

Current status, perspectives and tools of RRI in H2020 and global perspective

D.1.3

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Modification Control

Please note that this is a living document. If necessary, changes and add-ons will be made to guarantee effective dissemination and communication.

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1. Executive summary

Deliverable 1.3 is meant to summarize the current state of the art of Responsible Research and Innovation. More specifically, D.1.3 recaps the outcomes of Tasks 1.3 (Current state of RRI in H2020), 1.4 (Current state of RRI in a global world), 1.5 (Visioning Conference RRI in H2020 and beyond), and 1.6 (Preliminary pool of existing RRI tools and trainings). The document is composed of different sections exemplifying the projects funded in H2020, the literature dedicated to this theme, the different tools developed in the last couple of years, and the issues at stake when considering the global range of RRI. The Visioning Conference represents the directions suggested by different stakeholders and they will be a substantial driver for the Social Labs. An additional aspect is represented by a short analysis of the barriers and actual situation of RRI when compared to its objectives according to the European Commission. This analysis has been taken by two documents evaluating mid-term results of H2020.

2. Introduction

Deliverable 1.3 wants to represent a useful repository for the Consortium when performing their different empirical activities, especially the Social Lab experiments. Therefore, readers may understand the document not as a research paper but rather as a pondered list useful to find the necessary information to recruit social lab participants, to grasp the development of RRI within the EC framework, and to understand some of the major outcomes of five years of investigations. This deliverable has not the ambition of representing an exhaustive picture of RRI efforts, given the great difficulty of giving credit to all the numerous ongoing, alternative and less visible developments around it.

In order to fulfil such objective, we have summarized the results of our reconnaissance in a brief, accessible and comprehensible document, and we have kept the lists of full references as annexes.

The analyses reported in D.1.3 is based on the internal developments of the EC strategy as reported and witnessed by internal documents, reports, and exemplified by the differences in calls, projects and funding. However, it would be shortsighted to limit the potential and extension of RRI only to the EC funding strategy. In fact, RRI has been extensively addressed also from a conceptual perspective in journals, books and other documents (expert reports) as well as conferences and workshops. Therefore, D.1.3 will also indicate some of the main sources for gathering knowledge outside of H2020 funding scheme.

3. The General Analysis of the RRI Projects funded through the EU's Framework Programmes between 2012 and 2017

RRI has been adopted at the EC level in 2012, with the first projects starting in 2013. The European Commission defines RRI as '*[] an approach that anticipates and assesses potential implications and societal expectations with regard to research and innovation, with the aim to foster the design of inclusive and sustainable research and innovation*'².

However, in the development of an overall policy process, the EC has also developed new ways of conducting R&I towards 'responsible' practices, as exemplified by Commission Moedas' 3Os Strategy³. As underlined by Commissioner Moedas, "an invention becomes an innovation only if users become a part of the value creation process. Notions such as 'user innovation'... emphasize the role of citizens and users in the innovation processes as 'distributed' sources of knowledge. This kind of public engagement is one of the aims of the Responsible Research and Innovation programme in Horizon 2020" (Annex I, p.228)⁴.

RRI is articulated and promoted in the Horizon 2020 Work Programme in three main ways. A first one focuses on the notion and its implementation as such. A second is to refine RRI through the analysis and promotion of what have been called key dimensions (European Commission 2014, 2 f.): Public Engagement, Gender Equality, Science Education, Open Access, Ethics and Governance. It is worth noticing that gender and engagement can also be detected in projects not addressing RRI given the crosscutting nature of the both and the participative nature of H2020 in general. A third way, more recent in call descriptions, is to study the application of RRI mechanisms or actions in specific domains like for instance, security technologies. We have then performed an analysis trying to take into account these variations.

In the following sections, we have outlined an analysis on the trends with regard to RRI. In order to do this, we have included projects directly dealing with the notion of RRI, projects implementing one or more of the keys, and projects implementing RRI in specific domains. In annex the reader can find an extensive list of projects with a potential match with a specific social lab. It is sensible however, not to stick to those indications as some projects may be useful in other senses or might contain indications trespassing our matches.

This list cannot and should not be conceived as exhaustive of RRI projects. According to the evaluation report in fact there are 784 projects flagged as RRI relevant⁵. These flags were assigned by project officers, so they surely had a connection. However, given that often there is no access to more than the description of the projects it was not possible for us to scrutinize this correspondence⁶.

² <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/responsible-research-innovation>

³ http://europa.eu/rapid/press-release_SPEECH-15-5243_en.htm

⁴ [https://ec.europa.eu/research/evaluations/pdf/archive/h2020_evaluations/swd\(2017\)221-annex-1-interim_evaluation-h2020.pdf#view=fit&pagemode=none](https://ec.europa.eu/research/evaluations/pdf/archive/h2020_evaluations/swd(2017)221-annex-1-interim_evaluation-h2020.pdf#view=fit&pagemode=none)

⁵ Annex I, p.247.

⁶ The Common Research Datawarehouse (CORDA) allows identification of RRI-relevant funded projects through a system called 'flagging'. Flagging is the process by which projects that fit the criteria for being

The purpose of this brief analysis is to trace how the funding for RRI-related projects between 2012 and 2017 developed. To this end, the project team used CORDIS, the "Community Research and Development Information Service" of the European Commission⁷ to identify those projects within FP7 (2007-2013) and H2020 (2014-2020) that had and have a major focus on RRI and/or on one or more of the RRI thematic keys (gender, ethics, public engagement, open access, science education)⁸. In addition, a systematic Internet-based search for EU-funded RRI-projects was conducted to cross check and complement the CORDIS findings. As a result, 181 RRI-related projects for the period 2012 - 2017 (October) were identified.

Based on the identified RRI-related projects (see Annex, we examined which funding topics gained significance and which areas received less attention between 2012 and 2017. The basis for this analysis are key project information provided by CORDIS, such as total project volume and EU contribution, project duration, funding topic, research objectives.

3.1. Overview search strategy

The main source for this project overview was CORDIS, the "Community Research and Development Information Service" of the European Commission. CORDIS is a publicly available repository that includes public information on all EU funded projects, including factsheets, reports and deliverables. CORDIS offers to use key words and to search for projects that are funded under a particular call. The information we decided to use for this project overview was the acronym and name of the project, a link to the project webpage (if available), field of research, scope and objective of the project, project partners, project duration, project volume, call for proposal and funding topic, funding scheme and a link to the final or midterm report (if available). In case we could not extract all required data from CORDIS, a supplementary web search was conducted.

In a first search for RRI relevant projects, we used the key words "RRI" and "Responsible Research and Innovation". From this initial list of results, only those projects were selected to be included in this overview that demonstrated a major focus on RRI.

In terms of time and project structure, only EU-funded projects that started in 2012 or later, and which were conducted by at least two European partners from different countries, were included. For instance, a one-day event, organised by a national research organisation in a city of the same country was not included. To have an understanding of the content of the projects we scanned the respective abstracts.

In a second search, we used the key words "science education", "public engagement" and "societal engagement", "ethics", "open access" and "gender" in order to cover the five keys of

RRI-relevant are attributed a 'flag'; these flags are attributed by project officers from the EC and executive agencies responsible for managing different parts of Horizon 2020. In this way CORDIS allows quick identification of projects that are flagged as RRI relevant, those that are not relevant, and also those that are missing flags (for whatever reason that may be). The flagging system does not hold any other data – such as information about why projects are attributed a flag.

⁷ http://cordis.europa.eu/projects/home_en.html

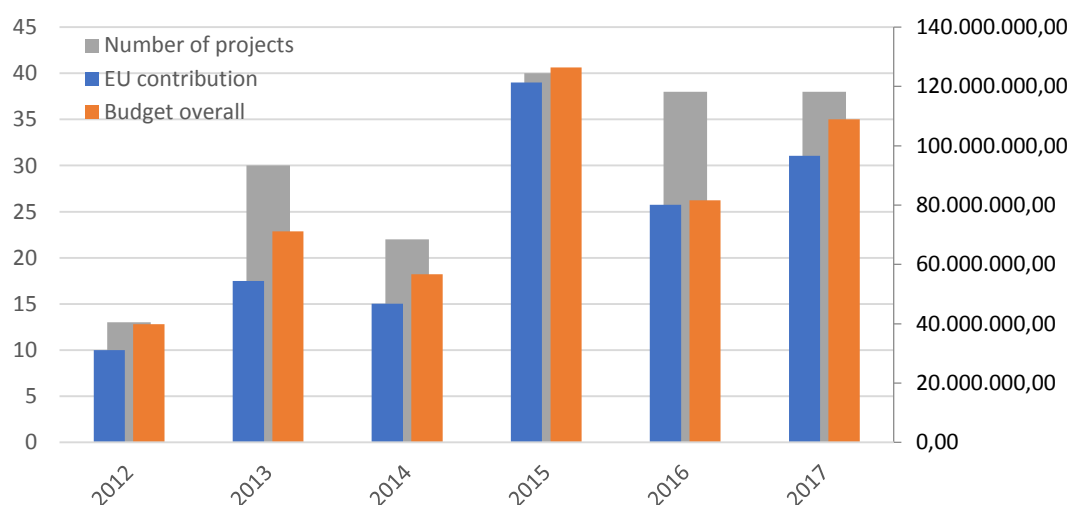
⁸ <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/responsible-research-innovation>

RRI as well. Governance has been left out because of its contested understanding. Again, the selected projects had to meet the criteria of starting in 2012 or later. In addition, there had to be some reference to the topic of research and innovation or science and technology. To make sure that the project list covers all relevant projects, we crosschecked if the call for proposals and funding topic of an identified project offered further relevant projects for us.

3.2. EU funding for /of RRI between 2012 and 2017: An overview

Looking at the overall development of RRI-funding by the EU between 2012 and 2017, the CORDIS data show considerable fluctuation - both in terms of the number of projects funded and in terms of budgets made available each year (Figure 1). The largest amount of funding for the RRI-related projects was provided in 2015 and in 2017, whereas the least funding was made available in 2012. The main reason for this low level of funding is due to the fact that the term "RRI" was for the first time included in FP7 calls in 2012. Starting from 2012, a significant increase in terms of funding for RRI projects can be observed.

Figure 1: Aggregated annual budgets for RRI-related projects between 2012 and 2017



Source: compiled by Fraunhofer ISI

Very generally, funding topics related to what was eventually labelled as the "keys" of RRI, such as gender, public engagement, science communication, young people and science, ethics or overall questions of the place of science and technology in society date many years back. As such, although before 2012 FP7 did not explicitly mention RRI, important constitutive elements of RRI ambitions were well represented. For instance, in the Science and Society (SaS) funding line of 2011, one topic covered the implementation of structural change in research organisations with a focus on gender, another one the development of integrated assessment methods for measuring societal impacts on emerging scientific developments. The project EST-

Frame for instance (funded under the latter topic), had the aim to contribute to socially robust and ethically sound research and technology development by providing further methodological development of appropriate tools for social impact assessment and technology evaluation and therefore already picked up the evolving debate on RRI.

The first work programme that mentioned the term RRI was the Science in Society (SiS) programme of 2012. This initiated the first wave of projects explicitly working under the label of RRI.

GREAT, Res-Agora, PROGRESS and Responsibility had the task of defining the notion in its theoretical features, its governance implications, its global scope and lastly, its overall referential status for R&I. These four projects have had the great merit of providing an extensive picture of the potential and the challenges of RRI, but also of initiating a dialogue about its implementation.

The GREAT project has investigated the theoretical features of RRI and of its components, providing an overview as well as governance indications on the modalities to implementing a normative approach. GREAT has proposed a governance framework focused on integrating contextual features in the implementation of RRI⁹.

Res-Agora has worked extensively on governance tools and methodology so to generate clear indications on how to adopt RRI in a procedural but well-defined fashion. Res-Agora has generated a highly sophisticated governance mechanism and a set of tools for RRI enforcement¹⁰.

PROGRESS has dialogued with countries external to the EU so to unveil differences but most of all in order to start constructing bridges between a 'European' notion and other alternative perspectives. It is particularly interesting their development on the double track of Responsible Innovation and Social Innovation¹¹.

Responsibility has represented the first attempt of constructing a community by building up a repository and shared indications for continuing the investigations about RRI. The results of Responsibility have fed the objectives of RRI Tools, at today the largest project on RRI¹².

These projects primarily focused on conceptual questions, e.g. the GREAT project or the Res-AGorA project, which both dealt with the development of governance frameworks for RRI. In the following years, RRI gained more and more importance. An additional emphasis was put on RRI in an industrial context as well as awareness raising for RRI. The amount of funding topics explicitly mentioning RRI continuously grew during the second term of FP7, and the topic further increased its significance in Horizon 2020. Under Horizon 2020, RRI was granted a cross cutting function, which means that projects focusing so far solely on technology development or research in the natural sciences, now have to increasingly take into account RRI elements

⁹ <http://www.great-project.eu>

¹⁰ <https://res-agora.eu/news/>

¹¹ <http://www.progressproject.eu>

¹² <http://responsibility-rri.eu>

such as engagement or ethical acceptability. In addition, the H2020 work programme "science with and for society (SwafS)", the successor of the "Science in society" programme, explicitly funds projects related to the concept of RRI.

The cross cutting function of RRI in Horizon 2020 is well reflected in our project overview as the projects deemed to be relevant for RRI are rooted in a greater variety of funding topics than was the case in FP7. Besides SwafS, RRI projects are now also funded under the funding programmes Euratom (nuclear development), the nanomaterials, the Health, Security topics or ICT.

Starting with the funded projects under the first H2020 work programmes of 2014-2015, we identified a second wave of RRI projects, primarily focusing on questions of institutionalisation and how RRI can be embedded in organisations. Examples are the JERRI project (Joining Efforts for Responsible Research and Innovation), the RRI-Practice project (RRI in practice) or the STARBIOS 2 project (Structural Transformation to Attain Responsible BioSciences), all three of which funded under the SwafS topic "Supporting structural change in research organisations to promote Responsible Research and Innovation".

Recently, a third wave of RRI related funding topics is emerging, focussing more on a systemic perspective of RRI. This systemic approach to RRI is, for instance, apparent in the FoTRIS project (start in 2016), the NewHoRRIZon project (start in 2017) and in calls included in the SwafS Work Programme 2016-2017 that explicitly address systemic RRI issues reaching beyond the confines of organisations and institutions.

Besides these overall developments related to EU funding and RRI, the so-called RRI thematic "keys" have never lost their importance and have constantly received particular grants throughout the years.

The EU has obviously played a significant role during the process of conceptual development and institutionalisation of RRI. By having a look at the work programmes and the funded projects, in this introduction we presented our preliminary observations. As follows, we will have a closer look at particular interesting aspects for each year between 2012 and 2017, partly visualised by graphs.

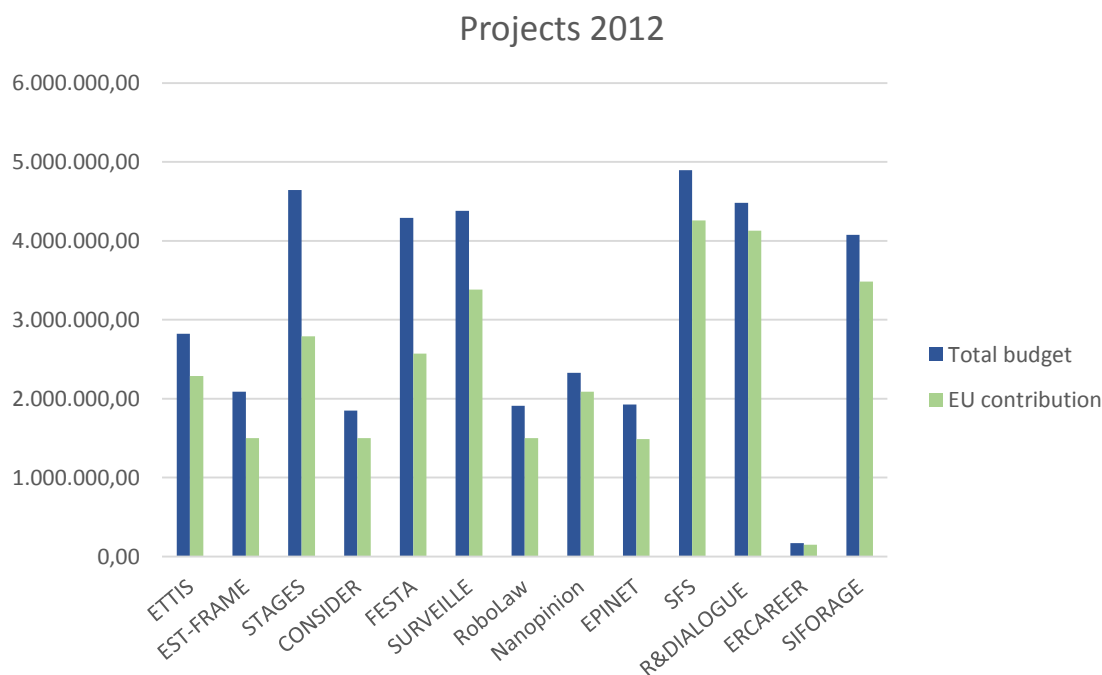
3.3. RRI-related projects starting in 2012

In 2012 the single largest grant (with EUR 4 259 077) was provided for the "SFS" project, which aimed to bring together stakeholders and citizens in a dialogue on societal issues related to the ocean (see Figure 2 for the financial illustration of 2012 projects). Another large-scale project under the same call was "NANOPINION", which proposed a platform for learning, information, outreach, dialogue and monitoring for young people, general public and consumer opinion on nanotechnology.

The majority of the projects under the "Gender" topic was supported by a large EU budget. The main purpose of the "gender" projects was to encourage more female researchers in academia, and to further gender equality in science. For instance, the "FESTA" and "STAGES" projects, which had the objective to empower women in science, technology and academia, enjoyed large project volumes, with EUR 4 290 431 and EUR 4 646 640 respectively.

"Ethics" and "legal" research fields were part of the funding topics under the 2012 calls as well. Three projects in total received EU funding under these topics. The project "Surveille" received the largest budget with EUR 3 382 354 in comparison to the other projects in ethics field, aiming to "identify, elaborate and assess the whole range of legal and ethical issues raised by the use of surveillance technology in the prevention, investigation and prosecution of terrorism and other crime". The project "CONSIDER" with its objective of engaging civil society organizations in designing research governance was the only project funded under the "CSO involvement" field with a project volume of EUR 1.849.467. Last but not least, encouraging "public engagement" in nanotechnology was also an extensively funded area.

Figure 2: Aggregated total budgets for RRI-related projects starting in 2012



Source: compiled by Fraunhofer ISI

3.4. RRI-related projects starting in 2013

The concept of RRI gained additional momentum in 2013. The projects focusing on the development of theoretical, normative, comprehensive frameworks as well as the dynamics of RRI were initiated (see Figure 3 for the total budgets allocation for each funded project). In addition to existing and novel research and innovation activities, issues such as transparency and interactive processes engaging societal actors, individuals and wide range of stakeholders have gained importance. "Science communication" and "open access and research data" were the emergent research fields observed among 2013 projects. The project "ASSIST-ME", which aimed to investigate formative and summative assessment methods to support and improve inquiry-based approaches in European science, technology and mathematics, obtained the largest project budget with EUR 3 971 945. The "gender" topic maintained its significance and received a large amount funding from the EU. (In particular the projects "GENDERTIME" and "GENOVATE", mainly aiming to increase the involvement and career advancement of women researchers in science, were granted with EUR 3 314 019,70 and EUR 3 185 139,60 overall budget volume, respectively).

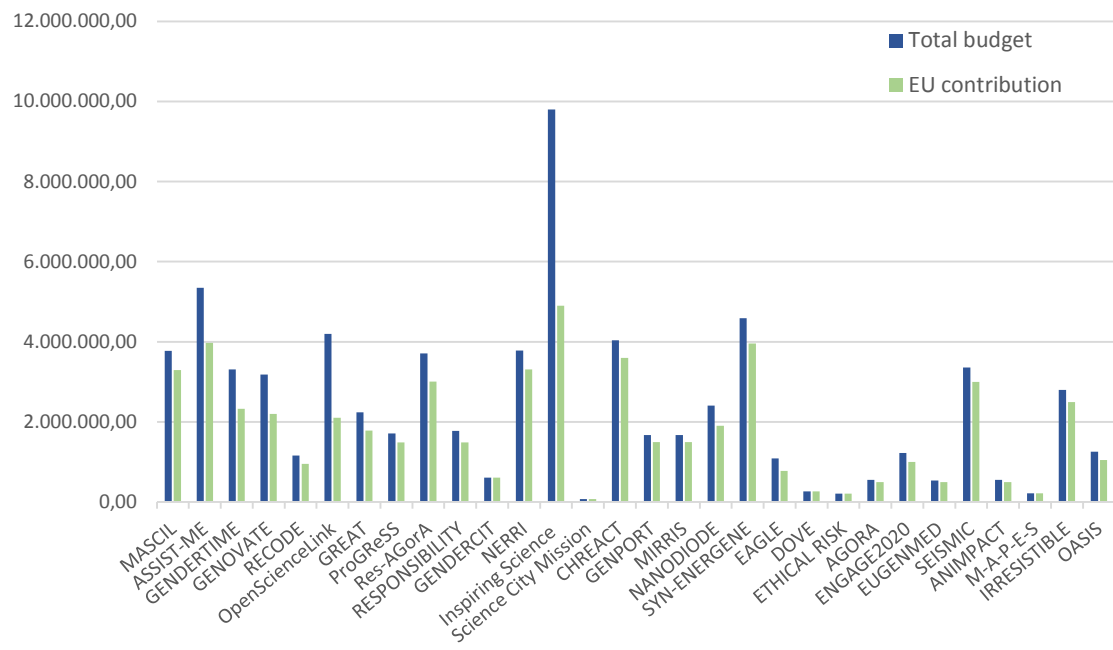
Five projects in the field of "Open Access" received funding from the EU. Among them, "OpenScienceLink", with its intention to "introduce and pilot a holistic approach to the publication, sharing, linking, review and evaluation of research results, based on the open access to scientific information" received the largest overall budget (EUR 4 199 955).

Similar to the previous years, projects under the "FP7-SiS" funding topic and "Science in society" field continued to receive significant amounts of funding from the EU. In this respect, the project "NERRI", aiming at the introduction of RRI in neuro-enhancement in the European Research Area through mobilization and mutual learning (MML) activities engaging scientists, policy-makers, industry and civil society groups, effective governance of nanotechnologies, and the project "SYN-ENERGENE", which aims at the initiation and fostering of public dialogue on synthetic biology and mutual learning processes among a wide variety of stakeholders from science, industry, civil society, education, art and other fields, obtained a considerable amounts of funding from the EU.

The "public engagement" topic gained additional momentum in 2013. The "NANODIODE" project, aiming to improve the governance of nanotechnologies by participatory means, was supported with EUR 1 899 842 from the EU for three years.

Figure 3. Aggregated total budgets for RRI-related projects starting in 2013

Projects 2013



Source: Compiled by Fraunhofer ISI

3.5. RRI-related projects starting in 2014

The important role of public participation as an integral element of the RRI approach was further emphasized in 2014 by a large share of funding. And similarly, the "Science Education/Raising Awareness of RRI" topic also enjoyed increasing support.

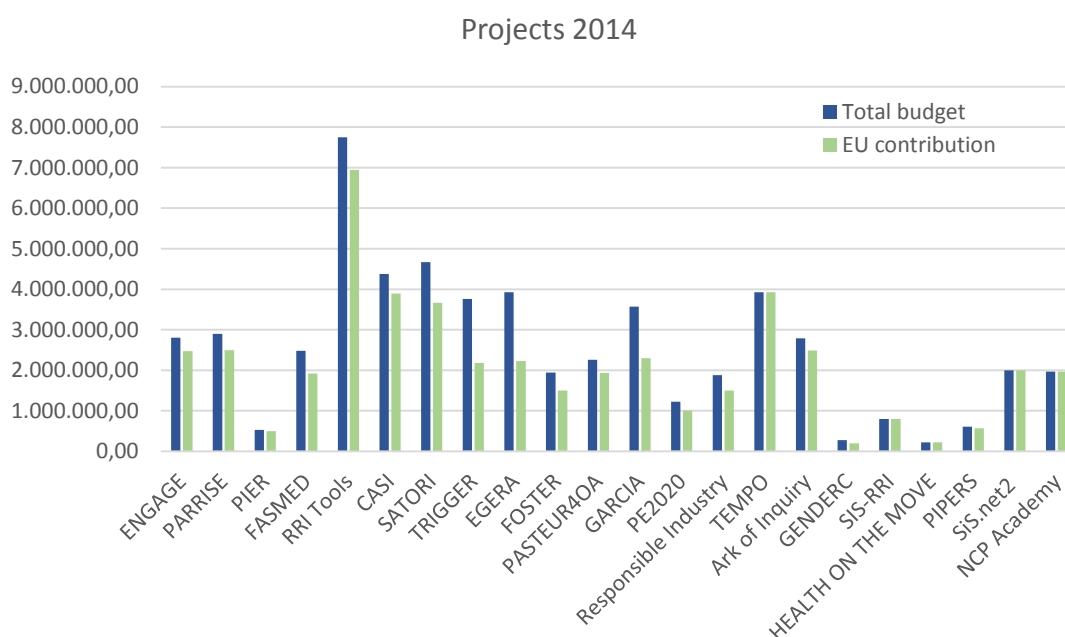
Furthermore, "Training and dissemination of RRI" topic, as a new research field, emerged in 2014. The "RRI Tools" project under this field received the largest funding for a comparatively short period of time (2 years) with an EU contribution of EUR 6 942 031. The project developed a training and dissemination toolkit for RRI.

The "gender" topics remained important in 2014, as reflected by two major projects under the "Science in Society" call: "TRIGGER" and "EGERA". The project "TRIGGER", with its EUR 2 179 369 financial capacity for 3 years, aims at promoting systemic interventions designed to have deep, long lasting and widespread impacts at all the different levels in 5 research organizations. The "EGERA" project has the aim of promoting a full set of measures to achieve gender equality and fight gender-based stereotypes in research and academia.

The growing efforts to promote RRI in an industrial context is reflected by the project "Responsible Industry" which focused on how industry can work productively together with societal actors and integrate RRI principles into research and innovation processes.

The "Open access" topic received increased support in 2014 than in 2013. Among these projects was "FOSTER", which aims "to support different stakeholders, especially young researchers, in adopting open access in the context of the European Research Area (ERA) and in complying with the open access policies and rules of participation set out for Horizon 2020 (H2020)". The "PASTEUR4OA" project intends to encourage the development of matching policies on open access and open data in the European Union.

Figure 4: Aggregated total budgets for RRI-related projects starting in 2014



Source: Compiled by Fraunhofer ISI

3.6. RRI-related projects starting in 2015

Compared to previous years, an increasing number of projects addressed "open access" issues in 2015. Furthermore, these projects received the largest amount of funding from the EU budget among all RRI-related projects starting in 2015. Of these new projects, "OpenAIRE2020" obtained the largest budget from the EU with EUR 13 000 000. The project targets a pivotal phase in the long-term effort to implement and strengthen the impact of the Open Access (OA) policies of the European Commission.

A research field received funding in an RRI context in 2015: "Human factors in Border Control" and "ESAIRE". The project "BODEGA" under the first mentioned research field aims to support border management and enhance travelers' border crossing experience, by conceiving the ethical and societal compatibility issues.

The "Gender" field continued to be significant within the 2015 funding topics. "HYPATIA", "GENERA", "GEDII" and "LIBRA" are the funded projects, targeting, in general terms, to promote gender equality in research and innovation.

Also, nanotechnology continued to be relevant for 2015 projects, but rather with a lower budget. Under the "Nanotech and Societal Engagement" research field, the "NANO2 ALL" project, targeting to establish a European-wide sustainable platform for mutual learning and informed dialogue among all stakeholders to improve transparency and societal engagement in responsible nanotechnology, was fully funded with EUR 999 856,60 EU budget for 4 years period.

Another new funding topic with RRI-aspects was “Nuclear developments and interaction with society”, funded under “EURATOM” emerged in the 2015 calls. The project “HoNESt” has the goal to conduct a three-year interdisciplinary analysis of the experience of nuclear developments and its relationship to contemporary society. For its 3-years duration, the project receives full-funding from the EU with EUR 3 052 269.

The number of projects under the “Science Education”, “Science Communication” and “RRI in higher Education” research fields have increased remarkably in 2015. Eight projects from the “Science Education” field, address the objective of engaging youth for science exploration and increasing their career awareness for science with multi-stakeholder cooperation. Among these, the “CHESS” project was awarded with the largest support (EUR 3 950 971,20) for the 4-years project period. “CHESS” intends to include intersectoral secondments, interdisciplinary communication skills, public engagement and outreach with particular focus on patient, clinician and policy-maker audiences.

In the field of “Science Communication”, “EuroStemCell” is a project with the objective of addressing the urgent need for trusted, high quality information on stem cells by citizens and stakeholders across Europe, and further to establish a model for large-scale dissemination of Framework-funded research outputs to European publics.

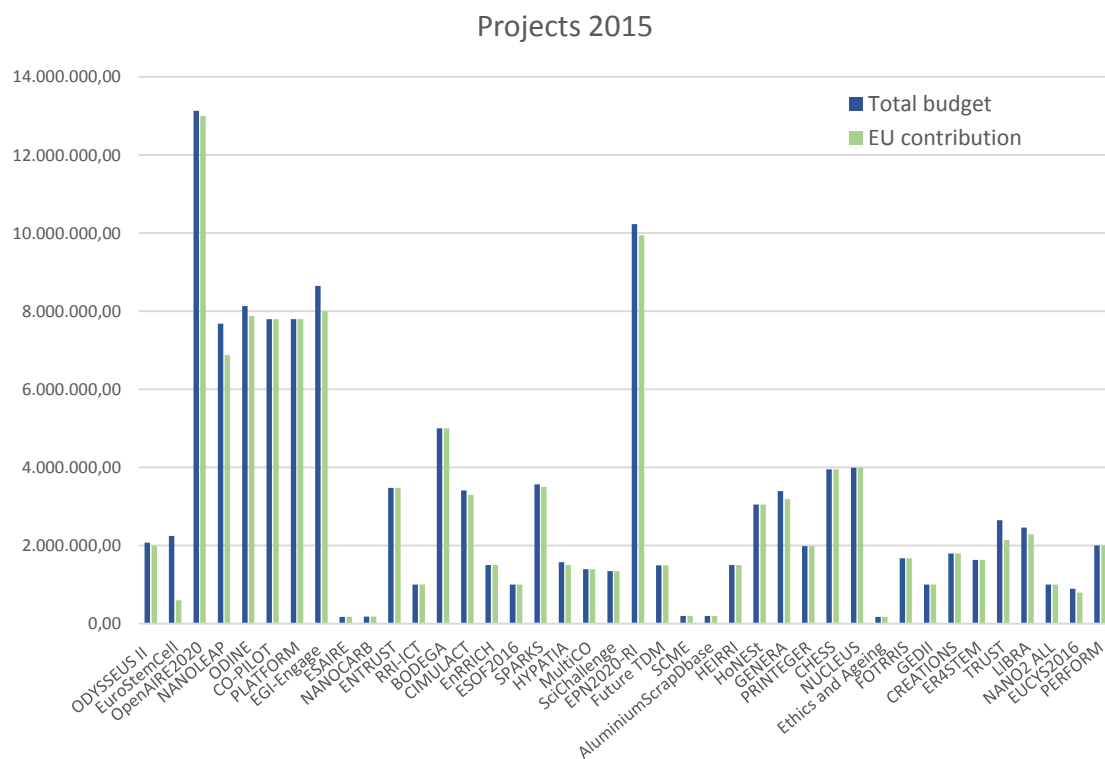
Clearly, the term “RRI” appears more frequently in the project descriptions compared to the previous years:

- “EnRRICH” and “HEIRRI” projects are the two projects within the “RRI in higher Education” research field. “EnRRICH” has the objective to build the capacity of staff in higher education to facilitate their students’ development of knowledge, skills, attitudes and competencies in responsible research and innovation, and respond to the research needs of society, particularly underserved civil society organisations. The project “HEIRRI” aims to foster an alignment of research and innovation (R&I) with the needs, values and societal expectations.
- Under the ICT-Call and within the “Technology and societal interaction” research field, the project “RRI-ICT Forum” aims at monitoring, analyzing, supporting and promoting SSH contribution to RRI approach in ICT research and innovation under H2020.
- Under the SwafS call, the project “FoTRRIS” aims to develop and introduce new governance practices to foster Responsible Research and Innovation (RRI) policies and methods in research and innovation systems. The project receives for the three-year period a full financing from the EU budget (EUR 1 674 500).

The “CIMULACT” and “SPARKS” projects are funded under the “Public Engagement” research field, which gives “concrete and unique input to EU’s research and innovation agenda based on visions from citizens in 30 European countries” and “promotes Responsible Research and Innovation (RRI) across 29 European countries”, respectively.

Last but not least, four projects (“SCME”, “PRINTEGER”, “Ethics and Ageing” and “TRUST”) in the field of “Ethics” started in 2015, focusing on objectives such as the ethical implications of embryo modification and the dynamics of misconduct and ethical challenges due to the population aging.

Figure 5: Aggregated total budgets for RRI-related projects starting in 2015



Source: Compiled by Fraunhofer ISI

3.7. RRI-related projects starting in 2016

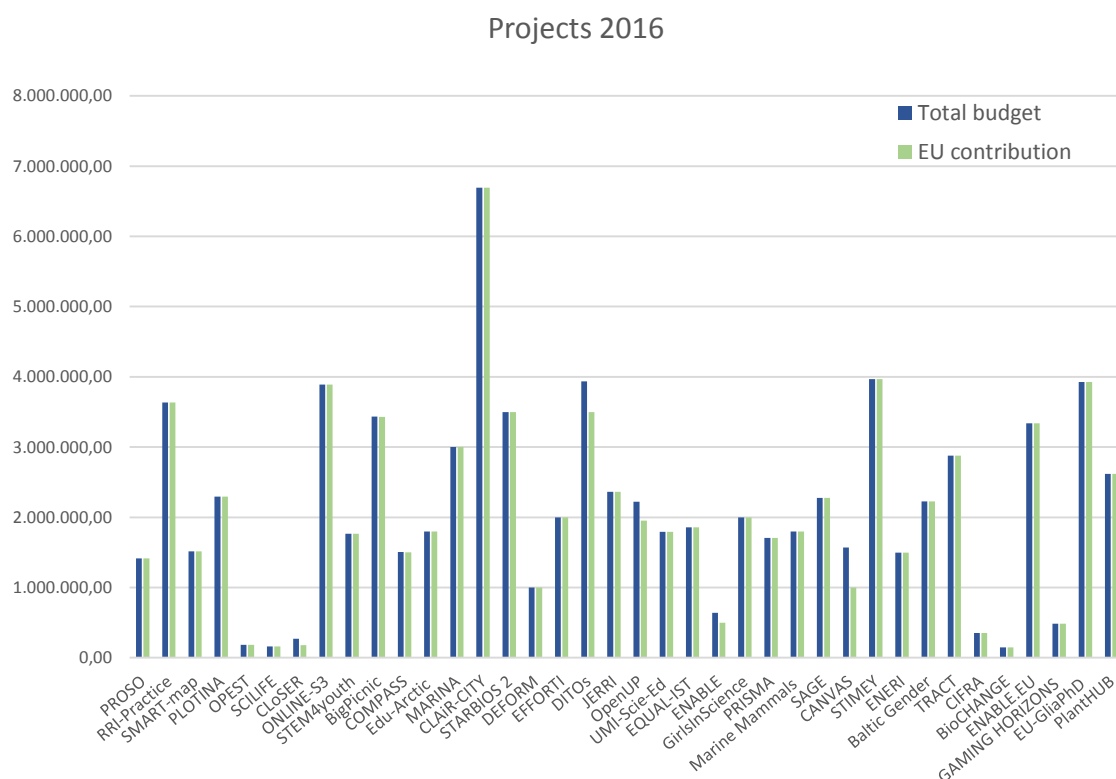
In 2016, the aggregate level of funding for RRI-related projects decreased compared to 2015. Nonetheless, new research fields and topics explicitly including RRI aspects also emerged in 2016:

- The project "ONLINE-S3" under the "Smart specialization" research field, aims to develop an e-policy platform augmented with a toolbox of applications and online services to assist national and regional authorities in the EU in elaborating or revising their smart specialisation agenda.
- The "MARINA" project under the "Knowledge sharing" field, has the objective to create an all-inclusive Knowledge Sharing Platform (KSP) catalyzing the convergence of already existing networks, communities, on-line platforms and services providing an online socio-technical environment that facilitates and stimulates the direct engagement of researchers, Civil Society Organisations (CSOs), citizens, industry stakeholders, policy and decision makers, research funders and communicators for improving Responsible Research and Innovation.
- In the "Research integrity" field, the project "DEFORM" aims to "analyse the occurrence of research malpractice (RM), provide a financial modelisation of RM related risks and loss of opportunity and propose a methodology and guidelines for anticipating, prevent and mitigate the appearance of this type of practices."
- Under "Swafs" call, the field "Raising interest in EU research career" emerged. Within this area, the main objective of the project "ENABLE" is to connect European researchers of tomorrow with prominent scientists of today, in particular to inspire and to give them the necessary tools to follow in their footsteps.
- The "Value-driven Cyber security" topic, as a new research field, gained importance in 2016. The "CANVAS" project aims to construct an alliance for value-driven cyber security, based on European values and fundamental rights.
- Under the ICT Call and "ICT Patents and Responsible Innovation" field, the project "CIFRA" has the objective of "providing a structured review of the role of the Patent System on the innovation process and its impacts the social development with specific focus on the particularities of ICT research and innovation".

The projects under the "Gender" category again represent a substantial part of the total share of projects starting in 2016.

The "Science Education" and "Public Engagement" fields represent the largest share of the total funded projects in 2016. Among these, the project "DITOs" aims at elevating public engagement with science across Europe, was awarded with the largest budget of EUR 3 498 953. In the field "Science Education", the "STIMEY" project develops an educational platform with multi-level components on the base of a well-researched pedagogical framework, aiming to make STEM education more attractive to young people.

Figure 6: Aggregated total budgets for RRI-related projects starting in 2016



Source: Compiled by Fraunhofer ISI

3.8. RRI-related projects starting in 2017

In 2017, RRI-related projects funded under the Information and Communication Technologies (ICT) calls become more relevant:

- The “HubIT” project was awarded with the largest amount of budget in this research field. "The long term strategic objective of HubIT is to contribute to the high level of European research and innovation and ensure that H2020 funded and further ICT related innovation is responsible, inclusive and aimed at reversing inequalities."
- The projects “K-PLEX” and “EoC” focus on “key aspects of data that are at risk of being left out of our knowledge creation processes in a system” as well as “the ethical codes and guidelines”, respectively.

A large number of projects under the “Open Science” and “Open Access” fields started in 2017:

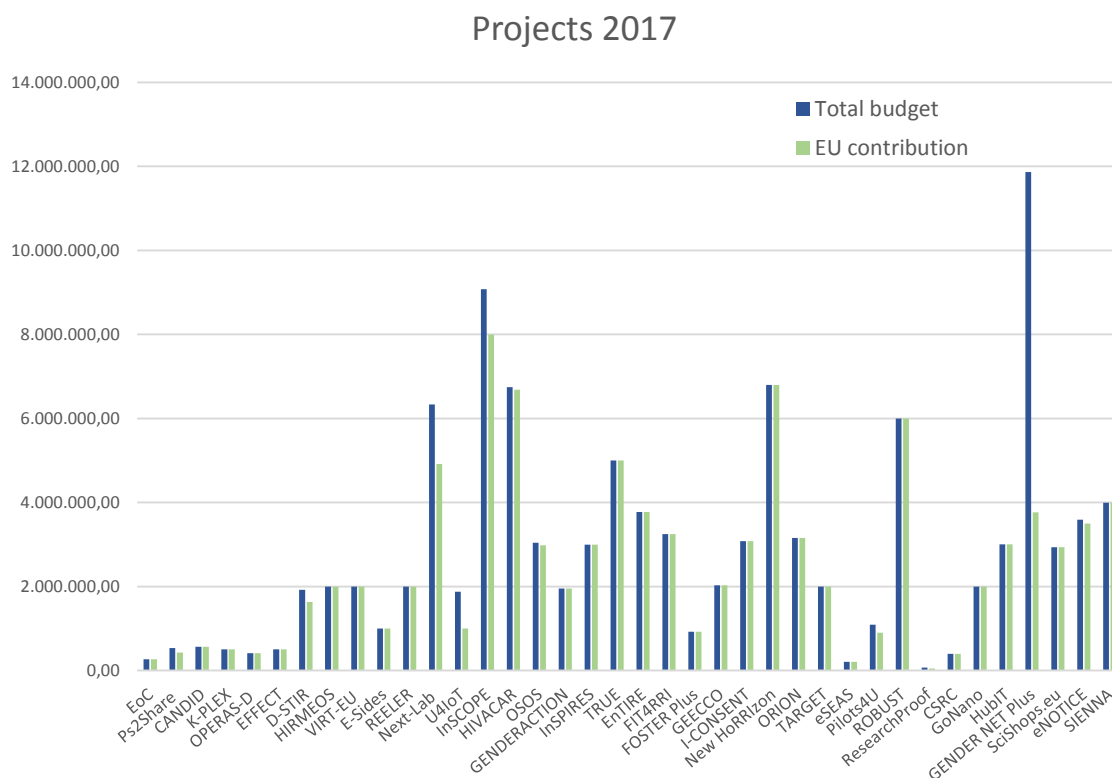
- Within the “Open Access” field, the project “InSCOPE” under the ICT Call was awarded with the largest amount of funding (EUR 7 998 652) among the new projects starting in 2017. The main target of “InSCOPE” is to “set up an open access pilot line infrastructure for H-TOLAE technology, which is modular ensuring a comprehensive toolbox of printing, assembly, production integration and process validation

distributed over the partners". Another project under the "Open Access" field to mention is "Pilots4U", which "aims to setup one very visible, easy accessible network of open access pilot and multipurpose demo-infrastructures for the European bio-economy with Europe-wide coverage and protecting IP rights of users".

- Under the "Open Science" topic the project "FIT4RRI" intends to bridge the gap between the potential role of RRI and Open Science for helping Research Funding and Performing Organisations (RFPOs) to manage the rapid transformation processes affecting science. Moreover, the project "ORION" intends "to "embed" Open Science and Responsible Research and Innovation (RRI) principles in RPFOS' policies, practices and processes to organise and do research". In addition to "FIT4RRI" and "ORION" projects, which principally focus on the connection between RRI and Open Science, the "FOSTER Plus" aims to "promote the practical implementation of Open Science, with activities targeting academic staff, young scientists and policy-makers in particular".

In addition, a large number of projects under the "Ethics", "Gender", "Public Engagement" and "Science Education" research fields started in 2017. Among these, the projects associated with the "Public Engagement" receive the lowest budget, whereas the "Gender" and "Science Education" topics are awarded with the largest volume of EU funding. The project "GENDER NET Plus" under the SwafS Call and "Gender Equality" topic, receives EUR 3 768 310 for its 5-years project period. "GENDER NET Plus" "aims to strengthen transnational collaborations between research programme owners and managers, provide support to the promotion of gender equality through institutional change and instigate the integration of sex and gender analysis into research and funding programmes".

Figure 7: Aggregated total budgets for RRI-related projects starting in 2017



Source: Compiled by Fraunhofer ISI

3.9. A glance at 2018

With regard to the calls in the current year, data suggest that RRI is growing in interest and expertise, becoming a protagonist amongst SSH investigations. The SWAFS program is a good example of this tendency.

According to CORDIS in fact, a total of 221 proposals were submitted in response to the only 15 topics in 2017 for H2020-SWAFS-2016-17.

The number of proposals for each topic is shown below:

- SwafS-03-2016-2017: 24
- SwafS-05-2017: 17
- SwafS-06-2017: 2
- SwafS-08-2017: 8
- SwafS-10-2017: 26
- SwafS-11-2017: 42
- SwafS-12-2017: 5
- SwafS-13-2017: 44
- SwafS-14-2017: 3
- SwafS-21-2017: 5
- SwafS-22-2017: 15
- SwafS-23-2017: 15

- SwafS-24-2017: 1
- SwafS-26-2017: 7
- SwafS-27-2017: 7

4. Barriers, Obstacles and actual gaps between theory and practices:

In this part, it might be useful to highlight some of the barriers, obstacles and difficulties that RRI has encountered in the last years. This might be helpful for the diagnosis phase of the different social labs.

Amongst the different barriers preventing RRI from a full implementation, we have operated a pondered selection because they are different in nature and because they can be enlightening according to the specific challenge. We see two main levels slowing down the implementation of a “good” RRI. A first level is the conceptual clarification of what a good RRI should look like. In this sense, not only exploitation, but the very agreement on the main features of a meta-notion like RRI appear difficult. A second level, more in line with our investigations, is the one focusing on the institutional barriers and ‘inefficiencies’ in the implementation of RRI.

We have chosen to refer to a mid-term evaluation report on H2020¹³, supported by a perspective developed in a forthcoming article by Kerstin Goos and Ralf Lindner, together with some comments by some members of our consortium. The evaluation assessed the whole FP but we are going to limit our analysis to RRI as such and to SWAFS as main operational sectors of RRI.

According to Goos & Lindner¹⁴, although RRI has several positive aspects, it might be argued that it also raises some doubts or criticism. The first one is the question of whether RRI represents a novelty or it is just old wine in new bottles. Other assessment frameworks are seen as playing a similar or identical function. A second skepticism regards the vagueness intrinsic to the notion, which triggers an efficient and clear combination of STI policies able to influence the decision-making process. A third issue warns us to recognize the possibility of using RRI as a window dressing, favoring instrumental approaches.

If we now consider the mid-term evaluation report we have concrete indications of the actual situation of RRI. As the reader might know, RRI is built on 6 keys developed by the SWAFS program and more recently by the vision of 3Os.

If we consider RRI as such data can help us in understanding its overall role and consistency within H2020.

“As of 1 January 2017, CORDA data show that 11.0% of Horizon 2020 projects, *for which data are available (i.e. not missing)*, are RRI relevant. The EC contribution to these flagged projects is EUR 2.7 billion this equates to 13.95% of the Horizon 2020 budget. Excluding *ad hoc* calls and joint undertakings, more than two-thirds of the RRI-flagged EC contribution goes to MSCA (30.4%), SC1 – Health (14.8%), Industrial Leadership – LEIT (13.7%), and SC5 – Climate (12.4%)” (Annex I, p.247).

This shows, together with the analysis presented above, that RRI has been receiving greater attention and importance. However, the provisional indications about future calls do not appear to continue this trend.

¹³ More specifically we will refer to the two Annexes of the report.

¹⁴ Goos, K. & Lindner, R., (2018) Genealogies of the concept of RRI – from fragmented notions towards commonalities and disparities (working title), to be published.

“Screening of the draft 2018-2020 Work Programme scoping papers provides preliminary cause for concern: just two mentioned RRI explicitly (Excellent Science – MSCA & SC2 – Food) and in some lines no keywords associated with RRI were mentioned at all (Industrial Leadership – Innovation in SMEs, Industrial Leadership – Access to Risk Finance). Nevertheless, some dimensions of RRI were mentioned more frequently than others (e.g. public engagement and gender) and in some scoping papers keywords were mentioned several times across the context and strategic orientations, pointing to a fuller treatment and embedding of the concept; these include SC5 – Climate (which currently has 22.5% of projects flagged as RRI relevant in CORDA for which data are available) and SC6 – Inclusive Societies (which currently has 41.5% of projects flagged as RRI relevant in CORDA for which data are available)” (Annex I, p.239).

A factor attracting the attention of the evaluators is the gap between the intentions and actual effort in fulfilling RRI conditions.

The main driver, not only of RRI but of H2020 itself, engagement, is not promoted in a consistent way. In the two mid-term reports we have detected the recurrent recognition of this gap:

“The level of involvement of 'true' CSO in consortia is very low, of peripheral importance, and of a potentially poor quality given the low funding” (Annex I, p.247).

“Civil Society Organisations (CSOs) have played only a marginal role in EU Framework Programmes (FPs), and have therefore had only very limited effects on network morphology, performance and research output” (Annex II, p.1129)¹⁵.

“RRI is highly policy relevant and there is widespread support for involving citizens and CSOs in Horizon 2020. However, CSO involvement in Horizon 2020 is very low, and CSOs are generally “hangers on” in projects and rarely co-ordinate them” (Annex I, p.240).

Furthermore, the report suggests that engagement, where present, is mostly at the exit-stage, undermining the potential richness of new knowledge as well as an increase in legitimacy. Civil society is called in as a passive recipient, either as formal participants or once the results of a project are out. Another aspect with respect to the necessity to engage different stakeholders is the lack of for-profit actors, an aspect that seems to hinder innovation practices in RRI (Annex II, p.1138).

Moreover, the experts have highlighted that there are two other main aspects of RRI that are not sufficiently implemented, gender and science education. The former is present, being itself a cross-cutting issue, but it is not implemented at the institutional level. Besides, gender receives less attention the more we enter into a qualitative assessment. The latter seemed to be very much out of the priorities of H2020 until this year where additional efforts have been put in place. For instance, the experts highlighted that “public expenditure in the EU28 on education in 2012 was EUR 672 billion¹⁶ compared to the SWAFS budget allocation to science education in 2016 of EUR 0.006 billion” (Annex II, p.1136).

A connected problem with the implementation of RRI and its keys is the reduction of actions which require a substantial and creative care to quantitative actions.

The gender case is perhaps the most evident one together with engagement. Both often suffer from being reduced to quantitative integration of a good number of specific actors without considering if this integration touches the qualitative aspect of the project. This approach can lead to counterproductive outcomes where gender considerations are automatically and unreflexively integrated in the application but not implemented in the project.

¹⁵ [https://ec.europa.eu/research/evaluations/pdf/archive/h2020_evaluations/swd\(2017\)221-annex-2-interim_evaluation-h2020.pdf#view=fit&pagemode=none](https://ec.europa.eu/research/evaluations/pdf/archive/h2020_evaluations/swd(2017)221-annex-2-interim_evaluation-h2020.pdf#view=fit&pagemode=none)

¹⁶ http://ec.europa.eu/eurostat/statistics-explained/index.php/Educational_expenditure_statistics.

According to the mid-term report gender balance is quite good when considering % of women in projects, very good in terms of % of women in experts and evaluation groups, weak when it comes to gender aspects explicitly mentioned in research contents. The % varies according to the specific sector with SWAFS reaching 85% of projects embedding gender aspects, and at the other extreme FOOD and TRANSPORT with 10,8 and 15,7 respectively. It appears though that the understanding of gender aspect, beside from being too low in some domains, is also limited to the integration of women but not thoroughly addressed.

RRI has been so far particularly present as a standalone matter of investigation and it has also been broken down into six main domains (the keys). However, there is still little evidence about the paths to implementing it in many other sectors of H2020. Although with the emergence of WP 16-17 RRI has trespassed its borders and became a crosscutting issue this seems to be difficult for certain societal challenges or sectors. There are some important exceptions. For instance, 8 projects in the domain of security have been flagged as directly integrating RRI. A successful story is surely represented by the project BODEGA¹⁷, where RRI is not confined to one WP, but has the explicit task of working with all the other WPs in order to design tools and recommendations in the automatization process of border controls.

However, in some specific sectors it is more difficult to embed RRI, especially if we assume that we should implement it through the six keys. If certain societal challenges seem to be needing the support of the six keys in order to be able to define the different dimensions of RRI, other sectors (e.g. Euratom), pose difficulties to implementing, for instance, gender aspects or open access¹⁸. The suggestion we can provide the reader with is to still try and think of possible issues with regard to the keys although seemingly absent. The main aim is to not deliberately disregard any of the keys and try to keep a balance amongst them.

As a last point, it is important to mention the possibility of assessing RRI successful stories. If the qualitative evaluation still suffers from different interpretations of the concept, the quantitative measurement is progressing. A first attempt is represented by an expert report published in 2015. A second example is the MORRI project, which has been acknowledged also by the evaluation report.

“The MoRRI project is currently developing an indicator system to measure the evolution and benefits of RRI. The study covers all EU-28 countries and (where possible) countries associated to FP7 and Horizon 2020. It has identified 36 indicators for the evolution of RRI and 11 indicators for the benefits of RRI. These collectively cover the 5 dimensions of RRI and also governance. Data collection on these indicators will provide a much clearer view of national-level differences and could eventually lead to greater coherence between countries in their approach to RRI” (Annex II, p.1159).

4.1.SWAFS

SWAFS is surely the most important *locus* where RRI is investigated and implemented. 82.6% of SWAFS projects are RRI relevant and those not considered to be RRI relevant are ethics parts of the governance line or NCP projects.

¹⁷ <http://bodega-project.eu>

¹⁸ For an exception and good example of SSH and RRI in action is the TOXI-triage project, 179 one of eight projects flagged as taking into account the Gender dimension, RRI and SSH: it also has ICT as one of its primary objective so it 100% supports the digital agenda. This EUR12 million project has 18 participants and aims to develop and field/trial a new level of medical care and site management during triage within rescue efforts in a CBRN (chemical, biological, radiological and nuclear) incident.

SWAFS is expected to contribute to 33 longer-term results (see intervention logic) across all three parts of the 3Os strategy but the relation between SWAFS, RRI and the 3Os still needs to be clarified (Annex II, p.1118).

“A review by the expert group of the 53 SWAFS projects across all its lines of activity suggests that funded actions so far have focused on:

- 1) trying to understand the notion of RRI and barriers to its implementation/uptake,
- 2) creating ad hoc and largely unconnected structures out of the existing system to promote RRI, and
- 3) encouraging cultural rather than structural changes (i.e. in terms of how science is conducted).

Building on a body of support and good practices, SWAFS aims to improve the contribution of R&I to tackling societal challenges. It creates and consolidates links between R&I stakeholders, for instance by inviting citizens and civil society to engage more in R&I. [...] SWAFS is designed with transversality and transdisciplinarity in mind; it focuses on particular societal challenges (e.g. marine mammals, digitalisation, robotics, biosciences) and on issues that cut across them (e.g. CIMULACT). This aims to ensure focused, timely and appropriate responses to the emerging world of R&I and continual improvements in the knowledge base that can be transferred to other parts of Horizon 2020” (Annex II, p.1129).

SWAFS programme has been allocated 432.7 million for the period 2014-2020. Organisations from all 28 EU Member States have participated in SWAFS. The United Kingdom and Germany have the highest number of participants and participations, followed by Italy and Spain” (Annex II, p.1125).

4.1.1. Limits of SWAFS

SWAFS effectiveness has been considered to be in line with its own objectives and very important for H2020, but very weak if compared to other program lines or to its “material” contribution to H2020 objectives.

“The effectiveness of SWAFS (i.e. its ability to effectively achieve its objectives) is limited due to the scale of the ambition, the relatively small budget allocation (less than EUR 0.45 billion over 7 years) and the range of funded activities. The expert group found that the budget appears to be out of all proportion to the stated objectives. Therefore, the low budget given to SWAFS does not appear to give the political 'clout' required to contribute greatly to this longer-term result.

Connected to this, institutional changes are not clearly defined for all of the eight lines. Moreover, the relatively low budget, the limited lifetime of funding, and the fact that just a handful of projects are funded per topic, which spreads resources rather thinly, means that the institutional changes that are implemented need to be sustainable to be considered effective.

While SWAFS projects have focused on sustainability in general, they have so far not focused on climate change and biodiversity to a significant extent. While the relevance of SWAFS to tackling societal challenges is high, it could be improved by aligning itself more closely to the outcomes of COP21/22, the SDGs, challenges related to healthcare and social inequalities, and other overarching international agreements related to societal challenges.

The global challenges, new policy orientations outlined in the 3Os strategy, and need for increasingly open collaboration between all parts of society, calls for much greater support for citizen science and

user-led innovation in the programme. This would increase the relevance of SWAFS to stakeholders and Member State practices and policies in the field of R&I” (p.1133).

4.2. Consortium considerations about the evaluation and RRI

Actual and potential obstacles have been assessed by some of the partners within the Consortium. This deliverable is meant to represent a list of tools and practices as well as barriers. However, the main scope is to serve as means for the social labs. Therefore, also the understanding and indications grasped by members of the Consortium are highly relevant. Michael Bernstein has made some very fruitful and insightful comments on this report.

“What I learned about RRI in H2020 from the interim evaluation: R. Bernstein

The Interim Evaluation of Horizon 2020 sheds considerable doubt on whether the 11% of Horizon 2020 projects claiming RRI relevance really are ‘instances where citizens, CSOs and other societal actors contribute to the co-creation of scientific agendas and scientific contents’ (pp. 64-65) At the project level, there are but a handful of cases of genuine coproduction (p 66). At the program level, there is little detail on how consultations, or the largest pan European consultation so far, for example CIMULACT, will be enacted in future research and innovation agendas (the strategic programming process) (p 59). Targeted search for RRI keys reveal:

- core civil society representation in programming is at once overburdened and under-engaged;
- gender remains poorly “understood and is often confused with gender balance in research teams”;
- social science and humanities integration remains scant, skewed towards economics, political science, and sociology over the full range of disciplines, and a mere 2.1% of the total H2020 spend;
- open access initiatives are progressing (60 to 68 % publications qualify), but issues persist with the remainder opting out citing intellectual property, personal data, national security, or other reasons;
- science education is not remarked upon at all, delegated to ERASMUS+ reporting;
- the word ‘ethics’ or ‘ethical’ appears only 6 times, and in no case related to content or deliberation.

There was an overall sense, as well, of the paucity of means to track indicators of RRI to understand impact (note, MORRI is working on this).

At the end of the Interim Evaluation are a list of short-and long-term limitations identified for Horizon 2020. Some of these limitations seemed to me like they would lend themselves as opportunities that RRI or RI activities could help address. There might be a way to think about leveraging these limitations as inspiration for future our pilot actions:

Short term limitations (listed as action items)

- Build understanding of and capacity to engage cross-cutting issues of the program;
- Tie stronger feedbacks to policy;
- Accelerate sustainable development and climate targets;

- Improve depth and breadth of social science and humanities embedding, as well as advisory body and evaluation body gender balances;
- Engage users in agenda-setting;

Long term challenges (listed as action items)

- Clarify Framework- and Program- level intervention logics (links between impact, results, outputs, and outcomes);
- Enhance salience of indicators for public monitoring;
- Be more inclusive of and transparent with stakeholder involvement
- Increase involvement of ‘end-users’ in co-design of agendas;
- Align program and policy priorities with challenge-based approaches and with less work program fragmentation
- Establish “impact-focused mission-oriented approach to deliver on implementation of SDGs.”

Some partners of the Consortium have also shared their opinion and personal experiences with regard to RRI by answering to a questionnaire. The general barriers and/or obstacles that they have identified are the following:

- Resistance to change. Because taking RRI seriously also means a shift in power relations and of long time existing practices.
- Ignorance. Because the whole concept is not easy to grasp immediately.
- Bureaucratic and/or regulatory slow-down of creative and innovative practices.
- Lethargy. People often prefer simple and quick solutions. But RRI is a continuous process.
- Burnout. The concept is hyped very much now, and people might get bored or fed up with it.
- Quality control/Assessment of RRI. No clear agreed indicators for RRI.
- Definition. There is not one agreed upon definition but different approaches of RRI exist at the same time which leads to a vagueness of the concept.
- Discrepancy between theory and practice: The umbrella term is so broad, it is difficult to implement concretely

4.2.1. RRI Tools Diagnosis

The RRI Tools project had also identified a number of obstacles hindering progress towards RRI goals. Namely they listed the following issues:

- Attitudes, in particular a lack of buy - in, resistance to change and the tendency to focus on short term goals in research, innovation and policy
- Knowledge and the lack of a shared understanding of what RRI is – and what it means to each of the stakeholders
- The unpredictability of science which makes it difficult to control and plan
- Industry’s focus on profit
- A lack of networking opportunities within and between stakeholders

- Lack of time, money, people and infrastructure
- Skills – the lack of expertise and training to implement RRI, as well as ‘soft’ skills for scientists

5. Literature and Events

5.1. Articles

The Journal of Responsible Innovation (JRI) is probably the most visible reference if we are looking for articles dealing directly with the different aspects of RRI. Founded in 2014, it has already published more than 100 contributions tackling a whole sort of problems and offering a precious space to implementing the notion of RRI¹⁹. According to Burget *et al.*, there are around 235 RRI related articles published in the last years²⁰.

However, also other journals have shown or are now showing an increasing interest in hosting debates on RRI and the relation with present and future challenges. Research Policy, Science and Public Policy, Journal of Philosophy Management, Science and Engineering Ethics, are only some examples of this general tendency. Amongst the different articles the most cited is the one written by Owen, Macnaghten and Stilgoe in 2012²¹.

5.2. Books

Several books have been published in the last 5 years, dealing with the different aspects of RRI and/or its connection to other domains. The first referential book is the collection of contribution edited by Owen et al. in 2013²². In this text, not only several amongst the most useful definitions of RRI were collected in one volume, but we can also find a broad extension of the theoretical attention necessary to clarify the notion/definition(s) itself. Richard Owen, Jack Stilgoe, Phil Macnaghten René von Schomberg Chris Groves, Arie Rip, Erik Fisher, Jeroen van Den Hoven are only few of the authors who have contributed to this pioneering book. Many themes are discussed extensively, and it represents a useful reference for further reflections.

Other important books are the collection operated by Van den Hoven et al., where the focus is more onto the implementation of empirical extensions of RRI²³. Similarly, also the volume edited by Iatridis and Schroeder²⁴ brings up the crucial but still controversial relation between RRI and the industrial sector.

More recently, Wiley/Iste have launched the first series of monographies expressively dedicated to RRI in its different aspects. The understandings of responsibility²⁵, the ways to include society in the

¹⁹ <http://www.tandfonline.com/loi/tjri20>

²⁰ <https://link.springer.com/article/10.1007%2Fs11948-016-9782-1>

²¹ Responsible research and innovation: From science in society to science for society, with society, *Science and Public Policy*, Volume 39, Issue 6, 1 December 2012, pp. 751–760.

²² Owen, R., Bessant, J. and Heintz, M. (Eds.), (2013). *Responsible Innovation. Managing the Responsible Emergence of Science and Innovation in Society*. Hoboken (NJ): John Wiley & Sons.

²³ Van den Hoven, J., et al. (2014). *Responsible Innovation 1: Innovative Solutions for Global Issues*. Dordrecht: Springer.

²⁴ Iatridis, K. and Schroeder, D. (2016). *Responsible Research and Innovation in Industry The Case for Corporate Responsibility Tools*. Dordrecht: SpringerBriefs.

²⁵ Gianni, R. (2016). *Responsibility and Freedom: the Ethical Realm of RRI*. London / New York: ISTE / Wiley.

decision-making process²⁶, and the comparison with similar frameworks²⁷, are only a few of the over 20 titles already published, or foreseen by 2018 (Annex).

5.3. Conferences

Numerous conferences are now stably offering a space to discuss RRI in order to build up a community able to debate and construct new paths for its implementation. ESOF²⁸, STS²⁹, TA³⁰ and IEEE³¹ conferences are only some examples of a growing space of crossroads between different experiences contributing to build a shared conceptual platform. Other examples have been project based conferences like the Go4 conference or the RRI Tools final event in Brussels.

6. State of RRI in a Global Dimension

This section integrates the knowledge acquired by our partners as well as some EC projects aimed at understanding how to broaden the scope of RRI to a global scale. Some questions were sent out to our partners, asking to describe the current scenario with regard to RRI in their countries, the differences and similarities with a European conception, as well as the challenges and potential paths they would indicate. The JERRI project provides important information about a RRI sound framework at Arizona State University (ASU) and at Chinese Academy of Science (CAS)³². The Progress project on the other hand warned us to consider differences in income and needs pointing at the key-role of social innovation. Lastly, a useful additional reference, because more critical, is represented by a paper summarizing the results of a workshop held at Sao Paulo, Brasil in 2014³³.

One of the increasingly urgent aims of the EU, when it comes to RRI, is to try and expand its scope and efficacy beyond the borders of the European Union. Considering the potential global range of R&I products and processes, it is understandable that reducing the investigations to the European ground would limit the notion severely.

As well, the plurality of perspectives, already present at the European level, stimulates methodologies and tools able to deal with these differences in an inclusive manner. Besides, whether in some countries we do not find relevant recurrences of a similar framework, in others, the implementation of RRI sound measures are evident and advanced. Therefore, it is useful and crucial not to understand how to “export” RRI (as warned Macnaghten *et al.*), but rather how can we “import” responsible sound practices from other cultural and political scenarios.

Such an objective at the EC level is witnessed not only at the discourse level, where Carlos Moedas has recently established “Openness to the world” as a driving objective by conceiving social challenges as

²⁶ Reber, B. (2016). *Precautionary Principle, Pluralism and Deliberation. Sciences and Ethics*. Maesschalck, M. (2017). *Reflexive Governance for Research and Innovative Knowledge*. London / New York: ISTE / Wiley.

²⁷ Grunwald, A. (2016). *The Hermeneutic Side of Responsible Research and Innovation*. London / New York: ISTE / Wiley.

²⁸ <http://esof.eu/>

²⁹ <https://easst.net/easst-2018/>

³⁰ <https://cork2017.technology-assessment.info>

³¹ https://www.ieee.org/conferences_events/conf_index.html

³² <https://www.jerri-project.eu/jerri/index.php>

³³ Macnaghten et al., (2014). Responsible Innovation across borders: tension, paradoxes and possibilities. In: *Journal of Responsible Innovation*, 1:2, 191-199.

<http://www.tandfonline.com/doi/pdf/10.1080/23299460.2014.922249>

global ones³⁴. It is also exemplified by some of the projects financed by the EC and a constant increase of a global perspective as a requirement in calls. All these measures show the necessity of establishing a dialogue with 'external' actors. Two notably examples of these efforts, are the projects PROGRESS and JERRI, which have analysed differences and similarities in countries like China, South Africa and the United States.

This objective, present in the discourse, does not appear to be sufficiently supported by numbers. Although we do not have a clear indication about the numerical involvement of third countries in the development of RRI, we do have data about the general contribution of these countries in H2020.

In general, H2020 repartition of third countries participation is the following:

"MSCA have the highest number and share of third-country participations. The other parts that perform above average are Societal Challenges 6 – "Europe in a changing World – Inclusive, innovative and reflecting societies", 5 – "Climate action, environment, resource efficiency and raw materials" and 2 – "Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy". The parts with the least international participation are the Future and Emerging Technologies, LEIT-ICT, LEIT-NMBP (Nanotechnology – Materials – Biotechnology – Primary metals) as well as Societal Challenges 3 – "Secure, clean and efficient energy", 4 – "Smart, green and integrated transports" and 7 – "Secure societies – Protecting freedom and security of Europe and its citizens". In terms of EU contribution to third-country participants, the highest and lowest performing parts are the same as before, except for Research Infrastructures and the Societal Challenge 1 – "Health, demographic change and well-being", with a relatively high EU contribution to third country participants, but also the MSCA, where the EU contribution is relatively low as there are only exceptional third-country beneficiaries" (Annex I, p.242).

The surprising factor is that the mid-term evaluation has shown a strong reduction in the partnership with third countries in H2020 when compared with FP7. "The participation-share of third countries that are automatically eligible for funding from Horizon 2020 has dropped by around 30% with respect to FP7. The most active country in Horizon 2020 is South Africa, followed by Argentina, Chile, Kenya and Egypt, as compared to FP7, where the most active countries were South Africa, Argentina, Morocco, Egypt and Chile" (Annex I, p.238)³⁵.

In order to start a dialogic exchange of experiences about paths, enablers and barriers, which will continue during the life-time of the project, we have integrated the results of these two projects together with informal interviews carried with the partners working in third countries, namely Colombia, India and West Indies.

6.1. CAS

According to the report made within the Jerri project (D.9.1), responsibility at the Chinese Academy of Science is understood as the consideration of two kind of perspectives: on the one hand, try to benefit society to the maximum extent, on the other hand be aware of injustice and avoid the potential risks of using a technology. In this context, four general principles were set up: responsibility, sustainability and serving the societal needs, and fostering the economic development. Responsibilities are defined following two aspects: according to the research process (research integrity) and from the perspective of society. Concerning societal responsibilities, scientists should be aware of their responsibilities in political decision-making consultations, in science communication, in teaching young researchers about

³⁴ <https://ec.europa.eu/research/opentotheworld/index.cfm>

³⁵ These data do not include MSCA and ERC.

S&T ethics and in avoiding conflicts of interest. In October 2014, the CAS also published the normative reading "如何开展负责任的科学研究" (how to conduct responsible scientific research).

According to D.9.1, the links between "CAS and EU - RRI are (societal) responsibility of scientists, science education/science popularisation and open access. Secondly, societal participation is viewed at CAS as one facet under science popularisation. Finally, the linkage between open access, open science, societal participation and science popularisation is very strong: some aspects of these ideas are overlapping and at the same time, some aspects of these ideas have the "mean - aim" relationship" (p.43). However, it appears as if society engagement is confined to information sharing and not to the design and not to a co-construction model.

Engagement is felt to be an important aspect but there are several doubts on how to implement it. Specifically, with regard to societal participation, there are two main challenges. "The first is how to communicate with policy makers and with society. The second is how to bring the public's opinions into scientific policy decisions. Besides, based on their experimentation of "consensus conference", a great amount of time and efforts have to be invested in preparing and conducting the conference. If there is no permanent organisational setting, it will be difficult to realise this idea on a regular basis.

There are no particular references to gender issues.

Open access has been considered as one of main tasks for the future too. Since the "Berlin Declaration" in 2003, CAS has been supporting this idea and undertaking the follow-up steps to push this idea forward although it is still unclear how to implement it.

Regarding science education, the term "science popularisation" has been used extensively in China. However, 'popularisation' is still directed to policy makers rather than society and "the culture to promote science popularisation is not accepted widely" (D.9.1, p.42).

According to D.9.1, ethics is a sensitive issue at CAS because of negative past experiences when Chinese scientists were treated unfairly, using ethics as the excuse to hinder their publication. However, "it will take time to transform the passive and reactive attitude to an active attitude at policy level. The aim to set up the ethics governance (e.g. rules and laws enacted by the central government) at national level is ambitious" (D.9.1, p.42).

Governance: There are some measures put in place to improve the governance management especially thanks to experienced academicians, although it appears that it will take time to fully institutionalise a broader and more responsible engagement.

In general, the investigations undertaken with CAS researchers have shown the importance of external requirements for the implementation of responsible practices. Society's expectations, a sense of duty and "external" kind of pressures, all play a decisive role in driving researcher's ethics.

However, these investigations have also shown that there are two main barriers to the implementation of a RRI sound framework at CAS.

A first barrier is the gap between academic excellence and the related indicators, and societal needs. Scientific progress often 'forces' scientists to pursue objectives that are not necessarily related to responsible practices. A second obstacle, it seems to be stemming from the difficulty in receiving "substantial commitment from policy makers at ministerial level" (D9.1, p.41).

6.2. ASU

Another interesting example is the one of Arizona State University (ASU). ASU has become one of the most important and innovative universities in the U.S. now ranking 17th of 768 U.S. universities without medical schools according to the data from the National Science Foundation (D.9.1, p.14).

ASU has adopted “a transdisciplinary approach in teaching and research, to its activities, which integrate education, research and innovation, and to its outreach activities in particular with local public, non-profit or corporate partners” (D.9.1, p.48).

ASU seems to be an original attempt to develop responsible practices since they have adopted, in 2002, the New American University conceptual model, breaking with traditional academic hierarchic and performance-focused framework. According to D.9.1 of the Jerri project in fact, ASU has established “a network structure which is to support horizontal, nimble and responsive action. The most important feature of this structure is that horizontal activities are not centrally governed, but rather facilitated or supported by the university administration” (D.9.1, p. 49).

The description of this process has been highlighted by Crow & Dabars (2015): “In the course of a decade, ASU reconstituted its curriculum, organisation, and operations through a deliberate design process undertaken to build an institution committed to the pursuit of discovery and knowledge production, broad socioeconomic inclusiveness, and maximisation of societal impact. The academic community has been consciously engaged in an effort to accelerate a process of institutional evolution that might otherwise have proceeded, at best, only incrementally, or possibly in the face of crisis”³⁶.

This process generated positive or “successful” results as described by D.9.1:

“The normative reorientation has been driven by a high commitment of the university leadership and has been legitimised by a new business model that flooded millions of additional research dollars into ASU’s pocket as well as by a clear (number-driven) communication showing the benefits of the approach.

- Maturation processes are taking place, in particular the organisational redesign, new incentives, a consistent communication to support high degrees of shared understanding and cultural change (e.g. entrepreneurial spirit).
- Much has been invested in the systemic “overflowing” character: ASU explicitly engages in achieving mutual understanding, mutual goals and mutual benefit with partners.
- This and many other aspects of change rest on the shoulders of institutional entrepreneurs, in particular decentrally, at the level of principal investigators”.

With regard to the six keys, these are not explicitly adopted by ASU, but it is nevertheless active in the fields of ethics, gender equality and open access, although the rationale for these activities does not originate in ASU’s mission.

“In the interviews at ASU, often clear linkages between ASU’s mission and some of the RRI keys appeared. Regularly, these were “Science Education” and “Engagement”. There are also efforts at ASU regarding ethics (see above, RCR) gender and open access, however these are not linked explicitly to ASU’s mission” (D.9.1, p.58).

ASU’s peculiarity and main reason for success is that they have developed a solid governance structure integrating, through partnerships, “donors, corporate and community partners, NGOs or other universities” p.64. Accordingly, not only ASU has implemented a horizontal management structure (*ASU explicitly engages in achieving mutual understanding, mutual goals and mutual benefit with partners* p.64), but this has been sensibly done by integrating economic and situational needs.

6.3. General Considerations

³⁶ Crow, M.M.; Dabars W.B. (2015): A new model for the American research university. In: *Issues in Science and Technology*. Spring 2015, p. 60.

Another useful source to start bridging cultures and perspectives, is the experience of the workshop held in Sao Paulo in 2014, where 10 early career researchers from Sao Paulo State, and 11 from the UK³⁷. Here the regard was a critical one, underlying the importance of not assuming a patronizing stance but rather a dialogic process of mutual learning. *“If RI is to make a positive difference in a rapidly globalizing world, it will need to ensure there is a place for the global South at the heart of the development of its discourse, rather than as an after-thought, or just as another comparative case study”*.

This global regard on RRI sound procedures shows some general factors.

RRI, as defined by the EC, embeds a vision that is shared by many countries although we find differences either in their wording or in their focus on specific aspects.

Engagement is implicitly or explicitly considered to be the main objective and fundamental tool for defining and achieving responsible sound practices. Some cases have proven successful, whether in other cases engagement still represents an objective rather than a matter of fact.

Open access is usually understood as fundamental in principle but problematic in practical terms.

All the countries that have been taking into account science education as a crucial point, although concrete improvements still can be taken. CAS for instance refers to it as popularisation, but its pedagogical value is directed at policy-makers rather than society at large.

Gender is fundamental in all analysed cases, but the current scenario suggests that it is often limited to a quantitative calculation.

Ethics is often identified with research integrity.

Governance is the crucial point in order to implement RRI. In Arizona State University and to some extent in Chinese Academy of Sciences, RRI sound processes are strong, or getting stronger, because of a transdisciplinary and/or multilateral structure, whether in West Indies and Columbia, for instance, major efforts at the institutional level are still lacking.

In general, there is a general agreement on the importance of the keys, although the match between overall strategies and specific actions seldom explicitly refer to those keys in third countries.

External pressures are also really important to start a change in the governance of RRI. In Columbia for instance, RRI sound discourse is completely absent from public debate, hindering a major shift towards responsible practices.

At the procedural level, it turned out that discussions and negotiations around responsibility goals can hardly be separated from the levers and barriers of institutionalisation. External drivers “questioning” research and innovation institutions have played a major role in steering R&I towards responsible or sustainable practices. However, more successful stories originate in places where researchers found a strong institutional support. The case of ASU is exemplary.

Some countries like China support the acknowledgement, made by an expert report in 2015 and by the mid-term report³⁸, about the apparent lack of environmental issues in RRI. ASU has also placed a strong

³⁷ <http://www.tandfonline.com/doi/pdf/10.1080/23299460.2014.922249>

³⁸ http://ec.europa.eu/research/swafs/pdf/pub_rri/rri_indicators_final_version.pdf ; For instance, in evaluating SWAFS, the mid-term report states: “While the relevance of SWAFS to tackling societal challenges is high, it could be improved by aligning itself more closely to the outcomes of COP21/22, the SDGs, challenges related to healthcare and social inequalities, and other overarching international agreements related to societal challenges” Furthermore, only **“one SWAFS project is classified as climate related**. The EC contribution to climate in SWAFS is

focus on sustainability, like reported by D.9.1: “ASU is the first university to integrate sustainability criteria into its staff evaluation program. All employees are evaluated on their contribution to our sustainability efforts” (D.9.1, p.62).

CAS raises some interesting and important cultural challenges given that the understanding of responsibility is different. Besides, the specific political structure of a country also plays a significant role in implementing responsible practices.

There is another relevant aspect, which emerged especially with the Progress project, that is the fact that some countries or regions, especially if with middle or low income, tend to promote social innovation instead of responsible innovation.

7. Visioning Conference: RRI in H2020 and beyond

The ‘Visioning Conference’, held in Brussels on the 5th and 6th October, gathered actors from different sectors of society, with the aim of discussing actual problems and imagining concrete measures able to implement RRI in future projects. If some results offer more a vision concerning what RRI should or could become in the future, the co-construction process through which the workshop was conducted has also produced some important and clear suggestions. The general objective was to generate a vision and some measures able to serve as a bottom-up reference for the implementation of the Framework Program 9.

7.1. Actions

The 13 Actions emerging from the conference are the following:

- Enabling Participation

This action, which we can surely conceive as widely accepted as the core methodological tool of RRI, here consists of empowering citizens at all stages and level of projects. Design, process and impact should be co-constructed together with citizens able to influence the decision-making process. An additional aspect is to think of funding for reimbursements.

- Focus on Societal Impact

FP9 should think of RRI as encouraging results that extend their benefits beyond the life time of a project and offer support also for social kinds of innovation. Besides, programs and calls should be always kept problem-oriented (societal challenges).

- Fostering Solidarity

estimated at EUR 0.4 million (0.4% of the total budget – the target is for it to exceed 35%). This is the lowest in Horizon 2020 and significantly below the average, which is 28.2% of the EC contribution” (Annex II, p.1127).

The FP9 scheme should be particularly opened to welcoming newcomers with no experience in running EC projects so to widen participation and encourage diversity in knowledge production. As well it is suggested that the EC should think of rewards for knowledge and/or experience sharing.

- Horizontal Training

Here the suggestion is to improve the horizontal exchange and formation of different stakeholders so to spread knowledge and experience. Horizontal thinking is one of the core features of a more democratic manner to implement R&I and RRI should be strongly and concretely embedding such objective. Therefore, the participants have suggested some concrete tools like summer schools, benchmarks for accessing funds and presence of such horizontal dialectic in funding and calls. A transdisciplinary impact factor is also considered as in implementation in this sense.

- Transforming Performance Criteria

This action emerged as a very important one for almost all the participants. The suggestion is to produce indicators that are not confined at the product/output stage but rather make a substantial change in the process development. Something like a Societal Sounding Board should constantly assess desirable outcomes according to inclusive mechanisms able to reflect the pluralism of perspectives within societies. Therefore, FP9 should include adaptive and inclusive process indicators, coping with changes, for evaluating societal sound benefits.

- Reflective and Learning

This action overlaps with others and witness the key-role of a reflexive attitude able to enact and maintain a learning process amongst different actors.

- Respecting and Embracing Differences

Participants to the workshop support the adoption of mechanisms for integrating feedback from practitioners. The objective is to establish a dynamic and responsive understanding of RRI able to be implemented in different contexts (geographical, disciplinary, etc.). RRI should be fostering learning cycles amongst different stakeholders.

- Recognising Externalities (Negative and Positive)

In a similar fashion, it emerged the necessity to come to terms with the plurality of values present in society as well as with the interests and perspectives of different stakeholders.

- Reflective R&I (Embracing failure)

Another crucial aspect in order to implement RRI in the next Framework Programme is the necessity to adopt a reflexive stance at different stages of the R&I life cycle. R&I should be shaped so to recognize the possibility of failure and these failures should be shared so to assume a value in the research community. Reflexivity should be implemented on the ground of displacement methodologies. These can be enacted by journals, fora and similar research common spaces.

Besides, participants highlighted two other measures in order to foster reflexive processes. A first advocates a slowing down of the signature phase so to open up for reflexivity improving projects. A second measure is to introduce mechanisms to establish an entrepreneurial attitude amongst project officers. As well, project officers should be enablers of impact.

- Motivating by Narratives

As well as more rational processes, participants have suggested that more personal and 'irrational' features could play a decisive role in motivating for more responsible approaches to R&I. Accordingly, not only reasons should be brought on the floor but also narratives, which are commonly formed by a mixture of values, arguments and interpretations. It is not marginal to uptake such a powerful, visioning perspective for implementing RRI in the new framework. As highlighted by participants and by some members of the consortium, RRI should also express a positive image of the future we want.

- Capacity Building

In order to enable citizens or stakeholders to participate in responsible processes of R&I, it is important to provide them with the appropriate and sufficient capacities. At the same time, researchers should also be incentivized to engage more with society. Therefore, FP9 should focus on pedagogical measures able to enrich the general knowledge about research and innovation themes.

- RRI Specific Resources

RRI should be allocated specific resources so to increase its efficacy and its uptake at all levels.

- Support the radical creative

The workshop has recognised the importance of the EC's newest indications with regard to innovation. Thus, FP9 should embed an attitude to openness in order to integrate the unexpected, consider the uncertain and include the unheard. Openness is considered to be a valuable and precious exercise that should be implemented to a certain extent at all levels, like for instance proposal writing.

8. Preliminary pool of existing RRI tools and trainings

This section is meant to offer a list of tools useful to implement RRI. However, it is important to rely on previous effort and move a step further in the implementation of RRI. RRI is based on a bottom-up approach and thus it can only be implemented through input from a broader set of stakeholders, who are supposed to unveil problems and barriers and formulate feasible, legitimate and efficient hypothesis.

Accordingly, there are different instruments which could be useful to implement responsible practices. Participation is surely at the same time the precondition and the objective of RRI. However, participatory processes can vary in effectiveness and legitimacy. Therefore, a good participatory process is also an instrument to promote good RRI mechanisms and to perform RRI by doing it (within the same

participatory process). Thus, we have to offer a series of additional tools to substantiate participation in order to create a fruitful environment and develop 'good' participatory processes.

It is important to highlight the fact that these social labs are already an exemplification of how to implement RRI and that the same methodologies should and could be applied on different scales by researchers and innovators.

Amongst the several tools developed in the last couple of years, anticipation, inclusion and reflection appeared to be the one largely considered to be useful. We have added some general RRI tools that could help in navigating rough seas.

In addition to the list of tools hereunder, the reader can use RRI Tools' search engine (<https://www.rri-tools.eu/search-engine>) which helps finding the most relevant resources in a set of 700+ ones. Many filters can be apply to narrow the result by the type of tool, stakeholder relevance or RRI key. The toolkit includes:

- inspiring practices;
- manuals, guidelines, how-tos, catalogues and online databases of resources;
- background documents including presentations, reports, cross-analysis and pan-European surveys;
- other European projects that developed RRI resources; and,
- a self-reflection tool to assess professional practices.

RRI Tools is the major repository of most of the tools on RRI available. It can be very useful when trying to find resources for the Social Labs pilot actions.

8.1. Anticipation

- Guide to Organizing Scenario Workshops:

The guide discusses the nature of scenario workshops and provides step-by-step instructions for organising each of the three workshop types identified in the PERARES project: strategies, synergies and developments

This is a very useful tool providing a guide for scenario workshops. This tool also aims at the methodology we could use in our SLs. Moreover, they provide a structure on how to adapt on different cases. This is rather a methodological tool than a tool on RRI, still it can be of high relevance especially in the planning phase of the Social Labs.

[http://www.livingknowledge.org/fileadmin/Dateien-Living-Knowledge/Library/Project_reports/PERARES Guide to organize scenario workshops to develop partnerships between reseachers and CSOD3.1.pdf](http://www.livingknowledge.org/fileadmin/Dateien-Living-Knowledge/Library/Project_reports/PERARES_Guide_to_organize_scenario_workshops_to_develop_partnerships_between_reseachers_and_CSOD3.1.pdf)

- Iriss toolkit

The future Risks and Opportunities Toolkit is aimed at helping organisations build strategies for the future.

This is a very useful tool providing a list of workshop methodologies which could be highly interesting for the Social Labs. The resource gives a brief overview per method showing single steps and giving helpful hints.

http://www.iriss.org.uk/sites/default/files/future_risk_and_opportunities_card_pack.pdf

8.2. Inclusion

- AA1000 Stakeholder Engagement Standard

The AA1000 Stakeholder Engagement Standard (AA1000SES) is a generally applicable open source framework for designing, implementing, assessing and communicating the quality of stakeholder engagement, which can be used by a broad spectrum of organisations—multinational businesses, small and medium enterprises, governments and civil societies.

It is a useful tool, but only for public engagement questions and resources about gender equality. Research papers targeting these topics can be found on the website. But they also offer advisory services where public engagement is one aspect. This tool addresses industry and business and therefore can also be helpful in terms of diverse social lab groups. Nevertheless, other aspects of RRI are not addressed.

https://www.accountability.org/wp-content/uploads/2016/10/AA1000SES_2015.pdf

- People & Participation

The guide first discusses what participation is and why it should be done (when necessary), as well as some issues and tensions that may arise. It then details how to plan for participation and describes a selected set of participation methods. Specific information is provided for each method, including participant numbers and roles, resource and time requirements, expected outcomes, strengths and weaknesses, and in which situations the method will be most effective. Illustrative examples are also provided for each method.

Limited useful: this tool aims at public engagement and actively addresses the involvement of citizens in the decision-making process. This is for sure useful and could be an interesting resource for a possible pilot, but for the social lab it might not be of relevance.

<http://www.involve.org.uk/wp-content/uploads/2011/03/People-and-Participation.pdf>

- Participation Compass

Participation Compass is a useful and practical tool for people who are directly involved in planning, running or commissioning participation activities.

This tool is very useful: the platform offers a comprehensive compilation of established engagement techniques (<http://www.participationcompass.org/article/index/method>) and provides brief descriptions. This helps to get an overview of what is out there and suitable. From there one has to search deeper for more information and materials (which the platform also provides with linked articles or related methods). Filter functions help browsing through the compilation.

<http://www.participationcompass.org/>

- Participation Works

Participation Works focuses on the meaning of participation and offers a selection of participation techniques and examples. It contains 21 proven techniques from around the world and shows how to choose between them, how to use them and where to find more information.

It is very useful compilation of suitable engagement techniques, with additional information on participation and guidance on which form of participation is useful in the context. It offers case studies for each technique. Also, there are websites and mail contacts to persons with further information. Although, the PDF format does not offer comfortable browsing or using search engine.

http://b.3cdn.net/nefoundation/e59722efbe227ca37e_4fm6b0lv9.pdf

- Participatory Methods Toolkit

The Participatory Methods Toolkit is a hands-on toolkit for starting up and managing participatory projects. The first chapter contains general guidelines for using participatory methods as well as a brief overview of 50 methods and techniques and a comparative chart of 13 methods. The core of the toolkit incorporates in-depth explanations of the 13 methods listed in the chart, each having a description of when to use it, the different steps involved, best practices and budget, accompanied by hints and tips for putting the methods into action.

This is a very useful toolkit, especially for beginners in participation techniques because it also contains an introduction on participation and guidance on which tool to apply, using a classification scheme for assessing existing tools. A comparative chart helps selecting the appropriate tool.

http://forlearn.jrc.ec.europa.eu/guide/1_why-foresight/Documents/0509%20Participatory%20Method%20Toolkit.pdf

- SAS2: A Guide to Collaborative Inquiry and Social Engagement

The guide is a useful resource for (1) researchers, facilitators and activists working with people to solve problems and support inclusive inquiry and decision-making, and (2) scholars studying and teaching participatory action research in the social sciences.

The description states that:

"Part 1 outlines the concepts and skillful means needed to support multi-stakeholder dialogue. It also provides detailed instructions on how to integrate and ground collaborative inquiry in the projects, plans, evaluations and activities of multiple stakeholders. Part 2 presents a selection of techniques for collaborative inquiry and examples of real-life applications in South Asia and Latin America. The examples focus on a range of issues including land tenure, local economic development, agriculture, forestry, fisheries, and organizational development.

This book will be an invaluable resource for researchers, facilitators and activists working with people to solve problems and support inclusive inquiry and decision-making. It will also be useful to scholars and academics studying and teaching participatory action research in the Social Sciences."

It seems very well adapted for SL Managers.

<https://idl-bnc-idrc.dspacedirect.org/bitstream/handle/10625/35977/IDL-35977.pdf>

- Action Catalogue

A decision support tool that helps researchers, decision makers and others wanting to conduct inclusive research find the participatory methods best suited to their specific needs.

This is a very useful tool. The action catalogue can be used by the social lab facilitators to decide which methods to use or also to explore new methods. But it could also be a very useful tool for the future pilots.

This tool is easy to use, doesn't take too much time and is a great compilation of methods.

<http://actioncatalogue.eu/>

8.3. Public Engagement

- Engage 2020 Science, Society and Engagement – An e-anthology

This Anthology eBook provides a short introduction to public engagement in research and innovation. In the Engage 2020 deliverable, there is a good overview of public engagement methods and tools

This is an excellent compilation of background knowledge in respect to Public Engagement but limited in respect to practicalities of the SL. For SL workshops the case studies could be useful to discuss with participants the concept of PE and how it can be realised in practice (p. 52 ff) as well as some workshop methods to design the own SL workshop (p. 74 ff).

<http://engage2020.eu/media/D3-2-Public-Engagement-Methods-and-Tools-3.pdf> (p. 8 ff)

- STIR

It is a mean to evaluate and adjust research and other technical decisions in light of societal dimensions in real-time, as research and innovation processes are taking place.

STIR is a very similar concept to RRI. On the webpage there a video teaching how to STIR. However, STIR is very much practitioner- and policy-oriented. In analogy, the decision protocol could be used in SL when taking a decision on the pilot actions (video: <https://vimeo.com/148687460>).

<https://cns.asu.edu/research/stir>

8.4. Reflection

- Cards for fostering sparkling RRI conversations

This set of cards presents different questions, statements & ideas that will foster, hopefully, friendly conversations and collective reflections about different aspects of Research and Innovation, and the different scopes of Responsible Research and Innovation, RRI.

The cards can be used in the workshops to steer conversations and reflections on RRI in smaller or bigger groups. They can be used as icebreaker, you can choose the most suitable ones, or as playful break in the workshop (see complete list of options and ideas how to use them).

http://www.ecsite.eu/sites/default/files/rri_cards_-_guidelines_0.pdf

- RRI Co-construction Method (Res-AGorA)

The RRI Co-construction Method offers a practical way to work with the Responsibility Navigator developed by the Res-AGorA project. Step-by-step instructions are provided for you to do your own RRI Co-construction workshop.

This is a very practical manual to organise co-construction workshop that can be used online and offline (can be downloaded). It is a hands-on method for co-constructing an RRI approach and implementation process with stakeholders. This process can be tailored for the needs of an organisation. It could be helpful for the SL, especially for developing certain pilot activities. It could also be used as guiding tool for the SL process itself. Besides, it is linked with the Responsibility Navigator. (timeline approx.: 1,5 days) (additional use: policy briefs by Res-AGorA project that provide an overview of the method).

<http://responsibility-navigator.eu/co-construction-method/>

- RRI Tools' Self-Reflection Tool

This tool stimulates reflection and offers inspiring ideas for research and innovation practices.

This very inspiring tool is a good help to reflect on your own practice regarding RRI. It focuses on the six keys, which could be a good start to approach and understand RRI. It is the equivalent of KARIM's Responsible Innovation Criteria, but this time not focused on innovation. This tool can be used at the very beginning of SL for the diagnosis phase.

<https://www.rri-tools.eu/self-reflection-tool>

8.5. RRI

- A practical guide to Responsible Research and Innovation. Key Lessons from RRI Tools

This quick guide explains what responsible research and innovation really means and why it is so important for modern society. It explores RRI through the lens of the RRI Tools project and provides practical examples of its implementation through a number of case studies (page 15) and an overview of the RRI Toolkit structure and main contents (page 33). A selection of 'How To' guidelines (page 37) explains how to apply RRI to specific situations, including policy, research and business contexts. Finally, this guide provides five recommendations (page 51) that can help to make all types of research and innovation more responsible.

As background literature for RRI, for the SL to discuss cases where RRI principles have been applied (p.15ff). Especially interesting for the SL are the 'How to' guidelines for introducing RRI in policy and funding(p.38ff).

<https://www.rri-tools.eu/documents/10184/16301/RRI+Tools.+A+practical+guide+to+Responsible+Research+and+Innovation.+Key+Lessons+from+RRI+Tools>

- KARIM's Introduction to Responsible Innovation Criteria

The manual begins by explaining the context of innovation, including responsibility in innovation and the opportunities for SMEs. It then provides a detailed explanation of the diagnostic tool and its analysis process, as well as an analytical grid developed by KARIM. The grid contains 24 criteria that represent the social, economic and environmental impacts potentially linked to an innovation project.

This resource provides a very good diagnostic tool for responsible innovation, with 24 criteria. It could be useful when working with business and industry to help them assess their position towards responsible innovation.

http://www.karimnetwork.com/wp-content/uploads/2014/10/guide_online.pdf

- RRI Tools' catalogue of Good Practices

The goal of this catalogue is to provide concrete guidance on how RRI can be put into practice. Accordingly, at the heart of this document is a compilation of descriptions of good RRI practices. These have been selected from a larger collection of so-called promising practices that had been brought together in the RRI Tools project through a consultation round with stakeholders in research and innovation held by RRI Tools consortium partners from all around Europe,

This document provides 31 examples of good RRI practices across Europe in very varied disciplines. This can be used to exemplify what RRI can be. It could also be used as case-studies. This is what was done

by the RRI Tools projects which produced training materials from some of these best practices. Those could be used in SLs as well: <https://www.rri-tools.eu/training/resources>

https://www.rri-tools.eu/documents/10184/107098/RRITools_D1.4-CatalogueOfGoodRRIPractices.pdf/0a9e0b86-a07c-4164-ba98-88912db9cabe

RRI Tools' training resources

The RRI training is based on a series of modules: (1) Explaining the RRI concept, (2) Why is RRI important?, (3) Using the RRI Toolkit and (4) Bringing RRI to life: showcases.

These four training modules could be used in SLs. The first one provides a PPT which is a good introduction to what RRI is, the second an activity to assess the opportunities, obstacles and solutions for RRI (diagnosis phase), the third on the RRI Toolkit (find tools for the experiment phase), and the fourth on best practices (diagnosis phase and introduction to RRI)