SHAPE-ID: Shaping Interdisciplinary Practices in Europe

Deliverable 2.2 Report on Survey among interdisciplinary and transdisciplinary researchers and post-survey interviews with policy stakeholders

Project Information

Project Acronym	SHAPE-ID
Project Title	Shaping Interdisciplinary Practices in Europe
Grant Agreement No	822705
Project Start Date	1 February 2019
Project End Date	31 July 2021
Call Identifier	H2020-SC6-GOVERNANCE-2018
Funding Scheme	Coordination and Support Action (CSA)
Project Website	www.shapeID.eu

Deliverable Information

Deliverable No	D2.2
Deliverable Title	Report on Survey among interdisciplinary and transdisciplinary researchers and post-survey interviews with policy stakeholders
Work Package No	2
Work Package Lead	Christian Pohl (Survey Lead: Jack Spaapen)
Contributing Partners	ETH, IBL PAN, TCD
Deliverable Type	Report
Dissemination Level	Public
Author(s)	Jack Spaapen, Bianca Vienni Baptista, Anna Buchner and Christian Pohl
Contributors	Lucien Schreiber, Maciej Maryl, Keisha Taylor Wesselink, Catherine Lyall, Jane Ohlmeyer and Doireann Wallace
Contractual Deadline	29th February 202
Delivery Date	6th March 2020

Version Management

Version	Date	Author	Description of Change
1.0	22/01/2020	Jack Spaapen	First draft
2.0	29/01/2020	Jack Spaapen, Bianca Vienni Baptista, Anna Buchner	Second draft part A First draft part B
3.0	05/02/2020	Jack Spaapen, Bianca Vienni Baptista, Anna Buchner	Third draft part A Second draft part B
4.0	10/02/2020	Jack Spaapen, Bianca Vienni Baptista, Anna Buchner	Fourth draft part A Third draft part B
5.0	28/02/2020	Jack Spaapen, Bianca Vienni Baptista, Anna Buchner	Final draft
6.0	03/03/2020	Jack Spaapen, Bianca Vienni Baptista, Anna Buchner	Final draft for submission following Coordinator quality check
7.0	05/03/2020	Jack Spaapen, Bianca Vienni Baptista, Anna Buchner	Final draft for submission

Table of Contents

List of Tables

List of Figures

Abbreviations

AHSS – Arts, Humanities and Social Sciences

ASJC – All Science Journal Classification

COALESCE – Collaborative Alliances for Societal Challenges (Research Fund)

CORDIS – Community Research and Development Information Service

DGRI - Directorate General for Research and Innovation (European Commission)

EC – European Commission

ERC – European Research Council

ETH – Swiss Federal Institute of Technology (partner)

EU – European Union

GDPR – General Data Protection Regulation

H2020 – Horizon 2020

IBL PAN – Institute of Literary Research, Polish Academy of Sciences (partner)

ID – interdisciplinarity

IDR – interdisciplinary research

IRC – Irish Research Council

ITD – Inter- and Transdisciplinary Research

KNAW – Royal Netherlands Academy of Arts and Sciences

LERU – League of European Research Universities

NWO – The Dutch Research Council

MSCA – Marie Skłodowska-Curie actions

PI – Principal Investigator

REF UK – Research Excellence Framework United Kingdom

RRI – Responsible Research and Innovation

SEP – Standard Evaluation Protocol

SHAPE-ID – Shaping interdisciplinary practices in Europe

SSH – Social Sciences & Humanities

STEM – Science, Technology, Engineering and Mathematics

STEMM – Science, Technology, Engineering, Mathematics and Medicine

TD – transdisciplinarity

TDR – transdisciplinary research

THE – *Times Higher Education* (Academic and University News)

WP – Work package

Executive Summary

Inter- and transdisciplinary research (IDR/TDR) is increasingly important to academic life and to research policy and funding in the 21st century. Responding to societal challenges demands multi-partner collaborations between experts with diverse disciplinary backgrounds, yet in practice it remains a challenge to conduct and adequately support inter- and transdisciplinarity. Further insight is therefore urgently needed into the merits and difficulties of such collaborations.

Through a qualitative survey among European researchers and interviews with policy makers we hope to enhance the knowledge about inter- and transdisciplinary collaboration. The survey and interviews were carried out as part of Work Package 2 of the SHAPE-ID project (https://www.shapeid.eu), which is also conducting a systematic literature review. We aim to serve the research community and relevant stakeholders in society with new insights, examples of good practice and tips on how to overcome difficulties that might help their current and future IDR and TDR endeavours. We focus on Arts, Humanities and Social Sciences (AHSS), but are also interested in the growing collaboration between these fields and the so-called STEMM fields (Science, Technology, Engineering, Medicine and Mathematics).

We address two main questions: (i) When developing a European IDR/TDR project, what are the main difficulties people encounter in realising a good research team that is balanced in terms of the various interests and goals of the different participants, and (ii) Which factors of success and failure do researchers integrating AHSS in larger projects consider relevant for their daily practice of IDR/TDR?

Key Findings

One of the biggest obstacles mentioned by respondents for developing good IDR/TDR projects is career path issues, because within academia the reward system is still primarily geared towards disciplinary structures. It is more difficult for inter- and transdisciplinary researchers to publish in high impact journals and it is more difficult to get funded. We find factors related to academic cultures and epistemologies to be the next most common obstacles. Thirdly, institutional factors constitute a strong barrier to effective IDR/TDR, confirming results from our literature review.

Our results show furthermore that contextual differences influence the potential for IDR/TDR – differences between research fields, institutions and countries. Differences between academic fields with regard to methodologies and output modalities are obvious, but differences also exist between universities (some invest much more time, people and money in supporting IDR/TDR than others), and between countries that have developed IDR/TDR policies at the national level and countries that are less advanced in that respect.

Somewhat to our surprise, our respondents did not report major problems with the integration of AHSS research into larger projects, perhaps because most projects in the survey developed from long-standing collaboration between partners, and sufficient knowledge was already exchanged and trust built. This also was the case when STEMM researchers were involved, although some respondents mentioned that differences in those cases were sometimes hard to bridge. It is very important to know how the various disciplines can complement each other. The survey did not deliver clear information about the level of integration in the various projects, perhaps because real interdisciplinary integration between AHSS and STEMM is still rare.

Discussion

At a later stage SHAPE-ID will formulate policy recommendations. Here we take an advance on that in the form of a preliminary discussion directed towards three main audiences of our research: research policy makers at the institutional, national and EU level, funding organisations, and researchers.

Policy makers at three levels

Stimulating IDR/TDR is not only a matter of creating specific programmes for this kind of research. It also means that policy makers at the three levels of the research system – institutional, national and EU – attune their policies for these kinds of research endeavour. It appears from our survey that the EU programmes are most advanced when it comes to collaboration between disciplines and or with partners in society. These policies, in particular as reflected in the Work Programmes in Pillars 2 and 3 of Horizon 2020, are picked up by countries and universities to varying degrees. It would be advisable for countries and institutions that are less active in this respect to reconsider their policies and their interactions with other levels of the research system and potential societal partners.

For universities, it would also be advisable to rethink their curricula and PhD training in terms of inclusion of IDR/TDR elements in curricula. Furthermore, universities together with other policy makers could invest in using more comprehensive research evaluation systems that entail broader criteria and indicators, and intense interaction with the relevant societal stakeholders – public, private and also supranational.

Funders

More so than European funding programmes, national funding organisations are often still organised along disciplinary lines, whether they are split up (like in the UK) or integrated (like in the Netherlands). That makes it difficult to develop IDR and TDR programmes, in particular where AHSS disciplines are concerned. One problem is that STEMM fields are still seen as better equipped than AHSS to solve grand societal challenges. This is not easy to change, but it would help if funders realise this and take special

measures to change this cultural misunderstanding. Dedicated IDR/TDR calls can be a powerful instrument here, preferably developed with experienced researchers in the universities.

Researchers

Respondents in this survey are overall successful interdisciplinary or transdisciplinary researchers since they received substantial funding to carry out their research. The knowledge and expertise gathered in these projects could be more systematically shared within their institutions. Apparently, that does not happen too often in most universities. It would also help to have a good lead into the rich world of knowledge that already exist about IDR and TDR, for example an easy to navigate website and perhaps a toolkit with instruments to address the main obstacles people encounter when doing IDR or TDR.

Urgent changes needed to promote attitude towards IDR/TDR

There are two issues that respondents primarily mention as things that need to change to better enable IDR/TDR. The first is the institutional funding structure that is still not stimulating IDR/TDR; the second is the world of publishing. Clearly, these are not easy for researchers to change. However, they can use their influence, certainly the more prominent researchers among them. Evidently, they have to do so in collaboration with the boards of faculties and the university, which of course largely comprise prominent academics.

Specifically, for AHSS integration, perhaps the biggest challenge is to fight prejudice and misconceptions, both among researchers and policy makers. According to one funder we interviewed, it is difficult:

> (…) to ask them if they are aware of the value proposition they bring with them. Most of the time, AHSS [researchers] do not understand the problem. So what questions can they ask? What can you bring to the project? [Funders should] try to help this (…) I think that AHSS is not entrepreneurial enough, maybe this is not the right word but it summarises my thinking (SHAPE-ID Interview_1).

Whether or not this is true, to change things to better stimulate and support IDR/TDR, proactive policy makers are needed as role models. The following quote is indicative of the willingness many civil servants have to bridge the gap in AHSS integration:

> How can I, as a funder, see what they need? By learning from societies, associations, universities, etc., and by putting them all together. We need to map the ecosystem challenge and to give examples of how this integration looks like. These are strong actions to perform and can produce a systemic change (SHAPE-ID Interview_8).

Preamble

This report consists of two Parts. Part A presents an overall synthesis of the research. Part B is a more detailed review of survey and interview data. Some textual overlap is inevitable. Obviously both parts are related but they can be read independently.

Part A: Survey among researchers and interviews with policy stakeholders

1   Introduction

One of the literally hottest issues of global concern is the uncontrollable wildfires that seem to be occurring all over the world. At the time we conducted this survey Australia almost gave way under the most devastating wildfires ever to hit the continent. Shocking wildfires are happening not only in Australia, but in many other places in the world, in Europe (e.g. Spain), North and South America (e.g. California, Brazil), and many more areas. While it is clear that these fires cause incredible damage to people's health and houses, and to the environment, and thus to the economy, it is also surprising that it seems virtually impossible to effectively prevent and combat these fires even though they have been ravaging large parts of the world for a long time. The current climate crisis exacerbates this problem.

One reason it is so difficult to mitigate the effects of the fires is that so many sectors of society are involved in battling the fires (fire fighters, policy makers, researchers, industry, NGOs, individuals), but there is an apparent lack of coordination. As an article in the *Seattle Times* on 3 October 2019 stated, "the long term effective management [of wildfires] is still in its infancy". In the Pacific North West of the USA the University of British Columbia, the University of Washington and Oregon State University are teaming up with local and regional business and policy communities to create a joint programme to meet the wildfire challenge via transdisciplinary collaboration. In the article, Gail Murphy, Vice President of Research and Innovation at the University of British Columbia, mentions an important side goal of the programme: "By taking an issue like wildfires and showing what is possible when we all work together, we are building a scaffolding that we can replicate for other issues that people are interested in trying to address and to solve" (Cascadia Innovation Corridor, 2019).

This example of the necessity of interdisciplinary and transdisciplinary collaboration can be seen as an illustration of a new position of research and researchers engaging with other actors in society, which is much more geared towards the productive interaction of academics with partners in society to solve global or regional problems.

Such interdisciplinary research (IDR) and transdisciplinary research (TDR) gradually seems to be becoming part and parcel of academic life in the 21st century. This type of academic research is not only reserved for major challenges our society faces. An example on a much smaller scale and with arguably less damaging effects is the way innovations in the language curriculum in high schools is coming about. In the Netherlands, the National Language platform is concerned with the dropping interest in languages in both high schools and universities, a negative trend that is seen in many other European countries and other parts of the world, for example the USA. The Dutch platform brings together academic researchers from different language departments, teachers from professional schools, high school teachers, school boards and local, regional and national policy makers to jointly develop new language programmes that hopefully will attract more students. As a matter of fact, this issue is of supranational importance since current European policy is to stimulate member states to ensure that students have knowledge of at least two other European languages than the mother tongue. In any event, here again, the efficacy of working together was seen as an important side effect of curriculum innovation, since previously different stakeholders followed their own advice and reports, which made it difficult for policy makers at different levels to make decisions that were broadly supported (personal communication, Dutch Ministry of Education, Culture and Sciences, 30th October, 2019).

What these two examples have in common is that such complex collaborations are never easy, as different partners enter these endeavours with diverse knowledge, expertise, interests and goals, and often with a lack of understanding about "the others" and how different disciplines and expertise can work together in a productive way.

2   Scope and objectives

This report presents the findings from a qualitative survey among researchers and interviews with policy stakeholders conducted between mid-November 2019 and mid-February 2020. We present our work in two parts. Part A presents an aggregate synthesis of the results of the survey and interviews. In Part B, we present the results of the survey and interviews in more detail, following the questionnaire and the interview guidelines.

Work Package 2 (WP2) of SHAPE-ID addresses precisely the problems that are likely to arise when people with different backgrounds, perspectives and interests work together in interdisciplinary and transdisciplinary projects. We have found useful evidence – in literature and research practice – that can help us understand both the merits and the difficulties of conducting IDR and TDR. A recent article in *Times Higher Education* (Bothwell, 2020) shows the importance of gaining knowledge about this kind of research, as it addresses both the growing share of IDR in academia and a lack of understanding among people working in the academic sector.

The survey and interviews relate directly to Objective 1 of SHAPE-ID, namely, to review existing literature and practice contributing to the understanding of IDR/TDR. The interviews among non-academic stakeholders particularly contribute to Objective 2, which is to enable stakeholders to jointly learn from best and poor practices of IDR/TDR and to improve AHSS integration in larger research endeavours. This work will also inform the development of a taxonomy or framework of AHSS integration modalities and the SHAPE-ID final toolkit and policy brief.

We have two main goals. The first is to serve the research community and relevant stakeholders with new insights and examples of good practice that might help prevent pitfalls in current and future interdisciplinary and transdisciplinary endeavours. As a related goal, we want to build a community of scholars working in IDR/TDR and invited participants in the survey to join the wider SHAPE-ID community to mutually learn from their and our experiences. The second aim is to share useful suggestions with policy makers and funding organisations on how best to approach IDR and TDR in the context of societal challenges that need collaboration between different disciplines and/or non-academic stakeholders. SHAPE-ID is particularly interested in collaborative work carried out within the Arts, Humanities and Social Sciences (AHSS). However, given that most societal challenges we face today require the combined efforts of a wide variety of disciplines and expertise, our interest also includes collaboration between AHSS and other fields in the natural and technical sciences that we refer to as STEMM fields (i.e., Science, Technology, Engineering, Mathematics and Medicine). It follows from this that a third interest of our survey concerns the way AHSS is integrated in science policy and funding programmes, either on their own or in combination with STEMM fields.

3 Survey project description

3.1 Overview of approach

Our literature review reveals that there is no single generally accepted definition for inter- and/or transdisciplinary research (see Vienni Baptista et al., 2019, Section 4.1, p. 18). Arguably, there are differences between the two, but there is also overlap. Projects that start as interdisciplinary may evolve to transdisciplinary forms when stakeholders start participating at some point. The heterogeneous understandings of inter- and transdisciplinarity reflect a diversity of practice and expectations across disciplines and communities. However, our review also shows the existence of similarities across fields and topics, such as inter-dependence of participants, cooperative labour, and mutuality, all oriented towards shared purposes (Castán Broto et al., 2009; Callard & Fitzgerald, 2015; Vienni Baptista et al., 2019).

The survey therefore does not aim at finding a single understanding of the practices in different areas of research or societal challenges, but rather to find a variety of factors that either frustrate or stimulate collaboration between different disciplines, fields and non-academic partners. These factors prove to be valuable as they emerge directly from research experiences developed in different European countries.

In our survey we address two main questions:

1) When developing a European[1] IDR/TDR project, what are the main difficulties people encounter in realising a good research team that is balanced in terms of the various interests and goals of different participants?

2) Which factors of success and failure do European researchers integrating AHSS in larger projects consider relevant for their daily practice of IDR/TDR?

We use a qualitative survey because the kinds of questions we are interested in are mainly of a qualitative nature and we wanted to give the researchers participating in the survey maximum freedom to talk about their specific experiences. Another reason to choose a qualitative survey is that the practices of inter- and transdisciplinary projects are widely diverse, dependent as they are on contextual factors, both in terms of policy demands and societal conditions, and also on variations in the composition of the teams, be they mainly academic disciplines or a mixture of academic and non-academic stakeholders. While these variations are broadly discussed in the academic literature where many factors can be found to be either frustrating or stimulating collaboration in IDR/TDR projects, our survey aims in the first place to connect the practical experiences of researchers without burdening them with research findings that largely are still contested. In short, we wanted an unobtrusive survey that gives leeway for researchers to talk about their own experiences. This way, the survey also aims at complementing the other part of WP2, the systematic literature review. In our analysis, we also consider the survey and interview findings in relation to the literature review findings.

We direct our questionnaire to researchers, primarily principal investigators (PIs) of European projects (see Chapter 7.1 for a precise account of the sources we used). Our main target group are researchers working in AHSS projects, either between AHSS disciplines or AHSS collaborating with STEMM disciplines. Since these types of project are as a rule conducted in a policy context, we have interviewed a limited number of policy stakeholders after our provisional analysis of the survey data to shed some light on how policy makers and funders promote inter- and transdisciplinary research.

---

[1] European refers to IDR/TDR research registered in the CORDIS database or another database at the European level, or in one of the EU member states. See Part B, Chapter 7.1 for a full account of the databases we use in this survey.

We used a qualitative survey with a semi-structured questionnaire (see Appendix 1). Based on the survey lead's previous experience of this type of survey format, posing policy related questions is most effective for eliciting responses, especially among representatives of the academic community. For the interviews with policy makers, we use a guideline based on the three phases of the policy process: ex ante, ex durante and ex post the research conducted (see Appendix 2).

3.2   Development of questionnaire

In order to develop the questions for the survey questionnaire we used some of the preliminary results of the then ongoing systematic literature review, in particular those relating to factors that hinder IDR/TDR collaboration (see for further details Vienni Baptista et al., 2019). We also consulted SHAPE-ID partners and members of the SHAPE-ID Expert Panel. We asked them what, in light of their own experience with IDR/TDR, are the two or three most urgent themes to be addressed in the survey. We also asked them to mention projects that would be worthwhile to include in the survey. Additionally, we asked them to distinguish between different aggregation funding levels: institutional or inter-institutional; national; European/international. Finally, colleagues were requested to specify whether these examples were collaborations within AHSS fields or between AHSS and STEMM fields.

Thus, we have profited from the collective experience within and outside the SHAPE-ID project, both in terms of the questions asked and the formal and informal sources used for the selection of survey participants. The results of this survey reveal patterns of behaviour that will help the development of a taxonomy (or framework), and the resulting toolkit.

The questionnaire consists of six sections, and is provided in Appendix 1:

- **Section 1.** Respondents are asked to characterise their project in terms of its purpose explained to interested outsiders, and in terms of the balance between AHSS and STEMM.
- **Section 2.** Respondents are asked to give a more factual summary of their project: name, PI, start and end date, main parties involved.
- **Section 3.** Addresses the policy context of the project to identify whether this is favourable for IDR/TDR.
- **Section 4.** Targets the development phase of the project to see how different parties got to-gether, whether it concerns a new idea or not and what kind of topics are discussed.
- **Section 5.** Investigates the main stimuli and hindrances for IDR/TDR and what participants are doing to overcome these. It also addresses the topic of monitoring and evaluation of IDR and TDR projects.
- **Section 6.** Solicits advice from respondents for researchers and policy makers about how to support IDR and TDR, based on their practical experience.

3.3 Selection of researchers and research projects

For the survey we built a database of research projects from several European databases, the H2020 CORDIS database in the first place, but also several others, supplemented with projects based on personal knowledge from team members (see Part B, Chapter 7.1 for a detailed description). Here we present an overview of the selection process.

We identified IDR and TDR projects in a variety of fields and topics, conducted in Europe, both joint and individual research projects and also some research-oriented networks, often including PhD training. We conducted a search in the CORDIS database using interdisc* and transdisc* as keywords and found respectively 2050 interdisciplinary and 167 transdisciplinary projects. We then manually selected those projects that were either AHSS or AHSS/STEMM, but with a major role for AHSS, 247 in total. Through other sources we supplemented this with a further 133 projects. Our resulting database consisted of 401 records, from which we selected 268 to invite to participate in the survey. These 268 projects were selected manually based on three additional criteria: fields represented in each project, gender balance and country balance. We carried out the further selection manually, by reading the "objective" paragraphs for the projects in the database. We selected projects that are ongoing in 2019 or finished between 2017 and 2019. We received 38 questionnaires back,[2] a 14% response rate.[3] We worked hard to secure gender and geographic balance in our selection. We are confident of the gender balance of our respondents but note that there were few project coordinators from Central and Eastern Europe and as a result the response rate from this region was low.

4 Analysis of survey responses

4.1 General observations

In Chapter 8 of Part B we elaborate on the survey results. Here we present a number of observations we feel are most relevant for future research and research policy concerned with inter- and transdisciplinary research projects.

4.1.1 IDR/TDR as a necessity for societal challenges

Researchers participating in the survey seem overall to agree on the value and importance of conducting IDR and TDR to address major challenges in society today. Perhaps this is not surprising

---

[2] One respondent provided detailed information on 4 separate projects, giving us a total of 41 project responses to analyse. We therefore refer to the figure of 41 in our analysis and discussion.

[3] Response rates differ widely depending on the field and topic, the kind of survey (quantitative or qualitative, online, telephone, phone), whether it is internal or external, national or international, per sector etc. What can also make a difference is what is in it for respondents. For online surveys in the academic sector we found response rates ranging between 15 and 35%.

since respondents were all successful in receiving funding for IDR/TDR research, but it is our understanding that many respondents were driven by the urge to conduct research that had more than just scientific impact. A most striking quote in this respect was the question one respondent posed:

> How we can keep very fragile economies, (…) healthy and competitive?" [This respondent also gave the answer:] "(…) we need more understanding and respect over the silos that leads for better and more productive co-creation (SHAPE-ID Survey_6, AHSS/STEMM).

4.1.2   Need for greater mutual understanding

Perhaps the most pressing issue that requires attention when doing IDR/TDR is the need for greater mutual understanding of each other's interests, expertise and knowledge. In the interviews we held with policy makers, it appeared that one of their main concerns was that in projects where both AHSS and STEMM researchers participated the level of understanding of each other's disciplines was generally rather low and was only overcome with huge investment in time to gain an understanding of each other's production and communication processes.

The relevance of studying how IDR and TDR are done and perceived by researchers in Europe is clear, but while much knowledge is "out there" – as becomes apparent in our literature review – the knowledge does not seem to be widespread. This might be due to the fact that it is not easy to access literature because of the breadth of topics, contexts, sectors, etc. One example is the lack of knowledge about how to effectively monitor and evaluate progress in IDR/TDR projects. There is a lot of knowledge available about AHSS integration and evaluation[4], but our survey shows that respondents are struggling with the lack of approaches to this topic.

4.1.3   Universities are increasing supports for IDR / TDR

Many respondents notice the efforts of universities to improve supports for IDR and TDR and that new institutional and governmental policies are emerging to stimulate such research. This is also acknowledged in the interviews with policy makers. However, despite such efforts this development is still slowed down by traditional disciplinary interests and funding structures. Some researchers argue that it is hard to change the current allocation and reward system because IDR is seen as "dangerous for both young researchers and specialist professors" (SHAPE-ID Survey_4, AHSS/STEMM), a remark also mentioned in the academic literature,[5] but not everyone is negative about this: "Departmental

---

[4] See for example Schuch (2019) and Spaapen and Sivertsen (2020).

[5] See for instance Lyall (2019).

divisions exist at my university, but they do not stifle effective collaboration"(SHAPE-ID Survey_10, AHSS/STEMM).

4.1.4 Get rid of the "silos" on both sides

The old adage that communities have problems and universities have departments needs a bit more nuance.[6] On the one hand, public organisations are often divided into silos too, and on the other, universities are in a transition phase to enable a better match between knowledge production and societal demand.[7] This observation certainly supports the need for more intense interaction between research and policy. The interviews show that this can be done in different effective ways, for example via regular personal exchange, or via double functions, or trading places between academics and stakeholders.

4.1.5 The EU is breaking a lance for IDR / TDR

According to most respondents in this survey, at the supranational level, the EU in particular, things are more favourable for IDR/TDR, as most researchers acknowledge – when asked to give examples of programmes that stimulate IDR/TDR, they refer to all the Pillars of H2020, including ERC and Marie Curie. The interviews with policy makers also show a disconnect between different funding levels. Whereas the EU has been working on missions and societal challenges through several subsequent Framework programmes and SSH integration has been monitored since 2014, national schemes have incorporated these to varying degrees. Further collaboration between these different policy levels is necessary to avoid reproducing unsuccessful funding practices for IDR/TDR. The interviews we conducted with policy makers show that universities vary too in the time and effort they put into developing and maintaining relationships with "Brussels".

4.1.6 Already existing collaborations help

In order to be successful in receiving funding, it helps a lot to have an already existing collaboration, preferably for some years. This does not mean a closed shop, but an existing structure makes it easier for new elements and partners to become part of the network:

> Interesting results come from mixing people that know each other already and new people who can make novel inputs. The challenge to build a functioning network is a short-term necessity. Easy communication between partners is absolutely required (SHAPE-ID Survey_38, AHSS).

---

[6] Berger and Duguet (1982, p. 130).

[7] See reports from LERU on increasing interdisciplinarity in academia (Wernli & Darbellay, 2016), and on productive interaction between researchers and societal stakeholders (Van den Akker & Spaapen, 2017).

One thing successful IDR and TDR projects appear to have in common is to have ample time (2 years is not exceptional) to get to know each other and to develop a common research agenda.

4.1.7 Integration between AHSS and STEMM does not have to be excessively difficult

According to most respondents integrating AHSS and STEMM research is not necessarily more difficult than integration within AHSS disciplines, as long as there is clarity about the goals and about the complementarity of partners. Respondents do acknowledge that there are differences in perspective and methods, and some AHSS respondents mention the fact that STEMM researchers see the contribution of AHSS research in rather instrumental terms (address ethical issues, or make research results digestible for the public), but they also mention that this can be overcome through strong management, clear goals agreed from the outset, and an open learning mentality among the partners. To us, this seems to evidence a growing self-confidence among AHSS researchers compared to previous times when AHSS disciplines were hardly integrated in larger collaborative projects.

4.1.8 Evaluation is not seen as a big problem (yet)

Evaluation of projects does not appear to be seen as a big issue by most respondents. We put forward two reasons for this. Firstly, for most projects in our database, evaluation was not yet a priority given that their project was still ongoing. The second reason could be a lack of knowledge about methods for assessing the varied outputs of IDR/TDR:

> In our project there is not one single form of outcome, but many: dissemination by briefings and small scale/open public events with a variety of audiences, publications, web-documentaries, website. So there was not one streamlined evaluation, but rather an evaluation of individual events (…) (SHAPE-ID Survey_38, AHSS).

Such variety is indeed hard to handle in an evaluation. Other respondents maintain that evaluation is done according to EU regulations, and some find an original but perhaps not so reliable "method" to assess progress in IDR and TDR projects: "We check each other's work, I cannot do my co-researchers work, but I can check if it makes sense" (SHAPE-ID Survey_36, AHSS).

Perhaps it is not widespread yet, but there are more comprehensive evaluation methods available that are based on mutual learning among participants instead of ranking outputs in terms of traditional bibliometrics. Moreover, there are methods to cover other relevant forms of output that are important for IDR and TDR projects, for example connecting with wider audiences, mixed media outputs and enhancing understanding of societal problems or policy questions. Evaluation, in short, should be oriented to the wider process of doing IDR or TDR instead of oriented towards specific products (Guba & Lincoln, 1989; Huebner & Betts, 1999; Spaapen & Van Drooge, 2011).

4.2   Some specific highlights

Two things stand out from the survey results when it comes to necessary conditions for IDR and TDR: time and truly joint venture. Giving sufficient time and space for discussions of the specific forms of IDR and TDR and their uses in the research is a crucial point in many responses. "Get out there and get to know the other perspectives first, then develop the research questions together!" (SHAPE-ID Survey_26, AHSS/STEMM). It is seen as important to "(…) make all partners all accountable for what they do, and for identifying the right problem, framing the research question and developing options for resolution" (SHAPE-ID Survey_8, AHSS/STEMM).

Communication skills were frequently mentioned and highly valued by respondents. Researchers suggest regular face-to-face meetings arranged for the group and also for individuals to guarantee that communication channels are open, together with video teleconferences. And for all this, time is of the essence to grow mutual understanding and attune ideas, perspectives and goals.

Specifically, for AHSS-STEMM integration, researchers advocate open collaboration and active listening:

> Do not only consider what collaboration between different disciplinary backgrounds could entail. Think about how aligned political worldviews are crucial in a collaboration between STEMM and AHHS cooperation (SHAPE-ID Survey_16, AHSS/STEMM).

Respondents also point to institutional barriers and constraints that hinder AHSS integration:

> The bureaucratic administration of universities and departments continue to be quite rigid and outdated due to the suffocating nature of rules that result in unnecessary micromanagement, and over-specialization of academics continues to be encouraged and seen as a "safe refuge" for publication and promotion (SHAPE-ID Survey_21, AHSS).

We conclude from this quote that apparently Early Career Researchers need to be protected from vulnerable IDR/TDR settings that imply short contracts and unstable working conditions See also Chapter 8, where we show that one of the main worries of respondents is that participating in IDR/TDR is jeopardising the career of young researchers. To be concise, we present these observations and highlights in Table 1.

![SHAPE-ID - Shaping interdisciplinary practices in Europe]

Table 1 Eight general observations and two highlights from the survey

1	Researchers agree on the value and importance of conducting IDR and TDR to address major challenges in society today.
2	The most pressing issue that requires attention when doing IDR/TDR is the need for more mutual understanding of each other's interests, expertise and knowledge.
3	Efforts on the part of universities to improve supports for IDR and TDR and new institutional and government policies are emerging to stimulate such research.
4	Public organisations are often divided into silos too, and on the other hand, universities are in a transition phase to enable a better match between knowledge production and societal demand.
5	At the supranational level, the EU in particular, things are more favourable for IDR/TDR.
6	In order to be successful in receiving funding, it helps a lot to have an already existing collaboration, preferably for some years.
7	Integration between AHSS disciplines is not necessarily more difficult than AHSS-STEMM integration, as long there is clarity about the goals and about the complementarity of partners.
8	Evaluation does not seem to be seen as a big problem, but most projects surveyed are not yet at the stage of being evaluated.
9	It is important to give sufficient time and space to discuss the specific forms of IDR and TDR and their uses in the research.
10	Do not only consider what collaboration between different disciplinary backgrounds could entail. Think about how aligned political worldviews are crucial in a collaboration between STEMM and AHSS cooperation.

5   Feedback of stakeholders based on selected interviews

5.1   Selection of interviewees

In our survey we targeted primarily researchers, but these operate in a policy context which increasingly demands IDR and TDR. This demand comes at the price of jeopardising traditional disciplinary structures and policies in the academic world, as outlined in the *Times Higher Education* article of 13 February 2020 (Bothwell, 2020).

On the one hand, a policy maker (and former researcher) quoted in the article realises that current global challenges demand IDR and TDR: "How many of the big problems of the world are going to be solved within the domains of one discipline these days?" asks Ian Chubb, former vice-chancellor of the Australian National University and former chief scientist of Australia. On the other hand, some researchers take a more sceptical point of view, like Lakshmi Balachandran Nair, a social scientist specialising in methods and statistics at Utrecht University: "I have seen some scholars refer to bringing together strategy and organisational behaviour as interdisciplinarity (…) But if you are to divide disciplines so strictly and talk about any small thing connecting them as interdisciplinary, then everything we do is interdisciplinary in one way or another," she says.

For Rick Szostak, economics professor at Canada's University of Alberta and former president of the Association for Interdisciplinary Studies, a "basic suspicion of interdisciplinarity" within the academy is understandable given scholars' disciplinary backgrounds. But he also thinks that some of that suspicion is "often just masking turf wars over resources".

With a survey directed towards the research community, it seems only fair to give policy makers in the academic sphere the chance to offer their side of the story. Therefore, we have conducted a limited number of interviews with stakeholders holding different positions in the European research system. We spoke to people either working in a university, in a science academy, a research council, or at EC level. While these individuals are by no means representatives of the academic or research community in Europe – if that is even possible – their views can serve to balance the (preliminary) results of the survey and therefore enrich our findings.

5.2   Overview of results

In Chapter 9, we analyse the interviews in more detail. Here we present a summary of some of the main results.

Our survey was conducted among researchers who are experienced in conducting IDR/TDR research. Part of the survey asks respondents to reflect on the policy context they are working in. To enable some reflection from a policy perspective on the preliminary results of the survey, we decided to conduct a limited number of interviews (10) with policy makers who work either in a university or in a funding organisation. All ten interviews were conducted with experienced and senior policy makers (4), funders (4); and two researchers involved in funding schemes. The interviewees represent national and international organisations in Ireland, Germany, Poland, the United Kingdom, the Netherlands and Norway. In two cases we interviewed representatives of European level organisations.[8]

The interviewees are by no means representative of the European community of policy makers as a whole – if that is even possible – but they all have long-standing experience with IDR/TDR policy development and funding. We performed semi-structured phone or Skype interviews that lasted between 30 and 60 minutes. The focus was on their involvement with IDR/TDR policy, in particular AHSS integration in larger research programmes.

The questionnaire is divided into three parts based on the process used in policy organisations to follow projects: (i) policy support during the development and start-up phase; (ii) monitoring and other forms

---

[8] Since some of our interviewees requested anonymity, we do not publicise their names or associations.

of interaction/support during the actual research phase; and (iii) finalisation and evaluation of projects. We report here briefly on each of the three phases and elaborate in Part B with background data.

5.2.1 Phase 1: Development and start-up phase of IDR/TDR projects

Time is probably the most important element in promoting and developing IDR/TDR research programmes. As one interviewee acknowledges, it takes long-term university policy for promoting IDR/TDR to be successful: "This was necessary because many researchers still tend to favour individual projects" (SHAPE-ID Interview_2).

Time is also needed to reorganise existing programmes that are disciplinary in orientation into portfolios with larger themes. In the Netherlands, it took the Research Council NWO a number of years to change from a mainly disciplinary oriented organisation into a transdisciplinary oriented organisation (at least for half of its budget). This process also entailed building links across different portfolios and relating this to the government's innovation agenda (the so-called Top Sector policy[9]).

Many policy makers agree on the fact that a closer relationship between research and policy sectors is needed to better foster IDR/TDR, but for that to be successful a cultural change is needed concerning the role of AHSS. Interviewees recognise that policy rhetoric is becoming more favourable for AHSS, and also regarding its role in larger projects with STEMM input, but that does not mean that real change is already happening.

Respondents acknowledge that it is now necessary that AHSS researchers also take the lead in IDR/TDR projects, to no longer be seen as an auxiliary to STEMM projects, and challenge prejudices.

To summarise, the main problems related to setting up IDR/TDR projects are: (i) Finding the right connections with non-academic partners, in Europe, in industry, local government, etc.; (ii) Energy and time to put projects together; (iii) Early scoping stage: To decide "what the problem is?" and to decide with co-funders "what the broader challenge is?".

5.2.2 Phase 2: Monitoring IDR/TDR projects

Most IDR/TDR projects have a strong orientation towards addressing societal challenges, and a problem widely discussed in the literature is the relationship between societal challenges and IDR/TDR, in particular regarding strategies and methods to manage this connection. That is why we asked our interviewees whether they use or promote any particular method or approach during the project to bring different partners together to discuss collaboration on such topics. While most policy makers keep a distance once a project is running, some do consult at times with project leaders or participate

---

[9] See website of the top sectors: https://www.nwo.nl/en/policies/top+sectors

in events organised by projects. Contacts are also maintained through research support officers. More formal contacts exist through monitoring reports, though they are often carried out mainly through quantitative data.

Regarding AHSS integration during projects, policy makers expect that in the new Horizon Europe programme there is potentially more chance for AHSS integration, through the mission-oriented research and innovation agenda and cross-cutting issues. DG Research and Innovation will continue to monitor this process with regular integration reports. This all sounds promising indeed, but we do have to keep in mind that similar expectations existed when the H2020 programme was introduced, and that did not always work out in favour of AHSS.

At the national level, we found some examples of efforts to strengthen the connection between IDR/TDR research and societal challenges, in particular focusing on AHSS integration. In the Netherlands, for example, for certain topics funders first invite AHSS researchers to come up with their questions and ideas to develop the programme, because as one said: "You have to make a special effort for AHSS" (SHAPE-ID Interview_1). The same interviewee also mentioned an interesting budgetary measure:

> We also sometimes divide the budget for IDR/TDR themes in a way that no one field can go run with the money. And it is very important to have mixed evaluation committees, not only with different disciplines, but also with stakeholders. Clearly, the success of a project, its impact, is always dependent on the uptake of stakeholders (SHAPE-ID Interview_1).

5.2.3   Phase 3: Finalisation and evaluation of IDR/TDR projects

Interviewees agreed that any programme dealing with IDR/TDR faces greater evaluation challenges than those assessing mono-disciplinary projects. Evaluation is not easy because there is little consensus about indicators and criteria for IDR/TDR, nor about approaches and methods.

One interviewee finds that:

> Horizon 2020 is very ambitious on this point and in addition to 3 main criteria […] you have 14 cross cutting issues that are relevant. Even without flagging issues such as gender, SSH and RRI/ethics can play a role. When a topic is flagged as relevant for SSH evaluators are asked to look at interdisciplinary aspects of the proposal as part of the excellence criteria. We know however that this works only in theory and this is not done systematically (SHAPE-ID Interview_3).

There are ways to assess aspects of IDR/TDR, but it is not done systematically. And, this is even less the case when it comes to assessing the integration of AHSS, as the following quote from the same person shows:

> There has been an increase in flagged topics since 2014. In WP 2018-20 the average is about 43% in pillars 2 and 3 of Horizon 2020. In many of the Societal Challenges the number is as high as 50%. This has to do with increased awareness and a push to include more SSH aspects in the topics across Work programme parts. It is not sure however if this is a positive development. In my opinion for increased impact and to strengthen the ties between SSH and STEM European R&I would benefit if the share of flagged topics goes down. This has mainly two explanations; the first being that SSH expertise is not needed everywhere and secondly with so many flagged topics (with differing relevance for SSH) in many cases we see that SSH becomes only an add-on (SHAPE-ID Interview_3).

To further develop evaluation strategies, funders increasingly cooperate with researchers and institutional policy makers.

> Our communities are prepared and trained to work together. We also invite Project Managers to our table to work together and to explain them how the call works. We look at the collaborations, you have to understand the relationships between actors (SHAPE-ID Interview_1).

A goal of this rapprochement is also to promote internal change at universities towards a more positive attitude towards IDR/TDR.

A most important factor remains the question how to improve the situation of AHSS Integration in Horizon 2020 and lay the foundation for a real improvement in Horizon Europe. The AHSS integration reports of the Directorate General for Research and Innovation (DG-RI), European Commission, and other monitoring reports are useful to indicate how well AHSS integration is proceeding, to create awareness and to use it as a tool to do better, according to our interviewees. However, more is needed. As one of our interviewees put it:

> However, what would really make a difference at European level and strengthen the impact of the framework programme is really the issue of facilitating cooperation between SSH and STEM and make this a natural and seamless part of research programmes – and at the same time influence how this is being done in the 90% or so of European funding that is controlled by the member states and associated countries. If done properly SSH Integration would – alongside SC6/Cluster2/ERC etc. – exploit the very best expertise that Europe has to offer to ensure that social, human, economic, cultural, political [aspects] are fully taken into account in the encounters created by science and thematic policies (SHAPE-ID Interview_3).

5.3 Implications for AHSS integration in IDR/TDR

All interviewees agree that it is not easy to develop inter- and transdisciplinary initiatives for AHSS research, and certainly not when they have to collaborate with STEMM fields. There are several reasons for this. Firstly, public officers that really believe in AHSS and want to stimulate AHSS research participation in larger programmes are needed. Secondly, there still is a strong orientation in the

science world towards first looking to STEMM fields and then perhaps later including AHSS researchers to address some ethical or legal issues. This is a recurrent opinion coming from researchers, policy makers and funders alike, despite the fact that major problems in society need input from AHSS research, even those with what looks like a primarily STEMM orientation.

In line with findings from the SHAPE-ID systematic literature review, policy makers and funders confirm that the label AHSS has to be disentangled due to the fact that it groups very different disciplines. In our previous report (see Vienni Baptista et al., 2019), we have confirmed that the label "AHSS" does not represent the spectrum of experiences nor the real integration processes that are being developed.

Together with marking special budget for AHSS projects, a set of practical measures can be implemented to foster more integrative research. For example: to allow part of the budget for a project manager who has experience with IDR/TDR, to organise match-making events, meetings with all disciplines, and with (potential) stakeholders, and to stimulate young researchers to go out and work with stakeholders to broaden their experience and perspective.

Despite the open attitude towards AHSS at EU level, it remains difficult to strengthen the position of AHSS, according to some of our interviewees. Most themes and programmes favour STEMM spheres ("or at least that is how it looks" (SHAPE-ID Interview_1)).

As our findings show, at different policy levels different approaches can be identified in approaching the problem of AHSS integration in IDR/TDR. Policy and funding agencies at all levels increasingly recognise their responsibility in how IDR/TDR is rewarded and promoted. But their perspectives may change if we observe the national or European level, each of them having different, sometimes competing, sometimes complementary, tools and strategies to cope with IDR/TDR support and funding. The uptake of EU IDR/TDR policies also varies between countries. Openness in their perception of this problem constitutes a fruitful space for connecting different actors and bridging the gap in AHSS integration.

For their part, universities and other institutions impose sets of rules that may differ from region to region. European funding schemes are powerful sources to develop top-down approaches to IDR/TDR but sometimes result in unclear definitions that add uncertainty to the research process. Horizon Europe is seen as a promising land to innovate and create better interfaces between STEMM and AHSS. To really achieve these goals, our interviews also confirm that researchers need to open themselves up more to inter- and transdisciplinarity.

6 Conclusions and Discussion

The two main questions addressed in the survey are:

1) When developing a European IDR/TDR project, what are the main difficulties people encounter in realising a good research team that is balanced in terms of the interests and goals of the different participants?

2) Which factors of success and failure do European researchers integrating AHSS in larger projects consider relevant for their daily practice of IDR?

6.1 Main difficulties

If we use the survey question about the factors hindering IDR/TDR as a measure to answer the first question, career path issues are seen as the biggest obstacle for researchers conducting IDR/TDR. The main reason for this seems to be the fact that the reward system within academia is still primarily geared towards a disciplinary structure. It is more difficult for inter- and transdisciplinary researchers to publish in high impact journals and it is harder to get funded. It is also more difficult to organise effective research evaluation because of a lack of methods and because evaluators with experience in IDR or TDR are still scarce. Closely behind the career issues, we find factors related to academic cultures and epistemologies as the most common obstacles in the surveyed projects. Institutional factors constitute a strong barrier to effective IDR/TDR as well, confirming what the literature review has also identified.

While respondents acknowledge the attempts made by many universities to stimulate IDR and TDR, they also are critical of the pace at which this is proceeding. The will is there, but the practice often not yet. According to most researchers in this survey, at the supranational level, the EU in particular, things are much more favourable for IDR/TDR, as most researchers acknowledge – when asked to give examples of programmes that stimulate IDR/TDR, they refer to H2020 generally, or specifically to the ERC or Marie Curie programmes. But while it is true that the European system has more opportunities for collaboration across disciplines and with non-academic stakeholders, we do have to keep in mind that most of our respondents did receive funding from one of the European programmes.

Clearly, differences exist between research fields, institutions and countries when it comes to stimulating IDR/TDR. Several of the policy makers noted this, and one remarked that there are also differences in the way countries pick up on results to implement in their own policies. Furthermore, several researchers refer to contextual differences such as the fact that the area they work in profits from the fact that it is connected to local (e.g. urban development), or regional and/or national policy issues (e.g. migration, sustainability).

Differences between countries exist too. Some countries are more IDR/TDR oriented in their policy. A respondent from Ireland, for example, says their department is very favourable for IDR/TDR "as we have traditionally tended to work as interdisciplinary teams and with transdisciplinary research with outside agencies" (SHAPE-ID Survey_14, AHSS).[10]

The Netherlands established in the last decade two nationwide funding schemes, the previously mentioned Top Sector Policy to connect academic research with socio-economic priorities and stimulate TDR, and the National Science Agenda to stimulate IDR and TDR, and moreover engage the general public in research endeavours.[11] In contrast, a researcher from Southern Europe complains that scholars who work across disciplines are rather penalised at the national level when it comes to things like obtaining the national habilitation to work as associate or full professor.

6.2   AHSS integration

When it comes to AHSS integration in larger projects, the survey data do not reveal significant problems. A major reason for this was the fact that most projects participating in the survey were the result of a long standing – formal or informal – collaboration between partners, and sufficient knowledge had already been exchanged and trust built. When asked about the relationship with STEMM partners, most respondents were positive about that kind of cooperation, although some researchers mentioned that differences were sometimes hard to bridge. It is very important to know how the various disciplines can complement each other. The survey did not deliver clear information about the level of integration in the various projects, perhaps because real interdisciplinary integration between AHSS and STEMM is rare.

The survey also could not bring clarity to the question of whether it makes a difference if a mixed project started from an AHSS perspective or from a STEMM perspective. There were just not enough answers addressing this question specifically. Again, what seems to matter is having a good idea of how AHSS and STEMM can complement each other: "it was actually quite straightforward, as the AHSS people involved have a clear understanding of the benefits of STEMM collaboration and how to tailor those relationships" (SHAPE-ID Survey_10, AHSS/STEMM).

6.3   Policies stimulating AHSS integration in IDR and TDR

While universities do develop policies to stimulate IDR and TDR in general, and sometimes specifically for AHSS, traditional disciplinary structures and funding policies still create obstacles to IDR and TDR

---

[10] The Irish Research Council (IRC) has an interdisciplinary funding scheme that asks AHSS researchers to be lead PI with a co-PI from STEMM.

[11] Website of the National Science Agenda: https://www.nwo.nl/en/research-and-results/programmes/dutch+national+research+agenda; website of the top sectors: https://www.nwo.nl/en/policies/top+sectors

development. For example, most young academics are still educated and trained in one particular discipline. The former president of the Royal Netherlands Academy of Arts and Sciences (KNAW), Robbert Dijkgraaf, complained about this in a recent radio interview: "we still train people in narrow topics and fields, while the future demands a much broader knowledge and perspective." [12]

6.4   Discussion

At a later stage SHAPE-ID will formulate policy recommendations. Here we take an advance on that in the form of a preliminary discussion directed towards three main audiences for our research: research policy makers at the institutional, national and EU level, funding organisations, and researchers.

6.4.1   Research policy makers at three levels

Stimulating IDR/TDR is not only a matter of creating specific programmes for this kind of research. It also means that policy makers at the three levels of the research system – institutional, national and EU – attune their policies to support such research. It appears from our survey that the EU programmes are most advanced when it comes to collaboration between disciplines and or with partners in society. These policies, in particular as seen in Pillars 2 and 3 of Horizon 2020, are picked up by countries and universities to varying degrees. Some countries are more advanced than others (for example by developing national funding schemes for IDR/TDR), and some universities are more active than others (for example by investing time and people in building relationship with external partners, including the EC). It would be advisable for countries and institutions that are less active in this respect to reconsider their policies and their interactions with other levels of the research system and potential societal partners.

For universities, it would also be advisable to rethink their curricula and PhD training in terms of inclusion of IDR/TDR elements in curricula. Currently, there are possibilities for that in the Erasmus+ initiative for the New European universities, where consortia of European universities develop ideas and designs for universities that are more embedded in the societal context. Furthermore, universities together with other policy makers could invest in using more comprehensive research evaluation systems that entail broader criteria and indicators, and intense interaction with the relevant societal stakeholders – public, private and also supranational. Good examples are the Dutch national protocol SEP (Standard Evaluation Protocol) or the UK REF system (Research Excellence Framework), not so much to copy, but as a source of inspiration.

---

[12] Dr. Kelder and co., radio show on the Dutch public radio station NPO 1, Saturday 8 February 2020 [translated by Jack Spaapen].

6.4.2 Funders

Unlike European funding programmes, national funding organisations are often still organised along disciplinary lines, whether they are split up (like in the UK) or integrated (like in the Netherlands). That makes it difficult to develop IDR and TDR programmes, particularly where AHSS is concerned. According to several of our interviewees, this is difficult for many reasons, the main one probably being that at all policy levels, the STEMM disciplines are seen as more important to solving grand challenges than AHSS disciplines are. This is not easy to change, but it would help if funders realise this and take special measures to change this cultural misunderstanding. One way of doing this, suggested by one of our interviewees, is to engage researchers with a good reputation in developing IDR and TDR programmes. These people could also inspire officers in funding organisations that have AHSS in their portfolio. The Collaborative Alliances for Societal Challenges (COALESCE) programme of the Irish Research Council may serve as an example as it aims at addressing national and global challenges with excellent academic research.

6.4.3 Researchers

Respondents in this survey are overall successful IDR or TDR researchers since they received large amounts of funding to conduct their research. There are two issues that respondents mention as things that need to change. The first is the institutional funding structure that still does not stimulate IDR/TDR; the second is the world of publishing. Clearly, it is not easy for individual researchers to induce change, but certainly the more prominent researchers should be able to change funding structures in their own institution, obviously working together with the boards of faculties and the university which largely consist of academics.

6.5 IDR / TDR knowledge dissemination

While it is true that there is a need for more studies to fully understand the obstacles that researchers – AHSS researchers in particular – face when performing IDR and TDR to address societal challenges, it would help to have a good point of access into the rich world of knowledge that already exists about IDR and TDR. A useful and easy to navigate website that provides a good introduction to the relevant literature, and perhaps a toolkit with instruments to address the main obstacles people encounter when doing IDR or TDR, would be valuable. More knowledge about how to effectively monitor and evaluate progress in projects is an example of a relevant topic since our interviews show that funders point to a lack of approaches to this as a problem.

Specifically, for AHSS integration, it can be a challenge to fight prejudice and misconceptions that exist both in the research community and with funders. According to one funder:

(…) it is hard to ask them if they are aware of the value proposition they bring with them. Most of the time, AHSS do not understand the problem. So what questions can they ask? What can you bring to the project? Funders should try to help this (…) I think that AHSS is not entrepreneurial enough, maybe this is not the right word but it summarises my thinking (SHAPE-ID Interview_ 1).

This might however also have to do with the fact that AHSS researchers sometimes struggle to communicate their own added value, as for instance some participants in the Dublin Learning Case Workshop in December 2019 acknowledged.[13]

Whatever is exactly the case, the need for more mutual understanding is clear, and our interview responses revealed the willingness many civil servants have to work to bridge the gap in achieving AHSS integration:

How can I, as a funder, see what they need? By learning from societies, associations, universities, etc., and by putting them all together. We need to map the ecosystem challenge and to give examples of how this integration looks like. These are strong actions to perform and can produce a systemic change (SHAPE-ID Interview_1).

---

[13] Full results of the SHAPE-ID learning case workshops will be published in Summer 2020. An overview of the workshop can be found at https://www.shapeid.eu/first-shape-id-workshop-takes-place-at-trinity-college-dublin/ and a summary of some of the preliminary insights emerging from the workshop is available at https://www.shapeid.eu/how-can-the-arts-and-humanities-position-themselves-as-leaders-in-societal-challenges-research-insights-from-the-first-shape-id-workshop/

SHAPE-ID
Shaping interdisciplinary practices in Europe

Part B Background material

Preamble

In this second part, we present a more detailed analysis of the results of the survey and interviews. We begin with a more elaborate explanation than in Part A above of the sources used for the survey and interviews (Chapter 7). We then discuss the survey results by section (Chapter 8; the survey has six sections, see Appendix 1) and review the results of the interviews with policy stakeholders (Chapter 9). We conclude with a preliminary synthesis of the data (Chapter 10).

To a certain extent, this format includes some overlap between the two parts. Part A can be read as an independent report, with Part B presenting the same story in more detail.

7   Review of survey and interviews

7.1   Sources for survey and interviews

7.1.1   Databases for survey

For the survey we built a database of IDR/TDR research projects using several European databases, supplemented with projects based on the personal knowledge of team members.

We identified in the H2020 CORDIS database IDR and TDR projects in a variety of fields and on a range of topics, conducted in Europe. These were both joint and individual research projects and also some research-oriented networks, often including PhD training. Identification of potential projects was based on the keywords interdisc* and/or transdisc* in the project description; we found, respectively, 2050 interdisciplinary and 167 transdisciplinary projects. As an aside, in the CORDIS database for the preceding Framework Programme 7, these numbers were 36 and 4 respectively, which indicates an enormous growth in IDR and TDR projects. We then manually selected from this total of H2020 IDR/TDR projects those that were either primarily AHSS or a mixture of AHSS and STEMM, but only if AHSS had a major role. This resulted in a list of 247 projects. We supplemented this number with 133 projects from other sources, (see below for the full list of sources). Our resulting database consisted of 401 records, divided among 247 projects extracted from the H2020 CORDIS database, 57 extracted from two LERU reports (LERU, 2014; Wernli & Darbellay, 2016) and 97 extracted from projects that are either flagged in the CORDIS database as SSH or suggestions from SHAPE-ID colleagues. We made sure to avoid overlap between the different sources. Most of the 401 records are joint research projects, but 41 are individual projects, or started out as such, and 22 are research and training networks.

From these 401 projects, we selected 268 projects to invite to participate in the survey. These 268 projects are the result of the application of three further criteria: fields represented in each project to make sure that we had a balanced range of topics, and gender and country balance. We carried out this further selection manually, by reading the "objective" paragraphs of the projects. We selected projects that are ongoing in 2019 or finished between 2017 and 2019. We received 38 questionnaires back, a 14% response rate.[14]

To summarise, survey participants have been selected from the following sources:

- The EU H2020 project database (CORDIS), accessed in September 2019. We selected projects using interdisc* and transdisc* keyword searches, and also searched for projects funded under SSH-flagged topics.
- The DG-RI report "Integration of Social Sciences and Humanities in Horizon 2020. Participants, budget and disciplines: 4th monitoring report on SSH flagged projects funded in 2017 under the societal challenges and industrial leadership priorities" (Kania, Lemaire & Swinnen, 2019).
- The LERU policy brief "SSH and interdisciplinary research, a showcase of excellent research projects from LERU universities" (LERU, 2014).
- The LERU position paper "Interdisciplinarity and the 21st century research-intensive university" (Wernli & Darbellay, 2016).
- The collective knowledge of the IDR and TDR landscape held by SHAPE-ID partners in order to find interesting cases that do not emerge from the other selection mechanisms, and in order to include "the excluded".

7.1.2 Mailing procedure

After defining the sample to be surveyed, we sent invitations to the 268 selected Principal Investigators (PIs) of the corresponding projects. Invitations were sent to the following selection: 192 researchers from projects identified from the CORDIS database and SSH-flagged projects list, 56 researchers from projects listed in the LERU reports and 20 from projects suggested by the SHAPE-ID Expert Panel and consortium members. Reminders were sent several times to non-responders between November 2019 and January 2020 (a total of 897 emails sent).

We invited researchers to participate in our online survey by sending a cover letter by email. To avoid the email being sent to the recipient's spam folder, we used a text email and embedded the SHAPE-ID

---

[14] Response rates differ widely depending on the field and topic, the kind of survey (quantitative or qualitative, online, telephone, phone), whether it is internal or external, national or international, per sector etc. What can also make a difference is what is in it for respondents. Based on experience of the survey lead with online qualitative surveys directed at academic audiences, response rates vary between 15 and 35%.

project logo into it. We used personalised invitations and reminders that included a full email address, avoiding general email addresses from projects and programmes where possible. In those cases where the PI's personal information was not available, we contacted the Project Manager and asked for suitable representatives from the project.

In the email invitation, we briefly presented SHAPE-ID, the aims of the research and the purpose of the survey. As an incentive for completing the survey, we offered the opportunity for respondents to become part of our learning community. In this case we would update them on the results of the survey and on the progress of the SHAPE-ID project. We will also offer also expert advice upon request.

The email also explained that participation in the survey is voluntary and the researcher may refuse to answer any question or withdraw at any time. All data collected through this survey is treated in compliance with responsible research and innovation (RRI) guidelines and the General Data Protection Regulations (GDPR). Survey data is securely stored in IBL PAN and ETH servers according to EU regulations.

7.2   Responses

We gathered 38 individual responses. One respondent divided their answers to cover 4 different projects in which they participated. We therefore divide this response into 4 separate ones for the purpose of analysis. Consequently, the final number of analysed questionnaires was 41 (AHSS and STEMM: 32, AHSS: 9, STEMM: 1). All the responses were analysed in NVivo 12®, combined with manual checks.

7.3   Selection of policy stakeholders

We built a database of potential interviewees affiliated to funding agencies and organisations responsible for research policy making in Europe. We used a snowball technique to collect suggestions on who to interview in different countries and at different levels. SHAPE-ID partners provided fruitful connections. We performed ten semi-structured interviews (see Appendix 2 for the guidelines used for the interviews).

All ten interviewees are experienced at the senior level: four policy makers, four funders, and two researchers involved in funding schemes. The interviewees represent national and international organisations in Ireland, Germany, Poland, the United Kingdom, the Netherlands and Norway. In two cases we interviewed representatives of European level organisations.

8   Review of survey results

8.1   Survey sections 1 and 2: Characteristics of responding projects

The purpose of Sections 1 and 2 of the survey is to investigate the context in which the projects of respondents operate, and to present some of the main characteristics of these projects, including the level of inter- or transdisciplinarity, whether it is AHSS or a mix between AHSS and STEMM fields.

The total number of responses is 41. For the most part the questionnaires were completed by the PI. Of the responding projects, 12 projects were recently finished, and 29 are ongoing (Figure 1).
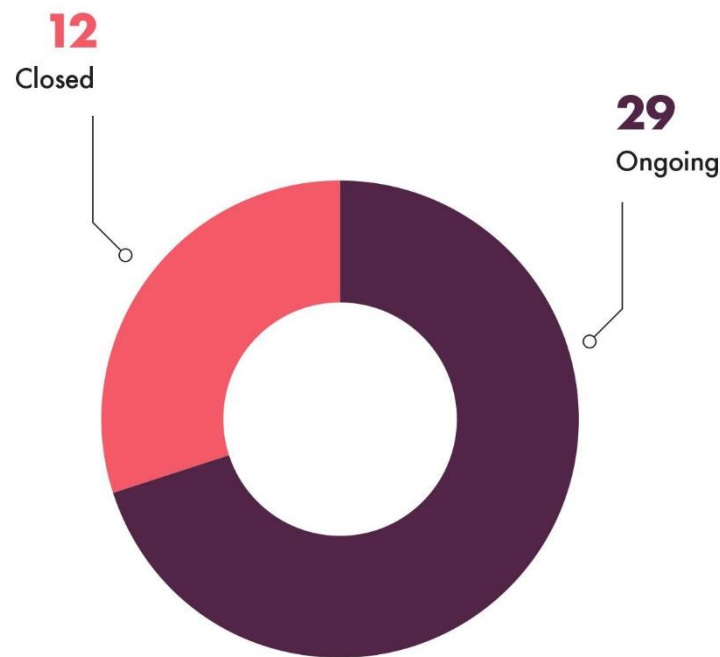
Figure 1 Project status of surveyed projects

Approximately half of the projects (22) are financed by the European Commission's Horizon 2020 Framework Programme. The remaining are financed by national (15)[15] and internal university funding schemes (4) as main funders. Many projects receive funding from more than one source (Figure 2).

---

[15] UK research councils, Swiss National Science Foundation (SNSF), local and regional communities in France, Interreg Alcotra, French research funding, Leverhulme Trust, Swiss National Foundation, The Wellcome Trust, Ministry of Science and Education Germany, Swedish International Development Cooperation Agency, Belmont Forum and NORFACE member organisations.

Figure 2 Main funding organisations

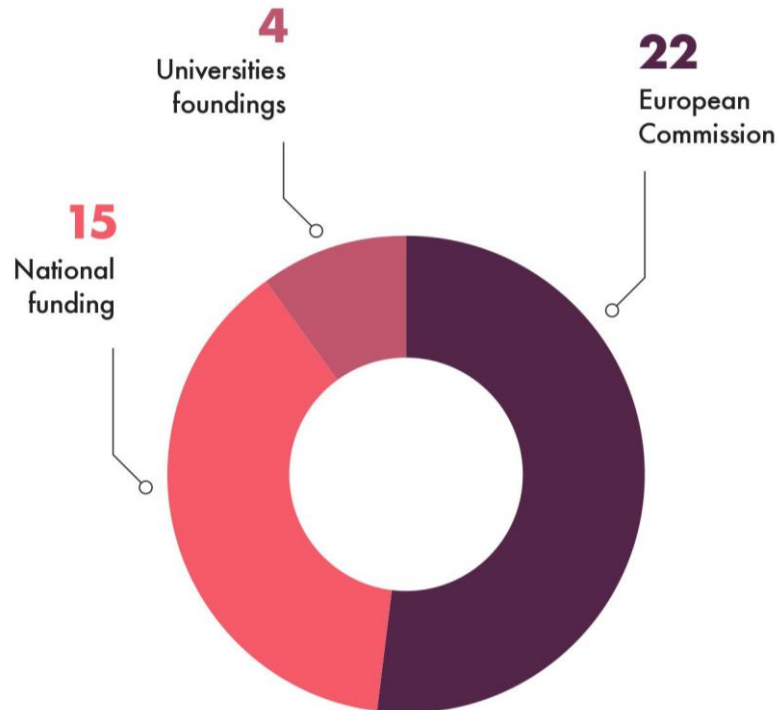Researchers were asked to characterise their project as either inter- or trans-disciplinary according to the definition we present in the questionnaire[16]. Seventeen researchers stated that their project is both inter- and transdisciplinary. The following quote provides an example:

> It is both, the research is interdisciplinary but we rely on engagement with institutions such as museums etc. to achieve our goals; inter- and transdisciplinary - we work with many non-academic organisations; Ideally, transdisciplinary, often interdisciplinary, 13 transdisciplinary, and 9 interdisciplinary (SHAPE-ID Survey_28, AHSS/STEMM).

Most researchers found the collaboration in their project to be a balanced partnership between AHSS and STEMM disciplines. However, they also emphasised that achieving this was not at all a simple task.

In the words of one researcher:

> (…) to build this balanced partnership took more than 10 years to be built; we worked hard for it or we were equal partners, but we know each other for a longer time (SHAPE-ID Survey_6, AHSS/STEMM).

---

[16] In the questionnaire we use this basic definition: interdisciplinarity for collaboration between academics from different disciplines, and transdisciplinarity for collaboration between academics and partners in other sectors of society.

Those who considered their projects as lacking in collaborative balance, pointed to the absence of understanding as the main reason for this situation:

> (…) there is a lack of understanding on both sides; to my experiences it is in many cases not balanced due to different perceptions, values, approaches (SHAPE-ID Survey_23, AHSS/STEMM).

It appears that it is possible to establish a well-balanced collaboration between AHSS and STEMM, but to achieve this investment in time and mutual knowledge and understanding is needed.

Figure 3 represents the leading academic disciplines or fields of knowledge (provided by respondents) according to ASJC Journal Classification.
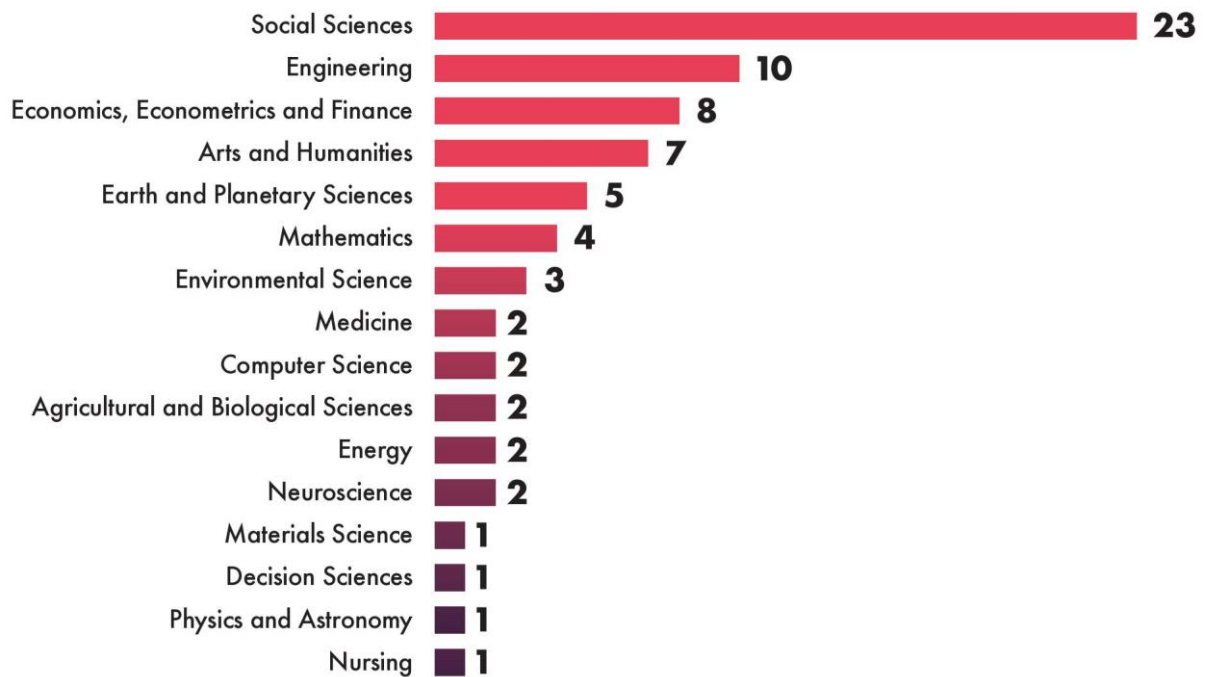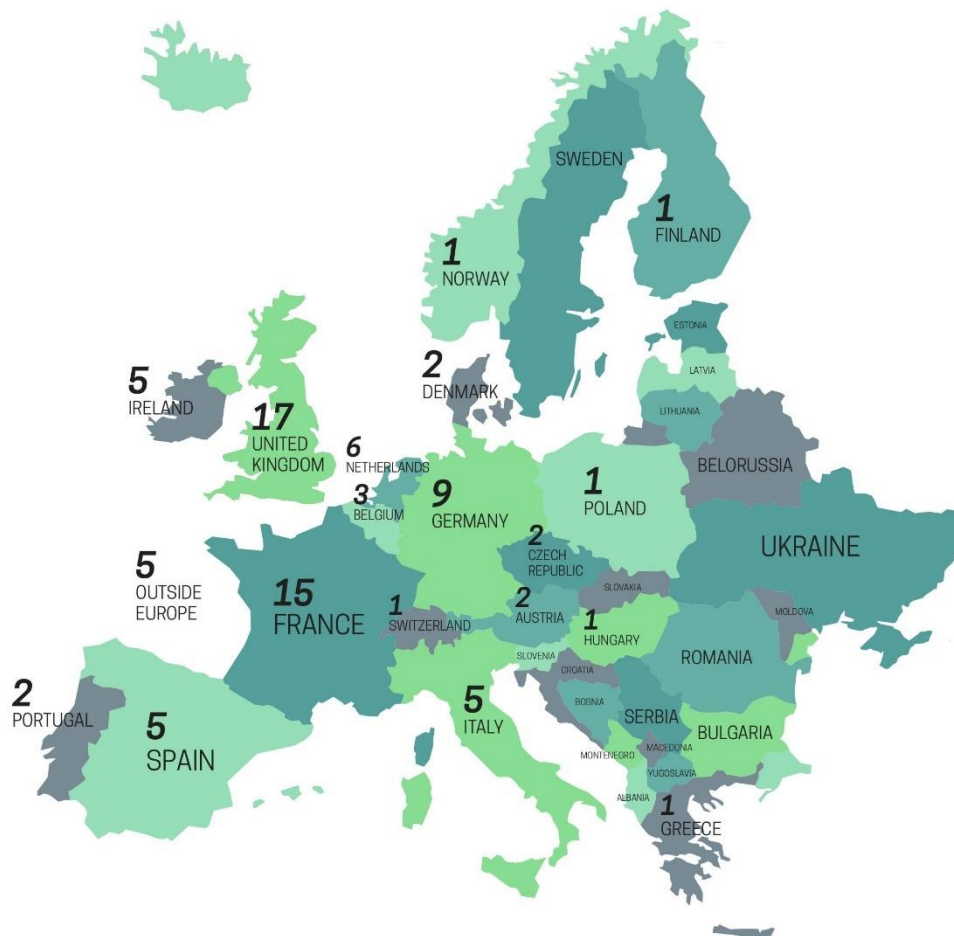

Figure 3 Leading participating academic disciplines and/or fields in projects

Figure 4 represents the institutions that participate in the surveyed projects.

Austria:
Graz University
The International Institute for Applied Systems Analysis - IIASA
Belgium:
Ghent University
Université de Liège
The Leuven Centre for Legal Theory and Empirical Jurisprudence
Czech Republic:
Charles University x 2
Denmark:
University of Southern Denmark
Copenhagen Business School
Finland:
Aalto University
France:
Université Paul-Valéry
University Grenoble Alpes x 4
University of Bordeaux
Météo France x 2
University of Savoie Mont Blanc x 2
Institut national de recherche en sciences et technologies pour l'environnement et l'agriculture - IRSTEA x 2
Centre National de la Recherche Scientifique - CNRS x 3
Germany:
Passau University
Free University of Berlin x 2
Potsdam Institute for Climate Impact Research

Ecologic Institute
Global Climate Forum
RWTH Aachen
Climate Analitics
TU Münich
Greece:
Athena Research Center
Hungary:
Institute for Computer Science and Control SZTAKI
Ireland:
Trinity College Dublin x 4
TU Dublin
Netherlands:
University of Wageningen
Free University Amsterdam
Planbureau voor de Leefomgeving - PBL
Erasmus University
Deltares
TU Delft
Norway:
University of Oslo
Poland:
Department of Economic Modelling Warsaw
Portugal:
Universidade do Porto
Universidade Nova de Lisboa
Spain:
University of Barcelona
International Association for Shell and Spatial

Structures - IASS
ITCL Institute of Technology
Universitat Pompeu Fabra
Basque Center for Climate Change
Switzerland:
University of Basel
UK:
University of Sussex x 2
University of Brighton x 2
University of Cambridge x 3
University of Bristol x 3
Durham University x 2
University of Kent
Cambridge Centre for Housing and Planning Research
Paul Watkiss Associate
Science and Policy Research Unit
University of Edinburgh x 2

Outside Europe:
University of Nevada Las Vegas (USA)
University of Vermont (USA)
Banaras Hindu University (India)
University of Auckland (New Zealand)
Universidad de las Artes - UArtes (Ecuador)

Figure 4 Participating institutes and countries in surveyed projects

Respondents detailed the main participating external stakeholders in their project. The following were mentioned most:

- international and national organisations (18)[17]
- NGOs (15)
- municipalities, city councils (7)
- cultural institutions (mainly museums) (11)
- industries e.g. SMEs; some private companies; business (5)
- charities, e.g. Action Networks; Foundations (4)
- national commissions and ministries (3)
- governmental bodies (3)
- EU organisations (2)
- schools (2)
- hospitals (1)
- Insurance Association (1)
- policy makers (2)

We also asked respondents to indicate the main governmental organisations involved in and/or targeted by the project. The following were mentioned:

- national governments and ministries (12)[18]
- EU (8)
- local communities and regional offices (5)
- municipalities (5)
- administrative regions and national parks (3)
- research funding bodies (2)
- regional intergovernmental organisation (1)

---

[17] The numbers in parentheses signify how many times a given category of stakeholders was mentioned. It is important to remember that in some cases respondents did not provide any answer to the given question and others provided an elaborate response that included a few stakeholders.

[18] See footnote 17.

Respondents were asked to describe their project using language suitable for a lay audience and explaining the main aims and purposes of their study. The answers can be divided into three main categories:

1. projects oriented towards finding a solution for a particular question or problem
2. projects oriented towards changing a particular process
3. projects focused on enhancing understanding.

Those solution-based projects are primarily described in the context of their expected final outcome, which is to cause social change. One researcher explains that their project aims to:

> (…) make the planet more sustainable; improve function and quality of life; to build resilient; equitable and sustainable futures; we work on solutions; to enhance well-being and quality of life for all (SHAPE-ID Survey_27, AHSS).

The accounts of process-oriented projects show them in the light of the actions that are undertaken throughout the project. For example:

> (…) we are dealing with some concept and social problem; provide insights from behind-the-scenes; design, elaborate and piloting; digitize; mapping and explaining; educating (SHAPE-ID Survey_21, AHSS/STEMM).

The third category of projects focuses on enhancing understanding. It characterises its goal by means of the following expressions: "try to understand" (SHAPE-ID Survey_9, AHSS; SHAPE-ID Survey_11, AHSS/STEMM); "seek to understand" (SHAPE-ID Survey_5, AHSS/STEMM); "create new insights" (SHAPE-ID Survey_23, AHSS/STEMM); "explore questions" (SHAPE-ID Survey_10, AHSS/STEMM); "understand the depth and complexity" (SHAPE-ID Survey_21, AHSS).

8.2   Survey section 3: Policy context for inter- and transdisciplinary research

This section of the survey focused on whether the policy context is favourable for IDR/TDR or not. We asked researchers to consider different policy levels (institution, country, supranational), and to assess the attention given to IDR/TDR. We asked them to provide examples of funding programmes or other initiatives that promote or frustrate IDR/TDR.

The answers to this question show an interesting range of variation, from favourable policy context to not favourable at all. Between those extremes a number of researchers found good intentions in policy statements but little effect due to hindering university structures and particularly funding schemes that favour disciplinary research. The divide between disciplines in the university and between policy structures are also obstacles.

The survey shows that most researchers see that new university and government policies are emerging that stimulate IDR/TDR. This development is slowed down by traditional disciplinary structures. The following quote is indicative:

> Attention on the benefits of IDR/TDR is growing across different policy levels. At the hospital and university this has been important for a while, while the attention at a funding and national level has increased in the last years, but it still seems easier to work in silos of different disciplines if you want funding (SHAPE-ID Survey_1, AHSS/STEMM).

Some researchers stated that it is hard to change the current allocation and reward system because IDR/TDR are seen as "dangerous for both young researchers and specialist professors" (SHAPE-ID Survey_4, AHSS/STEMM). But not everyone is negative about this: "Departmental divisions exist at my university, but they do not stifle effective collaboration" (SHAPE-ID Survey_10, AHSS/STEMM).

It is important to keep in mind that there are differences between research fields, institutions and countries when it comes to stimulating IDR/TDR. For example, several researchers refer to the fact that the area they work in profits from the fact that it is connected to local (e.g. urban development), or regional and/or national policy issues (e.g. migration, sustainability).

Differences between countries exist because some countries are more oriented towards IDR/TDR in their policy. The Netherlands, for example, favours IDR/TDR with the Top Sector Policy and the National Science Agenda. One researcher from Southern Europe explains that scholars who work across disciplines are rather penalised at the national level when it comes to, for instance, obtaining the national habilitation to work as an associate or full professor.

We have identified differences between institutions. For example, one researcher from Ireland says the department that they are affiliated to is very favourable for IDR/TDR:

> as we have traditionally tended to work as interdisciplinary teams and with transdisciplinary researchers outside of agencies. Support is given through internal seed funding mechanisms and through University wide funding to encourage more IDR/TDR (SHAPE-ID Survey_14, AHSS/STEMM).

Ireland in general seems to be favourable towards IDR/TDR according to this researcher:

> Irish research in general also appear to support [IDR/TDR], but in practice there are institutional practices that inhibit mainstreaming of IDR/TDR. It's too simplistic to say 'support' and 'frustrate' – it's more nuanced that that. With IDR/TDR there is agreement in principal, conflict in practice (SHAPE-ID Survey_14, AHSS/STEMM).

Despite the positive tone, this also refers to the gap between good intentions and daily practice when it comes to stimulating IDR/TDR. This is also evident in several much more critical reactions:

An interdisciplinary agenda still challenges vested interests and practices of the traditional academic establishment, which includes not only universities and research institutes but also scientific associations and powerful publishers. Interdisciplinary progress is often perceived as occurring at the fringes of traditional disciplines. In terms of promotions and reputation, it runs the risks of not counting as much as contributions to the core of a given traditional discipline (SHAPE-ID Survey_26, AHSS/STEMM).

And:

While a lot of universities pay lip service to interdisciplinarity, the policy context discourages such an approach in the two ways: the overall academic system rewards those who focus narrowly on sub-specializations, and this system promotes self-referential behaviour (SHAPE-ID Survey_21, AHSS) .

Many researchers refer to funding structures as a major obstacle, like in the UK where the research councils are divided along disciplinary lines, broad lines but nevertheless these make it challenging to get interdisciplinary funding. Although, as one researcher says, "by no means impossible" (SHAPE-ID Survey_10, AHSS/STEMM).

It is probably fair to say that according to most researchers in this survey, at the supranational level, the EU in particular, things are much more favourable for IDR/TDR. When asked to give examples of programmes that stimulate IDR/TDR, respondents reference H2020 generally, and specifically the ERC and Marie Curie programmes.

Finally, there are the researchers themselves. Asked about their experiences with cooperation with other disciplines, most researchers refer to the time needed to get to know each other, and to understand the intellectual and methodological approaches of different disciplines. What helps is if it becomes clear how different disciplines can complement each other:

Researchers from the medical community were very eager to engage because we had something to offer. I have also found the report by the Academy of Medical Science, The Health of the Public by 2040, very useful as it explicitly calls for medical humanities and interdisciplinary research to improve public health (SHAPE-ID Survey_12, AHSS/STEMM).

What does not help is that most young academics are still educated and trained in one particular discipline. According to the former president of the Royal Netherlands Academy of Arts and Sciences (KNAW), Robbert Dijkgraaf, in a recent radio interview, "we still train people in narrow topics and fields, while the future demands a much broader knowledge and perspective."[19]

According to the survey respondents, only a small minority of universities or faculties embrace a fully interdisciplinary profile. This goes for both education and research. And even when an institution shows

---

[19] Dr. Kelder and co., Dutch public radio show on NPO 1, Saturday 8 February 2020 [translated by Jack Spaapen].

considerable interest in IDR/TDR, there is the problem of "getting good quality and experienced IDR/TDR researchers (and research funding structures) to undertake academic reviews of IDR/TDR research proposals, [this] is much harder" (SHAPE-ID Survey_31, AHSS/STEMM). In particular as most PhDs are still trained in a disciplinary way, which might also affect their employability in a negative way.

As an example of this situation, a study of the Royal Netherlands Academy of Arts and Sciences into the PhD system concluded that almost 75% of Dutch PhD candidates end up working in industry or other sectors. That is why the PhD track should focus more on careers beyond academia, preferably in cooperation with potential employers.[20] The Royal Society (UK) presented, in 2010, a set of key actions to address this situation. The report considers that "Policy needs to be more closely attuned to the life cycle of scientists' careers, from school to retirement, and to the contribution of those who are trained in science but choose to work in other sectors" (2020, p.13).[21]

The publishing sector is also still mainly geared towards traditional disciplinary structures. As one respondent notes: "Interdisciplinary research is still difficult to get published in high-ranked journals, as journals tend to be mono-disciplinary in focus" (SHAPE-ID Survey_26, AHSS/STEMM).

It is then not surprising that institutional initiatives to promote IDR/TDR do not always meet with great enthusiasm in the academic community: "My university, for instance, has an annual Award for IDR/TDR projects but as far as I know not many candidates are applying for it" (SHAPE-ID Survey_17, AHSS/STEMM).

To conclude this topic, we refer to an indicative quote from one respondent:

> Nevertheless it often seems that anyone seeking to promote interdisciplinary research is up against formidable obstacles. An interdisciplinary agenda still challenges vested interests and practices of the traditional academic establishment, which includes not only universities and research institutes but also scientific associations and powerful publishers. Interdisciplinary progress is often perceived as occurring at the fringes of traditional disciplines. In terms of promotions and reputation, it runs the risks of not counting as much as contributions to the core of a given traditional discipline (SHAPE-ID Survey_26, AHSS/STEMM).

---

[20] Promoveren werkt! [Getting a PhD works!], 2016, KNAW, Amsterdam, English summary, p. 11

[21] The Scientific Century: securing our future prosperity, Royal Society Policy document 02/10 Issued: March 2010. Accessed: https://royalsociety.org/-/media/Royal_Society_Content/policy/publications/2010/4294970126.pdf.

A final remark, as a reflection on the following quote:

> there is a broad understanding that IDR/TDR is essential to address the issues at hand for urban transitions. However, in practice such approaches are difficult to establish and maintain as e.g. policy, administration and science is still organised in silos and sectors (SHAPE-ID Survey_26, AHSS/STEMM).

The old adage that societies have problems and universities have disciplines is perhaps not so true, as this respondent reminds us of the fact that the public sector is also often divided in silos (departments, ministries, etc.).

8.3 Survey section 4: Development phase of interdisciplinary and transdisciplinary projects

In this section of the survey, we were interested to learn how IDR/TDR projects emerge and how they are developed together with the various partners. We wanted to know whether IDR/TDR projects were started from the bottom up by researchers, or top down by some policy or funding scheme, whether it is an informal or formal collaboration, and if it was a new idea or building on existing ideas. Additionally, we sought to find out whether AHSS researchers started the project and others joined, or AHSS researchers joined a STEMM-led project, and whether partners discussed content (goals and how to achieve them) and (different) methods, or whether it was based on a joint and shared process of work.

8.3.1 How do projects start?

Not surprisingly, we found that there are many ways to start an IDR/TDR project. It can be the initiative of an individual researcher based on his or her own interest, or a coming together of many different parties because a government programme invited researchers and others to apply to address a particular societal challenge. The survey results show that most projects developed from already existing – more or less informal – collaborations. Such collaborations where partners already know each other have an obvious advantage:

> The actual funding application was written very quickly, but this was only possible as seven years of previous research had already been carried out. We learned which partners not to link with, which made the new project more efficient (SHAPE-ID Survey_10, AHSS/STEMM).

We found similar answers in many other cases. Respondents sometimes refer to informal collaborations, sometimes to previous applications that were or were not successful but served as a vehicle to get to know different partners with similar interests. A common way to start a project is a relatively small group of people developing an idea, with that group gradually joined by other partners, be they academics or non-academics. Whatever the initial phase of a project is, one thing they appear

to share is time, most often a considerable amount; several respondents mentioned time periods of 2 years or more to be able to consolidate a team.

> The project proposal had been developed from February 2015 to January 2017, when it was submitted for the first time. After rejection in May 2017 it was rewritten and resubmitted in January 2018. All the 5 HEI partners were involved in the preparation of the proposal from the beginning. All partners in other sectors had agreed to collaborate before the first submission of the proposal (SHAPE-ID Survey_9, AHSS).

Time is needed to understand the expertise of potential partners and the way different knowledge and interests can complement each other:

> We developed ideas with non-academic partners interested in what our research could do to help their policy and practice. Often the initial project development comes from a few collaborators (academic and non-academic) with whom we've worked before, and then expands and other partners are invited to join in if the project needs their expertise (academic and non-academic) (SHAPE-ID Survey_31, AHSS/STEMM).

A preliminary conclusion may be that in order to apply for major funding schemes asking for IDR/TDR, the fact that collaborations already exist is an advantage. We did not find any answer that implied a new consortium was formed to apply for funding, unless collaborations already existed. This may sound obvious, but it shows the importance for researchers, AHSS in particular, of being able to invest time in (informal) collaboration, in order to enhance the chance to be successful in funding for collaborative projects. It makes a difference whether an individual applies solely or as part of a group that jointly agreed on the aims and purpose of the research. Institutional support is always important, but seems to be even more important for individuals:

> I developed it with the support of my university and I reached out to the people and institutions I wanted to work with based on my own network and knowledge. The support I received from my university was extremely helpful and professional in that regard (SHAPE-ID Survey_2, AHSS/STEMM).

What is relevant is to have time to react to a call, which includes having prior knowledge of calls.

> Responding to an H2020 call, some months before the call appeared more than one year before the deadline for submitting the research proposal (it was a 2-stage call). I started with a core of 5 partners then adding the last 9. I knew all of them. The core expertise was on engineering, social sciences, and climate sciences (SHAPE-ID Survey_13, AHSS/STEMM).

This is where the importance of effective support within the university comes in. In our interviews with policy makers, we learned how important it is for university policy officers build up good connections with funding organisations, nationally, but especially in Brussels. They can attune university policy and research programmes and the calls that are prepared in the EU context.

We did not find a difference in how projects are started between interdisciplinary and transdisciplinary settings. This may be because work sometimes starts out as interdisciplinary but then becomes transdisciplinary, as answers to the first survey question showed. The next quote is also a good example:

> (…) interdisciplinary building first, based partly on the previous works between climatologist-hydrologists and social scientists. Local stakeholders have been associated during the project (SHAPE-ID Survey_24, AHSS/STEMM).

In either case, existing collaborations (with academic or with societal partners) seem a necessity for projects to materialise.

This is understandable since there are many demands even once a start-up team has been established to shape an inter- or transdisciplinary project. Multiple elements must be brought together: the organisational structure, intellectual and methodological differences, relevant stakeholders, academic and non-academic, perhaps an advisory body. This is even more demanding when the collaboration is international and different bureaucratic rules and regulations come into play.

Of course, things are much simpler when you keep it small:

> I sent an email to a centre (…) where I thought I could develop the type of (interdisciplinary) approach that I am interested in, which links land-use planning to housing. The proposal was NOT developed as an extension of existing collaboration, as I never had the opportunity to meet them before but I was inspired by the work of the director (SHAPE-ID Survey_15, AHSS).

However, that is not always a guarantee for success:

> I started inviting a Foundation related with a Bank to become part of the proposal. By this time, this foundation was active within the field of RRI (Responsible Research and Innovation) and it was the main field of my proposal. They accepted and suggest an international network of universities. I also talked with 3 individual researchers from different disciplines (I had worked with them previously in different projects), and with the CEO of the main European science museum network (I also had worked with them previously). Finally, some of them suggested the name of an Association of HEI Students and I also invited them to participate. They accepted, but when we had to sign the agreement with the EC, some months after the application, they refused to become part of the consortium because they had changed their director (SHAPE-ID Survey_17, AHSS/STEMM).

8.3.2   How did the project develop during the proposal phase?

Given that most respondents in this survey attested that their project grew out of existing collaboration, whether formal or informal, the writing of the proposal was often done by a small group of people. In other cases, researchers joined in partnership that already had a final research proposal. Still, there are different ways of doing this, some more integrated than others:

Collaboration during the proposal writing was limited to a number of informal discussions and giving feedback on an initial draft proposal. In other projects I have been part of a "collective transdisciplinary research proposal retreat". I would consider such an approach for a next transdisciplinary research (SHAPE-ID Survey_16, AHSS/STEMM).

Other projects were developed in a more formal and structured way:

In the first (…) cohort, we offered seed grants for the co-design of projects over a six-month period, before the call for full proposals. Co-production was a mandatory dimension of the projects (SHAPE-ID Survey_7, AHSS/STEMM).

In either case, at some point, the different elements have to be integrated one way or another. While some respondents are more relaxed about integration than others ("Efforts to integrate these [different parts] will develop as results emerge. We are still in the early stages of research" (SHAPE-ID Survey_28, AHSS/STEMM)), most respondents realised that it was important to think about integration from early on: "We had weekly teleconferences from the beginning of the project [that] helped the communication between the two groups of disciplines" (SHAPE-ID Survey_29, AHSS/STEMM). Another respondent said: "We had dozens of discussions explaining [to] each other the concepts and methods of our discipline. Then we defined the goal of our collaborative project" (SHAPE-ID Survey_30, AHSS/STEMM).

Most respondents believed that it is best to try to involve relevant partners, academic or not, from early on, not only from a scholarly point of view, but also from an organisational perspective, and to enhance support:

To clarify core shared terminology at the beginning of the project and agree on measures to assess appropriate level of interdisciplinary integration for successful deliverables.

To select an experienced project manager/coordinator who can pro-actively help networking and community-building in the early stages (sufficient funding for this critical phase needs to be guaranteed) (SHAPE-ID Survey_26, AHSS/STEMM).

And:

To build interdisciplinarity into the project from the start at all governance and implementation levels (methodological pluralism at the core; avoid "add-on" of disciplinary contributions); involve all categories of relevant stakeholders (including, if relevant, partners with policy/practice orientation) along the entire process – in governance, advisory bodies and research (SHAPE-ID Survey_26, AHSS/STEMM).

8.3.3 Topics discussed during the start-up phase

The main topics discussed during the start-up phase obviously depend on the one hand on the demands of the funder, mainly questions about quality, relevance, and expected impact; and on the other hand, on the kind of project being developed. A respondent in medical humanities talks about "content of intervention, methods applied and patient population" (SHAPE-ID Survey_1, AHSS/STEMM). In another (international) project partners discussed how they can best work together "across countries and institutions" (SHAPE-ID Survey_2, AHSS/STEMM), while in another project that involved a lot of societal stakeholders, modalities for co-production were discussed.

Methodological and quality issues are not mentioned much, perhaps because they seem self-evident, and probably because in many cases it concerns existing collaborations in which researchers trust each other's criteria and methods. When they are mentioned, the use of different methods, or the quality (excellence) of the various participants or the inclusion of Early Career Researchers are referenced.

Further, organisational matters and task distribution are discussed as not being so easy to solve:

> (…) the main question, still topical, is how to nuance this intermediate structure. Different possibilities have been studied, but it is still difficult to find an appropriate model of organization (SHAPE-ID Survey_24, AHSS/STEMM).

Discussion about the content and the orientation / focus of the project was hardly mentioned, but it is of course highly unlikely that it does not happen. Again, this can be because it is too obvious to mention, or that in many cases partners know each other already for quite some time, but it can also be due to the fact that partners largely stay in their own field of interest, and it is left up to the PI to integrate contributions later on.

However, some respondents do refer to content-oriented matters:

> In the rewriting phase, the team was joined by social scientists, and the problem of interdisciplinary cooperation between humanities and social sciences in the specific research was given major attention (SHAPE-ID Survey_9, AHSS).

8.3.4 AHSS or STEMM leading: does it matter?

The survey could not bring clarity on whether it makes a difference if a mixed project started from an AHSS perspective or from a STEMM perspective. There were just not enough answers addressing this question specifically. What does seem to matter is having a good idea of how AHSS and STEMM can complement each other:

> The development phase involved a number of meetings, but it was actually quite straightforward, as the AHSS people involved have a clear understanding of the benefits of STEMM collaboration and how to tailor those relationships (SHAPE-ID Survey_10, AHSS/STEMM).

And:

> We recruited a psychologist and an expert in addiction. We extended the group of PIs to cover gaps - human neuroscience, behavioural economics, policy and nutritional science (SHAPE-ID Survey_11, AHSS/STEMM).

And of course, again, the fact that collaboration existed before remains important:

> (…) interdisciplinary building, based partly on the previous works between climatologist-hydrologists and social scientists. Local stakeholders have been associated during the project (SHAPE-ID Survey_24, AHSS/STEMM).

Previous collaboration clearly makes it easier to bridge intellectual / scholarly differences, although sometimes, even after lengthy experience, it still seems difficult to bridge differences:

> Over years it became clear to me that engineers/engineering students don't understand design, they are afraid of design and they hate what they don't understand. The art students respectively have a tendency to live in their own bubble, not having so much interest in technology, engineering or growth business. But this is not the way, how we can keep very fragile economies (…) healthy and competitive, we need more understanding and respect over the silos that leads for better and more productive co-creation (SHAPE-ID Survey_6, AHSS/STEMM).

8.4   Survey section 5: Main obstacles and barriers to IDR/TDR

In this section of the survey our attention was on the obstacles and barriers that hinder IDR/TDR once the project has started. According to the SHAPE-ID literature review, two of the main challenges in IDR/TDR projects are the levels of collaboration/integration and communication between different participating disciplines and/or partners.

We asked researchers whether disciplines and/or fields in the projects collaborate in a loose or in a more integrated manner, trying to identify modes or styles of IDR/TDR. The responses can be divided into two kinds. Firstly, several researchers consider that they collaborate in a less rigidly organised manner due to the fact that "a looser structure of cooperation allows for more out of the box thinking and creativity stemming from transdisciplinary cooperation" (SHAPE-ID Survey_16, AHSS/STEMM). They consider that working with different practitioners requires a specific way of collaboration that allows the project to develop its own working dynamics. This looseness is not perceived as less

productive, on the contrary, while it is based on a dialogic mode, it is perceived as rigorous and seeks to better accomplish the aims of the project.

Secondly, other researchers explain that even if they commence their collaboration process in a loose way they seek more structured working processes for the duration of the project. The process of work varies and so does the way in which they collaborate among disciplines. Other researchers are working in a more progressively integrated mode of collaboration and on occasions realise almost complete integration. "(…) the aim is the integrate these and to look for points of intersection between the results" (SHAPE-ID Survey_28, AHSS/STEMM).

A number of researchers consider that they do collaborate in an integrated manner with no differences among disciplines. But some also recognise that STEMM disciplines sometimes might have a "romanticised" perception of what Arts and Design disciplines can do. One interesting model of integrative work is described in the following example:

> Each of the 15 individual research projects executed by the Early Stage Researchers is supervised by a team including representatives of the humanities and social sciences (SHAPE-ID Survey_9, AHSS).

We asked researchers if they could find differences between AHSS and STEMM collaboration. Most researchers did not detail the differences encountered in the process of integration. Rather, they consider that they do not find substantial differences in how to integrate AHSS disciplines and they find that they do it successfully. Others, but few, find strong differences among these disciplines and attribute different reasons for this. Two examples are listed below:

> Clinicians are more secure in their expert knowledge whereas [Arts & Humanities] and [Social Sciences] are able to hold a range of possible questions and answers in play at one and the same time. Interdisciplinary work has to manage this kind of issue (SHAPE-ID Survey_12, AHSS/STEMM).

And:

> (…) the STEMM [partners] have participated in the workshops and have led one some of the activity but their collaboration is more fragmented in the project (SHAPE-ID Survey_32, AHSS).

Researchers acknowledge a variety of procedures to achieve both collaboration and communication between AHSS and STEMM. We should say that these depend on the research questions and the goals of each project. Strategies to promote better collaboration and integration range from informal meetings, regular seminars, creation of further working groups, joint publications and more structured methodologies that are tailored to each project. Some examples of these interactions are provided below in the form of quotes from various respondents:

- Weekly meetings to discuss methods and results were mentioned as another strategy to get better integrated outputs. "(I)n these forums, goals, tasks and responsibilities are all discussed and agreed" (SHAPE-ID Survey_10, AHSS/STEMM).

- "(…) I have been involved in an interdisciplinary project, where we developed a formal interdisciplinary framework to structure cooperation, which allowed to develop an interdisciplinary case study framework for comparative research" (SHAPE-ID Survey_16, AHSS/STEMM).

- "Strong management, clear goals agreed from the outset, and an open learning mentality among the partners" (SHAPE-ID Survey_18, AHSS/STEMM).

- "(…) Disagreements are openly discussed and we have managed to work through them (…)".

- Working groups to reinforce the level of integration on specific topics due to the project's requirements (SHAPE-ID Survey_2, AHSS/STEMM).

- In the personal and disciplinary realm, a mutual understanding is crucial in all stages of the research. The following quote argues that "(…) there has to be mutual respect among all the researchers and an atmosphere where anyone can challenge the rest of the team about how things are understood, and what is planned and undertaken, without anyone taking offence or feeling proprietorial about their discipline" (SHAPE-ID Survey_31, AHSS/STEMM).

- Assessment of each individual projects every 6 months (SHAPE-ID Survey_9, AHSS).

These examples show a wide range of strategies that are developed by researchers to find pathways to better integration and to try to sort out disciplinary differences. Many respondents recognise personal characteristics and willingness to collaborate as primary drivers or obstacles to the process of integration.

In the SHAPE-ID literature review, we identified 25 factors that hinder or help AHSS integration in IDR/TDR (see Vienni Baptista et al., 2019). We selected 15 factors from this list that seem most relevant to ask researchers which obstacles might hinder collaboration. Using all 25, we feared, could lead to a situation where respondents might feel that they were drowning in choice. But we did add an "other" category at the end of the list to give respondents maximum freedom to choose. Figure 5 summarises the results. Researchers could select more than one answer.
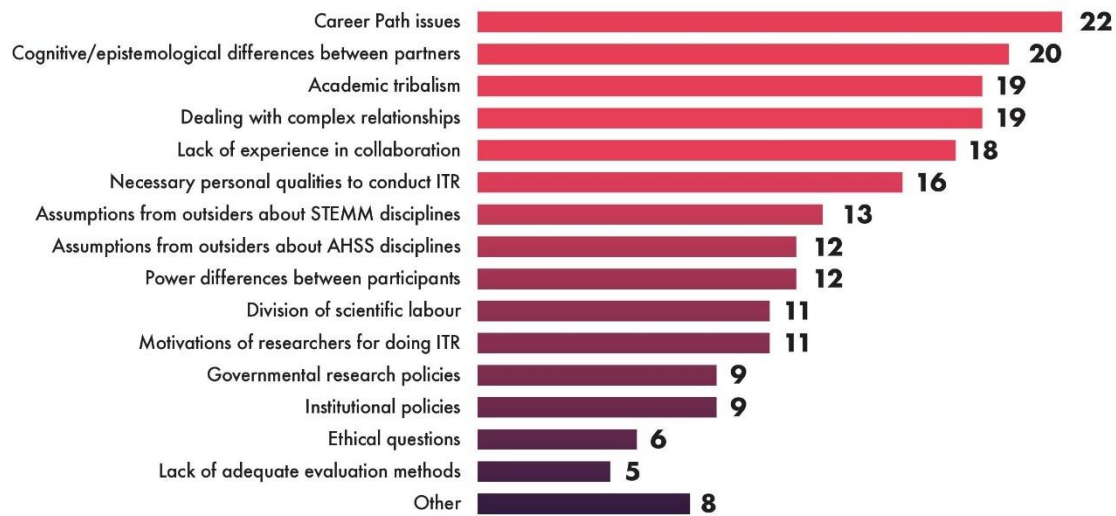
Figure 5 Obstacles that may hinder collaboration according to respondents

Clearly, career paths issues are one of the most commonly mentioned factors that can hinder IDR/TDR. We can further conclude that factors related to academic cultures and epistemologies are among the most common obstacles in the surveyed projects. The following quote summarises the perception of most respondents:

> Academic tribalism is most deeply rooted, since some scholars perceive their discipline to be superior and stick to what are clearly outdated modes of research because that is the long-standing tradition and that is what they are steeped in (SHAPE-ID Survey_21, AHSS).

Problems associated with the assumptions STEMM researchers have in relation to AHSS and their role in the research process, were also seen as relevant. These assumptions can range from more romanticised visions to instrumental perspectives on AHSS roles in IDR/TDR. Findings from the academic literature review corroborate that a substantive obstacle in IDR/TDR is to actually overcome the "ignorance" between disciplines that try to jointly collaborate. Participants in two of our learning case workshops also mentioned this. Differences in languages, communication skills and interpersonal relationships are also related to this barrier. In the words of one respondent:

> Cognitive/epistemological differences between partners, related to different interpretation of goals; effort is needed to get all partners in the same direction though same understanding of one another's work (SHAPE-ID Survey_20, AHSS/STEMM).

Time as a factor that hinders and helps IDR/TDR is a common topic among respondents and the academic literature has also studied it (Callard and Fitzgerald, 2015). In the case of IDR/TDR, the different time frames that apply in work with stakeholders add a further layer of complexity in the research process: "Different temporalities and value disagreements, different worldviews based not only disciplinary but also political and cultural backgrounds [are hindering factors]" (SHAPE-ID Survey_16, AHSS/STEMM).

This fact is not taken into consideration in most funding schemes but requires specific actions within the research process. "Temporalities of practitioners require fast reaction and flexibility which is not always easy to accommodate in research environments" (SHAPE-ID Survey_16, AHSS/STEMM).

In line with the preliminary results of the SHAPE-ID literature review (Vienni Baptista et al., 2019), survey respondents identified power relations and the inability to collaborate as factors that hinder the potential of IDR/TDR.

Lack of experience in collaboration is seen as a factor that hinders IDR/TDR. Traditional academic career models, which value disciplinary publications much more highly than, for instance, transdisciplinary cooperation, particularly at an early career stage, are also an obstacle. The academic literature is paying more attention to this phenomenon as well (see for instance Lyall, 2019). One respondent mentioned that "(…) the difficult and weak valuation of this long work, that expects though a large availability of the researcher" (SHAPE-ID Survey_24, AHSS/STEMM).

Measures for overcoming barriers/difficulties include strategies to arrive at a consensus within the group, methods found in the literature or innovative methods developed and implemented within a research team. All these aim at building common ground within the research team and fostering integration. Our findings confirm that consensus among partners seems the most frequent strategy, reached by discussion giving all participants, including stakeholders, an equal voice. Workshops are organised to achieve a common language/terminology, methodologies and ontology. Extensive consultation complements this strategy.

Regarding new methods and tools developed to overcome these difficulties, respondents shared the following recommendations:

- To develop an Output matrix to consolidate expectations (where members of the team could detail what do they expect from others, what can they contribute to others) (SHAPE-ID Survey_8, AHSS/STEMM).
- To hire an expert on transdisciplinary evaluation who accompanied the team from day 1 (SHAPE-ID Survey_8, AHSS/STEMM).

- To hire a creative facilitator (SHAPE-ID Survey_12, AHSS/STEMM)[22] .

- PD6 (product development in 6 hours) (SHAPE-ID Survey_6, AHSS/STEMM)[23].

- "I like, I wish" methodology for facilitated feedback (SHAPE-ID Survey_6, AHSS/STEMM)[24].

- To have 24/7 access to facilities (SHAPE-ID Survey_6, AHSS/STEMM).

- Weekly community breakfast (SHAPE-ID Survey_6, AHSS/STEMM).

- "When problems arise put them on the table and find a workable solution" is mentioned as the simplest solution (SHAPE-ID Survey_29, AHSS/STEMM).

8.4.1   Evaluation and monitoring of IDR/TDR projects

Evaluation and monitoring of IDR/TDR projects is often challenging because there is not yet an established regime for doing it, including methods, criteria and indicators. We asked how researchers decided to monitor and evaluate different project phases, especially given the fact that different disciplines have different ways of doing this. We also asked whether there was a dedicated person or partner or institute to carry out monitoring and evaluation.

The answers to questions about evaluation are not very specific overall. Unfortunately, we did not learn much about procedures and methods. Clearly, the way evaluation and monitoring are undertaken depend to a large extent on the size of the project and the demands of the funding organisation. A small project will likely have a much simpler form of evaluation ("We did not do this explicitly. We checked each other's work. I am not able to do the work of my coresearcher, but I can check if it makes sense." (SHAPE-ID Survey_36, AHSS/STEMM)) than a large one ("(…) our proposals all had to describe milestones, outputs, dissemination plans, and pathways to impact, so we had to discuss all of these things among our collaborators from the beginning. This has been a strength of our projects and ensured good impact, especially with policy-makers and practitioners, at the end" (SHAPE-ID Survey_31, AHSS/STEMM)). The second answer shows that it can pay to invest time and effort in evaluation.

What is perhaps most remarkable in the answers to these questions, is the fact that differences between disciplines in the way quality and relevance are assessed are hardly mentioned. Two researchers express their frustration about the lack of effort to conduct IDR/TDR evaluation:

---

[22] For more details on this tool please check: https://hearingthevoice.org/wpcontent/uploads/2015/02/WKPS_Creative_Fac_Final.pdf

[23] For an example of this role see: https://designfactory.aalto.fi/2016/02/pd6-product-development-in-6-hours/

[24] Details: https://dschool-old.stanford.edu/wp-content/themes/dschool/method-cards/i-like-i-wish-what-if.pdf

> Disciplinary boundaries are usually employed by the evaluation committees to exclude/include colleagues from the status of associate or full professor. This is particularly frustrating for scholars, like me, who works on topics – like digital media and political participation – that are necessarily IDR/TDR (SHAPE-ID Survey_3, AHSS).

And:

> At the level of the country, even if IDR/TDR is stressed in formal documents, the system has serious barriers. For instance, evaluation of research proposals applying for funds in a public call don't consider that different disciplines should have different criteria (even bibliometrics indicators are different from one discipline or other). In these cases, evaluators often are from a particular discipline and no expertise in [IDR/TDR] evaluation is demanded (SHAPE-ID Survey_17, AHSS/STEMM).

Most answers refer to following EU rules and procedures, or institutional demands of annual reporting about milestones and deliverables, without specifying what this precisely entailed. Only in one case, was the procedure described in more detail:

> We have 3 advisory boards, each of them representing different disciplines/fields/key issues/groups of stakeholders. They were very active giving ideas and feedback about our work and they also participated at the level of evaluation. In order to have this active implication we signed with them an agreement with clear tasks and conditions (including a fee according with the work we were demanding them) (SHAPE-ID Survey_17, AHSS/STEMM).

This description does not give any particularities about how evaluation was done and which indicators or criteria were used, but it does show that evaluation taken seriously can be quite demanding. As another researcher explains:

> This is one of the most difficult problems to address for developing IDR/TDR in academic sphere! In my past experiences, the monitoring of the projects were made through a double evaluation: inside the disciplines and in interdisciplinarity. For instance, some results were submitted in disciplinary journal, when other results, more interdisciplinary, were proposed to thematic and interdisciplinary journals. Because of the poor contribution of these last journal for the valuation in some disciplines, this double evaluation is necessary, although it is time consuming! (SHAPE-ID _Survey_24, AHSS/STEMM).

The lack of models for evaluating IDR/TDR may arguably strengthen the position of traditional academic evaluation procedures:

> Even if funding [is] available for developing inter or transdisciplinary research, it is still difficult to value these experience[s] in our current academic system: both for researchers' career or acknowledgment of the inter-transdisciplinary publications (SHAPE-ID _Survey_24, AHSS/STEMM).

This can also lead to a negative attitude to IDR/TDR:

> It is not widely promoted and there are very few concrete models at a local or national scale. At a local level (university department) there can be a purist attitude that research that treats interdisciplinarity as a threat to individual discipline integrity. (SHAPE-ID _Survey_28, AHSS/STEMM).

In a recent article in the *Times Higher Education* (Bothwell, 2020), a molecular biologist and deputy vice-chancellor (academic) at UNSW Sydney, Merlin Crossley, argued that finding solutions to grand challenges "definitely require[s] collaboration" across disciplines. But he also points to the danger of overplaying interdisciplinary research because it can lead to "waste", "distraction" and "mediocrity because no one's really capable of judging and criticising" such wide-ranging projects. To our mind, this is not true because there are ways of evaluating IDR and TDR, though they are quite different from traditional evaluation methods in the sense that evaluation is formative instead of summative, meaning that it is primarily process oriented instead of output oriented (Scriven, 1967). In particular, the more recent literature on the evaluation of the societal impact of research is indicative here. See for example the 2017 LERU position paper entitled "Productive interactions: Societal impact of academic research in the knowledge society" (Van den Akker & Spaapen, 2017, p.19-20), which discusses the consequences of growing inter- and transdisciplinarity in research universities.

In a few cases, a dedicated evaluation expert was hired, but in more cases evaluation and monitoring was left to the PI ("it is all down to the PI needing to mentor and monitor people" (SHAPE-ID Survey_10, AHSS/STEMM)), and/or the external advisory board. Again, no specification of how this was done could be extracted from the survey. The question is whether this is a good way of dealing with evaluating and monitoring since the PI often is already overburdened with other tasks, and the external advisory board might be at too great a distance (or too involved to keep the right distance!).

There were also quite a few blanks, arguably indicating that monitoring and evaluation were not prominent topics. Nevertheless, as outlined above, some researchers did say something about the difficulties assessing IDR/TDR.

A number of researchers mentioned that evaluation was done in terms of programme or project evaluation, which regards primarily process aspects like timelines and milestones. One researcher was more specific:

> a) use the traditional metrics as much as you can (yes, you sometimes can't);

> b) create your own metrics (utilisation rate of spaces, number of people/course/event/visitors, CNC machining hours/3D printing hours, patents, raised funding, number of spin-offs/start-up, number of coffees consumed from the coffee machine) (SHAPE-ID Survey_6, AHSS/STEMM).

The fact that there is a lack of accepted ways to evaluate IDR/TDR projects sometimes leads towards a different approach to evaluating altogether. Instead of following traditional models of evaluation based on some sort of ranking or other forms of judgment, mutual learning becomes the centre of attention. As one researcher described this:

> In terms of indicators, we were interested in signs of collaboration across academia and society, or [in] signs of anticipated societal impact (SHAPE-ID Survey_7, AHSS/STEMM).

But they add that there still is a need for "more established and accepted measures of the quality or impact of transdisciplinary research" (SHAPE-ID Survey_7, AHSS/STEMM). Having said that, there is apparently a lot more informal monitoring and evaluating going on in many projects, as becomes clear from the following quotes:

- Constant exchange and communication seem to be key (SHAPE-ID Survey_26, AHSS/STEMM).

- Setting aside dedicated time and space for collective reflexivity, to understand how to adapt and learn (SHAPE-ID Survey_16, AHSS/STEMM).

- We published as local teams where our disciplines directed us and discussed common [publications] as a group (SHAPE-ID Survey_18, AHSS/STEMM).

- We use collective knowledge and dialogue to come up with monitors and evaluation mechanisms (SHAPE-ID Survey_21, AHSS).

It is true that interdisciplinary research (and proposals) are difficult to evaluate. But this is to a large extent true when one tries to evaluate in ways comparable to criteria and indicators used in disciplinary evaluations. Perhaps the way forward is not to find agreement on methods used in those evaluations but to acknowledge that inter- and transdisciplinary research needs a different approach altogether, an approach that is focused on mutual understanding and learning instead of ranking and judgment.

8.5   Survey section 6: Respondents' comments

As a final question, we invited respondents to provide advice based on their experience in IDR/TDR. Specifically, we aimed to identify strategies for overcoming difficulties mentioned throughout the survey that could be useful for other researchers and practitioners. We organise these pieces of advice according to topics that have been identified in the systematic literature review.

In the preparatory and starting phases of a project, researchers consider it important to ensure that the individual goals are in line with one another and with the project goals. Several responses focused on the need to make all participants work on complex issues together rather than on little pieces of the problem. Individual accountability turns out to be as relevant as collective responsibility: "(…) make

them all accountable for what they do for identifying the right problem, framing the research question and developing options for resolution" (SHAPE-ID Survey_8, AHSS/STEMM). Providing sufficient time and space for discussions of the specific forms of IDR and their uses in the research, is a crucial point in many responses. The process of how to initiate an interdisciplinary collaboration is also relevant: "Don't decide you want to do an [IDR/TDR] project, and then decide to integrate other perspectives. Get out there and get to know the other perspectives first, then develop the research questions together! (SHAPE-ID Survey_26, AHSS/STEMM).

Related to the previous topic, communication issues were often mentioned and considered very important in the survey. Researchers suggested regular face-to-face meetings arranged for the group and for individuals to guarantee that communication channels are open, as well as teleconferences and preferably videoconferences.

Intra-group relationships are perceived as the main key to successful IDR/TDR. In the recommendation of one researcher: "(…) remain vigilant to signs of tension within the group to ensure that problems do not develop" (SHAPE-ID Survey_10, AHSS/STEMM). Other researchers advise that when building teams it is important to work with people whose work you admire and respect, and with whom you have had some contact or early meetings to ensure you can all collaborate well at a personal as well as an academic level.

These actions are related to the personal qualities inter- or transdisciplinary researchers need. One researcher advises others to "(…) ensure that the members from each side (AHSS & STEMM) listen to their colleagues talk about their work and engage with it to unsure that they understand why the collaboration is happening and why the two sides will benefit, and how they can work together" (SHAPE-ID Survey_10, AHSS/STEMM).

Another strategy is to "create a cooperative mechanism so that every project member is empowered in defining the rules / workflows of the project. This will make everyone accountable" (SHAPE-ID Survey_33, AHSS/STEMM). Absence of prejudices, openness and flexibility were also mentioned, in line with what the academic literature has examined (see for instance, Boix Mansilla et al., 2016; Lyall et al., 2011; Lyall, 2019).

As mentioned in the previous section, researchers consider the role of mediators and facilitators as valuable members in an inter- or transdisciplinary group. The fact that IDR/TDR settings increasingly require different kinds of expertise in the research process aligns with current discussions in different scientific communities (see for instance Bammer et al., 2020; Hoffmann et al., 2017).

Specific pieces of advice for AHSS-STEMM integration were also provided. Researchers advocate for open collaboration and active listening: "Do not only consider what collaboration between different disciplinary backgrounds could entail. Think about how aligned political worldviews are crucial in collaborations between STEMM and AHHS cooperation" (SHAPE-ID Survey_16, AHSS/STEMM).

Respondents consider that institutional barriers and constraints hinder AHSS integration.

> The bureaucratic administration of universities and departments continue to be quite rigid and outdated due to the suffocating nature of rules that result in unnecessary micromanagement, and over-specialization of academics continues to be encouraged and seen as a "safe refuge" for publication and promotion (SHAPE-ID Survey_21, AHSS).

According to a number of respondents, Early Career Researchers need to be protected from vulnerable IDR/TDR settings that imply short contracts and unstable working conditions.

Finally, project evaluation criteria are seen as a key challenge for IDR and TDR to fully developed. Two quotes show this: (i) "We need 10-30% AHSS representatives in clusters in Horizon Europe" (SHAPE-ID Survey_26, AHSS/STEMM); and (ii) "We need an evaluation practice which ensures that AHSS means AHSS involvement" (SHAPE-ID Survey_26, AHSS/STEMM). Some respondents align with the idea that the term "SSH integration" is inadequate, as the literature review has also shown (Vienni Baptista et al., 2019). Finding reviewers who have worked in a truly IDR/TDR way is challenging but necessary, according to other responses.

Preparatory and pilot projects are needed for overcoming disciplinary biases whereas funding schemes at the national level should openly ask for IDR/TDR projects on many different types of funding schemes.

To summarise, one respondent describes IDR/TDR challenges by suggesting that: "(1) The more you give, the more you get. (2) You can't teach anyone, who [doesn't] want to learn. (3) If you want change, you must change something. But be very careful, because change is always painful. Nothing is worse than change that is not understood. Be very careful NOT to change those things/processes that are the best (but must you must understand, what are they and why so?)" (SHAPE-ID Survey_6, AHSS/STEMM).

9 Interviews with policy stakeholders

(…) let's state that interdisciplinarity makes sense when there is a need for it, not when it is forced. It doesn't have to be a model for everyone. For instance, a mathematician who is working on the Boltzmann equation won't look for a Humanities scholar for his project (…) Therefore, we need to allow this kind of space. Sometimes project calls force people to create an artificial relationship. If the relationship is artificial, it doesn't work properly.

(SHAPE-ID Interview_5, 2020)

We begin this chapter with a quote from one of our interviews. It is indicative of the type of demands that IDR/TDR programmes are currently facing in different countries. Throughout the continent, we identify common problems that policy and funding schemes still cannot cope with successfully. This chapter aims at providing insights from actors involved in a decisive sector of IDR/TDR promotion: those who design, set the standards and provide resources to develop IDR/TDR.

The main aim of the interviews is to get feedback from policy makers/funders on their experiences with IDR/TDR to contextualise the results obtained from the survey. We selected policy makers and funders with involvement in IDR/TDR, specifically with AHSS and the integration of AHSS in larger collaborations with other fields, and invited them to a half hour interview. We especially sought experienced actors involved in: (i) setting up programmes to stimulate IDR/TDR; (ii) organising funding schemes; (iii) supporting IDR/TDR in AHSS; and (iv) collaboration of AHSS with other fields (STEMM) and/or with stakeholders.

We consider three phases in stimulating IDR/TDR, namely: (i) policy support during the development and start-up phase of research and innovation programmes; (ii) monitoring and other forms of interaction/support during the actual research phase; and (iii) project completion and evaluation of research and innovation programmes. We organise the interview outcomes accordingly. Questions related to the second phase were adapted when necessary according to the role and position of each interviewee in their organisation.

9.1 Phase 1: Development and start-up phase of projects

9.1.1 How do you select research proposals and/or researchers for IDR/TDR?

One interviewee acknowledged that the long-term university policy for promoting IDR/TDR has played a substantial role in supporting these approaches. In the case of the Netherlands, "[they] have created a separate fund of 15 million euro for a 6-year period. Themes are developed in collaboration with the staff of different SSH departments, and money is divided based on what they come up with. (…) This

was necessary because many researchers still tend to favour individual projects" (SHAPE-ID Interview_9).

In the Norwegian case, funding agencies have reorganised several programmes into 15 portfolios with larger themes. Each portfolio has a board of experts from different sectors including academic researchers from universities and research institutes, representatives of professional schools, and from the private and public sectors. These boards do not always have representatives from all of these sectors, but they aim at stimulating collaboration between disciplines and with other sectors depending on the topic. They also have to build links across the different portfolios and relate them to the government's agenda.

9.1.2 Problems and obstacles in setting up projects or programmes

Many of the policy makers we interviewed agreed on the fact that a closer relationship between researchers and the policy sector is needed to better foster IDR/TDR. This can be achieved by sharing activities such as seminars, workshops and conferences where common understanding and shared views should or could be elaborated. The following quote is indicative: "I think the main problem is that we need a cultural shift in the minds of most of the people working in research. To begin with the top" (SHAPE-ID Interview_5).

Stronger support to stimulate SSH integration into larger programmes or calls is urgently demanded. Interviewees recognise that the rhetoric is changing and is more favourable for SSH, but that does not mean that a change is really happening.

In the words of a policy maker:

> There is a long road ahead of us, and a lot has to happen to change the culture. Member states have to instruct their representatives better in terms of the importance of SSH, in terms of inter- and transdisciplinarity. Remember that some countries are doing much better than other countries when it comes to taking SSH integration seriously, the Netherlands and Norway are doing much better that countries from other parts of Europe that are often more science oriented. (SHAPE-ID Interview_3)

This quote shows the openness that many stakeholders, among policy makers and funders, have towards integrating AHSS in societal challenges. They acknowledge the relevance of convincing AHSS researchers to take the lead in IDR/TDR, even if the pathways to translate this openness into concrete and successful projects is still uncertain for these actors (be they researchers or policy makers/funders). An interviewee suggests a way to overcome this difficulty "My experience is that funders should try to come together and communicate among themselves. Inclusivity as [an important] keyword" (SHAPE-ID Interview_1).

Some of the main problems related to setting up IDR/TDR projects or programmes can be classified in terms of:

1) Finding the right connections with non-academic partners, in Europe, in industry, local government etc. One interviewee states: "That is the gist of my job, and this is costing a lot of time (…) but you really need to invest in it". (SHAPE-ID Interview_2)

2) Energy to put projects together. "This usually comes from STEMM researchers, they put the energy to get the funding and then at some point, then at the end they try to get AHSS researchers" (SHAPE-ID Interview_6). Efforts are being made to overcome this problem, according to our interviews, in the discussions that are being held for designing the programme for Horizon Europe. The same funder states that "AHSS must take the initiative at the very beginning of the projects. How can we make researchers to make more IDR/TDR? How to encourage them to take the lead? This has to be a task shared by researchers and policy makers together" (SHAPE-ID Interview_6).

3) Early scoping stage: To decide "what the problem is?" (SHAPE-ID Interview_1) and to decide with co-funders. "What is the broader challenge?" (SHAPE-ID Interview_1).

The biggest challenge for AHSS integration, according to a funder, is:

(…) to ask them if they are aware of the value proposition they bring with them. Most of the time, AHSS do not understand the problem. So what questions can they ask? What can you bring to the project? [Funders should] try to help this (…) I think that AHHS is not entrepreneurial enough, maybe this is not the right word but it summarises my thinking (SHAPE-ID Interview_1).

In summary, we find the following quote is indicative of the willingness many policy makers and funders have to bridge the gap in AHSS integration:

How can I, as a funder, see what they need? By learning from societies, associations, universities, etc., and by putting them all together. We need to map the ecosystem challenge and to give examples of how this integration looks like. These are strong actions to perform and can produce a systemic change (SHAPE-ID Interview_1).

9.1.3 Experience in stimulating/organising collaboration between AHSS and STEMM

As part of the set-up of a project, interviewees consider it necessary to invest time and resources in stimulating and encouraging AHSS and STEMM collaboration. Special initiatives range from "(…) SSH integration with bio-technical research, improving connection of biotechnical research with themes in society, one initiative where SSH is in the lead and invites STEMM fields" (SHAPE-ID Interview_2), to provide a few examples.

In this context, IDR/TDR promotion should be developed in a reasonable manner.

> This means that we should require interdisciplinary practice where it really is needed, not where we want to impose it because of political correctness, because it's what everyone does or because it's in good taste (SHAPE-ID Interview_6).

9.2 Phase 2: Monitoring research and innovation programmes

When asking funders about the strategies and methods to manage the connection between IDR/TDR and societal challenges, we aimed to gain insights that might shed light on a problem that is also widely cited in the academic literature. Different research communities are currently discussing ways to develop methods and tools for IDR/TDR and to systematise them in so-called "toolkits". In this part of the interview, we specifically asked if funders and policy makers use or promote any particular method or approach to bring different partners together to discuss collaboration on such topics. We consider that bridging these methods together with the ones elaborated by the research community may contribute to building shared strategies to tackle obstacles to IDR/TDR. They might also be a means to promote successful practices in IDR/TDR.

The following quote is indicative:

> By creating the time and space to speak to each other and to understand each other. We need to build a common language and a common ground, not only among funders but with the different communities and academic communities. We have consolidated a group (for that purpose). We sit at a table all together with confidence and we hear what the community has to say and what they think. One interesting question was "What could you bring to this?", and this was a great question and thing to do!" (SHAPE-ID Interview_1).

According to several interviewees, in the new Horizon Europe programme there is potentially more opportunity for SSH involvement, through cross-cutting issues. Strategic planning for the new Framework Programme is ongoing, including a consultation process to design the requirements of the calls in terms of the mission areas.

In the case of the Netherlands, there are several models that were developed to achieve a stronger connection between IDR/TDR research and societal challenges. These models make sure that AHSS is integrated in larger challenges to avoid the situation that AHSS researchers are called upon towards the end of the project to help implement research into society. In this case, AHSS researchers are also stimulated to take the initiative on societal themes such as democratic innovation, inequality, social resilience, migration, etc. An advisory board with prominent stakeholders from industry and the public sphere has proved to be a useful mechanism to promote TDR.

More specifically for AHSS, strategies to involve researchers in the early stage of project preparation are crucial. In the words of a funder:

> How this can be improved if we have AHSS disciplines on board? I try to highlight the positive aspects of AHSS integration into calls and programmes, rather than looking at what is missing. I try to find a pathway across language differences and barriers. We need to also build a partnership within the group, to find the connections and foster conversations with all the actors. These conversations might not be ready for the deadline, once the call is closed, but it will for sure be more mature for the next time. This is what we foster from my office. We foster a common language and understanding from the communities (SHAPE-ID Interview_8).

In the Netherlands, for example, for certain topics funders invite SSH researchers to come up with questions to develop the programme. "You have to make a special effort for SSH" (SHAPE-ID Interview_3). Another good example is provided in the following quote:

> We also sometimes divide the budget for IDR/TDR themes in a way that no one field can go run with the money. And it is very important to have mixed evaluation committees, not only with different disciplines, but also with stakeholders. Clearly, the success of a project, its impact, is always dependent on the uptake of stakeholders (SHAPE-ID Interview)[25].

To conclude, from the perspective of a researcher, the above-mentioned tools can also create problems. "It is very easy to suffocate a project just because someone forces its creators to collaborate with other disciplines. What will they do? They'll invite someone redundant. From their perspective it will be a superfluous work package and a superfluous part of the project" (SHAPE-ID Interview_4).

9.3   Phase 3: Project completion and evaluation

Interviewees agree that in any research and innovation programme proposals that lie between scientific or policy fields are more challenging to assess than mono-disciplinary proposals. Evaluation is not easy because there are no clear indicators and criteria for IDR/TDR. Nevertheless, we have extracted some positive lessons from our interviews, namely:

> In our calls, for example, we try to anticipate IDR/TDR by formulating the research question broadly, in a way that is paying attention to AHSS and STEM aspects, also by engaging stakeholders from early on, by using /explaining concepts like theories of change, impact pathways, etc. (SHAPE-ID Interview_1).

In the case of the European schemes, one interviewee considers that:

> Horizon 2020 is very ambitious on this point and in addition to 3 main criteria (in Pillars 2 and 3) you have 14 cross cutting issues that are relevant. Even without flagging issues such as gender, SSH and RRI/ethics

---

[25] We avoid identifying this interview with a number to guarantee the interviewees' anonymity.

can play a role. When a topic is flagged as relevant for SSH evaluators are asked to look at interdisciplinary aspects of the proposal as part of the excellence criteria. We know however that this works only in theory and this is not done systematically (SHAPE-ID Interview_9).

This refers to the European level where an evaluation panel is asked to consider a whole range of issues at the same time. To improve this:

> (…) strengthened awareness is needed, constant discussions about priorities, develop further guidance documents, improve the Commission website and the participant portal, discuss the issue with agencies, etc. An important issue is also that SSH is one of many aspects to be assessed, and possibly not intended, it finds itself in a situation of competing for attention. There may be ways of discussing how horizontal issues can benefit by finding synergies that have not been easy to identify until now (SHAPE-ID Interview_9).

A relevant comment from the same interviewee on how topics are flagged for SSH can be indicative of further constraints to fostering these disciplines' integration into IDR/TDR:

> There has been an increase in flagged topics since 2014. In WP 2018-20 the average is about 43% in Pillars 2 and 3 of Horizon 2020. In many of the Societal Challenges the number is as high as 50%. This has to do with increased awareness and a push to include more SSH aspects in the topics across Work Programme parts. It is not sure however if this is a positive development. In my opinion for increased impact and to strengthen the ties between SSH and STEM European R&I would benefit if the share of flagged topics goes down. This has mainly two explanations; the first being that SSH expertise is not needed everywhere and secondly with so many flagged topics (with differing relevance for SSH) in many cases we see that SSH becomes only an add-on (SHAPE-ID Interview_9).

Based on their own experiences, interviewees described relevant issues that Horizon Europe should focus on:

- Topic design: "(…) the earlier you can influence the topic texts the better" (SHAPE-ID Interview_8).

- Flagging: "(…) aim for approx. 25-40% in Societal challenges (…) In some areas SSH aspects are much more evident than in other fields" (SHAPE-ID Interview_9).

- "Ensure that a flag means actual involvement of SSH expertise and not only SSH relevance" (SHAPE-ID Interview_9).

- "For Missions and Clusters, a flag should mean a requirement (i.e. no SSH = not funded)" (SHAPE-ID Interview_8).

- "In Missions insist on interdisciplinarity and broad participation (boards, projects, users)" (SHAPE-ID Interview_8).

- "Involve SSH aspects more in innovation topics. The role of academia and civil society in future innovation programmes is important to broaden the interpretation of innovation in a more societal/human direction (…)" (SHAPE-ID Interview_9).

Many funders recognise that they collaboratively design the calls with different communities.

> Our communities are prepared and trained to work together. We also invite Project Managers to our table to work together and to explain them how the call works. We look at the collaborations, you have to understand the relationships between actors (SHAPE-ID Interview_1).

To further this collaboration, internal change at universities is also a must and it appears from the interviews that increasingly funding agencies work towards this aim.

9.4 Progress on interdisciplinarity in Horizon 2020 and beyond

The most important factor remains the question of how to improve the quality of SSH integration in Horizon 2020 and lay the foundation for a real improvement in Horizon Europe. The importance of the SSH integration monitoring reports produced by DG-RI was recognised by our interviewees, also as a tool to create awareness and do better.

> However, what would really make a difference at the European level and strengthen the impact of the framework programme is really the issue of facilitating cooperation between SSH and STEM and make this a natural and seamless part of research programmes – and at the same time influence how this is being done in the 90% or so of European funding that is controlled by the member states and associated countries. If done properly SSH Integration would – alongside SC6/Cluster2/ERC etc. – exploit the very best expertise that Europe has to offer to ensure that social, human, economic, cultural, political are fully taken into account in the encounters created by science and thematic policies (SHAPE-ID Interview_3).

9.4.1 What would you as policy maker/funder need/expect from academics to better integrate AHSS and address societal challenges?

As already found in our systematic literature review, funders and policy makers request more research on how IDR/TDR are done and the requirements for their success. Many suggested that calls should be shared by researchers and policy makers alike. "We (policy makers) need to meet more in symposia, workshops and learn more from the areas these researchers are interested in" (SHAPE-ID Interview_3).

In the words of an interviewee:

> Funders set expectations. We say "this is how it looks like" but this is not all. We need to touch back with the communities to see and understand how they work with the challenges. What can I do as a funder? I can do many more things than just giving money. For example, we network, we are brokers, we set standards. We can do all this together with researchers and communities as well. We cannot solve all these problems alone (SHAPE-ID Interview_8).

9.5 Implications for AHSS integration in IDR/TDR

To conclude, we summarise the implications that the current policy and funding situations have for AHSS integration according to the interviews. All interviewees agree that it is not easy to develop inter- and transdisciplinary initiatives for AHSS research, and certainly not when they have to collaborate with STEMM fields. There are several reasons for this. Firstly, policy makers and funders that really believe in AHSS and want to stimulate AHSS research participation in larger programmes are needed. Secondly, for most societal challenges, both the policy and the science worlds still tend to look first at STEMM fields and then perhaps later include AHSS researchers for specific issues, ethical, or legal, or socio-economic. This is a recurrent opinion coming from researchers, policy makers and funders alike.

In the words of one interviewee:

> So, not to include them from the start, and let them co-decide over the research question. Also, AHSS researchers are themselves not always eager to step outside their comfort zone, perhaps they have less experience. Freedom of research is often used as an argument not to participate. But I don't think there is a contradiction with impact questions. (…) It is important to find a balance between doing fundamental research and the connection with societal challenges (…)". (SHAPE-ID Interview_1).

Some policy makers suggest that the label "AHSS" (or "SSH") has to be disentangled due to the fact that it groups very different disciplines, confirming the findings of our systematic literature review. In our previous report (see Vienni Baptista et al., 2019), we have confirmed that the label does not represent the spectrum of experiences nor the real integration processes that are being developed.

> In general, I think that we have made some progress in the previous years. (…) But integration is primarily in Social Sciences and not so much in Humanities. And then mainly in a few disciplines like economics, business studies, political science, policy studies. So, there is still a long way to go (SHAPE-ID Interview_3).

Together with allocating specific budget for AHSS projects, a set of practical measures can be implemented to foster more integrative research. For example, allocating part of the budget for a project manager who has experience with IDR/TDR, to organise match-making events, meetings with all disciplines, and with (potential) stakeholders, and stimulating young researchers to go out to stakeholders to broaden their experience and perspective.

At EU level it is very difficult to strengthen the position of AHSS, according to some of our interviews. Most themes and programmes favour STEMM spheres ("or at least that is how it looks"). The following quote is indicative:

> We are trying to change that agenda, but that is not easy, because even if you have ideas for big issues like migration, crisis in democracy, social security, there is a tendency to include that in the STEMM

agenda. But it is also partly because many SSH researchers have difficulties to think outside their disciplinary framework or think in terms of what their contribution could be to the societal challenges (SHAPE-ID Interview_8).

As our findings showed, different levels can be identified in approaching the problem of AHSS integration in IDR/TDR. Policy and funding agencies recognise their responsibility in how IDR/TDR is rewarded and promoted. Their perspectives may change if we observe the national or European level, each of them having different, and sometimes complementary, tools and strategies to cope with IDR/TDR support and funding. Openness in their perception of this problem might constitute a fruitful space for connecting different actors and bridging the gap in AHSS integration.

For their part, universities and other institutions impose rules that may differ from region to region. European funding schemes are powerful sources to develop top-down approaches to IDR/TDR but can result in unclear definitions that add uncertainty to the research process. Horizon Europe is seen as promising innovation and the creation of better interfaces between STEMM and AHSS. To really achieve these goals, our interviews also confirm that researchers need to open themselves up to inter- and transdisciplinary connections, when possible.

10 Preliminary synthesis of survey and interviews

Two things jump out of the survey responses and interviews concerning the necessary conditions to be successful in conducting and integrating IDR and TDR: time and the ability to step out of the comfort zone of one's context, whether this is a discipline, public or private sector, or whatever area of expertise. More than disciplinary projects, researchers embarking on or engaging in IDR/TDR need space to get to know each other's idiosyncrasies. As one respondent put it: "Get out there and get to know the other perspectives first, then develop the research questions together!" (SHAPE-ID Survey_26, AHSS/STEMM).

Communication skills were mentioned as extremely important by respondents, and this was corroborated by one of our interviewees, who said: "in the end it all comes down to communication" (SHAPE-ID Survey_26, AHSS/STEMM). Researchers suggest all kind of mechanisms, from regular face-to-face meetings to audio and video conferences, anything to keep communication channels open at all times. Specifically, for AHSS-STEMM integration, researchers advocate open collaboration and active listening:

> Do not only consider what collaboration between different disciplinary backgrounds could entail. Think about how aligned political worldviews are crucial in a collaborations between STEMM and AHHS cooperation (SHAPE-ID Survey_16, AHSS/STEMM).

More importantly, respondents point to institutional barriers and constraints that hinder AHSS integration:

> The bureaucratic administration of universities and departments continue to be quite rigid and outdated due to the suffocating nature of rules that result in unnecessary micromanagement, and over-specialization of academics continues to be encouraged and seen as a "safe refuge" for publication and promotion (SHAPE-ID Survey_21, AHSS).

Early career researchers need to be protected from vulnerable IDR/TDR settings that imply short contracts and unstable working conditions. While there is some truth in these strong statements, IDR and TDR are getting more attention in the context of institutional research policies, and even more at the European level.

To find out what hinders IDR and TDR collaboration most, we presented the respondents with a table of possible issues. The most commonly identified issue respondents identified was career path issues, alluding to the fact that doing IDR or TDR is still experienced as a risk to one's career. This indicator was closely followed by cognitive differences between partners, academic tribalism, and dealing with complex relationships, which roughly point to the same problem of navigating disciplinary differences. Interestingly, institutional and governmental policies were not seen as a major problem, perhaps reflecting the fact that these respondents have received funding to do IDR or TDR research.

Researchers participating in the survey seem overall to agree on the value and importance of conducting IDR and TDR to address major challenges in society today. Perhaps this is not surprising since respondents were all successful in receiving funding for IDR/TDR research, but it is our understanding that many respondents were driven by the urge to conduct research that had a broader impact than only scientific, A most striking quote in this respect was the question one respondent posed, "How we can keep very fragile economies (…) healthy and competitive?" (SHAPE-ID Survey_6, AHSS/STEMM). This respondent also gave the answer: "(…) we need more understanding and respect over the silos that leads for better and more productive co-creation" (SHAPE-ID Survey_6, AHSS/STEMM).

One of the main concerns of the policy makers we interviewed was that in projects where both AHSS and STEMM researchers participated the level of understanding of each other's disciplines was generally rather low and was only overcome with huge investment in time to gain an understanding of each other's production and communication processes. The relevance of studying how IDR and TDR are done and perceived by researchers in Europe is clear, but while much knowledge is "out there" – as becomes apparent in our literature review – the knowledge does not seem to be widespread. This might be due to the fact that it is not easy to access literature because of the wideness of topics, contexts,

sectors, etc. More knowledge about how to effectively monitor and evaluate progress in projects is an example of a relevant topic since the survey results show that people are struggling with the lack of approaches to this topic.

Many respondents notice the efforts of universities to improve supports for IDR and TDR and that new institutional and government policies are emerging to stimulate that kind of research. This is also acknowledged in the interviews with policy makers. However, despite such efforts this development is still slowed down by traditional disciplinary interests and funding structures. The following quote is indicative:

> Attention on the benefits of ITR is growing across different policy levels. At the hospital and university this has been important for a while, while the attention at a funding and national level has increased in the last years, but it still seems easier to work in silos of different disciplines if you want funding (SHAPE-ID Survey_1, AHSS/STEMM).

Some researchers argue that it is hard to change the current allocation and reward system because IDR is seen as jeopardising the career of both young researchers and specialist professors. And SHAPE-ID's Catherine Lyall, who just published a new book on interdisciplinarity (Lyall, 2019), is quoted in the above mentioned THE article (Bothwell, 2020) with doubts about the genuine level of interdisciplinarity saying that while universities are often "very keen to boast about their new shiny interdisciplinary research centres" they do not always embed such research in their careers structures (Lyall 2019). But some respondents are more positive about this: "Departmental divisions exist at my university, but they do not stifle effective collaboration" (SHAPE-ID Survey_1, AHSS/STEMM).

According to most respondents, at the supranational level, the EU in particular, things are more favourable for IDR/TDR, as most researchers acknowledge, referring to EU programmes such as H2020, including the ERC and Marie Curie programmes, when asked to give examples of programmes that stimulate IDR/TDR. The interviews with policy makers also show a disconnect between different funding levels. Whereas the EU has been working on missions and societal challenges through several subsequent Framework programmes and SSH integration has been monitored since 2014, national schemes have incorporated these approaches to varying degrees. Further collaboration between these silos is necessary to avoid continued unsuccessful funding practices for IDR/TDR.

While many respondents argue that there is an advantage in having an already existing collaboration, preferably for some years, this line of reasoning was somewhat contradicted by a policy maker who said that sometimes it is better to have a fresh start because then interests are not yet so vested and everybody is more inclined to listen to other perspectives. Perhaps the truth is somewhere in the

middle. Having existing relationships with partners does not have to mean a closed shop, and an existing structure makes it easier for new elements and partners to become part of the network:

> Interesting results come from mixing people that know each other already and new people who can make novel inputs. The challenge to build a functioning network is a short-term necessity. Easy communication between partners is absolutely required. (SHAPE-ID Survey_38, AHSS)

Respondents acknowledge that there are differences in perspective and methods between AHSS and STEMM, and some AHSS respondents mention the fact that STEMM researchers see the contribution of AHSS research in rather instrumental terms (address ethical issues, or make research results digestible for the public), but they also mention that this can be overcome by strong management, clear goals agreed from the outset, and an open learning mentality among the partners. One could also see this as growing self-confidence among AHSS researchers.

Most respondents do not find integrating AHSS and STEMM research more difficult than integration within AHSS disciplines. They find it more important that there is clarity about the goals and about the complementarity of partners.

Respondents do not seem to see evaluation issues as something they worry about. This could be partly due to the fact that for most projects in our survey, evaluation was not yet a priority given that they were still ongoing. Another reason could be that there is a lack of knowledge about methods on how to assess the varied outputs of IDR/TDR:

> In our project there is not one single form of outcome, but many: dissemination by briefings and small scale/open public events with a variety of audiences, publications, web-documentaries, website. So there was not one streamlined evaluation, but rather an evaluation of individual events (SHAPE-ID Survey_38, AHSS).

Such variety is indeed hard to handle in an evaluation. Other respondents maintain that evaluation is carried out according to EU regulations, and some find an original but perhaps not reliable way out of the lack of methods to assess progress in IDR and TDR in a proper way: "We check each other's work, I cannot do my co-researchers work, but I can check if it makes sense" (SHAPE-ID Survey_36, AHSS).

Perhaps it is not yet widespread, but there are more comprehensive evaluation methods available that are based on mutual learning among participants instead of ranking output in terms of traditional bibliometrics or other quantitative methods. Moreover, there are methods to cover other relevant forms of output that are important for IDR and TDR projects, for example connecting with wider audiences, mixed media output, enhancing understanding of societal problems or policy questions. Evaluation, in short, should be oriented to the wider process of doing IDR or TDR instead of oriented

towards specific products. Further insights on this are presented in, for example, Van den Akker and Spaapen (2017), where productive interactions between academia and society are part of the evaluation process; Guba and Lincoln (1989) and Huebner and Betts (1999), who elaborate an alternative approach to programme evaluation which is based on negotiating with stakeholders, the so-called 4th generation evaluation; and in the recently published special section on AHSS evaluation in *Research Evaluation* (Spaapen & Sivertsen, 2020).

References

Bammer, G., O'Rourke, M., O'Connell, D. et al. (2020). Expertise in research integration and implementation for tackling complex problems: when is it needed, where can it be found and how can it be strengthened? *Palgrave Communications,* 6(5). DOI: https://doi.org/10.1057/s41599-019-0380-0

Berger, G., & Duguet, P. (1982). *The University and the community: the problems of changing relationships*. Paris: Organisation for Economic Co-operation and Development.

Boix Mansilla, V., Lamont, M. & K. Sato (2016). Shared Cognitive–Emotional–Interactional Platforms: Markers and Conditions for Successful Interdisciplinary Collaborations. *Science, Technology and Human Values*, 41(4): 571-612. DOI: https://doi.org/10.1177/0162243915614103

Bothwell, E. (2020). Is interdisciplinary research really the best way to tackle global challenges? *Times Higher Education.* Retrieved from: https://www.timeshighereducation.com/features/interdisciplinary-research-really-best-way-tackle-global-challenges. Accessed 13 February 2020.

Callard, F. & Fitzgerald, D. (2015). *Rethinking Interdisciplinarity across the Social Sciences and Neurosciences.* Palgrave McMillan.

Cascadia Innovation Corridor (2019). Cross-border research tackles Northwest's growing wildfire impacts. *Seattle Times*. Originally published September 30, 2019 at 3:16 pm. Updated October 3, 2019 at 1:56 pm. Retrieved from https://www.seattletimes.com/sponsored/cross-border-research-tackles-northwests-growing-wildfire-impacts/ . Accessed 3 October 2019.

Castán Broto, V., Gislason, M., & Ehlers, M.H. (2009). Practising interdisciplinarity in the interplay between disciplines: experiences of established researchers. *Environmental Science & Policy*, 12(7): 922-933. DOI: https://doi.org/10.1016/j.envsci.2009.04.005

Guba, Egon G. & Lincoln, Y.S. (1989). *Fourth Generation Evaluation*. Sage.

Hoffmann, S., Pohl, C., & Hering, J. G. (2017). Methods and procedures of transdisciplinary knowledge integration – empirical insights from four thematic synthesis processes. *Ecology and Society*, 22(1).

Huebner, A. J. & Betts, S.C. (1999). Examining Fourth Generation Evaluation: Application to Positive Youth Development. *Evaluation,* 5(3): 340-358.

Kania, K., Lemaire, C. & Swinnen, L. (2019). *Integration of social sciences and humanities in Horizon 2020. Participants, budget and disciplines: 4th monitoring report on SSH flagged projects*

funded in 2017 under the societal challenges and industrial leadership priorities. Directorate-General for Research and Innovation – European Commission.

LERU (2014). *SSH and interdisciplinary research, a showcase of excellent research projects from LERU universities*. Policy brief November.

Lyall, C. (2011). *Interdisciplinary research journeys: practical strategies for capturing creativity*. London: Bloomsbury Academic.

Lyall, C. (2019). B*eing an Interdisciplinary Academic: How Institutions Shape University Careers*. Palgrave.

Schuch, K., ed. (2019). *Proceedings of the Conference: "Impact of Social Sciences and Humanities for a European Research Agenda – Valuation of SSH in mission-oriented research" VIENNA 2018.* fteval Journal for Research and Technology Policy Evaluation (48). fteval – Österreichische Plattform für Technologiepolitikevaluierung, Wien.

Royal Society (2010). *The Scientific Century: securing our future prosperity* Issued: March 2010. Retrieved from: https://royalsociety.org/media/Royal_Society_Content/policy/publications/2010/4294970126.pdf accessed online 13 February 2020.

Scriven, M.S., (1967). The methodology of evaluation. In *Perspectives on curriculum evaluation.* Ralph W. Tyler (Ed.): 39-83. Chicago: Rand McNally.

Spaapen, J. and van Drooge, L. (2011). Introducing 'productive interactions' in social impact assessment. *Research Evaluation* 20(3): 211-218. https://doi.org/10.3152/095820211X12941371876742

Spaapen, J. and Sivertsen, G. (2020). Special Section: Societal Impact in the Social Sciences and Humanities. *Research Evaluation,* 29(1). https://doi.org/10.1093/reseval/rvz035

Wernli, D. and Darbellay, F. (2016). *Interdisciplinarity and the 21st century research-intensive university.* League of European Research Universities (LERU) position paper.

Van den Akker, W. and Spaapen, J. (2017). *Productive interactions: Societal impact of academic research in the knowledge society*. League of European Research Universities (LERU) position paper.

Vienni Baptista, B., Maryl, M., Wciślik, P., Fletcher, I., Buchner, A., Wallace, D. and Pohl, C. (2019). *Deliverable 2.1: Preliminary Report of Literature Review on Understandings of Interdisciplinary and Transdisciplinary Research*. SHAPE-ID project. Retrieved from: https://www.shapeid.eu/wp-content/uploads/2019/12/SHAPE-ID-822705-D2.1-Preliminary-Report-on-Literature-Review.pdf accessed online 13 February 2020.

Appendices

Appendix 1 Survey questionnaire

Researchers' practical experiences of working in inter- and trans-disciplinary projects

Your participation in this survey is voluntary and you may refuse to answer any question or withdraw at any time. All data collected through this survey will be treated in compliance with responsible research and innovation (RRI) guidelines and the General Data Protection Regulations (GDPR). Survey data will be stored securely.

By clicking "Next" below and starting the survey you acknowledge the following:

✔ I am 18 years or older and am competent to provide consent.

✔ I have read a document providing information about this research which was e-mailed to me and this consent form. I have had the opportunity to ask questions and all my questions have been answered to my satisfaction and understand the description of the research that is being provided to me.

✔ I agree that my data is used for scientific purposes and I have no objection that my data is published in scientific publications.

✔ I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights.

✔ I understand that I may refuse to answer any question and that I may withdraw at any time without penalty.

✔ I understand that I can print this page now in order to store a copy of this agreement.

About the survey

Inter- and trans-disciplinary research (ITR) poses specific challenges different from collaboration within a discipline. This is due to differences in research practices in various disciplines, and because academic systems are often not geared towards supporting ITR (including research policy, funding, and evaluation). The goal of this survey is to learn from your practical experiences about research and policy practices that stimulate or frustrate ITR. Our primary focus is on arts, humanities and social sciences (AHSS), but we are also interested in the collaboration between these fields and so-called STEMM fields (natural sciences, engineering, mathematics and medical fields). While several definitions of inter- and transdisciplinarity exist, for simplicity's sake we use interdisciplinarity for collaboration between academics from different disciplines, and transdisciplinarity for collaboration between academics and partners in other sectors of society.

More information about the project: https://shapeid.eu/

SHAPE-ID
Shaping interdisciplinary practices in Europe

SECTION 1: Characteristics of your project

Note that we use 'project' as a generic category referring to collective research endeavours

Please provide 3-4 sentences in response to each question.

1.1 If interested outsiders would ask you to describe your project in a few words, and tell them why it is important, what would you say?

[space for answer]

1.2 Does your project entail mainly researchers from arts, humanities and/or social sciences (AHSS), or do you collaborate with science, technology, engineering, mathematics and/or medicine (STEMM) fields?

[space for answer]

1.3 If you are in AHSS and collaborating with STEMM fields, would you characterise the collaboration as a balanced partnership: yes/no? If no, why?

[space for answer]

1.4 If you are in STEMM fields and collaborating with AHSS, would you characterise the collaboration as a balanced partnership: yes/no? If no, why?

[space for answer]

SECTION 2: Summary of the project

2.1 Name of your project

You can provide just an acronym

[space for answer]

2.2 Name(s) of the PI or PIs

[space for answer]

2.3 Start date of your project

[space for answer]

2.4 End date of your project (if applicable)

[space for answer]

2.5 Main funding organisation of your project

[space for answer]

2.6 Main objective(s) of your project

[space for answer]

2.7 Given our definition hereunder, characterisation of your project as either inter- or trans-disciplinary

Basic definition: We use interdisciplinarity for collaboration between academics from different disciplines, and transdisciplinarity for collaboration between academics and partners in other sectors of society

[space for answer]

2.8 Leading participating academic discipline(s) and/or field(s) in your project

[space for answer]

2.9 Leading participating academic institution(s) in your project

[space for answer]

2.10 Names of main participating external stakeholders in your project

E.g. private and not for profit industry, non-governmental organisations, consumer organisations, patient groups, etc.

[space for answer]

2.11 Names of main governmental organisations involved and/or targeted

[space for answer]

2.12 E-mail address

We will contact you only as a follow-up to this study in case we need some clarifications.

[space for answer]

SECTION 3: Policy context for Inter- and Trans-disciplinary Research (ITR)

Doing ITR is interesting and challenging, both in terms of collaborating with different disciplines having different ways of working and communicating, and in terms of a policy context that often is not specifically geared towards ITR. In this section we are interested to know how you experience the policy context that you work in.

3.1 Can you describe in a few sentences whether the policy context you are working in is favourable for ITR or not? Please consider different policy levels such as your own institution, the level of your country and the supranational level. Do you find at these different levels enough concrete attention and support for ITR?

[space for answer]

3.2 Can you provide examples of funding programmes or other initiatives that promote or frustrate ITR?

[space for answer]

SECTION 4: Development phase of your project

In this section, we are interested to learn how your project emerged and how it was developed together with your partners.

4.1 Please, indicate when you developed your proposal, how you started, and with which partner(s). Your reply can also include which circumstances applied (e.g. new idea or extension of existing collaboration) and whether it was informal or formal. Also, which partners were involved from the start and which joined later (e.g. particular disciplines and/or fields)?

[space for answer]

4.2 And, what were major topics that were discussed during the development phase and were any concrete procedures or methods established to help develop the project with multiple partners from the initial phase to the final proposal?

[space for answer]

SHAPE-ID
Shaping interdisciplinary practices in Europe

SECTION 5: Obstacles/barriers that hinder ITR

In this section we are interested in things that hinder ITR once the project has started. Two of the main challenges in ITR projects are the levels of integration and of communication between different participating disciplines and/or other partners.

5.1 Please, indicate whether disciplines and/or fields in your project collaborate in a loose or in a more integrated manner. And, as relevant, is there a difference in this respect between AHSS and STEMM?

[space for answer]

5.2 As relevant, specify any procedures that you established for both collaboration and communication and indicate whether and how consensus was reached in regard to common goals; division of tasks and responsibilities.

[space for answer]

5.3 Further, indicate which obstacles might hinder collaboration. Please check the list hereunder that we identified in the literature

More than one answer possible

o   Academic tribalism

o   Assumptions from outsiders about AHSS disciplines

o   Assumptions from outsiders about STEMM disciplines

o   Cognitive/epistemological differences between partners

o   Dealing with complex relationships

o   Division of scientific labour

o   Motivations of researchers for doing ITR

o   Necessary personal qualities to conduct ITR

o   Lack of experience in collaboration

o   Career Path issues

o   Governmental research policies

o   Institutional policies

o   Power differences between participants

o   Ethical questions

o   Lack of adequate evaluation methods

o   Other ….

5.4 Please, explain which of these aspects hindered collaboration the most in your project.

[space for answer]

5.5 Finally, how did you overcome these difficulties? Please, cite any specific measures for overcoming barriers/difficulties, including any particular methods you found in the literature and/or any new innovative methods you developed yourself as well as the responsible parties for creating and implementing them.

[space for answer]

5.6 Evaluation and monitoring of ITR projects is often difficult because there is not yet an established regime for doing this, including methods, criteria and indicators. How did you decide to monitor and evaluate different phases of your project, especially given the fact that different disciplines have different ways of doing that?

[space for answer]

5.7 Did you have a dedicated person or partner or institute to do monitoring and evaluation? And, if so, what kind of procedures or methods were used?

[space for answer]

SECTION 6: Final remarks or advice

Please provide 3-4 sentences in response to each question.

6.1 In this section we invite you to mention between 1 and 3 pieces of advice that in your experience will help other ITR projects overcoming difficulties mentioned in this survey.

1.

2.

3.

6.2 In addition, are there any questions, challenges, or strategies you think need to be addressed by researchers or policy makers to improve the success of ITR projects?

[space for answer]

6.3 Finally, could you please name stakeholders outside academia and/or policy makers who were important for your project, and why. We might contact these persons, but not without first consulting you.

[space for answer]

Appendix 2: Guidelines for interviews with policy makers and funders

We have conducted a survey among researchers and would like to have some feedback from policy makers / funders to see what their experiences are with interdisciplinary and transdisciplinary research. In particular in setting up programmes to stimulate inter- and transdisciplinary research, in organising funding schemes, in supporting inter- and transdisciplinary research in Arts, Humanities and Social Sciences (AHSS) and in collaboration of ASSH with other fields (STEM) and/or with stakeholders.

We see three phases in stimulating ITD/TDR:

1. Policy support during the development and start-up phase of research and innovation programmes
2. Monitoring and other forms of interaction/support during the actual Research phase
3. Finalisation and evaluation of research and innovation programmes

1. Development and start-up phase

a) Can you specify a bit more your experience with stimulating and/or organising ITR, e.g. what was the level of your involvement of setting up ITR projects, or perhaps larger funding programmes?

b) How do you select research proposals, and/or researchers for ITR?

c) What are in your experience the biggest problems that you had to resolve in setting up projects or programmes?

d) What is your experience in stimulating/organising collaboration between ASSH and STEMM fields; and what if non-academic stakeholders are involved?

e) How did you manage the connection between ITR research and societal challenges? Did you use or promote any particular method or approach to bring different partners together to discuss collaboration on such topics?

2. Monitoring research and innovation programmes

a) Have you been involved during ITR projects, for example in terms of monitoring? Please explain how and were you successful, and did you encounter problems

b) Have researchers asked for feedback during projects, and if so, what kind?

3. Finalisation and evaluation

a) How do you evaluate ITR research projects? Or do you know how projects are evaluated? Are there actual meetings with the researchers or they supposed to deliver written statements, and is there interaction with non-academic stakeholders?

b) How do you decide about the success of a project? And especially because effects or impact may not be visible immediately?

c) If ITR projects are about big societal challenges, how do you take care of continuation / sustainability?

d) What would you as policy maker / funder need/expect from academics to better integrate AHSS and address societal challenges?