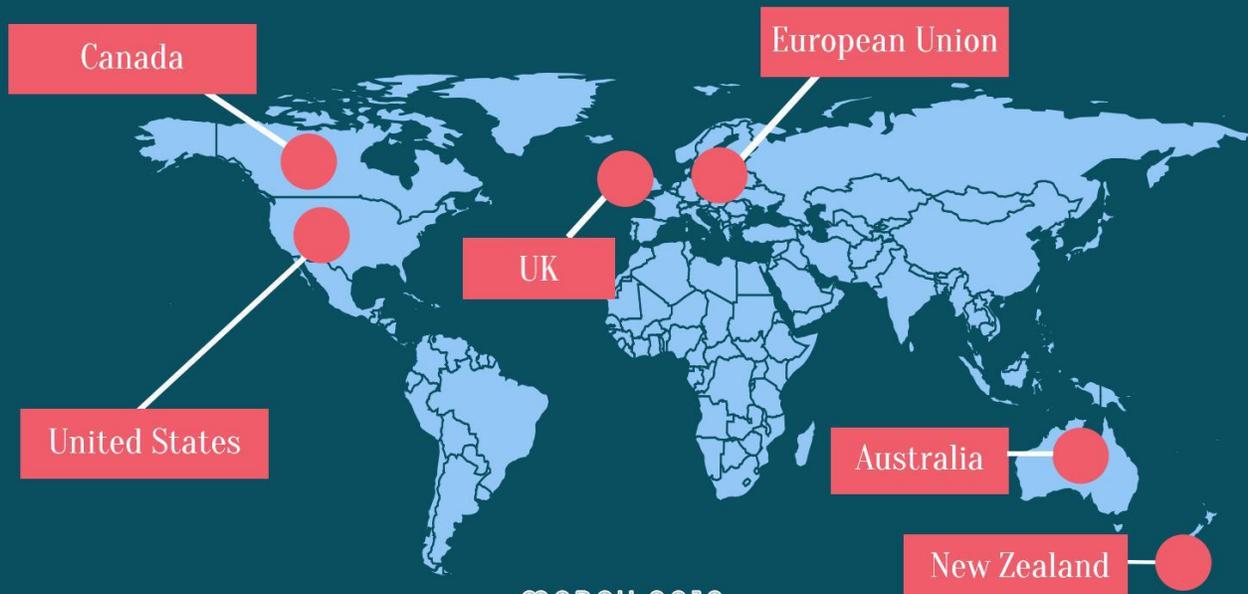


RESEARCH REPORT

THE GOOD, THE BAD, & THE UNKNOWN: An Environmental Scan of Research Impact

This report outlines the results from an environmental scan of research impact across 32 countries (Canada, USA, UK, the European Union, Australia and New Zealand). The report also includes a literature review outlining global trends in relation to knowledge mobilization and research impact. While new empirical work arising from the UK as a response to impact agendas is providing compelling evidence of the contributions that social science research makes to all areas of society, research impact remains a largely contested terrain. It is widely acknowledged that many of the research impact measures (such as bibliometrics) disadvantage the humanities and social sciences. Consequently, it is important that universities and researchers engage in debate about how research impact agendas will be operationalized in jurisdictions around the world.

PREPARED FOR THE CANADIAN FEDERATION FOR THE HUMANITIES AND SOCIAL SCIENCES



MARCH 2016

AUTHORS: DR. AMANDA COOPER & SAMANTHA SHEWCHUK



RIPPLE

Research Informing Policy, Practice
& Leadership in Education

The Good, the Bad, and the Unknown: An Environmental Scan of Research Impact for Humanities and Social Sciences in Canada, USA, UK, the European Union, Australia, and New Zealand.

AUTHORS: AMANDA COOPER & SAMANTHA SHEWCHUK

ACKNOWLEDGMENTS:

This report was commissioned and funded by the Canadian Federation for the Humanities and Social Sciences (FHSS) to provide an overview of the emerging international trends and indicators of research impact occurring globally for the humanities and social sciences. The study replicates work conducted by Cooper (2014) in public service sectors and is informed by a project from the Canadian Academy of Health Sciences (CAHS, 2009) who created a comprehensive menu of preferred indicators for research impact in the health sector.

DISCLAIMER ON PRESENTED VIEWS AND RESEARCH RESULTS:

The findings and conclusions presented in this report are those of the authors (Cooper and Shewchuk) and do not represent the official positions or policies of the Canadian Federation for the Humanities and Social Sciences or the researchers' educational institution.

HOW TO CITE THIS DOCUMENT:



Cooper, A. & Shewchuk, S. (2016). *The good, the bad, and the unknown: An environmental scan of research impact for humanities and social sciences in Canada, USA, UK, the European Union, Australia and New Zealand*. Report prepared for the Canadian Federation for the Humanities and Social Sciences. Kingston: A RIPPLE Research Report.

ABOUT RIPPLE:

Dr. Amanda Cooper, Assistant Professor in the Faculty of Education at Queen's University, is the Principal Investigator of RIPPLE. RIPPLE (Research Informing Policy, Practice and Leadership in Education) is a program of research, training and knowledge mobilization aimed at learning more about how knowledge brokering can increase research use and its impact by leveraging multi-stakeholder collaboration. Samantha Shewchuk, a doctoral student at Queen's University, is the program manager for RIPPLE. For more information visit: WWW.RIPPLENETWORK.CA

Contents

EXECUTIVE SUMMARY	6
1 Objectives.....	10
2 Setting the Stage	11
3 Literature Review.....	13
3.1 A Global Debate	13
3.2 Are the humanities under attack?.....	14
3.3 Understanding research use, knowledge mobilization and impact	15
4 Global Trends	19
4.1 A shift in the way research is viewed.....	19
4.2 Increased Requirements for Researchers From Funders	21
4.3 The open access movement.....	26
4.4 The Rise of Performance-Based Research Funding Systems	26
5 What is the UK Teaching us About Research impact?	28
5.1 The LSE Impact of Social Sciences Project	29
5.2 Capturing research impacts: A review of international practice.....	31
5.3 The metric tide: An independent review of research assessment.....	32
5.4 The nature, scale and beneficiaries of research impact	35
5.5 Approaches and Methodologies to Measuring Impact	36
6 Unique Features of Canadian Landscape of Impact	38
7 The Research Study	40
7.1 Project Overview.....	40
7.2 Conceptual Framework	41
7.3 The Sample	41
7.4 Methods	42
7.5 Findings	44
8 Indicators.....	50
9 Research Impact Resources for Researchers.....	60
10 Emerging Issues: The good, the bad, and the unknown	65
11 Recommendations.....	67
12 References	69
13 Appendices.....	73

Figures

Figure 1. Seven levels of research use leading to impact, summarized from Knott & Wildavsky (1980)	17
Figure 2. Paradigm shift in the way research is viewed, summarized from Chandler (2014).	19
Figure 3. Scholarship reconsidered: Discovery, Integration, Application and Teaching.	20
Figure 4. Brokering Functions of Canadian RBOs.	23
Figure 5. Timeline of established national performance-based research funding systems globally, dates and countries summarized from Hicks, 2012.	27
Figure 6. Key resources emerging from the UK informing the debate.	28
Figure 7. Eight mechanisms to increase research impact.	38
Figure 8. Conceptual framework to classify and analyze types of research impact resources (Adapted from Cooper, 2014).	41
Figure 9. 32 countries (highlighted in blue) included in environmental scan.	41
Figure 10. Methodological approach to conducting environmental scan.	43
Figure 11. Date of origin of research impact resources (N=721).	44
Figure 12. Frequency of research impact resources by Country (N=721).	45
Figure 13. Frequency of research impact by type (N=721).	46
Figure 14. Top 10 journals that published articles on research impact from our sample.	47
Figure 15. Type of agency that created research impact resources.	47
Figure 16. Frequency of research impact resources by field.	48
Figure 17. Frequency of research impact resources by country and type.	48
Figure 18. Frequency of research impact resources by agency and country.	49
Figure 19. Research impact resources categorized by focus topic.	50
Figure 20. Proportion of Indicators based on FHSS impact framework categories.	51
Figure 21. Frequencies of different types of indicators across 1105 indicators analyzed.	51
Figure 22. Expanded FHSS research impact framework.	52
Figure 23. Recommendations for the FHSS.	68

Tables

Table 1 Funders' definitions of KMb and Research Impact	21
Table 2 Keywords used to produce systematic search strings.....	42
Table 3 Scholarship Indicators.....	53
Table 4 Capacity Building Indicators	55
Table 5 Economy Indicators	56
Table 6 Society & Culture Indicators.....	57
Table 7 Practice Indicators	58
Table 8 Policy indicators	60

Appendices

Appendix A: Terms from Conceptual Framework and Analysis Defined.....	73
Appendix B: Scholarship Research Impact Indicators	76
Appendix C: Capacity Research Impact Indicators	82
Appendix D: Economy Research Impact Indicators.....	85
Appendix E: Society and Culture Research Impact Indicators	87
Appendix F: Practice Research Impact Indicators.....	90
Appendix G: Policy Research Impact Indicators.....	94
Appendix H: Research Impact Tools – Policy & Politics	95
Appendix I: Research Impact Tools – Software and Services	97
Appendix J: Research Impact Tools – Grant Writing	98
Appendix K: Research Impact Tools – Research & Knowledge Mobilization Planning	99
Appendix L: Research Impact Networks – Research Networks.....	105
Appendix M: Research Impact Projects	107
Appendix N: Open Access Repositories	108

EXECUTIVE SUMMARY



THE GOOD, THE BAD AND THE UNKNOWN: AN ENVIRONMENTAL SCAN OF RESEARCH IMPACT

OBJECTIVES

This project, funded by the Canadian Federation for the Humanities and Social Sciences (FHSS), aimed to

- ❁ To identify global trends in relation to research impact agendas
- ❁ To gather and analyze research impact indicators being used to assess humanities and social sciences
- ❁ To identify practical resources to support HSS researchers with research mobilization and impact

KEY DEFINITIONS

- ❁ Research Impact: “any effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia”(REF, 2011).
- ❁ Knowledge mobilization (KMb): “The reciprocal and complementary flow and uptake of research knowledge between researchers, knowledge brokers and knowledge users—both within and beyond academia—in such a way that may benefit users and create positive impacts within Canada and/or internationally, and, ultimately, has the potential to enhance the profile, reach and impact of social sciences and humanities research” (SSHRC, 2015)

GLOBAL TRENDS FROM THE LITERATURE: RISING RESEARCH IMPACT AGENDAS

- ❁ Rise of research impact agendas globally that utilize a combination of metrics and peer review panels to assess impact with both academic and non-academic audiences
- ❁ National performance-based research funding systems (PRFS) being established globally (Figure 1).
- ❁ Rising concern that PRFSs and impact assessment disadvantage some fields more than others, such as humanities, arts, social sciences among others

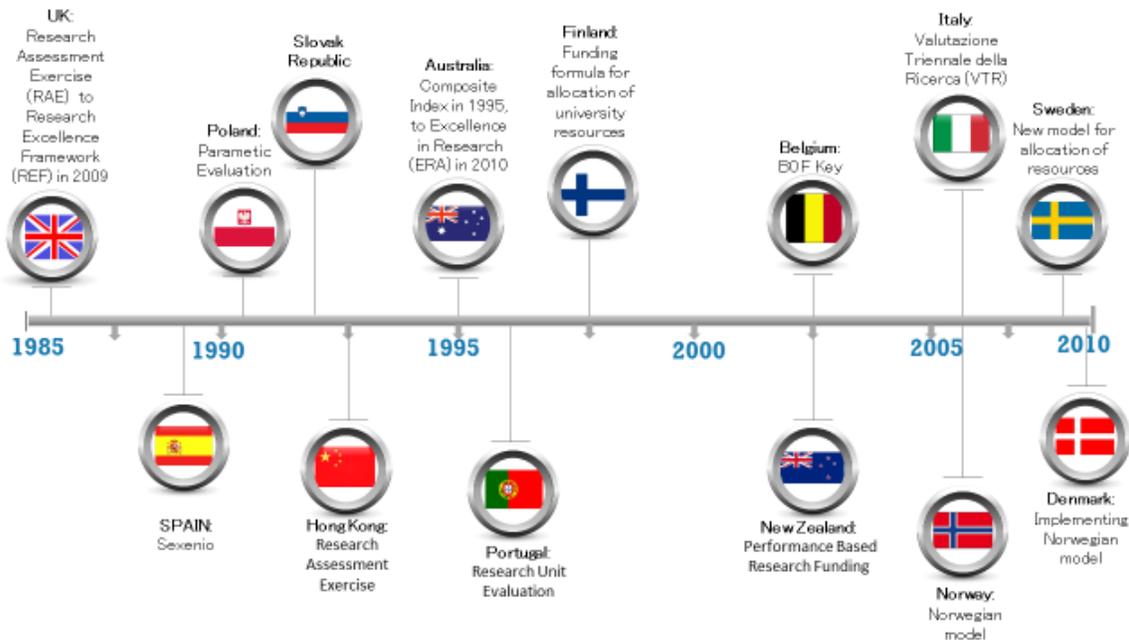


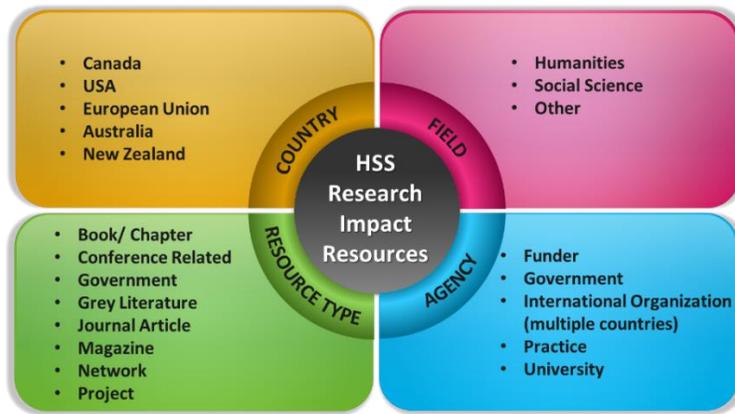
Figure 1. Timeline of established national performance-based research funding systems globally, dates and countries summarized from Hicks, 2012.



THE STUDY: AN ENVIRONMENTAL SCAN OF RESEARCH IMPACT RESOURCES

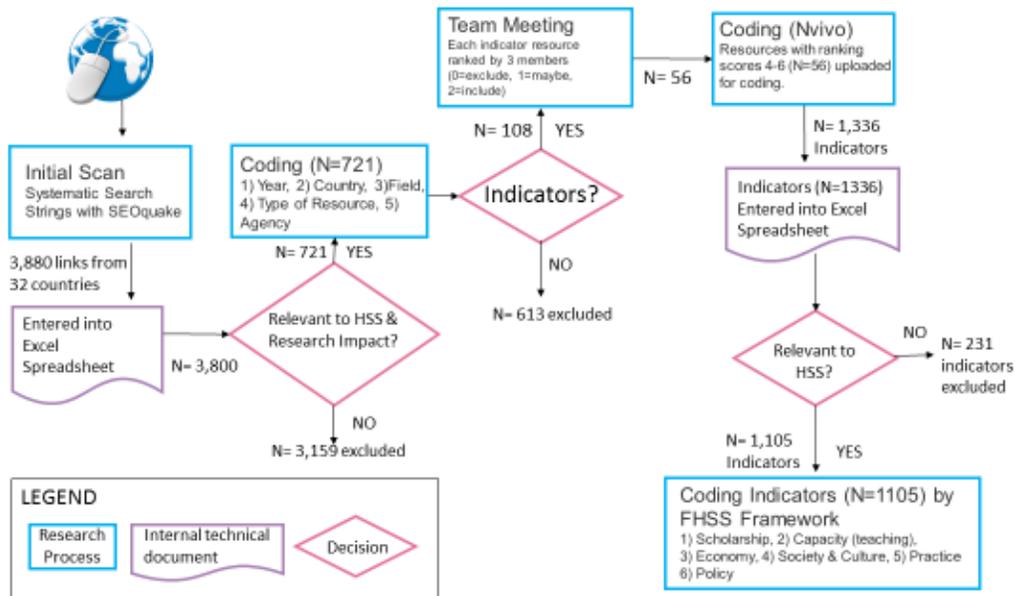
Is there a “best way” (best method) to evaluate the impacts of Humanities and Social Science research in Canada, and are there “best metrics” that could be used to assess those impacts (or improve them)?

CONCEPTUAL FRAMEWORK (ADAPTED FROM COOPER, 2015)



METHOD

The Sample included 32 countries: Canada, the USA, the UK, the European Union, Australia and New Zealand.



FINDINGS

AN EXPLOSION OF RESEARCH IMPACT RESOURCES HAVE ARISEN IN THE PAST DECADE

- 81% of the 721 impact resources analyzed originating since 2005, with over half of the research impact resources originating in the past five years.

DISCUSSION: THE GOOD, THE BAD & THE UNKNOWN

There are positive and negative aspects of the trends globally towards research impact, as well as much that is unknown since large scale performance-based research funding systems like the Research Excellence Framework (REF) from the UK are in their infancy, having only recently been rolled out in other jurisdictions (although initial forms of these systems began in 1986 with the Research Assessment Exercise in the UK).

THE GOOD

- ✿ Increasing focus on KMb and Impact can increase the visibility and reach of HSS research, when conceptualized broadly in ways that acknowledge the diversity of types of knowledge, creation and research that occurs across disciplines
- ✿ Increased requirements from funders are encouraging multi-stakeholder partnerships and collaborations that can benefit researchers and the non-academic stakeholders they work with
- ✿ Systems to evaluate research impact are advocating for the use of quantitative and qualitative data, and maintain that case study approaches best capture nuanced contributions of research
- ✿ National, large-scale research assessment systems, like the REF, are giving us new empirical evidence on research on a scale that we have not had previously
- ✿ Peer review, as an integrated component of research impact assessment, continues to have widespread support across disciplines.
- ✿ New empirical work arising from the UK as a response to impact agendas is providing compelling evidence of the contributions that social science research makes to all areas of society

THE BAD

- ✿ Many of the research impact metrics focus on bibliometric measures (such as journal ranking, impact factors) that disadvantage humanities, arts, social sciences and other non-STEM (Science, Technology, Engineering, Mathematics) fields, because outputs of these fields are not represented on major databases used for bibliometric analyses such as World of Science, Scopus and Google Scholar
- ✿ ‘Inappropriate indicators create perverse incentives’ (Wilsdon et al., 2015, vii); in fact, there is already some empirical studies to suggest that researchers’ behaviours in the UK are changing in undesirable ways (such as less focus on tasks like teaching and outreach in order to focus on publishing articles in journals that will increase score on REF)
- ✿ Issues with measuring ‘impact’ are widely acknowledged including timing (impact happens over long periods of time not directly at the end of a research project or grant), attribution (change cannot usually be attributed to one research project or piece of work among a myriad of other influences), context (different contexts for research use influence use)
- ✿ Currently, the REF and other systems lack transparency in how impact data is assessed, ranked and compared across disciplines. In fact, major reviews of REF suggest that data should not be compared across fields due to the wide diversity of different areas

THE UNKNOWN

- ✿ It is unclear what effect funding systems tied directly to performance on research impact assessments will have in the long term
- ✿ It is unlikely that research impact and metrics will go away, so it is important that we work collaboratively across disciplines to improve the metrics currently in use (which are widely acknowledged to be underdeveloped) or suggest different approaches to measuring the value of HSS
- ✿ Canada has not yet created a national system like other jurisdictions and, so far, has taken a softer approach to increasing mobilization efforts and impact through directed grants

1 Objectives

The Canadian Federation for the Humanities and Social Sciences (FHSS) is the national organization, representing 80 scholarly associations, 79 institutions and 85,000 researchers across Canada, with a mandate to:

- Promote the value of research and learning in the humanities and social sciences
- Support the dissemination of knowledge to the public and the public policy community
- Provide a range of services to individual members and member institutions (FHSS, 2015)

Due to research impact agendas ramping up internationally, and the high stakes of these agendas for the Humanities and Social Sciences (HSS), FHSS is leading a major initiative to develop a framework for assessing and measuring the impact of research in the humanities, social sciences and the arts.

Desired outcomes of the impact initiative include:

- A stronger agreement on how impact should be measured in the arts, humanities and social sciences
- More robust approaches to measures and discussions of impact in the arts, social sciences and humanities at disciplinary, institutional, national and international levels
- The Federation will serve its members and other stakeholders by leading the discussion on measuring impact, and in so doing take a more pro-active role at a time when the social sciences, arts and humanities have often been put on the defensive (FHSS, May 2014)

In 2014, the Federation wrote a working paper (FHSS, 2014) that identified five areas in which HSS research might have an impact: Scholarship, Capacity Building (in Teaching and Learning), Economy, Society and Culture and Practice and Policy. The working paper outlined potential indicators in each of the five areas, outlining time lag, relevance, key advantages and key limitations for each type of indicator. The current project, launched in July 2015, builds on this working paper and extends the FHSS impact initiative.

The current project conducted an environmental scan of the research impact resources for humanities and social sciences across 32 countries (Canada, USA, UK, the European Union, Australia and New Zealand). Environmental scans are not simply ad hoc online searches; rather, Conway (2009) highlights that environmental scanning is formal and systematic, using “formal methodologies for obtaining information for a specific purpose” (p. 2). The purpose of this environmental scan is to provide FHSS with emerging international *indicators* (operational measures of environmental analysis), *trends* (systematic variation of indicators over time) and *patterns* (clusters of trends) in relation to research impact to provide guidance for decision-making and strategy development at the FHSS (Costa, 1995). The objectives of the environmental scan were threefold:

- 1) To identify global trends in relation to research impact agendas
- 2) To aggregate a taxonomy of indicators that are currently being used to assess HSS from the literature (this work directly attempts to expand the FHSS 2014 working paper)
- 3) To identify the range of practical tools and resources that are available for HSS researchers to use to improve their KMB and research impact efforts.



We have created three products as a result of this project: this research report as well as two supplementary files that are meant to support HSS researchers directly. The first supplementary file is *A Taxonomy of Research Impact Indicators for the Humanities and Social Sciences* (aggregated and summarized from 1100+ indicators identified through the environmental scan) that HSS researchers can explore in relation to their projects and include on grant applications. The second supplementary file is *A Guidebook of Research Impact Resources for Researchers* outlining over 90+ resources collected from the environmental scan to assist HSS researchers in tracing and communicating the value of their work. While we identify many issues with the rising impact agenda and the use (and misuse) of metrics, we also recognize that these trends are unlikely to dissipate in the near future, hence feel it necessary to collate these resources and indicators in order to inform a broader discussion and strategic planning on how HSS research communities might shape the development of these issues across Canada.

After an exploration into research impact trends occurring around the globe, we title this report: *The Good, the Bad, and the Unknown* – and explore these issues from a variety of perspectives (funders, universities and researchers). There are many positives associated with the emerging focus on research mobilization: increased visibility and reach of HSS research, more collaborative partnerships including diverse academic and non-academic stakeholders, and the potential for greater public recognition of the value that HSS fields contribute to broader society. However, many fear that the negatives associated with these impact agendas (narrow, market-driven models of assessing research impact) will outstrip the potential benefits – to the expense of HSS and other non-STEM (Science, Technology, Engineering and Mathematical) fields which are widely acknowledged to be disadvantaged by bibliometric measures and counts of commercial patents or spin offs. And lastly, we discuss the unknown. Little is known about how the performance-based research funding systems (PRFSs), such as the Research Excellence Framework (REF) from the United Kingdom, will shape research landscapes across the world. We do know, that many countries are modeling their PRFSs after the UK. In this report, we explore the good, the bad, and the unknown in relation to research impact agendas.

We hope this report, and the two supplementary resources, will be of interest to universities, HSS researchers, and research administrators that are struggling to adapt to the rapidly shifting expectations for researchers and higher education institutions (HEIs) across Canada and abroad.

2 Setting the Stage

There is rising global interest in two interrelated concepts: knowledge mobilization (Kmb) and research impact. The goal of Kmb is to strengthen connections between research, policy and practice in order to improve social policy and outcomes for citizens. Research impact is defined in terms of benefits to society that occur beyond the ivory towers of academia. The two concepts are intricately connected as Kmb can be thought of as a mechanism and process to improve research use and its impact. Different stakeholders – governments, funders, intermediaries, universities, end-user communities – are interested in research use and its impacts for different purposes. Nutley, Walter and Jung (2008) highlight five divergent purposes that stakeholders would want information on research use and impact:

- *Addressing accountability.* Research can provide an account of the activities, interactions, and achievements of the unit being studied (such as a funding agency or research program).
- *Assuring value for money.* Researchers can demonstrate that the benefits arising from research are commensurate with its cost.
- *Setting priorities.* Stakeholders can help to focus and direct future research effort in content and design.
- *Assisting learning.* They may also want to develop a better understanding of the impact process in order to enhance future impacts.
- *Improving outcomes.* Ultimately, the goal of most stakeholders is improving outcomes for youth through more effective development of policies, programs, and services. (p. 4)

Regardless of the stakeholder or purpose, KMb and research impact are putting pressure on researchers, policymakers and practitioners alike. Collaboration among these diverse groups (researchers, policymakers and practitioners) is becoming an expectation and requirement in many jurisdictions – as countries recognize that diverse partnerships and expertise will be needed to confront complex societal issues. The Social Sciences and Humanities Research Council (SSHRC) updated their definition of KMb this summer:

Knowledge mobilization: The reciprocal and complementary flow and uptake of research knowledge between researchers, knowledge brokers and knowledge users—both within and beyond academia—in such a way that may benefit users and create positive impacts within Canada and/or internationally, and, ultimately, has the potential to enhance the profile, reach and impact of social sciences and humanities research.

Since SSHRC is the major funder for the humanities and social sciences in Canada, it is this conceptualization of KMb that will influence researchers' projects and behaviours across the country.

Canada faces complex challenges in rapidly shifting and globally networked society. Canada is characterized by its rapidly increasing diversity across a number of areas:

- **Immigration:** In 2011, Canada had a foreign-born population of about 6,775,800 people. They represented 20.6% of the total population, the highest proportion among the G8 countries.
- **Ethnic ancestry:** More than 200 ethnic origins were reported in the 2011 National Household Survey (NHS). In 2011, 13 different ethnic origins had surpassed the 1-million mark.



- Visible minority population: Nearly 6,264,800 people identified themselves as a member of a visible minority group. They represented 19.1% of the total population.
- Languages: Canada is a country of linguistic diversity. In addition to English and French, the 2011 NHS estimated more than 200 languages as mother tongue.
- Religions: Two-thirds of Canada's population are affiliated with a Christian religion, with slightly over a million individuals identified themselves as Muslim (3.2% of nation's total population). Hindus represented 1.5%, Sikhs 1.4%, Buddhists 1.1% and Jewish 1.0%.
- Same-sex couples: Between 2006 and 2011, the number of same-sex married couples nearly tripled, while the number of same-sex common-law couples rose 15%. As a result, married couples represented about 3 in 10 same-sex couples in 2011.

It is important that humanities and social science researchers collaborate with non-academic partners in communities to address the many issues arising from our shifting national landscape. HSS researchers have an important role to play informing debates within democratic nations. Unfortunately, unlike the Science Technology Engineering and Math (STEM) fields, there has not been as much empirical work studying how HSS research is used or what impact it has on policy, practice or broader culture and society.

Since scarcity of resources among higher education institutions (HEIs) will inevitably continue, it is imperative that HSS engage in processes and discussions around KMB and research impact, so that their value is recognized and communicated widely to the public, in order to save HSS from the chopping block in funding cuts that are occurring due to fiscal constraints from a global recession.

3 Literature Review

Impact is at one and the same time an object of derision and acclaim, anxiety and confidence. It is a troubled terrain, discussed from quite different directions, and there seems little prospect of developing a common conversation between those that traverse it. (Brewer, 2011, p.255)

3.1 A Global Debate

The rise of research impact agendas globally are a source of contention and debate across disciplines – and for good reason. From the surface, research impact might seem desirable to all involved in the research enterprise (funders, universities and researchers): Who wouldn't want research to tangibly benefit society? However, depending on the way research impact is conceptualized, assessed and what accountability measures are attached (such as direct funding to universities based on performance in relation to national research impact assessments) this agenda must be viewed with caution, and its future implications carefully considered. Many contend that impact agendas tend to

benefit Science, Technology, Engineering and Math (STEM) fields and other applied fields such as Health, and disadvantage Arts, Humanities and Social Science research areas (Bastow, Dunleavy and Tinkler, 2014; Watermeyer, 2014). This literature review explores KMB and research impact, outlining emerging trends and issues arising from the shifting landscape. As such, we label this report – The good, the bad, and the unknown – and explore these issues from a variety of perspectives in relation to funders, universities and researchers.

The most prominent example of a high stakes national research assessment apparatus is the UK’s Research Excellence Framework (REF) which evaluated 154 higher education institutions and included over 6,679 impact case studies submitted across Life Sciences, Engineering and Physical Sciences, Social sciences and Arts and Humanities attempting to describe how research has benefited society beyond the academy (More on the REF later in the report). The REF defines research impact as:

any effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia (REF, 2011).

The first issue with the impact agenda is the underlying assumption that research impact can, in fact, be measured and attributed to particular research projects or mobilization efforts, what SSHRC (2012) describes as “project fallacy” (p.13). Various authors have challenged the notion of impact on these grounds. Morton (2015) highlights that the “indirect nature of impact with research being modified or partially used or influencing the terms of debate over a long period of time, add to these challenges: ‘the ways in which research affects society are based on complex, iterative, self-reinforcing processes, distributed unequally across research initiatives’” (p.1). Instead, Morton suggests the conceptualization of research in relation to a contributions approach: “the concept of *contribution* rather than attribution has been developed here, suggesting that research is one factor amongst many influencing outcomes” (p. 3). Grant (2012) and other prominent impact scholars have also suggested changing our terminology from research ‘impacts’ to research ‘contributions’. Prior to a discussion about what research use and impact mean, it is first important to provide an overview of the perception that HSS has been under fire due to funding cuts, declining enrollments, and even more so due to the impact agendas that valorize applied research at the expense of other kinds of knowledge.

3.2 Are the humanities under attack?

There is a rising sentiment that agendas that attempt to narrowly define research impact in relation to marketization are threatening HSS. A look at popular media (such as blogs and social media) reveal a fear that HSS are not being valued and recognized within higher education reforms occurring globally. Preston (2015), in a piece called *The war against humanities at Britain’s universities*, personifies this viewpoint from a UK perspective:

A war is being waged within the cloistered world of academia, a war whose repercussions will be felt down through the generations. Long one of Britain’s global success stories, our universities are under attack by an austerity-obsessed government looking to maintain the excellence of our institutions at a fraction of the cost.... Currently fixed in the crosshairs are the disciplines of the humanities –

arts, languages and social sciences – which have suffered swinging funding cuts and been ignored by a government bent on promoting the modish, revenue generating STEM subjects (p.1)

The perception of the humanities as under attack have caused various authors to advocate for HSS. Sarah Churchwell (2014) in a blog entitled *Why the humanities matter* highlights the value of HSS:

Renowned scientist E. O. Wilson recently described the humanities as ‘the natural history of culture, and our most private and precious heritage’. The humanities are the study of what makes us human, of what it means to be human. As they penetrate every aspect of existence, they can, and should, intersect with the natural and social sciences, but literature, history, art, music, languages, theatre and film – and yes, television and computer games – are the stories and ideas through which we express our humanity

Since the humanities and social sciences tend to be less quantifiable than other disciplines in a number of areas, there has been a rising concern that HSS will be negatively affected by research funding and assessment agendas that rely on narrow views of impacts and quantifiable outcomes (such as commercial spin offs or patents). There is also the concern that impact movement places certain disciplines like HSS at a disadvantage, due to the nature to these fields. Hence, it is more important than ever to explore the ways in which HSS might actively engage in the research impact agenda and contribute to the important conversation on what is and should be valued in HSS research. The FHSS funding of this project is a recognition of the need for HSS to shape the conversation and make sure that the valuable contributions that HSS make to society are recognized and valued by funders and society. In order to understand research impact movements globally, it is first necessary to explore conceptions of research use and knowledge mobilization.

3.3 Understanding research use, knowledge mobilization and impact

The context of research has changed considerably in the past two decades. Alongside the rise of the research impact agenda has been a global interest in the field of knowledge mobilization (KMB) and knowledge translation (KT) (Nutley et al., 2007). KMB is about how research finds its way (or fails to find its way) into the hands of those in communities that could benefit from its use. There is a widely acknowledged gap between research, policy and practice across sectors (Davies et al., 2003). Research often fails to have the impact it might due to a lack of capacity to translate and mobilize this work to end users in non-academic settings including policymakers, practitioners, and community members. Due to this well documented problem, there has been an increased focus on KMB and KT across sectors. The rationale for prioritizing KMB is persuasive. Historical applications of evidence in countless areas of social policy have seen improved outcomes and benefits for citizens in society (such as handwashing in health, use of seatbelts in transportation, anti-smoking legislation in certain jurisdictions such as Canada, among many others). So it seems obvious that people would agree with the notion that applications of research, when they have the potential to benefit society, should be prioritized. The rise of attention to KMB have a been a result of this widespread recognition that research can inform policy and practice in ways that will benefit large scale systems and society at large. Funders have also adopted the view that KMB is important due to the fact that

research in most countries is funded primarily by the public purse. Hence, the public taxpayers should see the tangible benefits of government's investment in research. And if funders do invest in research, they want to determine where they should target these funds to get the best return on investment possible.

The issues and tensions surrounding research mobilization and tracing its impact across diverse stakeholders in wide ranging contexts, however, are far from simple. The examples of evidence changing practice in handwashing, seatbelts and smoking legislation are areas of research that have obvious and somewhat direct applications. Not all research lends itself well to application, especially in HSS. Even in applied fields like the health sector, research has been shown to take an estimated 15 years to get research into recommended policy and to a 40% implementation rate in practice (Antman et al., 2001). Clarifying what counts as research use is also difficult.

Research use is widely conceived of as a necessary first step in impact. Popular conceptions of research use stem from Weiss' (1979) seminal work entitled *The many meanings of research utilization*. Three of the most commonly cited types of research use include *conceptual use* (when research informs our thinking, often in ways not overtly visible), *symbolic and/or tactical research use* (when research is used strategically to support a particular position), and *instrumental use* is when research is used in direct and observable ways (Cooper et al., 2009). Instrumental uses are far less frequent than conceptual and symbolic uses – and conceptual use is (for obvious reasons) very difficult to identify. A fourth type of use added to these taxonomies by Weiss et al. (2005) has been *imposed use* – this is when research is used because it is required through policies and accountability measures.

'Use' and 'Impact' are also not synonymous terms. Does 'use' constitute 'impact' or is impact a stronger, more robust concept than use? Knott and Wildavsky (1980) in a cleverly titled piece, *If dissemination is the solution, what is the problem?*, proposed seven standards of research use. His model was based specifically on policy; however, thinking through the various levels of research use can be helpful when thinking along a continuum of the stages of research use to impact for a stakeholder or end-user of research. Figure 1 summarizes and adapts Knott and Wildavsky's work.

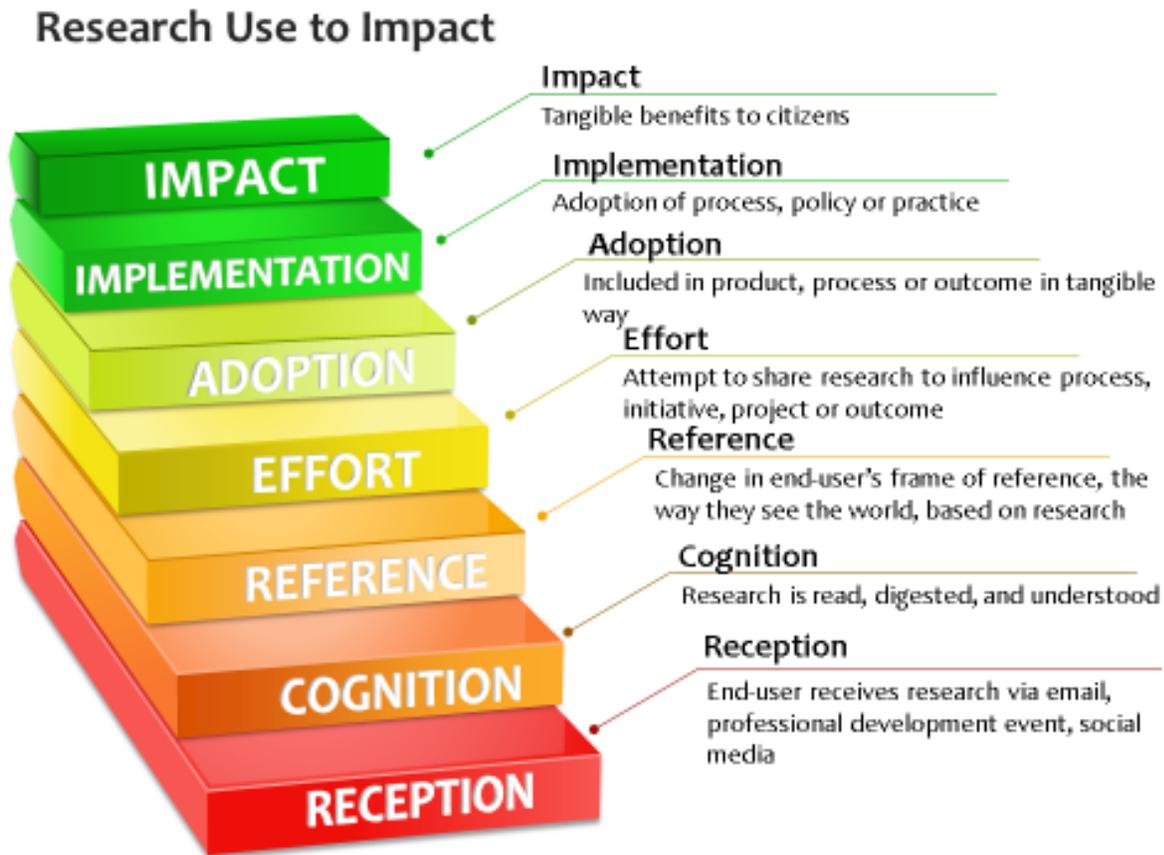


Figure 1. Seven levels of research use leading to impact, summarized from Knott & Wildavsky (1980)

In order for research to have impact, it travels through seven stages (reception, cognition, reference, effort, adoption, implementation and impact) from the moment where someone actually receives it in their inbox, to the point where they share and discuss this research with colleagues and ultimately act on it or implement it in some way. This model suffers the same weakness as many models of research use and impact, a linear depiction of research use and impact that bears little resemblance to how change actually occurs in communities. Research use and impact are circuitous, iterative, messy processes that happen over time. Incorporating research into policy and practice is not a single moment or act; rather it is about relationships among diverse stakeholders built over time and how knowledge evolves in networks and shapes behaviour. There are many taxonomies of impact (to be discussed in a subsequent section) that aim to identify the different ways in which research can have influence on different areas of society.

Sandra Nutley and Huw Davies are recognized as leading scholars in research utilization and impact across sectors. Originating from the UK, their work has influenced much of the field, including their work with research councils in the UK. In a report commissioned by the Economic and Social Research Council (2005) on assessing the non-academic impact of research, Nutley et al. highlight the importance of recognizing different types of research focuses on different areas and that all research does not lend itself well to application:

In any assessment of research impact it is important to take account of the different types of ...research. This is not just a matter of making the familiar distinction between basic and applied research but also entails acknowledging that different forms of research lead to different types of knowledge, for example: ‘knowing what works’; ‘knowing how things work’; and ‘knowing why things happen’. Assessment approaches need to be able to capture the impact of all these forms of research knowledge; they should not be signed with only ‘what works’ of research findings in mind (Nutley et al., 2005).

Hence, there is not a one size fits all approach to assessing the impact of research, especially since the type of research spanning Humanities and Social Science is so diverse. In another piece of work by Nutley, Powell and Davies (2013), *What counts as good evidence*, they summarize a schema from Brechin and Siddel (2000) on different ways of knowing:

- *Empirical knowing* – the most explicit form of knowing, which is often based on quantitative or qualitative research study;
- *Theoretical knowing* – which uses different theoretical frameworks for thinking about a problem, sometimes informed by research, but often derived in intuitive and informal ways;
- *Experiential knowing* – craft or tacit knowledge built up over a number of years of practice experience (p. 6).

A recognition of multiple ways of knowing, complicates research use and impact agendas even more, as there are many areas of HSS that focus on theoretical knowledge rather than just empirical knowledge. Glasziou and Haynes (2005) also provide three more areas to consider in relation to research use: underuse, overuse and misuse. Not all use is appropriate, and not all research impact is desirable. In fact, there are countless instances, where research used from a single study with a small sample was mobilized in ways that were detrimental to public service systems. For this reason, Cooper et al. (2009) argue that KMB efforts should only be systematized large scale where there are international bodies of reliable evidence. Reliable in this case means that “the evidence (however construed) can be independently observed and verified, and that there is broad consensus as to its contents (if not interpretation)” (Davies, Nutley & Smith, 2000, p.2). This further complicates efforts to trace impact to a single research team or project. It is also difficult to trace when someone decides not to use a particular piece of research after they have received and read it – so, the idea of tracing use to its ultimate impact is wrought with complex challenges. That being said, this does not necessarily mean that we should not attempt to learn more about the myriad of factors that influence society, including research – we should. We just need to be careful about how we go about these issues and realize that data gathered on research use and impact can be flawed, partial accounts and, as such, need to be open to discussion. The next section of this review explores the global trends and examines the similarities and differences in the ways research impact is being measured in different countries.

4 Global Trends

4.1 A shift in the way research is viewed

There are a number of global trends emerging that are changing the way that research is conceptualized, funded and enacted in communities. In a new book entitled *Achieving Impact in Research*, Chandler (2014) notes: “The emerging picture of impact is driving research direction in the twenty-first century. This paradigm shift, a change in the way we are viewing research in higher education, is both changing practice among researchers and changing the behaviors of research funders” (p.3). Figure 2 summarizes the shift identified by Chandler.

CHANGES IN THE WAY RESEARCH IS VIEWED

From	To
<ul style="list-style-type: none"> • Implicit • Research – an end in its own right • Curiosity Driven • Academic freedom • Self-regulated • Serendipity • Academic Excellence 	<ul style="list-style-type: none"> • Explicit • Focused and forward-looking research • Targeted • Constrained • Governance • Investment • Excellence with Impact



Figure 2. Paradigm shift in the way research is viewed, summarized from Chandler (2014).

The most prominent shift is from research being inward facing towards academics, universities and disciplinary silos, to research needing to be outward facing towards non-academic audiences and the general public. Some refer to this shift as engaged scholarship. Boyer’s (1990) piece on *Scholarship Reconsidered: Priorities of the professoriate* argued that conceptions of traditional research needed to be broadened:

knowledge is not necessarily developed in... a linear manner. The arrow of causality can, and frequently does, point in both directions. Theory surely leads to practice. But practice also leads to theory...viewed from this perspective, a more comprehensive, more dynamic understanding of scholarship can be considered (pp.15-16)

Boyer (1990) suggested four areas important to his conception of scholarship: **discovery** (original empirical work that advances societal knowledge, **integration** (synthesis across disciplines, across topics or across time), **application** (later termed “scholarship of engagement”) involves faculty members working outside the university with communities and non-academic audiences, and **teaching and learning** (study of teaching and learning processes) (Figure 3).

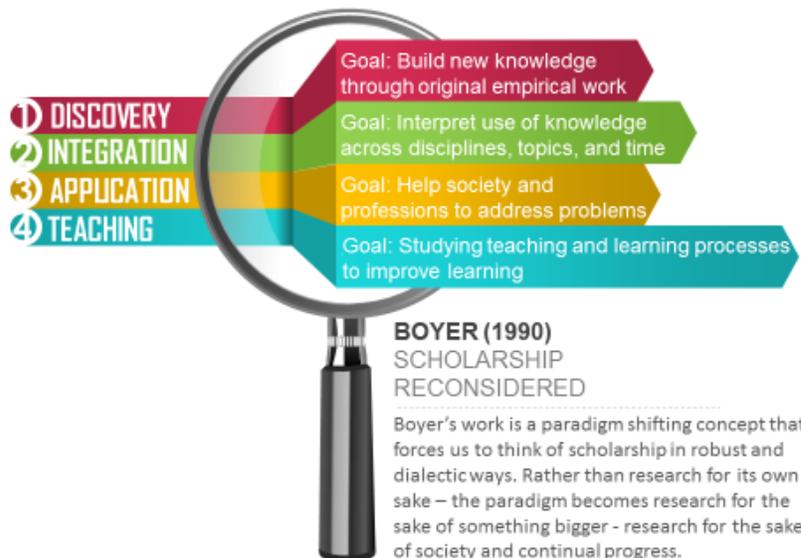


Figure 3. Scholarship reconsidered: Discovery, Integration, Application and Teaching.

Boyer's work fundamentally shifted the way many began conceptualizing the role of scholarship – scholarship that went beyond research and academic publications. Boyer's vision of the professoriate incorporated the idea of academics as public intellectual with an important role to play in societal improvement efforts. In many ways, the KMB and research impact movements (if one accepts the underlying spirit of these movements as societal transformation) echoes Boyer's notions of the role of scholarship beyond the ivory tower. The increased emphasis by research funders on non-academic engagement and impact is shifting the way researchers' conceptualize and go about their work. A more recent iteration of this goal, is the emerging field of engaged scholarship.

Engaged scholarship (defined as a form of collaborative inquiry between academics and practitioners that leverages their different perspectives to generate useful knowledge) is based on the belief that higher-quality, more relevant research results from true collaboration and from integrating the diverse perspectives of multiple stakeholders (Bowen and Graham, 2013, p. 2).

Many funders across the globe are changing the way they talk about research, its goals, and its ultimate impact. And most are moving towards conceptions of multi-stakeholder collaboration in the pursuit of greater research impact. The rationale behind the move to collaborative networks of diverse stakeholders is based on evidence on KMB and KT that research has failed to have the impact it might due to a lack of involvement of relevant end-users being involved in various stages of the research (Cooper et al., 2009; Mitton et al., 2007; Nutley et al., 2007). End-users have the potential to inform various aspects of the research process: from helping to shape what questions are asked, interpreting research results in relation to a specific context or user group, to providing input on what messages and modalities are best suited to a particular target audience. In light of these developments, it is important to explore the ways in which funders are shaping the research enterprise globally.

4.2 Increased Requirements for Researchers From Funders

Research impact agendas are being driven largely by research funders, who are increasing requirements for researchers around KMb and impact in grant applications. The policies of research funders around grant applications directly influence researchers' behaviours, as the competitive process of applying for funding causes researchers to try to align with funding priorities in order to increase chances of success. In the very least, these changes affect the grant applications themselves (as funders usually do not follow up and check whether or not KMb plans were actually implemented or not).

In order to frame the discussion around research impact and KMb – and as a precursor to the environmental scan of 32 countries (Canada, US, UK, European Union, New Zealand, and Australia) - our team visited the HSS funding agencies for each country in order to see how funders were defining KMb and research impact. Some countries had more than one research funding agency relating to HSS, so a total of 39 funding agency websites were visited. We explored two aspects of each funding agency: 1) their mission statements in relation to KMb and impact, and 2) looked for definitions of KMb and research impact in order to explore how research funders were shaping expectations of these concepts for researchers.

Over fifty percent (N=22, 56%) of the agencies did include in their mission statements something relating to KMb and the potential benefits of research to wider society. However, we were surprised and disappointed to learn that only three funding agencies actually had definitions of research impact (8% of funding agencies), and only five agencies had some type of definition of knowledge mobilization (13% of funding agencies). Some agencies are now requiring researchers to submit KMb and/or research impact plans (such as SSHRC and ESCR). Not having clear definitions and guidelines surrounding KMb and impact is problematic as researchers need to better understand how funders operationalize these concepts, so that they can align their approaches to KMb and impact in their applications and projects. Table 1 shows how social science funding agencies are defining KMb and research impact.

Table 1
Funders' definitions of KMb and Research Impact

Definitions of KMb and Research Impact from HSS funders	
Australian Research Council (ARC), Australia	Knowledge transfer/translation: Knowledge transfer is deliberately embedding knowledge for use in a context beyond the researcher's own sphere. Research impact: is the demonstrable contribution that research makes to the economy, society, culture, national security, public policy or services, health, the environment, or quality of life, beyond contributions to academia.
Social Sciences and Humanities Research Council (SSHRC), Canada	Knowledge mobilization: The reciprocal and complementary flow and uptake of research knowledge between researchers, knowledge brokers and knowledge users—both within and beyond academia—in such a way that may benefit users and create positive impacts within Canada and/or internationally, and, ultimately, has the potential to enhance the profile, reach and impact of social sciences and humanities research.

German Research Foundation, Germany	Knowledge transfer: The term 'knowledge transfer' refers to a transfer of knowledge between research and industry or the general public.
Netherlands Organization for Scientific Research (NWO), Netherlands	Knowledge utilisation: NWO believes that scientific knowledge and skills should be available and used outside of academia and/or in other scientific disciplines, in other words that knowledge utilisation should take place.
Swedish Research Council, Sweden	<p>Research Communication: Research Communication is needed so that knowledge generated by research can be of benefit to society.</p> <p>Objectives of Research Communication: The expansion of democracy created in a society of enlightened and critically thinking citizens is the overarching object of research communicating. Other goals are to illustrate and increase understanding of the importance of research to society. It is also important to promote dialogue and communication within the research community and to ensure that the results of research reach the areas in society where they can be useful, for example within education, healthcare and in trade and industry.</p>
Economic and Social Research Council (ESRC), UK	<p>Research Councils UK (RCUK) defines research impact as the demonstrable contribution that excellent research makes to society and the economy.</p> <p>Research impact embraces all the diverse ways that research-related skills benefit individuals, organisations and nations. These include:</p> <ul style="list-style-type: none"> • fostering global economic performance, and specifically the economic competitiveness of the United Kingdom • increasing the effectiveness of public services and policy • enhancing quality of life, health and creative output.
Arts and Humanities Research Council (AHRC), UK	Research impact: By impact we mean the “influence” of research or its “effect on” an individual, a community, the development of policy, or the creation of a new product or service. It relates to the effects of research on our economic, social and cultural lives.

All of these definitions capture the potential for research to benefit broader society and move beyond academia; however, many are quite general. SSHRC has a fairly comprehensive definition that emphasizes the reciprocal and complementary flow of knowledge between different stakeholder groups. Sweden also includes an interesting view that the primary role of research communication in relation to its potential contribution to enlightened and critically thinking citizens that characterize democratic societies. The Swedish Research Council also highlights the important role that research has to play in promoting dialogue.

Cooper (2015) building on the work of Levin (2004) conceptualizes knowledge mobilization in relation to three major domains: 1) research production, 2) research use in policy and practice, 3) mediated by research brokering. Cooper’s conceptualization of KMb focuses on brokering as the primary mechanism of KMb. Brokering involves building bridges between research production and research use in order to increase research impact. Cooper (2014) argues that it is important for researchers to recognize the role that brokering organizations (third party organizations that facilitate interaction between producers and users) can play assisting them in their KMb and

research impact initiatives. Cooper's previous work exploring 44 research brokering organizations across Canada identified eight brokering functions (Figure 4).

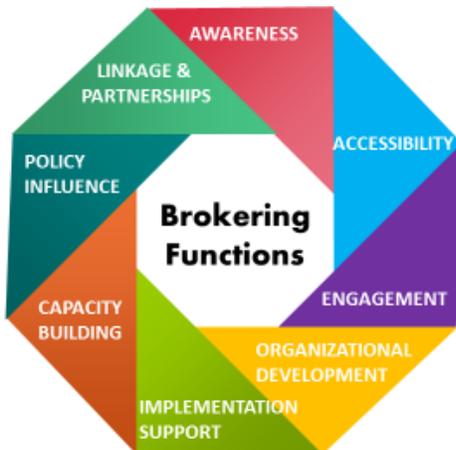


Figure 4. Brokering Functions of Canadian RBOs (adapted from Cooper, 2014).

Researchers often find new requirements from funders in relation to network development and KMB to be daunting due to the time and resources needed to develop networks. Cooper argues that in many cases, the best mobilizers of research might not be the researchers themselves, but brokering organizations with established networks that are best situated to translate and mobilize research. Meyer (2010) outlines:

Brokering involves a range of different practices: the identification and localization of knowledge, the redistribution and dissemination of knowledge, and the rescaling and transformation of this knowledge. Brokering knowledge thus means far more than simply moving knowledge – it also means transforming knowledge...knowledge brokering is likely to look very different in the various brokering spaces mentioned above, not least because the needs and expectations of the knowledge users might differ substantially. (p. 120)

Brokering facilitates and increases research impact. Cooper maintains that since brokers are often better suited to translate and transform research for different target audiences, that the role of the researcher (rather than being to act as the broker) is often to create partnerships with brokering organizations to facilitate this work, rather than going about building networks themselves.

While most of the funders that we explored did not have any resources available for researchers in relation to KMB and impact, there were some that did – such as AHRC, ESRC and SSHRC. The Arts and Humanities Research Council in the UK (<http://www.ahrc.ac.uk>) has developed a strategic plan in relation to impact including resources and tools for their researchers to use.

We take a portfolio approach to developing the evidence base [for impact]. A mix of quantitative and qualitative information is important to make a convincing and robust case for the impact and value of AHRC-funded research. An increasing emphasis on accountability and efficiency makes this approach more relevant than

ever. Quantitative evidence, for example, is needed to provide ‘hard’ evidence of outputs of funding, whilst case studies are recognised as the most effective approach to demonstrating impact (Arts and Humanities Research Council, UK)

Similarly, the Economic and Social Research Council from the UK includes guidelines about how to develop an impact strategy including templates and other resources (www.esrc.ac.uk/research/impact-toolkit). ESRC also went as far as delineating impact in two categories – 1) academic impact and 2) economic and social impact. ESRC also outlines that research impact (whether academic, economic or social) includes three types:

- *Instrumental impact*: influencing the development of policy, practice or service provision, shaping legislation, altering behavior.
- *Conceptual impact*: contributing to the understanding of policy issues, reframing debates
- *Capacity Building impact*: through technical and personal skill development (ESRC, 2015).

ESRC includes advice on how to maximise impact in relation to three areas (process, context, and content) and lists a number of key factors that are vital for generating impact including:

- established networks and relationships with research users
- involving users at all stages of the research, including working with user stakeholder and participatory groups
- well-planned public engagement and knowledge exchange strategies, including the use of product strategies which tailor evidence to the needs of users
- good understanding of policy/practice contexts eg through use of policy maps
- understand and target barriers to and enablers of change
- portfolios of research activity that build up reputations with research users
- excellent infrastructure, leadership and management support
- where appropriate, the involvement of intermediaries and knowledge brokers as translators, amplifiers, network providers. (ESRC, 2015)

Most of the factors listed from ESRC have to do with increasing collaboration between research producers and end-users in various capacities.

SSHRC’s website also included guidelines for effective knowledge mobilization. SSHRC distinguishes between outputs, outcomes and impacts:

Outputs are the first set of short-term results most researchers typically see (e.g., number of publications, presentations, event attendees, new partners added to a team, or new stakeholders and/or research users contacted or added to networks).

Outcomes (also called “results”) include all activities undertaken as a result of new insights. Outcomes may include: the number of people in various target audiences that use the research findings, the number of students trained, new capacities created, policies developed, business strategies formulated, etc. Outcomes may be either foreseen or unforeseen, direct or indirect, intended or unintended.

Impacts are long-term outcomes or effects that take the form of changed thinking and behaviours. Impacts are reflected through such indicators as, e.g., global economic performance, competitiveness, public service effectiveness, new products and services, employment, policy relevance, learning skills enhancement, quality of life, community cohesion, and social inclusion (SSHRC, 2015)

Hence, metrics that assess only outputs are not actually measuring impact. Impact is a far more robust concept. In the environmental scan we conducted, we identified and analyzed over a thousand indicators, most of which focused on outputs, rather than outcomes and impacts (See Indicators in Findings section). SSHRC also, through an evaluation of their KMb grants, lists a number of best practices in relation to research impact:

- Meetings with knowledge users are an effective vehicle for forging strong and lasting connections.
- When building relationships with organizations, build links across multiple levels, from frontline/program/policy staff to executives.
- To produce knowledge mobilization products that meet users’ needs, researchers can use or repackage existing materials, or develop new ones, in concert with the users and their identified needs.
- Larger projects typically employ a project co-ordinator. The use of knowledge brokers, who have specific skill sets, can be effective.
- Ultimately, the more proactive and multifaceted the approach researchers take with users, the more successful and durable the relationship.
- Successful projects often adopt more than one outreach medium in their knowledge mobilization plan.
- At the outset of their project, applicants should develop indicators to gauge the success of their knowledge mobilization plan. Examples include: citation indicators, the number of newsletter/blog subscribers, and the number of recommendations to policy-makers that have been adopted. (SSHRC, 2015)

The suggestions from both ESRC and SSHRC remain quite broad, but there are growing tools to support KMb and research impact efforts (This environmental scan identified over 90 practical resources for researchers to support KMb and impact efforts).

4.3 The open access movement

SSHRC advocates for open access publication platforms as an effective way to increase the visibility and impact of research. In Canada, a new Tri-agency open access policy will take effect for all grants awarded after May 1, 2015. The three major funders – SSHRC, The Canadian Institutes of Health Research (CIHR) and the Natural Sciences and Engineering Research Council (NSERC) – have created a harmonized policy that requires researchers to make sure that results from publically funded research are freely accessible online within 12 months of publication:

Open access makes it possible for the results of research to have the greatest possible impact. It is based on the idea that the products of research (i.e., full-text publications and research data) should be available to the user free of charge and without restrictions. This means that the results of research should be permanently accessible online, either through open access electronic journals, monographs or textbooks, or through institutional or personal repositories or archival systems. Over the past decade, the momentum for open access has been steadily growing. Numerous funding agencies and institutions around the world have implemented policies requiring that the publications and data resulting from the research they support be made freely available. (SSHRC, 2015)

While these policies will be active for all grants funded as of this year, it is unclear how these open access policies will be implemented and what surveillance or accountability measures will be taken to ensure that researchers follow through on open access. It also creates a number of problems in relation to copyright, as many of the academic journals will not allow copies of journal articles to be made freely available since paid memberships are required. The tri-council policy clearly states that it is the responsibility of the researchers to determine copyright permissions from each of the respective publishers.

4.4 The Rise of Performance-Based Research Funding Systems

The UK is widely regarded as the front-runner both in the field of KMB as well as research impact. KMB is about evidence-based policy and practice. Some attribute the beginning of the Evidence-based policy movement to a White paper written in the UK in 1999 in the early years of the Blair government entitled *Modernizing Government*: “We will improve our use of evidence and research so that we understand better the problems we are trying to address” (para 6). This rhetorical commitment to research use and its impact has continued. The UK has led the charge on the impact agenda by implementing one of the first large scale research assessment exercises (RAE) in 1986 that began a trend towards performance-based research funding systems that many countries have modelled from the UK. The more recent iteration of the RAE in the UK is the Research Excellence Framework (REF). The REF has created global interest as the world has watched to see how it plays out. Part of the reason that there is so much interest in research impact internationally is due to the rise of performance-based research funding systems (PRFSs) around the world. Figure 5 depicts 14 national performance-based research funding systems for universities that have arisen in the past two decades.

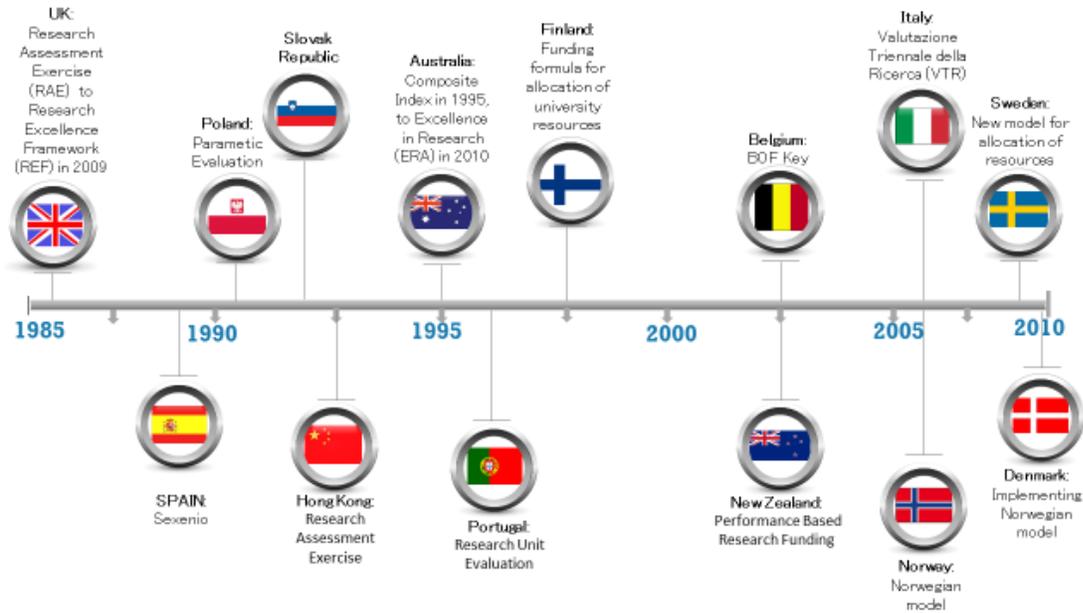


Figure 5. Timeline of established national performance-based research funding systems globally, dates and countries summarized from Hicks, 2012.

Hicks (2012) identifies five inclusion criteria for the 14 systems she considers to be performance-based research funding system: 1) Evaluation must be of research, not programs or teaching; 2) Evaluation happens after project; 3) research output must be evaluated, not just external funding and graduate student rates; 4) Research funding allocation is coupled to evaluation results (results are not just used as a feedback mechanism for universities; 5) national system (not just university level evaluation of their own activities). The emergence of PRFSs marks an age of high stakes accountability for higher education as research impact becomes directly tied to funding allocation for universities. PRFS systems are high stakes both for universities at the institutional level as well as for researchers themselves.

The rationale of performance funding is that funds should flow to institutions where performance is manifest: ‘performing’ institutions should receive more income than lesser performing institutions, which would provide performers with a competitive edge and would stimulate less performing institutions to perform. Outputs should be rewarded, not input (Herbst, 2007, p.90)

Usually these rationales are couched in the broader relationship between research excellence, innovation and global economic competitiveness (Hicks, 2010). Hicks maintains that performance-based research funding systems can be interpreted in relation to six core ideas:

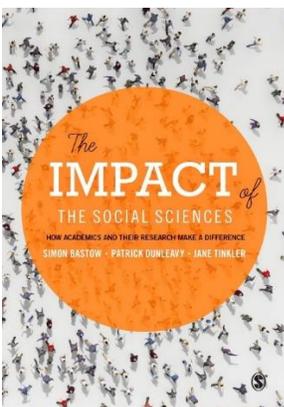
1. *Increased productivity*: “Output-based evaluation aims to increase research output without adding research resources to the system, thus increasing productivity” (p.253)
2. *Replacing traditional command-and-control systems with market like incentives*: “The shift to performance-based funding is part of a broader movement to make universities more

autonomous and introduce more strategic university management” (p.253) in contrast to control being held by researchers.

3. *Stronger Service Orientation*: “This dimension refers to increased attention to the needs of citizens...and less to the self-governed programmes of work of the community of scholars subject only to peer validation” (p.253).
4. *Devolution*: “The idea here is that programmes are more responsive and effective when managed closer to the provision of services” (p. 254) away from ministries and into the hands of universities.
5. *Formulating Policy*: This includes a shift from service delivery to contracting for service “The government as purchaser of ‘education services’ was explicitly articulated in the Australia context” (p.254)
6. *Enhanced Accountability*: “This means focusing on outputs and outcomes rather than processes and structures. Measuring research output and distributing funding on the basis of results is clearly meant to enhance accountability compared to the prior method of basing funding on numbers of faculty” (p.254).

Our team (Cooper, 2015) is conducting another study on funding agencies around the globe to answer the following question: How are social science funding agencies promoting (through requirements for researchers) and supporting (through agency initiatives) KMB and research impact? Early findings suggest that there is a lack of clarity on the part of research funding agencies about how to operationalize KMB and research impact. Agencies vary widely in their capacity to support researchers with KMB. Evaluation of KMB and research impact is still virtually absent in most (but not all) jurisdictions. Some funding agencies are creating toolkits to help researchers articulate the impact of their work; however, there is no evidence on the levels of use of these tools by researchers or the effectiveness of indicators and metrics in measuring impact. Funding agencies need to implement a more systematic approach to better support KMB and research impact agendas.

5 What is the UK Teaching us About Research impact?



The Impact of the Social Sciences Project (Bastow et al., 2015)



RAND review on international practices to capture research impacts (Grant et al., 2010).



Report of the Role of Metrics in research assessment and management (Wilsdon et al., 2015)



An analysis of Impact Case Studies from the Research Excellence Framework (Kings College, 2015).

Figure 6. Key resources emerging from the UK informing the debate.

There are a number of projects and publications from the UK that are shaping our understanding of global research impact agendas. Since the REF is the largest and most intensive performance-based research assessment program that has rolled out globally, the first few assessments of the REF process can provide key learnings for other jurisdictions that are modelling from the UK or borrowing elements from the REF in their impact assessment agendas. This section will provide an overview of four reports that are influencing the debate on research impact. The first is the London School of Economics (LSE) Impact of Social Sciences project. The second is a review conducted by RAND on international practices to capture research impact. The third is an independent review of the role of metrics in research assessment and management conducted by Wilsdon et al.'s (2015) called *The Metric Tide*. The fourth is a report - *The nature, scale and beneficiaries of research impact* - led by a prominent scholar of impact assessment Jonathon Grant analyzing the 6,679 case studies submitted by 154 universities for the REF last year.

5.1 The LSE Impact of Social Sciences Project

Perhaps one of the most influential projects shaping discussions of research impact in relation to the humanities and social sciences is London School of Economics and Political Science (LSE) Impact project. *The impact of social sciences project (Impact)*, funded by the Higher Education Funding Council for England (HEFCE), is an expansive project targeting the impact of the social sciences. The LSE impact project analyzes how social science research impacts society and attempts to develop metrics to measure these contributions. Their mission is to “maximise the impact of academic research”. LSE highlights the importance of the social sciences:

The social sciences have moved to an increasing central place in our understanding of how our societies develop and interact with each other. The external impact of university research about human-dominated and man-influenced systems- on business, government, civil society, media and culture – has grown enormously in the post-war period. It is entering a new phase as digital scholarship produces knowledge that is ‘shorter, better, faster, free’. The social sciences play a key and more integrated role in contemporary knowledge development. Yet the processes involved in social science research influencing wider decision-making have been relatively little studied in systematic ways, and consistently under-appreciated by observers outside academia. Within universities themselves scholars in other discipline groups have also been consistently and often vocally skeptical, especially physical scientists and technologists, whose central roles in knowledge development is already universally recognized and (mostly) lauded. (Bastow, Dunleavy, & Tinkler, 2014, p. 1-2).

The LSE Impact blog is also a burgeoning and widely accessed hub for diverse stakeholders including researchers, funders, among others. The blog posts provide a plurality of viewpoints on the impact agenda.

Bastow et al (2014) in their book outline a framework for understanding impact from Dunleavy and Tinkler (2014). It visualizes impact occurring through single discipline processes based on Boyer’s work (Discovery, Renewal, Integration and Application) which then moves to what they called “joined up scholarship” that is analogous to Cooper’s brokering conception outlined previously. It is

through joined up scholarship that impact interfaces are outlined (media, specialist media, professions, corporations, entrepreneurs, consultants, think tanks, policy communities and NGOs). And these interfaces connect to a domain of wider society outlined in relation to three areas: media, cultural and civil society systems; economic and business systems and public policy systems.

Bastow et al (2014) open their large empirical study by outlining 7 problems and disadvantages for the social sciences in demonstrating impact:

1. Social science research is generally ‘collective’ in character – it does not lend itself to the ‘unique discovery’ image of research closely associated (by outsiders) with STEM subjects (p.24)
2. Social science research has also not been capital intensive, nor have its key results been patentable (which essentially requires embodying innovations into physical products) (p.24)
3. Consequently, social science research rarely generates any strong or distinctive ‘first move advantages’ for firms or governments that adopt its insights, especially no quickly cashable comparative advantage of the kind that profit-maximizing businesses must seek. (p.25)
4. All the above features also mean that the social sciences are more exposed to competition from the full range of intermediaries than are their STEM counterparts (p. 25).
5. The value of social science expertise in external realms is also less linked to specific projects or pieces research than in the physical of STEM sciences.... Critics of the [REF] way of assessing external impacts via case studies have pointed out that its focus on discrete research projects or publications having specific impacts is STEM-centric and misses the importance of the ‘wise counsel’ aspects of academic service by social scientists (p. 26).
6. A great deal of external influence of the social sciences is concentrated in the public policy realm.... Yet here social scientists themselves have often suggested naïve or overstated views of what should count as ‘impact’, creating an ‘impossibilist’ image or benchmark of what real influence would consist of, implying a level or style of power that inherently cannot be attained (p. 26).
7. Finally applying social science and wider PSI [Professional Social Inquiry] knowledge that is limited in all the above ways within the public sector and government has created particular difficulties as bodies of knowledge seem to be ‘politicized’ or ‘subjective’. (p. 27)

Bastow et al. (2014) make a compelling (and largely quantitative) argument that social sciences make a substantial contribution to society. The book itself makes an important contribution to our understanding of the impact of social sciences, despite the fact that all the data are from the UK.

5.2 Capturing research impacts: A review of international practice

In 2010, HEFCE commissioned the RAND corporation to prepare a review of international practice in relation to research impact (Grant, Brutscher, Kirk, Butler & Wooding, 2010). The report provided an international review of approaches to evaluating research impact. The review is based on four case study examples of impact evaluation approaches: the Australian Research Quality Framework (RQF), the UK Arthritis Research Campaign (ARC) Scoring method, the US Program Assessment Rating Tool (PART) framework and the Dutch Evaluating Research in Context (ERiC) framework. A standard template of questions were created in order to compare the frameworks. The questions were: what the framework was; why it was being used; how it was being used; who were the key stakeholders; and what were the consequences arising from the assessment? The project also involved a workshop to identify and capture the main challenges, lessons, and ideas that arose from the frameworks. RAND identified several criteria that would be significant in developing an impact assessment framework. The framework should:

- be credible and acceptable to the academic as well as user communities
- encompass the full range of economic, social, public policy, welfare, cultural and quality-of-life benefits
- within a single broad approach, be adaptable to apply to all disciplines
- be practicable and not generate an excessive workload for the sector
- avoid undesirable perceptions and incentives
- complement other funding streams including the research councils' approach to increasing the impact of research

Six important issues were identified by participants from reviewing the four research assessment frameworks (RQF, ARC, PART and the ERiC) for Higher Education Institutions (HEIs): Strategic intent, Definitions (a common language), unit of analysis, attribution, end users, and burden. Six recommendations were made to HEFCE by RAND in relation to how these issues should be addressed in the REF:

Be clear on strategic intent → To be effective it will be essential that the approach can provide an unambiguous rating and comparison of submissions. Consider allowing some flexibility in the weights given to the three areas of assessment – quality, impact and environment. Be very explicit about the criteria for assessing impact.

Have a clear understanding of what it is meant by “impact.” → Who should define what is ‘impact’? Researchers, universities or HEFCE? Because of the imperfections of both quantitative and qualitative measures of impact, HEFCE should use a combination of the two, such as using case studies or narratives supported by possible proxy indicators of impact as proposed for the RQF. HEFCE must consider whether there should be an absolute evaluation of impacts or a relative one. **Have a clear idea of the unit of analysis** → RQF approach allows researchers and institutions discretion in how they organize into groupings – while still requiring groups to have some minimum size.

Acknowledge the challenge of attribution (“Attribution is the ascription of a causal link between observed changes and a specific intervention. In the context of research assessment, this means demonstrating a link between original research and verifiable impact” p.67) → RQF approach acknowledges that the issue of attribution is complex, but can be mitigated by a case study approach, and by focusing on those impacts where attribution is more readily demonstrated. It needs to be made explicit that case studies are illustrative, rather than intended to measure the total impact of an HEI. Secondly, a verification mechanism is likely to be important in building confidence in the approach and could be addressed by an auditing framework that would review impact claims and could double check a sample of impacts.

Undertake further work to understand the degree of administrative burden for different stakeholders → the administrative burden of assessing impact is relatively high – three of the four frameworks were rated amber, and the other (ERIC) red in the assessment.

Clarify the role of end users, and what is expected of them and whether this is realistic → There is a need to verify claims of impact in submissions by HEIs. There are no robust indicators for research impact similar to bibliometric analysis of research publications and citations. Thus the only alternative is some form of review. As the focus will be on research impact – as opposed to research quality – it will be important to recruit reviewers who can make an independent assessment of high impact research versus, for example, low impact research. This will mean identifying reviewers who are the end users of research, such a business people, policymakers and others. (Summarized from Grant et al., 2010, pp. 63-69)

This RAND report represents one of the first overviews of international practices for assessing research impact. And in fact, Jonathon Grant, was also involved in the subsequent evaluation of the REF.

5.3 The metric tide: An independent review of research assessment

The Metric Tide (Wilsdon et al., 2015) is a comprehensive independent review of the role of metrics in research assessment and management, conducted by a multidisciplinary group of experts also commissioned by HEFCE. Wilsdon opens the report with a reminder that metrics and research assessment remains a high stakes proposition:

Metrics evoke a mixed reaction from the research community. A commitment to using data and evidence to inform decisions makes many of us sympathetic, even enthusiastic.... Yet we only have to look around us, at the blunt use of metrics such as journal impact factors, h-indices and grant income targets to be reminded of the pitfalls. Some of the most precious qualities of academic culture resist simple quantification, and individual indicators can struggle to do justice to the richness and plurality of our research....At their worst, metrics can contribute to what

Rowan Williams... calls a “new barbarity” in our universities... Metrics hold real power: they are constitutive of values, identities and livelihoods.

The Metric Tide includes a comprehensive literature review (Wouters et al., 2015) of key issues arising from bibliometrics and the use of indicators.

A major issue with research assessment as it is occurring globally, is its reliance on bibliometrics and assessing the number of academic publications that occur in ‘high quality’ journals. Three major multidisciplinary databases are usually used for bibliometrics: Web of Science (WoS), Scopus, and Google Scholar (GS). Wouters et al. note that “The Social Sciences and Humanities (SSH) create special challenges for bibliometric analyses, primarily as books and national journals can play an important role in these subject areas and such publications are less often indexed in bibliographic databases” (p. iv). To exacerbate matters, Wouters et al. also note consensus in the literature that citation rates should not be directly compared across fields due to the differences that exist among fields. It is also difficult to deal with allocate credit to respective authors in multi-author publications (Wouters, 2015). Wouters et al. provide a detailed look at global trends:

The literature review also summarises the main research strands on indicator effects, noting the wide-ranging set of literatures that focus on the governance of science at large and the multi-disciplinary body of work that portrays the rise of performance measurement in academic settings as part of a broader upsurge of accountability measures in public institutions from the 1980s onward. Indicators are positioned as tools that drive competition, instrumentality and privatization strategies and help steer academic institutions and researchers towards becoming more like market-oriented actors (p. vi).

The authors go on to highlight five issues arising from indicator effects. The first is about *strategic behavior and goal displacement*. Studies indicate that funding and evaluation such as the REF are actually leading to goal displacement in a number of countries – where the goal becomes scoring highly on the assessment exercise. The second is *effects on interdisciplinarity* also show negative effects on goal displacements. *Task reduction* is also problematic, where certain types of activities that are not evaluated in the performance-based funding systems (such as teaching, outreach, and so on) are abandoned to focus on publishing in particular journals that will increase standing in the performance assessment. The fourth effect of indicator uses is in relation to *effects on institutions* where some evidence shows alignment with hiring practices or promotion between institutions and funding criteria. The last effect is in relation to the *effects on knowledge production* that “point to a discrepancy between the importance of indicators in evaluation practices according to academics and their own judgement of the accuracy of certain measures” (p.vii).

While Wilsdon et al recognize the positive potential of systems that encourage collaboration that might increase the impact of research in communities, they also caution the field and national funders about the application of such metrics across different institutions and disciplines. They provide many reasons that the research impact agenda has gained so much momentum internationally:

There are powerful currents whipping up the metric tide. These include growing pressures for audit and evaluation of public spending on higher education and research; demands by policymakers for more strategic intelligence on research quality and impact; the need for institutions to manage and develop their strategies for research; competition within and between institutions for prestige, students, staff and resources; and increases in the availability of real-time ‘big data’ on research uptake and the capacity of tools for analyzing them (Executive Summary)

Wilsdon et al. identify a number of major findings in relation to research assessment and the use of metrics including:

- Across the research community, the description, production and consumption of ‘metrics’ remains contested and open to misunderstanding
- Peer review, despite its flaws and limitations, continues to command widespread support across disciplines. Metrics should support, not supplant, expert judgement
- Inappropriate indicators create perverse incentives
- Indicators can only meet their potential if they are underpinned by an open and interoperable data infrastructure (pp.viii-ix)

The Wilsdon report ultimately advocates for what the authors refer to as responsible metrics. They identify a number of dimensions through which to understand ‘responsible metrics’:

- **Robustness:** basic metrics on the best possible data in terms of accuracy and scope;
- **Humility:** recognising that quantitative evaluation should support – but not supplant – qualitative, expert assessment;
- **Transparency:** keeping data collection and analytical processes open and transparent, so that those being evaluated can test and verify the results;
- **Diversity:** accounting for variation by field, and using a range of indicators to reflect and support a plurality of research and researcher career paths across the system;
- **Reflexivity:** recognising and anticipating the systemic and potential effects of indicators and updating them in response.

This comprehensive review makes a valuable contribution to our understanding of the use of metrics in national research assessments, especially bibliometrics. The authors provide 20 specific recommendations in relation to five areas: 1) supporting the effective leadership, governance and management of research cultures, 2) improving the data infrastructure that supports research information management, 3) increasing the usefulness of existing data and information sources, 4) using metrics in the next REF, and 5) coordinating activity and building evidence.

5.4 The nature, scale and beneficiaries of research impact

The Research Excellence Framework (REF) is an expansive national research assessment exercise in the UK that attempts to capture and compare the impacts of research across a range of institutions and disciplines. The outcomes of the REF are used to a) inform allocation of research funding, b) provide accountability for public investment in research and c) contribute to benchmarking information that will allow longitudinal comparisons. A major component of the REF is expert review panels who assess and rank impact case studies across four areas: 1) Life Science, 2) Engineering and Physical Sciences, 3) Social Sciences and 4) Arts and Humanities. The King's College report, released March 2015, is an initial analysis of REF 2014. The report, led by Jonathon Grant, analyzed 6,679 impact case studies submitted from 154 HEIs across the UK. As Grant and colleagues highlight: "The allocation of research funding based on non-academic impact is relatively new, with the REF being the first example of its application across a research system" (p.12). Hence, the REF is gaining international interest as other jurisdictions watch how it unfolds across the UK. The format of each impact case study was a four page summary that included five sections: 1) Summary of the impact, 2) A description of the underpinning research, 3) Reference to the research, 4) Details of the impact, and 5) Sources to corroborate the impact (King's College, 2015). Two criteria were utilized by expert peer review panels to assess impact case studies: "1. Reach - 'the spread or breadth of influence or effect on the relevant constituencies', and 2. Significance - 'the intensity or the influence or effect'" (p. 13). Data and text mining were used to analyze the impact cases.

Topic modelling was utilized to analyze the section 'details of impact' for all the documents. Analysis occurred in relation to 60 topics created from the research team that spanned the disciplines (some examples include architecture and building, arts and culture, banking, cancer, climate change, dentistry, film and theatre, media, mental health, museums and exhibitions, nuclear energy, public engagement, schools and education, sports, water and flood management, women, gender and minorities, among many others). The report found that the largest two areas of impact were informing government policy, followed by parliamentary scrutiny and technology commercialization. Analysis also found that smaller less research intensive HEIs sometimes make disproportionate contributions to impact. They found this disproportionate impact in relation to nine areas - sports, regional innovation and enterprise; arts and culture; music, drama and performance; religion; women, gender and minorities; schools and education; community and local government; and Asia. Hence, "this raises some interesting research policy questions with regard to the nexus of selective funding, concentration and research excellence" (p.71). In the end, UK research shows an incredible range of diversity of impacts. In fact the analysis of impact case studies across fields yielded over 3,709 unique pathways to impact!

International collaboration and reach is often used to assess research impact and excellence. Locations (geotags) were also extracted from impact case studies where possible. 23,420 locations were mentioned in the impact details; of these, 17,932 were outside the UK. The top ten countries mentioned outside the UK were United States (10%), Australia (6%), Canada (5%), Germany (5%), France (4%), Ireland (3%), China (3%), Netherlands (3%), India (3%) and Italy (3%). So UK research impact, at least as described by the researchers themselves, are having impacts in other countries. Grant and colleagues also used a deep mining approach to drill down into six themes more thoroughly:

- What is the impact and value of research on clinical practice and health gain?

- What has been the impact of research on industry in terms of spin-out companies, patents, or licenses?
- What has been the impact of research on public policy and parliamentary debate?
- What has been the impact of research on film and theatre?
- What has been the influence of the Wellcome Trust and British Academy?
- What has been the impact of research on the BRIC (Brazil, Russia, India and China) countries?

While we do not go over the results of each of questions in this review, the method for deep mining allowed a more nuanced qualitative analysis of case studies in conjunction with data and text mining in order answer more specific questions. We outline these questions in order to show the kind of deeper analyses that might be possible based on large scale collection of research impact case studies like the REF.

Grant and his team found that “the quantitative evidence supporting claims for impact was diverse and inconsistent, suggesting that the development of robust impact metrics are unlikely” (p.7). Similarly, since there were no common categories and indicators of impacts utilized across the cases, comparing across disciplines was not possible. Grant et al. suggest that “future analyses could be improved by collecting more structured and standardized information” while highlighting that “there are trade-offs to this suggestion to consider – such as the potential increased burden on case study authors, and the risk that diverse and heterogeneous impacts might be discouraged by a more prescriptive framework” (p.7). This report also outlines the limitations of case studies as primary research material, “they articulate a select set of impact, written to specific rules as defined in the REF guidance, and in a style and tone that aims to ‘sell’ the impact to assessment panels” (p.72).

The analysis by Grant et al. was one of the first to try to catalogue research impacts on this scale. In the end they highlight a number of important findings. Analysis reinforced “evidence on the broad contribution that research makes to the economy, society, culture, public policy and services, health, the environment and quality of life in the UK and globally” (p.71). Due to the fact that their analysis uncovered 3,709 unique pathways to impact:

This would suggest that any attempt to define a standard route to research impact could be counterproductive, and that both incentives to encourage researchers to consider impact (such as Research Council ‘pathways to impact’) and reward mechanisms for achieving impact (such as REF case studies) should continue to be narrative-based (p. 71).

The long terms implications of the REF and similar national research assessment exercises are still relatively unknown.

5.5 Approaches and Methodologies to Measuring Impact

There are a variety of approaches to measuring research impact that have been cited throughout the literature and used in the large scale research impact assessments occurring globally (like the REF). The emerging view is that mixed methods, with a focus on rich case studies, has the potential to capture more nuanced and robust narratives of impact across academic and non-academic audiences.

Morton (2015) outlines three main approaches to assessing research impact: forward tracking, backward tracking, and the evaluation of mechanisms to increase research use.

Forward tracking studies start with research and trace forward into policy or practice settings to investigate impact (Molas-Gallart et al. 2000; Nason et al. 2007). They are more common but rely heavily on the researcher's and research user's own recollections of research use (Nutley et al. 2007; Donovan 2011). Backward tracking approaches analyse a policy or practice setting to explore the use and impact of research (Gabbay and le May 2004; Smith 2007; Jung and Nutley 2008). In backward tracking studies, behaviour can be examined and tracked back to research. Specific interventions such as KE activity can be assessed. However, this type of assessment raises questions such as whether it will be possible to show impact of specific research projects or programmes (Buxton 2011) and, if so, if this will be generalizable. (Morton, 2015, p.3)

Morton along with many others (such as Boaz, 2009; Davies and Nutley, 2008; Phipps, 2012; Tseng, 2007) suggest the utility of case studies in capturing impact due to diverse contexts.

Morton (2014) identifies three key challenges to understanding and assessing research impact from the few existing impact studies that do exist.

Timing: impact may occur over unpredictable timescales; follow-up too soon and impact has yet to happen, too late and actor's recollections of events are vague (Bell et al., 2011; Meagher et al, 2008; Molas-Gallart and Tang, 2011)

Attribution: how can change be attributed to specific research projects, programmes or findings, especially when there are many other factors at play (Grant et al, 2000; Meagher et al, 2008; Spaapen and van Drooge, 2011)

Context: specific contexts for research use have a huge influence on the use of research, but we have limited ways of understanding their influence or how they change over time. (Bell et al, 2011; Court and Young, 2004). (Morton, 2015, p. 2)

Empirical studies from a cross-sector review of research impact by Walter et al. (2003b) considered many forms of impact including:

- changes in access to research
- changes in the extent to which research is considered, referred to or read
- citation in documents
- changes in knowledge and understanding
- changes in attitudes and beliefs
- changes in behaviour (p. 11)

In a cross-sector review of the literature on research impact, Walter et al. also identified eight mechanisms through which studies aimed to enhance research impact (Figure 7).

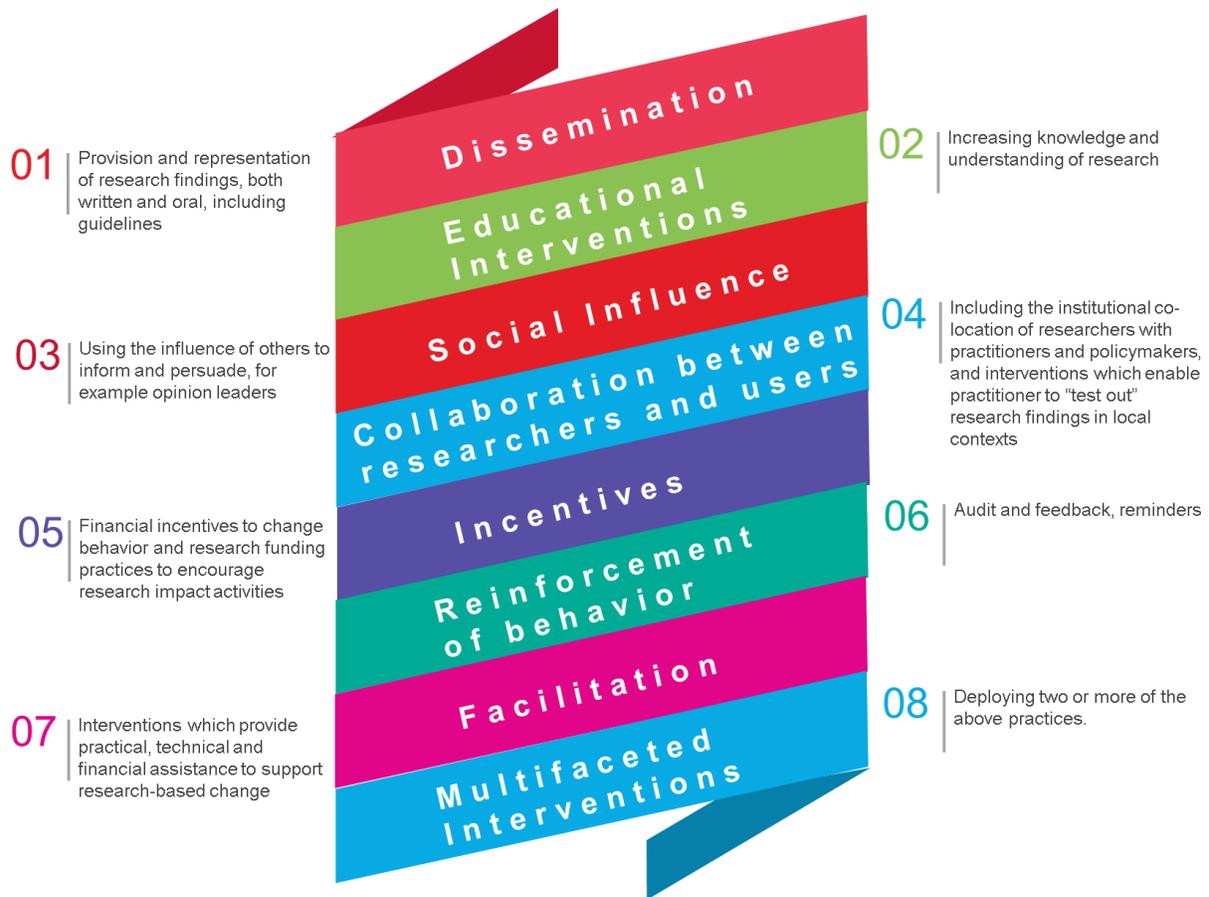


Figure 7. Eight mechanisms to increase research impact.

These mechanisms occurred in public service sectors, so not all of these mechanisms would be relevant to areas of HSS that do not deal directly with communities.

6 Unique Features of Canadian Landscape of Impact

Canada is acknowledged as a leader in both knowledge translation and knowledge mobilization. Mitton et al (2007) in a literature review that assessed the quality of empirical work in relation to knowledge transfer and exchange found that more than half of the authors of 'high quality' studies were located in Canada.

SSHRC has a knowledge mobilization strategy and requires researchers to submit Kmb plans and intended impacts with both academic and non-academic audiences. SSHRC has contributed to the national landscape in a variety of ways such as commissioning research to explore impact as well as creating Kmb funding streams (through connection and Kmb grants as well as partnership development grants).

Over 2006 and 2007, SSHRC funded 17 small scale (\$25,000) projects to assess research impacts. Wixted and Baudry (2012) summarize the findings from the projects in a discussion paper entitled "Capturing the Impacts" of Research. The projects were categorized as discipline based, focusing on knowledge mobilization and systems based studies. The projects used a range of methods to assess

research impacts including interviews and focus groups, surveys and data mining and analysis. Important findings from these 17 studies include:

- Canadians are willing to pay for research but there has not, perhaps, been enough communication about the value HASS fields have for practical problems (Rudd).
- HASS academic researchers behave in a manner similar to that of their colleagues in STEMM fields (Langford and Hawkins).
- Evidence suggests that HASS research outputs are accessed, used and the findings implemented in the non-academic world (government and law); however, this transition can often take decades (Couture).
- The full potential of HASS knowledge mobilization activities may not be realized if current incentive structures do not place greater weight on societal engagement relative to scholarship exclusive activities (Bloom). However, reconfiguring the institutional incentive systems needs to be done slowly and with consideration of the changes in behaviour and of unintended consequences. Simply changing the metrics will, over time, change behaviours but not necessarily with any change in actual impact. (This is a known phenomenon. See Steele et al. [2006] and Beaudry.)
- SSHRC needs to consider its position on making data more accessible on existing grants and decisions and on implementing the proposals on final reporting suggested by the Phipps research.
- The drive towards developing ever more sophisticated tools for mining databases to derive impact metrics is built on the implicit understanding that those databases are meaningful and contain unambiguous data, which is clearly not the case (see Beaudry in Chapter 2). Thus, assuming the desire to develop metrics is not going to go away, one has to determine what approaches are available for developing clearer datasets.
- There needs to be encouragement, dialogue and debate among HASS researchers on what the Canadian public perceives to be of research importance; on what researchers value; on the value of HASS in addressing various socio-economic issues; and other, so-called “methodological” limitations problems (Gingras and Archambault; Rudd; Langford and Hawkins; Lewis; see also Cressman et al. 2009).
- If the topic of science policy and impact (for all sciences) is to become a legitimate topic of scholarship in Canada, the question is whether it can do so within SSHRC’s existing committee structure where such proposals have no specific home.
- The ESRC in the United Kingdom has engaged in a concerted effort to develop its own guided approach to capture the impact of research. There is a huge wealth of material on the topic but is there a place for something more novel than trawling through mountains of journals to glean the complexity of the topic? An international conference, building on conferences organized by the ESRC, would be a start and a HASS-relevant compendium similar to that developed by the Canadian Academy of Health Sciences would be good. However, research does need more than a Wiki site hosted by one of the world’s social sciences councils. As we have learned from the knowledge

mobilization/translation projects, creating knowledge is not the problem; prolonged, engaged discussions between researchers and users will be. What venues and forums could be established for policy-makers and researchers to work with each other for an extended period of time?

- There is a wide diversity of approaches to impact analysis. Some sensitivity must be shown to the variety of methods—as well as the very language—used. New terms might be employed to complement or replace the word “impact” – terms that are less emotive and value-laden (e.g. social benefit) (Wixted & Beaudry, 2012, pp. 65-66)

This report, and the funded studies, contribute to an increased understanding of research impact across disciplines in relation to the Canadian landscape. SSHRC also commissioned and funded a review (2008) conceptualizing impacts of research/creation in the Fine Arts. This review proposed a taxonomy of research/creation funding in relation to five areas: means, legitimacy, capacity, collaboration and KMb. The report also suggested a taxonomy of impact that included 12 areas: personal (professional), theory, research systems, capacity, KMb (dissemination), collaboration, technological, personal (audience), cultural, economic, social and policy. In the end, the report outlined the ways in which SSHRC projects had made impacts in these 12 areas.

Canada also has a national network called *Research Impact* (RIR) that is Tri-council funded and includes 11 universities across the country that have KMb units. Founded in 2006, this network builds institutional capacity to support KMb among faculty, students and partner organizations. Another KMb initiative, unique to Canada and funded by SSHRC, is the Community-University Research Alliance (CURA). SSHRC funded a number of CURA projects in recent years which focused on KMb across a variety of areas. SSHRC has been involved in nurturing and encouraging Canada as a leader of KMb across the globe through many of its initiatives. So far Canada, through SSHRC initiatives, has taken a softer approach to KMb and research impact that rigid PBFSS cropping up in other jurisdictions with a focus on the requisite funding and capacity building needed to build robust networks across disciplines.

7 The Research Study

7.1 Project Overview

The overarching research questions guiding the environmental scan were modified from the Canadian Academy of Health Sciences (CAHS, 2009), who created a comprehensive menu of preferred indicators for research impact in the health sector:

Is there a “best way” (best method) to evaluate the impacts of Humanities and Social Science research in Canada, and are there “best metrics” that could be used to assess those impacts (or improve them)?

The focused research questions that guided the scan and analysis of research impact resources included:



1. How many and what types of research impact resources exist for the Humanities and Social Science Disciplines across Canada, USA, European Union, Australia and New Zealand?
2. How does the proportion and types of frameworks compare across countries and disciplines?
3. What type of agencies create and implement these frameworks (funders, universities, intermediaries, private companies)?
4. How do these frameworks compare (what categories, indicators and methods are used to capture research impact)? What are the similarities and differences across countries, disciplines, types of agencies and types of resources?

7.2 Conceptual Framework

The conceptual framework for this project was adapted from Cooper (2014) and explored four dimensions to classify research impact resources: 1) country of origin, 2) field, 3) agency that created the resource, and 4) type of resource (Figure 8). Appendix A includes definitions for each area of analysis. These definitions will be incorporated throughout the final report.

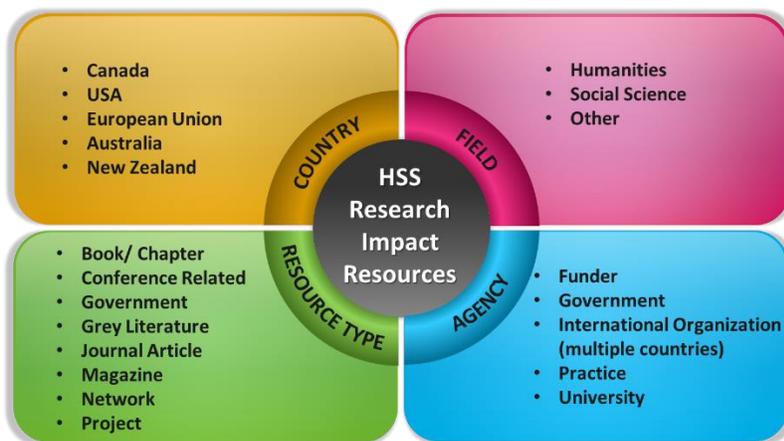


Figure 8. Conceptual framework to classify and analyze types of research impact resources (Adapted from Cooper, 2014).

7.3 The Sample

The Sample included Canada, the USA, the UK, the European Union, Australia and New Zealand (Figure 9).



Figure 9. 32 countries (highlighted in blue) included in environmental scan.

The full list of countries included: Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom, and United States.

7.4 Methods

This project provided an environmental scan of the research impact resources that exist for humanities and social sciences across US, Canada, the European Union, Australia and New Zealand. Environmental scans are not simply ad hoc online searches; rather, Conway (2009) highlights that environmental scanning is formal and systematic, using “formal methodologies for obtaining information for a specific purpose” (p. 2). The environmental scan was conducted using systematic search strings produced by combinations and permutations of key terms based on individual database thesauri (Table 2) in consultation with information scientists.

Table 2
Keywords used to produce systematic search strings

Country	Discipline	Type of Organization	Measure Synonyms	Research Synonyms	Impact Synonyms	Type of Resource
Canada United States European Union Australia New Zealand	Humanities Social Science	Research funder Government Intermediary University	Measure Evaluate Assess Capture	research academic evidence best practice knowledge translation knowledge mobilization	Impact Benefits Excellence	Framework Assessment Indicators Standards Metrics

There were two phases of analysis. The first analyzed resources in relation to the conceptual framework. The second phase conducted in-depth analysis and coding for 1105 indicators identified through the environmental scan. Figure 10 summarizes our methodological approach in relation to these two phases.

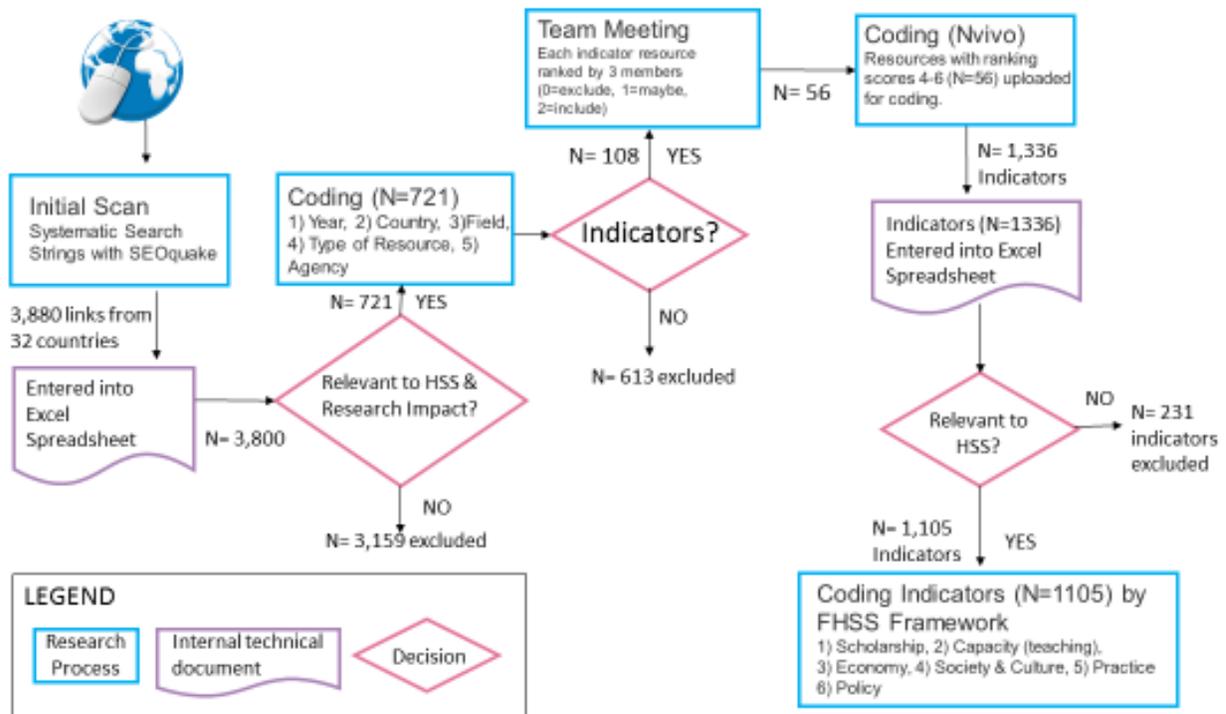


Figure 10. Methodological approach to conducting environmental scan.

Our initial scan used Google, Google Scholar and relevant databases in order to uncover articles, grey literature, and other research impact resources. Due to the large number of countries included in the environmental scan, we utilized SEOquake (<http://www.seoquake.com/>) an analytic seo-tool to automate searches and export initial results into Excel from Google and Google Scholar. SEOquake uses a keyword density tool to identify the number of times keywords are used on a webpage in order to gather results based on customized parameters we created. Where databases were utilized, we manually entered results into Excel. The initial search yielded 3,880 links based on our systematic search strings. Specific Boolean searches with database, number of results and notes on the search can be found in the Excel spreadsheet (Cooper and Shewchuk, 2015, Sheet 14).

Each of the 3,880 results were analyzed to determine inclusion or exclusion based on the conceptual framework and research questions. For instance, frameworks that were not relevant to the humanities and social sciences were excluded. Three thousand one-hundred and fifty-nine (3,159) results were excluded, leaving a sample of 721 research impact resources to be included for coding and further analysis. These 721 results were coded in Excel in relation to the major areas of the conceptual framework including country, field, agency and type of resource. Excel was used to calculate descriptive statistics and cross-country comparisons (Cooper and Shewchuk, 2015, Excel spreadsheet) to investigate trends.

We conducted further analysis of the 108 resources that had indicators in relation to the FHSS research impact framework: Scholarship, Capacity Building (through teaching and mentoring), Economy, Society and Culture, and Practice and Policy. In order to determine which of these 108 resources should be included in an in-depth analysis, the abstracts were read by three members of our research team and allotted 'scores' based on its relevance to the study: 0= exclude, 1 = maybe

include, 2= include. Team members did not see each others rankings before tallying the scores. We tallied scores and then excluded papers with totals between 0-2, included papers with totals between 4-6 and further discussed papers with ratings of 3-4 to decide whether to include them for indicator analysis. A total of 56 resources were included for further analysis and uploaded to NVivo.

Each resource (N=56) ranked highly relevant was uploaded into NVivo. Indicators from each resource were coded, which yielded 1336 discrete indicators. Of these 231 indicators were discarded for one of the following four reasons:

- a) The indicator was 1 word which made extrapolation about the meaning difficult without the full article
- b) The indicator used acronyms which made understanding difficult
- c) The indicator was duplicated from the same document
- d) The indicator dealt with non-research related activities

After excluding 231 indicators, 1105 indicators were coded according to the FHSS framework in relation to scholarship, capacity, economy, society and culture, practice and policy. We have created a supplementary file, entitled *A Taxonomy of Research Impact Indicators*, list all indicators categorized by the FHSS framework as a resource for HSS researchers to consider when contemplating indicators they might use for their grants or to assess KMb and impact on their projects.

7.5 Findings

The environmental scan for research impact resources for the humanities and social sciences across 32 countries including the UK, USA, Canada, the European Union, Australia and New Zealand identified 721 research impact resources. We conducted analysis for descriptive statistics based on the research questions and conceptual framework (Country, Field, Type of Resource, and Agency).

7.5.1 An explosion of research impact resources in the past decade

There has been a veritable explosion of research impact resources in the past decade (Figure 11).

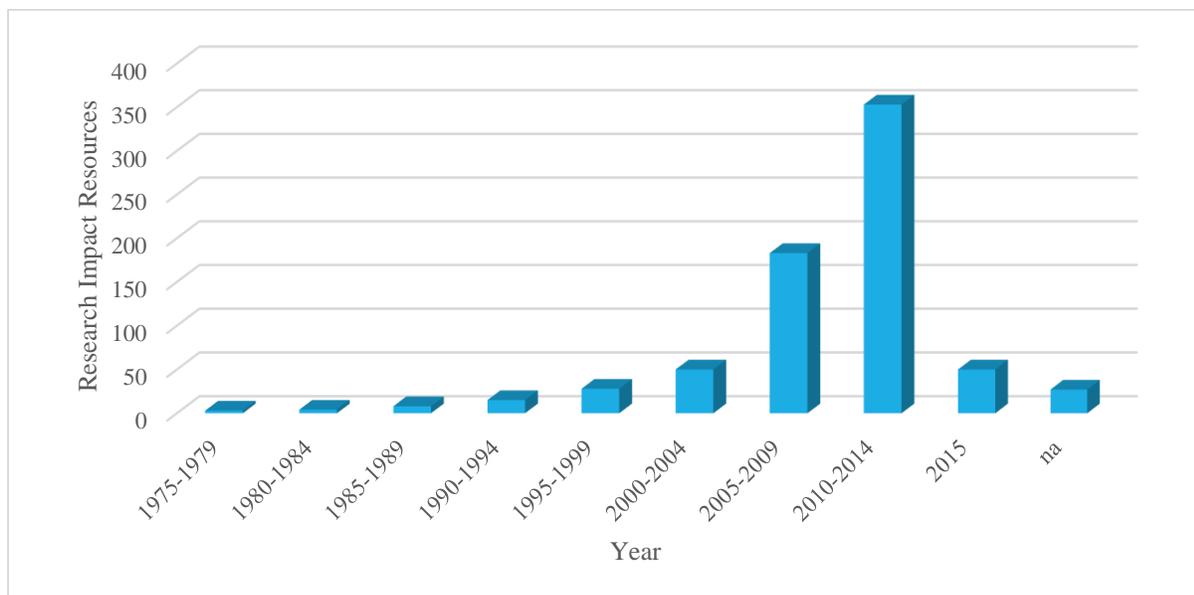


Figure 11. Date of origin of research impact resources (N=721).

81% of the resources have arisen since 2005, with over half of the research impact resources originating in the past five years. This trend, in and of itself, shows the growing prominence of research impact agendas across the globe.

7.5.2 Which countries are producing the most research impact resources?

The UK, Canada and the United States had the most research impact resources (Figure 12). ‘Other’ countries in our analyses included countries outside the 32 targeted by the environmental scan and were included when we thought the resource from that country would be of relevance to HSS researchers.

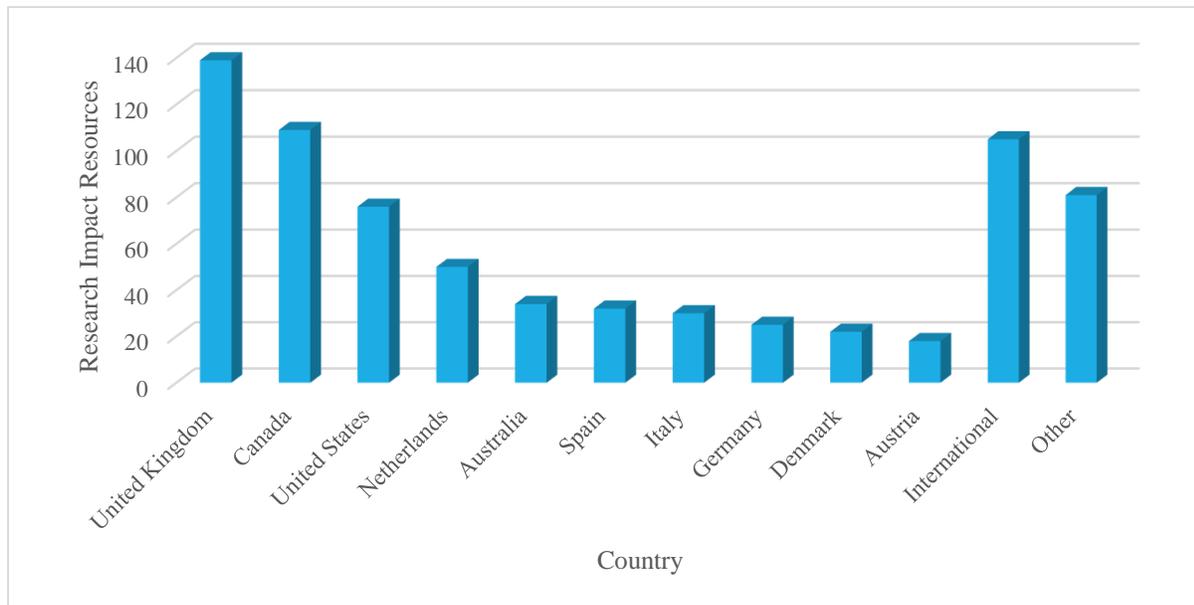


Figure 12. Frequency of research impact resources by Country (N=721).

International organizations (that include multiple partner countries such as OECD) also featured prominently in the distribution of research impact resources. Due to the move to the REF in the UK, it is perhaps not surprising that they had the largest proportion of research impact resources.

7.5.3 What kinds of research impact resources are being produced?

We were interested in mapping the different kinds of research impact resources that were being produced globally. The types uncovered by the environmental scan included journal articles, grey literature, government publications, books and book chapters, services, networks, conference related, project based, magazines, repositories and software to trace influence (for instance to assess social media platforms like Twitter and Facebook). Peer-reviewed journal articles comprised 45% of the resources identified and included a range of impact frameworks, studies and indicators (Figure 13).

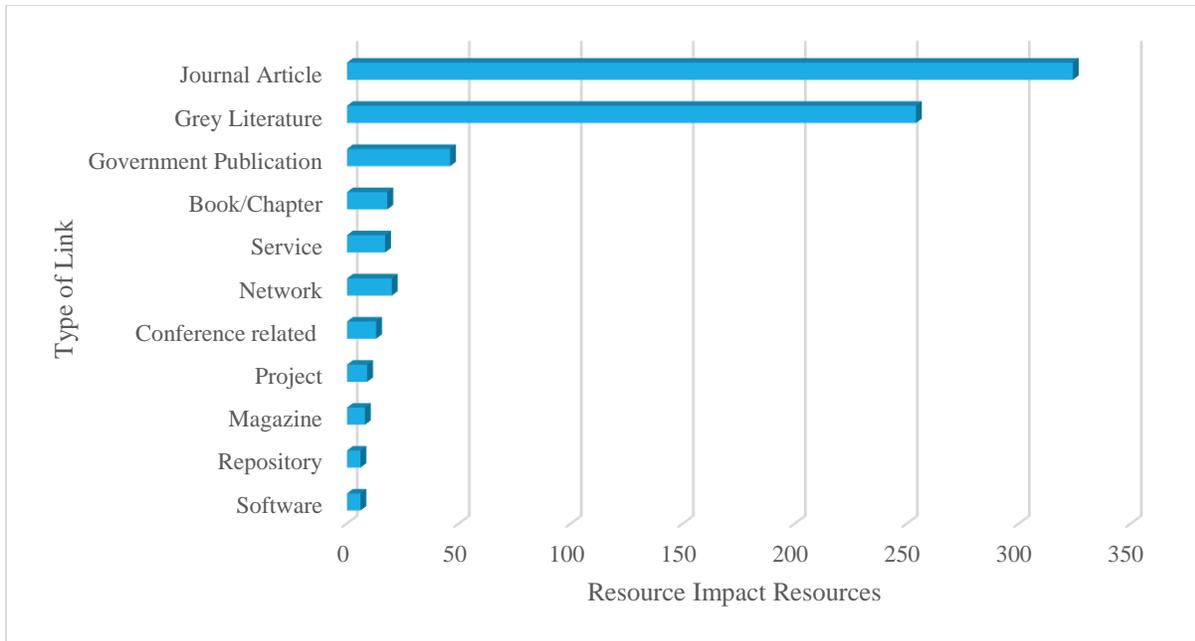


Figure 13. Frequency of research impact by type (N=721).

The second most prominent category included grey literature (reports, toolkits, and so on) followed by governmental publications. There were very few tools tailored to help researchers meet the rising demands from funders and governments (less than 9% of the total sample). Research impact resources were not always free, some (like journal articles and software) required licenses or subscriptions. However, there were some toolkits and resources that are freely available to assist researchers in their efforts to mobilize research and trace the subsequent influence of their work (the final report will showcase these resources).

Since 45% of the resources were actually articles, we did an additional analysis of just the peer reviewed articles (N = 300) in order to see if any journals featured prominently (Figure 14).

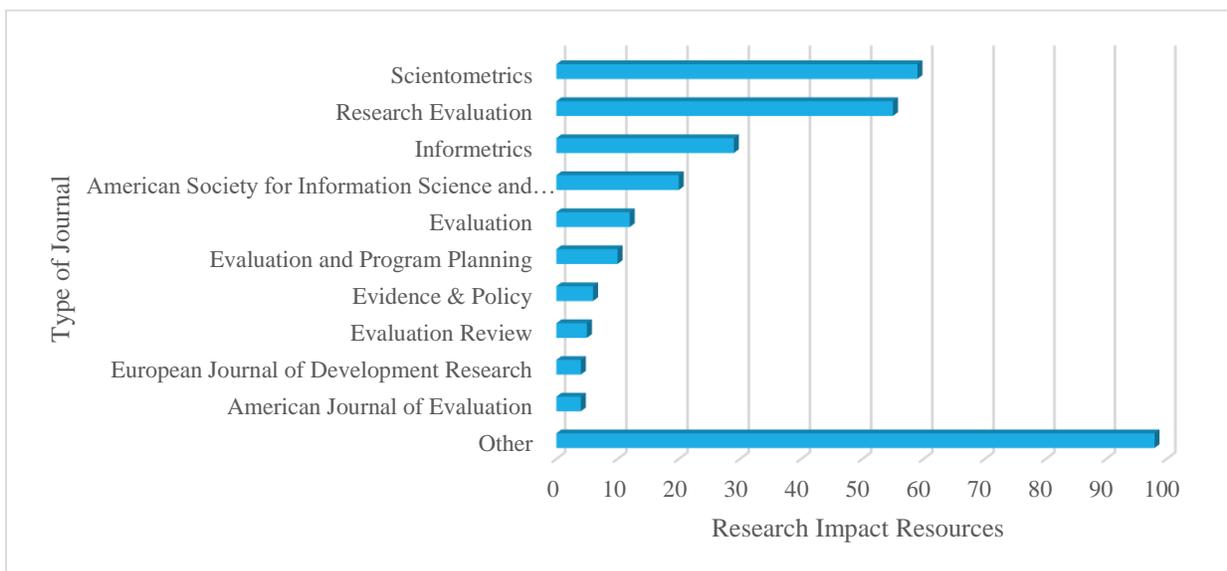


Figure 14. Top 10 journals that published articles on research impact from our sample.

Scientometrics and *Research Evaluation* had each published over 50 of the articles on research impact that were included in the sample.

7.5.4 What kinds of agencies are producing research impact resources?

We were interested in exploring what kinds of agencies (Universities, government, practice, funding, or international organizations) were actually producing research impact resources. Universities (43%) are creating the most research impact resources (Figure 15).

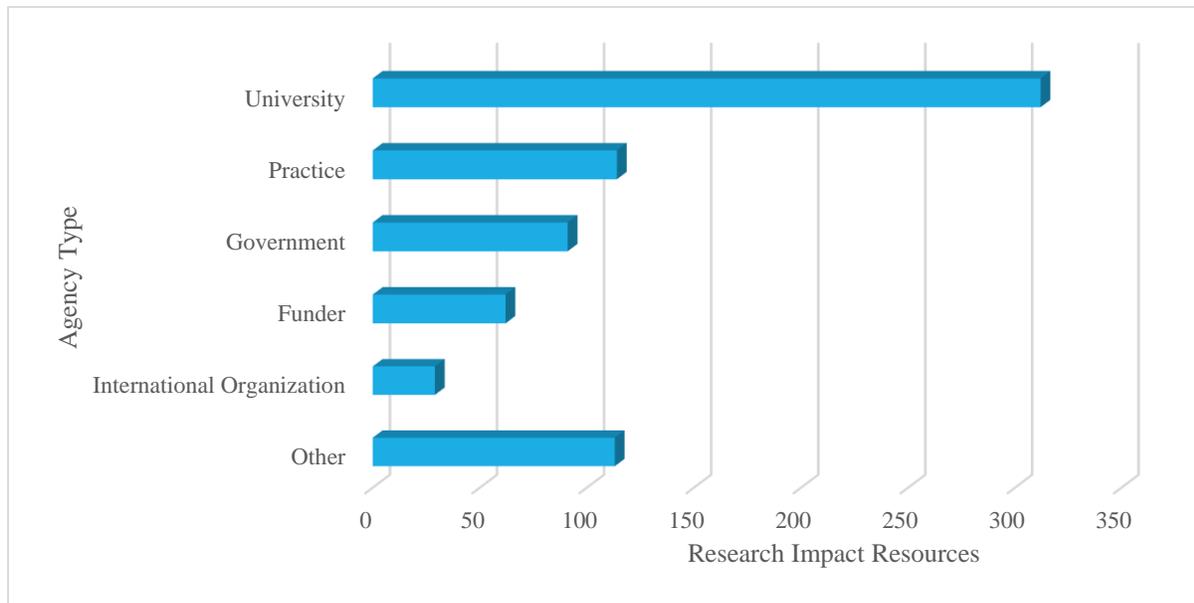


Figure 15. Type of agency that created research impact resources.

Universities are under pressure to communicate their value and impact; hence, it is probably not surprising that they are featured the most prominently in the environmental scan. We were surprised that more of the research impact resources were not being created by funders (only 9% of the sample were created by funding organizations).

7.5.5 Research Impact Resources by Field

The focus of the environmental scan was humanities and social sciences; however, HSS encompasses a wide range of disciplines. We decided to include resources that we found from other disciplines even if they were not from HSS specifically if we thought that HSS researchers might benefit from them. This led to an additional analysis to code to the 721 resources in relation to field. We have multiple categories that included humanities in some way. We coded these resources based on how the resources categorized themselves (Figure 16). Due to a large number of resources being classified under the multiple Science category (N = 558), Figure 15 excludes Multiple Science and shows the other 163 resources by field.

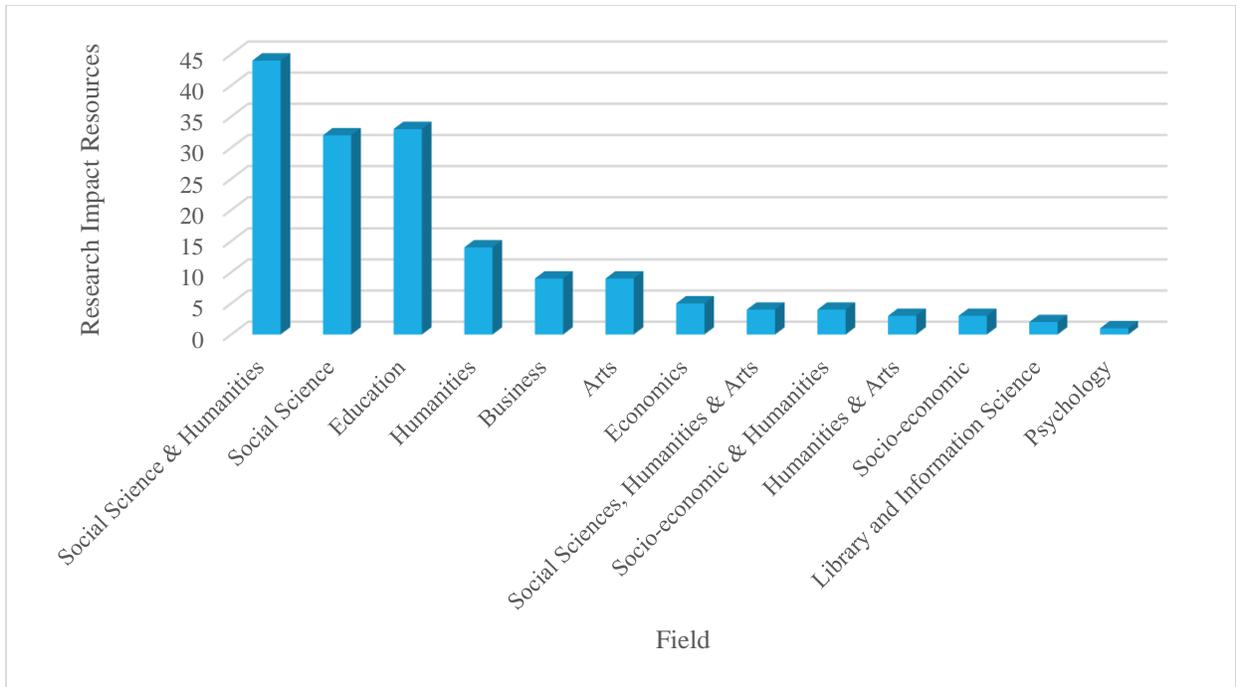


Figure 16. Frequency of research impact resources by field.

7.5.6 Cross-Country Comparisons

We also conducted cross-country comparisons of the 721 research impact resources to assess similarities and differences. Figure 16 shows the distribution of research impact resources by country and type of resource.

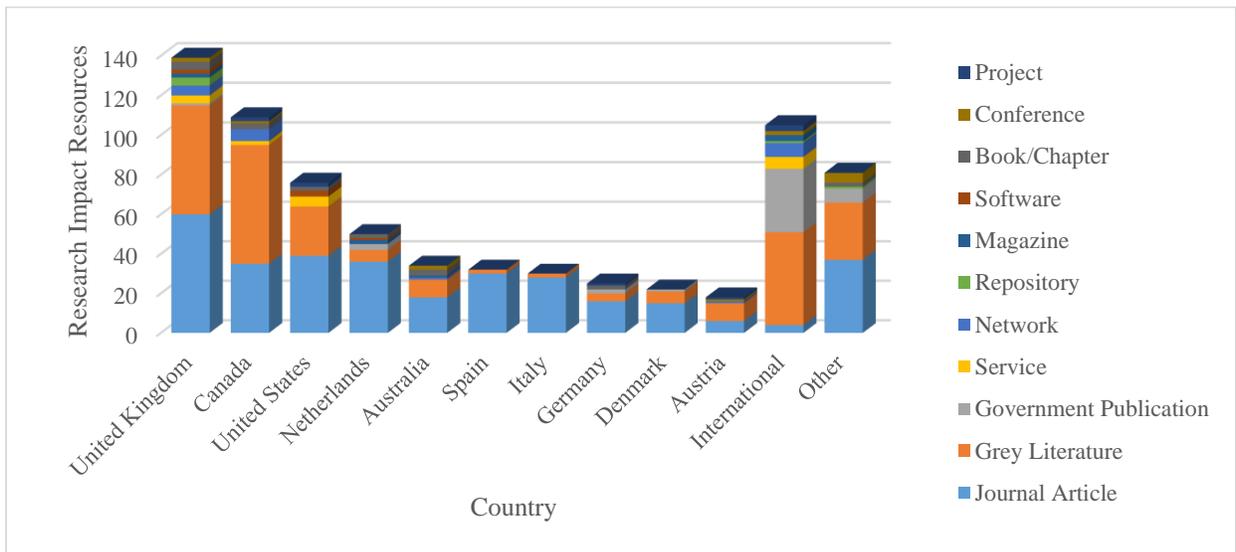


Figure 17. Frequency of research impact resources by country and type.

Most countries have similar distributions of types of research impact resources. However, international organizations have more governmental publications than single countries (70% of the government publications from the entire sample are produced by International organizations).

We also conducted a cross-country comparison in relation to the types of agencies creating research impact resources (Figure 18).

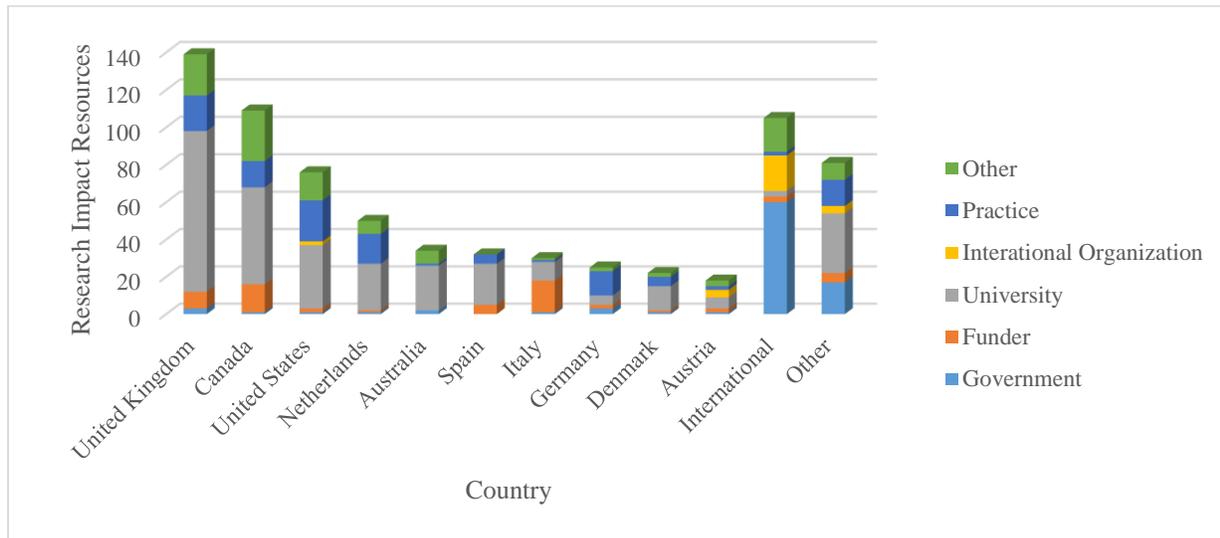


Figure 18. Frequency of research impact resources by agency and country.

Most countries have comparable distributions of the types of agencies that are creating research impact resources (mostly universities, followed by funders and practice organizations). Once again, international organizations have far more research impact resources produced by governmental agencies than single countries. Italy has the high proportion of research impact resources produced by funders ($N = 17$) which represents over half of the resources produced in Italy. Only 9% of research impact resources were created by funders and, of the resources created by funders ($N = 62$), 25% were produced in Canada ($N = 17$) and 27% were produced by Italy ($N = 17$).

7.5.7 Narrowing the Sample for Further Analysis

In an attempt to narrow the sample for more detailed analysis, we decided to determine which of the 721 resources actually contained indicators or were practical toolkits for researchers. This led to the development of another coding schema to try to classify the resources in relation to the topic addressed. Codes for this analysis ultimately included: indicators, scientometrics, national assessments, altmetrics, tools (free and paid), university ranking/ research reports, development and innovation, collaborative partnership, research funder, open access and other (Figure 19). Each code is further defined in Appendix A.

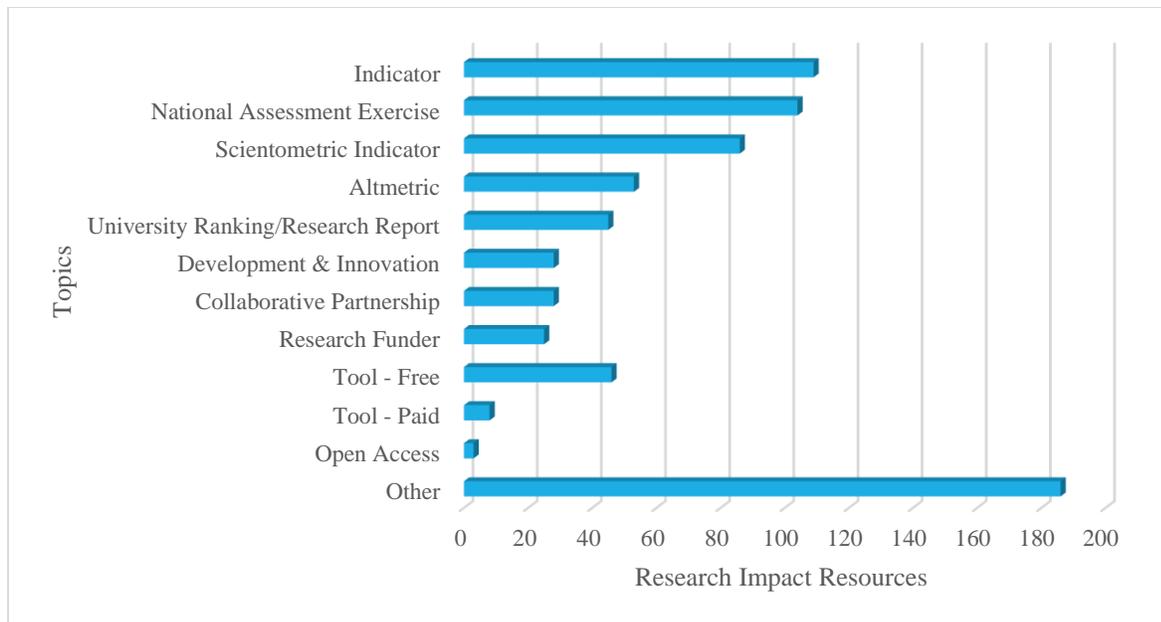


Figure 19. Research impact resources categorized by focus topic.

There are a few notable trends from this analysis. First, there are only 108 resources that include indicators, only 15% of the resources. Second, many of the resources arose from national assessment exercises that evaluated research impact. While toolkits did not dominate the sample, there are some practical tools that exist to help HSS researchers mobilize research with non-academic audiences as well as trace the impact of their work that we have summarized in a supplementary file: *A guidebook of research impact resources for researchers*.

8 Indicators

Indicators were an important focus of the environmental scan, as we hoped to identify what indicators were being used to assess HSS research globally. 1105 indicators were identified through the environmental scan and coded according to the FHSS framework: Scholarship, Capacity Building through teaching and learning, Economy, Society and Culture, and Practice and Policy. We made the decision to split the category of practice and policy into two distinct codes for analysis due to how distinct we felt these areas were. Figure 20 shows the relative proportion of the 1105 indicators in relation to the FHSS categories of research impact.

The dominant indicator is still the number of publications, so while momentum might be moving towards a focus on non-academic impacts, there is still little known about what metrics might best assess these areas or whether indicators could even be utilized as an appropriate proxy for impact.

We were also interested in the relative proportion of indicators that measured quantity versus quality. So, we coded all 1105 indicators in relation to whether they measured the 1) quantity or 2) quality of something. 78% (N=858) of the indicators related to quantity, and 22% (N=247) related to quality. Based on an inductive coding process of the 1105 indicators, we expanded the areas from the initial FHSS working paper (2014) in relation to major domains of the FHSS research impact framework. Figure 22 shows the FHSS expanded research impact framework based on this research.

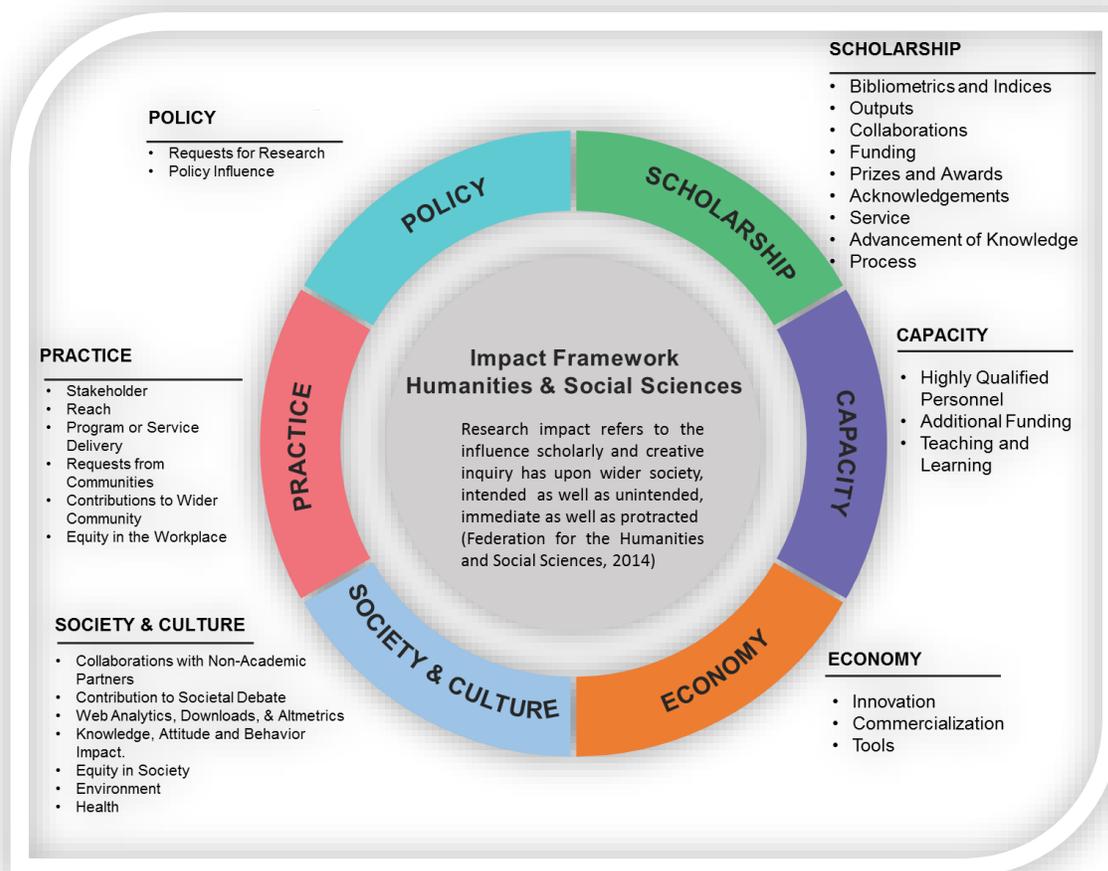


Figure 22 . Expanded FHSS research impact framework.

Due to similar types of indicators listed, the overall list of 1105 indicators found from the literature was collapsed into 420 discrete indicators with multiple citations and sources and included in the supplementary file for researchers. The following sections briefly outline major areas of the HSS framework, including some examples from the environmental scan (full lists of indicators for each topic can be found in the Appendices).

8.1 Scholarship

Scholarship indicators identified from the environmental scan related to more traditional outputs and measures of academia. Nine categories emerged in relation to scholarship: bibliometrics and indices, outputs, collaborations, funding, prizes and awards, acknowledgements, service, advancement of knowledge, and process. Table 3 provides definitions of each of these areas with some examples. For a full list of scholarship research impact indicators, see Appendix B.

Table 3
Scholarship Research Impact Indicators

Sub-Category	Indicators
1.1 Bibliometrics & Indices <i>Includes relative citation impact, highly cited publications, h-index, proportion of citations in relation to field</i> <i>Does not include citations counted from policy documents, etc. as these are a proxy for policy category</i>	<ul style="list-style-type: none"> • H-index (Holbrook, 2013) • G-index (Holbrook, 2013) • Citation index (Baker, 2011; Franklin, 2007; Giménez-Toledo & Román-Román, 2009) • Google lists of top journals (Memorial University, 2013) • Quality weighting = $3*A+2*B+1*C/A+B+C$ (García & Sanz-Menéndez, 2005)
1.2 Outputs <i>Counting of publications, conference publications, etc.</i> <i>- no analysis beyond frequencies, so not bibliometrics</i>	<ul style="list-style-type: none"> • Number of peer-reviewed/professional publications and citation counts for a specified period of time for an individual, department, or university (Andras, 2011) • Discussion papers and newsletters produced (Federation for the Social Sciences and Humanities, 2012) • Number of creative works and performances completed and in progress (Memorial University, 2013; Royal Irish Academy, 2011) • Number of book sales/loans (Holbrook, 2013) • Preparation of an edition of classical/medieval philosophical texts (which requires an exceptional combination of philosophical skills (Royal Irish Academy, 2011)
1.3 Collaborations <i>Determining proportion of publications authored internationally, nationally, and with other disciplines</i>	<ul style="list-style-type: none"> • # of collaborations (University of Saskatchewan, 2012) • Percentage of research at and of non-national and external researchers recruited by institution (Commission of the European Communities, 2005) • Share of foreigners in researchers, teacher-researchers, post-doc students and research support staff paid by the State or by universities (Bach & Llerena, 2007) • Number of projects/programs involving other Research Chairs (Finland's Ministry of Employment and the Economy Innovation, 2014) • Number of joint project/program sharing major facilities (Finland's Ministry of Employment and the Economy Innovation, 2014)
1.4 Funding <i>Grants researchers hold, infrastructure grants, share of funding given to</i>	<ul style="list-style-type: none"> • Funding knowledge circulation (Reale, Inzelt, Lepori, & van den Besselaar, 2012) • \$ of grants received (University of Saskatchewan, 2012)

Sub-Category	Indicators
<i>humanities and social sciences from countries, revenue generated etc.</i>	<ul style="list-style-type: none"> Federally Funded Share of Expenditures for Academic RD in the Humanities and Other Selected Fields (American Academy of the Arts & Sciences, 2013) Sponsored research funding (Tremblay, Zohar, Bravo, Potsepp, & Barker, 2010) Raising research funding for project, unit, institution, or field (Royal Irish Academy, 2011)
1.5 Prizes and Awards <i>Prizes that recognize research achievement</i>	<ul style="list-style-type: none"> Number of academic prizes/awards received; nominations for prizes/awards (Baker, 2011; Bloch, Sørensen, Graversen, Schneider, Schmidt, Aagaard, & Mejlgaard, 2014) Faculty national awards (Burke & Minassians, 2002) National and international awards and citations (University of Saskatchewan, 2008) Nobel prizes and other prestigious awards (Wilburtz, 2013) Number of civil society prizes/awards received; nominations for prizes/awards (Royal Netherlands Academy, 2013)
1.6 Acknowledgements <i>Proxies of influence</i>	<ul style="list-style-type: none"> Adjudication of awards; being asked to adjudicate awards (Memorial University, 2013) Citations in grant applications (Federation for the Humanities and Social Sciences, 2014) Number of invitations to present at national and international conferences and congresses with business (Finland's Ministry of Employment and the Economy Innovation, 2014) Reputation as measured by survey (Federation for the Humanities and Social Sciences, 2014) Angry letters from important people (Holbrook, 2013)
1.7 Service <i>The action of helping or doing voluntary work for a person, organization, etc.</i>	<ul style="list-style-type: none"> Amount of public service completed by an individual, unit, or institution (Burke & Minassians, 2002) Externally reviewing (national/international) submitted journal articles, book proposals, edited volumes, and manuscripts (Royal Irish Academy, 2011) Internal and external administrative activities related to the functioning of the University (e.g., program chair, coordinator, department head, advising, recruiting, external examiner for dissertations etc.) (Memorial University, 2013) Membership of juries for thesis awards (Royal Netherlands Academy, 2013) # of workshops, public presentations, conferences hosted, and meetings facilitated (University of Saskatchewan, 2012)
1.8 Advancement of Knowledge <i>New or improved research tools, methodology, etc.</i>	<ul style="list-style-type: none"> Databases created (Federation for the Social Sciences and Humanities, 2012) Research tools, and library tools. (Federation for the Social Sciences and Humanities, 2012) Improved research systems (Bornmann, 2013)
1.9 Process <i>Conferences, scholarly lectures, etc.</i>	<ul style="list-style-type: none"> Number of conference papers/proceedings (Ernø-Kjølhede & Hansson, 2011; Royal Netherlands Academy, 2013)



Sub-Category	Indicators
	<ul style="list-style-type: none"> Scholarly lectures and other professional presentations (Memorial University, 2013) Seminars/ symposia/ conferences – number; type; number of participants (Masset, Mulmi, & Sumner, 2011)

8.2 Capacity Building Indicators

Capacity building indicators in the FHSS framework are defined in relation to “capacity at the undergraduate and graduate levels through teaching and mentoring” (FHSS, 2014, p.24). Three categories emerged in relation to capacity: highly qualified personnel, additional funding, and teaching and learning . Table 4 provides definitions of each of these areas with some examples. For a full list of capacity building research impact indicators, see Appendix C.

Table 4
Capacity Building Research Impact Indicators

Sub-Category	Indicators
2.1 Highly Qualified Personnel <i>Includes measures of graduate students, faculty members, researchers etc.</i>	<ul style="list-style-type: none"> Graduate quantitative and writing skills (Burke & Minassians, 2002) Training – number of trainees; extent of training; duration of training; number and type of manuals (Masset, Mulmi, & Sumner, 2011) Number of institute researchers finding employment elsewhere in the field (Finland's Ministry of Employment and the Economy Innovation, 2014) Skills, knowledge gained and lessons learned which are transferable to other areas of project team members' life and work (Piggot-Irvine, Rowe, & Ferkins, 2015) Members more aware of self in relation to the concern/issue in the community or organization (Piggot-Irvine, Rowe, & Ferkins, 2015)
2.2 Additional Funding <i>Funding from external sources including donations from citizens.</i>	<ul style="list-style-type: none"> Technological investments by private and public investors (Masset, Mulmi, & Sumner, 2011) Technological investments by a specific institution (Masset, Mulmi, & Sumner, 2011) Private funding charitable giving for humanities activities (American Academy of the Arts & Sciences, 2013) Change in the adequacy of operational support of research infrastructure as a result of the research activity (Baker, 2011) Amount of third-party funding (Bornmann, 2013)
2.3 Teaching and Learning	<ul style="list-style-type: none"> Accredited programs (Burke & Minassians, 2002) Faculty, availability (Burke & Minassians, 2002) Faculty evaluation (Burke & Minassians, 2002) Teaching material, course development (Ernø-Kjølhede & Hansson, 2011) Teaching/lecture hours for master's and PhD students (Royal Netherlands Academy, 2013)

8.3 Economy Indicators

Economy in the FHSS framework was defined in relation to governmental policy, technology, and commercialization of research products (FHSS, 2014). Three categories emerged from the environmental scan in relation to economic indicators: innovation, commercialization, and tools. Table 5 provides definitions of each of these areas with some examples. For a full list of research impact indicators in relation to economy, see Appendix D.

Table 5
Economy Research Impact Indicators

Sub-Category	Indicators
3.1 Innovation <i>Mention of innovation</i>	<ul style="list-style-type: none"> • % of projects that lead to one or more commercialized innovations or are brought from one stage of the innovation process to another (Cozzarin, 2008) • Quality of results as e.g. Measured in number of peer reviewed publications innovative research and innovation (Finland's Ministry of Employment and the Economy Innovation, 2014)
3.2 Commercialization <i>Patents, spin offs, copyright etc.</i>	<ul style="list-style-type: none"> • Number of spin-offs (Bornmann, 2013; Finland's Ministry of Employment and the Economy Innovation, 2014) • Number of invention disclosures (University of Saskatchewan, 2008; Gardner, Fong, & Huang, 2010) • Number of international co-patents (Reale, Inzelt, Lepori, & van den Besselaar, 2012) • Number of expenditures (Commission of the European Communities, 2005) • Number of active licenses (Gardner, Fong, & Huang, 2010)
3.3 Tools <i>Creation of tools, software, products, services, processes, etc.</i>	<ul style="list-style-type: none"> • Number of new products provided (Bloch, Sørensen, Graversen, Schneider, Schmidt, Aagaard, & Mejlgaard, 2014) • Number of services provided (Bornmann, 2013) • Number of new or significantly improved processes put into practice (Cozzarin, 2008) • # of publicly available products and services (University of Saskatchewan, 2012) • Procedures for performance measurement by industrial partners (Finland's Ministry of Employment and the Economy Innovation, 2014)

8.4 Society and Culture Indicators

Society and Culture in the FHSS framework was conceptualized in relation to collaboration with community groups, participation in public events, and media coverage (FHSS, 2014). Building on this work, seven areas emerged from the environmental scan in relation to society and culture: collaboration with non-academic partners; contribution to societal debate; web analytics, downloads, and altmetrics; knowledge, attitude, and behavior impacts; equity in society; environment, and health. Table 6 provides definitions of each of these areas with some examples. For a full list of research impact indicators in relation to economy, see Appendix E.

Table 6
Society and Culture Research Impact Indicators

Sub-Category	Indicators
4.1 Collaborations with Non-Academic Partners	<ul style="list-style-type: none"> Partnerships between universities and external parties/stakeholders (De Jong, van Arensbergen, Daemen, van der Meulen, & van den Besselaar, 2011) Perceived value of community/university engagement Entity allows local groups who have an interest in their work to contribute their ideas or become partners on a project (University of Saskatchewan, 2012) Partners trust that each shares a commitment and willingness to collaborate for a similar vision (Burford et al., 2013) Culture of collaboration across groups. Many concrete interrelated interaction activities (Hellström, 2012) Number of advisory roles and board memberships (Federation for the Humanities and Social Sciences, 2014)
4.2 Contribution to Societal Debate <i>Media coverage</i>	<ul style="list-style-type: none"> Contributions to public debates and appearances in the national or international media as an expert (Royal Netherlands Academy, 2013) Press Releases – number of press releases published and in what for (Masset, Mulmi, & Sumner, 2011) Quotes in media (Holbrook, 2013) Other kinds of invitations based on one's reputation as a teacher, such as a media interview on a successful teaching innovation (Memorial University, 2013) Press Conferences – number of press articles that resulted and in what for (Masset, Mulmi, & Sumner, 2011)
4.3 Web Analytics, Downloads, & Altmetrics <i>Proxies of influence</i>	<ul style="list-style-type: none"> Research-related social media (Federation for the Humanities and Social Sciences, 2014) Social networking contacts (Holbrook, 2013) Downloads from databases or open access repositories (Federation for the Humanities and Social Sciences, 2014) # of website hits, Facebook likes, and Twitter followers (University of Saskatchewan, 2012) Blog mentions (Holbrook, 2013)
4.4 Knowledge, Attitude, and Behaviour Impacts	<ul style="list-style-type: none"> Post research identification of a direct or derived societal impact (Baker, 2011) Entity contributes positively to society by working to address social problems or global issues (Burford et al., 2013.) As a result of the entity's messages or activities, people have their own personal initiatives with similar goals (Burford et al., 2013) Impact on artistic, performance, cultural and literary work (Franklin, 2007) Decision-making takes into account the social, economic, and environmental needs for future generations (Burford et al., 2013)
4.5 Equity in Society	<ul style="list-style-type: none"> Reduced poverty (Masset, Mulmi, & Sumner, 2011) Sustained livelihoods of the poor (Masset, Mulmi, & Sumner, 2011) Increased household income (Masset, Mulmi, & Sumner, 2011)

Sub-Category	Indicators
	<ul style="list-style-type: none"> Socio-economic, geographic and historical considerations (high vacancy rates, cost of living, housing affordability, employment rates, etc.) (Canadian Homelessness Research Network, 2013) People aren't stigmatized because of their behaviour, appearance or activities including economic activities (i.e. Sex work) and substance use. (Canadian Homelessness Research Network, 2013)
4.6 Environment	<ul style="list-style-type: none"> Policy debate on climate change or the environment has been influenced by research (Bornmann, 2013) Action is consciously taken to share with others how to protect and restore the natural environment (Burford et al., 2013) Long-term commitments to protect the environment are created Entity is aware of the interconnectedness between the environment and their sphere of activity (Burford et al., 2013) People have respect for nature (Burford et al., 2013) Number of activities/projects towards goal of environmental sustainability (Burford et al., 2013)
4.7 Health	<ul style="list-style-type: none"> Improvements in child nutrition (Masset, Mulmi, & Sumner, 2011) Improvements in health care (e.g. Improved surgical treatment of brain tumours through pre-op MRI and intra-op ultrasound) (Tremblay, Zohar, Bravo, Potsepp, & Barker, 2010) Improved regulatory measures (e.g. For drinking water quality) (Tremblay, Zohar, Bravo, Potsepp, & Barker, 2010)

8.5 Practice Indicators

While practice and policy were listed as the final category from the original FHSS framework, the description in the working paper only related to contributions in public policy (FHSS, 2014). We created a separate category for practice, based on indicators that arose from the environmental scan. Six areas emerged in relation to practice: stakeholder indicators, research indicators, program or service delivery indicators, requests from communities for researchers to advise on a problem, contributions to wider community, and equity in the workplace. Table 7 provides definitions of each of these areas with some examples. For a full list of research impact indicators in relation to economy, see Appendix F.

Table 7
Practice Research Impact Indicators

Sub-Category	Indicators
5.1 Stakeholder Indicators <i>Indicators relating to stakeholder perspectives, training etc.</i>	<ul style="list-style-type: none"> Communications and interactions with stakeholders and the wider public (emails, visits, workshops, media publicity, etc.) (Finland's Ministry of Employment and the Economy Innovation, 2014) A clear planning process including how the practice was developed, and what agencies, systems and individuals were consulted. (Canadian Homelessness Research Network, 2013) The recipients have evidence of positive feedback on the impact (Piggot-Irvine, Rowe, & Ferkins, 2015) Level (%,#) of participation by key stakeholders, and their constructive early 'reactions' (e.g. take-up, expressed feedback) (Knowledge Brokers Forum, 2011)

Sub-Category	Indicators
	<ul style="list-style-type: none"> Core users' assessment of relevance and applicability - including ability to implement results in practice and ability to work across disciplines and sectors (Ernø-Kjølhedehed & Hansson, 2011)
5.2 Reach Indicators <i>Number of people that received research product, or in a network.</i>	<ul style="list-style-type: none"> Establishment of formalized knowledge networks (Ernø-Kjølhedehed & Hansson, 2011) Delivery milestone achievement (Knowledge Brokers Forum, 2011) Number and nature of network milestones and objectives achieved (Finland's Ministry of Employment and the Economy Innovation, 2014) Dissemination/presentation of findings and learnings to boundary partners and wider community (Piggot-Irvine, Rowe, & Ferkins, 2015) Use of research output by targeted audiences (Davies, Nutley, & Walter, 2005)
5.3 Program or Service Delivery Indicators	<ul style="list-style-type: none"> Demonstrable civil-society effects of research (Royal Netherlands Academy, 2013) That the practice fills a gap in services for the target population. (Canadian Homelessness Research Network, 2013) An effective process for complaints (Canadian Homelessness Research Network, 2013) State or level of health, disease, incidence, etc. (Knowledge Brokers Forum, 2011) Participants and boundary partners change in perspective and knowledge, attitude and skills (both individually and collectively) (Piggot-Irvine, Rowe, & Ferkins, 2015)
5.4 Requests from Communities for Researchers to Advise on a Problem <i>Consulting – not policy specific</i>	<ul style="list-style-type: none"> Academic researchers enabled to conduct research 'in the field' by working in practice concurrently (De Jong, van Arensbergen, Daemen, van der Meulen, & van den Besselaar, 2011) Requests for consultancy/advice from community groups (Federation for the Humanities and Social Sciences, 2014) Contributions to service facilities, community organizations, public debate (University of Saskatchewan, 2008) Demonstrable recognition by external target groups (Royal Netherlands Academy, 2013) Special problem requests with faculty (Holbrook, 2013)
5.5 Contributions to Wider Community <i>Events with Non-Academic Audiences</i>	<ul style="list-style-type: none"> Public forums (Federation for the Social Sciences and Humanities, 2012) Attendance at public events (Federation for the Humanities and Social Sciences, 2014) Lectures for professionals or a wide audience (Royal Netherlands Academy, 2013) Participation in public education programs (Holbrook, 2013)
5.6 Equity in the Workplace	<ul style="list-style-type: none"> Entity's activities or events create a safe environment for people (Burford et al., 2013) People feel that there is transparent communication (Burford et al., 2013) Different points of view are heard and incorporated (Burford et al., 2013)

Sub-Category	Indicators
	<ul style="list-style-type: none"> • People feel that their own individual identity and approach is respected (Burford et al., 2013) • Entity acts in a manner that is impartial and non-discriminatory (not discriminating on the basis of nationality, ethnic origin, colour, creed or religion) (Burford et al., 2013)

8.6 Policy Indicators

In the FHSS framework, public policy impact was conceptualized in relation to expert roles and consultations with government that would inform processes across disciplines. Two areas emerged from the environmental scan in relation to public policy: requests for research, and changes in public policy. Of all the categories, policy had the fewest indicators – with only 3% of the 1105 indicators coded relating to policy. Table 8 provides a brief description of each category with a few examples. A full list of research impact indicators relating to policy can be found in Appendix G.

Table 8

Policy Research Impact Indicators

Sub-Category	Indicators
6.1 Requests for Research <i>Number of consultations/presentations, reports to policymakers/decision makers, serving on panels, etc.</i>	<ul style="list-style-type: none"> • Consulting for governments (Federation for the Humanities and Social Sciences, 2014) • Participation in legislation and strategy planning (Bornmann, 2013) • Contributions to expert meetings (De Jong, van Arensbergen, Daemen, van der Meulen, & van den Besselaar, 2011) • Advisory and consultancy roles (De Jong, van Arensbergen, Daemen, van der Meulen, & van den Besselaar, 2011) • Management to be on committees adjudicating policy changes (Masset, Mulmi, & Sumner, 2011)
6.2 Changes in Public Policy <i>Proxies of influence in public policy</i>	<ul style="list-style-type: none"> • Citations in government documents (Federation for the Humanities and Social Sciences, 2014) • Level of commitment of governments to agreement (Masset, Mulmi, & Sumner, 2011) • Government agency linkages (University of Saskatchewan, 2008) • Mention by policy maker (Holbrook, 2013) • Changes (i.e., implementation, reinforcement) in policies attributable to policy research (Masset, Mulmi, & Sumner, 2011)

The environmental scan expanded the work of the FHSS working paper on indicators considerably. Aggregating over a thousand indicators from a variety of sources provides fertile ground to begin a deeper analysis and discussion about the relative strengths and weaknesses of various indicators. The full list of indicators is also packaged as a separate supplementary file for researchers to use as a resource in their KMB and impact planning, since identifying potential proxies and metrics to track KMB, project progress and impact are now encouraged by funders.

9 Research Impact Resources for Researchers

We also decided to find and describe all the practical resources for researchers that were identified from the environmental scan, so that they could support HSS researchers across Canada. In total, we

found tools (N=56), networks (N = 17), and projects (N = 10) from the environmental scan. Due to large number of resources that were found, only a small sample of resources will be highlighted in this section of the report with the full list of resources being catalogued in appendices. To determine which resources would be highlighted in the report, the Alexa Ranking was used for each website. The Alexa Rank is a global traffic rank that measures how a website is doing relative to all other sites on the web over the past 3 months. For more information about Alexa Rankings, visit: www.alexa.com. The two websites with the best alexa rankings were chosen for each type of resource. We begin this section by sharing a few of our favourite tools for KMb planning tools and tip sheets for increasing the reach and visibility of research, before outlining examples of each type of tool, network and project.

9.1 Our Favourites

1. **KMb Planning Toolkit.** This free toolkit, created by the Ontario Centre of Excellence for Child and Youth Mental Health, provides a KMb planning tool for researchers to organize their project in relation to audience, strategy, target, budget, timeline and evaluation. For more information, visit: www.kmbtoolkit.ca
2. **Tip sheets on maximizing impact.** The *Evidence and Policy* journal prepared a short tip sheet of simple things that researchers can do to increase exposure and impact of their work. For more information, visit <http://www.policypress.co.uk/PDFs/General/Ev%20&%20P%20Editorial%20Guidelines%20on%20Maximising%20Impact.pdf>
3. **Knowledge Translation Planning Template.** Melanie Barwick from Sickkids is a leading scholar in the field of KT. Her website offers courses as well as free KT planning toolkit. For more information, visit: www.melaniebarwick.com/training.php
4. **The Intersector Toolkit.** The Toolkit is a guide to help diagnose, design, implement, and assess successful intersector collaborations. The toolkit profiles 40 successful intersector initiatives and draws from an extensive body of research to provide practical knowledge to practitioners. Practitioners from any sector can use these tools. For more information, visit: <http://intersector.com/toolkit/>

9.2 Tools

Tools were defined as either a free or paid device or instrument that is used to carry out a particular function. Tools were organized into four subgroups: policy & politics, software & services, grant writing, and research knowledge & mobilization.

9.2.1 Policy & politics.

The resources in this subsection are meant to help researchers address various factors that need to be considered when attempting to turn research into policy influence. For a full list of tools for policy and politics, see Appendix H.

Communicating Research for Evidence-Based Policy. Divided into three parts – Concept, Policy Briefs, and Practical Means – this guide identifies the most important stages in the development of a communication strategy to make certain research concepts makes a real difference in enabling policy

action. For more information, visit: <http://ftp.infoeuropa.euroid.pt/database/000045001-000046000/000045501.pdf>

Thompson Reuters. Thomson Reuters Corporation can provide patent, trademark and brand content and services as well as manage and protect IP assets. Thomson Reuters also helps to foster scientific and scholarly research by: fostering collaborations with businesses, enabling discovery by providing access to the world's critical research, providing analytics which are designed to maximize returns on research funding, and offering tools to facilitate the peer-review and publishing process. For more information, visit: <http://thomsonreuters.com>

9.2.2 Software & services.

Software was defined as a program used by a computer (must require download). While software was defined as either free or paid action that helps or does the work for someone. The resources in this subsection are meant to help researcher's measure impact based on the consumption of research content by a population of readers. For a full list of software and services, see Appendix I.

CiteULike. CiteULike is a free service to help researchers to store, organize, and share academic papers. CiteULike allows researchers to share libraries with others. Researchers are able to file their papers in CiteULike using tags and can "export" their libraries to the reference manager of their choice. For more information, visit: www.citeulike.org

EPrints. EPrints software allows users to create repositories of open access research literature, scientific data, theses, reports, and multimedia. EPrints provides its open source software for free; however, they offer paid packages for hosting and support services. For more information, visit: <http://www.eprints.org/software/>

9.2.3 Grant Writing.

The resources in this subsection are meant to assist researchers in improving their odds of successfully competing in peer-reviewed research application competitions. For a full list of tools for grant writing, see Appendix J.

Welcome Europe. Welcome Europe provides toolboxes, training courses, and consulting services to European-based researchers for a fee. For more information, visit: <http://www.welcomeurope.com>

Research Funding Toolkit. The Research Funding Toolkit helps researchers to write better grant applications. In addition, researchers can also hire consulting and training services for a fee if desired. The toolkit consists of a book and a website. For more information, visit: <http://www.researchfundingtoolkit.org/>

9.2.4 Research & knowledge mobilization planning.

The resources in this subsection are meant to help researchers implement a clear plan in order to mobilize their research findings. For a full list of tools for KMB planning, see Appendix K.

The Center for Effective Global Action. The Center for Effective Global Action (CEGA) is a hub for research on global development, with a network of over 50 academic researchers extending across the University of California, Stanford University, and the University of Washington. In addition

to many other services, CEGA provides researchers with web-based tools on program design, evaluation, and scaling up projects. For more information, visit: <http://cega.berkeley.edu/tools/>

Altmetrics for Researchers. The guide contains information about altmetrics and traditional, citation-based metrics. For more information, visit: <http://guides.mclibrary.duke.edu/c.php?g=217135&p=1434254>

9.3 Networks

Networks were defined as a group or a system of interconnected people. Networks were organized into two subgroups: communities of practice and research networks. For a full list of networks, see Appendix L.

9.3.1 Communities of practice.

Communities of practice are groups of people who collaborate either in physical settings or online. This subsection contains examples of communities of practice that are devoted to knowledge mobilization and research impact.

Centre for Science and Policy. The Centre for Science and Policy offers government and industry decision makers policy fellowships (£2000 - £4500). At the beginning of the fellowship, fellows spend five days in Cambridge meeting up to 30 researchers chosen for the relevance of their work to the questions defined. Fellowships will last two years. During the fellowship Policy Fellows can make use of the Policy Fellows Network, made up of other Policy Fellows from Whitehall and industry, as well as the researchers who support the program. Fellows have the opportunity to attend, initiate and speak at a range of events. For more information, visit: <http://www.csap.cam.ac.uk/programmes/>

Mendeley Groups. Mendeley Groups allow you to collaborate to create a shared space to collect documents and notes. Groups can be private, invite-only, or public. Examples of research impact related groups include:

- Impact Research: <https://www.mendeley.com/groups/785831/impact-research/>
- Societal Impact of Research: <https://www.mendeley.com/groups/1002141/societal-impact-of-research/>
- Impact Factor: <https://www.mendeley.com/groups/2486431/impact-factor/>
- Altmetrics: <https://www.mendeley.com/groups/586171/altmetrics/>

9.3.2 Research networks.

Research networks are groups of institutions who are devoted to a particular aim. This subsection contains examples of research networks that are devoted to knowledge mobilization and research impact.

Knowledge Network for Applied Education Research (KNAER). KNAER's mission is to build, advance, and apply evidence-informed practices. KNAER conducts and synthesizes research as well as facilitates networks of policy-makers, educators and researchers. For more information, visit: <http://www.knaer-recrae.ca>

Research Impact. Research Impact (RIR) network of 11 universities located across Canada who are committed to maximizing the impact of academic research for the social, economic, environmental and health benefits of Canadians. RIR develops and shares knowledge mobilization best practices, services, and tools in order to increase institutional capacity for knowledge mobilization. For more information, visit: <http://researchimpact.ca/>

9.4 Projects

Projects were defined as an individual or collaborative enterprise that is carefully planned and designed to achieve a particular aim. Projects were organized by the region in which the project occurred: Canada, Europe, and United States. For a full list of projects, see Appendix M.

9.4.1 Canada.

Vital Outcome Indicators for Community Engagement (VOICE). The VOICE Research Project (2011-2015) investigates six areas of activities. They are: capacity building of communities and individuals, development of community-based indicators of success, support for and/or development of success pathways, evaluation of success pathways, knowledge mobilization, and sustainability activities. For more information, visit: www.voiceresearchproject.ca

9.4.2 Europe.

Statistical Indicators Benchmarking the Information Society (SIBIS). The SIBIS project (2001-2003) developed information society indicators to enable the benchmarking of progress in EU Member States. For more information, visit: <http://www.sibis-eu.org/>

CWTS Leiden Ranking. The CWTS Leiden Ranking is an annual project which offers insights into the scientific performance of 750 major universities worldwide. For more information, visit: <http://www.leidenranking.com/>

9.4.3 United States.

NISO Alternative Assessment. The NISO Alternative Assessment Metrics Initiative is a two-phase project, designed to explore, identify, and advance standards and/or best practices related to altmetrics. For more information, visit: http://www.niso.org/topics/tl/altmetrics_initiative/

Humanities Indicators. Humanities Indicators – a project of the American Academy of Arts & Sciences - provides comprehensive, up-to-date statistical information, the Humanities Indicators provide a picture of how the humanities are faring in the United States today. For more information, visit: <http://www.humanitiesindicators.org/content/document.aspx?i=176>

9.5 Open Access Repositories

Open access repositories are portals that are attempting to create searchable databases of research projects, impact case studies, outputs and indicators. For a full list of open access repositories, see Appendix N.

9.5.1 Social sciences and the humanities.

Open Edition. OpenEdition is an electronic resource portal in humanities and social sciences. For more information, visit: <http://www.openedition.org/?lang=en>



9.5.2 All sciences.

REF Impact Case Study Database. This database provides a searchable compendium of research impact case studies submitted during the REF 2014 in a normalized format. For more information, visit: <http://impact.ref.ac.uk/CaseStudies/About.aspx>

Northumbria Research Link. Northumbria Research Link is an open access repository of Northumbria University's research output. For more information, visit: <http://nrl.northumbria.ac.uk/>

Gateway to Research. The Gateway to Research repository allows users to search and analyze information about publically funded research in the United Kingdom. For more information, visit: <http://gtr.rcuk.ac.uk/resources/about.html>

10 Emerging Issues: The good, the bad, and the unknown

There are a number of issues emerging from research impact agendas occurring globally. We organize these issues in relation to negative developments, positive developments and areas that remain unknown due to lack of longitudinal consideration of implications and effects of research impact agendas.

10.1 The bad

Watermeyer (2014) has written a cogent article outlining many issues arising from the impact agenda:

Academic conceptual and strategic understandings of how to evidence and report impact and what constitutes *excellent* impact remain embryonic and at best vague. A nervous uncertainty is compounded by a sense that guidance offered by HE funders and regulators to academics conceptualising and choreographing their impact claims for the REF has been limited and largely formative; confusion as to how categories of impact and value align or differ; and how issue of ownership, travel and time-lag where research producers/knowledge workers are plural, diverse, mobile and migratory can be reconciled. (p. 361).

Unintended consequences of narrow conceptualizations of research impact are being uncovered globally, as some studies reveal “that an emphasis on demonstrating impact may actually hijack or subjugate the process of achieving impact and potentially even dilute or inhibit the positive effects of research” (Watermeyer, 2014, p. 362). Impact, in the end, is about the people in communities that researchers can collaborate with on shared goals, not academic publications published in high impact journals that are not read outside disciplinary silos within the academy. High stakes impact agendas are also causing researchers to overstate the contributions they think their research has made, what Dunleavy calls ‘fairy tales’ of academic achievement. Watermeyer (2011) highlights that working with communities and integrating needs of end users can be at odds with academic rigor of research processes. Other issues identified from this project include:

- Many of the research impact metrics focus on bibliometric measures (such as journal ranking, impact factors) that disadvantage humanities, arts, social sciences and other non-STEM (Science, Technology, Engineering, Mathematics) fields, because outputs of these fields are not represented on major databases used for bibliometric analyses such as World of Science, Scopus and Google Scholar
- ‘Inappropriate indicators create perverse incentives’ (Wilsdon et al., 2015, vii); in fact, there is already some empirical studies to suggest that researchers’ behaviours in the UK are changing in undesirable ways (such as less focus on tasks like teaching and outreach in order to focus on publishing articles in journals that will increase score on REF)
- Issues with measuring ‘impact’ are widely acknowledged including timing (impact happens over long periods of time not directly at the end of a research project or grant), attribution (change cannot usually be attributed to one research project or piece of work among a myriad of other influences), context (different contexts for research use influence use)
- Currently, the REF and other systems lack transparency in how impact data is assessed, ranked and compared across disciplines. In fact, major reviews of REF suggest that data should not be compared across fields due to the wide diversity of different areas
- Incentives for tenure and promotion are not well aligned with mobilization efforts with non-academic audiences, as peer-reviewed publications still remain the focus of most fields.

10.2 The Good

Despite many concerns with the use of metrics and accountability measures tied to research impact assessments, the underlying purpose of research mobilization efforts (if one takes them at face value) is positive. Research mobilization is about building collaborative partnerships in order to solve challenging societal problems and inform debates in democratic societies. The work being conducted within the humanities and social sciences makes valuable contributions to society and has the potential (with concerted strategic KMB planning) to have even more of an impact than it already does. In the end, KMB is encouraging new collaborations among diverse stakeholders – and networks have the potential to provide powerful avenues for societal cohesion and change. So the rising focus on KMB will yield positive influences across a number of different areas. Impact agendas are recognizing the importance of using mixed methods and integrating both qualitative and quantitative data to tell robust and nuanced stories of impact. And the rising impact agenda, due to the concern that it disadvantages HSS, has actually catalyzed large scale empirical work (such as Bastow et al.’s LSE Impact project) that are amassing compelling evidence about the contributions that HSS research makes to all areas of society. Despite the fact that some might argue that the impetus for some of this work needed to be taken up in defense of HSS fields, the result is a much richer understanding and tapestry of how HSS projects, funding, infrastructure, outputs, outcomes and impacts are occurring across the globe.

10.3 The Unknown

The enduring uncertainty surrounding research impact agendas is founded in the recognition that the field is underdeveloped and still in its infancy. This is especially problematic in jurisdictions where performance-based research funding systems have tied hard dollars to impact assessments. So regardless of the widespread consensus that indicators and metrics do not adequately capture impact (especially when comparing across diverse disciplines), funding agencies and national bodies

abroad in many countries are marching forward nonetheless (in the UK and Australia, to name a few). As a result of these developments, it is imperative that HSS researchers in Canada engage in this discussion:

Critical discussion around the nature and role of impact as a measure of assessment is, whilst difficult and prone to controversy, essential at a time where universities are mobilized as drivers of the knowledge economy and catalysts of economic recovery and where an emphasis on academic accountability, visibility and transparency is nevermore so acute (Watermeyer, 2011, p.361)

And as Watermeyer maintains “It furthermore seems common-sense, given a research focus in matters of epistemology and constitutions of value – equality, welfare, prosperity – that social scientists assume a leading role in developing theoretical and empirical frameworks unpacking the basis of impact as a new type of academic capital” (p.361). This lack of understanding and clarity around what impact means and looks like cannot be understated, because “academics need first understand the process and nature of impact before being able to articulate it” (Watermeyer, 2014, p.369). Canada has not yet created a national PRFS like other jurisdictions and, so far, has taken a softer approach to increasing mobilization efforts and impact through directed grants, increasing requirements for researchers to submit Kmb plans and report on these efforts.

It is unlikely that research impact and metrics will go away, so it is important that we work collaboratively across disciplines to improve the metrics currently in use (which are widely acknowledged to be underdeveloped) and suggest different approaches to measuring and tracing the value of HSS research. Watermeyer ultimately suggests that the first step to better understanding the impact phenomenon is to create a cartography of impacts – and, in many ways, the contribution this environmental scan makes in relation to identifying clusters of indicators in relation to scholarship, capacity, economy, society and culture and practice and policy begins this work. However, this mapping exercise is only the beginning of more dialogue, analyses and studies that are needed to better understand the ways in which research is translated, discussed and adapted by non-academic stakeholders in a variety of societal contexts.

11 Recommendations

The Federation has already made numerous contributions to the national landscape in relation to the impact agenda, such as the initial white paper on research impact for and commissioning this environmental scan. Figure 23 shows four recommendations that we think will help the federation continue to support their members to address the increasing demands on research in relation to Kmb and research impact.

Ideas into Action

002 Capacity Building Webinars For Researchers on KMb & Research Impact

Alongside the database of indicators, resources and case studies. We suggest webinars to both showcase the tools from the database and resource guide as well as to help researchers with their KMb and Research Impact Needs. Examples might include workshops on building KMb plans, using social media for KMb, how to match impact indicators to targeted stakeholder groups among others.

004 Multi-stakeholder Panels to Inform Impact Agenda

The Federation already has plans to include multi-stakeholder panels to inform their strategic planning on research impact. We reinforce the importance of this element to solidifying the awareness of the important role that the Federation has the potential to play in the growing KMb and Impact agendas occurring nationally.

Innovative Tools for Researchers 001

Building on the supplementary files from this report, we suggest the federation build a searchable database and interactive tools to support researchers targeting three elements:

- 1) Research Impact Indicators
- 2) Research Impact Resources
- 3) Research Case Studies (see Recommendation 3 below)

Exemplary Impact Cases 003

We suggest that the federation choose exemplary cases from a subset of research projects that show the richness and diversity of humanities and social science research, and create a series to showcase this work.

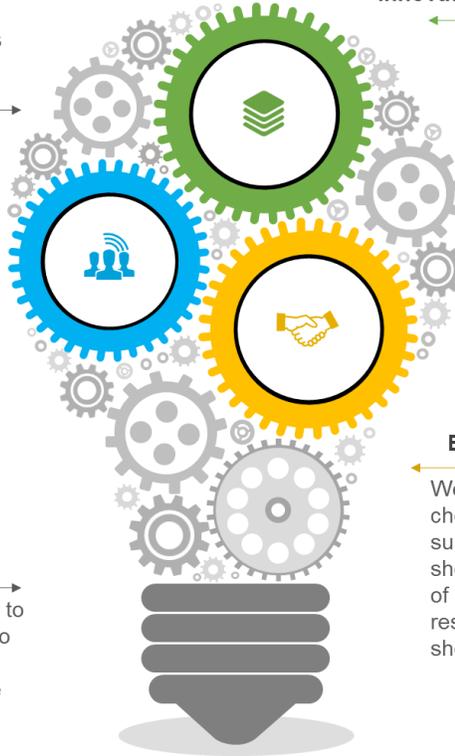


Figure 23. Recommendations for the FHSS.

In the current societal climate, it is more important than ever that the Federation and its members engage in discussions that will continue to shape the research impact agenda across Canada. If we do not actively participate in creating this agenda as HSS researchers, we will be subjected to assessment systems that do not represent our values and the important contributions that we know HSS makes to Canadian society.

12 References

- Bastow, S., Dunleavy, P. and Tankler, J. (2014). *The impact of the social sciences : How academics and their research make a difference*. Los Angeles : SAGE.
- Bell, S., et al. (2011). Real-world approaches to assessing the impact of environmental research on policy. *Research Evaluation*, 20(3) 227–37.
- Boaz, A., Fitzpatrick, B. & Shaw, B. (2009). Assessing the impact of research on policy: a literature review. *Science and Public Policy*, 36(4), 255–270.
- Bowen, S., & Graham, I. (2013). From knowledge translation to engaged scholarship: Promoting research relevance and utilization. *Science Direct*, 94(1), S3-S8.
- Boyer, E. (1990). *Scholarship reconsidered : Priorities of the professoriate*. Princeton, NJ : Carnegie foundation for the advancement of teaching.
- Brechin, A. and Siddell, M. (2000). Ways of knowing. In Gomm, R. and Davies, C. (Eds) *Using evidence in health care*, Buckingham: Open University Press.
- Brewer, J. (2011). The impact of impact. *Research Evaluation*, 20(3): 255-256.
- Buxton, M. (2011). The payback of ‘payback’: Challenges in assessing research impact. *Research Evaluation*, 20(3), 259–60.
- Chandler, C. (2014). What is the meaning of impact in relation to research and why does it matter? A view from inside academia. In P. Denicolo (Ed.), *Achieving impact in research* (pp. 1-15). California: Sage Publications Ltd.
- CAHS (2009). Panel on Return on Investment in Health Research, 2009. *Making an Impact: A Preferred Framework and Indicators to Measure Returns on Investment in Health Research*, Canadian Academy of Health Sciences, Ottawa, ON, Canada
- Cooper, A. (2014). *Research Impact in Public Service Sectors*. Kingston: A Ripple Project. Available at www.ripplenetwork.ca
- Cooper, A. (2015). *Social science funding agencies’ support and promotion of knowledge mobilization and research impact: an international study*. Kingston: A Ripple Project. Available at www.ripplenetwork.ca
- Conway, M. (2009). *Environmental Scanning: What it is, how to do it*. Thinking Futures, USA.
- Costa, J. (1995). An empirically-based review of the concept of environmental scanning, *International Journal of Contemporary Hospitality Management*, 7(7), pp. 4 - 9
- Court, J., & Young J. (2004). *Bridging research and policy in international development : An analytical and practical framework*, Research and Policy in Development Programme Briefing Paper. London: Overseas Development Institute.

- Davies, H., & Nutley, S. (2008). *Learning more about how research-based knowledge gets used: Guidance in the development of new empirical research*. New York: William T. Grant Foundation.
- Davies, H., Nutley, S. & Walter, I. (2005). *Approaches to assessing the non-academic impact of social science research*. A report prepared for the Economic and Social Research Council. UK: Research Unit for Research Utilisation.
- Denicolo, P. (Ed.). (2014). *Achieving impact in research*. California: Sage Publications Ltd.
- Donovan, C. (2008). The Australian research quality framework: A live experiment in capturing the social, economic, environmental, and cultural returns of publicly funded research. *New Directions for Evaluation*, 118, 47–60.
- Donovan, C. (2011). State of the art in assessing research impact: Introduction to a special issue, *Research Evaluation*, 20(3), 175–9.
- Federation for the Humanities and Social Sciences. (2014, October 10). *The impacts of humanities and social science research*. Retrieved September 30, 2015, from <http://www.ideas-ideas.ca/sites/default/files/2014-10-03-impact-project-draft-report-english-version-final2.pdf>
- Gabbay, J. & le May, A. (2004). Evidence based guidelines or collectively constructed “mindlines?”: Ethnographic study of knowledge management in primary care. *BMJ*, 329, 1013.
- Grant, J., Brutscher, P., Kirk, S., Butler, L., & Wooding, S. (2010). Capturing Research Impacts: A review of international practice. *RAND*.
- Grant, J., Cottrell, R., Cluzeau, F., & Fawcett, G. (2000). Evaluating “payback” on biomedical research from papers cited in clinical guidelines: Applied bibliometric study. *BMJ*, 320: 1107–1111.
- HEFCE. (2011). REF2014: Research Excellence Framework, <http://www.ref.ac.uk/>
- Herbst, M. (2007). Financing public universities. *Higher Education Dynamics*, 18, Springer.
- Hicks, D. (2012). Performance-based university research funding systems. *Research Policy*, 41(2), 251–261. [doi:10.1016/j.respol.2011.09.007](https://doi.org/10.1016/j.respol.2011.09.007)
- Jung, T. & Nutley S. (2008). Evidence and policy networks. *Evidence and Policy*, 4(2), 187–207.
- King’s College London and Digital Science (2015). *The nature, scale and beneficiaries of research impact: An initial analysis of Research Excellence Framework (REF) 2014 impact case studies*. Bristol, United Kingdom: HEFCE. Retrieved October 2, 2015 from: <http://www.kcl.ac.uk/sspp/policy-institute/publications/Analysis-of-REF-impact.pdf>
- Knott, J., & Wildavsky, A. (1980). If dissemination is the solution, what is the problem? *Knowledge: Creation, Diffusion, Utilization*, 1(4), 537-578.
- Meagher, L., Lyall, & Nutley, S. (2008). Flows of knowledge, expertise and influence: A method for assessing policy and practice impacts from social science research. *Research Evaluation*, 17(3), 163–73.



- Meyer, M. (2010). The rise of the knowledge broker. *Science Communication*, 32(1), 118-127.
- Mitton, C., Adair, C. E., McKenzie, E., Patten, S.B. and Perry B.W. (2007). Knowledge transfer and exchange: review and synthesis of the literature. *The Milbank Quarterly*, 85(4), 729-768.
- Molas-Gallart, J. & Tang, P. (2011). Tracing 'productive interactions' to identify social impacts: An example from the social sciences. *Research Evaluation*, 20(3), 219-26.
- Molas-Gallart, J., Tang, P., & Morrow, S. (2000). Assessing the non-academic impact of grant-funded socio-economic research: results from a pilot study, *Research Evaluation*, 9(3): 171-82.
- Morton, S. (2015). Progressing research impact assessment: A 'contributions' approach. *Research Evaluation Advance Access*, 1-15. Doi: 10.1093/reseval/rvv016
- Nason, E., Klautzer, J. & Rubin. (2007). Policy and practice impacts of research funded by the economic and social research council: A case study of the future of work programme, supporting data. Santa Monica, CA: RAND Corporation.
- Nutley, S., Powell, A., & Davies, H. (2013). What counts as good evidence? Provocation paper for the alliance for useful evidence. London, England: The Alliance for Useful Evidence.
- Nutley, S., Walter, I., & Davies, H. (2007). *Using evidence: How research can inform public services*. Bristol: Policy Press.
- Phipps, D. (2012). A report detailing the development of a university-based knowledge mobilization unit that enhances research outreach and engagement. *Scholarly and Research Communication*, 2(2), 1-13.
- Picard-Aitken, M., & Bertrand, F. (2008). Review and conceptualization of impacts of research/creation in the fine arts: Final report. *Science-Metrix*. Retrieved October 2, 2015 from: http://www.sshrc-crsh.gc.ca/about-au_sujet/publications/RC_fine_artsFinalE.pdf
- REF (2011). Assessment framework and guidance on submissions. REF 02.2011 (as of 28 July 2014) Available at: www.ref.ac.uk/pubs/2011-02/
- Smith, K. E. (2007). Health inequalities in Scotland and England: The contrasting journeys of ideas from research into policy. *Social Science and Medicine*, 64(7), 1438-1449.
- Spaapen, J. & Van Drooge, L. (2011). Introducing 'productive interactions' in social impact assessment. *Research Evaluation*, 20(3), 211-218.
- Tseng, V., Granger, R., Seidman, E., Maynard, R., Weisner, T. & Wilcox, B. (2007). Studying the use of research evidence in policy and practice. The William T. Grant Foundation.
- Walter, I., Nutley, S., Davies, H. (2003). *Research impact: A cross-sector literature review*. St Andrews: Research Unit for Research Utilisation.

- Watermeyer, R. (2014). Issues in the articulation of ‘impact’: The responses of UK academics to ‘impact’ as a new measure of research assessment. *Routledge*, 39(2), 359-377. DOI: 10.1080/03075079.2012.709490
- Weiss, C. H. (1979). The many meanings of research utilization. *Public Administration Review*, 39(5), 426-31.
- Weiss, C. H., Murphy-Graham, E., Birkeland, S. (2005). An alternate route to policy influence: How evaluations affect D.A.R.E., *American Journal of Evaluation*, 26, 12-30.
- Wilsdon, J., et al. (2015). *The metric tide: Report of the independent review of the role of metrics in research assessment and management*. DOI: 10.13140/RG.2.1.4929.1363
- Wixted, B. & Beaudry, C. (2012). “*Capturing the Impacts*” of Research. Prepared for the Social Sciences and Humanities Research Council. Simon Fraser: Centre for Policy Research on Science and Technology. Available at: http://www.sshrc-crsh.gc.ca/about-au_sujet/publications/Compendium_e.pdf
- Wouters, P. et al. (2015). The metric tide: Literature Review (Supplementary Report I to the Independent review of the Role of Metrics in Research Assessment and Management). HEFCE. DOI: 10.13140/RG.2.1.5066.3520

13 Appendices

Appendix A: Terms from Conceptual Framework and Analysis Defined

Domain	Term	Definition
Types of Agencies	Agency	Organizations that provide particular types of service (i.e., Funder, Government, International Organization, Practice, University).
	Funder	Research funding agencies which promote and support postsecondary-based research and research training in various fields (i.e., SSHRC, ESRC).
	Government	A branch or service of the supreme authority of a state or nation(s), taken as representing the whole.
	International Organization	An international organization is an organization with an international membership, scope, or presence (i.e., OECD, European Evaluation Society)
	Practice	A business, profession, or trade.
	University	An educational institution designed for instruction, examination, or both, of students in many branches of advanced learning, conferring degrees in various faculties, embodies colleges, polytechnic schools and other similar institutions.
Types of Fields Producing Resources	Field	A particular branch of study or sphere of activity or interest (i.e, art, business, economics, education, humanities, library and information science, psychology, social science, socio-economic science)
	Arts	The arts represent an outlet of expression, that is usually influenced by culture and which in turn helps to change culture. As such, the arts are a physical manifestation of the internal creative impulse. Major constituents of the arts include literature – including poetry, novels and short stories, and epics; performing arts – among them music, dance, and theatre.
	Business	The social science that studies business management.
	Economics	The social science that is concerned with the production, consumption, and transfer of wealth.
	Education	The social science that develops professional knowledge and skills related to learning
	Humanities	The study of how people process and document the human experience.

Library and Information Science	The social science that applies the practices, perspectives, and tools of management, information technology, education, and other areas to libraries; the collection, organization, preservation, and dissemination of information resources; and the political economy of information.
Psychology	The social science that studies the human mind and its functions, especially those affecting behavior in a given context.
Social Science	The scientific study of human society and social relationships.
Socio-Economic Science	The social science that studies how economic activity affects and is shaped by social processes. In general it analyzes how societies progress, stagnate, or regress because of their local or regional economy, or the global economy.

Types of Research Impact Resources	Resource Type	A piece of written, printed, or electronic matter that provides information or evidence or that serves as an official record (i.e., book/chapter, conference related, government publication, grey literature, journal article, magazine, network, project, repository, service, software).
	Book / Chapter	A written or printed work.
	Conference Related	Documents associated with conferences (i.e., call for proposals, speech transcripts, etc.). Does not include conference papers.
	Government Publication	Informational matter which is published as an individual document at Government expense, or as required by law.
	Grey Literature	Grey literature is academic literature that is not formally published (i.e., research report, technical report, working paper, conference paper, expert group reports, discussion paper, unpublished research, green papers, theses, dissertations, transcripts, newsletter, conference proceedings, media report).
	Journal Article	Scholarly or peer-reviewed articles written by scholars or professionals who are experts in their fields.
	Magazine	A periodical publication containing articles (not peer reviewed) typically covering a particular subject or area of interest.
	Network	A group or a system of interconnected people.
	Project	An individual or collaborative enterprise that is carefully planned and designed to achieve a particular aim
Repository	A central location where data is stored and managed.	



Focus Topic of Research Impact Resources	Service	Either free or paid action that helps or does the work for someone (can include in-browser apps such as Plum Analytics and websites such as Total Impact and Mendeley).
	Software	Programs used by a computer (must require download).
	Topic	The matter dealt with or the subject represented in the resource (i.e., altmetric, collaborative partnership, development/innovation, indicator, national assessment exercise, open access, research funder, scientometric indicator, tool, university ranking/research report)
	Altmetrics	Non-traditional metrics proposed as an alternative to more traditional citation impact metrics, such as impact factor and h-index. Examples include:
	Collaborative Partnership	When a group works together in a joint intellectual endeavor that pools common interests, assets, and professional skills in order to promote broader goals and outcomes for the entire group's benefit.
	Develop / Innovating	Grow or cause to grow and become more mature, advanced, or elaborate / introduce (something new, especially a product).
	Indicator	Quantitative or qualitative measures that chart research impact over time.
	National Assessment Exercise	Evaluation of the quality of research undertaken by higher education institutions in a nation.
	Open Access	A system where users have free access to literature.
	Research Funder	An organization that provides capital and other resources to help support post-secondary research
	Scientometric Indicator	Depicts essential aspects of scientific activities by quantitative and statistical methods, and its output proved to be a valuable supplement to qualitative methods such as peer reviews.
	Tool	A device or implement used to carry out a particular function - can either be free or paid
	University Ranking/ Research Report	The measure of post-secondary institutions using a set of indicators / the measure of research activities of a (singular) post-secondary institution over a particular year using indicators and case studies.

Appendices: Indicators Coded by FHSS Research Impact Framework

Appendix B: Scholarship Research Impact Indicators

Sub-Category	Indicators		
<p>1.10 Bibliometrics & Indices</p> <p><i>Includes relative citation impact, highly cited publications, h-index, proportion of citations in relation to field</i></p> <p><i>Does not include citations counted from policy documents, etc. as these are a proxy for policy category</i></p>	<ul style="list-style-type: none"> • H-index (Holbrook, 2013) • Universal h-index (Holbrook, 2013) • G-index (Holbrook, 2013) 	<ul style="list-style-type: none"> • Journal impact factor (Holbrook, 2013; University of Saskatchewan, 2012) • Citation index (Baker, 2011; Franklin, 2007; Giménez-Toledo & Román-Román, 2009) • Google lists of top journals (Memorial University, 2013) • Quality weighting = $3*A+2*B+1*C/A+B+C$ (García & Sanz-Menéndez, 2005) 	<ul style="list-style-type: none"> • Web of Science (WoS) (Memorial University, 2013) • Eigenfactor level (Wilburtz, 2013) • Average Impact Index (Giménez-Toledo, Román-Román, & Alcain-Partearroyo, 2007) • Number of bibliographic citations for all technical papers published in journals, conference proceedings or elsewhere (Cozzarin, 2008)
<p>1.11 Outputs</p> <p><i>Counting of publications, conference publications, etc. - no analysis beyond frequencies, so not bibliometrics</i></p>	<ul style="list-style-type: none"> • Number of new humanities titles (American Academy of the Arts & Sciences, 2013) • New titles in the humanities, by discipline price of new print titles, by field (American Academy of the Arts & Sciences, 2013) • Price of new print titles, by discipline (American Academy of the Arts & Sciences, 2013) • Price of academic e-books, by field or discipline (American Academy of the Arts & Sciences, 2013) • Number of peer-reviewed/professional publications and citation counts for a specified period of time for 	<ul style="list-style-type: none"> • Number of book sales/loans (Holbrook, 2013) • Contributions to textbooks (Holbrook, 2013) • Monographs (scholarly & practitioner) (Memorial University, 2013; Royal Irish Academy, 2011) • Number of Review articles or essays (Memorial University, 2013) • Number of Works submitted but not yet accepted or works designated 'revise and resubmit' (Memorial University, 2013) • Number of technical reports (Memorial University, 2013) • Number of multimedia (cd, web) (Memorial University, 2013) 	<ul style="list-style-type: none"> • Place of publications (Holbrook, 2013) • Share of international level publications by universities on the overall [country] scientific publications (Bach & Llerena, 2007) • Share of international level publications by universities on the overall world scientific publications (Bach & Llerena, 2007) • Number of popularized works (Bornmann, 2013) • Number of performances (University of Saskatchewan, 2008; Federation for the Humanities and Social Sciences, 2014)



Sub-Category	Indicators	
<p>an individual, department, or university (Andras, 2011)</p> <ul style="list-style-type: none"> • Publications that are valuable to the communities, but may not be recognized academically because they are not published by a university press. (Memorial University, 2013) • Publications by single authors (Finland's Ministry of Employment and the Economy Innovation, 2014) • Number of promotional articles/research publications on research results and products for users (Finland's Ministry of Employment and the Economy Innovation, 2014) • Proportion of research projects completed or milestones reached (in the planned time and within specified budgets) (Finland's Ministry of Employment and the Economy Innovation, 2014) • Case books, treatises, case comments (University of Saskatchewan, 2008; Franklin, 2007) • Production of documentary, fiction, experimental or animated films (Royal Irish Academy, 2011) • Discussion papers and newsletters produced 	<ul style="list-style-type: none"> • Number of creative works and performances completed and in progress (Memorial University, 2013; Royal Irish Academy, 2011) • Performance indicators (Finland's Ministry of Employment and the Economy Innovation, 2014; Royal Irish Academy, 2011) • Academic presses (Royal Irish Academy, 2011) • Preparation of an edition of classical/medieval philosophical texts (which requires an exceptional combination of philosophical, linguistic and palaeographical skills). (Royal Irish Academy, 2011) • Completed dissertations (Royal Netherlands Academy, 2013) • Collections for non-scientists/scholars and interested individuals (Royal Netherlands Academy, 2013) • Editions of texts (Royal Netherlands Academy, 2013) • % of published output of unit (Royal Netherlands Academy, 2013) 	<ul style="list-style-type: none"> • Number of case books, treatises, case comments (Franklin, 2007; University of Saskatchewan, 2008) • Number of books (print or online), book chapters, booklets. (University of Saskatchewan, 2008; Memorial University, 2013) • Gallery exhibition, new media installations and performance, net art and virtual and real space interactivity. Public media, public lectures and talks. (Royal Irish Academy, 2011) • Editions of texts (Royal Netherlands Academy, 2013) • Articles in specialist publications (not being primarily scientific/scholarly journals) (Royal Netherlands Academy, 2013) • New media such as “e-journals, public databases, blogs, and wiki documents.” (Federation for the Social Sciences and Humanities, 2012)

Sub-Category	Indicators			
1.12 Collaborations <i>Determining proportion of publications authored internationally, nationally, and with other disciplines</i>	(Federation for the Social Sciences and Humanities, 2012)	<ul style="list-style-type: none"> • # of collaborations (University of Saskatchewan, 2012) • Percentage of research at and of non-national and external researchers recruited by institution (Commission of the European Communities, 2005) • Share of foreigners in researchers, teacher-researchers, post-doc students and research support staff paid by the State or by universities (Bach & Llerena, 2007) • Organizing ‘forward thrust’ projects. Evaluating projects in terms of future trends. Recruiting personnel to open new fields. (Hellström, 2012) • Number of projects/programs involving other Research Chairs (Finland's Ministry of Employment and the Economy Innovation, 2014) • Number of joint project/program sharing major facilities (Finland's Ministry of Employment and the Economy Innovation, 2014) • Share of funded papers with no national authors (Reale, Inzelt, Lepori, & van den Besselaar, 2012) 	<ul style="list-style-type: none"> • International partnerships (Franklin, 2007; University of Saskatchewan, 2008) • Collaboration with institutions considered as internationally excellent (Franklin, 2007) • Cross-unit and cross-institution collaborative groups (Franklin, 2007; University of Saskatchewan, 2008) • Freedom of movement and affiliation between groups. Self-selection to pursue topics (Hellström, 2012) • Interdisciplinary and multidisciplinary achievements/outputs (Franklin, 2007; University of Saskatchewan, 2008) • Share of funded papers which are internationally co-funded (Reale, Inzelt, Lepori, & van den Besselaar, 2012) • Share of national output with international co-authors (Reale, Inzelt, Lepori, & van den Besselaar, 2012) • Intensity of funding for collaboration (Reale, Inzelt, Lepori, & van den Besselaar, 2012) 	<ul style="list-style-type: none"> • Managing and incentivizing research partnerships to explore new fields and avoid lock-ins (Hellström, 2012) • Co-authoring/presenting of research results (Piggot-Irvine, Rowe, & Ferkins, 2015) • Share of projects with at least one foreign partner (thus considering only collaborations in which foreign partners have an official role) (Primeri, Reale, Lepori, Laredo, Nedeva, & Thomas, 2014) • Visiting foreign researchers who have conducted or are conducting scientific/academic activities in the center/unit (The Severo Ochoa Centers of Excellence Program, 2011)



Sub-Category	Indicators		
<p>1.13 Funding</p> <p><i>Grants researchers hold, infrastructure grants, share of funding given to humanities and social sciences from countries, revenue generated etc.</i></p>	<ul style="list-style-type: none"> • Funding knowledge circulation (Reale, Inzelt, Lepori, & van den Besselaar, 2012) • Budget and share of total direct research funding budget (Reale, Inzelt, Lepori, & van den Besselaar, 2012) • Budget for Joint Research Programmes (JRP) (Reale, Inzelt, Lepori, & van den Besselaar, 2012) • Budget for attracting researchers from abroad (Reale, Inzelt, Lepori, & van den Besselaar, 2012) • Extent of cross-border funding schemes (Reale, Inzelt, Lepori, & van den Besselaar, 2012) • \$ of grants received (University of Saskatchewan, 2012) • Federally Funded Share of Expenditures for Academic RD in the Humanities and Other Selected Fields (American Academy of the Arts & Sciences, 2013) 	<ul style="list-style-type: none"> • Raising research funding for project, unit, institution, or field (Royal Irish Academy, 2011) • Prestigious national and international research grants, personal funding (Royal Netherlands Academy, 2013) • Fundraising (Royal Netherlands Academy, 2013) • Personal grants (Royal Netherlands Academy, 2013) • Analysis of funding for mobility (Reale, Inzelt, Lepori, & van den Besselaar, 2012) • State funding for the humanities (Royal Irish Academy, 2011) 	<ul style="list-style-type: none"> • Post-doctoral grants received by research staff members (The Severo Ochoa Centers of Excellence Program, 2011) • Sponsored research funding (Tremblay, Zohar, Bravo, Potsepp, & Barker, 2010) • # of grants received (University of Saskatchewan, 2012; Bloch, Sørensen, Graversen, Schneider, Schmidt, Aagaard, & Mejlgaard, 2014) • \$ of revenue generated • Effective openness of the research funding (University of Saskatchewan, 2012) • Numbers and Revenues of Local, State, and Regional Humanities (and Humanities and Arts) Councils (American Academy of the Arts & Sciences, 2013)
<p>1.14 Prizes and Awards</p> <p><i>Prizes that recognize research achievement</i></p>	<ul style="list-style-type: none"> • Number of academic prizes/awards received; nominations for prizes/awards (Baker, 2011; Bloch, Sørensen, Graversen, Schneider, Schmidt, Aagaard, & Mejlgaard, 2014) • Faculty national awards (Burke & Minassians, 2002) 	<ul style="list-style-type: none"> • National and international awards and citations (University of Saskatchewan, 2008) • Nobel prizes and other prestigious awards (Wilburtz, 2013) 	<ul style="list-style-type: none"> • Number of civil society prizes/awards received; nominations for prizes/awards (Royal Netherlands Academy, 2013)

Sub-Category	Indicators		
1.15 Acknowledgements <i>Proxies of influence</i>	<ul style="list-style-type: none"> • Adjudication of awards; being asked to adjudicate awards (Memorial University, 2013) • Citations in grant applications (Federation for the Humanities and Social Sciences, 2014) • Number of invitations to present at national and international conferences and congresses with business (Finland's Ministry of Employment and the Economy Innovation, 2014) • Reputation as measured by survey (Federation for the Humanities and Social Sciences, 2014) 	<ul style="list-style-type: none"> • Appearing at invited lectures (Royal Irish Academy, 2011) • Invited chapters appearing in books edited, or with contributions, by leading international scholars in the field. (Royal Irish Academy, 2011) • Demonstrable utilisation by peers of researcher's output (Royal Netherlands Academy, 2013) • Demonstrable recognition by peers for researcher's output (Royal Netherlands Academy, 2013) • Esteem of senior fellows (Holbrook, 2013) 	<ul style="list-style-type: none"> • Faculty recommendations (Holbrook, 2013) • Angry letters from important people (Holbrook, 2013) • Lawsuits (Holbrook, 2013) • Arrests (Holbrook, 2013) • Invited editorship of a special edition of an international journal (Royal Irish Academy, 2011) • Post-publication peer-review (e.g., book reviews, dedicated symposia) (Federation for the Humanities and Social Sciences, 2014)
1.16 Service <i>The action of helping or doing voluntary work for a person, organization, etc.</i>	<ul style="list-style-type: none"> • Amount of public service completed by an individual, unit, or institution (Burke & Minassians, 2002) • Externally reviewing (national/international) submitted journal articles, book proposals, edited volumes, and manuscripts (Royal Irish Academy, 2011) • Internal and external administrative activities related to the functioning of the University (e.g., program chair, coordinator, department head, advising, recruiting, external examiner for dissertations etc.) (Memorial University, 2013) 	<ul style="list-style-type: none"> • Organising international conferences (Royal Irish Academy, 2011) • Serving on a committee that ranks grant or scholarship applications (Memorial University, 2013) • Membership of juries for thesis awards (Royal Netherlands Academy, 2013) • # of workshops, public presentations, conferences hosted, and meetings facilitated (University of Saskatchewan, 2012) 	<ul style="list-style-type: none"> • Service in an association or society concerned with the improvement of teaching and learning (Memorial University, 2013) • Editing or contributing to a professional journal on teaching one's subject (Memorial University, 2013) • Organizing or hosting conferences, departmental speaker series, talks (Memorial University, 2013)



Sub-Category	Indicators		
<p>1.17 Advancement of Knowledge <i>New or improved research tools, methodology, etc.</i></p>	<ul style="list-style-type: none"> • Databases created (Federation for the Social Sciences and Humanities, 2012) • Research tools, and library tools. (Federation for the Social Sciences and Humanities, 2012) 	<ul style="list-style-type: none"> • Improved research systems (Bornmann, 2013) 	
<p>1.18 Process <i>Conferences, scholarly lectures, etc.</i></p>	<ul style="list-style-type: none"> • Number of conference papers/proceedings (Ernø-Kjølhede & Hansson, 2011; Royal Netherlands Academy, 2013) 	<ul style="list-style-type: none"> • Scholarly lectures and other professional presentations (Memorial University, 2013) 	<ul style="list-style-type: none"> • Seminars/ symposia/ conferences – number; type; number of participants (Masset, Mulmi, & Sumner, 2011)

Appendix C: Capacity Research Impact Indicators

Sub-Category	Indicators	
2.1 Highly Qualified Personnel <i>Includes measures of graduate students, faculty members, researchers etc.</i>	<ul style="list-style-type: none"> • Graduate student support (Burke & Minassians, 2002) • Graduate quantitative and writing skills (Burke & Minassians, 2002) • Graduates who participated in community service (Burke & Minassians, 2002) • Preparation of new students (Burke & Minassians, 2002) • Satisfaction (alumni, employers, students) (Burke & Minassians, 2002) • Students participating in research (Burke & Minassians, 2002) • Number of students studying abroad (Burke & Minassians, 2002) • Teacher training (Burke & Minassians, 2002) • Workforce training (Burke & Minassians, 2002) • Research competence development (Hellström, 2012) • Mentoring activities supporting learning. (Hellström, 2012) • Success of graduate/undergraduate presentations and grants (Holbrook, 2013) • Training – number of trainees; extent of training; duration of training; number and type of manuals (Masset, Mulmi, & Sumner, 2011) 	<ul style="list-style-type: none"> • Number of capacity building experiences for younger (Bloch, Sørensen, Graversen, Schneider, Schmidt, Aagaard, & Mejlgaard, 2014) researchers (phd, postdoc) • Number of industrial phds (Bornmann, 2013) • Number of graduates/graduation rate (Burke & Minassians, 2002) • Well-educated graduates that flow to firms (Bornmann, 2013) • Number of professional development courses offered (Bornmann, 2013) • Number of degrees awarded (Burke & Minassians, 2002) • Time to degree (Burke & Minassians, 2002) • Workforce and economic development (Burke & Minassians, 2002) • Job placement rates (Burke & Minassians, 2002) • Licensure test scores • Transfer rates (Burke & Minassians, 2002) • Population with tertiary education (Commission of the European Communities, 2005) • Integration of research as a learning outcome in courses (Federation for the Humanities and Social Sciences, 2014) • Number and quality of experiential learning / research • Interdisciplinary team development (Federation for the Social Sciences and Humanities, 2012) • Number of mentoring services provided (Baker, 2011) • Employment attained (Baker, 2011) • Development of new knowledge or skills (Bloch, Sørensen, Graversen, Schneider, Schmidt, Aagaard, & Mejlgaard, 2014) • Expertise received (personal) (Bloch, Sørensen, Graversen, Schneider, Schmidt, Aagaard, & Mejlgaard, 2014) • Number of younger researchers (PhD, postdoc) employed (Bloch, Sørensen, Graversen, Schneider, Schmidt, Aagaard, & Mejlgaard, 2014) • Teacher training opportunities (Burke & Minassians, 2002) • Assessment of student learning (Burke & Minassians, 2002) • Cooperative education, internships (Burke & Minassians, 2002) • Expenditure per student (Burke & Minassians, 2002) • Percentage of doctoral programmes with industry placements by institution and percentage of researchers that

Sub-Category	Indicators		
	<ul style="list-style-type: none"> • Number of institute researchers finding employment elsewhere in the field (Finland's Ministry of Employment and the Economy Innovation, 2014) • Skills, knowledge gained and lessons learned which are transferable to other areas of project team members' life and work (Piggot-Irvine, Rowe, & Ferkins, 2015) • Members more aware of self in relation to the concern/issue in the community or organization (Piggot-Irvine, Rowe, & Ferkins, 2015) • Shifted perspectives (Piggot-Irvine, Rowe, & Ferkins, 2015) 	<ul style="list-style-type: none"> • opportunities for students (Federation for the Humanities and Social Sciences, 2014) • Number of Post-Docs in Centres Career steps of HR employed at centres and job mobility of employees (Finland's Ministry of Employment and the Economy Innovation, 2014) • Number of specialized training opportunities created by Networks (Finland's Ministry of Employment and the Economy Innovation, 2014) • Number of publications and conferences involving trainees (Finland's Ministry of Employment and the Economy Innovation, 2014) 	<ul style="list-style-type: none"> • benefit (Commission of the European Communities, 2005) • Education of students in close cooperation with the business community (Ernø-Kjølhede & Hansson, 2011) • Number and quality of experiential learning/ research opportunities for students (Federation for the Humanities and Social Sciences, 2014) • Greater valuing of trying new ideas and being creative (Piggot-Irvine, Rowe, & Ferkins, 2015) • Number of jobs created within consortia (all partners) (Finland's Ministry of Employment and the Economy Innovation, 2014)
<p>2.2 Additional Funding <i>Funding from external sources including donations from citizens.</i></p>	<ul style="list-style-type: none"> • Technological investments by private and public investors (Masset, Mulmi, & Sumner, 2011) • Technological investments by a specific institution (Masset, Mulmi, & Sumner, 2011) • Private funding charitable giving for humanities activities (American Academy of the Arts & Sciences, 2013) • Individual, Corporate, and Foundation giving to arts, culture, and humanities organizations (American Academy of the Arts & Sciences, 2013) 	<ul style="list-style-type: none"> • Percentage of individual grants awarded by Community (Commission of the European Communities, 2005) • Amount of commissioned research by societal actors (De Jong, van Arensbergen, Daemen, van der Meulen, & van den Besselaar, 2011) • External funding for other research (University of Saskatchewan, 2008) • In-kind contributions made by communities to faculty research • In-kind contributions that faculty members make to communities (Memorial University, 2013) 	<ul style="list-style-type: none"> • Trends in R&D investment in [Country] (Finland's Ministry of Employment and the Economy Innovation, 2014) • Industry contributions as a proportion of total funding (Finland's Ministry of Employment and the Economy Innovation, 2014) • Foreign investment (Burke & Minassians, 2002) • Private fundraising (Burke & Minassians, 2002) • Amount of external funding relating to research cooperation with non-academic institutions (Bornmann, 2013)

Sub-Category	Indicators		
	<ul style="list-style-type: none"> Sources of funding for academic research and development in the humanities and other selected Fields (American Academy of the Arts & Sciences, 2013) Change in the adequacy of operational support of research infrastructure as a result of the research activity (Baker, 2011) Amount of third-party funding (Bornmann, 2013) 	<ul style="list-style-type: none"> % contribution of industry to total budget (Finland's Ministry of Employment and the Economy Innovation, 2014) Trends in R&D investment of partners (Finland's Ministry of Employment and the Economy Innovation, 2014) 	
2.3 Teaching and Learning	<ul style="list-style-type: none"> Faculty workload (Burke & Minassians, 2002) Faculty Credentials (Burke & Minassians, 2002) Student-faculty ratios (Burke & Minassians, 2002) Class size (Burke & Minassians, 2002) Accredited programs (Burke & Minassians, 2002) Faculty, availability (Burke & Minassians, 2002) Faculty evaluation (Burke & Minassians, 2002) Teaching material, course development (Ernø-Kjølhede & Hansson, 2011) Teaching/lecture hours for master's and PhD students (Royal Netherlands Academy, 2013) The development of university and public school curricula (Federation for the Social Sciences and Humanities, 2012) 	<ul style="list-style-type: none"> Ability to attract and retain distinguished, entrepreneurial faculty (Gardner, Fong, & Huang, 2010) Influencing curriculum design (Holbrook, 2013) Research seminars, course or curriculum development; course materials prepared for students (Memorial University, 2013) The presence of one's research and creative work in university courses and in schools (Memorial University, 2013) Number of courses developed and introduced (Finland's Ministry of Employment and the Economy Innovation, 2014) 	<ul style="list-style-type: none"> Invitations to contribute to the teaching literature (Memorial University, 2013) Availability of curricula/courses and effective take-up of professional training in line with industrial needs (Finland's Ministry of Employment and the Economy Innovation, 2014) Number of participant (non-university) staff contributing to research training and/or teaching (Finland's Ministry of Employment and the Economy Innovation, 2014) symposia/seminars held (Finland's Ministry of Employment and the Economy Innovation, 2014) Development of course materials/new courses (Federation for the Social Sciences and Humanities, 2012)



Appendix D: Economy Research Impact Indicators

Sub-Category	Indicators		
3.1 Innovation <i>Mention of innovation</i>	<ul style="list-style-type: none"> • % of projects that lead to one or more commercialized innovations or are brought from one stage of the innovation process to another (Cozzarin, 2008) 	<ul style="list-style-type: none"> • Quality of results as e.g. Measured in number of peer reviewed publications innovative research and innovation (Finland's Ministry of Employment and the Economy Innovation, 2014) 	
3.2 Commercialization <i>Patents, spin offs, copyright etc.</i>	<ul style="list-style-type: none"> • Number of spin-offs (Bornmann, 2013; Finland's Ministry of Employment and the Economy Innovation, 2014) • Number of invention disclosures (University of Saskatchewan, 2008; Gardner, Fong, & Huang, 2010) • Number of international co-patents (Reale, Inzelt, Lepori, & van den Besselaar, 2012) • Number of triad patents (Commission of the European Communities, 2005) • Number of expenditures (Commission of the European Communities, 2005) • Number of active licenses (Gardner, Fong, & Huang, 2010) • Number of licenses/options executed within the year based only on know-how (Gardner, Fong, & Huang, 2010) • Total income from royalties (Gardner, Fong, & Huang, 2010) • Number of full-time professionals in technology transfer offices (Gardner, Fong, & Huang, 2010) 	<ul style="list-style-type: none"> • Number of patent applications (Bornmann, 2013) • Number of patents produced (Bornmann, 2013) • Number of transferred patents (Finland's Ministry of Employment and the Economy Innovation, 2014) • Income derived from patents, patent licensing, copyright, and trademark (Federation for the Humanities and Social Sciences, 2014) • % of companies participating in the program still conducting research +5 years after the project is completed (Cozzarin, 2008) • Predictions of outcomes of technology investments (Masset, Mulmi, & Sumner, 2011) • Number and impact of breakthrough technologies (Finland's Ministry of Employment and the Economy Innovation, 2014) • Market orientation and (inter)national relevance to 	<ul style="list-style-type: none"> • Number of confidential disclosure agreements executed during the year to enable disclosure of know-how (Gardner, Fong, & Huang, 2010) • Number of material transfer agreements executed (Gardner, Fong, & Huang, 2010) • Number of business ideas incubated (Finland's Ministry of Employment and the Economy Innovation, 2014) • Increased private sector capacity and receptivity the results of research and development (Finland's Ministry of Employment and the Economy Innovation, 2014) • Share of funded patents in total national patent output (Reale, Inzelt, Lepori, & van den Besselaar, 2012) • New or improved products/services/processes launched (Finland's Ministry of Employment and the Economy Innovation, 2014)

Sub-Category	Indicators	
	<ul style="list-style-type: none"> Number of commercialization agreements (Franklin, 2007; University of Saskatchewan, 2008) Legal expenditures on protection of intellectual property (Gardner, Fong, & Huang, 2010) Number of industry linkages (Franklin, 2007; University of Saskatchewan, 2008) Average gross commercialization income (University of Saskatchewan, 2008) 	<ul style="list-style-type: none"> Addresses significant challenges that meet business needs (Finland's Ministry of Employment and the Economy Innovation, 2014)
3.3 Tools <i>Creation of tools, software, products, services, processes, etc.</i>	<ul style="list-style-type: none"> Number of new products provided (Bloch, Sørensen, Graversen, Schneider, Schmidt, Aagaard, & Mejlgaard, 2014) Number of services provided (Bornmann, 2013) Number of tools or instruments created (Bornmann, 2013) Number of new or significantly improved processes put into practice (Cozzarin, 2008) # of publicly available products and services (University of Saskatchewan, 2012) 	<ul style="list-style-type: none"> industry (Finland's Ministry of Employment and the Economy Innovation, 2014) Addresses significant challenges that meet business needs (Finland's Ministry of Employment and the Economy Innovation, 2014) New program and service development (Davies, Nutley, & Walter, 2005) Number of artifacts, exhibitions, standards, designs created (De Jong, van Arensbergen, Daemen, van der Meulen, & van den Besselaar, 2011) Number of guidelines, manuals, codes of conduct (De Jong, van Arensbergen, Daemen, van der Meulen, & van den Besselaar, 2011) Procedures for performance measurement by industrial partners (Finland's Ministry of Employment and the Economy Innovation, 2014)
		<ul style="list-style-type: none"> Addresses significant challenges that meet business needs (Finland's Ministry of Employment and the Economy Innovation, 2014) Number of new prototypes and demonstration facilities (Ernø-Kjølhede & Hansson, 2011) New processes, concepts, techniques, models, typologies (Ernø-Kjølhede & Hansson, 2011) New software created (Royal Netherlands Academy, 2013) Contributions to technological advances (Franklin, 2007) Tools/instruments mentioned in full texts (Moed, Linmans, Nederhof, Zuccala, López Illescas, & de Moya Anegón, 2009) New technologies created (Cozzarin, 2008; Cressman, Holbrook, Lewis, & Wixted, 2009)



Appendix E: Society and Culture Research Impact Indicators

Sub-Category	Indicators		
4.1 Collaborations with Non-Academic Partners	<ul style="list-style-type: none"> • Partnerships between universities and external parties/stakeholders (De Jong, van Arensbergen, Daemen, van der Meulen, & van den Besselaar, 2011) • Coordination between specialisms/disciplines through learning mechanisms. Strategic integration of disciplines (Hellström, 2012) • Perceived value of community/university engagement Entity allows local groups who have an interest in their work to contribute their ideas or become partners on a project (University of Saskatchewan, 2012) • Partners trust that each shares a commitment and willingness to collaborate for a similar vision (Burford et al., 2013) • Culture of collaboration across groups. Many concrete interrelated interaction activities (Hellström, 2012) • Number of advisory roles and board memberships (Federation for the Humanities and Social Sciences, 2014) • Number of personnel contributing from each participant (Finland's Ministry of Employment and the Economy Innovation, 2014) 	<ul style="list-style-type: none"> • Capturing the effects of collaboration and integration via common topics, core curricula and elimination of bottlenecks (Hellström, 2012) • Mobilization of groups or researchers to work on a particular problem requiring the input of many. Assembling epistemic resources to achieve a particular goal (Hellström, 2012) • Protests/demonstration/sit-ins (Holbrook, 2013) • Sustained community trust and support, reflected in returning to do further research with the same community. (Memorial University, 2013) • Joint publications among science-industry partners (Finland's Ministry of Employment and the Economy Innovation, 2014) • Nature of links between researchers and partners (Finland's Ministry of Employment and the Economy Innovation, 2014) 	<ul style="list-style-type: none"> • Number of formalized collaborations (Bornmann, 2013) • Number and quality of partnerships between researchers and the private sector (Federation for the Humanities and Social Sciences, 2014) • Increased networking/collaboration between research partners, firms, community groups (Bornmann, 2013) • Actual collaboration in research, testing and evaluation with stakeholders (De Jong, van Arensbergen, Daemen, van der Meulen, & van den Besselaar, 2011) • Number of new participants and/or associate members (Finland's Ministry of Employment and the Economy Innovation, 2014) • New partnerships developed (Piggot-Irvine, Rowe, & Ferkins, 2015) • Proposals submitted with partners for new projects (Piggot-Irvine, Rowe, & Ferkins, 2015) • Number and quality of partnerships between researchers and community groups (Federation for the Humanities and Social Sciences, 2014)
4.2 Contribution to Societal Debate	<ul style="list-style-type: none"> • Contributions to public debates and appearances in the national or 	<ul style="list-style-type: none"> • Other kinds of invitations based on one's reputation as a teacher, such 	<ul style="list-style-type: none"> • Media coverage of research (newspapers/ TV / online)

Sub-Category	Indicators		
<i>Media coverage</i>	international media as an expert (Royal Netherlands Academy, 2013) <ul style="list-style-type: none"> • Press Releases – number of press releases published and in what for (Masset, Mulmi, & Sumner, 2011) • Quotes in media (Holbrook, 2013) 	as a media interview on a successful teaching innovation (Memorial University, 2013) <ul style="list-style-type: none"> • Requests for media appearances (Federation for the Humanities and Social Sciences, 2014) 	(Federation for the Humanities and Social Sciences, 2014) <ul style="list-style-type: none"> • Media mentions (Holbrook, 2013) • Press Conferences – number of press articles that resulted and in what for (Masset, Mulmi, & Sumner, 2011)
4.3 Web Analytics, Downloads, & Altmetrics <i>Proxies of influence</i>	<ul style="list-style-type: none"> • Research-related social media (Federation for the Humanities and Social Sciences, 2014) • Social networking contacts (Holbrook, 2013) • Downloads from databases or open access repositories (Federation for the Humanities and Social Sciences, 2014) 	<ul style="list-style-type: none"> • # of website hits, Facebook likes, and Twitter followers (University of Saskatchewan, 2012) • Public use of research-based web resources on social and cultural issues (Federation for the Humanities and Social Sciences, 2014) 	<ul style="list-style-type: none"> • Number of article or product downloads (Royal Netherlands Academy, 2013) • Blog mentions (Holbrook, 2013) • Trending in social media (Holbrook, 2013)
4.4 Knowledge, Attitude, and Behaviour Impacts	<ul style="list-style-type: none"> • Post research identification of a direct or derived societal impact (Baker, 2011) • Entity contributes positively to society by working to address social problems or global issues (Burford et al., 2013.) • As a result of the entity's messages or activities, people have their own personal initiatives with similar goals (Burford et al., 2013) 	<ul style="list-style-type: none"> • Impact on artistic, performance, cultural and literary work (Franklin, 2007) • Decision-making takes into account the social, economic, and environmental needs for future generations (Burford et al., 2013) • People have a sense of power that they can effect change (Burford et al., 2013) 	<ul style="list-style-type: none"> • Demonstrable contribution to social issues (citations, references, knowledge utilisation in public media, including TV/radio science programmes) (Royal Netherlands Academy, 2013) • Technology adoption (Masset, Mulmi, & Sumner, 2011) • Change in attitudes (Bornmann, 2013)
4.5 Equity in Society	<ul style="list-style-type: none"> • Reduced poverty (Masset, Mulmi, & Sumner, 2011) • Sustained livelihoods of the poor (Masset, Mulmi, & Sumner, 2011) • Increased household income (Masset, Mulmi, & Sumner, 2011) • Socio-economic, geographic and historical considerations (high vacancy rates, cost of living, 	<ul style="list-style-type: none"> • Increased diversity (Holbrook, 2013) • People aren't stigmatized because of their behaviour, appearance or activities including economic activities (i.e. Sex work) and substance use. (Canadian Homelessness Research Network, 2013) 	<ul style="list-style-type: none"> • A formal anti-discriminatory policy is operationalized through an active commitment to reduce and eliminate issues such as racism, sexism and homophobia. (Canadian Homelessness Research Network, 2013)



Sub-Category	Indicators		
	housing affordability, employment rates, etc.) (Canadian Homelessness Research Network, 2013)		
4.6 Environment	<ul style="list-style-type: none"> • Policy debate on climate change or the environment has been influenced by research (Bornmann, 2013) • Action is consciously taken to share with others how to protect and restore the natural environment (Burford et al., 2013) • Long-term commitments to protect the environment are created Entity is aware of the interconnectedness between the environment and their sphere of activity (Burford et al., 2013) • People have respect for nature (Burford et al., 2013) 	<ul style="list-style-type: none"> • Action is consciously taken to contribute to a greater understanding of the way nature is organized in systems and cycles (Burford et al., 2013) • Action is consciously taken to contribute to a greater understanding of the natural world as a source of personal fulfillment (Burford et al., 2013) • Number of activities/projects towards goal of environmental sustainability (Burford et al., 2013) 	<ul style="list-style-type: none"> • The environment and community of life is celebrated (Burford et al., 2013) • Entity acts to reduce its environmental impact or remedy its contribution to (Burford et al., 2013) • Entity tries to have a positive effect on the natural environment (Burford et al., 2013) • Entity implements a policy of purchasing (Burford et al., 2013) • Environmentally sustainable products, e.g., recycled paper, even if cheaper alternatives exist (Burford et al., 2013)
4.7 Health	<ul style="list-style-type: none"> • Improvements in child nutrition (Masset, Mulmi, & Sumner, 2011) 	<ul style="list-style-type: none"> • Improvements in health care (e.g. Improved surgical treatment of brain tumours through pre-op MRI and intra-op ultrasound) (Tremblay, Zohar, Bravo, Potsepp, & Barker, 2010) 	<ul style="list-style-type: none"> • Improved regulatory measures (e.g. For drinking water quality) (Tremblay, Zohar, Bravo, Potsepp, & Barker, 2010)

Appendix F: Practice Research Impact Indicators

Sub-Category	Indicators		
5.1 Stakeholder Indicators <i>Indicators relating to stakeholder perspectives, training etc.</i>	<ul style="list-style-type: none"> Communications and interactions with stakeholders and the wider public (emails, visits, workshops, media publicity, etc.) (Finland's Ministry of Employment and the Economy Innovation, 2014) Feedback from stakeholders and communication summaries (Finland's Ministry of Employment and the Economy Innovation, 2014) Research developments (based on stakeholder input and discussions) (Finland's Ministry of Employment and the Economy Innovation, 2014) A clear planning process including how the practice was developed, and what agencies, systems and individuals were consulted. (Canadian Homelessness Research Network, 2013) Mechanisms that are in place for ongoing feedback and complaints (for non-anti-discriminatory issues) (Canadian Homelessness Research Network, 2013) 	<ul style="list-style-type: none"> Opinion of stakeholders (Finland's Ministry of Employment and the Economy Innovation, 2014) Survey of partners (Finland's Ministry of Employment and the Economy Innovation, 2014) The recipients have evidence of positive feedback on the impact (Piggot-Irvine, Rowe, & Ferkins, 2015) Enhanced understanding of vocabulary, perspectives, preferences and so forth. among different boundary groups (interactional expertise) (Piggot-Irvine, Rowe, & Ferkins, 2015) That clients' feedback on the quality of the practice and its outcomes is collected. (Canadian Homelessness Research Network, 2013) A practice design that reflects the needs of its population. (Canadian Homelessness Research Network, 2013) 	<ul style="list-style-type: none"> Occasional/structural interaction with stakeholders to establish relevance (De Jong, van Arensbergen, Daemen, van der Meulen, & van den Besselaar, 2011) Opinion of partners regarding changes in capacity and receptivity in their organizations (Finland's Ministry of Employment and the Economy Innovation, 2014) Core users' assessment of relevance and applicability - including ability to implement results in practice and ability to work across disciplines and sectors (Ernø-Kjølhed & Hansson, 2011) Level (%,#) of participation by key stakeholders, and their constructive early 'reactions' (e.g. take-up, expressed feedback) (Knowledge Brokers Forum, 2011)
5.2 Reach Indicators <i>Number of people that received research product, or in a network.</i>	<ul style="list-style-type: none"> Establishment of formalized knowledge networks (Ernø-Kjølhed & Hansson, 2011) Establishment of knowledge networks and other cooperation relations focusing on knowledge 	<ul style="list-style-type: none"> Evidence demonstrating the impacts of networks on national, international norms, regulations and policies (Finland's Ministry of Employment and the Economy Innovation, 2014) 	<ul style="list-style-type: none"> Number and size of firms, sectors, provinces and regions using results of the network research (Finland's Ministry of Employment and the Economy Innovation, 2014)



Sub-Category	Indicators		
<ul style="list-style-type: none"> • production (Ernø-Kjølhede & Hansson, 2011) • # of outputs (information, \$, service transactions) (Knowledge Brokers Forum, 2011) • Delivery milestone achievement (Knowledge Brokers Forum, 2011) • Number and nature of network milestones and objectives achieved (Finland's Ministry of Employment and the Economy Innovation, 2014) • Number of partners positioned in high value segments of production chain (Finland's Ministry of Employment and the Economy Innovation, 2014) • Dissemination/presentation of findings and learnings to boundary partners and wider community (Piggot-Irvine, Rowe, & Ferkins, 2015) 	<ul style="list-style-type: none"> • Evidence demonstrating the networks' contributions to the health and social well-being of Canadians (Finland's Ministry of Employment and the Economy Innovation, 2014) • Creation or expansion of stakeholder networks or network relations, new contacts (Piggot-Irvine, Rowe, & Ferkins, 2015) 	<ul style="list-style-type: none"> • New global and local linkages (Cressman, Holbrook, Lewis, & Wixted, 2009) • Use of research output by targeted audiences (Davies, Nutley, & Walter, 2005) • Number of university-industry links within the network (Finland's Ministry of Employment and the Economy Innovation, 2014) • Story telling (in a health promotion project involving radio) (Federation for the Social Sciences and Humanities, 2012) • Demonstrable utilisation by external target groups (Royal Netherlands Academy, 2013) • Number of works translated (Royal Netherlands Academy, 2013) 	
<p>5.3 Program or Service Delivery Indicators</p>	<ul style="list-style-type: none"> • Demonstrable civil-society effects of research (Royal Netherlands Academy, 2013) • That the practice fills a gap in services for the target population. (Canadian Homelessness Research Network, 2013) • An effective process for complaints (Canadian Homelessness Research Network, 2013) 	<ul style="list-style-type: none"> • An effective and comprehensive intake system that includes basic information about the client, their background, their needs and other relevant data. (Canadian Homelessness Research Network, 2013) • That the organization, through its practice, assesses each client's level of acuity, risk and resilience in order to match the client to an appropriate level of service and support (Canadian Homelessness Research Network, 2013) 	<ul style="list-style-type: none"> • # or % of entities or individuals showing intended actions/adoptions (Knowledge Brokers Forum, 2011) • Participants and boundary partners change in perspective and knowledge, attitude and skills (both individually and collectively) (Piggot-Irvine, Rowe, & Ferkins, 2015) • A shared intake and assessment tool to reduce duplication and support effective service delivery (in communities with multiple

Sub-Category	Indicators		
	<ul style="list-style-type: none"> State or level of health, disease, incidence, etc. (Knowledge Brokers Forum, 2011) 		<ul style="list-style-type: none"> services) (Canadian Homelessness Research Network, 2013)
<p>5.4 Requests from Communities for Researchers to Advise on a Problem <i>Consulting – not policy specific</i></p>	<ul style="list-style-type: none"> Academic researchers enabled to conduct research ‘in the field’ by working in practice con-currently (De Jong, van Arensbergen, Daemen, van der Meulen, & van den Besselaar, 2011) Requests for consultancy/advice from community groups (Federation for the Humanities and Social Sciences, 2014) 	<ul style="list-style-type: none"> Contributions to service facilities, community organizations, public debate (University of Saskatchewan, 2008) Demonstrable recognition by external target groups (Royal Netherlands Academy, 2013) Special problem requests with faculty (Holbrook, 2013) 	<ul style="list-style-type: none"> Projects commissioned by or carried out in cooperation with target groups (Royal Netherlands Academy, 2013) Town hall meetings (Holbrook, 2013)
<p>5.5 Contributions to Wider Community <i>Events with Non-Academic Audiences</i></p>	<ul style="list-style-type: none"> Public forums (Federation for the Social Sciences and Humanities, 2012) Attendance at public events (Federation for the Humanities and Social Sciences, 2014) 	<ul style="list-style-type: none"> Lectures for professionals or a wide audience (Royal Netherlands Academy, 2013) 	<ul style="list-style-type: none"> Participation in public education programs (Holbrook, 2013)
<p>5.6 Equity in the Workplace</p>	<ul style="list-style-type: none"> Entity's activities or events create a safe environment for people (Burford et al., 2013) People feel that there is transparent communication (Burford et al., 2013) Different points of view are heard and incorporated (Burford et al., 2013) People feel that their own individual identity and approach is respected (Burford et al., 2013) Women feel they are valued (Burford et al., 2013) Entity acts in a manner that is impartial and non-discriminatory (not discriminating on the basis 	<ul style="list-style-type: none"> Decision-making processes are ethical (Burford et al., 2013) Regular monitoring of how people are treated (Burford et al., 2013) Teams include members with different characteristics (e.g., gender, culture, age, and other aspects of individual difference such as personality) (Burford et al., 2013) People have self-respect (Burford et al., 2013) People are inclusive (talk to everyone and no one is left out) (Burford et al., 2013) 	<ul style="list-style-type: none"> People feel that they are treated equitably and with fairness (Burford et al., 2013) People treat each other with equity and fairness (Burford et al., 2013) Truth-seeking, non-judgmental, confidential channels are in place for individuals/teams seeking guidance on the application of ethics, reporting violations and examining violations of ethics (Burford et al., 2013) People feel that they can participate in the vision and activities of the entity or project without compromising their



Sub-Category	Indicators		
<p>of nationality, ethnic origin, colour, creed or religion) (Burford et al., 2013)</p> <ul style="list-style-type: none"> • Differences of opinion are acknowledge and valued through dialogue (Burford et al., 2013) • Individuals express their own opinions (Burford et al., 2013) • People feel that their opinions are respected (Burford et al., 2013) • People become aware of how their existing knowledge, skills, resources, and/or traditions can contribute to a project or the whole entity (Burford et al., 2013) • People feel that the work environment is pleasant and harmonious (Burford et al., 2013) 	<ul style="list-style-type: none"> • People respect the differences in others (Burford et al., 2013) • People feel that they are encouraged to explore their own ideas and/or reflect on their own individuality (Burford et al., 2013) • People feel that they are encouraged to develop their own visions and goals for projects, and/or for the whole entity (Burford et al., 2013) • People investigate what is right and good by themselves, rather than adopting other people's opinions (Burford et al., 2013) 	<p>personal beliefs or values (Burford et al., 2013)</p> <ul style="list-style-type: none"> • People's behaviour is consistent with their words (Burford et al., 2013) • Ongoing mutual respect for each other and appreciation of diversity (Piggot-Irvine, Rowe, & Ferkins, 2015) • People are perceived to be respectful in their interactions with others (Burford et al., 2013) • People are perceived to be trustworthy (Burford et al., 2013) 	

Appendix G: Policy Research Impact Indicators

Sub-Category	Indicators		
6.1 Requests for Research <i>Number of consultations/presentations, reports to policymakers/decision makers, serving on panels, etc.</i>	<ul style="list-style-type: none"> Consulting for governments (Federation for the Humanities and Social Sciences, 2014) Participation in legislation and strategy planning (Bornmann, 2013) Number of board memberships (Federation for the Humanities and Social Sciences, 2014) 	<ul style="list-style-type: none"> Consulting for think-tanks (Federation for the Humanities and Social Sciences, 2014) Contributions to expert meetings (De Jong, van Arensbergen, Daemen, van der Meulen, & van den Besselaar, 2011) Invitations to participate as an expert witness, an advisor, on an expert panel, or committee (Federation for the Humanities and Social Sciences, 2014) 	<ul style="list-style-type: none"> Commissioned reports (Federation for the Humanities and Social Sciences, 2014) Advisory and consultancy roles (De Jong, van Arensbergen, Daemen, van der Meulen, & van den Besselaar, 2011) Management to be on committees adjudicating policy changes (Masset, Mulmi, & Sumner, 2011)
6.2 Changes in Public Policy <i>Proxies of influence in public policy</i>	<ul style="list-style-type: none"> Citations in government documents (Federation for the Humanities and Social Sciences, 2014) Level of commitment of governments to agreement (Masset, Mulmi, & Sumner, 2011) Government agency linkages (University of Saskatchewan, 2008) 	<ul style="list-style-type: none"> Mention by policy maker (Holbrook, 2013) Number and nature of policies and practices of the user sector have been influenced by research findings (Finland's Ministry of Employment and the Economy Innovation, 2014) Policymakers' perceptions of relevance of the studies (Masset, Mulmi, & Sumner, 2011) 	<ul style="list-style-type: none"> Quotes in policy (Holbrook, 2013) The presence or absence of legislation and/or policy impedes or enables the development and implementation of the practice (Canadian Homelessness Research Network, 2013) Changes (i.e., implementation, reinforcement) in policies attributable to policy research (Masset, Mulmi, & Sumner, 2011)



Appendices: Research Impact Resources for Researchers

Appendix H: Research Impact Tools – Policy & Politics

Name	Location	Description	Free	Paid
Communicating Research for Evidence-Based Policymaking	European Union	Divided into three parts – Concept, Policy Briefs, and Practical Means – this guide identifies the most important stages in the development of a communication strategy to make certain research concepts makes a real difference in enabling policy action. For more information, visit: http://ftp.infoeuropa.euroid.pt/database/000045001-000046000/000045501.pdf	X	
Thomson Reuters	United States	Thomson Reuters Corporation can provide patent, trademark and brand content and services as well as manage and protect IP assets. Thompson Reuters also helps to foster scientific and scholarly research by: fostering collaborations with businesses, enabling discovery by providing access to the world's critical research, providing analytics which are designed to maximize returns on research funding, and offering tools to facilitate the peer-review and publishing process. For more information, visit: http://thomsonreuters.com		X
ODI Toolkits	United Kingdom	ODI Toolkits provide practical tips, tools, and guidance for development practitioners. Toolkits include: <ul style="list-style-type: none"> • Mapping Political Context: A Toolkit for Civil Society Organisations • Policy Engagement: How civil society can be more effective • Successful Communication: A toolkit for Researchers and Civil Society Organisations For more information, visit: http://www.odi.org/publications/3854-odi-toolkits	X	
ODI Handbooks	United Kingdom	ODI Handbooks provide guidance and practical tools that might help users enhance their impact. Handbooks include: <ul style="list-style-type: none"> • Weaving Global Networks: Handbook for Policy Influence • Tools for Policy Impact: A Handbook for Researchers • Targeting Tools: Radio For more information, visit: http://www.odi.org/search/site/handbook	X	
Policy Impact Toolkit	United Kingdom	This toolkit is designed to support evaluators and researchers who are committed to engaging with decision makers to see the evidence from their studies used to build better policies and programmes. For more information, visit: http://policyimpacttoolkit.squarespace.com/	X	

<i>Name</i>	<i>Location</i>	<i>Description</i>	<i>Free</i>	<i>Paid</i>
Research to Action	United Kingdom	Research to Action caters to the strategic and practical needs of people trying to improve the way development research is communicated and utilised. The site has been structured and populated with material that is useful to people who would like to be more strategic and effective in their research communication and engagement. Key toolkits include: designing a policy influence plan, monitoring and evaluating policy influence, and research communication for policy influence. For more information, visit: http://www.researchtoaction.org/	X	
DC Research	United Kingdom	DC Research provides evaluation, research, and policy & partnership solutions and advice to public, private, community, and voluntary sector clients. DC Research provides the following services: toolkits and impact frameworks, 'green book' services, impact assessments, partnership reviews and assessments, regeneration policy research, evaluation, area profiling and baseline assessments, strategic advice & action planning, and supporting partner and funder agendas. For more information, visit: http://www.dcresearch.co.uk/		X



Appendix I: Research Impact Tools – Software and Services

Name	Location	Description	Free	Paid
CiteULike	Web-based	CiteULike helps researchers to store, organize, and share scholarly papers. For more information, visit: http://www.citeulike.org/	X	
EPrints	Web-based	EPrints is a software platform which allows the user to set up repositories of open access research literature, scientific data, theses, reports, and multimedia. EPrints provides its open source software for free; however, they offer paid packages for hosting and support services. For more information, visit: http://www.eprints.org/software/	X	X
PaperCritic	Web-based	PaperCritic offers researchers a way of storing, organizing, and sharing scholarly papers. For more information, visit: http://www.papercritic.com/	X	
CitNetExplorer	Web-based	CitNetExplorer is a software tool for visualizing and analyzing citation networks of scientific publications. The tool allows citation networks to be explored interactively and can be imported directly from the Web of Science database. For more information, visit: http://www.citnetexplorer.nl/Home	X	
ReaderMeter	Web-based	ReaderMeter utilizes readership-based metrics to estimate impact. The site was not functional as of September 1, 2015; however, the website states the service will be brought back. For more information, visit: http://readermeter.org/	X	
Zotero	Web-based	Zotero helps you collect, organize, cite, and share your research sources. For more information, visit: https://www.zotero.org/	X	
Impactstory	Web-based	Impactstory is an open-source, web-based tool that helps scientists explore and share the diverse impacts of all their research products—from traditional ones like journal articles, to emerging products like blog posts, datasets, and software. You can try Impactstory for free for 30 days, no credit card required. After the free trial has ended you must pay \$60/year for the service. For more information, visit: https://impactstory.org/		X

Appendix J: Research Impact Tools – Grant Writing

<i>Name</i>	<i>Location</i>	<i>Description</i>	<i>Free</i>	<i>Paid</i>
Welcome Europe	European Union	Welcome Europe offers toolboxes, training courses, and consulting services to European-based researchers for each stage of their project. For more information, visit: http://www.welcomeurope.com		X
Research Funding Toolkit	United Kingdom	The Research Funding Toolkit helps academics to write better research grant applications. In addition, researchers can hire consulting and training services if desired. The toolkit consists of a book and a website. For more information, visit: http://www.researchfundingtoolkit.org/	X	X
Kudos	Web-based	Kudos is a web-based service that helps researchers and their institutions and funders to maximize the visibility and impact of their published articles. Kudos provides a platform for assembling and creating information to help search filtering, for sharing information to drive discovery, and for measuring and monitoring the effect of these activities. The basic service is free for researchers to use; publishers and institutions pay a fee for access to support tools, information on article and author performance within Kudos, and also to supplement the data set available to their authors to help them evaluate the impact of their efforts. For more information, visit: https://www.growkudos.com/	X	



Appendix K: Research Impact Tools – Research & Knowledge Mobilization Planning

Name	Location	Description	Free	Paid
The Center for Effective Global Action (CEGA)	United States	The CEGA is a network of 50+ academic researchers extending across the University of California, Stanford University, and the University of Washington. In addition to many other services, CEGA provides researchers with web-based tools on program design, evaluation, and scaling up projects. For more information, visit: http://cega.berkeley.edu/tools/	X	
Altmetrics for Researchers	United States	The guide contains information about altmetrics and traditional, citation-based metrics. For more information, visit: http://guides.mclibrary.duke.edu/c.php?g=217135&p=1434254	X	
Research Skills Toolkit	United Kingdom	The toolkit brings together key skills, knowledge, behaviours, and attitudes relevant for researchers. Four domains are included in the toolkit: knowledge and intellectual abilities; personal effectiveness; research governance and organization, and; engagement, influence, and impact. For more information, visit: http://www.skillstoolkit.ox.ac.uk/vitae	X	
Maximizing The Impacts Of Your Research: A Handbook For Social Scientists	United Kingdom	This handbook provides a large menu of evidence-based advice and guidance on how to ensure that your work achieves its maximum visibility and influence with both academic and external audiences. Detailed information is provided on what constitutes good practice in expanding the impact of social science research. A wide range of new developments, tools, and new techniques are showcased in the handbook. For more information, visit: http://blogs.lse.ac.uk/impactofsocialsciences/the-handbook/	X	
Knowledge Utilization Resource Guide	Canada	This guide highlight resources that can help answer some common questions, such as: What is knowledge utilization? How is knowledge utilization accomplished in organization? How does knowledge utilization shape policy implementation? How do the determinants of knowledge utilization vary across levels of decision-making? For more information, visit: http://www.kusp.ualberta.ca/en/Resources/~-/media/Knowledge%20Utilization%20Studies%20Program/Documents/KUResourceGuide.ashx	X	
Open Access Toolkit	Canada	This toolkit provides general information about the open access and scholarly publishing model, and repositories. For more information, visit: http://researchguides.library.yorku.ca/content.php?pid=258206&sid=2131074	X	

Name	Location	Description	Free	Paid
The Impact Toolkit	United Kingdom	The Impact Toolkit is a resource designed to take researchers through a step by step process of thinking about the impact from their research projects. You must have a University of Leeds ID and password to gain access to the toolkit. For more information, visit: http://www.sdduonline.leeds.ac.uk/impact-toolkit/#forward		X
Research Impact and Profiles	Australia	This guide describes the different resources which can assist you to examine the impact of your own research. For more information, visit: http://guides.is.uwa.edu.au/content.php?pid=372347&sid=3050051	X	
Researcher Development	United Kingdom	This website provides links to presentations, guide books, and toolkits aimed at enhancing researcher development. Examples include: <ul style="list-style-type: none"> • Social Media: A guide for researchers • Writing for the web for researchers • Planning for Impact Toolkit For more information, visit: http://www.bath.ac.uk/learningandteaching/rdu/guides/	X	
Guide for Knowledge Mobilization in the Context of Research Partnerships	Canada	This document provides research partners with a tool to enrich and optimize the dissemination and transfer of knowledge resulting from their research. The guide begins by identifying the significance of knowledge mobilization within the context of social economy research partnerships. The Guide then provides a brief overview of examples of knowledge mobilization practices of the Alliance de recherche universités-communautés en économie sociale. Lastly, a number of suggestions are made to promote rewarding, relevant and high-quality strategies for knowledge mobilization. For more information, visit: http://www.aruc-es.uqam.ca/Portals/o/docs/pdf/Guide_Knowledge_Mobilization.pdf	X	
Knowledge Translation and Transfer Plan	Canada	The toolkit contains helpful information on why you would want to develop a Knowledge Translation and Transfer (KTT) plan, how to go about identifying your audience(s), and what KTT activities might be suitable for your research project. In addition, other KTT resources are listed by topic. For more information, visit: http://www.uoguelph.ca/omafra_partnership/ktt/en/kttinaction/KTT-Toolkit.asp	X	
Public Policy@Southampton	United Kingdom	Established by the University of Southampton, Public Policy@Southampton is an external facing, public engagement team mandated to increase the reach and impact of University of Southampton research. Public Policy offers three different levels of		X



Name	Location	Description	Free	Paid
		support to researchers designed to increase impact. Costs range from £500.00 for 9 hours of support, up to £5000.00 for 6+ months of support. For more information, visit: http://publicpolicy.southampton.ac.uk/		
The Knowledge Translation Toolkit: A resource for Researchers	Canada	This toolkit seeks to explain some of Knowledge Translation’s key concepts and make them operational through a variety of practical examples and “hands-on” guides. For more information, visit: https://idl-bnc.idrc.ca/dspace/bitstream/10625/46960/1/133361.pdf	X	
Evaluation: Practical Guidelines	United Kingdom	This guide is designed for those who lead projects intended to engage general audiences in science, social science, engineering and technology and the social, ethical and political issues that new research in these areas raises. For more information, visit http://www.rcuk.ac.uk/Publications/policy/Evaluation/	X	
Knowledge Translation Professional Certificate	Canada	The Knowledge Translation Professional Certificate (KTPC™) is a five-day professional development course, held in Toronto, and is the only course of its kind in North America. The KTPC develops the competencies of KT Practitioners working across all disciplines. The curriculum is presented as a combination of didactic and interactive teaching, exemplars, and exercises. For more information, visit: http://www.sickkids.ca/Learning/AbouttheInstitute/Programs/Knowledge-Translation/Knowledge-Translation-Professional-Certificate/Knowledge-Translation-Professional-Certificate.html		X
A tool for assessing research quality and relevance	Denmark	This toolkit provides information on how to document and compare research quality and relevance across research areas and institutions. The tool is designed to be applicable in a variety of areas within the research system, i.e. for assessment and prioritization of basic and competitive funding, and at different levels (the individual researcher, research team, department, institute, faculty or institution). For more information, visit: http://ufm.dk/en/publications/2006/files-2006/a-tool-for-assessing-research-quality-and-relevance.pdf	X	
Impact Toolkit	United Kingdom	The toolkit includes information on developing an impact strategy, promoting knowledge exchange, public engagement and communicating effectively with your key stakeholders. For more information, visit: http://www.esrc.ac.uk/funding-and-guidance/impact-toolkit/	X	
Partnerships Toolkit	Canada	This toolkit is meant to assist researchers and partners at various stages of the Partnerships processes—from application to the	X	

Name	Location	Description	Free	Paid
		implementations of your partnership. For more information, visit: http://www.sshrc-crsh.gc.ca/about-au_sujet/partnerships-partenariats/toolkit-trouse_d-information-eng.aspx		
Knowledge Sharing Toolkit	International	This toolkit is a living knowledge repository about knowledge sharing where registered users can add tools and methods, edit existing pages, insert comments and anecdotes, or even list themselves as contacts if they have had experience with a particular tool or method. For more information, visit: http://www.kstoolkit.org/	X	
Impact Measurement Toolkit	United Kingdom	This toolkit is an introduction to impact measurement procedures and an explanation of the principals involved. For more information, visit: http://www.kingstonsmith.co.uk/media-and-resources/impact-measurement-toolkit-for-the-charity-sector/	X	
The Impact Field Guide & Toolkit: From Arts to Impact	United Kingdom	This toolkit includes a set of tools and guides designed to help those who are working with film to better evaluate the impact of their work. For more information, visit: http://impactguide.org/index.php	X	
National Coordinating Centre for Public Engagement	United Kingdom	The National Coordinating Centre for Public Engagement (NCCPE) supports Universities across the United Kingdom to increase their public engagement activity. Along with consulting and training services, the NCCPE has an extensive resource section to help researchers support their evaluation of their public engagement work. For more information, visit: http://www.publicengagement.ac.uk/	X	X
The Intersector Toolkit	United States	The Toolkit is a guide to help diagnose, design, implement, and assess successful intersector collaborations. The toolkit profiles 40 successful intersector initiatives and draws from an extensive body of research to provide practical knowledge to practitioners. Practitioners from any sector can use these tools to navigate their challenges. For more information, visit: http://intersector.com/toolkit/	X	
MyRI: An Open Access Toolkit to support bibliometrics training and awareness	Ireland	This toolkit provides a set of materials to support bibliometric training. The toolkit includes videos and other interactive elements. Topics covered include: introduction to bibliometrics, tracking your research impact, and journal ranking and analysis. In addition, training and presentation materials are available (i.e., worksheets, lesson plans, posters). For more information, visit: http://www.ndlr.ie/myri/	X	
Tools for Knowledge Mobilization: Creating Research Summaries	Canada	This KMB Tool Kit describes the process undertaken to develop clear language research summaries at York University. For more information, visit:	X	



Name	Location	Description	Free	Paid
		https://researchimpact.othree.ca/documents/toolsforkmb/kmbtools_researchsummariespdf		
Knowledge Translation Planning Template	Canada	The Knowledge Translation Planning Template can be used to plan and evaluate a knowledge translation (KT) strategy. It identifies and documents steps needed to implement a KT strategy. This template can be used along with guides to developing a KT strategy, available from the Hospital for Sick Children Toronto. For more information, visit: http://www.melaniebarwick.com/training.php	X	
Knowledge Mobilization Toolkit	Canada	There are three phases to the Knowledge Mobilization (KMb) Toolkit. The first section helps you determine goals and considerations for your knowledge mobilization plan. The second phase includes ways to mobilize knowledge and key considerations. The final phase includes resources on evaluation. In addition to the toolkit, KMb-related definitions and case studies of what other researchers are doing. For more information, visit: http://www.kmbtoolkit.ca/	X	
The Knowledge Brokers Forum	Canada	The Knowledge Brokers' Forum (KBF) is a collaborative space to promote knowledge sharing and dissemination on knowledge brokering (KB) and the role of intermediaries in international development. KBF allows you to: learn, share, and advise with global community of peers involved in knowledge brokering and intermediary work, and access and share knowledge brokering resources. For more information, visit: http://www.knowledgebrokersforum.org/219319	X	
WeValue	United Kingdom	This toolkit can be used to assess previously intangible, values-related aspects of projects and activities. The toolkit consists of 166 qualitative, values-based indicators, together with guidance on their application. The indicators are presented in a 'menu' format to facilitate users in identifying and crystallizing what intangibles are important to them, and those they wish to evaluate. A second 'menu' is provided of assessment methods for potential use, accompanied by detailed guidance notes. For more information, visit: http://www.wevalue.org/index.php	X	
Knowledge Network of Applied Education Research – Project Resource Toolkit	Canada	This toolkit is a compilation of the many resources created by the Knowledge Network of Applied Education Research (KNAER) projects. There are resources for a variety of audiences including teachers, parents, administrators, and researchers. There are 29 different types of resources – including: tipsheets, online videos, podcasts, reports,	X	

Name	Location	Description	Free	Paid
Helping authors choose the right mode of publication to maximise impact	Italy	online forums, and workshops. For more information, visit: http://www.knaer-recrae.ca/ This toolkit is meant to help researchers choose the right journal in order to maximize impact. For more information, visit: http://eprints.rclis.org/8567/2/paperISSsubmit.pdf	X	
Using Twitter in university research, teaching and impact activities A guide for academics and researchers	United Kingdom	This guide shows you how to get started on Twitter and discusses how Twitter can be used as a resource for research, teaching and impact activities. For more information, visit: http://blogs.lse.ac.uk/impactofsocialsciences/files/2011/11/Published-Twitter_Guide_Sept_2011.pdf	X	
Scientist Knowledge Translation Training Workshop	Canada	The Scientist Knowledge Translation Training Workshop is a two-day professional development course held in Toronto. The course is suited to Knowledge Translation professionals, science/practitioners, educators, and decision makers in community based organizations and government. This is a practice-oriented course which covers the following material: 1. Utility of KT, for researchers, educators, clinician-scientists, 2. KT strategies and their evidence base, 3. Developing a KT plan (practical, hands-on approach with tools), 4. Plain language communication, 5. Communicating with media, 6. Communicating with policy makers. For more information, visit: https://www.sickkids.ca/Learning/AbouttheInstitute/Programs/Knowledge-Translation/Scientist%20Knowledge/index.html		X
Pathways to Impact Toolkit	United Kingdom	This guide is aimed at researchers and support staff involved in writing and supporting Pathways to Impact applications. For more information, visit: http://documents.manchester.ac.uk/display.aspx?DocID=23012		
Public Engagement Evaluation Guide	United Kingdom	This guide provides support for quantitative and qualitative evaluation for those running public engagement events or projects. In addition, the guide is accompanied by podcasts that offer an introduction on how to use the toolkit, and exemplars of people who have used the guide. For more information, visit: http://www.manchesterbeacon.org/publications/view/10/Public-Engagement-Evaluation-Guide	X	



Appendix L: Research Impact Networks – Research Networks

Network	Location	Description
Knowledge Network for Applied Education Research	Canada	KNAER's mission is to build, advance, and apply evidence-informed practices. KNAER conducts and synthesizes research as well as facilitates networks of policy-makers, educators and researchers. For more information, visit: http://www.knaer-recrae.ca
Research Impact	Canada	Research Impact (RIR) is a pan-Canadian network of 11 universities committed to maximizing the impact of academic research for the social, economic, environmental and health benefits of Canadians. RIR is committed to developing institutional capacities to support knowledge mobilization by developing and sharing knowledge mobilization best practices, services and tools. For more information, visit: http://researchimpact.ca/
Social Innovation Generation	Canada	The focus of Social Innovation Generation (SiG) is to foster social innovation to achieve impact, durability, and scale by engaging the creativity and resources of all sectors. SiG is a collaborative partnership between The J.W. McConnell Family Foundation, the University of Waterloo, the MaRS Discovery District, and the PLAN Institute. For more information, visit: http://www.sigeneration.ca
Baltic Sea Region University Network	Baltic Sea Region	The Baltic Sea Region University Network's (BSRUN) mandate is to develop a mutually beneficial and equal partnership by strengthening the collaboration in University governance, management, and administration. Currently there are 29 member institutions in Belarus, Estonia, Finland, Latvia, Lithuania, Poland, and Russia. Members can attend BSRUN events such as: <ul style="list-style-type: none"> • Research Evaluation & Assessing Research Quality Practical Seminar • Successful Knowledge Transfer & Research Commercialisation Seminar For more information, visit: http://www.bsrun.org
United Kingdom Evaluation Society	United Kingdom	The UK Evaluation Society's aim is to promote and improve the theory, practice, understanding, and utilisation of evaluation and its contribution to public knowledge and to promote cross-sector and cross-disciplinary dialogue and debate. Networks exist in Wales, the North West, the North East, the Midlands, London, and South West to provide events and communications. For more information, visit: http://www.evaluation.org.uk
Research Unit for Research Utilisation	United Kingdom	The Research Unit for Research Utilisation (RURU) is a cross-university research collaboration that investigates the use of social science research in public policy and service delivery settings. The core RURU team are based at the School of Management, University of St Andrews, but the unit benefits from collaboration with a team of research associates from across the UK. For more information, visit: http://www.ruru.ac.uk/

Network	Location	Description
Consortium of Institutions for Development and Research in Education in Europe	Europe	The Consortium of Institutions for Development and Research in Education in Europe (CIDREE) is a network of educational institutions that play a national role in the field of educational research. The aim of CIDREE is to mobilize knowledge and information amongst member institutions and other stakeholders. For more information, visit: http://www.cidree.org
Research Informing Policy, Practice, and Leadership in Education	Canada	Research Informing Policy, Practice, and Leadership in Education (RIPPLE) conducts empirical studies to explore knowledge mobilization efforts across systems; builds partnerships across producers, users, and intermediaries, and; creates knowledge mobilization resources. For more information, visit: http://www.ripplenetwork.ca



Appendix M: Research Impact Projects

Project	Location	Duration	Description
NISO Alternative Assessment	United States	2013 – 2015	The NISO Alternative Assessment Metrics Initiative is a two-phase project, designed to explore, identify, and advance standards and/or best practices related to altmetrics. For more information, visit: http://www.niso.org/topics/tl/altmetrics_initiative/
CWTS Leiden Ranking	Netherlands	2015	The CWTS Leiden Ranking 2015 offers key insights into the scientific performance of 750 major universities worldwide. For more information, visit: http://www.leidenranking.com/
Danube-INCO.NET	Europe – Danube Region	2014 – 2016	Danube-INCO.NET seeks to overcome obstacles hindering the social and economic development of the Danube Region. For more information, visit: http://danube-inco.net/
Humanities Indicators	United States	2008 – 2013	Humanities Indicators provides comprehensive, up-to-date statistical information, the Humanities Indicators provide a picture of how the humanities are faring in the United States today. For more information, visit: http://www.humanitiesindicators.org/content/document.aspx?i=176
Third Sector Impact Project	Europe	2014 – 2019	The goal of the Third Sector Impact project is to institutionalize the capability of national statistical agencies to generate reliable empirical data on the third sector. For more information, visit: http://thirdsectorimpact.eu/news/a-statistical-revolution-in-data-on-the-third-sector-in-europe/
Statistical Indicators Benchmarking the Information Society (SIBIS)	Europe	2001 – 2003	The SIBIS project developed information society indicators to enable the benchmarking of progress in EU Member States. For more information, visit: http://www.sibis-eu.org/
Vital Outcome Indicators for Community Engagement (VOICE)	Canada – Northern Manitoba	2011 – 2015	The VOICE Research Project investigates six areas of activities. They are: capacity building of communities and individuals, development of community-based indicators of success, support for and/or development of success pathways, evaluation of success pathways, knowledge mobilization, and sustainability activities. For more information, visit: www.voiceresearchproject.ca
IMPACT-EV	Europe	2014 – 2017	The IMPACT-EV project designed to develop a permanent system of selection, monitoring and evaluation of the various impacts of Social Sciences and the Humanities research. For more information, visit: http://impact-ev.eu/about/
ComNet Project	Europe	2007 - 2009	The main aim of ComNet is to increase the quality of European networks and networking activities in education through developing, testing and delivering a training course and learning materials on networking skills and competences for successfully planning and implementing networks in adult education. For more information, visit: http://www.networks-in-education.eu/

Appendix N: Open Access Repositories

Repository	Location	Description
Northumbria Research Link	United Kingdom	Northumbria Research Link is an open access repository of Northumbria University's research output. For more information, visit: http://nrl.northumbria.ac.uk/
OpenEdition	France	OpenEdition is an electronic resource portal in humanities and social sciences. For more information, visit: http://www.openedition.org/?lang=en
Gateway to Research	United Kingdom	The Gateway to Research repository allows users to search and analyze information about publically funded research in the United Kingdom. For more information, visit: http://gtr.rcuk.ac.uk/resources/about.html
White Rose Research Online	United Kingdom	White Rose Research Online is an open access repository which houses research outputs from the Universities of Leeds, Sheffield and York. For more information, visit: http://eprints.whiterose.ac.uk

