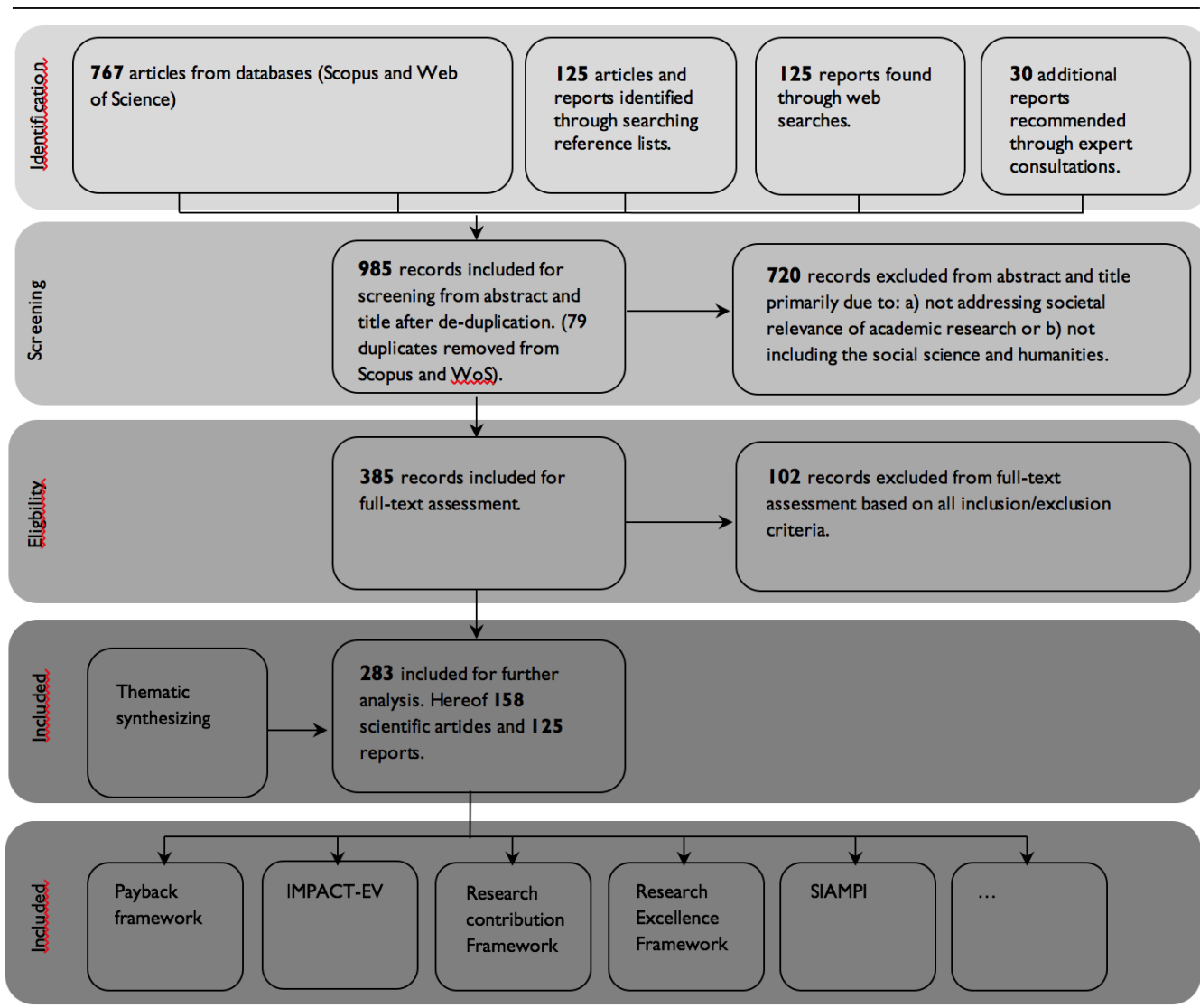## A.4. A thematic synthesizing of the SSH impact agenda

After screening the literature, a thematic synthesis was performed to systematically identify, analyse, and report central patterns across the text corpus. The process of conducting the thematic analysis were not carried out in a linear and sequenced way, but were characterized by a recursive and parallel process involving reading and initial coding of the documents, searching and developing descriptive themes and interpreting the identified themes. This approach was found to be a useful method to organise the diverging literature into coherent categories of different themes which are still guided by the review questions. The overall themes identified relates to: 1) impact classifications, 2) methodological strategies and 3) Ex ante drivers of impact which are further divided into different subcategories. In relation to the conceptual understandings of impact, the review identifies specific classifications of impact (e.g. academic impact, social impact, policy impact etc.) and in relation to methodological strategies frequently mentioned methods for measuring impact is accounted for (e.g. bibliometric, altmetric, peer review etc.). The drivers of impact key concepts were found across the entire review corpus (e.g. co-production, knowledge brokering, co-creation, absorptive capacity). On the basis of the themes and related subthemes, the analyses seek to outline central directions and distinctions that reflect the main variations in the impact conceptualization, methods for measurements, and agendas on impact drivers. These distinctions represent important considerations

emphasised in the literature as a whole and should to be considered carefully when assessing the impact of SSH research. The thematic analyses are presented in chapter 3, 4 and 5 in the report.

A.5. Analysis of specific impact assessment models

Apart from thematic analyses, the review also extracts specific impact assessment models used to understand and assess impact from SSH research. These analyses look at the strength and weaknesses of these frameworks in relation to the social science and humanities. The impact assessment models include both SSH specific models and broader evaluation systems used to assess societal impact from research across scientific fields. These analyses are presented in chapter 2.

APPENDIX B. Flowchart of the review process

Identification

767 articles from databases (Scopus and Web of Science)

125 articles and reports identified through searching reference lists.

125 reports found through web searches.

30 additional reports recommended through expert consultations.

Screening

985 records included for screening from abstract and title after de-duplication. (79 duplicates removed from Scopus and WoS).

720 records excluded from abstract and title primarily due to: a) not addressing societal relevance of academic research or b) not including the social science and humanities.

Eligibility

385 records included for full-text assessment.

102 records excluded from full-text assessment based on all inclusion/exclusion criteria.

Included

Thematic synthesizing

283 included for further analysis. Hereof **158** scientific articles and **125** reports.

Included

Payback framework

IMPACT-EV

Research contribution Framework

Research Excellence Framework

SIAMPI

…

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